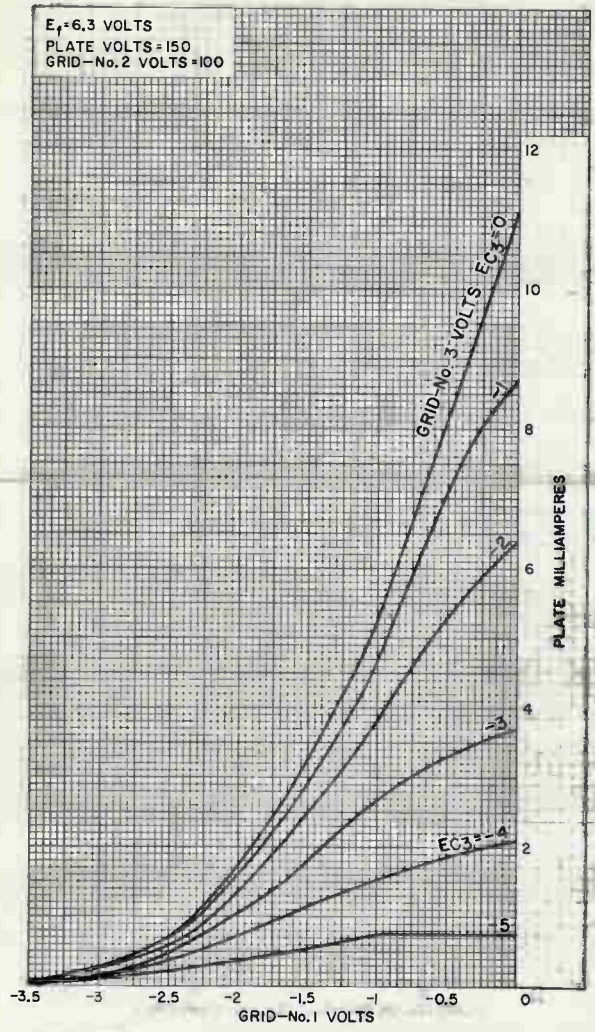
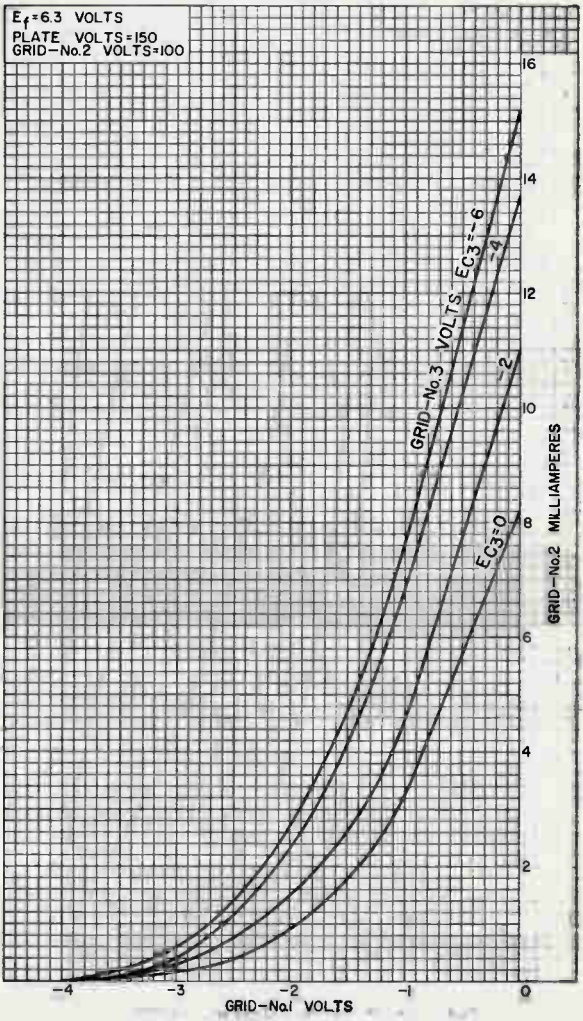
AVERAGE CHARACTERISTICS



92CM—11005

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

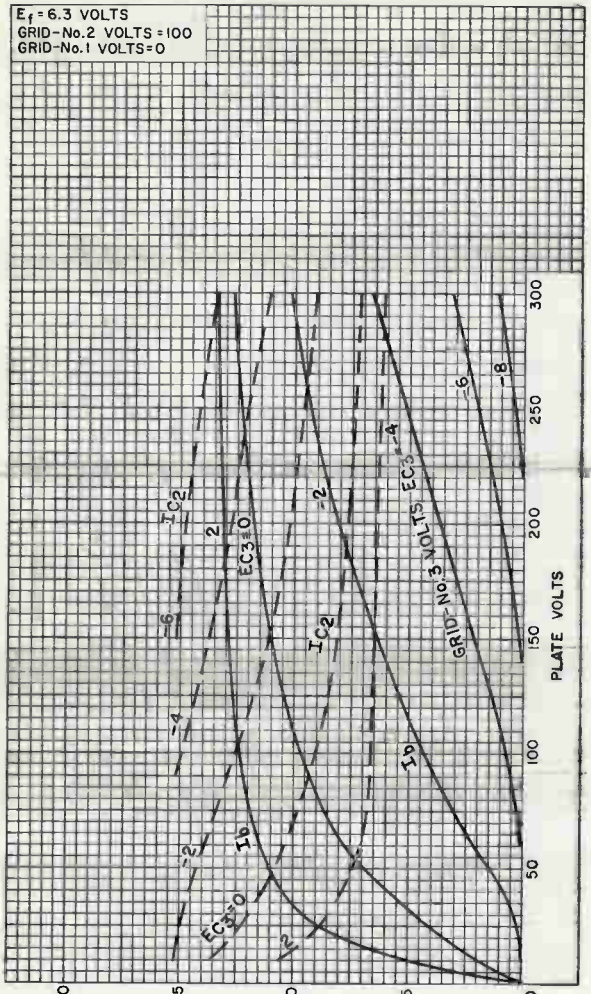
AVERAGE CHARACTERISTICS



92CM-11007

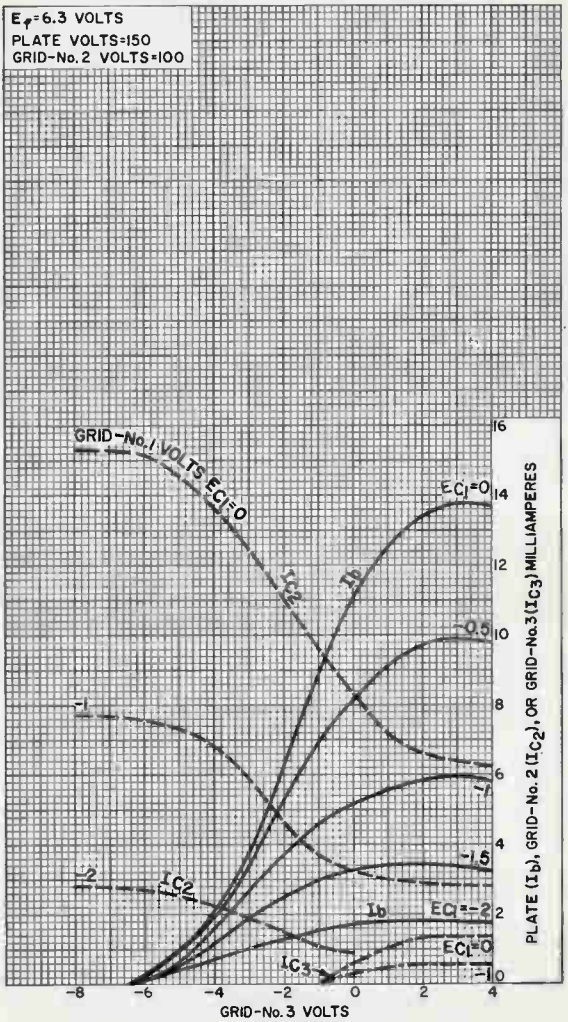
6GX6

AVERAGE CHARACTERISTICS



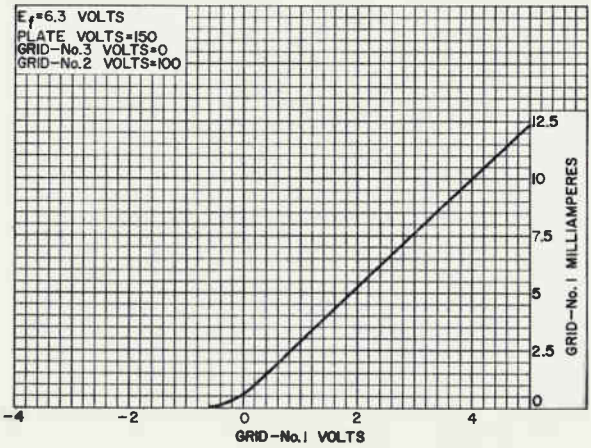
92CM-11003

AVERAGE CHARACTERISTICS



92CM-11006

AVERAGE GRID-No.1 OPERATION CHARACTERISTIC



92CS-11004

Sharp-Cutoff Pentode

With Two Independent Control Grids

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.45 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.026	μμf
Grid No.1 to cathode & internal shield, grid No.3, grid No.2, and heater	8	μμf
Grid No.3 to plate	1.6	μμf
Grid No.1 to grid No.3	0.12	μμf
Grid No.3 to cathode & internal shield, plate, grid No.2, grid No.1, and heater	6.5	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	150	volts
Grid-No.3 Supply Voltage	0	volts
Grid-No.2 Supply Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Cathode Resistor	180	ohms
Plate Resistance (Approx.)	0.14	megohm
Transconductance, Grid No.1 to Plate	3700	μmhos
Transconductance, Grid No.3 to Plate	750	μmhos
Plate Current	3.7	ma
Grid-No.2 Current	3	ma
Grid-No.1 Supply Voltage (Approx.) for plate μa = 20	-4.5	volts
Grid-No.3 Supply Voltage (Approx.) for plate μa = 20	-7	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

6GY6

Basing Designation for BOTTOM VIEW. 7EN

Pin 1 – Grid No.1
Pin 2 – Cathode, Internal Shield
Pin 3 – Heater

Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Grid No.3

GATED AGC AMPLIFIER & NOISE INVERTER

For operation in a 525-line, 30-frame system[b]

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	300	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[c]	600	max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	100	max.	volts
Positive-bias value	0	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300	max.	volts
GRID-No.2 VOLTAGE. See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	50	max.	volts
Positive-bias value	0	max.	volts
GRID-NO.2 INPUT:			
For grid-No.2 voltages up to 150 volts	1	max.	watt
For grid-No.2 voltages between 150 and 300 volts. See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
PLATE DISSIPATION	1.7	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[d]	max.	volts

Maximum Circuit Values:

Grid-No.3-Circuit Resistance	0.68	max.	megohm
Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.22	max.	megohm
For cathode-bias operation	0.47	max.	megohm

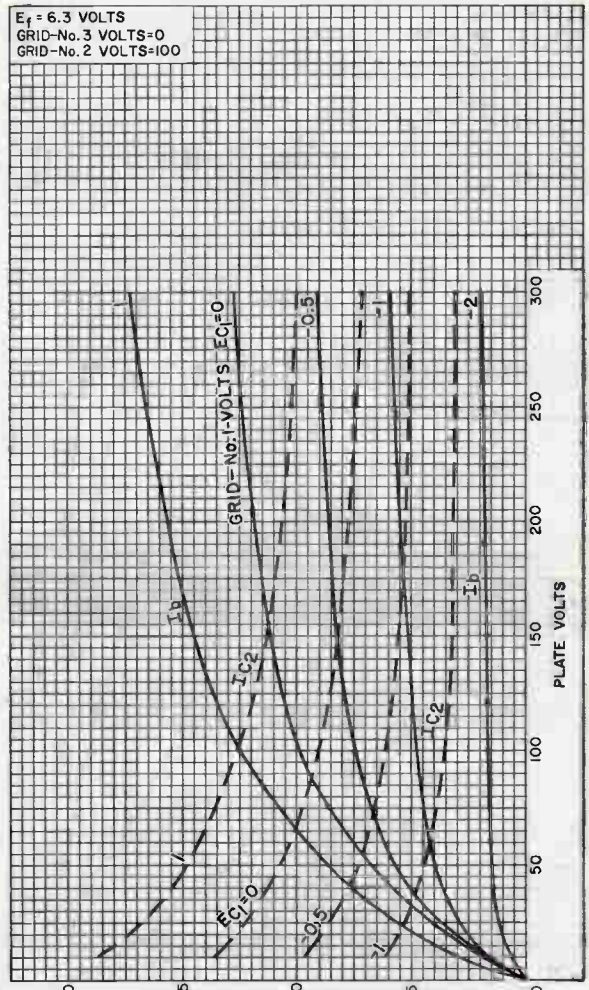
[a] Without external shield.

[b] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[c] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

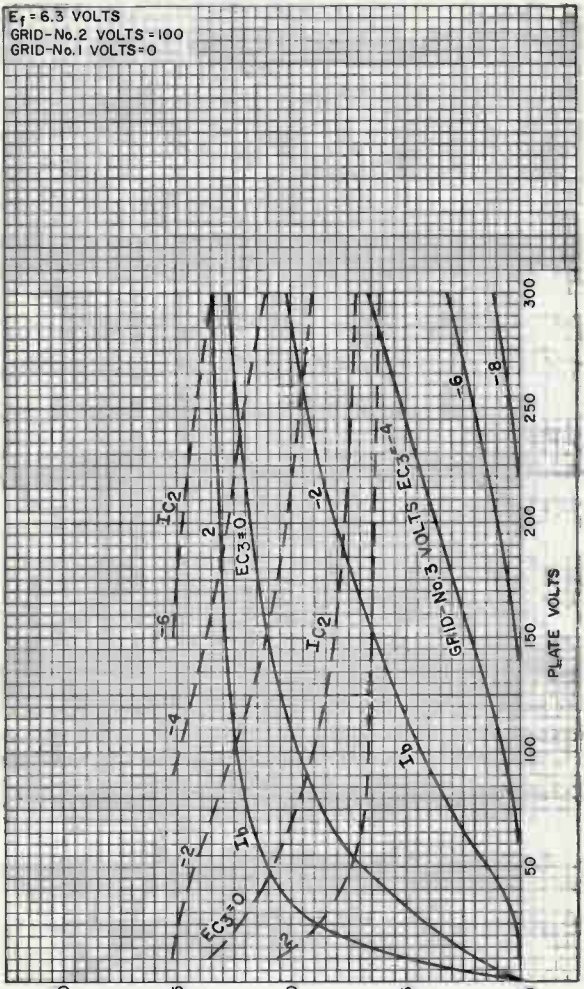
[d] The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS



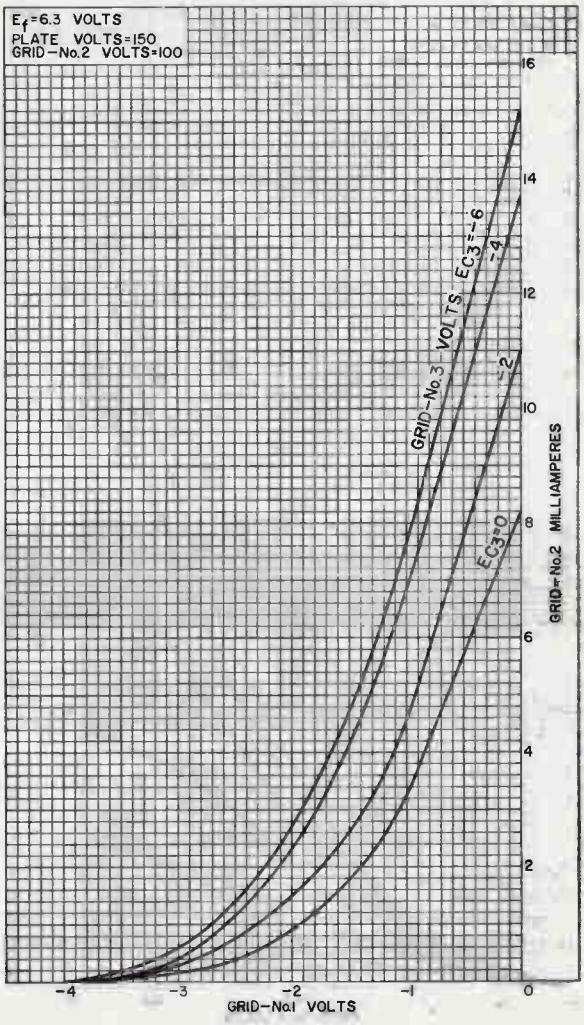
92CM-11002

AVERAGE CHARACTERISTICS



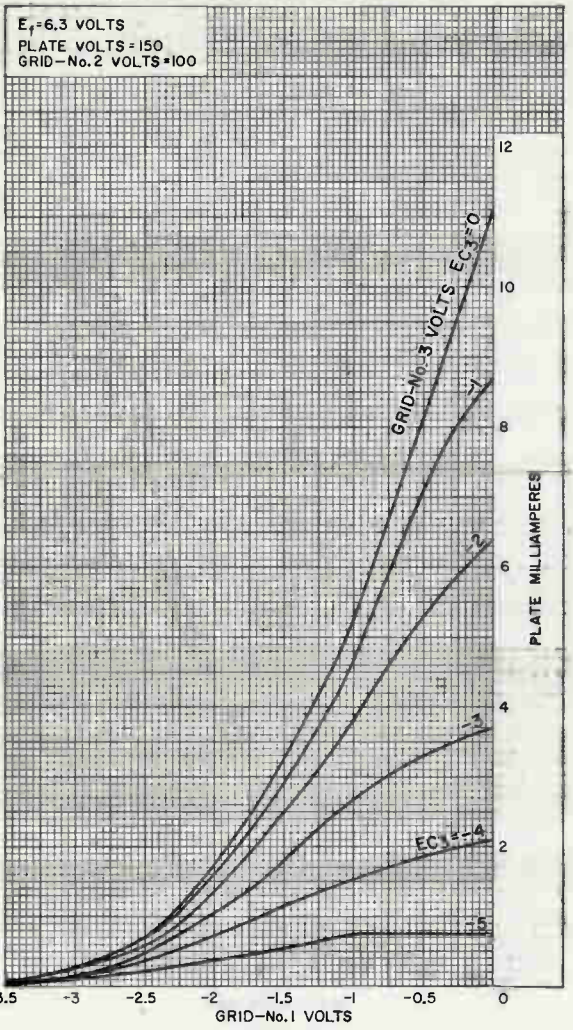
92CM-11003

AVERAGE CHARACTERISTICS



92CM-11007

AVERAGE CHARACTERISTICS



92CM-11005

6H6, 6H6-GT/G

TWIN DIODE

Heater	Coated Unipotential Cathodes		
Voltage	6.3		a-c or d-c volts
Current	0.3		amp.
	6H6	*6H6-GT/G*	
Direct Interelectrode Cap.°			
Plate #1 to Cathode #1	3.0	3.0	μμf
Plate #2 to Cathode #2	3.4	4.0	μμf
Plate #1 to Plate #2	0.10 max.	0.10 max.	μμf
Maximum Overall Length	1-3/4"	3-5/16"	
Maximum Seated Height	1-3/16"	2-3/4"	
Maximum Diameter	1-5/16"	1-5/16"	
Bulb	Metal Shell MT-8	T-9	
Base	Small Wafer, Octal 7-Pin	Intermed. Shell, Octal 7-Pin	
Basing Designation	70	G-7Q	
Pin 1	6H6, Shell / 6H6-GT/G, Internal Shield	Pin 4 - Cathode #2	
Pin 2	Heater	Pin 5 - Plate #1	
Pin 3	Plate #2	Pin 7 - Heater	
		Pin 8 - Cathode #1	
RCA Socket		Stock No. 9924	
Mounting Position		Any	

BOTTOM VIEW

Maximum Ratings Are Design-Center Values

RECTIFIER OR DOUBLER

Peak Inverse Voltage		420 max.	volts
Peak Plate Current per Plate		48 max.	ma.
D-C Heater-Cathode Potential		330 max.	volts
As Half-Wave Rectifier:*			
A-C Plate Voltage per Plate (RMS)	117	150 max.	volts
Total Effect. Plate-Supply Impedance per Plate ▲	15 min.	40 min.	ohms
D-C Output Current per Plate	8 max.	8 max.	ma.
As Voltage Doubler:			
	Half-Wave	*Full-Wave*	
A-C Plate Voltage per Plate (RMS)	117	117	volts
Total Effect. Plate-Supply Impedance per Plate ▲	30 min.	15 min.	ohms
D-C Output Current	8 max.	8 max.	ma.

° With shell or external and internal shields connected to cathodes.

* In half-wave service, the two units may be used separately or in parallel.

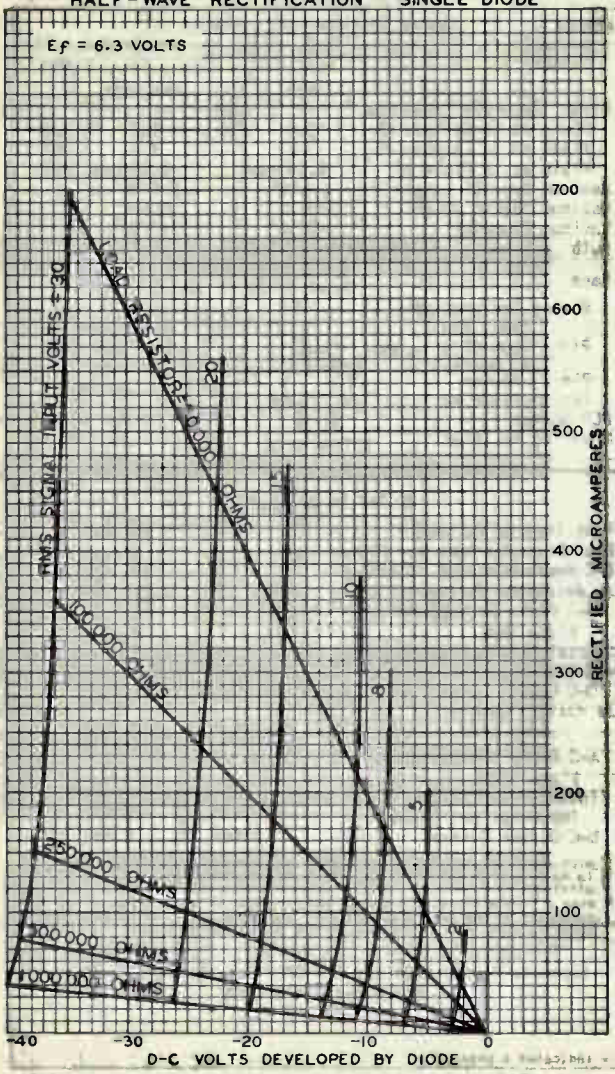
▲ When a filter-input condenser larger than 40 μf is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

Circuits for the 6B6 and 6E6-GT/G are the same as those shown under Type 25Z5.

← Indicates a change.

AVERAGE CHARACTERISTICS

HALF-WAVE RECTIFICATION - SINGLE DIODE



Power Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.760		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances (Approx.):[b]			
Grid No.1 to plate	0.18		μμf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	13.0		μμf
Plate to cathode, grid No.3, grid No.2, and heater	8.0		μμf

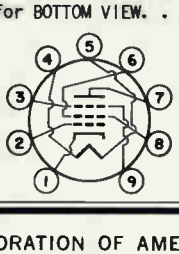
Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	60	250	250	volts
Grid No.3	*Connected to cathode at socket*			
Grid-No.2 Supply Voltage	250	125	250	volts
Grid-No.1 Voltage	0	–	–	volts
Cathode Resistor	–	33	100	ohms
Mu-Factor, Grid No.2 to Grid No.1	–	–	33	
Plate Resistance (Approx.)	–	28000	24000	ohms
Transconductance	–	24000	20000	μmhos
Plate Current	150[c]	40	40	ma
Grid-No.2 Current	37[c]	4.2	6.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	–	-6.4	-13	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-13/16"
Length, Base Seat to Bulb Top (Excluding tip)	2-7/16" ± 3/32"
Diameter	0.750" to 0.850"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Basing Designation for BOTTOM VIEW	9PU

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Grid No.3
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Grid No.2
Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Grid No.3

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC PLATE VOLTAGE	350 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[a]	2500 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	volts
GRID No.1 (CONTROL-GRID) VOLTAGE	-100 max.	volts
GRID-No.2 INPUT	2 max.	watts
PLATE DISSIPATION	10 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation	1 max.	megohm
For cathode-bias operation	2.2 max.	megohms

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

[d] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[e] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For VHF Oscillator-Mixer Service in TV Receivers

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3±0.6[a]	volts
Current at heater volts = 6.3	0.450[b]	amp
Warm-up time (Average)	11	sec
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[c] max.	volts
Direct Interelectrode Capacitances:[d]		
Triode Unit:		
G_T to P_T	1.9	pf
Input: G_T to $(K+G3_P+IS,H)$	3.0	pf
Output: P_T to $(K+G3_P+IS,H)$	1.9	pf
Pentode Unit:		
$G1_P$ to P_P	0.010 max.	pf
Input: $G1_P$ to $(K+G3_P+IS,G2_P,H)$	5.0	pf
Output: $G1_P$ to $(K+G3_P+IS,G2_P,H)$	3.4	pf
H to K[e]	3.8	pf

Characteristics, Class A_1 Amplifier:

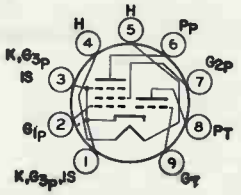
	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	150	125	volts
Grid-No.2 Supply Voltage	–	125	volts
Grid-No.1 Supply Voltage	0	−1	volts
Cathode Resistor	56	–	ohms
Amplification Factor	40	–	
Plate Resistance (Approx.)	5000	200000	ohms
Transconductance	8500	6400	μmhos
Plate Current	18	12	ma
Grid-No.2 Current	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	−12	−9	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding Tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2

Base. . . . . Small-Button Noval 9-Pin (JEDEC No. E9-1)
Basing Designation for BOTTOM VIEW. 90A

Pin 1 - Cathode, Pentode Grid No. 3, Internal Shield
Pin 2 - Pentode Grid No. 1
Pin 3 - Same as Pin 1
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Plate
Pin 7 - Pentode Grid No. 2
Pin 8 - Triode Plate
Pin 9 - Triode Grid



AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

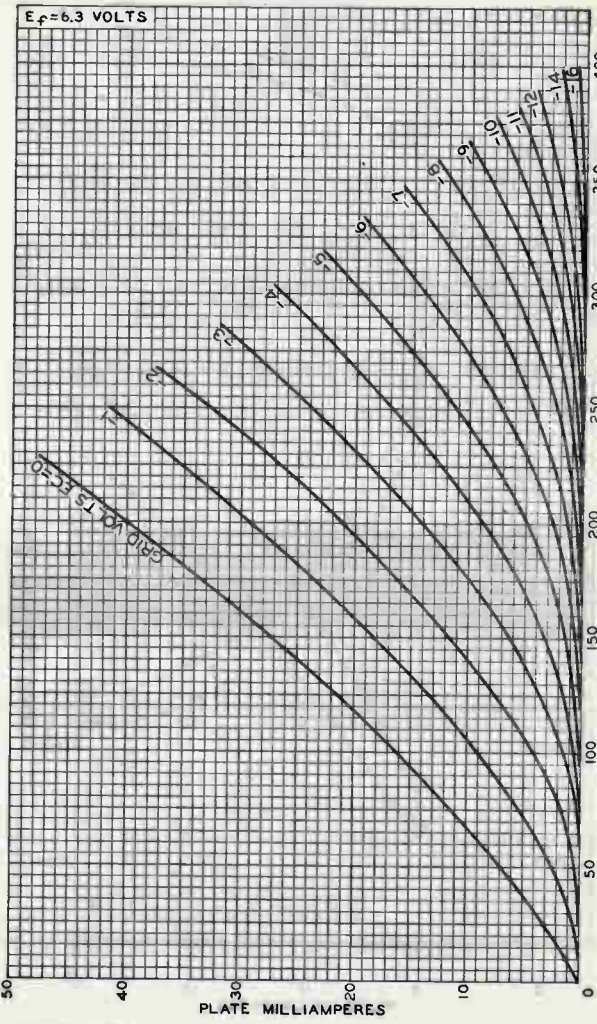
	Triode Unit	*Pentode Unit*	
Plate Voltage	330 max.	330 max.	volts
Grid-No. 2 (Screen-Grid) Supply Voltage.	-	330 max.	volts
Grid-No. 2 Voltage	See *Grid-No. 2 Input Rating Chart* at front of Receiving Tube Section		
Grid-No. 1 (Control-Grid) Voltage: Positive-bias value	0 max.	0 max.	volts
Grid-No. 2 Input: For grid-No. 2 voltages up to 165 volts	-	0.55 max.	watt
For grid-No. 2 voltages between 165 and 330 volts	See *Grid-No. 2 Input Rating Chart* at front of Receiving Tube Section		
Plate Dissipation	2.5 max.	3.1 max..	watts

Maximum Circuit Values:

Grid-No. 1 Circuit Resistance: For fixed-bias operation. . .	0.5 max.	0.25 max.	megohm
For cathode-bias operation. .	1.0 max.	0.5 max.	megohm

a For parallel heater operation.
b For series heater operation current must be limited to 0.450 ± 0.090 amperes.
c The dc component must not exceed 100 volts.
d With external shield JEDEC No. 315 connected to cathode except as noted.
e With external shield JEDEC No. 315 connected to ground.

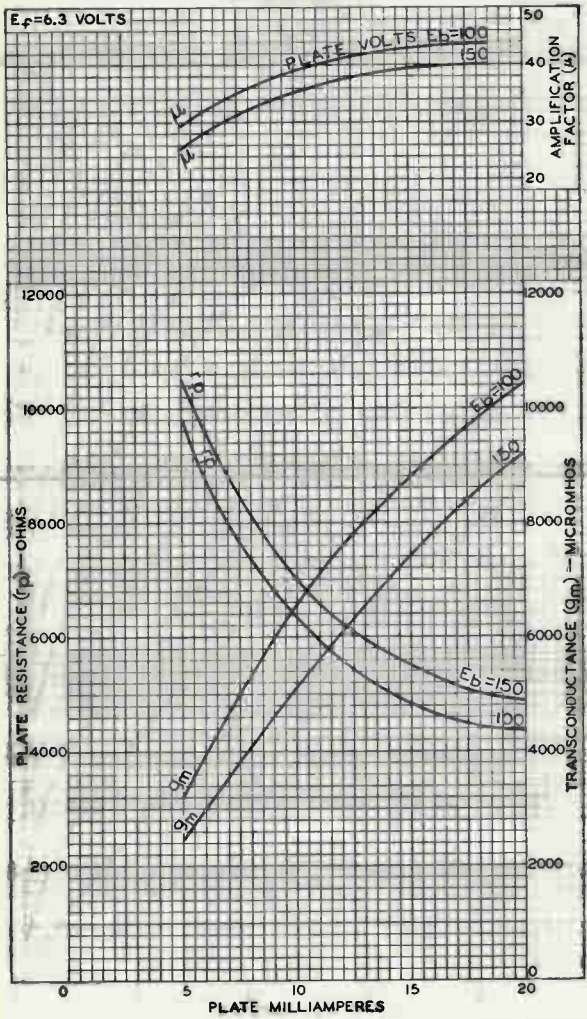
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-9866

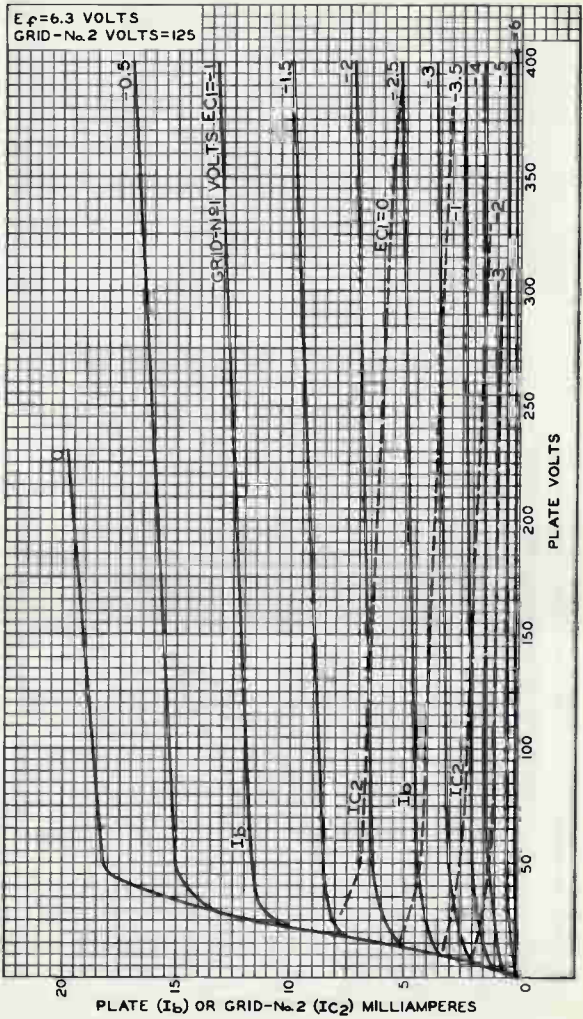
6HB7

AVERAGE CHARACTERISTICS
Triode Unit



92CM-9882RI

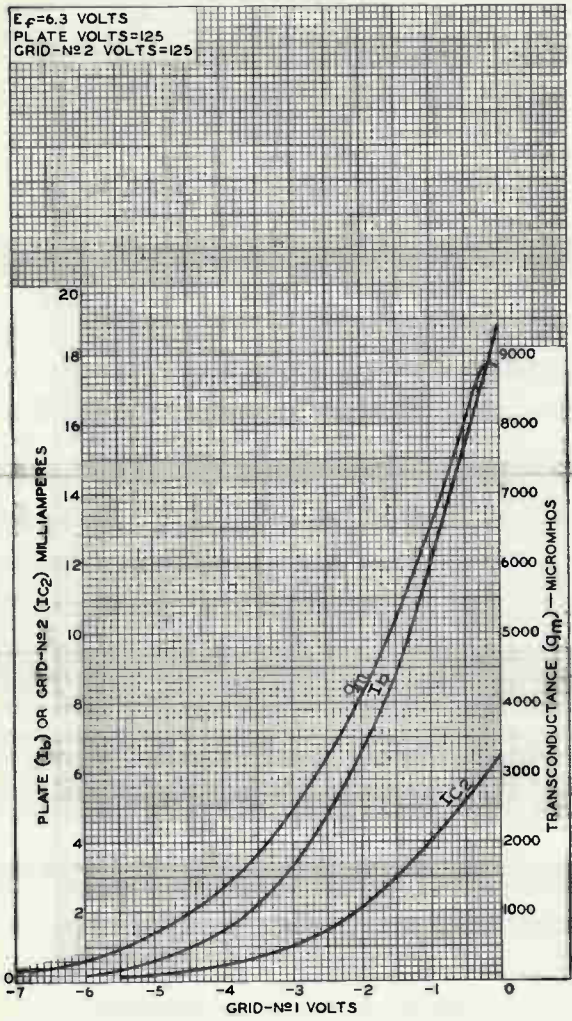
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-9867RI

6HB7

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-9868RI

Beam Power Tube

Duodecar Type

For Vertical-Deflection-Amplifier Circuits in TV Receivers

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	0.8	A
Direct Interelectrode Capacitances:[a]			
Grid No.1 to plate	c_{g1-p}	0.54	pF
Input: G1 to (K,G3,G2,H)	c_i	9.5	pF
Output: P to (K,G3,G2,H)	c_o	7.0	pF

For the following characteristics, see Conditions below:

Plate Resistance (approx.)	r_p	–	50000	Ω
Transconductance	g_m	–	4100	μmho
DC Plate Current	I_b	180[b]	43	mA
DC Grid-No.2 Current	I_{c2}	20[b]	3.5	mA
Cutoff DC Grid-No.1 Voltage for I_b = 100 μA.	$E_{c1(co)}$	–	-50	V
Conditions:				
Heater Voltage	E_h	6.3	6.3	V
DC Plate Voltage	E_b	60	250	V
DC Grid-No.2 Voltage	E_{c2}	250	250	V
DC Grid-No.1 Voltage	E_{c1}	0[c]	-20	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	2.875in (73.02mm)
Maximum Seated Length	2.500in (63.5 mm)
Maximum Diameter	1.188in (30.1 mm)
Dimensional Outline	JEDEC 9-60
Envelope	JEDEC T9
Base	Small-Button Duodecar 12-Pin (JEDEC E12-70)
Terminal Diagram	JEDEC 12EY
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design-Maximum Values[d]

For operation as a Vertical-Deflection-Amplifier Tube in a 525-line, 30-frame system

DC Plate Supply Voltage	E_{bb}	350	V
Peak Positive-Pulse Plate Voltage[e]	e_{bm}	2500	V

DC Grid-No.2 (Screen-Grid) Voltage .	E_{c2}	300	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	±200	V
Average	E_{hk}	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Cathode Current:			
Peak	i_{km}	260	mA
Average	$I_{k(av)}$	75	mA
Grid-No.2 Input	P_{g2}	2.75	W
Plate Dissipation[f]	P_b	12	W
Envelope Temperature (at hottest point on envelope surface.)	T_E	200	°C
MAXIMUM CIRCUIT VALUES			
Grid-No.1-Circuit Resistance			
With fixed bias	R_{g1}	1.0	MΩ
With cathode bias	R_{g1}	2.2	MΩ

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

[c] Applied for two seconds maximum so as not to damage tube.

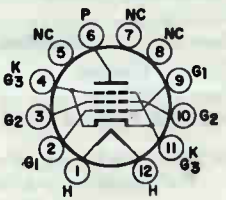
[d] Unless otherwise specified, as defined in the current issue of EIA Standard RS-239.

[e] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one vertical scanning cycle. In a 525-line, 30-frame system, 15% of one vertical scanning cycle is 2.5 ms.

[f] An adequate bias resistor or other means is required to protect the tube in the absense of excitation.

TERMINAL DIAGRAM – Bottom View

Pin 1 - Heater
Pin 2 - Grid No.1
Pin 3 - Grid No.2
Pin 4 - Grid No.3, Cathode
Pin 5 - No Connection
Pin 6 - Plate
Pin 7 - No Connection
Pin 8 - No Connection
Pin 9 - Grid No.1
Pin 10 - Grid No.2
Pin 11 - Grid No.3, Cathode
Pin 12 - Heater



JEDEC 12EY

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.75	amp
Direct Interelectrode Capacitances:▲		
Triode Unit:		
Grid to plate	3.5	μμf
Grid to cathode, pentode cathode & grid No.3 & internal shield, and heater	2.8	μμf
Plate to cathode, pentode cathode & grid No.3 & internal shield, and heater	2.6	μμf
Pentode Unit:		
Grid No.1 to plate	0.1 max.	μμf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	10	μμf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	4.2	μμf
Triode grid to pentode plate	0.015 max.	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*		
Plate Supply Voltage	200	45	200	volts
Grid-No.2 Supply Voltage	–	125	125	volts
Grid-No.1 Voltage	−2	0	–	volts
Cathode Resistor	–	–	68	ohms
Amplification Factor	70	–	–	
Plate Resistance (Approx.)	17500	–	75000	ohms
Transconductance	4000	–	12500	μmhos
Plate Current	4	40●	25	ma
Grid-No.2 Current	–	15●	7	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	–	–	−9	volts
Grid-No.1 Voltage (Approx.) for plate μa = 20	−6	–	–	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"

Length, Base Seat to Bulb Top (Excluding tip) . . . 2" ± 3/32"
Diameter . . . . . 0.750" to 0.875"
Dimensional Outline. . . . . *See General Section*
Bulb T6-1/2
Base . . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW 9DX

Pin 1 – Triode Cathode
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Pentode Cathode, Grid No.3, Internal Shield
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate

AMPLIFIER — Class A1

Maximum Ratings, ***Design-Maximum Values:***

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE.	330 max.	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	330 max.	volts
GRID-No.2 VOLTAGE.	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value. . . .	0 max.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 165 volts.	–	1.1 max.	watts
For grid-No.2 voltages between 165 and 330 volts.	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION.	1 max.	5 max.	watts
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode . . .	200 max.	200 max.	volts
Heater positive with respect to cathode . . .	200* max.	200* max.	volts

Maximum Circuit Values:

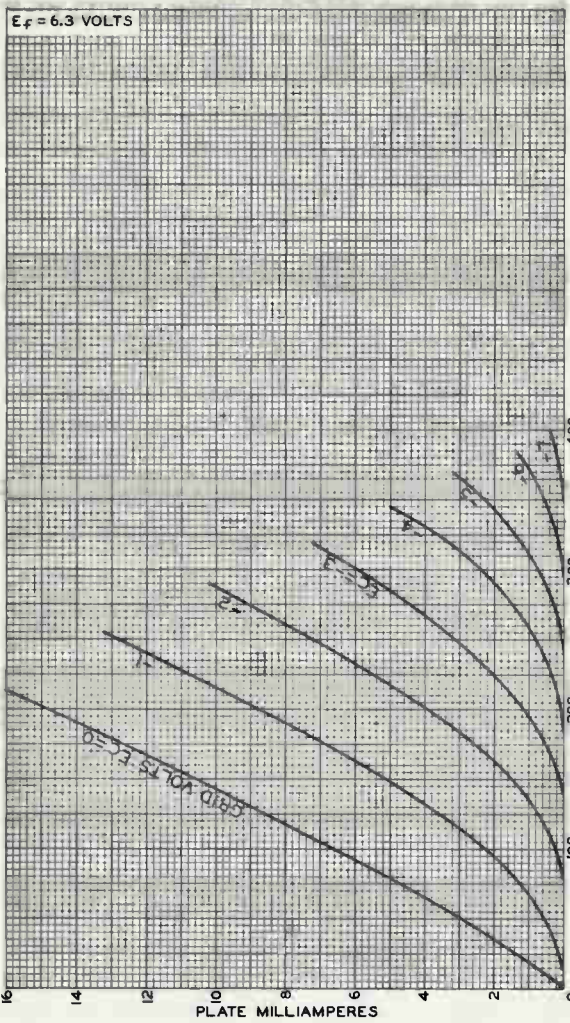
	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance:			
For fixed-bias operation .	0.5 max.	0.25 max.	megohm
For cathode-bias operation.	1 max.	1 max.	megohm

▲ Without external shield.

● This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

★ The dc component must not exceed 100 volts.

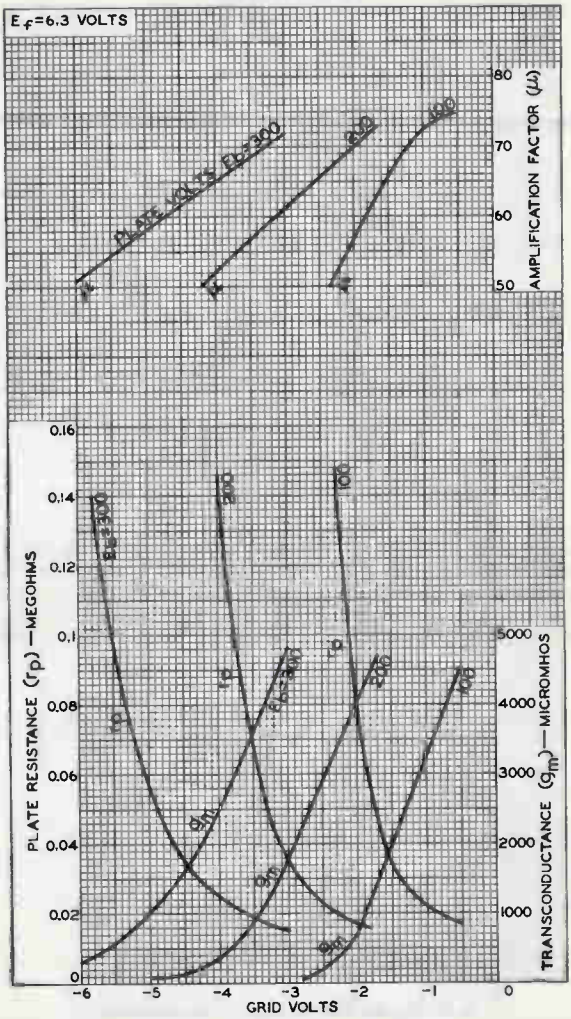
Triode Unit



92CM-8644

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

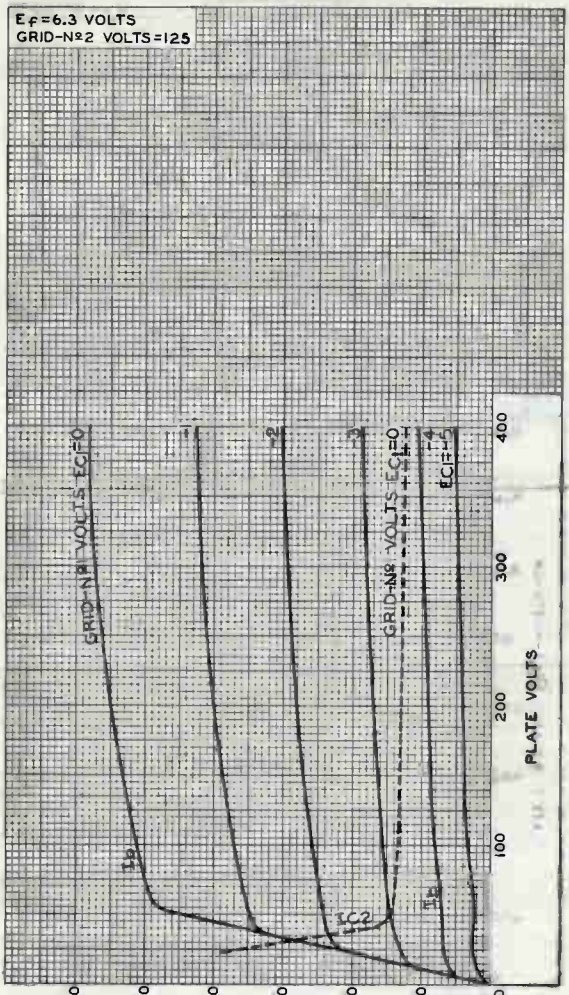
AVERAGE CHARACTERISTICS
Triode Unit



92CM-10874

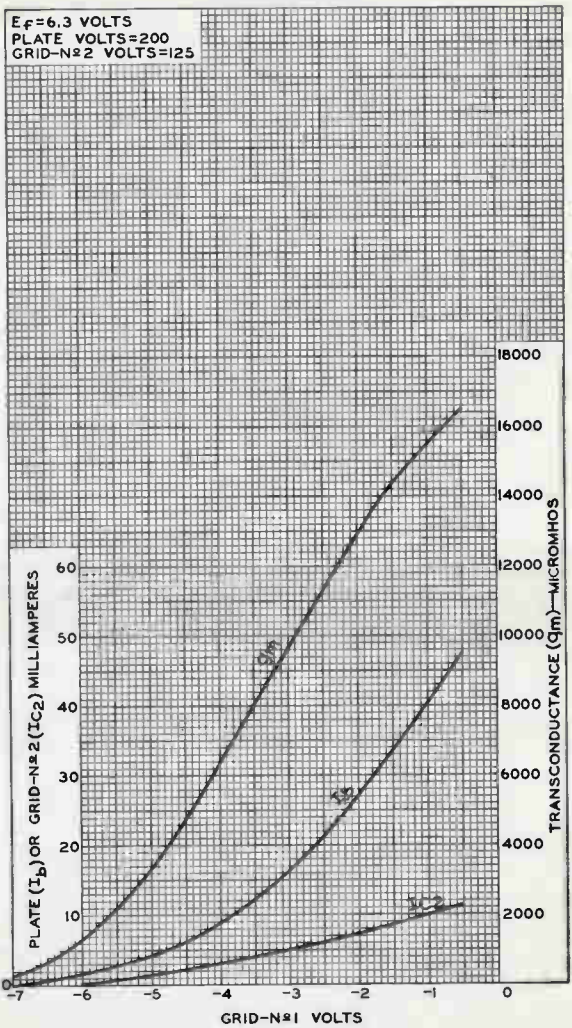
6HF8

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-9906

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-9905RI

Beam Power Tube

7-PIN MINIATURE TYPE
CONTROLLED CATHODE WARM-UP TIME MINIMIZES EXTRANEOUS SOUND DURING RECEIVER WARM UP.

For Use in the Audio Output Stages of Television Receivers

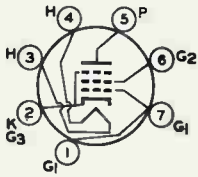
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.450	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Minimum Cathode Warm-up Time:[b] Heater volts = 6.3, plate and grid-No.2 volts = 250, and cathode resistor (ohms) = 680	14	sec
Direct Interelectrode Capacitances (Approx.):		
G1 to P	0.4	pf
Input: G1 to (K+G3,G2,H)	8.0	pf
Output: P to (K+G3,G2,H)	8.5	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding Tip)	2" ±3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No. E7-1)
Basing Designation for BOTTOM VIEW	7BZ

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.3
Pin 3 - Heater



Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Grid No.1

AMPLIFIER — Class A_1

Maximum Ratings, ***Design-Maximum Values:***

Plate Voltage	275 max.	volts
Grid-No.2 (Screen-Grid) Voltage	275 max.	volts
Grid-No.2 Input	2 max.	watts

Plate Dissipation	12 max.		watts
Bulb Temperature (At hottest point on bulb surface)	250 max.		°C

Typical Operation and Characteristics:

Plate Voltage	180	250	volts
Grid-No.2 Voltage	180	250	volts
Grid-No.1 (Control-Grid) Voltage	-8.5	-12.5	volts
Peak AF Grid-No.1 Voltage	8.5	12.5	volts
Zero-Signal Plate Current	29	45	ma
Max.-Signal Plate Current	30	47	ma
Zero-Signal Grid-No.2 Current	3	4.5	ma
Max.-Signal Grid-No.2 Current	4	7	ma
Plate Resistance (Approx.)	58000	52000	ohms
Transconductance	3700	4100	μmhos
Load Resistance	5500	5000	ohms
Total Harmonic Distortion	8	8	%
Max.-Signal Power Output	2	4.5	watts

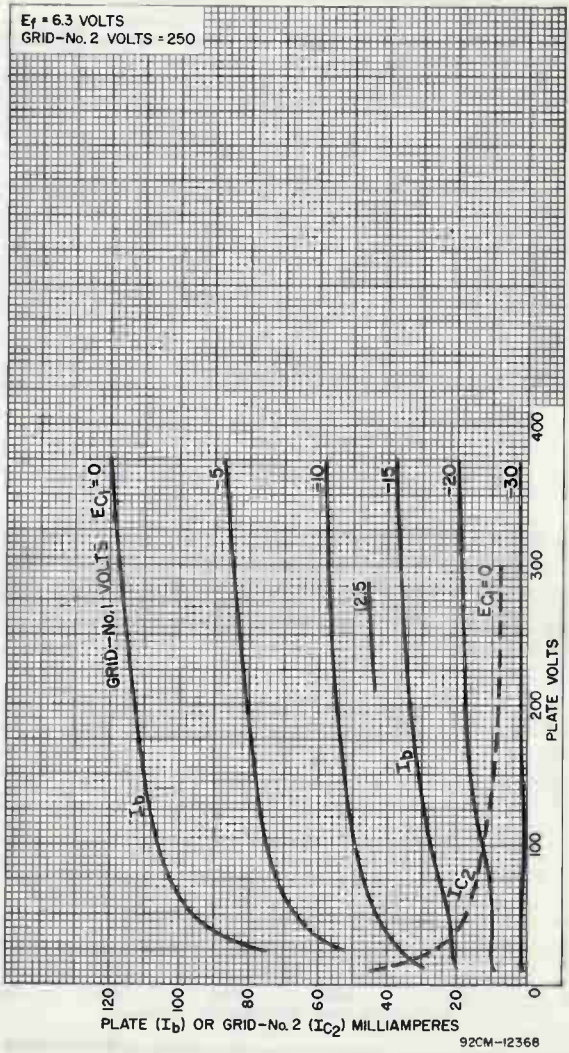
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

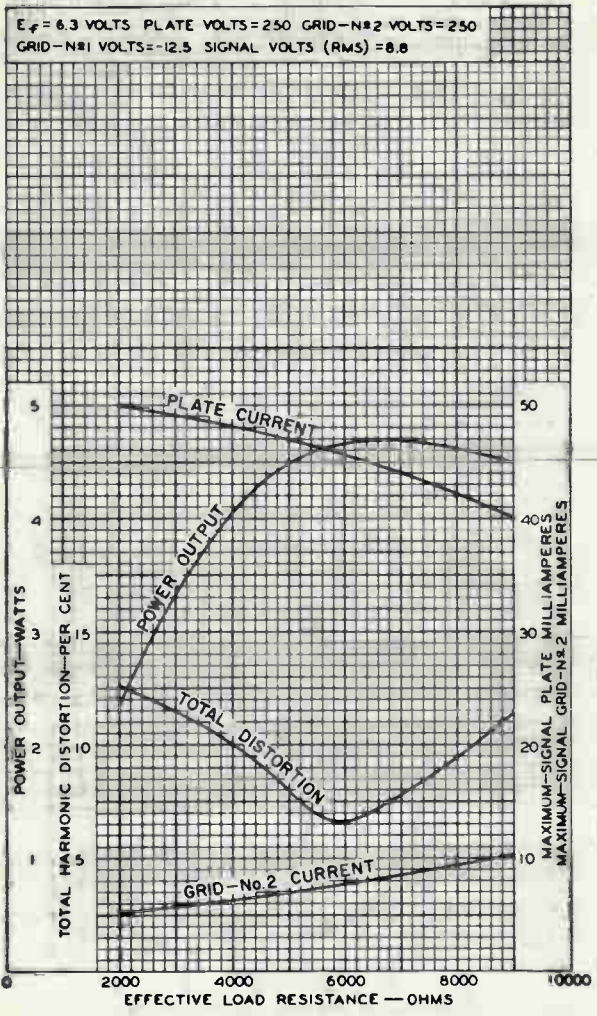
[a] The dc component must not exceed 100 volts.

[b] The time interval between the instant all electrode voltages are applied and the instant a current of one milliampere flows in the plate circuit of the 6HG5.

AVERAGE CHARACTERISTICS



OPERATION CHARACTERISTICS



92CM-6339R2

Diode—Sharp-Cutoff Pentode

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*			
Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	-	sec
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts
Direct Interelectrode Capacitances:[d]			
Diode Unit:			
Plate to cathode and heater	2.4		μμf
Cathode to plate and heater	3.0		μμf
Pentode Unit:			
Grid No.1 to plate	0.015 max.		μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	7.0		μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	3.2		μμf
Diode plate to pentode grid No.1	0.005 max.		μμf
Diode cathode to pentode plate	0.15 max.		μμf
Diode plate to pentode plate	0.035 max.		μμf

Characteristics, Class A$_1$ Amplifier:

Plate Supply Voltage	125	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	125	volts
Cathode Resistor	56	ohms
Plate Resistance (Approx.)	0.2	megohm
Transconductance	9300	μmhos
Plate Current	11.5	ma
Grid-No.2 Current	3.6	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-6	volts
Grid-No.1 Voltage (Approx.) for plate ma. = 2, and cathode resistor (ohms) = 0	-3	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"

6HJ8

Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9CY

Pin 1 – Pentode Cathode
Pin 2 – Pentode Grid No.1
Pin 3 – Pentode Grid No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate

Pin 7 – Diode Cathode
Pin 8 – Diode Plate
Pin 9 – Pentode Grid No.3, Internal Shield

PENTODE UNIT — Class A_1 Amplifier

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	330 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 165 volts	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	3.2 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1 max.	megohm

DIODE UNIT

Maximum Ratings, ***Design-Maximum Values:***

DC PLATE CURRENT	5 max.	ma

Characteristics, Instantaneous Value:

Plate Current for plate volts = 10	50	ma

[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] Without external shield.

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Video and Bandpass Amplifier Applications in TV Receivers

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6[a]	volts
Current at heater volts = 6.3	0.600[b]	amp
Warm-up time (Average)	11	sec
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[c] max.	volts

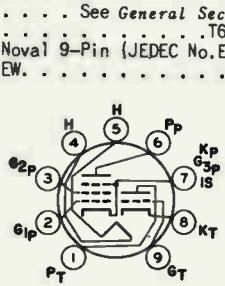
Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[d]	
Triode Unit:			
G_T to P_T	2.8	2.8	pf
Input: G_T to (K_T, K_P+$G3_P$+IS,H)	2.8	3.0	pf
Output: P_T to (K_T, K_P+$G3_P$+IS,H)	1.6	2.4	pf
Pentode Unit:			
$G1_P$ to P_P	0.030 max.	0.026 max.	pf
Input: $G1_P$ to (K_P+$G3_P$+IS,$G2_P$,H)	7.5	7.5	pf
Output: P_P to (K_P+$G3_P$+IS,$G2_P$,H)	2.4	3.0	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AE

Pin 1 – Triode Plate
Pin 2 – Pentode Grid No.1
Pin 3 – Pentode Grid No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate
Pin 7 – Pentode Cathode, Grid No.3, Internal Shield
Pin 8 – Triode Cathode
Pin 9 – Triode Grid



Characteristics:

	Triode Unit	*Pentode Unit*	
Plate Voltage	125	125	volts
Grid-No.2 Voltage	–	125	volts
Grid-No.1 Voltage	-1	-1	volt
Amplification Factor	40	–	
Plate Resistance (Approx.)	5000	150000	ohms
Transconductance	7000	10000	μmhos
Plate Current	12.5	12	ma
Grid-No.2 Current	–	4.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	–	-7	volts

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	*Pentode Unit*	
Plate Voltage	330 max.	330 max.	volts
Grid-No.2 (Screen-Grid) Supply Voltage	–	330 max.	volts
Grid-No.2 Voltage	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Grid-No.1 (Control-Grid) Voltage: Positive-bias value	0 max.	0 max.	volts
Grid-No.2 Input: For grid-No.2 voltages up to 165 volts	–	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Plate Dissipation	2.5 max.	2.5 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	1 max.	0.25 max.	megohm
For self-bias operation	1 max.	1 max.	megohm

[a] For parallel heater operation.
[b] For series heater operation current must be limited to 0.600 ± 0.040 amperes.
[c] The dc component must not exceed 100 volts.
[d] With external shield, JEDEC No.318, connected to cathode of unit under test.

High-Mu Triode

7-PIN MINIATURE TYPE

Useful as Grounded-Cathode RF-Amplifier Tube in VHF Tuners

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.180	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	110 max.	volts
Heater positive with respect to cathode	110 max.	volts
Direct Interelectrode Capacitances:[a]		
Grid to plate	0.36	pf
Grid to cathode, internal shield, external shield, and heater	4.3	pf
Plate to cathode, internal shield, external shield, and heater	2.9	pf
Cathode to plate	0.080	pf
Cathode to grid, internal shield, external shield, and heater	3.1	pf
Heater to cathode	2.3	pf
Heater to grid	0.070 max.	pf

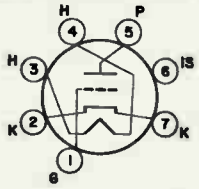
Characteristics, Class A_1 Amplifier:

Plate Voltage	135	volts
Grid Voltage	-1	volt
Amplification Factor	72	
Plate Resistance (Approx.)	5000	ohms
Transconductance	14500	μmhos
Plate Current	11.5	ma
Grid Voltage (Approx.) for Trans-conductance (μmhos) = 150	-5.7	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

Basing Designation for BOTTOM VIEW. 7GM



Pin 1 – Grid
Pin 2 – Cathode
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Internal Shield
Pin 7 – Cathode

AMPLIFIER — Class A_1

Maximum Ratings, ***Design-Maximum Values:***

Plate Supply Voltage	600 max.	volts
Plate Voltage	220 max.	volts
Grid Voltage:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
Cathode Current	22 max.	ma
Plate Dissipation	2.6 max.	watts

Typical Operation:

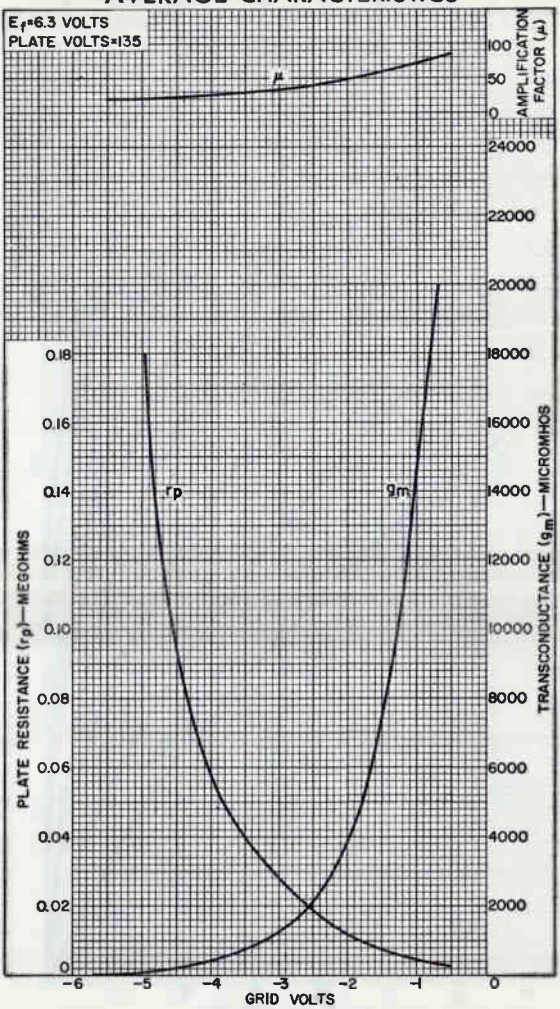
Plate Voltage	135	volts
Grid Voltage. . . . . Adjusted for grid μa = 10		
Plate Load Resistance	1000	ohms
Amplification Factor	80	
Plate Resistance (Approx.)	4000	ohms
Transconductance	20000	μmhos
Plate Current	19	ma

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	1 max.	megohm
For cathode-bias operation	1 max.	megohm

[a] With external shield JEDEC No.316 connected to cathode.

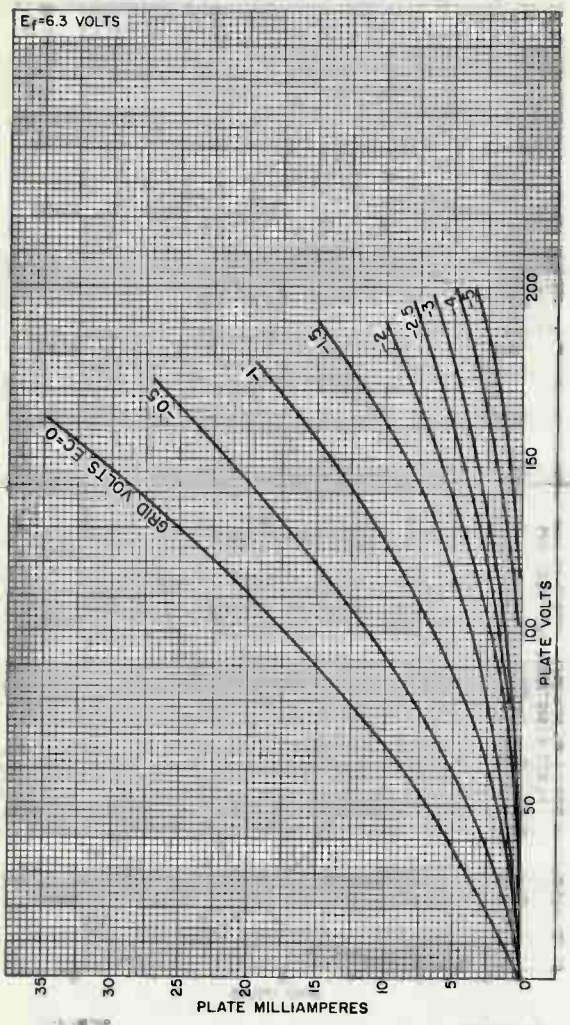
AVERAGE CHARACTERISTICS



92CM-12224

6HM5/6HA5

AVERAGE PLATE CHARACTERISTICS



92CM-12223

Semiremote-Cutoff Pentode

7-PIN MINIATURE TYPE

For Intermediate-Frequency-Amplifier Applications in FM, AM, and AM/FM Receivers

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	-	sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts
Direct Interelectrode Capacitances:[d]			
Grid No.1 to plate		0.006 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater		8.8	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater		5.2	μμf

Characteristics, Class A1 Amplifier:

Plate Supply Voltage	200	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	115	volts
Grid-No.1 Supply Voltage	0	volts
Cathode Resistor	68	ohms
Plate Resistance (Approx.)	0.5	megohm
Transconductance	8500	μmhos
Plate Current	13.2	ma
Grid-No.2 Current	4.3	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 60	-15	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

6HR6

Basing Designation for BOTTOM VIEW. 7BK

Pin 1 – Grid No.1
Pin 2 – Grid No.3, Internal Shield
Pin 3 – Heater

Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Cathode

AMPLIFIER — Class A[1]

Maximum Ratings, *Design-Maximum Values:*

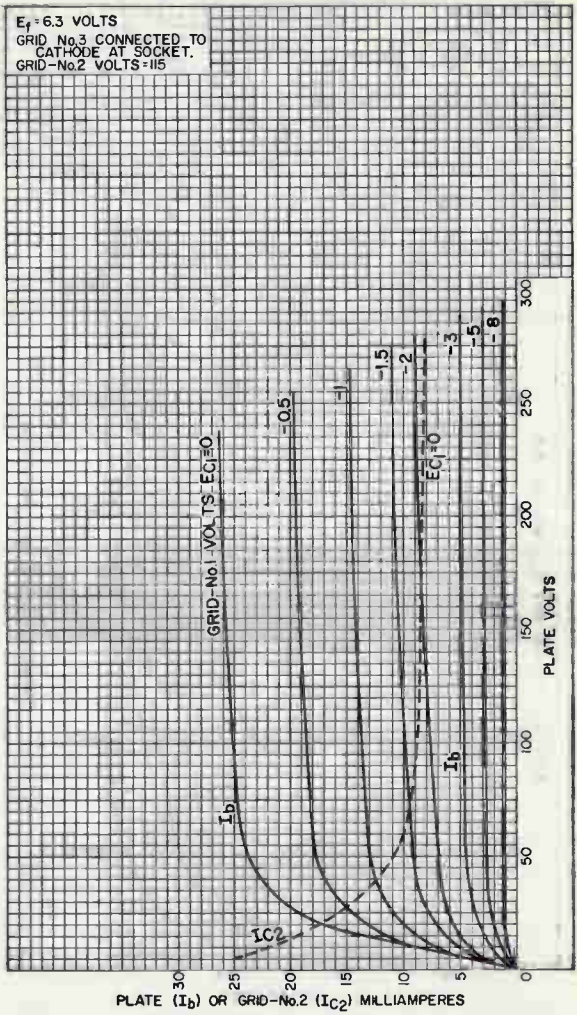
PLATE VOLTAGE	300 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts	1 max.	watt
For grid-No.2 voltages between 150 and 300 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	3 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1 max.	megohm

[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] Without external shield.

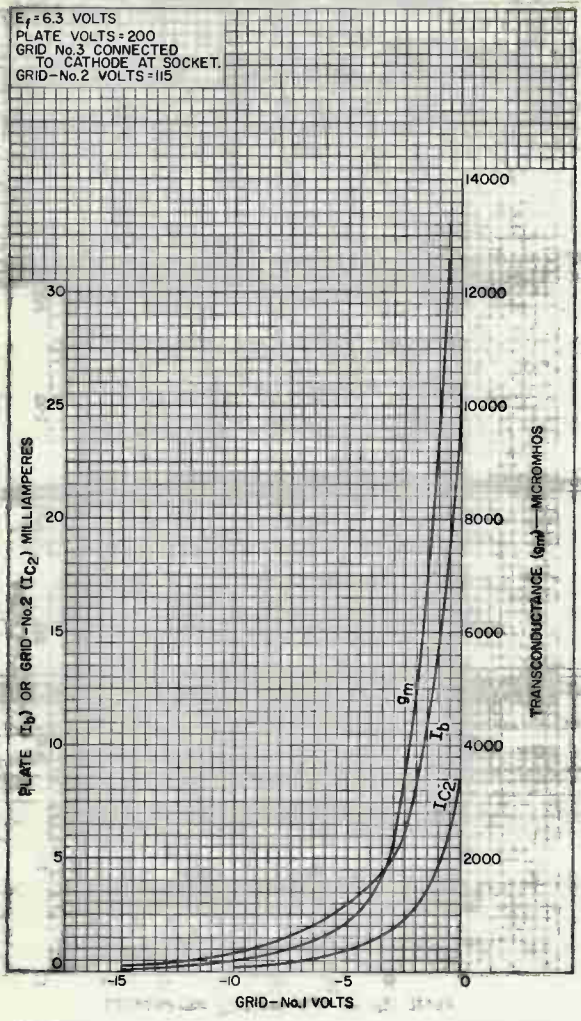
AVERAGE CHARACTERISTICS



92CM-11530

6HR6

AVERAGE CHARACTERISTICS



92CM-11533

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	–	sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts
Direct Interelectrode Capacitances:[d]			
Grid No.1 to plate	0.006 max.		μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	8.8		μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	5.2		μμf

Characteristics, Class A$_1$ Amplifier:

Plate Supply Voltage	75	150	volts
Grid No.3	*Connected to cathode at socket*		
Grid-No.2 Supply Voltage	75	75	volts
Grid-No.1 Supply Voltage	0	0	volts
Cathode Resistor	68	68	ohms
Amplification Factor[e]	50	–	
Plate Resistance (Approx.)	–	0.5	megohm
Transconductance	–	9500	μmhos
Plate Current	–	8.8	ma
Grid-No.2 Current	–	2.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	–	-4	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

Basing Designation for BOTTOM VIEW. 7BK

Pin 1 – Grid No.1
Pin 2 – Grid No.3, Internal Shield
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Cathode

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

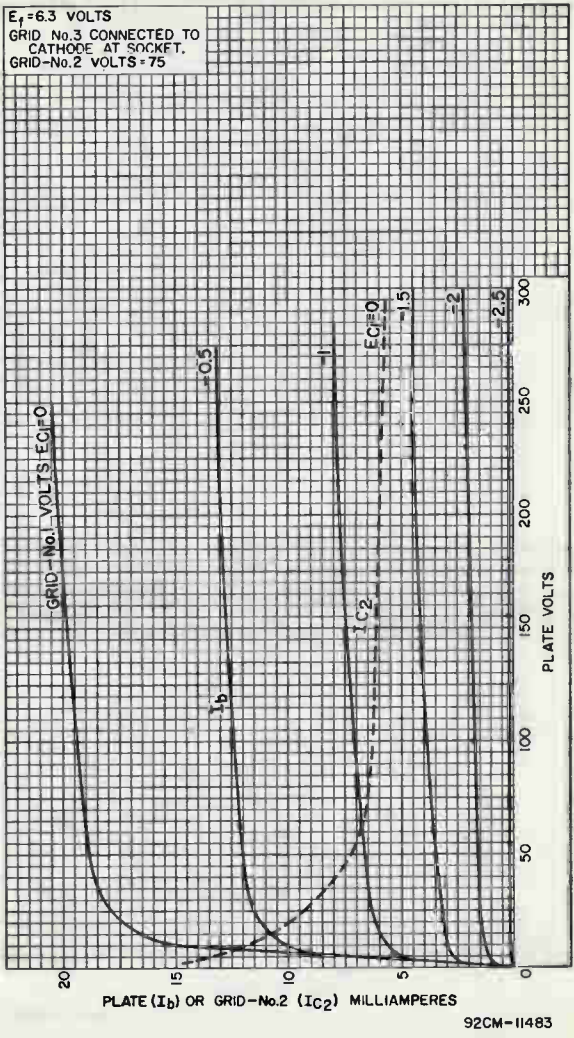
PLATE VOLTAGE	300 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts	1 max.	watt
For grid-No.2 voltages between 150 and 300 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	3 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1 max.	megohm

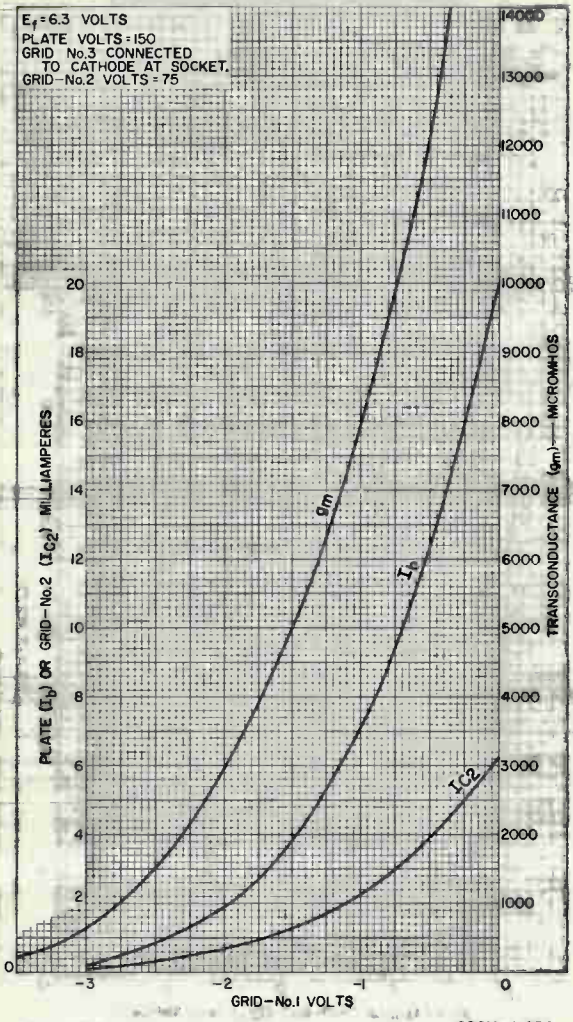
[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] Without external shield.
[e] Triode connection (Grid No.2 connected to plate).

AVERAGE CHARACTERISTICS



92CM-11483

AVERAGE CHARACTERISTICS



92CM-11484

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

Sharp-Cutoff Twin Pentode

With Common Cathode, Grid No.1, & Grid No.2

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.300		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances:[b]			
Grid No.3 to plate (Each unit)	2.0		pf
Grid No.1 to all other electrodes	6.0		pf
Grid No.3 (Each unit) to all other electrodes	3.6		pf
Plate (Each unit) to all other electrodes	3.0		pf
Grid No.3 (Unit No.1) to grid No.3 (Unit No.2)	0.015	max.	pf

Characteristics, Class A_1 Amplifier:

With one unit operating and plate and grid No.3 of other unit connected to ground			
Plate Voltage	100	100	volts
Grid-No.3 Voltage	0	0	volts
Grid-No.2 Voltage	67.5	67.5	volts
Grid-No.1 Voltage	0	[c]	volts
Grid-No.3-to-Plate Transconductance	–	450	μmhos
Grid-No.1-to-Plate Transconductance	1100	–	μmhos
Plate Current	–	2	ma
Grid-No.3 Voltage (Approx.) for plate μa = 100.	–	-3.5	volts ←
Grid-No.1 Voltage (Approx.) for plate μa = 100.	–	-2.3	volts
With both units operating			
Plate Voltage (Each unit)	100	100	volts
Grid-No.3 Voltage (Each unit)	-10	0	volts
Grid-No.2 Voltage	67.5	67.5	volts
Grid-No.1 Voltage	[c]	[c]	volts
Plate Current (Each unit)	–	2	ma
Grid-No.2 Current	7	4.4	ma
Cathode Current	7.1	8.5	ma

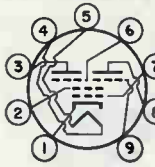
← Indicates a change.

6HS8

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
→ Basing Designation for BOTTOM VIEW	9FG

Pin 1 – Cathode
Pin 2 – Grid No.2, Internal Shield
Pin 3 – Plate of Unit No.2
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Grid No.3 of Unit No.2
Pin 7 – Grid No.1
Pin 8 – Plate of Unit No.1
Pin 9 – Grid No.3 of Unit No.1

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE (Each unit)	300 max.	volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE (Each unit):		
Peak positive value	50 max.	volts
DC negative value	50 max.	volts
DC positive value	3 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	150 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	50 max.	volts
CATHODE CURRENT	12 max.	ma
GRID-No.2 INPUT	0.75 max.	watt
PLATE DISSIPATION (Each unit)	1.1 max.	watts

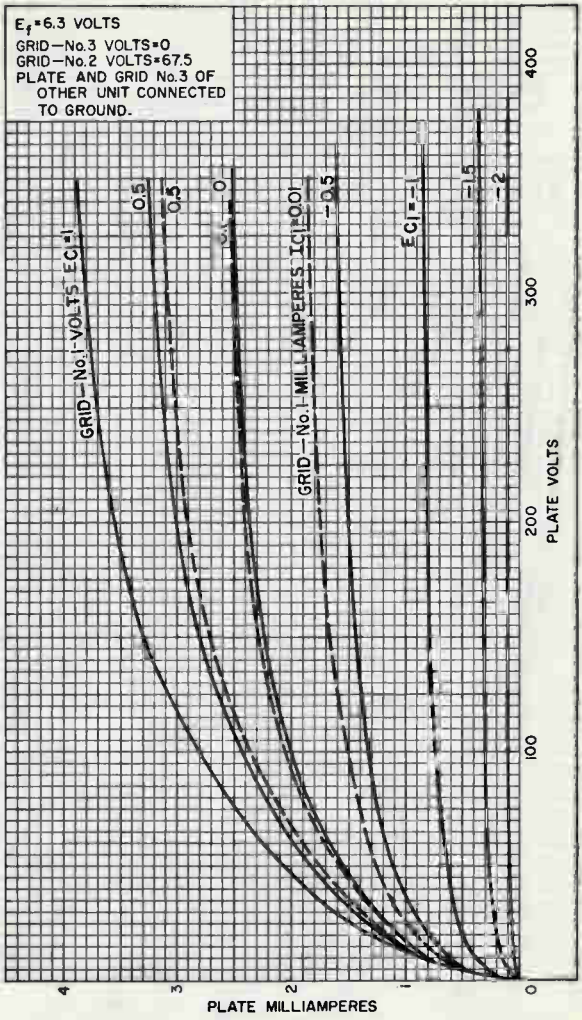
Maximum Circuit Values:

Grid-No.3-Circuit Resistance (Each unit)	0.5 max.	megohm
Grid-No.1-Circuit Resistance	0.5 max.	megohm

[a] The dc component must not exceed 100 volts.
[b] Without external shield.
[c] Adjusted to give a dc grid-No.1 current of 100 microamperes.

→ Indicates a change.

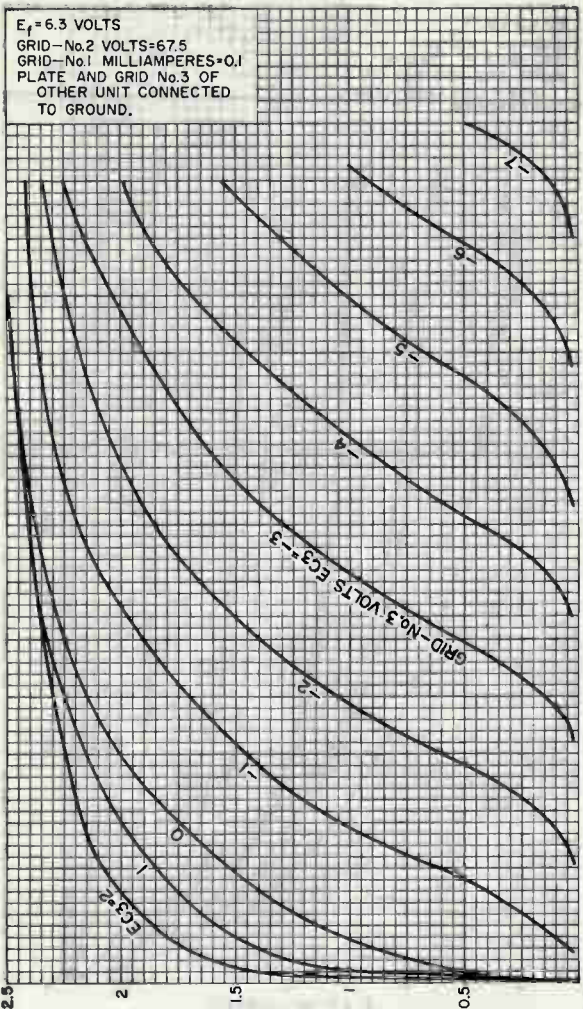
AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM—11099

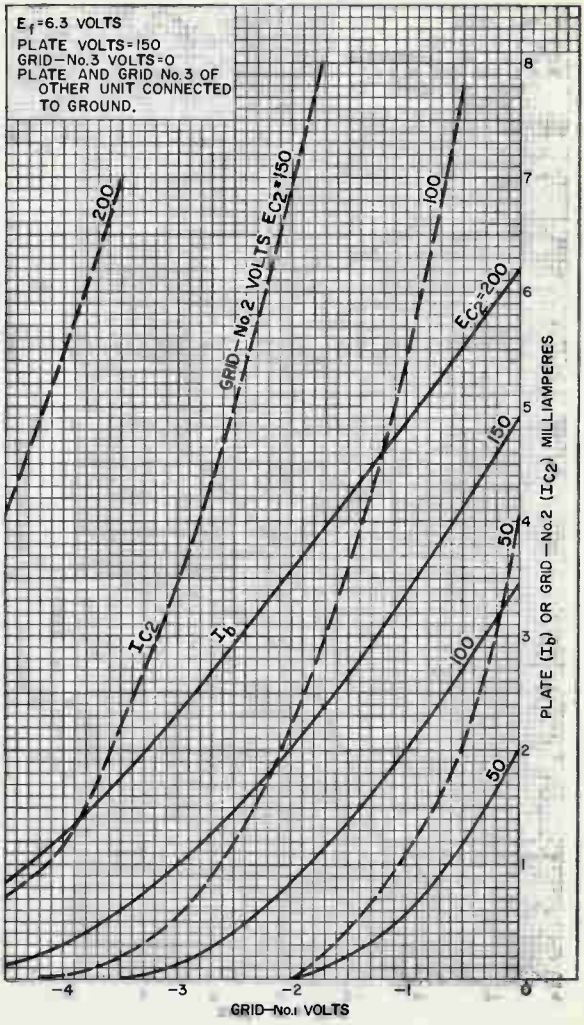
6HS8

AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM—11102

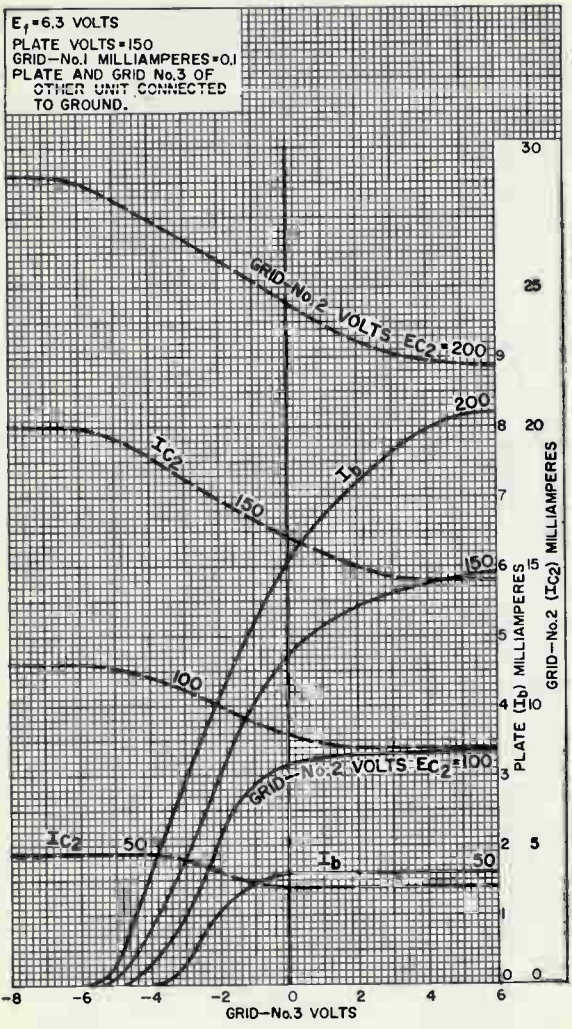
AVERAGE CHARACTERISTICS
Each Unit



92CM—11104

6HS8

AVERAGE CHARACTERISTICS
Each Unit



92CM—11105

Sharp-Cutoff Pentode

With Two Independent Control Grids

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	-	sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[c]	max.	volts
Direct Interelectrode Capacitances (Approx):[d]			
Grid No.1 to plate		0.023	pf
Grid No.1 to cathode & internal shield, grid No.3, grid No.2 & internal shield, and heater		8.2	pf
Grid No.1 to grid No.3		0.09	pf
Grid No.3 to plate		1.6	pf
Grid No.3 to cathode & internal shield, plate, grid No.2 & internal shield, grid No.1, and heater		7.2	pf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	150	volts
Grid-No.3 Supply Voltage	0	volts
Grid-No.2 Supply Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Cathode Resistor	180	ohms
Plate Resistance (Approx.)	0.11	megohm
Transconductance, Grid No.1 to Plate	3400	μmhos
Transconductance, Grid No.3 to Plate	600	μmhos
Plate Current	3.2	ma
Grid-No.2 Current	3.2	ma
Grid-No.1 Supply Voltage (Approx.) for plate μa = 20	-4.5	volts
Grid-No.3 Supply Voltage (Approx.) for plate μa = 20	-7	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"

6HZ6

Bulb. T5-1/2
Base. . . . . .Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation For BOTTOM VIEW. 7EN

Pin 1 – Grid No.1
Pin 2 – Cathode, Internal Shield
Pin 3 – Heater

Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2, Internal Shield
Pin 7 – Grid No.3

FM SOUND-DETECTOR SERVICE

Maximum Ratings, ***Design-Maximum Values:***

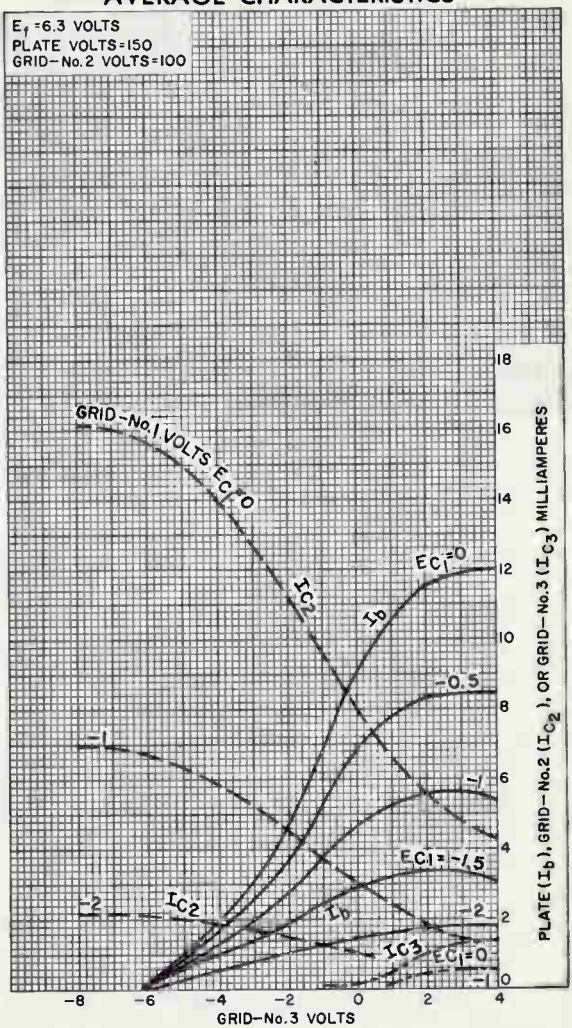
PLATE VOLTAGE	300	max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:			
Negative value (DC and peak)	100	max.	volts
Positive value (DC and peak)	25	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300	max.	volts
GRID-No.2 VOLTAGE . . . . . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	50	max.	volts
Positive-bias value	0	max.	volts
GRID-No.3 INPUT	0.1	max.	watt
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 150 volts	1	max.	watt
For grid-No.2 voltages between 150 volts and 300 volts . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
PLATE DISSIPATION	1.7	max.	watts

Maximum Circuit Values:

Grid-No.3-Circuit Resistance	0.68	max.	megohm
Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.22	max.	megohm
For cathode-bias operation	0.47	max.	megohm

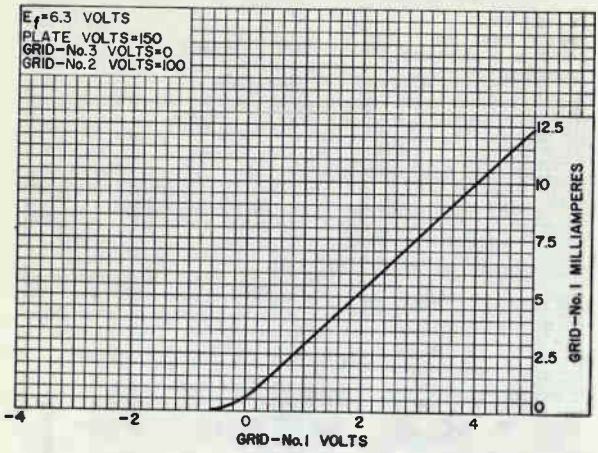
[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] Without external shield.

AVERAGE CHARACTERISTICS



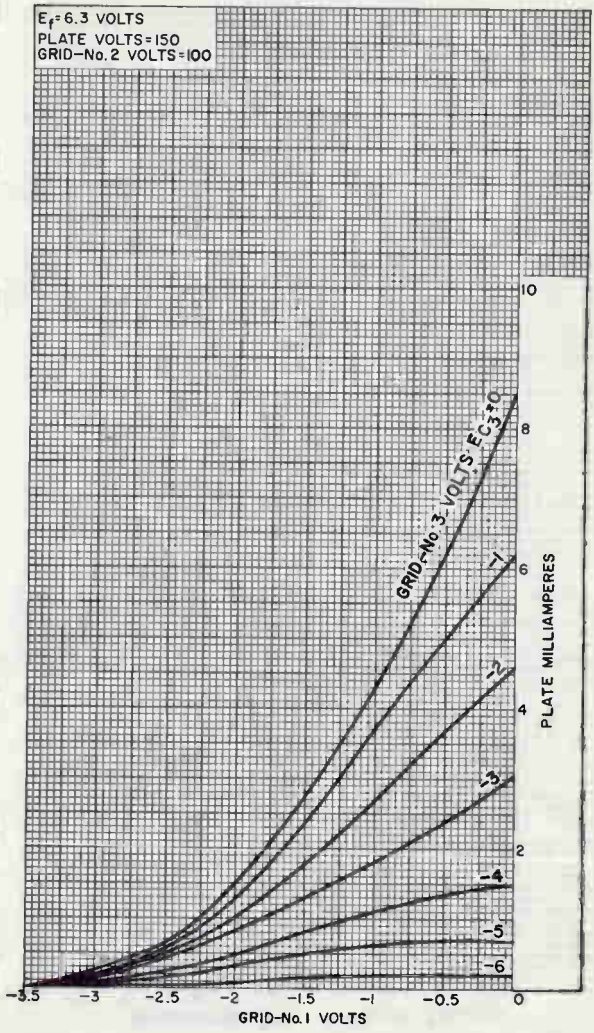
92CM-11789

AVERAGE GRID-No.1 CHARACTERISTIC



92CS-11004

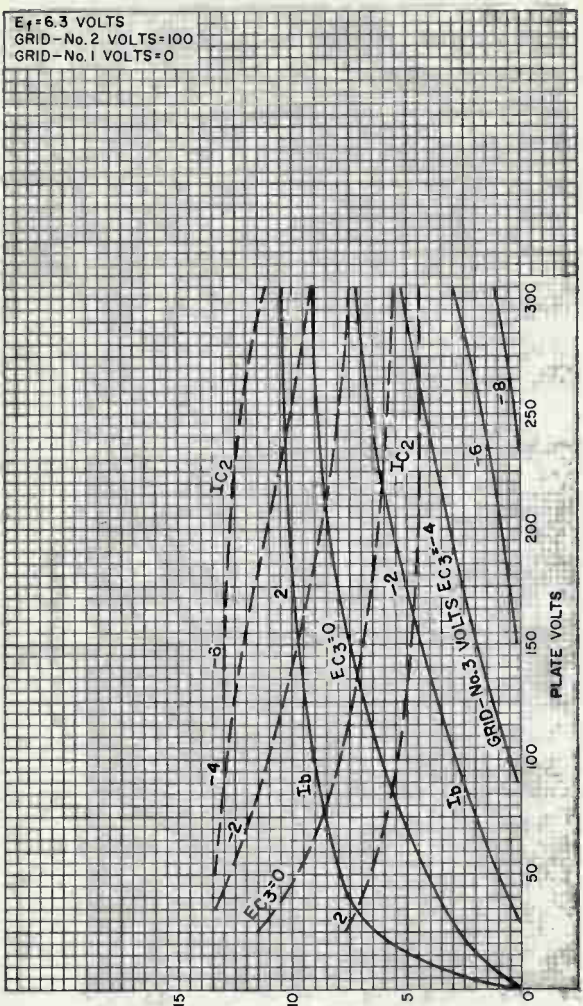
AVERAGE CHARACTERISTICS



92CM-11788

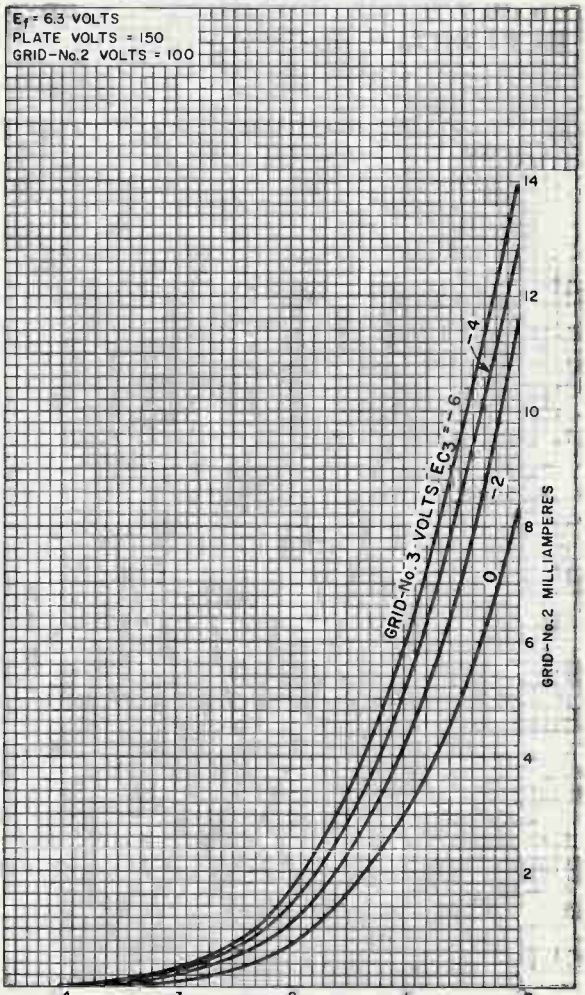
6HZ6

AVERAGE CHARACTERISTICS



92CM—11793

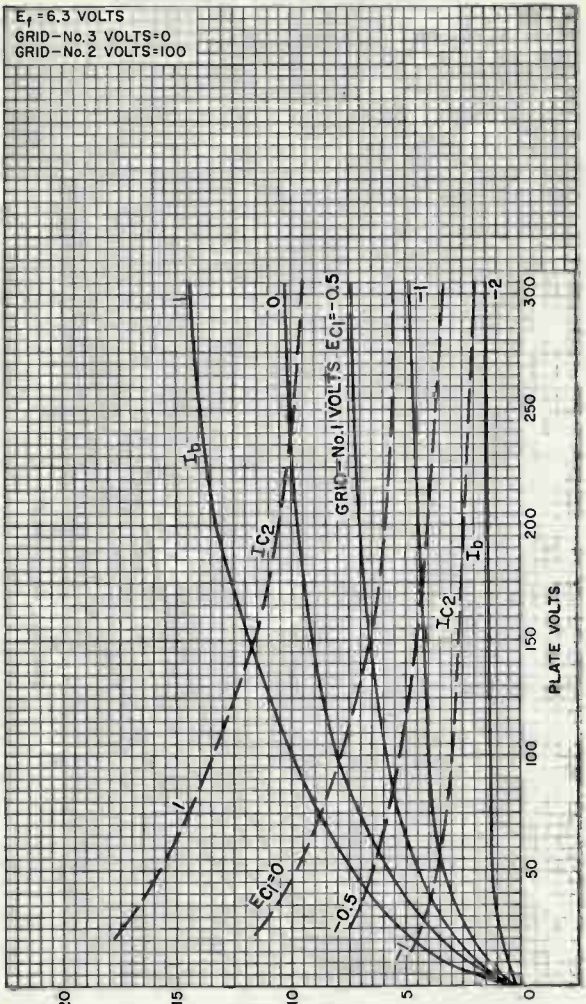
AVERAGE CHARACTERISTICS



92CM-11791

6HZ6

AVERAGE CHARACTERISTICS

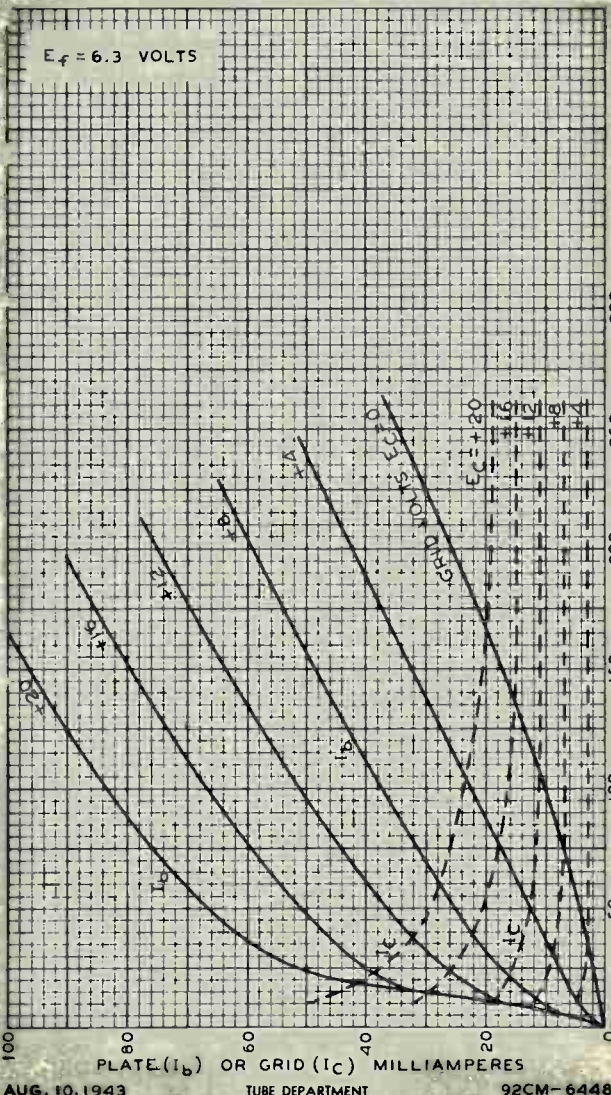


92CM–11792

RCA

6J5

AVERAGE PLATE CHARACTERISTICS

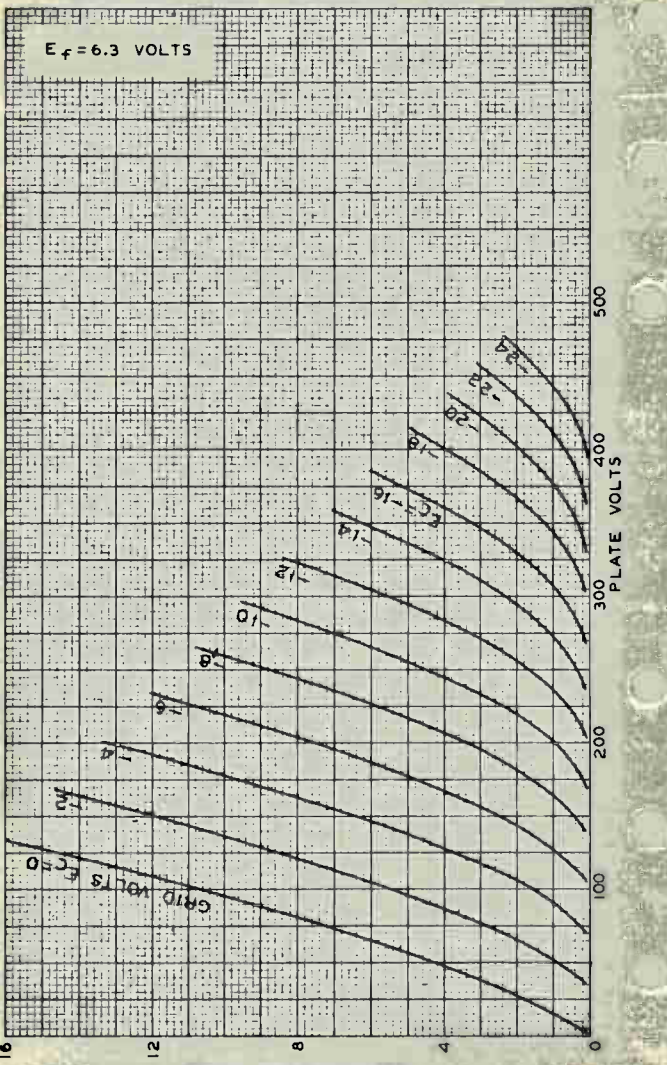


AUG. 10, 1943 TUBE DEPARTMENT 92CM-6448
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6J5

RCA

6J5
AVERAGE PLATE CHARACTERISTICS



APRIL 27, 1943 TUBE DEPARTMENT 92CM-4771R1

RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

Medium-Mu Twin Triode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.45 ± 6%	amp
Warm-up time (Average)	11	sec

Direct Interelectrode Capacitances (Approx.):

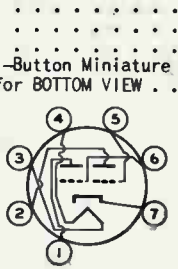
	Without External Shield	*With External Shield*[a]	
Unit No.1			
Grid to plate	1.6	1.5	μμf
Grid to cathode and heater	2.2	2.6	μμf
Plate to cathode and heater	0.4	1.6	μμf
Unit No.2			
Grid to plate	1.6	1.5	μμf
Grid to cathode and heater	2.2	2.6	μμf
Plate to cathode and heater	0.4	1	μμf

Characteristics, Class A_1 Amplifier (Each Unit):

Plate Supply Voltage	100	volts
Cathode Resistor[b]	50[c]	ohms
Amplification Factor	38	
Plate Resistance (Approx.)	7100	ohms
Transconductance	5300	μmhos
Plate Current	8.5	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BF



Pin 1 – Plate of Unit No.2
Pin 2 – Plate of Unit No.1
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Grid of Unit No.1
Pin 6 – Grid of Unit No.2
Pin 7 – Cathode

6J6A

AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Positive-bias value	0 max.	volts
PLATE DISSIPATION	1.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	0.5 max.	megohm

RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy

Key-down conditions per tube without modulation

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

DC PLATE VOLTAGE	300 max.	volts
DC GRID VOLTAGE:		
Negative-bias value	40 max.	volts
Positive-bias value	0 max.	volts
DC PLATE CURRENT	15 max.	ma
DC GRID CURRENT	8 max.	ma
DC PLATE INPUT	4.5 max.	watts
PLATE DISSIPATION	1.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Typical Push-Pull Operation at Frequencies up to 50 Mc:[d]

Values are for Both Units

DC Plate Voltage	150	volts
DC Grid Voltage:		
From a fixed supply of	-10	volts
From a grid resistor of	625	ohms
From a cathode resistor of	220	ohms
DC Plate Current	30	ma
DC Grid Current (Approx.)[e]	16	ma
Driving Power (Approx.)[e]	0.35	watt
Useful Power Output (Approx.)[c]	3.5	watts

[a] With external shield JEDEC No.316 connected to cathode.

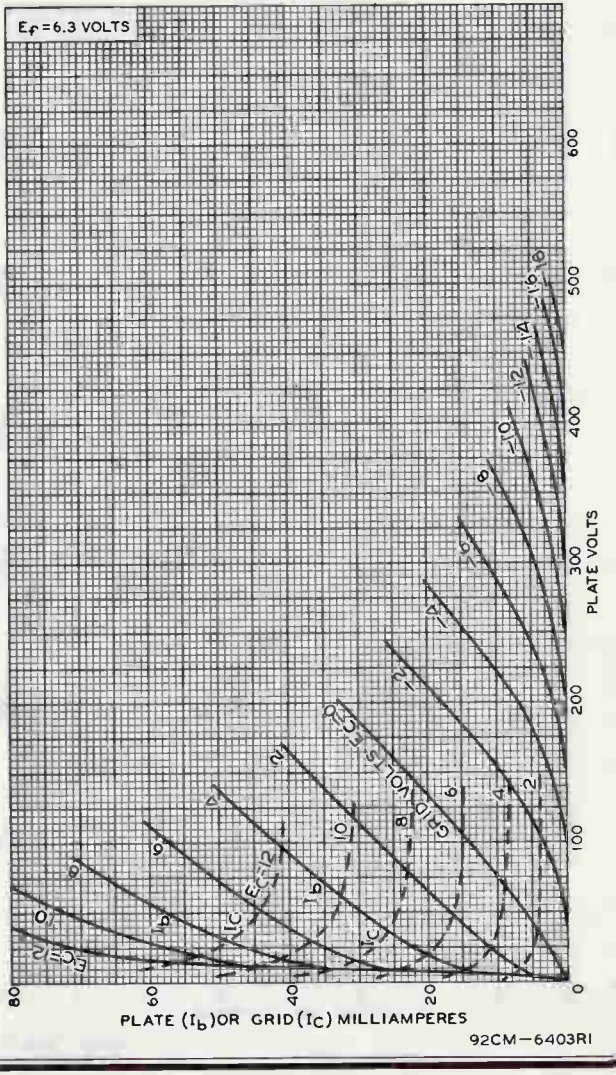
[b] Fixed-bias operation is not recommended.

[c] Value is for both units operating at the specified conditions.

[d] Approximately 1 watt can be obtained when the 6J6A is used at 250 Mc as a push-pull oscillator with a plate voltage of 150 volts, with maximum-rated plate dissipation, and with a grid resistor of 2000 ohms common to both units

[e] For effect of load resistance on grid current and driving power, refer to *TUBE RATINGS—Grid Current and Driving Power* in the *General Section*.

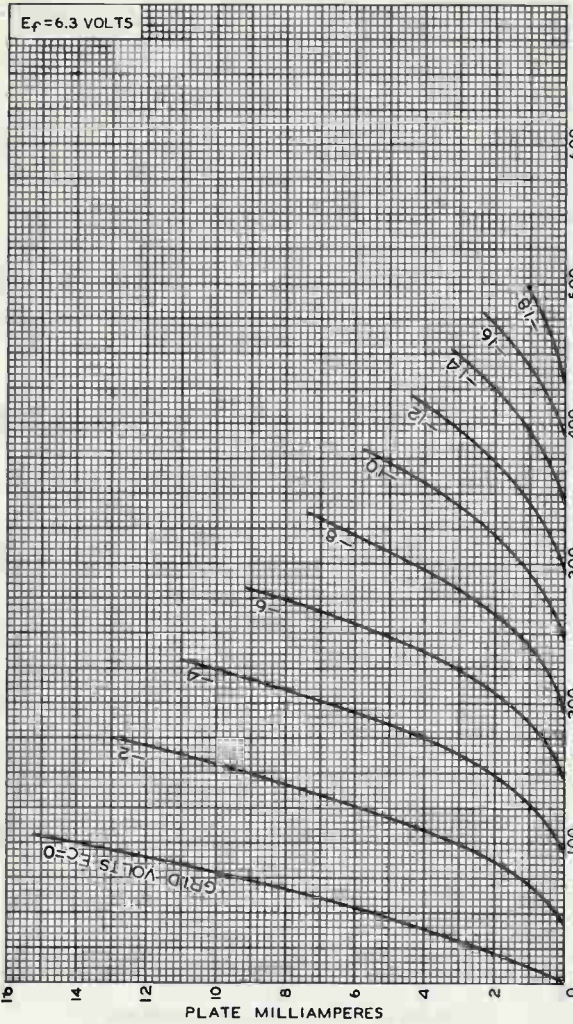
AVERAGE CHARACTERISTICS
Each Unit



92CM—6403RI

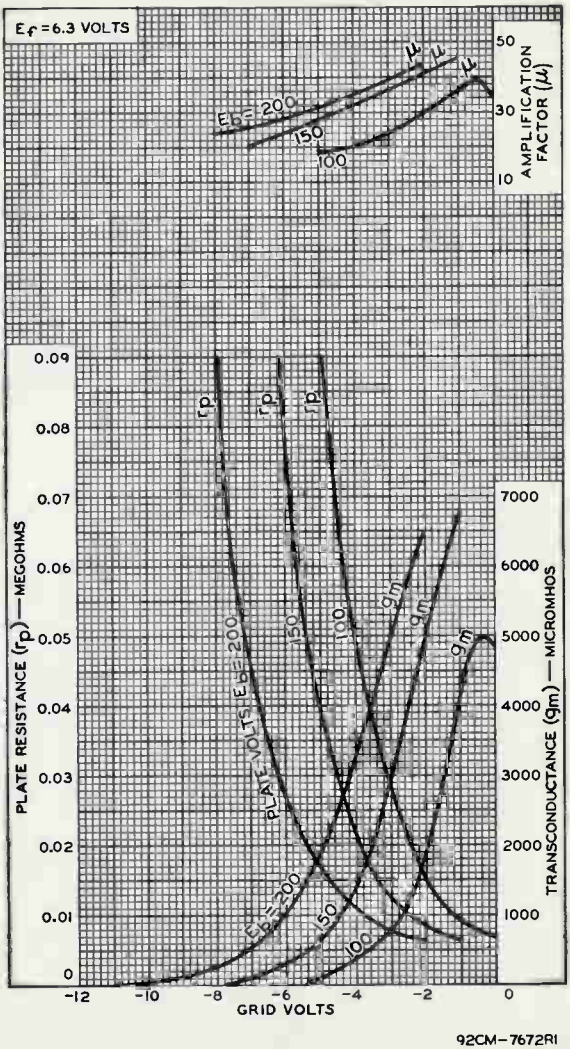
6J6A

AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM—6402RI

AVERAGE CHARACTERISTICS
Each Unit



92CM-7672R1

Pentode—
Beam Power Tube

For Combined Limiter, Quadrature-Grid Discriminator, and Audio Power Output Applications in FM and TV Receivers

DUODECAR TYPE

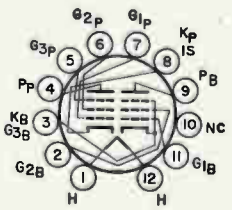
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.950	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Direct Interelectrode Capacitances:[b]		
Beam Power Unit:		
Grid No.1 to plate	0.2	pf
Input: $G1_B$ to (K_B+$G3_B$,$G2_B$,H)	11	pf
Output: P_B to (K_B+$G3_B$,$G2_B$,H)	7.0	pf
Pentode Unit:		
Grid No.1 to plate	0.01	pf
$G1_P$ to (K_P+IS, P_P, $G3_P$, $G2_P$, H)	4.0	pf
$G3_P$ to (K_P+IS, P_P, $G2_P$, $G1_P$, H)	3.2	pf

Mechanical:

Operating Position	Any
Types of Cathodes	Coated Unipotential
Maximum Overall Length	2.375"
Seated Length	1.750" to 2.000"
Diameter	1.062" to 1.188"
Dimensional Outline (JEDEC 9-58)	See *General Section*
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC E12-70)
Basing Designation for BOTTOM VIEW	12BT

Pin 1 – Heater
Pin 2 – Beam Power Grid No.2
Pin 3 – Beam Power Cathode, Beam Power Grid No.3
Pin 4 – Pentode Plate
Pin 5 – Pentode Grid No.3
Pin 6 – Pentode Grid No.2
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Cathode, Internal Shields
Pin 9 – Beam Power Plate
Pin 10 – No Internal Connection
Pin 11 – Beam Power Grid No.1
Pin 12 – Heater



PENTODE UNIT — LIMITER & DISCRIMINATOR SERVICE

Maximum Ratings, *Design-Maximum Values:*

Plate Supply Voltage	330	volts
Grid-No.3 (Quadrature-Grid) Voltage	c	
Grid-No.2 (Accelerator-Grid) Voltage	110	volts
Grid-No.1 (Limiter-Grid) Voltage:		
Positive-peak value	60	volts
Cathode Current	13	ma

Typical Operation:

Input-Signal Center Frequency	*4.5*	*10.7*	*10.7*	*Mc*
Plate Supply Voltage	270	85	285	volts
Plate Voltage	62	121	122	volts
Grid-No.3 Voltage	c	c	c	c
Grid-No.2 Voltage	100	55	100	volts
Cathode-Circuit Resistance[d]	200-400	200-400	200-400	ohms
Peak AF Output Voltage	16.8	6	16.6	volts
Minimum Grid-No.1 Signal Voltage (RMS) for AM rejection[d]	2	1.25	2	volts
Minimum Grid-No.1 Signal Voltage (RMS) for limiting action[e]	1.25	1.25	1.25	volts
Plate Current	0.44	0.25	0.49	ma
Grid-No.2 Current	10	4.1	9.8	ma
Plate Load Resistor	0.33	0.085	0.33	megohm
Linearity Resistor	1000	470	1500	ohms
Integrating Capacitor	0.001	0.002	0.001	μf
Coupling Capacitor	0.25	0.25	0.01	μf
Frequency Deviation	±25	±75	±75	kc
AM Rejection:				
For grid-No.1 signal volts (RMS) = 2	25	31	20	db
For grid-No.1 signal volts (RMS) = 3	30	30	29	db
Total Harmonic Distortion	1.8	2	1.6	%

BEAM POWER UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

Plate Voltage	275	volts
Grid-No.2 (Screen-Grid) Voltage	275	volts
Plate Dissipation	10	watts
Grid-No.2 Input	2	watts

Typical Operation and Characteristics:

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 (Control-Grid) Voltage	-8	volts
Peak AF Grid-No.1 Voltage	8	volts

Zero-Signal Plate Current	35	ma
Max.-Signal Plate Current	39	ma
Zero-Signal Grid No.2 Current	2.5	ma
Max.-Signal Grid No.2 Current	7	ma
Plate Resistance (Approx.)	0.1	megohm
Transconductance	6500	μmhos
Load Resistance	5000	ohms
Total Harmonic Distortion	10	%
Max.-Signal Power Output	4.2	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation	0.25	megohm
For cathode-bias operation	0.5	megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] For proper operation of the pentode unit of the type shown in the accompanying Typical Quadrature-Grid-FM Detector Circuit, the Q of the tuned circuit (L_1, C_6) should be sufficiently high to develop a 4-volt rms signal at the quadrature grid when a 2-volt rms signal at the center frequency is applied to grid No.1.

It is recommended that L_1 be shunted by a capacitance of at least 10 μμf. This capacitance may be composed of tube capacitance, stray capacitance, the distributed capacitance of L_1, and a fixed capacitor.

[d] The cathode-circuit resistance should be adjusted for maximum AM rejection at the AF output of the circuit at the specified grid-No.1 signal voltage. AM rejection is measured with an applied signal containing 30 per cent amplitude modulation and 30 per cent frequency modulation.

[e] At signal levels above specified value, limiting is within ±3 decibels.

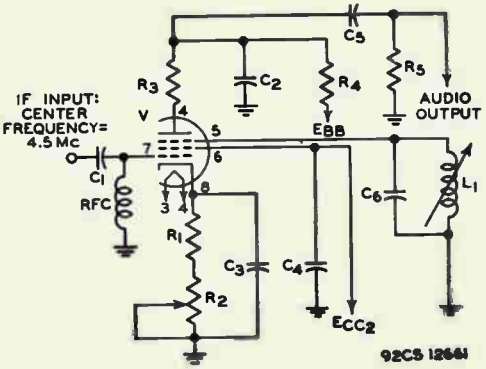
OPERATING CONSIDERATIONS FOR PENTODE UNIT

To insure proper phasing of the signal voltage developed at the quadrature grid, the components of the quadrature-grid circuit should be shielded from those of the control-grid circuit.

To obtain a symmetrical discriminator-response curve, the plate currents for no input signal and for unmodulated input signal should be equal. To assure this equality, it is necessary that the plate voltage and grid-No.2 voltage have the proper values.

The proper plate voltage for any grid-No.2 voltage may be determined from the accompanying *Operating Characteristics, Pentode Unit* curve. This curve may also be used to determine the average dynamic plate current for any combination of grid-No.2 voltage and plate voltage.

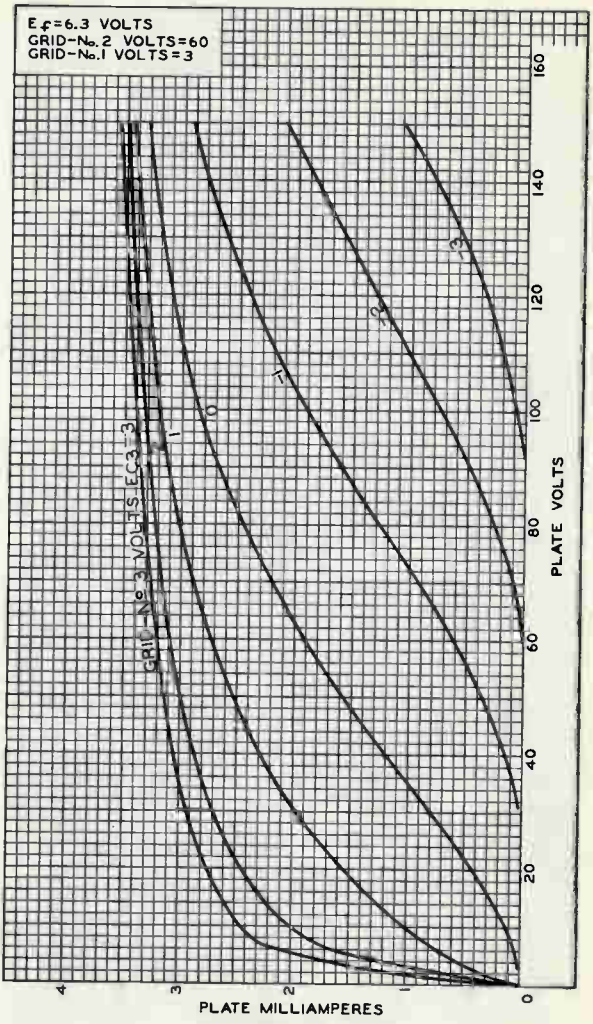
TYPICAL QUADRATURE-GRID-FM-DETECTOR CIRCUIT



C_1: 100 $\mu\mu$f
C_2: Integrating capacitor, 0.001 μf
C_3, C_4: 0.01 μf
C_5: 0.25 μf
C_6: 10 $\mu\mu$f[c]
L_1: c
R_1: 200 ohms
R_2: Cathode-bias potentiometer, 200 ohms
R_3: Linearity resistor, 1000 ohms
R_4: Plate-load resistor, 0.33 megohm
R_5: 0.47 megohm
V: Pentode Unit of Electron-tube-type 6J10

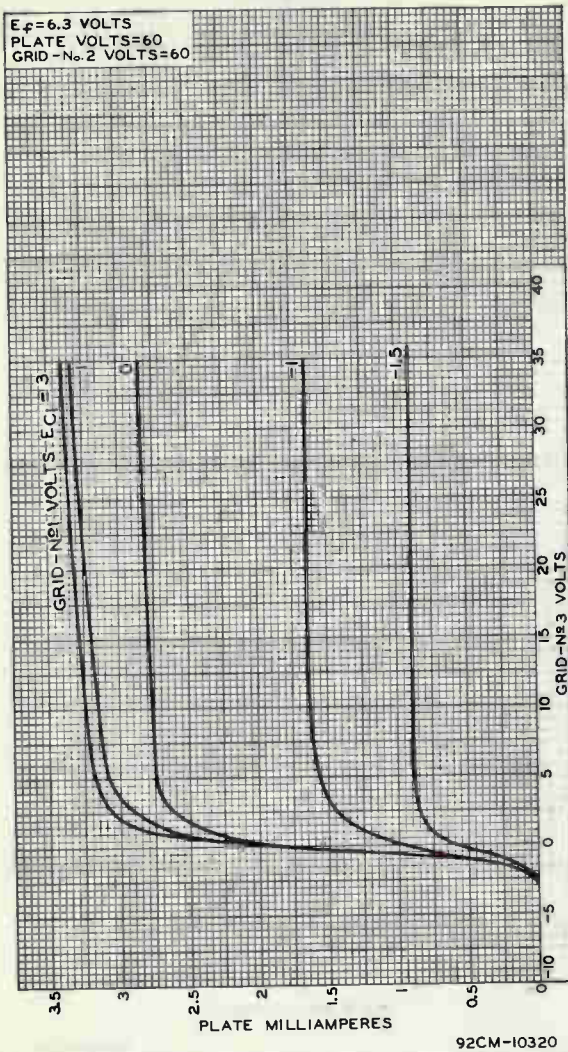
[c] For footnote see end of data.

AVERAGE PLATE CHARACTERISTICS
Pentode Unit



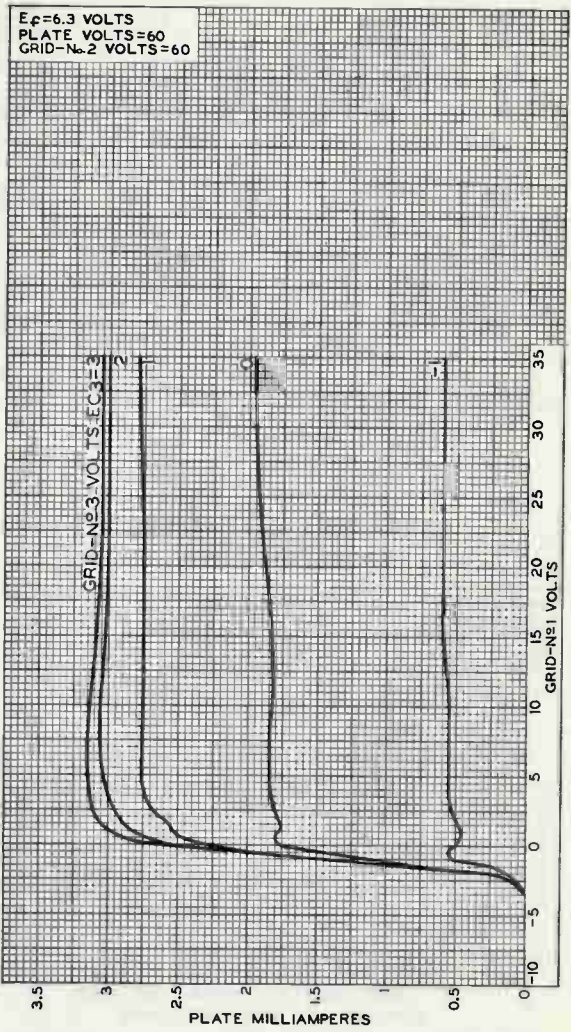
92CM-10319

AVERAGE CHARACTERISTICS
Pentode Unit



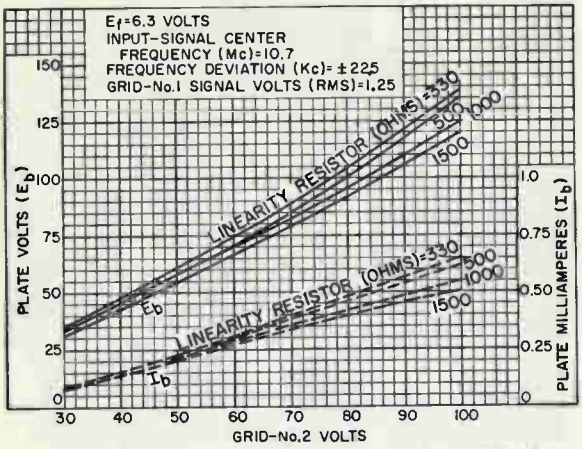
92CM-10320

AVERAGE CHARACTERISTICS
Pentode Unit

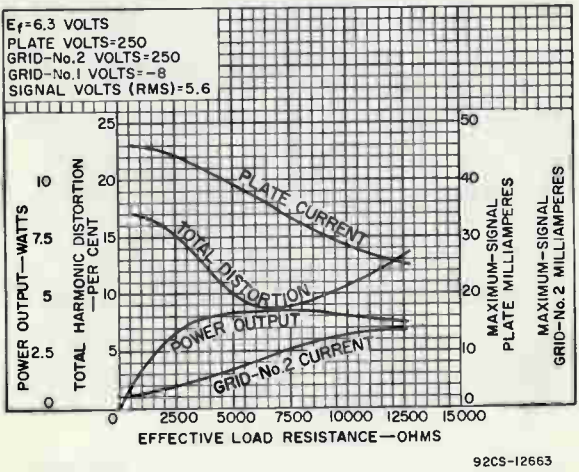


92CM-10322

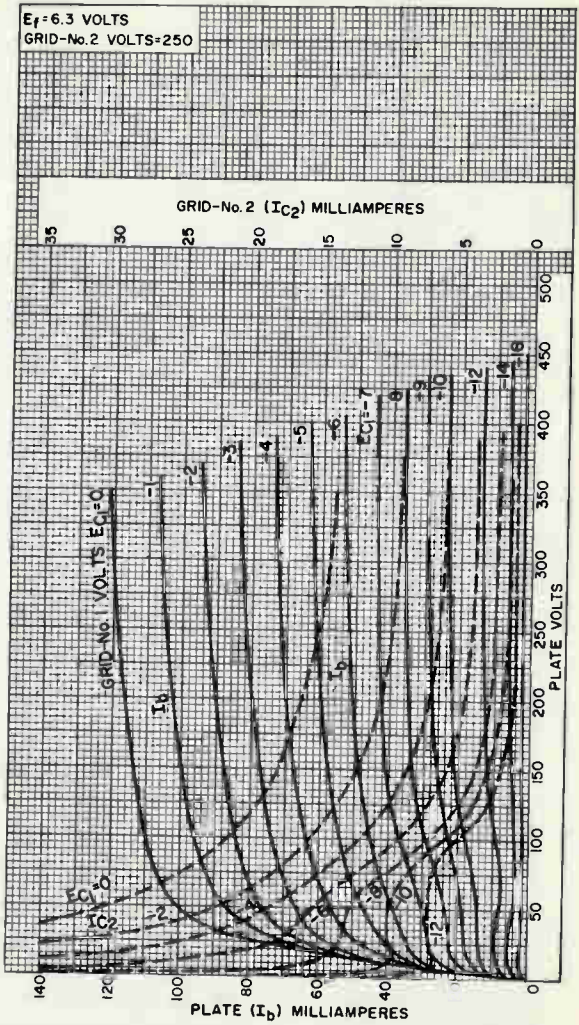
OPERATION CHARACTERISTICS
Pentode Unit



OPERATION CHARACTERISTICS
Beam Power Unit



AVERAGE CHARACTERISTICS
Beam Power Unit



92CM-12669

6JB6A

Beam Power Tube

NOVAR TYPE
SEPARATE GRID-No.3 BASE-PIN TERMINAL FOR "SNIVETS" CONTROL[a]
For Horizontal-Deflection-Amplifier Service in Black-and-White TV Receivers

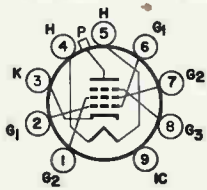
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[b] max.	volts
Direct Interelectrode Capacitances (Approx.):[c]		
Grid No.1 to plate	0.2	pf
Input: G1 to (K+G3,G2,H)	15.0	pf
Output: P to (K+G3,G2,H)	6.0	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.505"
Seated Length	2.875" ± 3.125"
Diameter	1.438" ± 1.562"
Dimensional Outline	See *General Section*
Bulb	T12
Cap	Skirted Miniature (JEDEC No.C1-2 or C1-3)
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-88)
Basing Designation for BOTTOM VIEW	9QL

Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.1
Pin 7 - Grid No.2
Pin 8 - Grid No.3
Pin 9 - Do Not Use
Cap - Plate



Characteristics, Class A_1 Amplifier:

	Triode Connection	*Pentode Connection*		
Plate Voltage	150	60	250	volts
Grid No.3	–	*Connected to cathode at socket*		
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	-22.5	0	-22.5	volts
Amplification Factor	4.4	–	–	
Plate Resistance (Approx.)	–	–	15000	ohms

6JB6A

	Triode Connection	Pentode Connection		
Transconductance	-	-	7100	μmhos
Plate Current	-	390[d]	70	ma
Grid-No.2 Current	-	32[d]	2.1	ma
Grid-No.1 Voltage (Approx.) for plate current = 1 ma.	-	-	-42	volts

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC Plate-Supply Voltage	770 max.	volts
Peak Positive-Pulse Plate Voltage[f]	6500 max.	volts
Peak Negative-Pulse Plate Voltage	1500 max.	volts
DC Grid-No.3 Voltage[a]	70 max.	volts
DC Grid-No.2 (Screen-Grid) Voltage	220 max.	volts
DC Grid-No.1 (Control-Grid) Voltage	-55 max.	volts
Peak Negative-Pulse Grid-No.1 Voltage	330 max.	volts
Cathode Current:		
Peak	550 max.	ma
Average	175 max.	ma
Grid-No.2 Input	3.5 max.	watts
Plate Dissipation[g]	17.5 max.	watts
Bulb Temperature (At hottest point on bulb surface)	240 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For grid-resistor bias operation[f]	1 max.	megohm

[a] A positive voltage may be applied to grid No.3 to reduce interference from "snivets" which may occur in television receivers. A typical value for this voltage is 30 volts.

[b] The dc component must not exceed 100 volts.

[c] Without external shield.

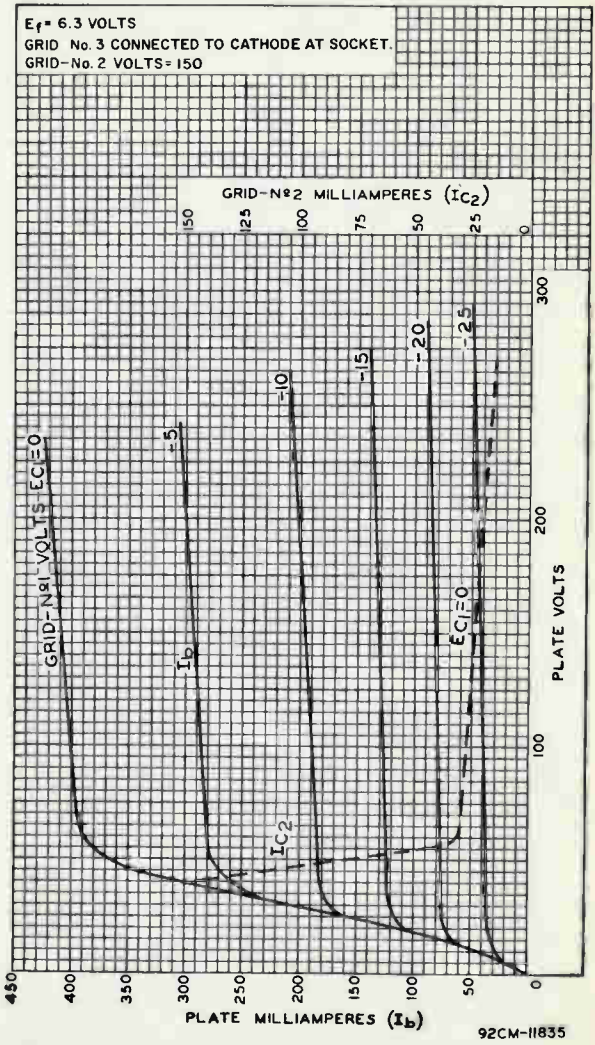
[d] This value can be measured by a method involving a recurrent wave form such that the plate dissipation, grid-No.2 input, and cathode current will be kept within ratings in order to prevent damage to the tube.

[e] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

[f] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525 line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[g] It is essential that the plate dissipation be limited in the event of loss of grid signal. For this purpose, some protective means such as a cathode resistor of suitable value should be employed.

AVERAGE CHARACTERISTICS



Beam Power Tube

NOVAR TYPE

SEPARATE GRID-No.3 BASE-PIN TERMINAL FOR "SNIVETS" CONTROL[a]

For Horizontal-Deflection-Amplifier Service
In Low-B+ Black-and-White TV Receivers

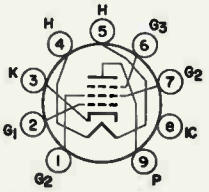
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.600	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[b] max.	volts
Direct Interelectrode Capacitances (Approx.)[c]		
Grid No.1 to plate	0.7	pf
Input: G1 to (K,G3,G2,H)	22.0	pf
Output: P to (K,G3,G2,H)	9.0	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.130"
Seated Length	2.500" to 2.750"
Diameter	1.438" to 1.562"
Dimensional Outline	See *General Section*
Bulb	T12
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-88)
Basing Designation for BOTTOM VIEW	9QU

Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.3
Pin 7 - Grid No.2
Pin 8 - Do Not Use
Pin 9 - Plate



Characteristics, Class A_1 Amplifier:

	Triode Connection[d]	*Pentode Connection*		
Plate Voltage	125	50	130	volts
Grid No.3	*Connected to cathode at socket*			
Grid-No.2 Voltage	–	125	125	volts
Grid-No.1 Voltage	-20	0	-20	volts
Amplification Factor	4.1	–	–	
Plate Resistance (Approx.)	–	–	12000	ohms
Transconductance	–	–	10000	μmhos
Plate Current	–	525[e]	80	ma
Grid-No.2 Current	–	32[e]	2.5	ma
Grid-No.1 Voltage (Approx.) for plate ma = 1	–	–	-40	volts

6JG6A

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[f]

DC Plate Supply Voltage	770 max.	volts
Peak-Positive-Pulse Plate Voltage[g]	6500 max.	volts
Peak Negative-Pulse Plate Voltage	1500 max.	volts
DC Grid-No.3 (Suppressor-Grid) Voltage[a]	75 max.	volts
DC Grid-No.2 (Screen-Grid) Voltage	220 max.	volts
DC Grid-No.1 (Control-Grid) Voltage:		
Negative-bias value	55 max.	volts
Peak Negative-Pulse Grid-No.1 Voltage	330 max.	volts
Cathode Current:		
Peak	950 max.	ma
Average	275 max.	ma
Grid-No.2 Input	3.5 max.	watts
Plate Dissipation[h]	17 max.	watts
Bulb Temperature (At hottest point on bulb surface)	220 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For grid-No.1-resistor-bias operation	2.2 max.	megohms

[a] A positive voltage may be applied to grid No.3 to reduce interference from "snivets" which may occur in television receivers. A typical value for this voltage is 30 volts.

[b] The dc component must not exceed 100 volts.

[c] Without external shield.

[d] With grid No.2 connected to plate at socket.

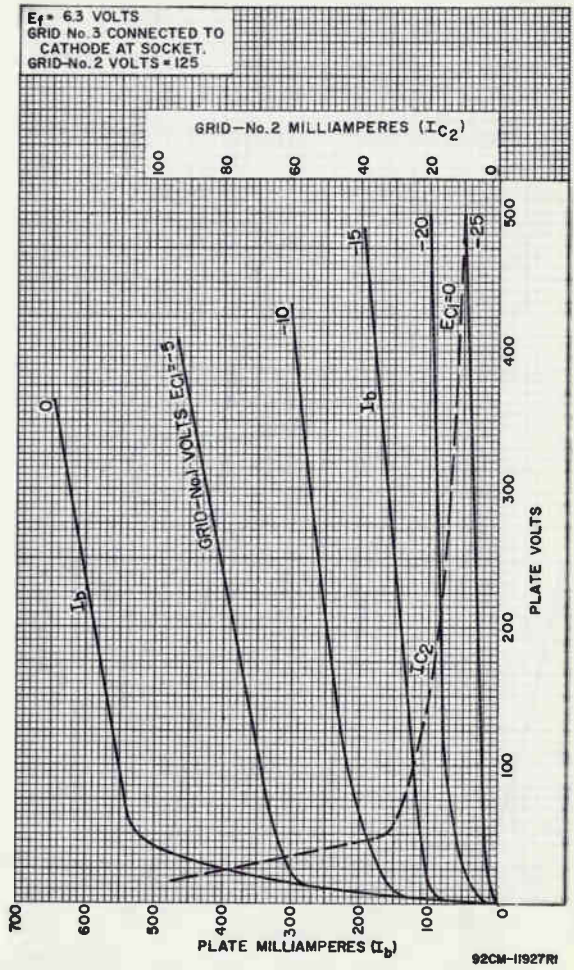
[e] This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

[f] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[g] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system 15 per cent of one horizontal scanning cycle is 10 microseconds.

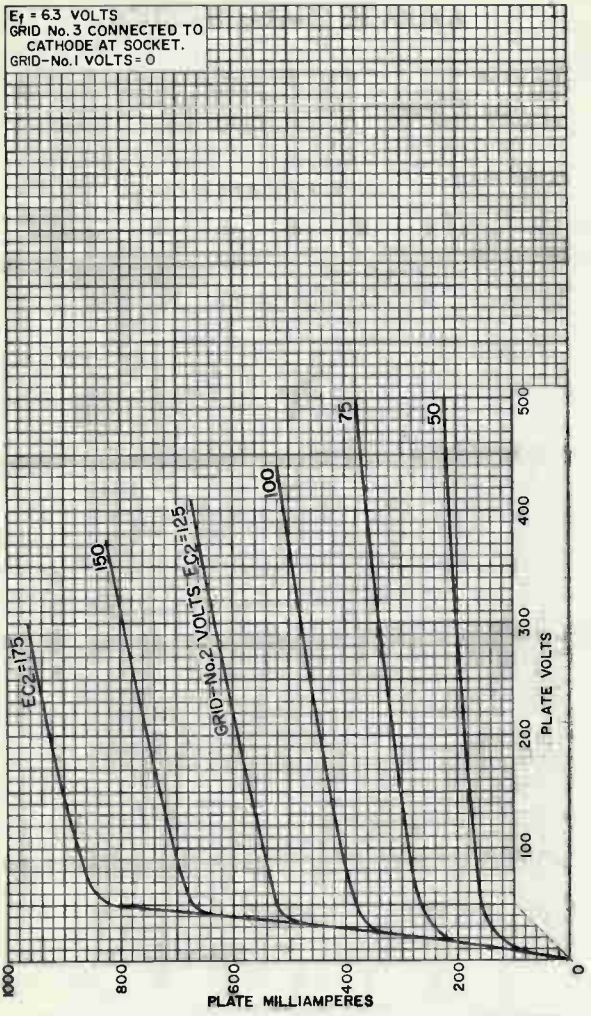
[h] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

AVERAGE CHARACTERISTICS



6JG6A

AVERAGE PLATE CHARACTERISTICS



92CM-11923RI

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE
FRAME-GRID CONSTRUCTION — DARK HEATER

For Use in IF-Amplifier Stages of Color- and Black-and-White TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values[a]

Heater Voltage (AC or DC)	E_h	6.3	V
Heater Current	I_h	0.300	A
Direct Interelectrode Capacitances			
Without external shield			
Grid No.1 to plate	c_{g1-p}	0.019 max	pF
Input: G1 to (K, G3+IS, G2, H)	c_i	8.5	pF
Output: P to (K, G3+IS, G2, H)	c_o	3.0	pF
For the following characteristics, see Conditions			
Plate Resistance (Approx.)	r_p	180	Ω
Transconductance	g_m	16000	μmho
DC Plate Current	I_b	14	mA
DC Grid-No.2 Current	I_{c2}	3.4	mA
Cutoff DC Grid-No.1 Voltage. Plate μA = 100	$E_{c1(co)}$	-3	V

Conditions

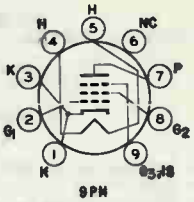
Heater Voltage	E_h	Bogey Value	V
DC Plate Supply Voltage	E_{bb}	125	V
Grid No.3	-	Connected to cathode at socket	
DC Grid-No.2 Supply Voltage	E_{cc2}	125	V
Cathode Resistor	R_k	56	Ω

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.187 in
Maximum Seated Length	1.937 in
Length, Base Seat to Bulb Top. Excluding tip	1.469 to 1.656 in
Maximum Diameter	0.875 in
Dimensional Outline (JEDEC 6-2)	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – No Internal Connection
Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Grid No.3, Internal Shield



DESIGN-MAXIMUM RATINGS

For operation as a Class A_1 Amplifier Tube

DC Plate Voltage	E_b	330	V
Positive DC Grid-No.3 (Suppressor-Grid) Voltage	E_{c3}	0	V
DC Grid-No.2 (Screen-Grid) Supply Voltage	E_{cc2}	330	V
DC Grid-No.2 Voltage	E_{c2}	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
DC Grid-No.1 (Control-Grid) Voltage			
Positive-bias value	E_{c1}	0	V
Heater-Cathode Voltage			
Peak	e_{hkm}	±200	V
DC	E_{hk}	100	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V
Grid-No.2 Input	P_{g2}		
For $E_{c2} \leq 165$ V	-	0.7	W
For $E_{c2} \geq 165$ V and ≤ 330 V	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	P_b	3.1	W

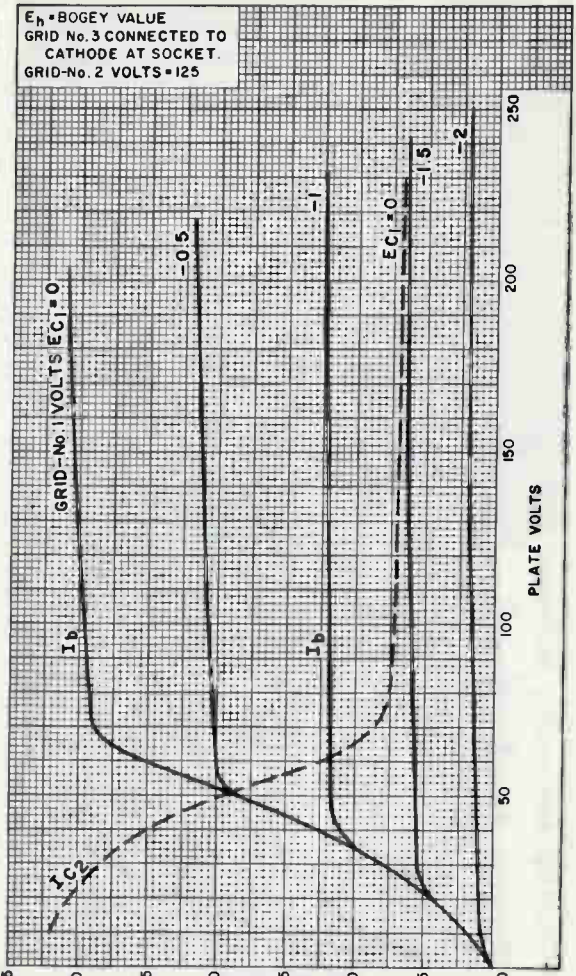
MAXIMUM CIRCUIT VALUES

Grid-No.1 Circuit Resistance	$R_{g1(ckt)}$		
For fixed-bias operation		0.25	MΩ
For cathode-bias operation	-	1	MΩ

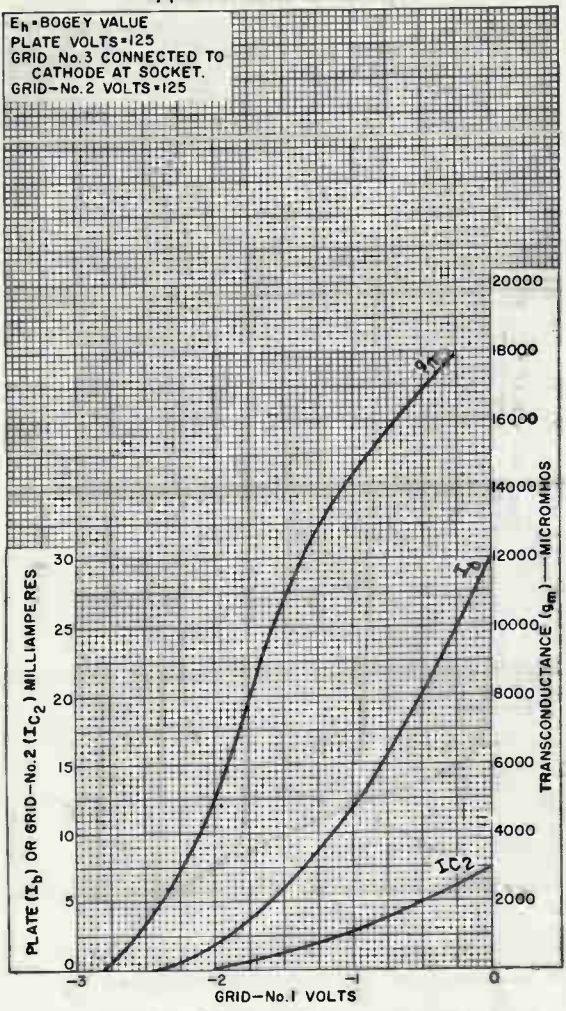
[a] Unless otherwise specified.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics



Typical Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*

Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	–	sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[d]	
Triode Unit:			
Grid to plate	1.3	1.2	μμf
Grid to cathode and heater	2.8	3.2	μμf
Plate to cathode and heater	0.44	0.9	μμf
Pentode Unit:			
Grid No.1 to plate	0.038 max.	0.018 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	4.8	5.0	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	0.9	1.6	μμf
Pentode grid No.1 to triode plate	0.05 max.	0.036 max.	μμf
Pentode plate to triode plate	0.075 max.	0.012 max.	μμf
Heater to cathode	6.5	6.5[e]	μμf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*		
Plate Voltage	125	100	125	volts
Grid-No.2 Voltage	–	70	125	volts
Grid-No.1 Voltage	−1	0	−1	volt
Amplification Factor	40	–	–	
Plate Resistance (Approx.)	6000	–	300000	ohms
Transconductance	6500	5700	5500	μmhos

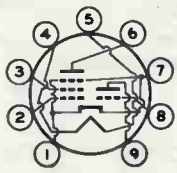
6JC8

	Triode Unit	*Pentode Unit*	
Plate Current	12	– 9	ma
Grid-No.2 Current	–	– 2.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	–7	– 6.5	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9PA

Pin 1 – Pentode Grid No.3, Cathode, Internal Shield
Pin 2 – Pentode Grid No.1
Pin 3 – Pentode Grid No.2
Pin 4 – Heater



Pin 5 – Heater
Pin 6 – Pentode Plate
Pin 7 – Pentode Grid No.3, Cathode, Internal Shield
Pin 8 – Triode Grid
Pin 9 – Triode Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	275 max.	275 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	275 max.	volts
GRID-No.2 VOLTAGE	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	0 max.	volts
PLATE DISSIPATION	1.7 max.	2.3 max.	watts
GRID-No.2 INPUT: For grid-No.2 voltages up to 137.5 volts	–	0.45 max.	watt
For grid-No.2 voltages between 137.5 and 275 volts	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance: For fixed-bias operation	–	0.1 max.	megohm
For cathode-bias operation	–	0.5 max.	megohm

[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] With external shield JEDEC No.315 connected to pin 3 except as noted.
[e] With external shield JEDEC No.315 connected to pin 6.

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE
FRAME-GRID CONSTRUCTION

For Use as High-Gain Intermediate-Frequency-Amplifier Tube in Television Receivers. No External Shield Required. Cutoff Characteristic Approaching Semiremote.

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.300		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances:[b]			
Grid No.1 to plate	0.018	max.	pf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	8.2		pf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	3.0		pf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	125	volts
Grid-No.3 Voltage	0	volts
Grid-No.2 Supply Voltage	125	volts
Grid-No.1 Supply Voltage	0	volts
Cathode Resistor	56	ohms
Plate Resistance (Approx.)	160000	ohms
Transconductance	14000	μmhos
Plate Current	15	ma
Grid-No.2 Current	4	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 600	-4.5	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

6JD6

Basing Designation for BOTTOM VIEW. 9PM

Pin 1 –Cathode
Pin 2 –Grid No.1
Pin 3 –Cathode
Pin 4 –Heater
Pin 5 –Heater
Pin 6 –No Internal Connection

Pin 7 –Plate
Pin 8 –Grid No.2
Pin 9 –Grid No.3 Internal Shield

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

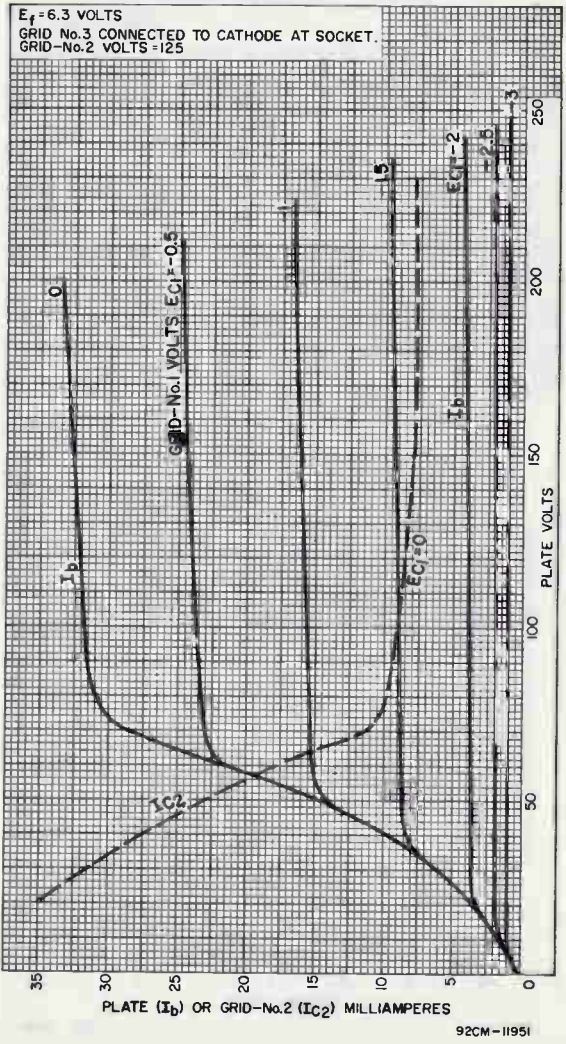
PLATE VOLTAGE	330 max.	volts
GRID-NO.3 (SUPPRESSOR-GRID) VOLTAGE:		
Positive value.	0 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE. . .	330 max.	volts
GRID-NO.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-NO.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-NO.2 INPUT:		
For grid-No.2 voltages up to 165 volts	0.6 max.	watt
For grid-No.2 voltages between 165 and 330 volts .	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.5 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation.	0.25 max.	megohm
For cathode-bias operation.	1 max.	megohm

[a] The dc component must not exceed 100 volts.
[b] Without external shield.

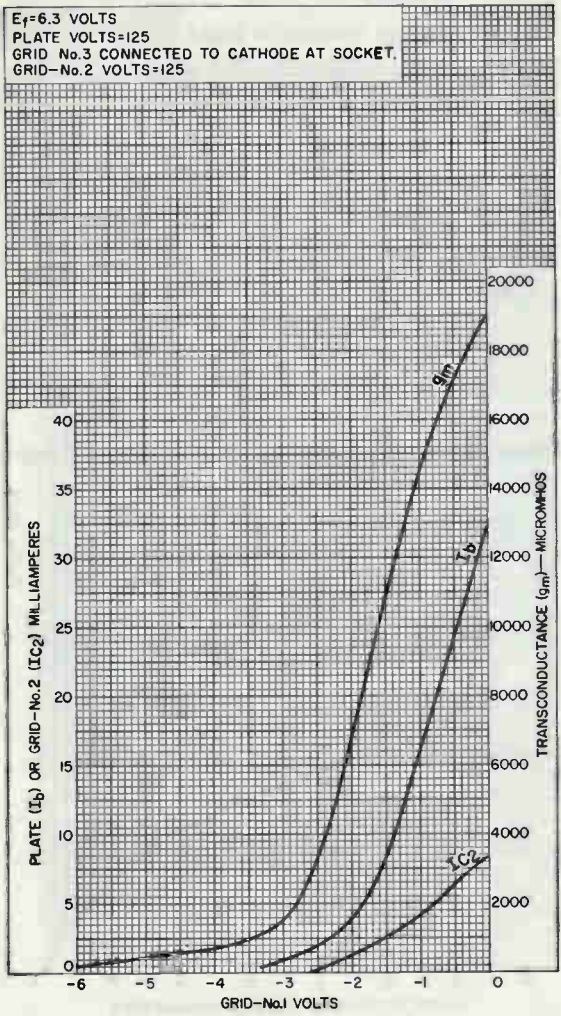
AVERAGE CHARACTERISTICS



92CM-11951

6JD6

AVERAGE CHARACTERISTICS



92CM-11952R1

Beam Power Tube

NOVAR TYPE

For Horizontal-Deflection-Amplifier Service in Low-B+, Black-and-White TV Receivers

ELECTRICAL

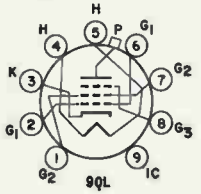
Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V	1.600	A
Maximum heater-cathode voltage:		
Heater negative with respect to cathode:		
Peak	200	V
Heater positive with respect to cathode:		
Peak	200	V
DC component	100	V
Direct Interelectrode Capacitances (Approx.)[a]		
Grid No.1 to plate	1.2	pF
Input: G1 to (K, G3, G2, H)	22.0	pF
Output: P to (K, G3, G2, H)	9.0	pF

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.550 in
Seated Length	2.910 to 3.170 in
Diameter	1.438 to 1.562 in
Dimensional Outline	See *General Section*
Bulb	T12
Cap	Skirted Miniature (JEDEC No.C1-2 or C1-3)
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-88)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Grid No.2
Pin 2 – Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.1
Pin 7 – Grid No.2
Pin 8 – Grid No.3
Pin 9 – Do Not Use
Cap – Plate



CHARACTERISTICS

Peak Positive-Pulse Plate Voltage[b]	6500	–	–	V
Plate Voltage	–	50	130	V
Grid No.3	Connected to cathode at socket			
Grid-No.2 Voltage	125	125	125	V
Grid-No.1 Voltage	–	0	-20	V
Plate Resistance (Approx.)	–	–	12000	Ω

Transconductance	-	-	10000	μmho
Plate Current	-	525[c]	80	mA
Grid-No.2 Current		32[c]	2.5	mA
Grid-No.1 Voltage (Approx.)	-125	-	-40	V
For plate mA = 1				
Triode Amplification Factor (Triode connection: grid No.2 connected to plate at socket. Plate volts = grid-No.2 volts = 125; grid-No.1 volts = -20)	-	-	4.1	

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, Design-Maximum Values

For operation in a 525-line, 30-frame system

DC Plate Supply Voltage	770	V
Peak Positive-Pulse Plate Voltage[d]	6500	V
Peak Negative-Pulse Plate Voltage	1500	V
DC Grid-No.3 Voltage[e]	100	V
DC Grid-No.2 (Screen-Grid) Voltage	220	V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	330	V
Cathode Current		
Peak	950	mA
Average	275	mA
Grid-No.2 Input	3.5	W
Plate Dissipation[f]	17	W
Bulb Temperature	240	°C
At hottest point on bulb surface		

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance		
For grid-resistor-bias operation[f]	0.47	MΩ
For plate-pulsed operation	10	MΩ
(Horizontal-deflection circuits only)		

[a] Without external shield.

[b] Under conditions shown in footnote[d].

[c] This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

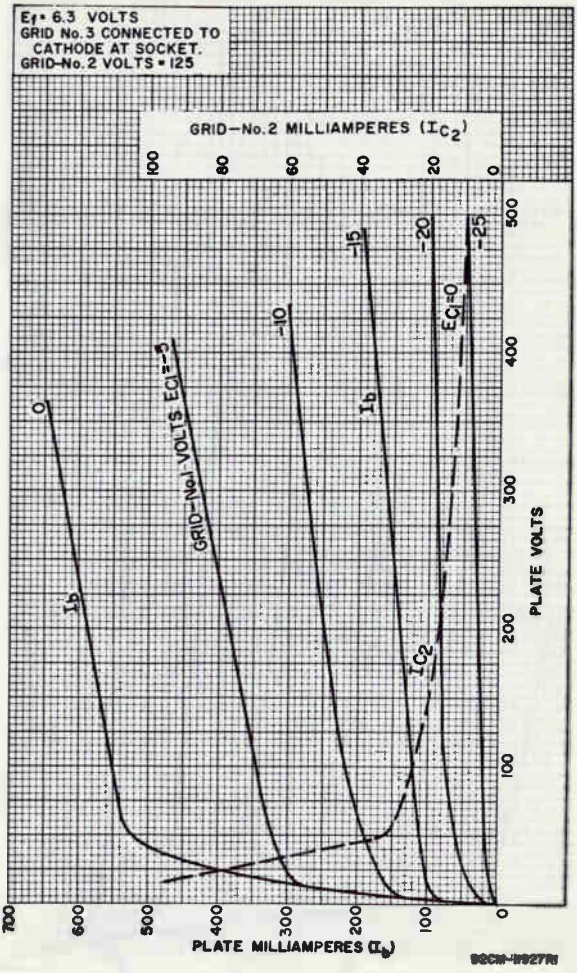
[d] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame sysyem, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[e] In horizontal-deflection-amplifier service, a positive voltage may be applied to grid No.3 to reduce interference from 'snivets' which may occur in both vhf and uhf television receivers. A typical value for this voltage is 50 volts.

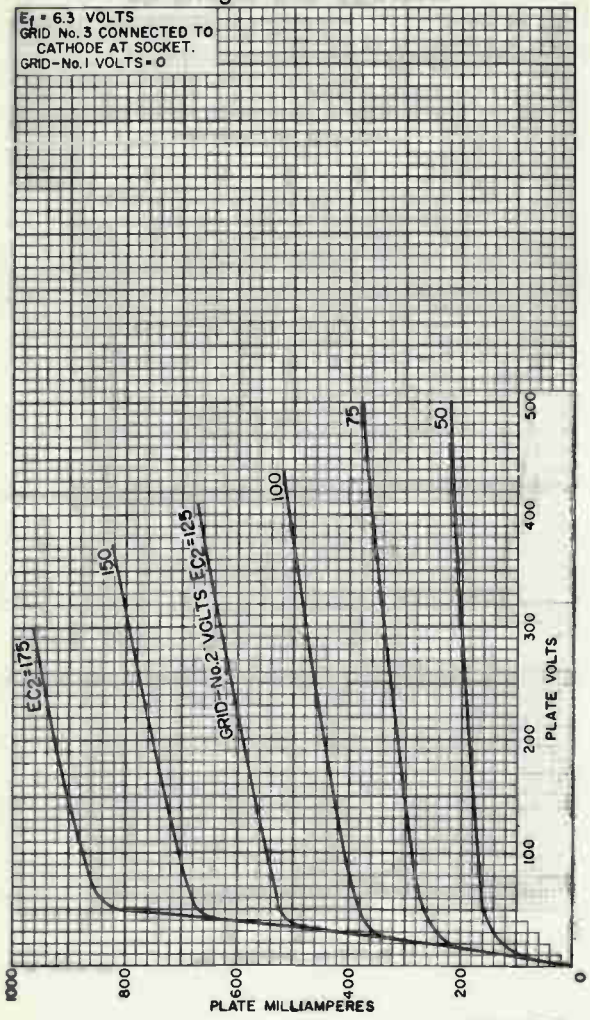
[f] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Average Characteristics



Average Characteristics



92CM-11923R2

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Semiremote-Cutoff Pentode

7-PIN MINIATURE TYPE

For Use in Gain-Controlled Picture-IF Amplifier Stages of Color TV Receivers

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.300	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200	volts
Heater positive with respect to cathode	200[a]	volts

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[b]	
Grid No.1 to plate	0.025 max.	0.015 max.	pf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	7	7	pf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2	3	pf

Characteristics, Class A$_1$ Amplifier:

Plate Supply Voltage	125	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	125	volts
Cathode Resistor	56	ohms
Plate Resistance (Approx.)	0.26	megohm
Transconductance	8000	μmhos
Plate Current	14	ma
Grid-No.2 Current	3.6	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 50 and cathode resistor (ohms) = 0	-19	volts
Transconductance Range for grid-No.1 volts = -4.5 and cathode resistor of 56 ohms	400 - 900	μmhos

Mechanical:

Mounting Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"

6JH6

Dimensional Outline . . . . . See *General Section*
Bulb. T5-1/2
Base. . . . . .Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW. 7CM

Pin 1 - Grid No.1
Pin 2 - Cathode
Pin 3 - Heater
Pin 4 - Heater
Pin 5 Plate
Pin 6 - Grid No.2
Pin 7 - Grid No.3, Internal Shield

AMPLIFIER — Class A[1]

Maximum Ratings, *Design-Maximum Values:*

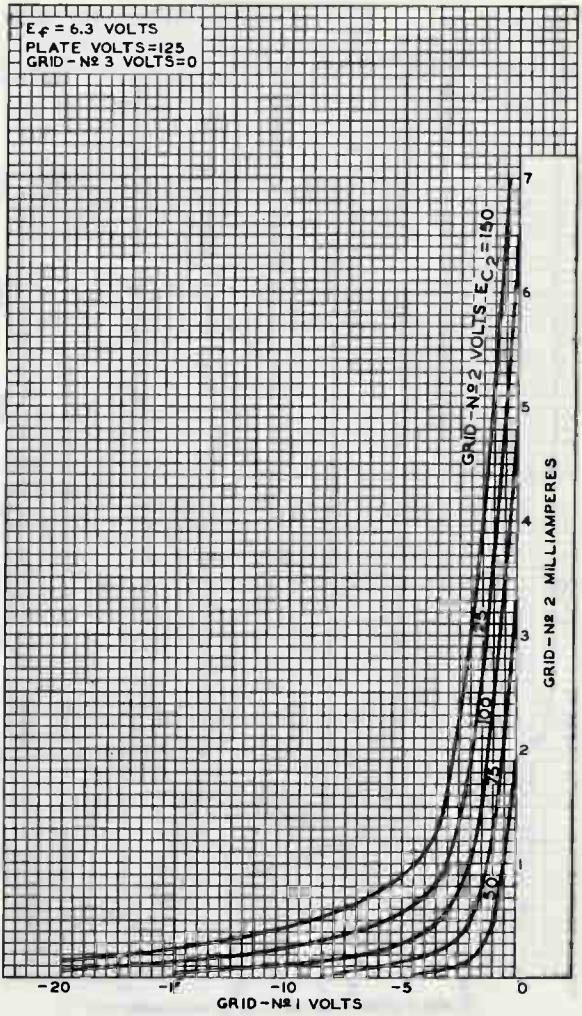
PLATE VOLTAGE	300 max. volts
GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE	0 max. volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300 max. volts
GRID-No.2 VOLTAGE . . . . . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:	
Positive-bias value	0 max. volts
GRID-No.2 INPUT:	
For grid-No.2 voltages up to 150 volts	0.55 max. watt
For grid-No.2 voltages between 150 and 300 volts . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.3 max. watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:	
For fixed-bias operation	0.25 max. megohm
For cathode-bias operation	1 max. megohm

[a] The dc component must not exceed 100 volts.
[b] With external shield JEDEC No.316 connected to cathode.

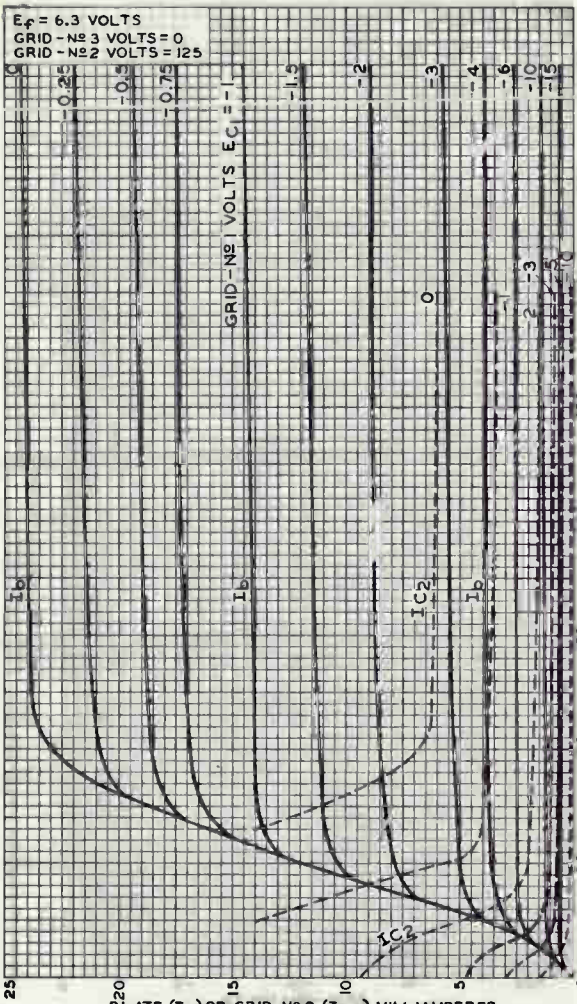
AVERAGE CHARACTERISTICS



92CM-9485RI

6JH6

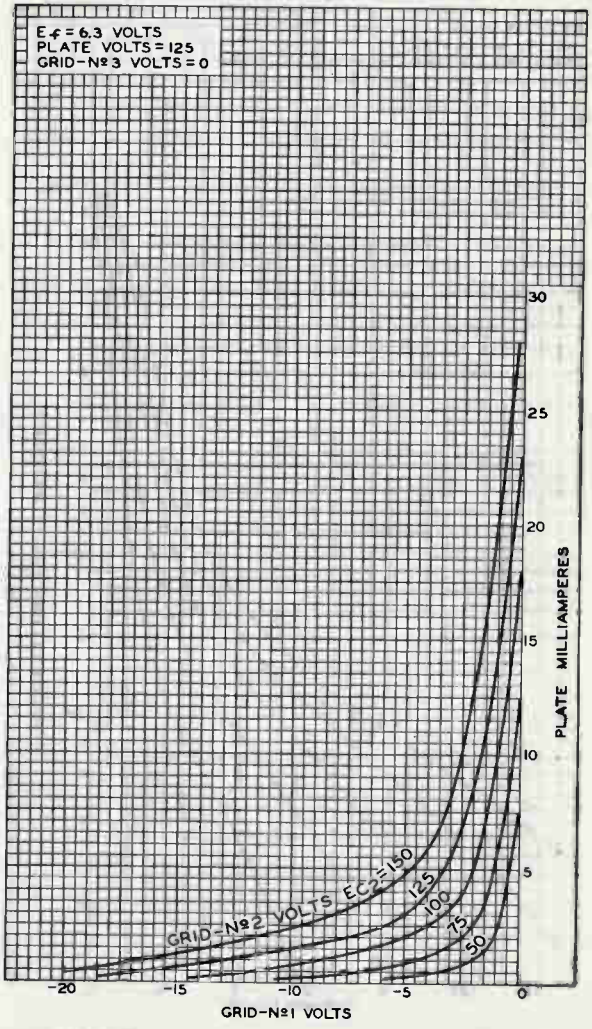
AVERAGE CHARACTERISTICS



92CM-8508R2

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

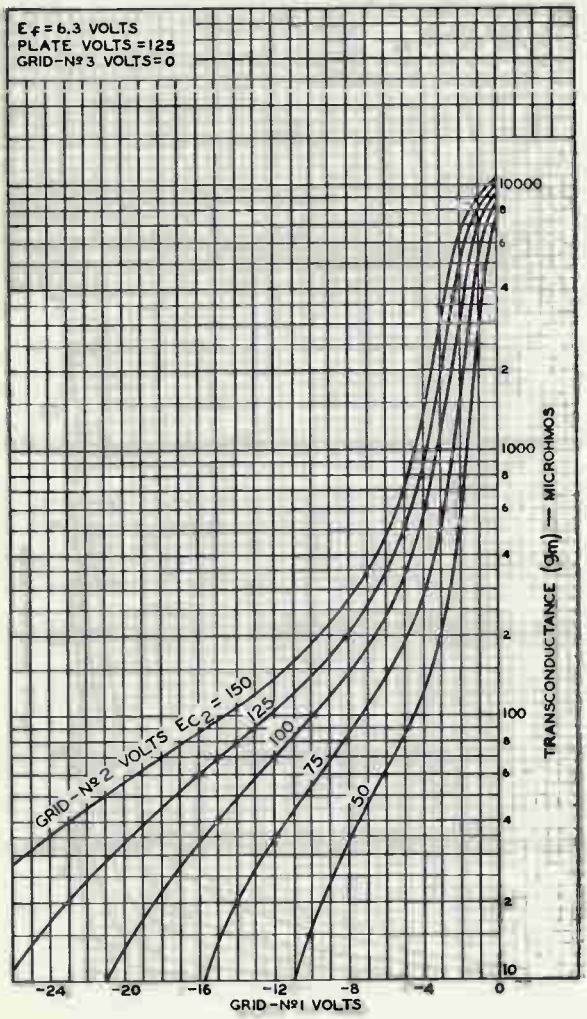
AVERAGE CHARACTERISTICS



92CM-9481RI

6JH6

AVERAGE CHARACTERISTICS



92CM-8509R1

Beam-Deflection Tube

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.300	amp
Direct Interelectrode Capacitances:[a]		
Grid No.1 to all other electrodes except both plates	7.5	μμf
Grid No.1 to deflecting electrode No.1	0.04 max.	μμf
Grid No.1 to deflecting electrode No.2	0.07 max.	μμf
Plate No.1 to all other electrodes	5.0	μμf
Plate No.2 to all other electrodes	5.0	μμf
Plate No.1 to plate No.2	0.4	μμf
Deflecting electrode No.1 to all other electrodes	4.8	μμf
Deflecting electrode No.2 to all other electrodes	4.8	μμf
Deflecting electrode No.1 to deflecting electrode No.2	0.38	μμf

Characteristics, Class A_1 Amplifier:

With both plates connected together and with both deflecting electrodes connected to cathode at socket

Plate-No.1 Supply Voltage	250	volts
Plate-No.2 Supply Voltage	250	volts
Grid-No.3 Voltage	250	volts
Cathode Resistor	220	ohms
Total Plate Current	14	ma
Grid-No.3 Current	1.5	ma
Transconductance	4400	μmhos
Grid-No.1 Voltage (Approx.) for total plate μa = 10	-13	volts

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

6JH8

Basing Designation for BOTTOM VIEW. 9DP

Pin 1 – Deflecting Electrode No.2
Pin 2 – Deflecting Electrode No.1
Pin 3 – Grid No.3
Pin 4 – Heater

Pin 5[b] – Heater, Internal Shield, Grid No.2
Pin 6 – Grid No.1
Pin 7 – Cathode
Pin 8 – Plate No.2
Pin 9 – Plate No.1

COLOR-TV DEMODULATOR

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE (Each plate). . . .	330 max.	volts
PEAK DEFLECTING-ELECTRODE VOLTAGE (Each electrode):		
Negative value.	165 max.	volts
Positive value.	165 max.	volts
GRID-No.3 (ACCELERATING-GRID) VOLTAGE	330 max.	volts
GRID-No.2 (FOCUSING-GRID) VOLTAGE	*Connect to cathode at socket*	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-No.3 INPUT	1 max.	watt
CATHODE CURRENT	33 max.	ma
PLATE DISSIPATION (Each plate). .	3 max.	watts

Typical Operation:

Plate Supply Voltage (Each plate)	250	volts
Grid-No.3 Voltage	250	volts
Grid No.2	*Connected to cathode at socket*	
Cathode Resistor.	220	ohms
Maximum Deflecting-Electrode Switching Voltage[c].	28	volts
Deflecting-Electrode Voltage for minimum deflecting-electrode switching voltage[c]. .	-14	volts
Voltage Difference Between Deflecting Electrodes for plate-No.1 current and plate-No.2 current to be equal. . . .	0	volts
Maximum Plate-No.1 Current for deflecting-electrode-No.1 volts = -15, and deflecting-electrode-No.2 volts = +15. . .	0.7	ma
Maximum Plate-No.2 Current for deflecting-electrode-No.1 volts = +15, and deflecting-electrode-No.2 volts = -15. . .	0.7	ma

Maximum Deflecting-Electrode-No.1 Current for deflecting-electrode-No.1 volts = +25, and deflecting-electrode-No.2 volts = -25	0.1	ma
Maximum Deflecting-Electrode-No.2 Current for deflecting-electrode-No.1 volts = -25, and deflecting-electrode-No.2 volts = +25	0.1	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation. . . .	0.1 max.	megohm
For cathode-bias operation. . .	0.25 max.	megohm

[a] Without external shield.

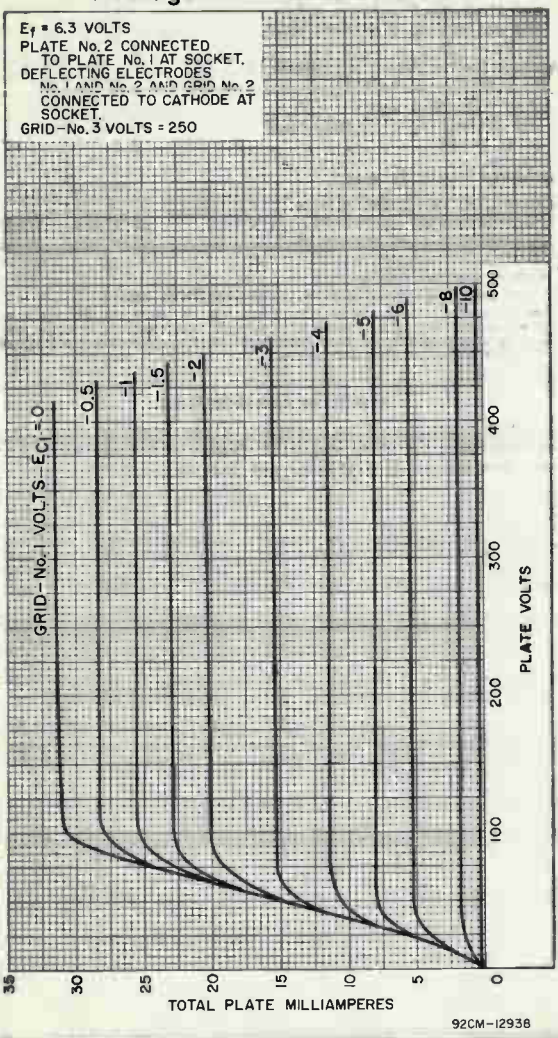
[b] Pin 5 should be connected directly to cathode at socket.

[c] The Deflecting-Electrode Switching Voltage is the total voltage change on either deflecting electrode with an equal and opposite voltage change on the other deflecting electrode required to switch the plate current from one plate to the other plate.

OPERATING CONSIDERATIONS

This type should be located in equipment so that it is not subjected to stray magnetic fields which may affect the intrinsic operating plate-current balance.

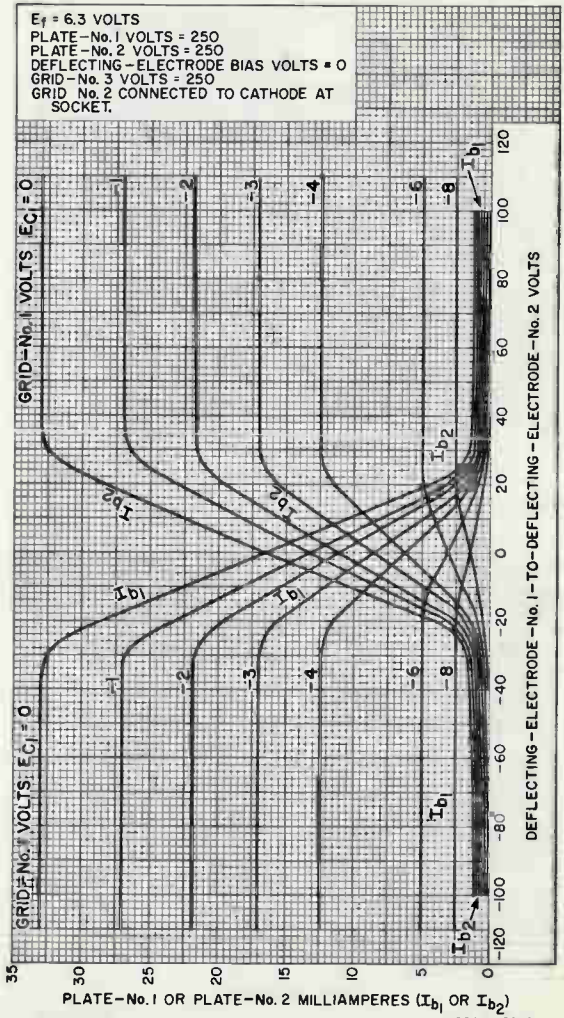
Average Plate Characteristics



92CM-12938

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

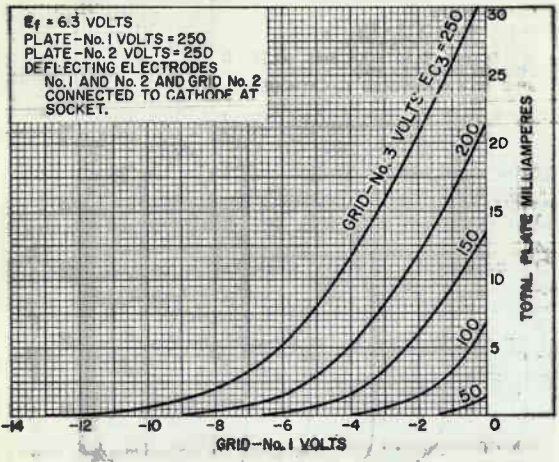
Average Characteristics



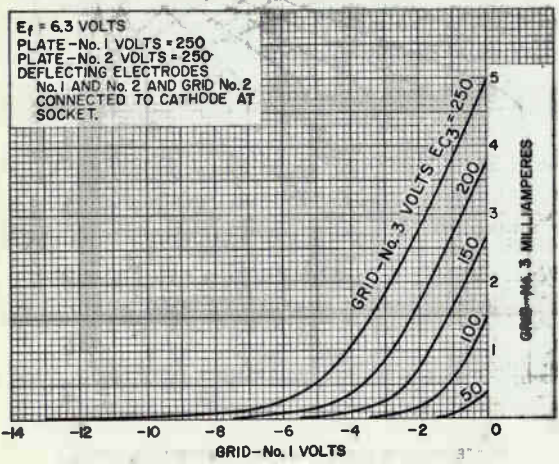
92CM-12939

6JH8

Average Characteristics



92CS-12936



92CS-12937

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Beam Power Tube

with an Integral Diode

9-PIN MINIATURE TYPE

PLATE DISSIPATION = 10 WATTS — **DARK HEATER**

For Feedback-Stabilized Vertical Deflection Amplifier Applications in Black-and-White and Color TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Voltage (AC or DC)	E_h		6.3	V
Heater Current	I_h		1.2	A
Direct Interelectrode Capacitances				
Without external shield				
Grid No.1 to plate	e_{g1-p}		0.32	pF
Input: G1 to (K, G3 + P_D, G2, H)	c_i		13.0	pF
Output: P to (K, G3 + P_D, G2, H)	c_o		6.0	pF
For the following characteristics, see **Conditions**				
Amplification Factor (Triode Connection)[a]	μ		6.5	
Plate Resistance (Approx.)	r_p		10.5	kΩ
Transconductance	g_m		4200	μmho
DC Plate Current	I_b	150[b]	35	mA
DC Grid-No.2 Current	I_{c2}	20[b]	2.5	mA
Cutoff DC Grid-No.1 Voltage. Plate mA = 1	$E_{c1(co)}$		-37	V
Instantaneous Diode-Plate-to-Cathode-Voltage Drop for instantaneous diode-plate current ($r_{b(d)}$) = 2 mA	$e_{b(d)}$		5	V

Conditions

Heater	E_h	6.3	6.3	V
DC Plate Voltage	E_b	40	140	V
DC Grid-No.3 Voltage	E_{c3}	0	0	V
DC Grid-No.2 Voltage	E_{c2}	120	140	V
DC Grid-No.1 Voltage	E_{c1}	0	-18	V

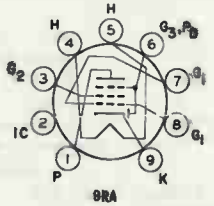
MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Dimensional Outline (JEDEC 6-4)	See *General Section*
Maximum Overall Length	3.062 in (77.77 mm)
Maximum Seated Length	2.812 in (71.42 mm)
Maximum Diameter	0.875 in (22.22 mm)
Envelope	JEDEC Designation T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC Designation E9-1)
Terminal Diagram	9RA

6JQ6

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Plate
Pin 2 – Do Not Use
Pin 3 – Grid No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.3, Diode Plate
Pin 7 – Grid No.1
Pin 8 – Grid No.1
Pin 9 – Cathode



9RA

DESIGN-MAXIMUM RATINGS[c]

For operation as a Feedback-Stabilized Vertical-Deflection-Amplifier Tube in Black-&-White & Color Television Receivers in a 525-line, 30-frame system

DC Plate Voltage	E_b	425	V
Peak Positive-Pulse Plate Voltage (Absolute-Maximum Value)[d]	e_{bm}	2000	V
DC Grid-No.3 & Diode-Plate Voltage	$E_{c3}, E_{b(d)}$	+10 -150	V V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	330	V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	e_{c1m}	150	V
Heater-Cathode Voltage			
Peak	e_{hkm}	±200	V
Average[e]	$E_{hk(av)}$	100	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V
Cathode Current			
Peak	I_{km}	250	mA
Average[e]	$I_{k(av)}$	70	mA
Average Diode-Plate (& Grid-No.3) Current[e]	$I_{b(av)\ (d)}$	1	mA
Grid-No.2 Input	P_{g2}	2	W
Plate Dissipation	P_b	10	W
Envelope Temperature (At hottest point on envelope surface)	T_E	240	°C

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance	$R_{g1(ckt)}$		
For grid-No.1-resistor-bias operation	-	2.2	MΩ
For cathode-bias operation	-	2.2	MΩ

[a] With grid No.3 and diode plate connected to cathode and with grid No.2 connected to plate at socket.

[b] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

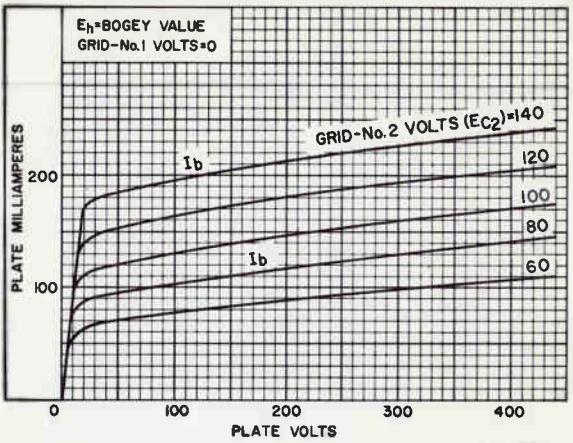
[c] Unless otherwise specified.

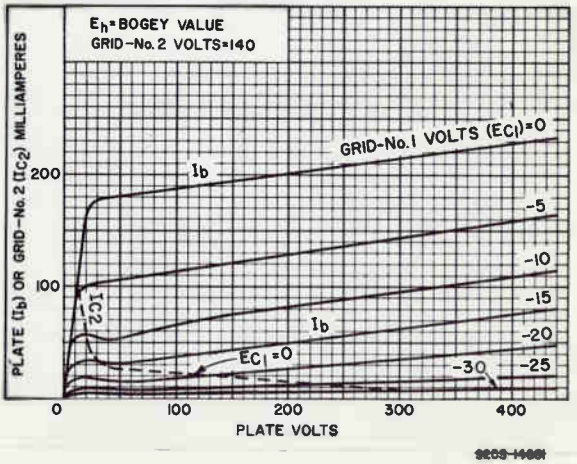
[d] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 ms.

[e] Measured with a dc meter.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics





Beam Power Tube

Novar Type

For Horizontal-Deflection-Amplifier Service in Low-B+, Black-and-White TV Receivers

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc.	E_h	6.3	V
Heater Current	I_h	1.6	A
Direct Interelectrode Capacitances:[a]			
Grid No.1 to plate	c_{g1-p}	0.7	pF
Input: G1 to (K,G3,G2,H)	c_i	22.0	pF
Output: P to (K,G3,G2,H)	c_o	9.0	pF

For the following characteristics, see Conditions below:

Amplification Factor (Triode Connection)[b]	μ	-	-	4.7	-	
Plate Resistance (Approx.)	r_p	-	-	-	18	kΩ
Transconductance	g_m	-	-	-	7000	μmho
DC Plate Current	I_b	-	470[c]	-	45	mA
DC Grid-No.2 Current	I_{c2}	-	32[c]	-	1.5	mA
Cutoff DC Grid-No.1 Voltage for I_b = 1 mA	$E_{c1(co)}$	-75	-	-	-32	V
Conditions:						
Heater Voltage	E_h	Bogey value				V
Peak Positive-Pulse Plate Voltage[d]	e_{bm}	6500	-	-	-	V
DC Plate Voltage	E_b	-	50	125	130	V
Grid No.3	-	Connected to cathode at socket				
DC Grid-No.2 Voltage	E_{c2}	125	125	125	125	V
DC Grid-No.1 Voltage	E_{c1}	-	0	-20	-20	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	3.130 in (79.50 mm)
Maximum Seated Length	2.750 in (69.85 mm)
Maximum Diameter	1.562 in (39.67 mm)
Envelope	JEDEC Designation T12
Dimensional Outline	JEDEC Designation 12-96
Base[e]	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC Designation E9-88)
Terminal Connections (See TERMINAL DIAGRAM)	JEDEC Designation 9QU
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design Maximum Values[f]

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system

DC Plate Supply Voltage	E_{bb}	770	V
Peak Positive-Pulse Plate Voltage[g]	e_{bm}	6500	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1500	V
DC Grid-No.3 Voltage[h]	E_{c3}	75	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	220	V
DC Grid-No.1 (Control-Grid) Voltage:			
Negative-bias value	$-E_{c1}$	55	V
Peak Negative-Pulse Grid No.1 Voltage	$-e_{c1m}$	360	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	±200	V
Average	$E_{hk(av)}$	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Cathode Current:			
Peak	i_{km}	950	V
Average	$I_{k(av)}$	275	V
Grid-No.2 Input	P_{g2}	3.5	V
Plate Dissipation[k]	P_b	17	V
Envelope Temperature (at hottest point on envelope surface)	T_E	240	°C

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance:	$R_{g1(ckt)}$		
For grid-No.1-resistor-bias operation		0.47	MΩ
For plate-pulsed operation (horizontal-deflection circuits only)		10	MΩ

a Measured without external shield in accordance with the current issue of EIA Standard RS-191.

b With Grid No.2 connected to plate at socket.

c This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

d Under pulse-duration condition specified in Footnote [g].

e Designed to mate with "Novar 9-contact" Socket generally available from your local RCA Distributor.

f As defined in the current issue of EIA Standard RS-239.

g This rating is applicable where the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

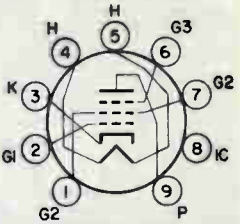
h In horizontal-deflection-amplifier service, a positive voltage may be applied to grid No.3 to reduce interference

from "snivets" which may occur in both vhf and uhf television receivers. A typical operating value for this voltage is 30 V.

k An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

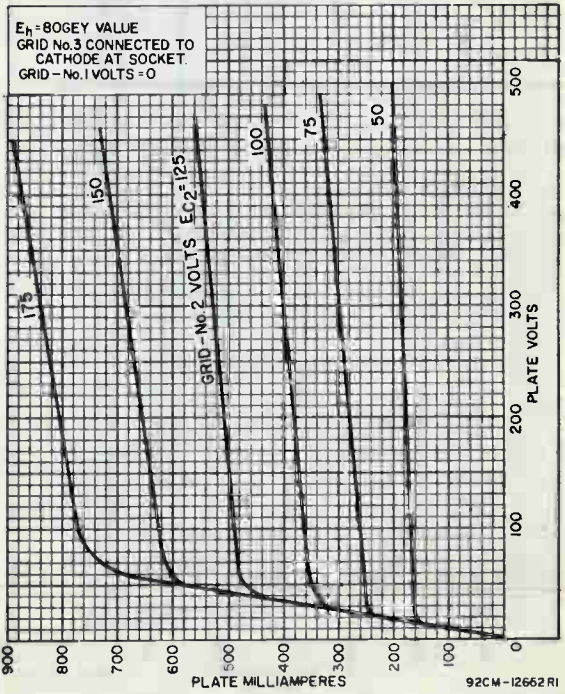
TERMINAL DIAGRAM (Bottom View)

Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.3
Pin 7 - Grid No.2
Pin 8 - Do Not Use
Pin 9 - Plate

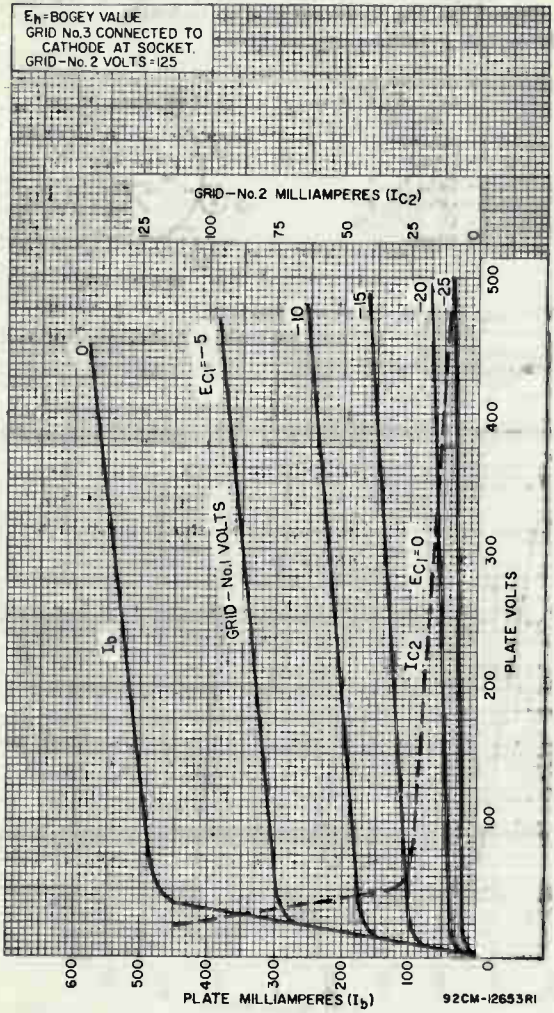


JEDEC 9QU

TYPICAL PLATE CHARACTERISTICS



TYPICAL CHARACTERISTICS



6JT6A

Beam Power Tube

NOVAR TYPE

SEPARATE GRID-No 3 BASE-PIN TERMINAL FOR "SNIVETS" CONTROL[a]

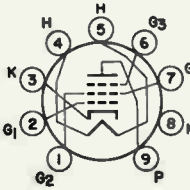
For Horizontal-Deflection-Amplifier Service in Black-and-White TV Receivers

Electrical:

Heater Ratings and Characteristics:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode.	200 max.	volts
Heater positive with respect to cathode.	200[b] max.	volts
Direct Interelectrode Capacitances (Approx.):[c]		
Grid No.1 to plate	0.26	pf
Input: G1 to (K,G3,G2,H)	15.0	pf
Output: P to (K,G3,G2,H)	6.5	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.880"
Seated Length	2.250" to 2.500"
Diameter	1.438" to 1.562"
Dimensional Outline	See *General Section*
Bulb	T12
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-88)
Basing Designation for BOTTOM VIEW	9QU



Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.3
Pin 7 - Grid No.2
Pin 8 - Do Not Use
Pin 9 - Plate

Characteristics, Class A_1 Amplifier:

	Triode Connection[d]	*Pentode Connection*		
Plate Voltage	150	60	250	volts
Grid No.3	–	*Connected to Cathode at socket*		
Grid-No.2 Voltage	150	150	150	volts
Grid-No.1 Voltage	-22.5	0	-22.5	volts
Amplification Factor	4.4	–	–	
Plate Resistance (Approx.)	–	–	15000	ohms
Transconductance	–	–	7100	μmhos

6JT6A

	Triode Connection[d]	Pentode Connection		
Plate Current	–	390[e]	70	ma
Grid-No.2 Current	–	32[e]	2.1	ma
Grid-No.1 Voltage (Approx.) for plate ma = 1	–	–	-42	volts

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[f]

DC Plate Supply Voltage	770 max.	volts
Peak Positive-Pulse Plate Voltage[g]	6500 max.	volts
Peak Negative-Pulse Plate Voltage	1500 max.	volts
DC Grid-No.3 (Suppressor-Grid) Voltage[c]	70 max.	volts
DC Grid-No.2 (Screen-Grid) Voltage	220 max.	volts
DC Grid-No.1 (Control-Grid) Voltage: Negative-bias value	55 max.	volts
Peak Negative-Pulse Grid-No.1 Voltage	330 max.	volts
Cathode Current:		
Peak	550 max.	ma
Average	175 max.	ma
Grid-No.2 Input	3.5 max.	watts
Plate Dissipation[h]	17.5 max.	watts
Bulb Temperature (At hottest point on bulb surface)	240 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For grid-resistor-bias operation	1 max.	megohm

[a] A positive voltage may be applied to grid No.3 to reduce interference from "snivets" which may occur in television receivers. A typical value for this voltage is 30 volts.

[b] The dc component must not exceed 100 volts.

[c] Without external shield.

[d] With grid No.2 connected to plate at socket.

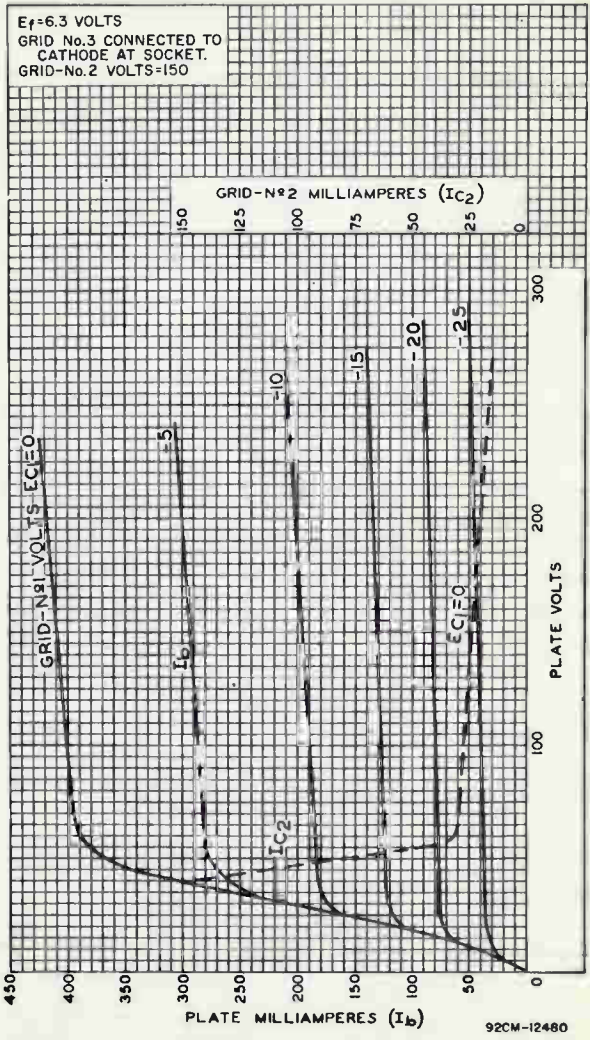
[e] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

[f] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

[g] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[h] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

AVERAGE CHARACTERISTICS



Beam Power Tube

NOVAR TYPE

For Horizontal-Deflection-Amplifier Service in Low-B+, Black-and-White TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Voltage (AC or DC)	E_h	6.3	V
Heater Current	I_h	1.600	A
Direct Interelectrode Capacitances			
Without external shield			
Grid No.1 to plate	C_{g1-p}	1.2	pF
Input: G1 to (K, G3, G2, H)	C_i	22	pF
Output: P to (K, G3, G2, H)	C_o	9.0	pF

For the following characteristics, see Conditions

Amplification Factor	μ	-	-	4.7	-	
Triode connection[a]						
Plate Resistance (Approx.)	r_p	-	-	-	18	kΩ
Transconductance	g_m	-	-	-	7000	μmhos
DC Plate Current	I_b	-	470[b]	-	45	mA
DC Grid-No.2 Current	I_{c2}	-	32[b]	-	1.5	mA
Cutoff DC Grid-No.1 Voltage	$E_{c1(co)}$	-75	-	-	-32	V
Plate mA = 1						

Conditions

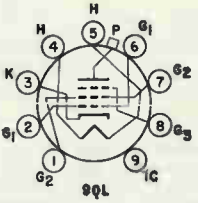
Heater Voltage	E_h	Bogey value				V
Peak Positive-Pulse Plate Voltage[c]	e_{bm}	6500	-	-	-	V
DC Plate Voltage	E_b	-	50	125	130	V
Grid No.3		Connected to cathode at socket				
DC Grid-No.2 Voltage	E_{c2}	125	125	125	125	V
DC Grid-No.1 Voltage	E_{c1}	-	0	-20	-20	V

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.550 in
Maximum Seated Length	3.170 in
Maximum Diameter	1.562 in
Dimensional Outline	See *General Section*
Envelope	JEDEC T12
Top Cap	Skirted Miniature (JEDEC C1-2 or C1-3)
Bases (alternates)	
Large-Button Novar 9-Pin (JEDEC E9-76)	
Large-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-88)	

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Grid No.2
Pin 2 – Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.1
Pin 7 – Grid No.2
Pin 8 – Grid No.3
Pin 9 – Do Not Use
Top Cap – Plate



DESIGN-MAXIMUM RATINGS

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system

DC Plate Supply Voltage	E_{bb}	770	V
Peak Positive-Pulse Plate Voltage[d]	e_{bm}	6500	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1500	V
DC Grid-No.3 Voltage[e]	E_{c3}	75	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	220	V
DC Grid-No.1 (Control-Grid) Voltage	$-E_{c1}$	55	V
Negative-bias value			
Peak Negative-Pulse Grid-No.1 Voltage	$-e_{c1m}$	330	V
Heater-Cathode Voltage			
Peak	e_{hkm}	±200	V
Average	$E_{hk(av)}$	100	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V
Cathode Current			
Peak	i_{km}	950	mA
Average	$I_{k(av)}$	275	mA
Grid-No.2 Input	P_{g2}	3.5	W
Plate Dissipation[f]	P_b	17	W
Envelope Temperature	T_g	240	°C
At hottest point on envelope surface			

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance	$R_{g1(ckt)}$		
For grid-No.1-resistor-bias operation	-	0.47	MΩ
For plate-pulsed operation (horizontal-deflection circuits only)	-	10	MΩ

[a] With grid No.2 connected to plate at socket.

[b] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

[c] Under pulse-duration condition specified in Footnote d.

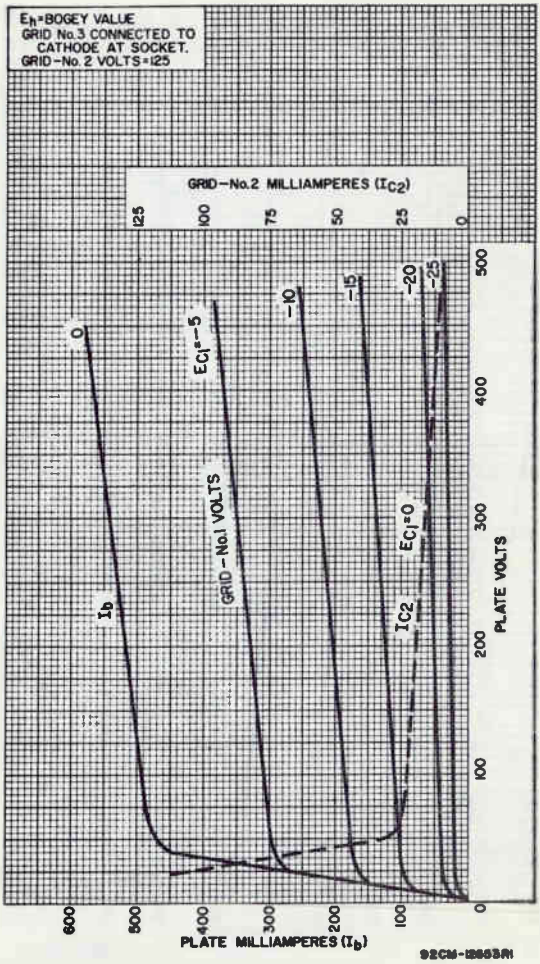
[d] This rating is applicable where the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

[e] In horizontal-deflection-amplifier service, a positive voltage may be applied to grid No.3 to reduce interference from "snivets" which may occur in both vhf and uhf television receivers. A typical operating value for this voltage is 30 V.

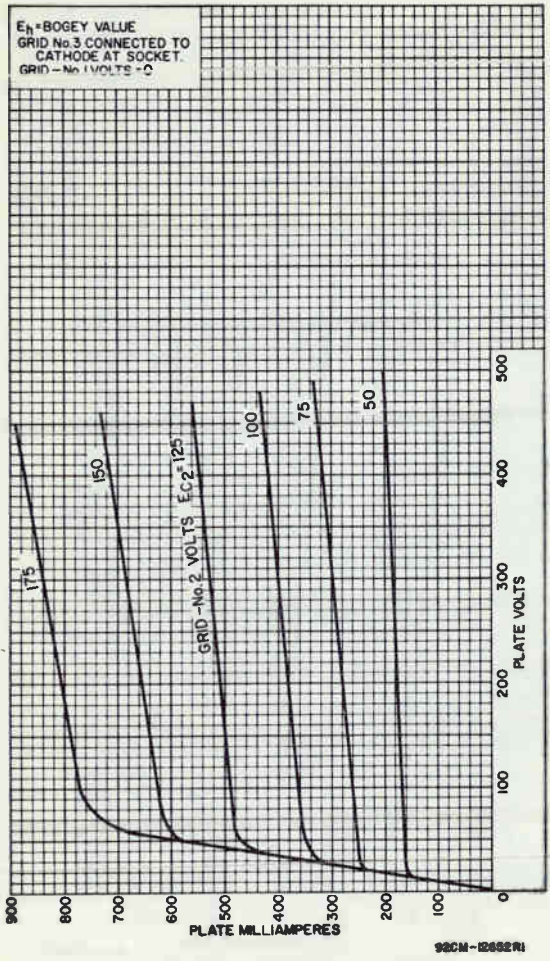
[f] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

Typical Characteristics



Typical Plate Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

6JU8A

Quadruple Diode

9-PIN MINIATURE TYPE

For Phase-Detector and Noise-Immune Color-Killer Circuits in Color-Television Receivers, and for FM-Stereo-Multiplex Equipment

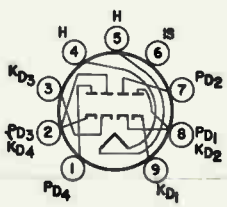
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.600	amp
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	300 max.	volts
Direct Interelectrode Capacitances (Approx.):[a]		
$P_{D1}+K_{D2}$ to K_{D1}	1.8	pf
$P_{D1}+K_{D2}$ to P_{D2}	2.2	pf
P_{D2} to (IS,H)	0.62	pf
$P_{D3}+K_{D4}$ to K_{D3}	1.9	pf
$P_{D3}+K_{D4}$ to P_{D4}	2.2	pf
P_{D4} to (IS,H)	0.94	pf
K_{D1} to (IS,H)	1.8	pf
K_{D3} to (IS,H)	1.9	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ±3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9PQ

Pin 1 – Plate of Unit No.4
Pin 2 – Plate of Unit No.3, Cathode of Unit No.4
Pin 3 – Cathode of Unit No.3
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Internal Shield
Pin 7 – Plate of Unit No.2
Pin 8 – Plate of Unit No.1, Cathode of Unit No.2
Pin 9 – Cathode of Unit No.1



6JU8A

Maximum Ratings, *Design-Maximum Values:*

Values are for Each Unit

Peak Inverse Plate Voltage.	300 max.	volts
Peak Plate Current.	54 max.	ma
DC Output Current	9 max.	ma

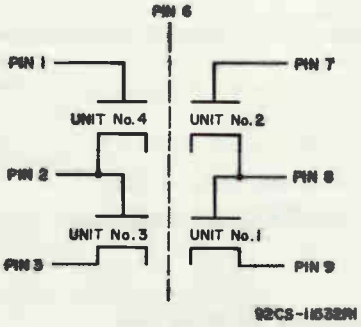
Characteristics, Instantaneous Value:

Values are for Each Unit

Plate Current for plate volts = 10	60	ma

[a] Without external shield.

ARRANGEMENT OF DIODE UNITS



High-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Sound-IF, Keyed-AGC, Sync-Separator, Sync-Amplifier, Noise-Suppression Circuits, and Video Amplifier Service

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC)	6.3[a]	6.3 ±0.6	volts
Current	0.600 ±0.040	0.600[b]	amp
Warm-up time (Average)	11	–	sec
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts
Direct Interelectrode Capacitances:[d]			
Triode Unit:			
Grid to plate	2.2		pf
Grid to cathode and heater	3.0		pf
Plate to cathode and heater	2.0		pf
Pentode Unit:			
Grid No.1 to plate	0.08 max.		pf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2 and heater	8.0		pf
Pentode plate to pentode cathode & grid No.3 & internal shield, grid No.2 and heater	3.2		pf
Pentode grid No.1 to triode plate	0.012 max.		pf
Pentode plate to triode plate	0.24 max.		pf

Characteristics, Class A_1 Amplifier:

	Triode Unit	
Plate Voltage	200	volts
Grid-No.1 Voltage	-2	volts
Amplification Factor	70	
Plate Resistance (Approx.)	17500	ohms
Transconductance	4000	μmhos
Plate Current	4	ma

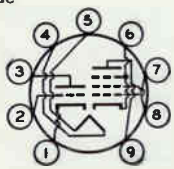
6JV8

	Triode Unit				
Grid-No.1 Voltage (Approx.) for plate μa =20. . . .			-5		volts
	Pentode Unit				
Plate Voltage	40	60	125	200	volts
Grid-No.2 Voltage	125	200	125	200	volts
Grid-No.1 Voltage . . .	0	0	-1	-2.9	volts
Plate Resistance (Approx.)	-	-	100000	150000	ohms
Transconductance.	-	-	11500	10700	μmhos
Plate Current	28*	51*	22	22	ma
Grid-No.2 Current	9*	14*	4	4	ma
Grid-No.1 Voltage (Approx.) for plate μa =20. . . .	-	-	-3.5	-8	volts

Mechanical:

Operating Position. . . . . Any
Type of Cathodes. . . . . Coated Unipotential
Maximum Overall Length. . . . . 2-5/8"
Maximum Seated Length . . . . . 2-3/8"
Length from Base Seat to Bulb Top (Excluding tip) . 2" ±3/32"
Diameter. . . . . 0.750" to 0.875"
Dimensional Outline . . . . . See *General Section*
Bulb. T6-1/2
Base. . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW. 9DK

Pin 1 -Triode Cathode
Pin 2 -Triode Grid
Pin 3 -Triode Plate
Pin 4 -Heater
Pin 5 -Heater
Pin 6 -Pentode Cathode, Grid No.3, Internal Shield



Pin 7 -Pentode Grid No.1
Pin 8 -Pentode Grid No.2
Pin 9 -Pentode Plate

AMPLIFIER —Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	330 max.	330 max.	volts
GRID-NO.2 (SCREEN-GRID) VOLTAGE	-	330 max.	volts
GRID-NO.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	50 max.	50 max.	volts
Positive-bias value	0 max.	0 max.	volts
PLATE DISSIPATION	1.1 max.	4 max.	watts
GRID-NO.2 INPUT	-	1.7 max.	watts

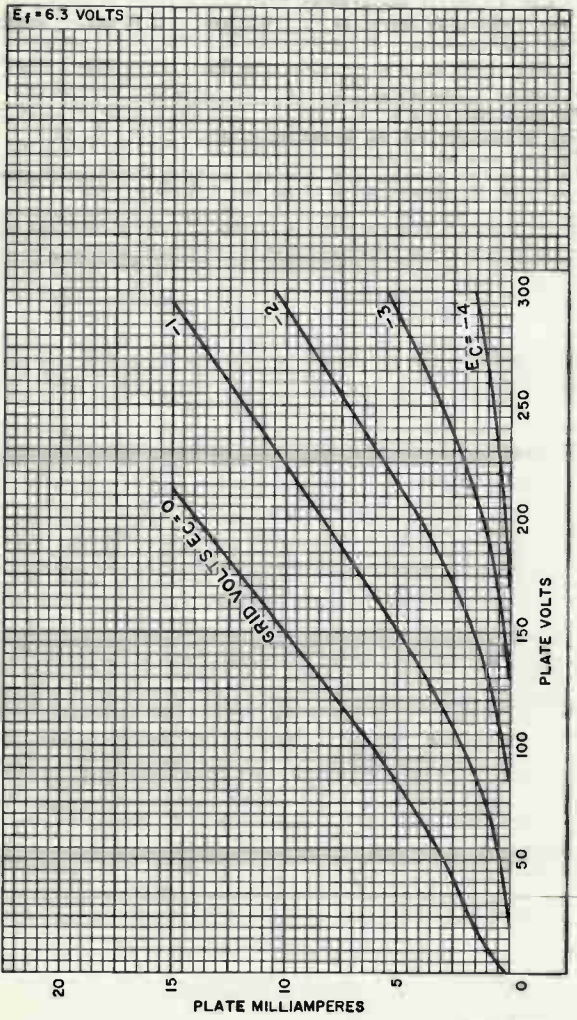
Maximum Circuit Values:

Grid-No.1 Circuit Resistance:			
For fixed-bias operation. . .	0.5 max.	0.25 max.	megohm
For cathode-bias operation	1 max.	1 max.	megohm

[a] At heater amperes = 0.600.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] Without external shield.
[e] This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

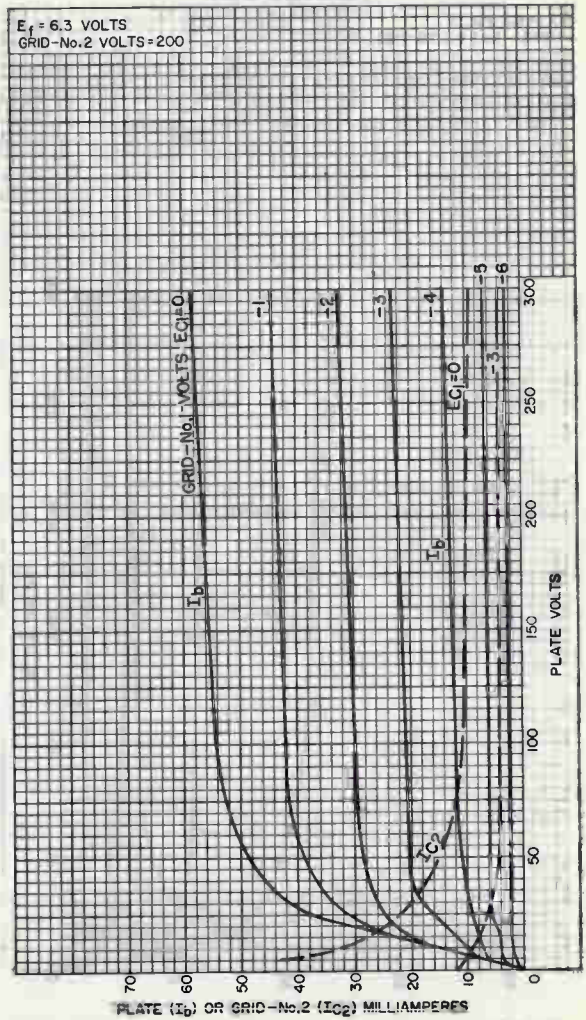
6JV8

AVERAGE PLATE CHARACTERISTICS
Triode Unit



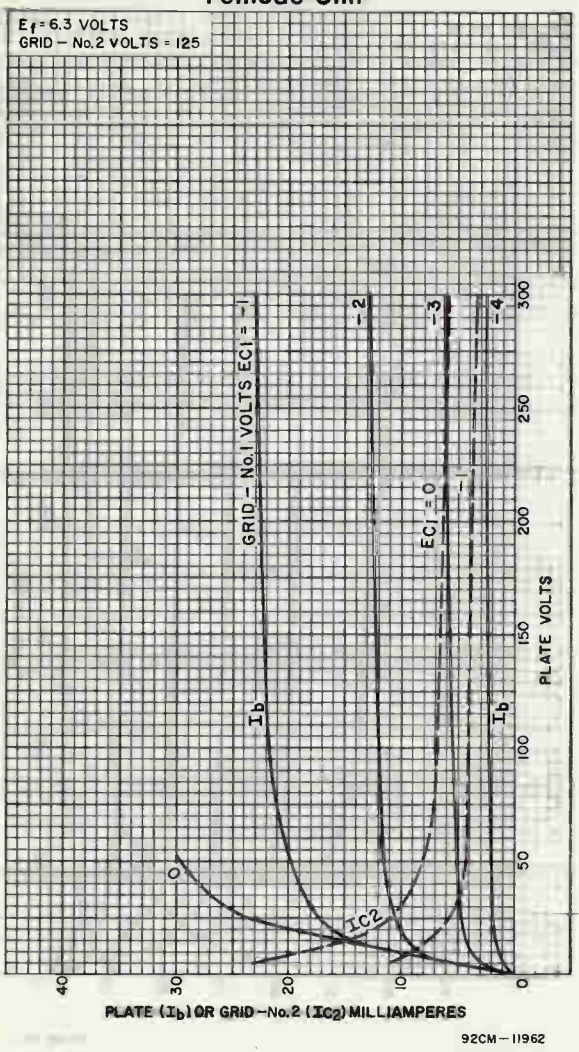
92CM-11980

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11961

AVERAGE CHARACTERISTICS
Pentode Unit



92CM — 11962

Medium-Mu Triode—Beam Power Tube

DUODECAR TYPE

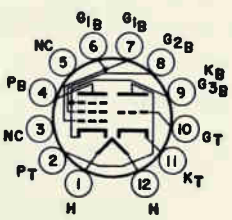
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ±0.6	volts
Current at heater volts = 6.3	1.200	amp
Peak heater–cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Direct Interelectrode Capacitances (Approx.):[b]		
Triode Unit:		
G_T to P_T	3.6	pf
Input: G_T to (K_T,H)	2.2	pf
Output: P_T to (K_T,H)	0.7	pf
Beam Power Unit:		
$G1_B$ to P_B	0.34	pf
Input: $G1_B$ to (K_B+$G3_B$,$G2_B$,H)	11.0	pf
Output: P_B to (K_B+$G3_B$,$G2_B$,H)	7.0	pf

Mechanical:

Operating Position	Any
Types of Cathodes	Coated Unipotential
Maximum Overall Length	2.375"
Seated Length	1.750" to 2.000"
Diameter	1.062" to 1.188"
Dimensional Outline	See *General Section*
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12DZ

Pin 1 – Heater
Pin 2 – Triode Plate
Pin 3 – No Internal Connection
Pin 4 – Beam Power Plate
Pin 5 – Same as Pin 3
Pin 6 – Beam Power Grid No.1
Pin 7 – Beam Power Grid No.1
Pin 8 – Beam Power Grid No.2
Pin 9 – Beam Power Cathode, Beam Power Grid No.3
Pin 10 – Triode Grid
Pin 11 – Triode Cathode
Pin 12 – Heater



Characteristics, Class A_1 Amplifier:

	Triode Unit	*Beam Power Tube*		
Plate Voltage	150	45	120	volts
Grid-No.2 Voltage	–	110	110	volts
Grid-No.1 Voltage	-5	0	-8	volts
Amplification Factor	20	–	–	

Plate Current	3.5	122	46	ma
Grid-No.2 Current	–	16.5	3.5	ma
Grid-No.1 Voltage (Approx.)				
for plate μa=10	-11	–	–	volts
100	–	–	-25	volts

VERTICAL-DEFLECTION OSCILLATOR

Triode Unit

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC Plate Voltage	250 max.	volts
Peak Negative Pulse-Grid Voltage	400 max.	volts
Cathode Current:		
Peak	70 max.	ma
Average	20 max.	ma
Plate Dissipation	1 max.	watt

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	1 max.	megohm
For cathode-bias operation	2.2 max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Beam Power Unit

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC Plate Voltage	250 max.	volts
Peak Positive-Pulse Plate Voltage	2000 max.	volts
Grid No.2 Voltage	200 max.	volts
Cathode Current:		
Peak	245 max.	ma
Average	70 max.	ma
Plate Dissipation[d]	7 max.	watts
Grid-No.2 Input	1.8 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	1 max.	megohm
For cathode-bias operation	2.2 max.	megohms

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

[d] In stages operating with grid-leak bias, an adequate cathode-bias resistor or other suitable means is required to protect the tube in the absence of excitation.

6K5-GT/G

HIGH-MU TRIODE

Heater ■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances (Approx.):		
Grid to Plate	2.0	μμf
Grid to Cathode	2.4	μμf
Plate to Cathode	3.6	μμf
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Cap		Skirted Miniature
Base		Small Wafer Octal 7-Pin, Sleeve
Pin 1 - Base Sleeve		Pin 5 - No Connection
Pin 2 - Heater		Pin 7 - Heater
Pin 3 - Plate		Pin 8 - Cathode
Pin 4 - No Connection		Cap - Grid
Mounting Position		Any

BOTTOM VIEW (G-5U)

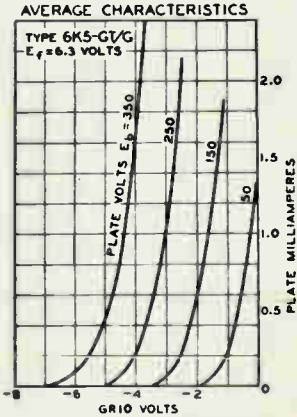
Maximum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage		250 max.	volts
Characteristics — Class A_1 Amplifier:			
Plate	100	250	volts
Grid	-1.5	-3	volts
Amp. Fact.	70	70 approx.	
Plate Res.	78000	50000 approx.	ohms
Transcond.	900	1400	μmhos
Plate Cur.	0.35	1.1	ma.

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

AVERAGE CHARACTERISTICS



92C-6154

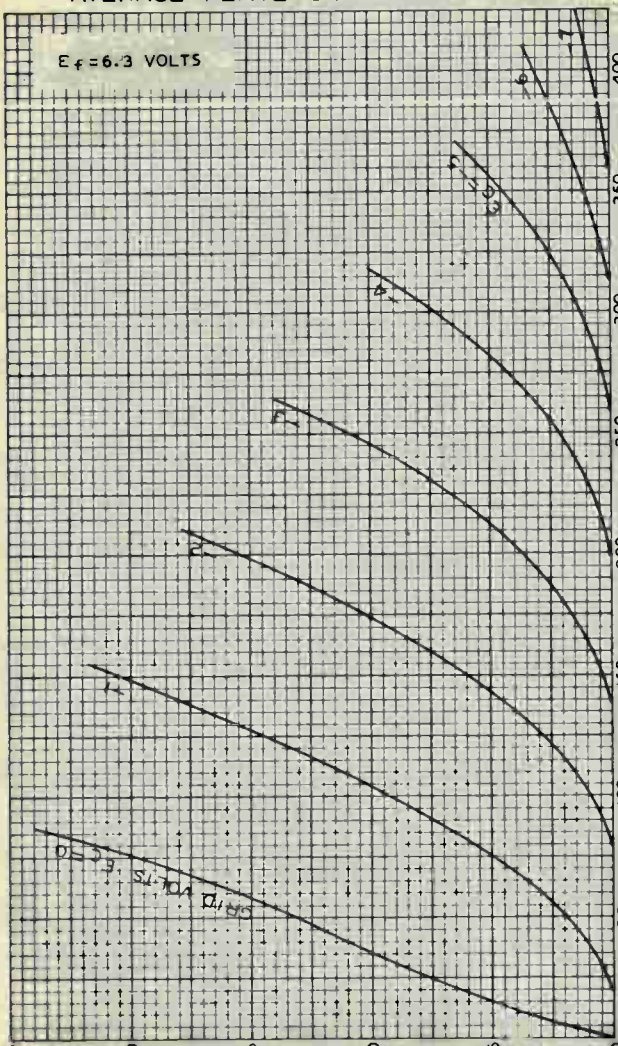
— Indicates a change.

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6K5-GT/G

6K5-GT/G

AVERAGE PLATE CHARACTERISTICS



MAY 1, 1940

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA HARRISON NEW JERSEY

92C-4785

6K6-GT

POWER PENTODE

GENERAL DATA

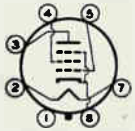
Electrical:

Heater, for Unipotential Cathode:			
Voltage	6.3		ac or dc volts
Current	0.4		amp
Direct Interelectrode Capacitances (Approx.):°			
Grid No.1 to plate		0.5	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater		5.5	μμf
Plate to cathode & grid No.3, grid No.2, and heater		6	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	*See General Section*
Bulb	T-9
Base	Intermediate-Shell Octal 7-Pin (JETEC No.B7-7), Short Intermediate-Shell Octal 7-Pin with External Barriers (JETEC No.B7-59), Intermediate-Shell Octal 6-Pin (JETEC No.B6-81), or Short Intermediate-Shell Octal 6-Pin with External Barriers (JETEC No.B6-84)
Basing Designation for BOTTOM VIEW	7S

Pin 1♦ – No Connection
Pin 2 – Heater
Pin 3 – Plate
Pin 4 – Grid No.2



Pin 5 – Grid No.1
Pin 7 – Heater
Pin 8 – Cathode, Grid No.3

AF POWER AMPLIFIER – Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	315 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	285 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
GRID-No.2 INPUT	2.8 max.	watts
PLATE DISSIPATION	8.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode ▲	200 max.	volts

° Without external shield.
♦ Pin 1 as well as pin 6 is omitted on the 6-Pin bases.

▲: See next page.

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Plate Voltage	100	250	315	volts
Grid-No.2 Voltage	100	250	250	volts
Grid-No.1 Voltage	-7	-18	-21	volts
Peak AF Grid-No.1 Voltage	7	18	21	volts
Zero-Signal Plate Current	8	32	25.5	ma
Max.-Signal Plate Current	9.5	39	28	ma
Zero-Signal Grid-No.2 Current	1.6	5.5	4	ma
Max.-Signal Grid-No.2 Current	3	10	9	ma
Plate Resistance (Approx.)	104000	90000	110000	ohms
Transconductance	1500	2300	2100	μmhos
Load Resistance	12000	7600	9000	ohms
Total Harmonic Distortion	11	11	15	%
Max.-Signal Power Output	0.35	3.4	4.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	315 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	285 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
GRID-No.2 INPUT	2.8 max.	watts
PLATE DISSIPATION	8.5 max.	watts
→ PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

Typical Operation:

Values are for 2 tubes

	Fixed Bias	*Cathode Bias*	
Plate Voltage	285	285	volts
Grid-No.2 Voltage	285	285	volts
Grid-No.1 Voltage	-25.5	-	volts
Cathode Resistor	-	400	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	51	51	volts
Zero-Signal Plate Current	55	55	ma
Max.-Signal Plate Current	72	61	ma
Zero-Signal Grid-No.2 Current	9	9	ma
Max.-Signal Grid-No.2 Current	17	13	ma

▲: See next page.

→ indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6K6-GT

POWER PENTODE

	Fixed Bias	*Cathode Bias*	
Effective Load Resistance (Plate to plate)	12000	12000	ohms
Total Harmonic Distortion	6	4	%
Max.-Signal Power Output	10.5	9.8	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

AF POWER AMPLIFIER - Class A_1

Triode Connection - Grid No.2 Connected to Plate

Characteristics:

Plate Voltage	250	volts
Grid-No.1 Voltage	-18	volts
Amplification Factor	6.8	
Plate Resistance (Approx.)	2500	ohms
Transconductance	2700	μmhos
Plate Current	37.5	ma
Grid-No.1 Voltage (Approx.) for plate current of 0.5 ma	-48	volts

VERTICAL DEFLECTION AMPLIFIER

Triode Connection - Grid No.2 Connected to Plate

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system□

DC PLATE VOLTAGE	315 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)#	1200■max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE	-250 max.	volts
CATHODE CURRENT:		
Peak	75 max.	ma
Average	25 max.	ma
PLATE DISSIPATION	7 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For cathode-bias operation	2.2 max.	megohms

▲ The dc component must not exceed 100 volts.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 percent of one vertical scanning cycle is 2.5 milliseconds.

■ Under no circumstances should this absolute value be exceeded.

← Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

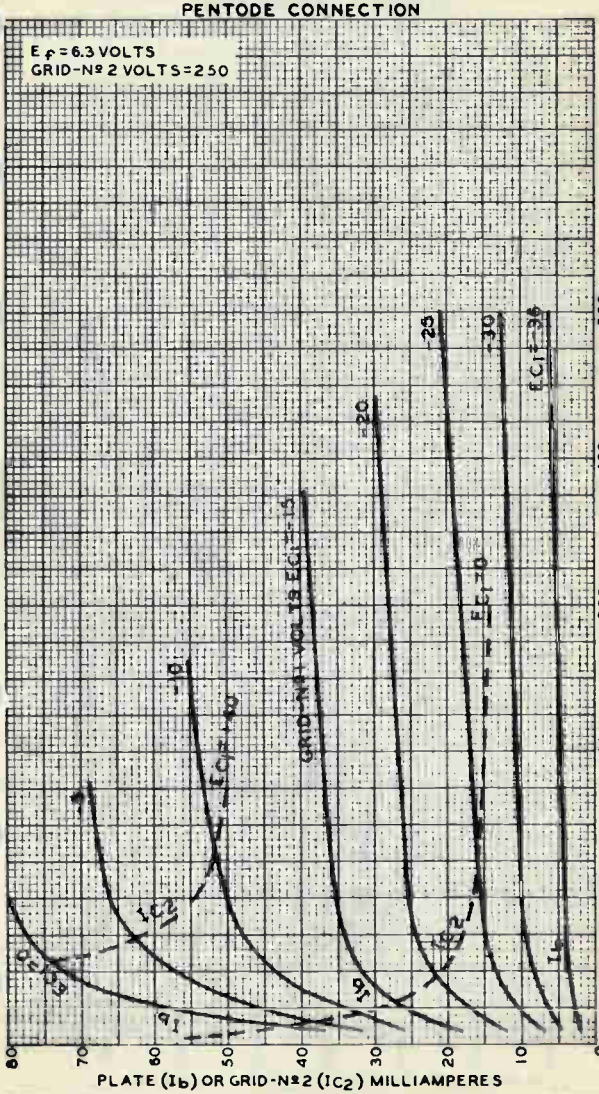
PLATE (I_b) OR GRID-№2 (I_{c2}) MILLIAMPERES
PLATE AND GRID-№2 VOLTS
GRID-№1 VOLTS
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-5209R2

RCA

6K6-GT

AVERAGE PLATE CHARACTERISTICS

PENTODE CONNECTION

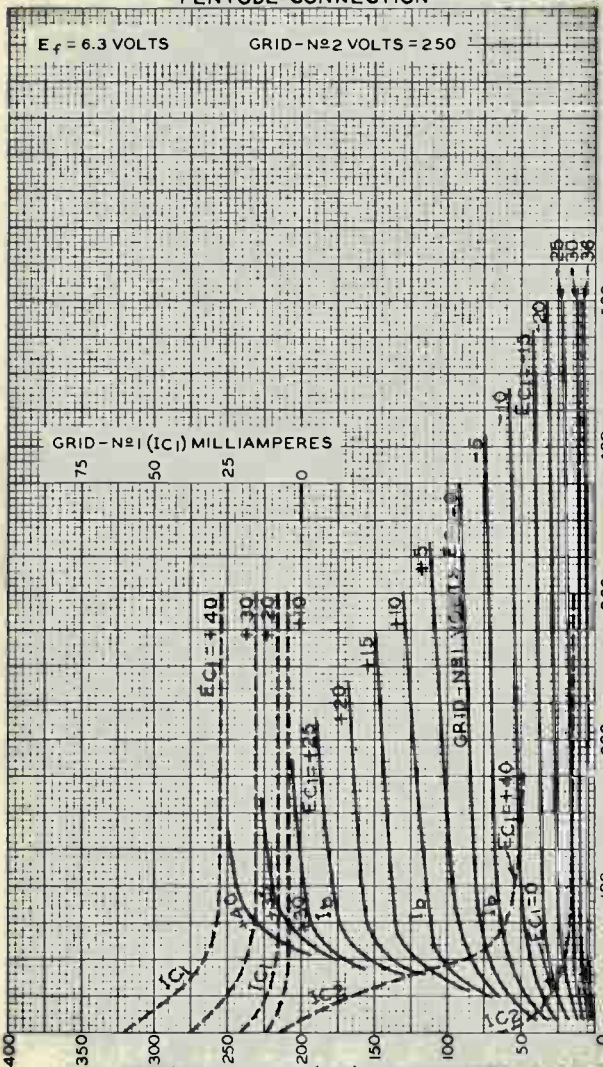


6K6-GT

RCA

6K6-GT

AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



FEB. 13, 1948 TUBE DEPARTMENT 92CM-6311R1

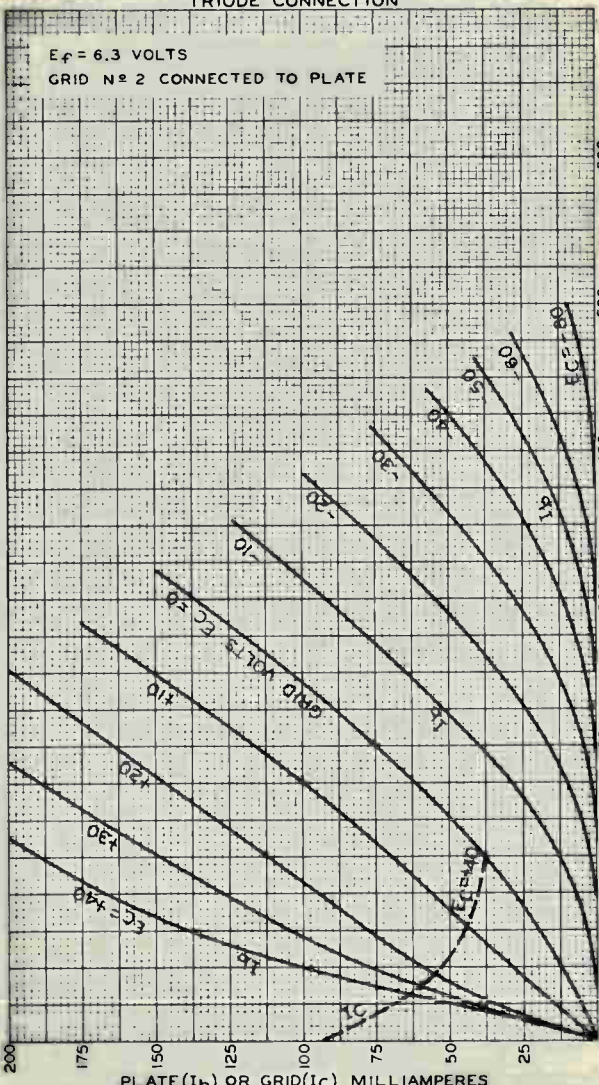
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

RCA

6K6-GT

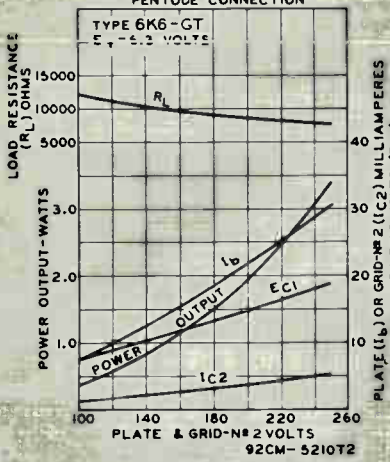
AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



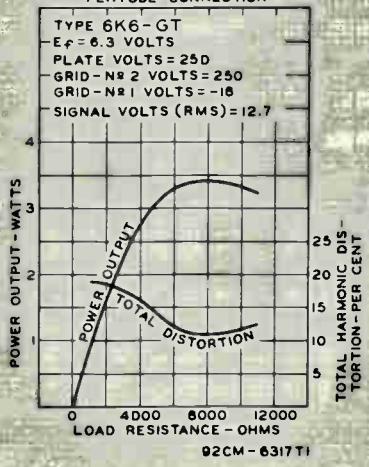
OPERATION CHARACTERISTICS

PENTODE CONNECTION



OPERATION CHARACTERISTICS

PENTODE CONNECTION



6K11/6Q11

Three-Unit Triode

With Medium-Mu Unit and Two High-Mu Units

DUODECAR TYPE

Electrical:

Heater Characteristics and Ratings:

Voltage (AC or DC)	6.3[a]		6.3±0.6	volts
Current	0.600±0.040		0.600[b]	amp
Warm-up time (Average)	11		–	sec
Peak heater-cathode voltage (Each unit):				
Heater negative with respect to cathode	200 max.			volts
Heater positive with respect to cathode	200[c] max.			volts

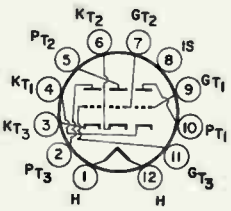
Direct Interelectrode Capacitances (Approx.):[d]

	Unit No.1	*Unit No.2*	*Unit No.3*	
Grid to plate	1.3	1.3	1.3	pf
Input: G to (K,IS,H)	1.9	1.8	1.8	pf
Output: P to (K,IS,H)	1.8	0.7	1.8	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	1.875"
Seated Length	1.250" to 1.500"
Diameter	1.062" to 1.188"
Dimensional Outline (JEDEC 9-56)	See *General Section*
Bulb	T9
Base	Small-Button Duodecar 12-Pin (JEDEC No.E12-70)
Basing Designation for BOTTOM VIEW	12BY

Pin 1 – Heater
Pin 2 – Plate of Unit No.3
Pin 3 – Cathode of Unit No.3
Pin 4 – Cathode of Unit No.1
Pin 5 – Plate of Unit No.2
Pin 6 – Cathode of Unit No.2
Pin 7 – Grid of Unit No.2
Pin 8 – Internal Shield
Pin 9 – Grid of Unit No.1
Pin 10 – Plate of Unit No.1
Pin 11 – Grid of Unit No.3
Pin 12 – Heater



AMPLIFIER — Class A_1

	Unit No.1	*Unit No. 2 or 3*	
Characteristics:			
Plate Voltage	250	250	volts
Grid Voltage	-8.5	-2	volts

Transconductance.	2200	1600	μmhos
Plate Current	10.5	1.2	ma
Grid Voltage (Approx.) for plate μa = 10	24		volts

Maximum Ratings, *Design-Maximum Values:*

Plate Voltage	330	330	volts
Grid Voltage:			
Negative-bias value	50	50	volts
Positive-bias value	0	0	volts
Cathode Current	20		ma
Plate Dissipation	2.75	0.3	watts

[a] At heater amperes = 0.608.
[b] At heater volts = 6.3
[c] The dc component must not exceed 300 volts.
[d] Without external shield.

High-Mu Triode—Sharp-Cutoff Pentode

Pentode Unit Has Two Independent Control Grids

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values):*			
Voltage (AC or DC) . .	6.3[a]	6.3 ± 0.6	volts
Current.	0.600 ± 0.040	0.600[b]	amp
Warm-up time (Average).	11	–	sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode . .	200 max.		volts
Heater positive with respect to cathode . .	200[c] max.		volts
Direct Interelectrode Capacitances:[d]			
Triode Unit:			
Grid to plate.		2.2	μμf
Grid to cathode & internal shield, and heater		2.8	μμf
Plate to cathode & internal shield, and heater		2.2	μμf
Pentode Unit:			
Grid No.1 to plate		0.1 max.	μμf
Grid No.1 to cathode & internal shield, grid No.3, grid No.2, and heater		9.5	μμf
Grid No.1 to grid No.3		0.5	μμf
Grid No.3 to plate		2.2	μμf
Grid No.3 to cathode & internal shield, plate, grid No.2, grid No.1, and heater		7.0.	μμf

Characteristics, Class A_1 Amplifier:

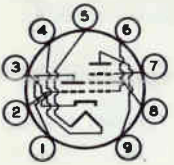
	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	200	150	volts
Grid-No.3 Supply Voltage	–	0	volts
Grid-No.2 Supply Voltage	–	100	volts
Grid-No.1 Supply Voltage	–2	0	volts
Cathode Resistor	–	180	ohms
Amplification Factor	70	–	
Plate Resistance (Approx.)	17500	100000	ohms
Transconductance, Grid No.1 to Plate	4000	4400	μmhos
Transconductance, Grid No.3 to Plate	–	600	μmhos

for plate μa =			
10	-5	-	volts
20	-	-4	volts
Grid-No.3 Supply Voltage (Approx.)			
for plate μa = 20	-	7	volts

Mechanical:

Operating Position . . . . . Any
Type of Cathode. . . . . Coated Unipotential
Maximum Overall Length . . . . . 2-5/8"
Maximum Seated Length. . . . . 2-3/8"
Length, Base Seat to Bulb Top (Excluding tip). . . . 2" ± 3/32"
Diameter . . . . . 0.750" to 0.875"
Dimensional Outline. . . . . See *General Section*
Bulb T6-1/2
Base . . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW 9PV

Pin 1 – Triode Plate
Pin 2 – Triode Grid
Pin 3 – Cathode, Internal Shield
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Pentode Grid No.1
Pin 7 – Pentode Grid No.3
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate

GATED AGC AMPLIFIER & NOISE INVERTER

Pentode Unit

For operation in a 525-line, 30-frame system[6]

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE.	300 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[7]	600 max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:		
Negative-bias value.	100 max.	volts
Positive-bias value.	0 max.	volts
GRID-No.2 (SCREEN-GRID)		
SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 VOLTAGE.	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value.	50 max.	volts
Positive-bias value.	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts.	1.1 max.	watts

For grid-No.2 voltages between 150 volts and 300 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2 max.	watts

Maximum Circuit Values:

Grid-No.3-Circuit Resistance	0.68 max.	megohm
Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1 max.	megohm

AMPLIFIER — Class A_1

Triode Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
PLATE DISSIPATION	1.1 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1 max.	megohm

[a] At heater amperes = 0.600.

[b] At heater volts = 6.3.

[c] The dc component must not exceed 100 volts.

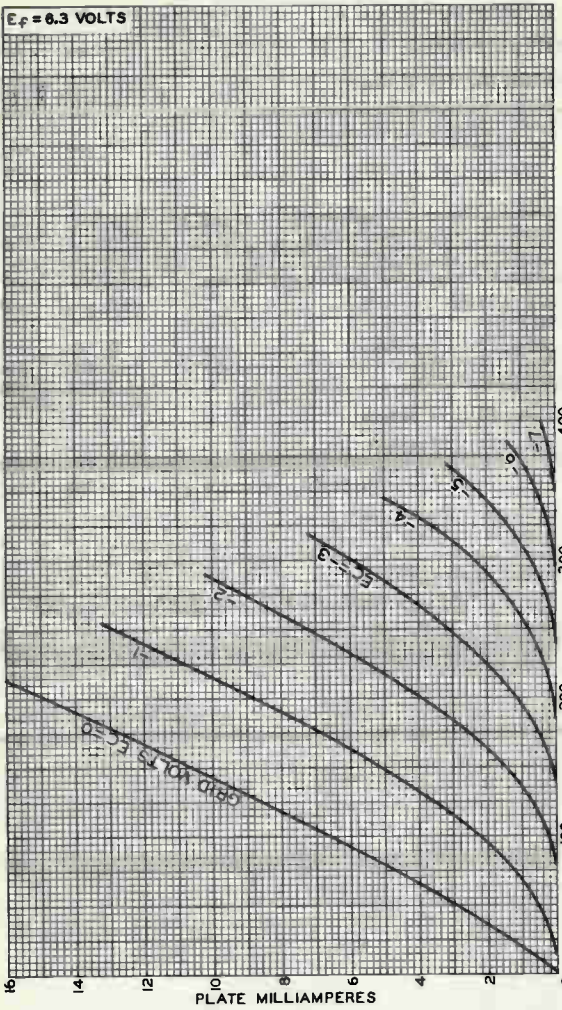
[d] Without external shield.

[e] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commision.

[f] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

6KA8

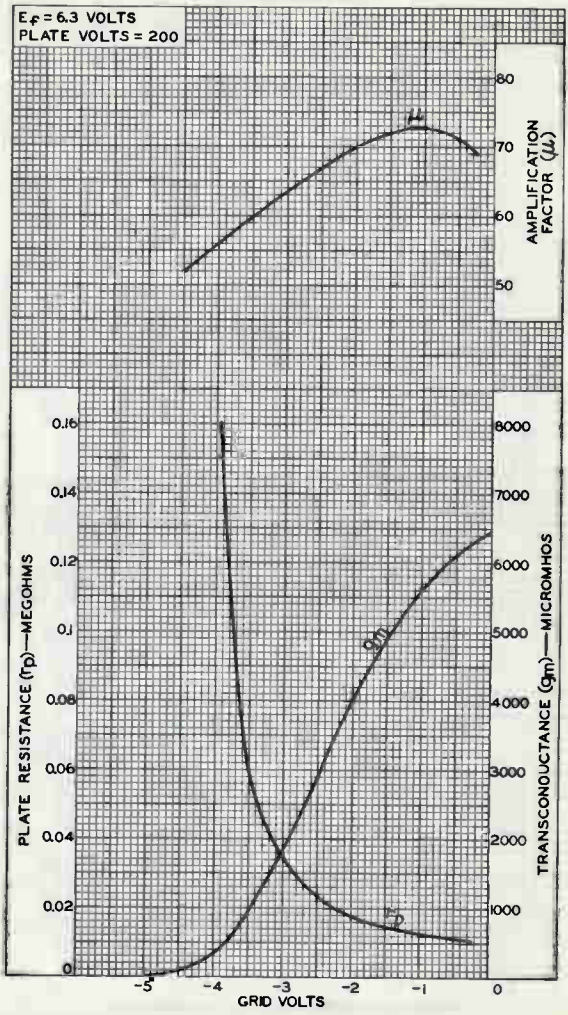
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-8644

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

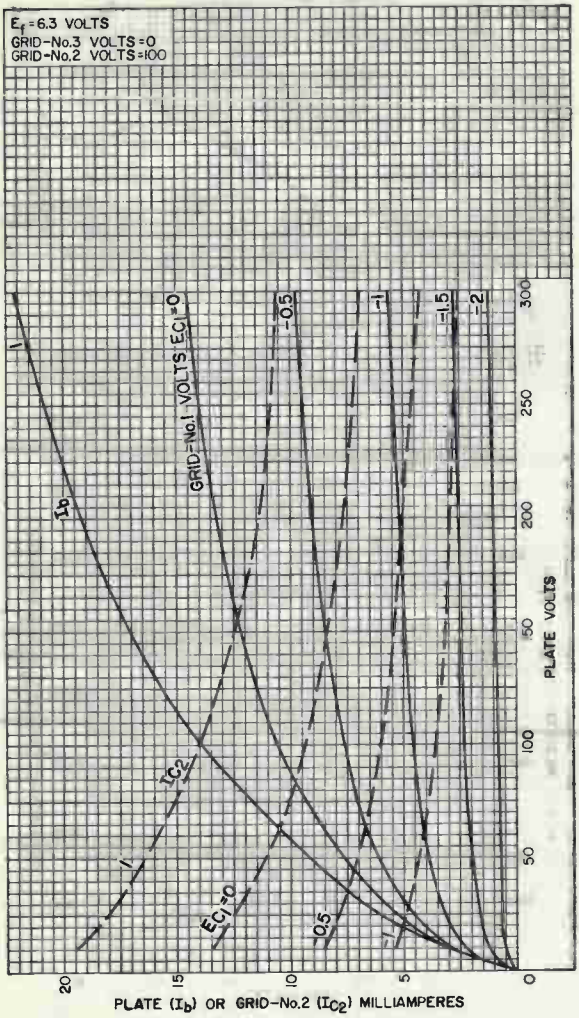
AVERAGE CHARACTERISTICS
Triode Unit



92CM-8647

6KA8

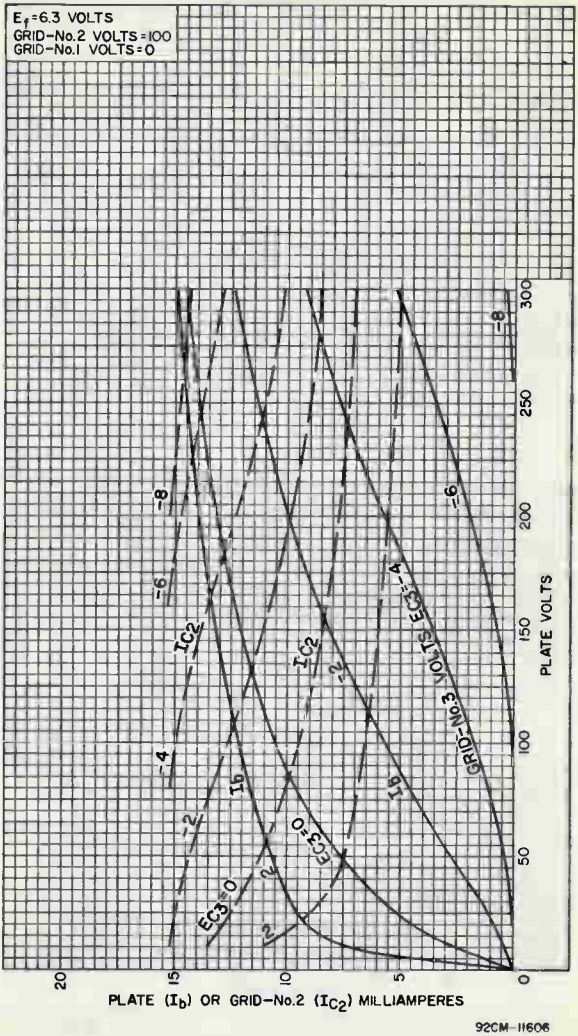
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11594

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

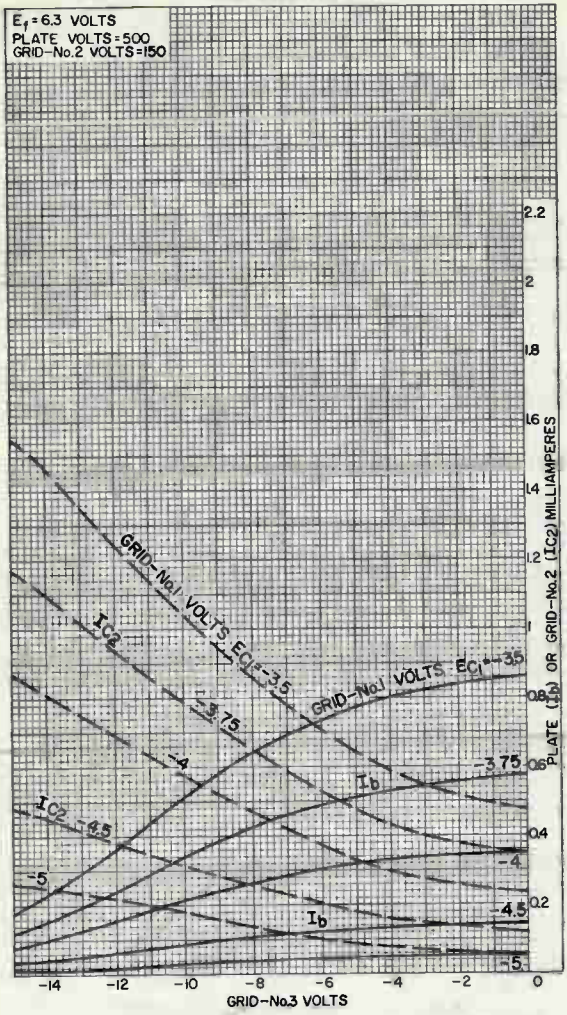
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11606

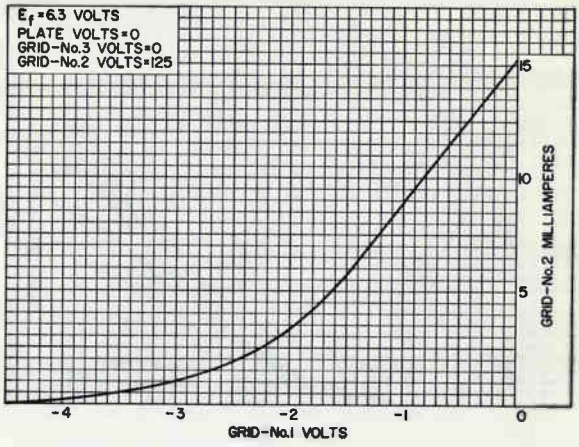
6KA8

AVERAGE CHARACTERISTICS
Pentode Unit

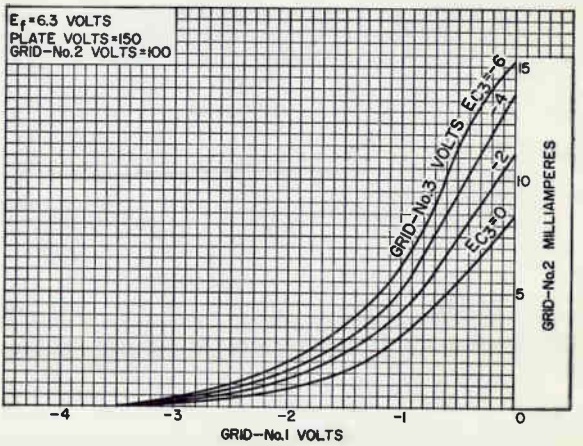


92CM-11600

AVERAGE CHARACTERISTICS
Pentode Unit



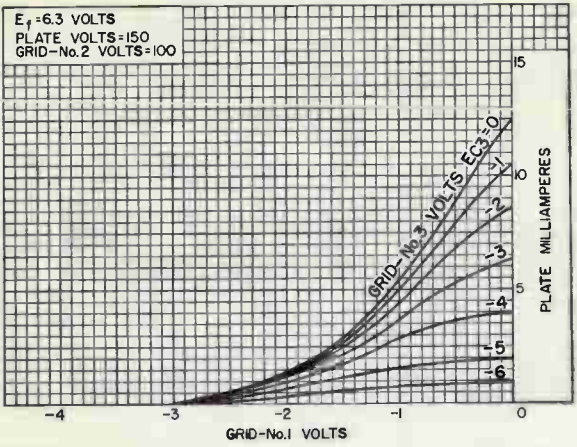
92CS-11595



92CS-11596

6KA8

AVERAGE CHARACTERISTICS
Pentode Unit



92CS-11614

Beam Power Tube

Duodecar Type

For Low B+ Horizontol-Deflection-Amplifier Circuits of Color-TV Receivers

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc. . .	E_h		6.3			V
Heater Current	I_h		2.85			A
Direct Interelectrode Capacitances (approx.):[a]						
Grid No.1 to plate	c_{g1-p}		0.8			pF
Input: G1 to (K,G3,G2,H) .	c_i		40			pF
Output: P to (K,G3,G2,H).	c_o		16			pF
For the following characteristics, see Conditions below:						
Amplification Factor (Triode Connection)[b] . . .	μ	–	–	–	4[c]	
Plate Resistance (approx.)	r_p	–	–	–	6000	Ω
Transconductance	g_m	–	–	–	14000	μmho
DC Plate Current	I_b	–	1100[d]	780[d]	100	mA
DC Grid-No.2 Current. . . .	I_{c2}	–	110[d]	44[d]	2	mA
Cutoff DC Grid-No.1 Voltage for I_b = 1 mA	$E_{c1(co)}$	-125	–	–	-40	V
Conditions:						
Heater Voltage	E_h	←		6.3	→	V
Peak Positive-Pulse Plate Voltage[e]	e_{bm}	5000	–	–	–	V
DC Plate Voltage	E_b	–	45	60	150	V
DC Grid-No.3 Voltage . . .		Connected to cathode at socket				
DC Grid-No.2 Voltage . . .	E_{c2}	110	160	110	110	V
DC Grid-No.1 Voltage . . .	E_{c1}	–	0	0	-22.5	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length. . . . . 4.625 in (117.47 mm)
Maximum Seated Length . . . . . .4.250 in (107.95 mm)
Maximum Diameter. . . . . 1.563 in (39.7 mm)
Dimensional Outline . . . . . JEDEC 12-118
Envelope. . . . . .JEDEC T12
Top Cap[f] . . . . . .Small (JEDEC C1-1)
Base . . . . . Large-Button Duodecar 12-Pin (JEDEC E12-74)

Terminal Diagram	JEDEC 12GW
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design-Maximum Values[g]

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system

DC Plate Supply Voltage	E_{bb}	990	V
Peak Positive-Pulse Plate Voltage[h]	e_{bm}	7000[k]	V
DC Grid-No.3 Voltage[m]	E_{c3}	20	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	200	V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	$-e_{c1m}$	250	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	±200	V
Average[n]	E_{hk}	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Cathode Current:			
Peak	i_{km}	1400	mA
Average[n]	$I_{k(av)}$	400	mA
Grid-No.2 Input	P_{g2}	5.0	W
Plate Dissipation[p]	P_b	33	W
Envelope Temperature	T_E	225[q]	°C

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance	R_{g1}	2.2	MΩ
Grid-No.3-Circuit Resistance	R_{g3}	0.01	MΩ

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] With grid No.3 and grid No.2 connected, respectively, to cathode and plate at socket.

[c] Conditions: $E_b = E_{c2} = 150$ V, $E_{c1} = -22.5$ V.

[d] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

[e] Under pulse-duration condition specified in Footnote h.

[f] Designed to mate with connector of 0.250-inch cap, generally available from your local RCA distributor.

[g] As defined in the current issue of EIA Standard RS-239, unless otherwise specified.

[h] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

[k] Absolute-Maximum Value.

[m] In horizontal-deflection-amplifier service, a positive voltage may be applied to grid No.3 to reduce interference from "snivets," which may occur in both vhf and uhf television receivers. A typical value for this voltage is 20 volts.

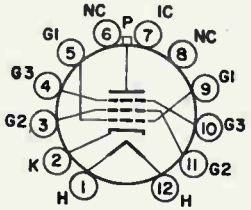
[n] Measured with a DC meter.

[p] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

[q] This rating is applicable when measurement is made using a thermocouple attached to a 0.1-inch wide phosphor-bronze ring placed at the hottest location on the envelope. A maximum rating of 240°C is applicable to direct thermocouple measurements taken at the hottest point on the envelope surface.

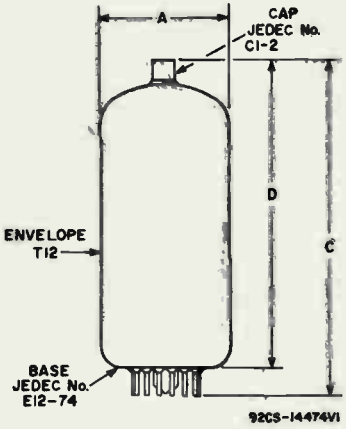
TERMINAL DIAGRAM (Bottom View)

Pin 1 – Heater
Pin 2 – Cathode
Pin 3 – Grid No.2
Pin 4 – Grid No.3
Pin 5 – Grid No.1
Pin 6 – No Connection
Pin 7 – Do Not Use
Pin 8 – No Connection
Pin 9 – Grid No.1
Pin 10 – Grid No.3
Pin 11 – Grid No.2
Pin 12 – Heater
Cap – Plate



JEDEC 12GW

DIMENSIONAL OUTLINE (JEDEC No. 12-118)



DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
A	1.437*	1.563	36.5*	39.7
C	–	4.625	–	117.47
D	–	4.250	–	107.95
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				

* Applies to the minimum diameter except in the area of the seal.

Medium-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE
FRAME-GRID PENTODE
For Combined Oscillator-Mixer Applications in TV Receivers Having an IF of 40 Mc

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.400		amp
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances:[b]			
Triode Unit:			
Grid to plate	1.3		pf
Grid to cathode, pentode cathode & pentode grid No.3 & internal shield, and heater	2.4		pf
Plate to cathode, pentode cathode & pentode grid No.3 & internal shield, and heater	2.0		pf
Pentode Unit:			
Grid No.1 to plate	0.015	max.	pf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	5.0		pf
Plate to cathode & grid No.3, & internal shield, grid No.2, and heater	3.4		pf
Heater to triode cathode and pentode cathode	5.5[c]		pf

Characteristics, Class A₁ Amplifier:

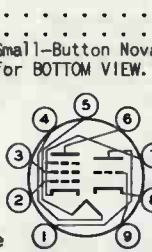
	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	125	125	volts
Grid-No.2 Supply Voltage	–	125	volts
Cathode Resistor	68	33	ohms
Amplification Factor	40	–	
Plate Resistance (Approx.)	5000	125000	ohms
Transconductance	8000	12000	μmhos
Plate Current	13	10	ma
Grid-No.2 Current	–	2.8	ma

6KE8

Grid-No.1 Voltage (Approx.)
for plate μa =
100 . . . . . -5 - volts
50. . . . . - -3 volts

Mechanical:

Operating Position. . . . . Any
Type of Cathodes. . . . . Coated Unipotential
Maximum Overall Length. . . . . 2-3/16"
Maximum Seated Length . . . . . 1-15/16"
Length, Base Seat to Bulb Top (Excluding tip). . 1-9/16" ± 3/32"
Diameter. . . . . 0.750" to 0.875"
Dimensional Outline . . . . . See *General Section*
Bulb. T6-1/2
Base. . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW. 9DC



Pin 1 - Triode Plate
Pin 2 - Pentode Grid No.1
Pin 3 - Pentode Grid No.2
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Plate
Pin 7 - Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 8 - Triode Cathode
Pin 9 - Triode Grid

AMPLIFIER — Class A1

Maximum Ratings, ***Design-Maximum Values:***

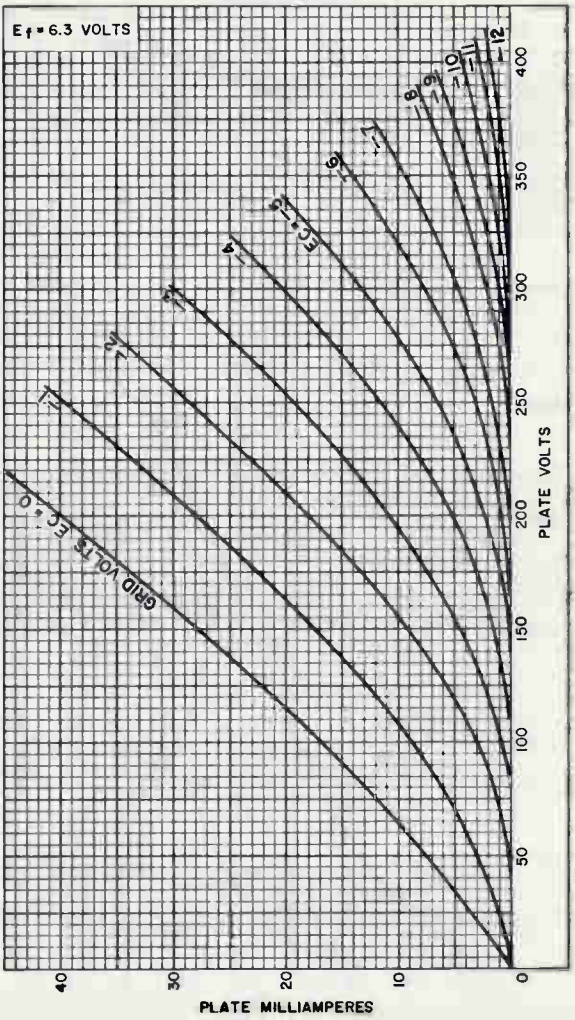
	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	280 max.	280 max.	volts
GRID-No.2 SUPPLY VOLTAGE	-	280 max.	volts
GRID-No.2 VOLTAGE	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 VOLTAGE:			
Positive-bias value	0 max.	0 max.	volts
CATHODE CURRENT	20 max.	20 max.	ma
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 140 volts	-	0.5 max.	watt
For grid-No.2 voltages between 140 and 280 volts	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2 max.	2 max.	watts

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance:			
For fixed-bias operation.	0.5 max.	0.25 max.	megohm
For cathode-bias operation.	1 max.	0.5 max.	megohm

[a] The dc component must not exceed 100 volts.
[b] With external shield JEDEC No.315 connected to cathode of unit under test except as noted.
[c] With external shield JEDEC No.315 connected to ground.

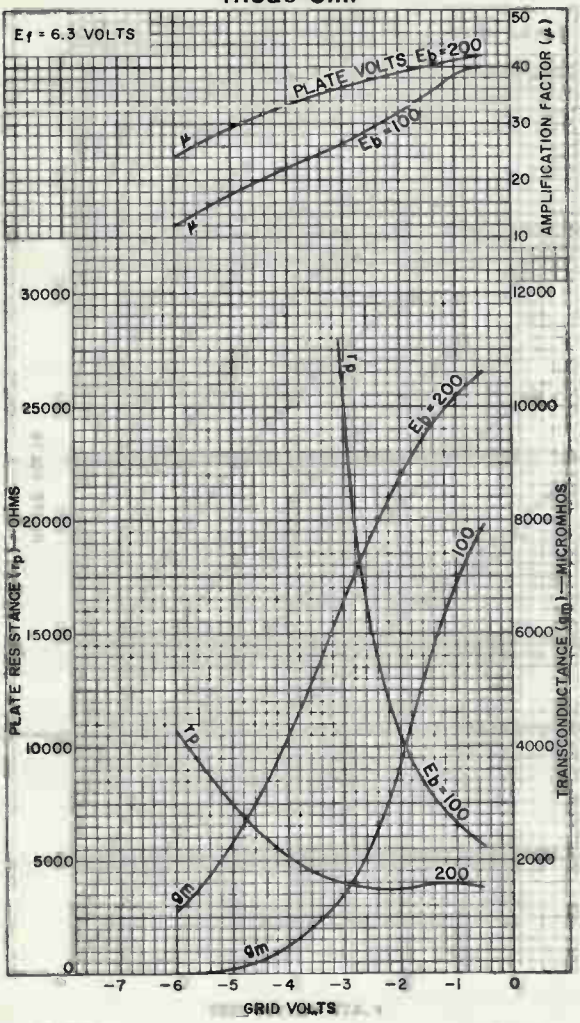
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-11897

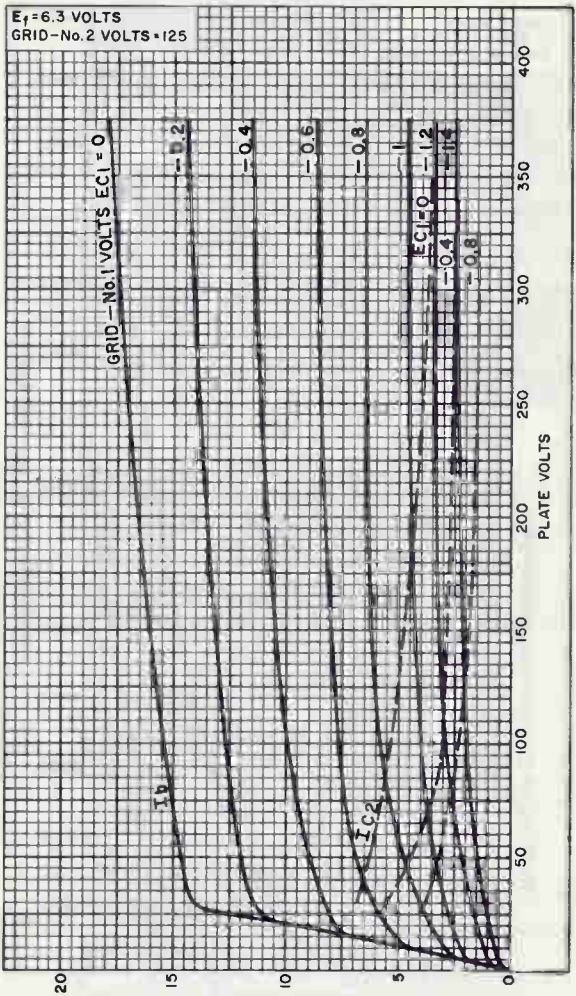
6KE8

AVERAGE CHARACTERISTICS
Triode Unit



92CM-11901

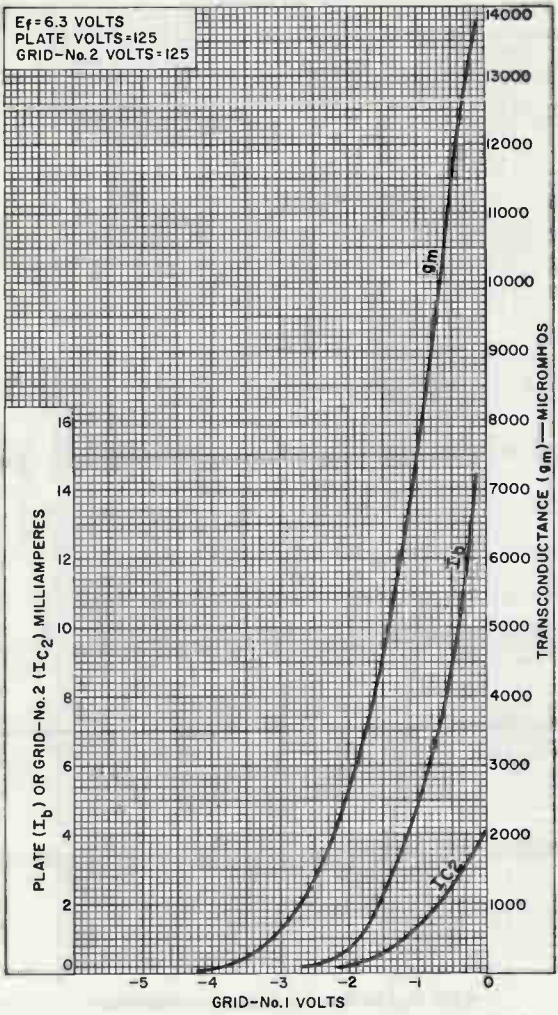
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11903

6KE8

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11902

6KM6

Beam Power Tube

NOVAR TYPE

SPECIAL MULTIPLE-FIN PLATE STRUCTURE[a]
SPECIALLY FORMULATED ENVELOPE GLASS[b]

For Color-TV Horizontal-Deflection-Amplifier Applications

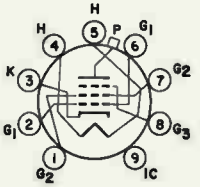
ELECTRICAL

Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V	1.600	A
Maximum heater–cathode voltage:		
Heater negative with respect to cathode:		
Peak	200	V
Heater positive with respect to cathode:		
Peak	200	V
DC component	100	V
Direct Interelectrode Capacitances (Approx.)		
Without external shield		
Grid No.1 to plate	1.2	pF
Input: G1 to (K, G3, G2, H)	22	pF
Output: P to (K, G3, G2, H)	9.0	pF

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.550 in
Seated Length	2.910 to 3.170 in
Diameter	1.438 to 1.562 in
Dimensional Outline	See *General Section*
Bulb	T12
Cap	Skirted Miniature (JEDEC No.C1-2 or C1-3)
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-88)
Basing Designation for BOTTOM VIEW	9QL

Pin 1 – Grid No.2
Pin 2 – Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.1
Pin 7 – Grid No.2
Pin 8 – Grid No.3
Pin 9 – Do Not Use
Cap – Plate



CHARACTERISTICS

For the following characteristics, see **Conditions**					
Amplification Factor	–	–	4	–	
Triode Connection[c]					
Plate Resistance	–	–	–	6000	Ω
Transconductance	–	–	–	9500	μmho
DC Plate Current	–	560[d]	–	80	mA

DC Grid-No.2 Current	-	31[d]	-	2.4	mA
Cutoff DC Grid-No.1 Voltage	-110	-	-	-42	V
Plate mA = 1					
Conditions					
Heater Voltage	6.3	6.3	6.3	6.3	V
Peak Positive-Pulse Plate Voltage[c]	6500	-	-	-	V
DC Plate Voltage	-	60	140	140	V
DC Grid-No.3 Voltage	30	30	0	30	V
DC Grid-No.2 Voltage	140	140	140	140	V
DC Grid-No.1 Voltage	-	0	-24.5	-24.5	V

MAXIMUM RATINGS, DESIGN-MAXIMUM VALUES

For operation in a 525-line, 30-frame system

DC Plate Supply Voltage	770	V
Peak Positive-Pulse Plate Voltage[e]	6500	V
Peak Negative-Pulse Plate Voltage	1500	V
DC Grid-No.3 Voltage[f]	75	V
DC Grid-No.2 (Screen-Grid) Voltage	220	V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	330	V
Cathode Current		
Peak	950	mA
Average	275	mA
Grid-No.2 Input	3.5	W
Plate Dissipation[g]	20	W
Envelope Temperature	240	°C
At hottest point on bulb surface		

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance		
For grid-No.1-resistor-bias operation	0.47	MΩ
For plate-pulsed operation	10	MΩ

[a] Designed to minimize secondary-electron emission from plate and eliminate "knee" discontinuities in zero-bias region.

[b] Designed to reduce glass problems after long periods of high-voltage and elevated temperature operation.

[c] With grid No.3 and grid No.2 connected, respectively, to cathode and plate at socket.

[d] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

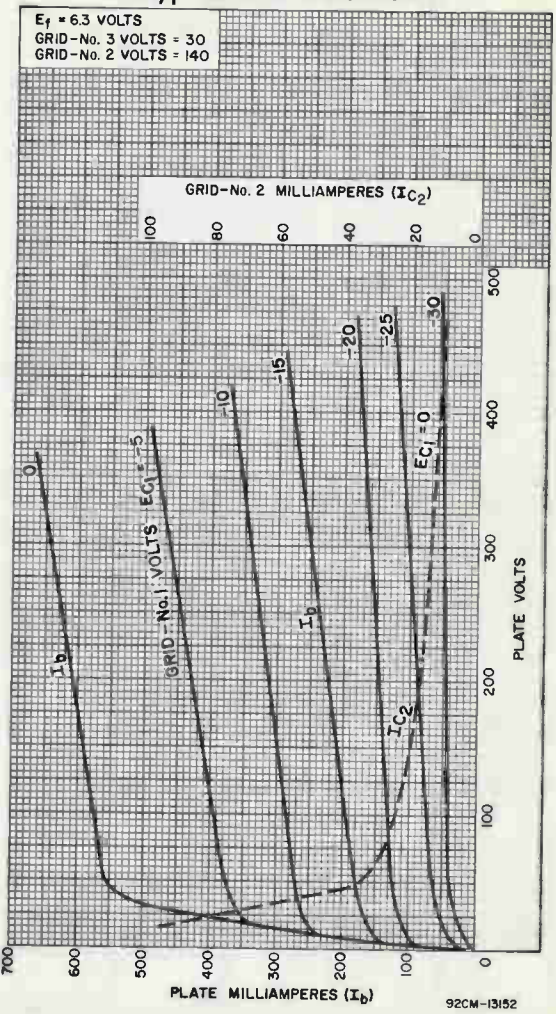
[e] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[f] In horizontal-deflection-amplifier service, a positive voltage may be applied to grid No.3 to reduce interference from "snivets" which may occur in both vhf and uhf television receivers. A typical operating value for this voltage is 30 volts.

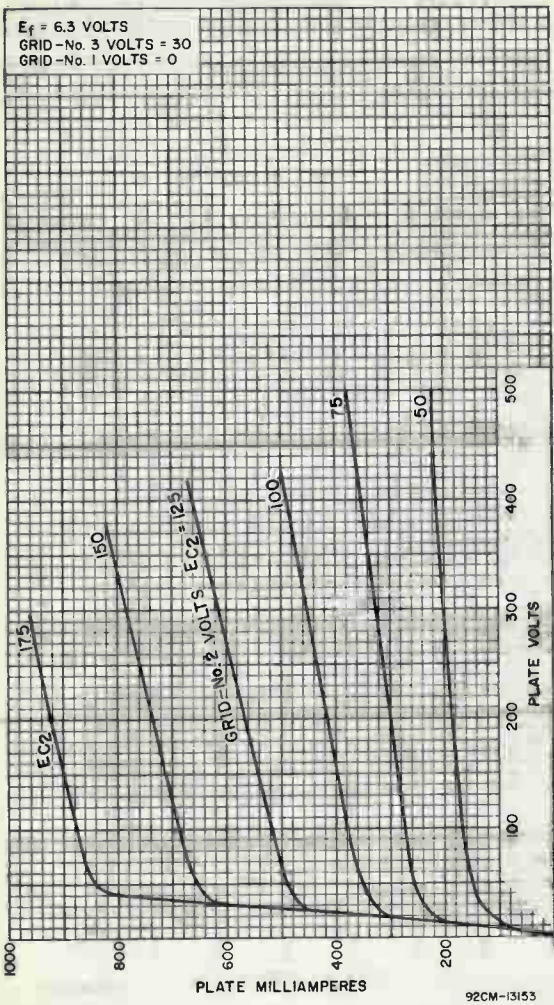
[g] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics



Typical Plate Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

6KM8

Diode—
Sharp-Cutoff Three-Plate Tetrode

9-PIN MINIATURE TYPE

For Frequency-Divider and Complex-Wave-Generator Circuits of Electronic Musical Instruments

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.300		amp
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances:[b]			
Tetrode Unit:			
Grid No.1 to plate 1A	0.02	max.	pf
Grid No.1 to plate 1B	0.02	max.	pf
Grid No.1 to plate 2	0.06	max.	pf
Grid No.1 to cathode & internal shield, grid No.2, and heater	5.5		pf
Plate 1A to cathode & internal shield, grid No.2, and heater	1.2		pf
Plate 1B to cathode & internal shield, grid No.2, and heater	1.3		pf
Plate 2 to cathode & internal shield, grid No.2, and heater	1.8		pf
Tetrode grid No.1 to diode plate	0.024	max.	pf
Tetrode plate 1A to diode plate	0.18		pf
Tetrode plate 1B to diode plate	0.024		pf
Tetrode plate 2 to diode plate	0.013		pf

Characteristics, Class A_1 Amplifier (Tetrode Unit):

Plates 1A, 1B, and 2 connected together at socket

Plate Voltage	100	volts
Grid-No.2 Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	2.2	megohms
Plate Resistance (Approx.)	30000	ohms
Transconductance	3400	μmhos
Plate Current	4.2	ma
Grid-No.2 Current	1.7	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-4	volts

Triode Connection—

Grid No.2 connected to plates 1A, 1B, and 2 at socket

Plate Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts

6KM8

Grid-No.1 Resistor (Bypassed)	2.2	megohms
Transconductance	4500	μmhos
Amplification Factor	45	
Plate Current	5.5	ma

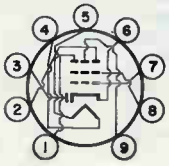
Separate plate operation, plates not under test grounded

Plate Voltage:		
Plate 1A	100	volts
Plate 1B	100	volts
Plate 2	100	volts
Grid-No.2 Voltage	100	volts
Grid-No.1 Supply Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	2.2	megohms
Transconductance:		
Grid No.1 to plate 1A	2000	μmhos
Grid No.1 to plate 1B	2000	μmhos
Grid No.1 to plate 2	1800	μmhos
Plate Resistance (Approx.):		
Plate 1A	0.1	megohm
Plate 1B	0.1	megohm
Plate 2	0.12	megohm
Plate Current:		
Plate 1A	2.3	ma
Plate 1B	2.3	ma
Plate 2	2.1	ma
Grid-No.2 Current:		
For plate 1A volts = 100	3.8	ma
For plate 1B volts = 100	3.8	ma
For plate 2 volts = 100	3.3	ma

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9QG

Pin 1 – Tetrode Plate 1B
Pin 2 – Tetrode Plate 1A
Pin 3 – Diode Plate
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Cathode, Internal Shield
Pin 7 – Tetrode Grid No.1
Pin 8 – Tetrode Grid No.2
Pin 9 – Tetrode Plate 2

FREQUENCY-DIVIDER & COMPLEX-WAVE-GENERATOR SERVICE

TETRODE UNIT

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE:		
PLATE 1A	330 max.	volts
PLATE 1B	330 max.	volts
PLATE 2	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	330 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 165 volts	0.65 max.	watt
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE 1A DISSIPATION	1 max.	watt
PLATE 1B DISSIPATION	1 max.	watt
PLATE 2 DISSIPATION	1 max.	watt

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For grid-No.1-resistor-bias operation	2.2 max.	megohms

DIODE UNIT

Maximum Ratings, ***Design-Maximum Values:***

PLATE CURRENT	1 max.	ma

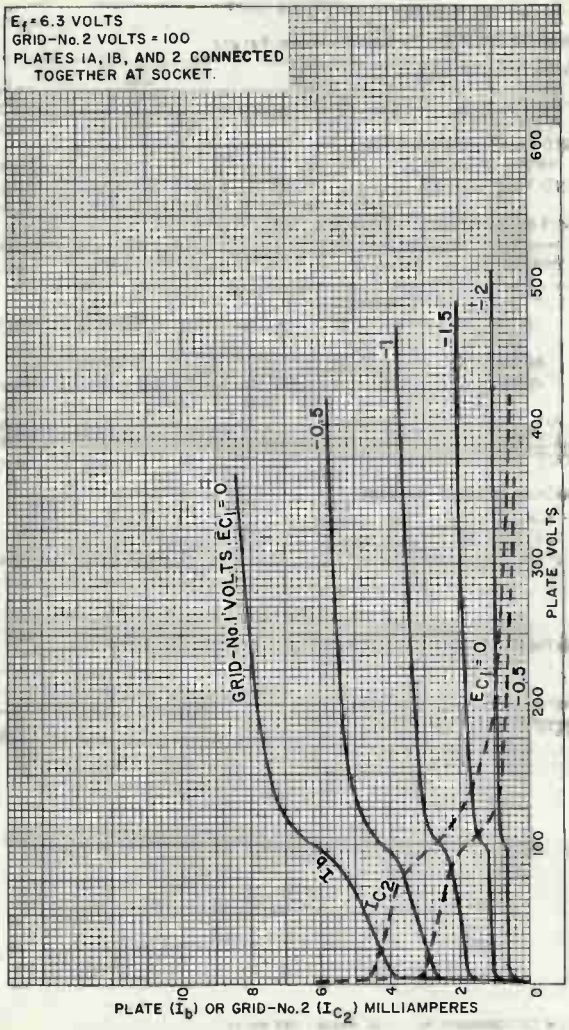
Characteristics, ***Instantaneous Test Condition:***

Plate Current for plate volts = 10	2	ma

[a] The dc component must not exceed 100 volts.
[b] Without external shield.

6KM8

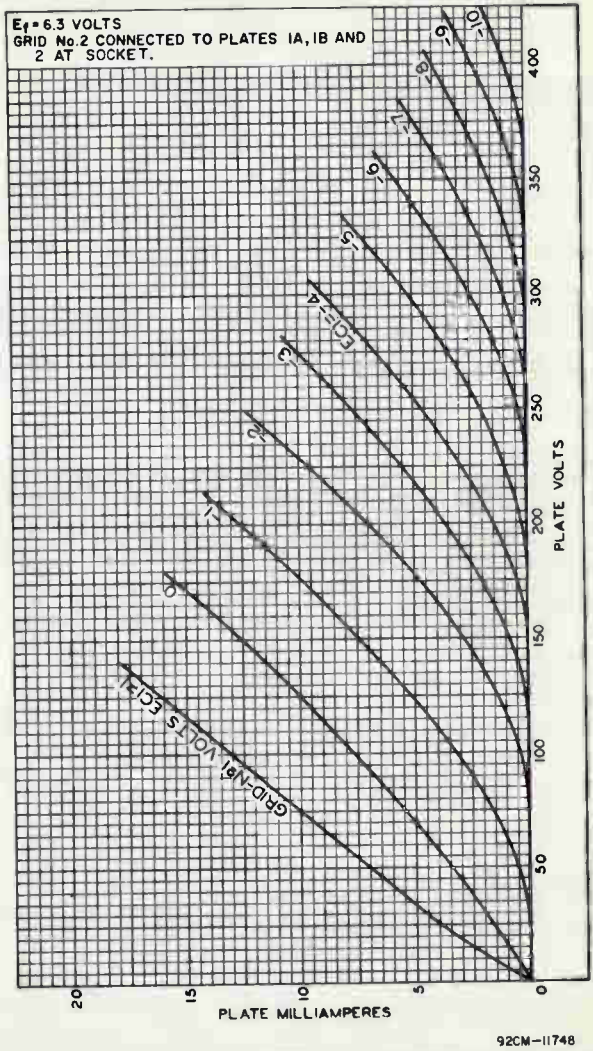
AVERAGE CHARACTERISTICS
Tetrode Unit



92CM-11713RI

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

AVERAGE PLATE CHARACTERISTICS
Tetrode Unit—Triode Connection



92CM-11748

Semiremote-Cutoff Pentode

9-PIN MINIATURE TYPE
FRAME-GRID CONSTRUCTION — DARK HEATER

For High-Gain IF-Amplifier Applications in TV Receivers

ELECTRICAL CHARACTERISTICS

		Bogey Values[a]		
Heater Voltage (AC or DC)	E_h	6.3		V
Heater Current	I_h	300		mA
Heater Warm-up Time	-	11		s
Direct Interelectrode Capacitances				
Without external shield				
Grid No.1 to plate	C_{g1-p}	0.019	max	pF
Input: G1 to (K, G3 + IS, G2, H)	C_i	9.5		pF
Output: P to (K, G3 + IS, G2, H)	C_o	3		pF
For the following characteristics, see Conditions				
Plate Resistance (Approx.)	r_p	160	-	Ω
Transconductance	g_m	18000	-	μmho
DC Plate Current	I_b	17	-	mA
DC Grid-No.2 Current	I_{c2}	4.2	-	mA
Cutoff DC Grid-No.1 Voltage For g_m = 10 μmho	$E_{c1(co)}$	-	-22	V

Conditions

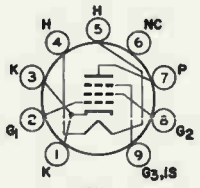
		Bogey	Value	
Heater Voltage	E_h			V
DC Plate Supply Voltage	E_{bb}	125	170	V
DC Grid-No.3 Voltage	E_{c3}	0	0	V
DC Grid-No.2 Supply Voltage	E_{cc2}	125	170	V
Grid No.1	-	Connected to negative end of R_k		
Cathode Resistor	R_k	56	56	Ω

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.187 in
Maximum Seated Length	1.937 in
Maximum Diameter	0.875 in
Length, Base Seat to Bulb Top, Excluding tip	1.469 to 1.656 in
Dimensional Outline (JEDEC 6-2)	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – No Internal Connection
Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Grid No.3, Internal Shield



9PM

DESIGN-MAXIMUM RATINGS

For operation as a Class A_1 Amplifier Tube in TV Receivers

DC Plate Voltage	E_b	330	V
DC Grid-No.3 (Suppressor-Grid) Voltage	E_{c3}	+0	V
DC Grid-No.2 (Screen-Grid) Supply Voltage	E_{cc2}	330	V
DC Grid-No.2 Voltage	E_{c2}	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
DC Grid-No.1 (Control-Grid) Voltage	E_{c1}	+0	V
Heater-Cathode Voltage			
Peak	e_{hkm}	±200	V
Average	$E_{hk(av)}$	100	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V
Grid-No.2 Input	P_{g2}		
For $E_{c2} \leq 165$ V	–	0.6	W
For $E_{c2} > 165$ V and ≤ 330 V	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	P_b	3.1	W

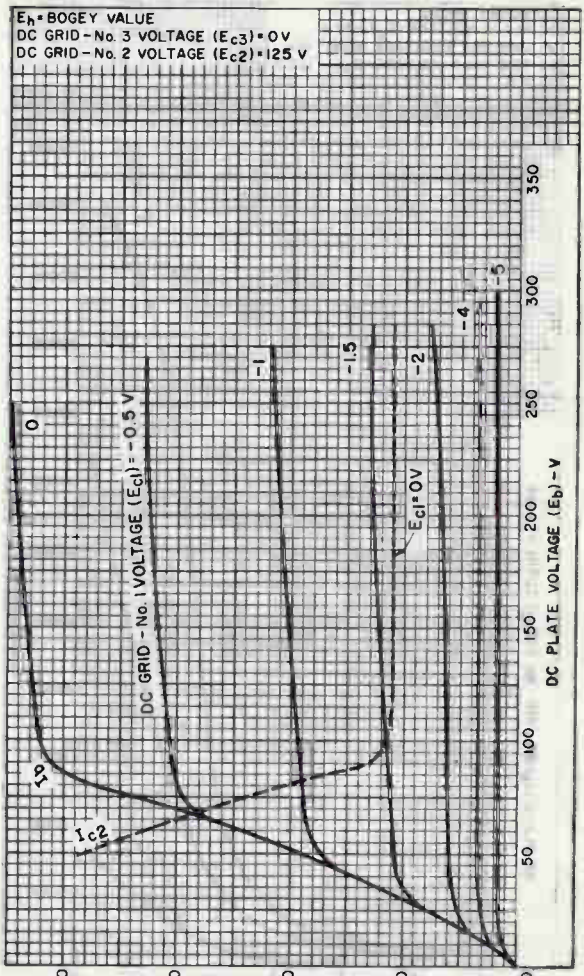
MAXIMUM CIRCUIT VALUES

Grid-No.1 Circuit Resistance	$R_{g1(ckt)}$		
For fixed-bias operation	–	250	kΩ
For cathode-bias operation	–	1	MΩ

[a] **Unless otherwise specified.**

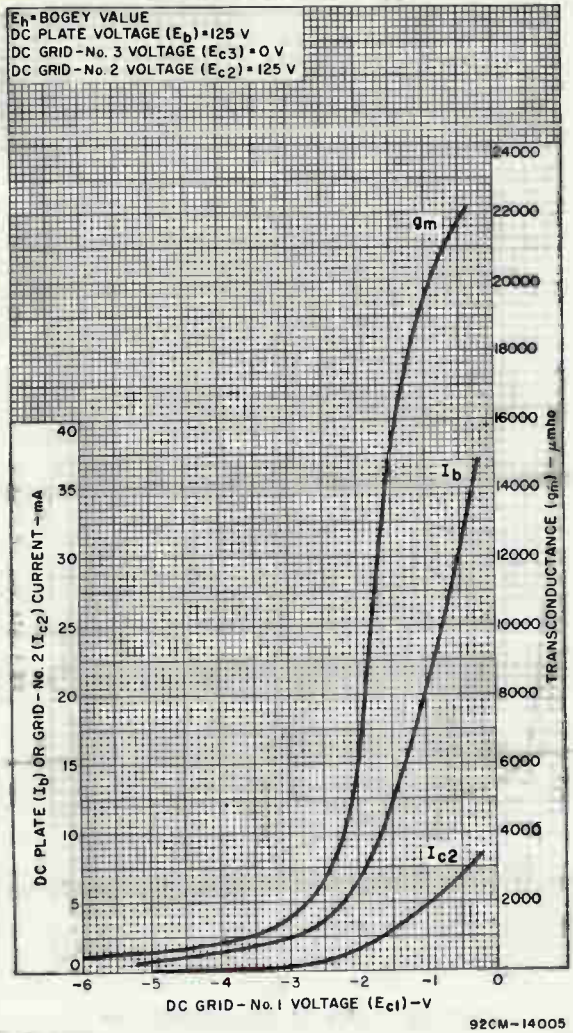
RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics



92CM-14009

Typical Characteristics



92CM-14005

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Color-Killer, Sound IF Amplifier, and Band-pass-Amplifier Applications in TV Receivers

Electrical:

Heater Characteristics and Ratings:

Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.600	amp

Peak heater-cathode voltage:

	Unit:	Triode	Pentode[a]	
Heater negative with respect to cathode		200 max.	20 max.	volts
Heater positive with respect to cathode		200[b] max.	20 max.	volts

Direct Interelectrode Capacitances:

	Without External Shield	With External Shield[c]	
Triode Unit:			
G_T to P_T	3.0	3.0	pf
Input: G_T to ($H+G3_P+IS, K_T$)	3.2	3.2	pf
Output: P_T to ($H+G3_P+IS, K_T$)	1.6	2.4	pf
Pentode Unit:			
$G1_P$ to P_P	0.046 max.	0.030 max.	pf
Input: $G1_P$ to ($H+G3_P+IS, G2_P, K_P$)	7.5	7.5	pf
Output: P_P to ($H+G3_P+IS, G2_P, K_P$)	2.2	2.8	pf
G_T to P_P	0.018 max.	0.003 max.	pf
$G1_P$ to P_T	0.006 max.	0.002 max.	pf

Characteristics, Class A_1 Amplifier:

	Unit:	Triode	Pentode	
Plate Voltage		250	125	volts
Grid-No.2 Voltage		–	125	volts
Grid-No.1 Voltage		-2	-1	volts
Amplification Factor		100	–	
Plate Resistance (Approx.)		31500	150000	ohms
Transconductance		3200	10000	μmhos
Plate Current		1.8	12	ma
Grid-No.2 Current		–	4.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20		-3.5	-7	volts

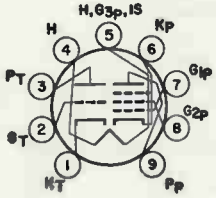
Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"

6KT8

Length, Base Seat to Bulb Top (Excluding Tip) . . . . . 1-9/16" ± 3/32"
Diameter . . . . . 0.750" to 0.875"
Dimensional Outline. . . . . .See *General Section*
Bulb T6-1/2
Base . . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW 9QP

Pin 1 – Triode Cathode
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – See Footnote a (Heater, Pentode Grid No.3, Internal Shield)
Pin 6 – Pentode Cathode
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate



AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Unit:	*Triode*	*Pentode*	
Plate Voltage		330 max.	330 max.	volts
Grid-No.2 Supply Voltage		–	330 max.	volts
Grid-No.2 Voltage		See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Grid-No.1 Voltage:				
Positive-bias value		0 max.	0 max.	volts
Grid-No.2 Input:				
For grid-No.2 voltages up to 165 volts		–	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts		See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Plate Dissipation		1 max.	2.5 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.5 max.	0.25 max.	megohm
For cathode-bias operation	1 max.	1 max.	megohm

[a] Pin No.5 (Pentode Grid No.3, Internal Shield, and Heater) should be operated at or near ground potential. If the peak cathode-to-grid-No.3 voltage exceeds +20 volts, undesirable changes in the tube characteristics may result.

[b] The dc component must not exceed 100 volts.

[c] With external shield JEDEC No.315 connected to pins 4 and 5.

6KV6

Beam Power Tube

NOVAR TYPE **DARK HEATER**

For High-Voltage-Pulse Shunt-Regulator Applications in Color-TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Voltage	E_h	6.3	V
Heater Current	I_h	1.600	A
Direct Interelectrode Capacitances			
Without external shield			
Grid No.1 to plate	C_{g1-p}	1.2	pF
Input: G1 to (K,G3,G2,H)	C_i	22	pF
Output: P to (K,G3,G2,H)	C_o	9.0	pF

For the following characteristics, see **Conditions**

Amplification Factor (Triode Connection)[a]	μ	–	4	–	
Plate Resistance (Approx.)	r_p	–	–	6000	Ω
Transconductance	g_m	–	–	9500	μmho
DC Plate Current	I_b	580[b]	–	80	mA
DC Grid-No.2 Current	I_{c2}	24[b]	–	2.4	mA
Cutoff DC Grid-No.1 Voltage (Plate mA = 1)	$E_{c1(co)}$	–	–	-42	V

Conditions

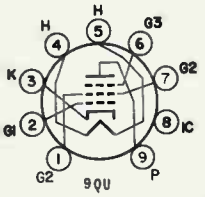
Heater Voltage	E_h	Bogey Value		V
DC Plate Voltage	E_b	100	140	V
DC Grid-No.3 Voltage	E_{c3}	0	0	V
DC Grid-No.2 Voltage	E_{c2}	140	140	V
DC Grid-No.1 Voltage	E_{c1}	0	-24.5	V

MECHANICAL CHARACTERISTICS

Operating Position . . . . . Any
Type of Cathode . . . . . Coated Unipotential
Dimensional Outline (JEDEC 12-96) . . . . See *General Section*
Maximum Overall Length . . . . . 3.130 in
Maximum Seated Length . . . . . 2.750 in
Maximum Diameter . . . . . 1.562 in
Envelope . . . . . JEDEC Designation T12
Base[c] . . . . . Large-Button Novar 9-Pin with Exhaust Tip (JEDEC Designation E9-88)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Grid No.2
Pin 2 – Grid No.1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid No.3
Pin 7 – Grid No.2
Pin 8 – Do Not Use
Pin 9 – Plate



DESIGN-MAXIMUM RATINGS

For operation as a High-Voltage-Pulse Shunt-Regulator Tube in Color-Television Receivers in a 525-line, 30-frame system

DC Plate Supply Voltage (I_b = 0 mA)	E_{bb}	770	V
Peak Positive-Pulse Plate Voltage[c]	e_{bm}	6500	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1500	V
DC Grid-No.3 Voltage	E_{c3}	75	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	220	V
Grid No.1 (Control-Grid) Voltage			
Peak negative-pulse value	$-e_{c1m}$	330	V
Negative dc value (bias)	$-E_{c1}$	75	V
Heater-Cathode Voltage			
Peak	e_{hkm}	+200 -500	V
Average[d]	$E_{hk(av)}$	100	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V
Cathode Current			
Peak	i_{km}	950	mA
Average[d]	$I_{k(av)}$	275	mA
Grid-No.2 Input	P_{g2}	3.5	W
Plate Dissipation[e]	P_b	20[f]	W
Envelope Temperature (at hottest point on envelope surface)	T_E	240	°C

MAXIMUM CIRCUIT VALUE

Grid-No.1-Circuit Resistance For grid-No.1-resistor-bias operation	$R_{g1(ckt)}$	1	MΩ

[a] With grid No.3 and grid No.2 connected, respectively, to cathode and plate at socket.

[b] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

[c] This rating is applicable where the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

[d] Measured with a dc meter.

[e] Adequate circuit precautions must be taken to protect the tube in the absence of grid-No.1 bias.

[f] Plate dissipations up to 24 W maximum are permissible for short periods of time (up to 10 s maximum) provided the maximum envelope-temperature rating is not exceeded.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Beam Power Tube

NOVAR TYPE

For High-Voltage-Pulse Shunt-Regulator Applications in Color-TV Receivers

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3		V
Heater Current	I_h	1.6		A
Direct Interelectrode Capacitances:[a]				
Grid No.1 to plate	c_{g1-p}		0.6	pF
Input: G1 to (K,G3,G2,H)	c_i		22	pF
Output: P to (K,G3,G2,H)	c_o		9.0	pF

For the following characteristics, see Conditions below.

Amplification Factor (Triode Connection)[b]	μ	-	4	-	
Plate Resistance (Approx.)	r_p	-	-	10000	Ω
Transconductance	g_m	-	-	6000	μmho
DC Plate Current	I_b	440[c]	-	40	mA
DC Grid-No.2 Current	I_{c2}	30[c]	-	2.4	mA
Cutoff DC Grid-No.1 Voltage for I_b = 1 mA	$E_{c1(co)}$	-	-	-42	V

Conditions:

		Bogey Value			
Heater Voltage	E_h				V
DC Plate Voltage	E_b	100	140	140	V
DC Grid-No.3 Voltage	E_{c3}	0	0	0	V
DC Grid-No.2 Voltage	E_{c2}	140	140	140	V
DC Grid-No.1 Voltage	E_{c1}	0	-24.5	-24.5	V

MECHANICAL CHARACTERISTICS

Dimensional Outline . . . . . JEDEC No.12-97
Maximum Overall Length . . . . . 3.380in. (85.85 mm)
Maximum Seated Length . . . . . 3.000in. (76.2 mm)
Maximum Diameter . . . . . 1.562in. (39.6 mm)
Envelope . . . . . JEDEC Designation T12
Base[d] . . . . . Large-Button Novar 9-Pin with Exhaust Tip
(JEDEC Designation E9-88)

Terminal-Connections Designation	JEDEC 9QU
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design-Maximum Values[e]

For operation as a High-Voltage-Pulse Shunt-Regulator Tube in Color Television Receivers in a 525-line, 30-frame system.

DC Plate Supply Voltage (I_b = 0 mA)	E_{bb}	900	V
Peak Positive-Pulse Plate Voltage	e_{bm}	6500	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1500	V
DC Grid-No.3 Voltage	E_{c3}	75	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	220	V
Peak Positive-Pulse Grid-No.2 Voltage	e_{c2m}	600	V
Grid No.1 (Control-Grid) Voltage:			
Peak negative-pulse value	$-e_{c1m}$	330	V
Negative dc value (bias)	$-E_{c1}$	250	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+200 -500	V
Average[g]	$E_{hk(av)}$	100	V
Heater Voltage	E_h	5.7 to 6.8	V
Cathode Current:			
Peak	i_{km}	950	mA
Average[g]	$I_{k(av)}$	275	mA
Grid-No.2 Input	P_{g2}	2.0	W
Plate Dissipation[h]	P_b	28[k]	W
Envelope Temperature (at hottest point on envelope surface)	T_E	240	°C

MAXIMUM CIRCUIT VALUE

Grid-No.1-Circuit Resistance:	$R_{g1(ckt)}$		
For grid-No.1-resistor-bias operation		1	MΩ

[c] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] With grid No.3 and grid No.2 connected, respectively, to cathode and plate at socket.

[c] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

[d] Designed to mate with "Novar 9-Contact" Socket generally available from your local RCA Distributor.

[e] As defined in the current issue of EIA Standard RS-239.

[f] This rating is applicable where the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

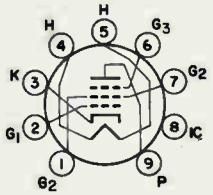
[g] Measured with a dc meter.

[h] Adequate circuit precautions must be taken to protect the tube in the absence of grid-No.1 bias.

[k] Plate dissipations up to 32W maximum are permissible for short periods of time provided the maximum envelope-temperature rating is not exceeded. This condition may exist under high-line voltage, zero picture tube beam current.

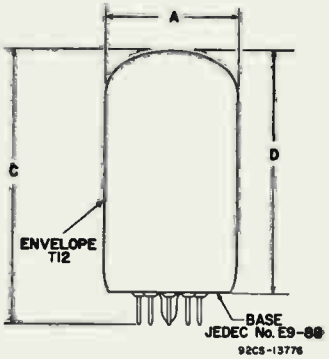
TERMINAL DIAGRAM — Bottom View

Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.3
Pin 7 - Grid No.2
Pin 8 - Do Not Use
Pin 9 - Plate



JEDEC 9QU

DIMENSIONAL OUTLINE — JEDEC No. 12-97



DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
A	1.438*	1.562	36.6*	39.6
C	–	3.380	–	85.85
D	2.750	3.000	69.9	76.2
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				

* Applies to the minimum diameter except in the area of the seal.

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE **FRAME-GRID CONSTRUCTION**

For Use as a Combined Voltage Amplifier and Video Output Tube in TV Receivers

ELECTRICAL

Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at heater volts = 6.3	0.775	A
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	200	V
Heater positive with respect to cathode	200[a]	V
Direct Interelectrode Capacitances[b]		
Triode Unit:		
Grid to plate	3.7	pF
Grid to cathode, pentode cathode, pentode grid No.3 & internal shield, and heater.	2.5	pF
Plate to cathode, pentode cathode, pentode grid No.3 & internal shield, and heater.	2.4	pF
Triode grid to pentode plate	0.015 max	pF
Pentode Unit:		
Grid No.1 to plate	0.12 max	pF ←
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	13.0	pF
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	4.8	pF
Pentode plate to triode plate	0.17 max	pF

Characteristics, Class A_1 Amplifier

	Triode Unit	*Pentode Unit*		
Plate Supply Voltage	-	125	200	V
Plate Voltage	200	-	-	V
Grid-No.2 Supply Voltage	-	125	125	V
Grid-No.1 Supply Voltage	-2	-	-	V
Cathode Resistor	-	82	68	Ω
Amplification Factor	70	-	-	
Plate Resistance (Approx.)	17500	55000	75000	Ω
Transconductance	4000	21000	23000	μmho
Plate Current	4	16.5	20	mA ←
Grid-No.2 Current	-	3.1	3.5	mA ←
Grid-No.1 Voltage (Approx.) for plate current = 100 μA	-4.5	-4.2	-4.2	V

← Indicates a change.

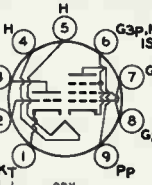
6KV8

MECHANICAL

Operating Position	Any
Maximum Overall Length	2-5/8 in
Maximum Seated Length	2-3/8 in
Length, Base Seat to Bulb Top (Excluding tip)	2 ± 3/32 in
Diameter	0.750 to 0.875 in
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

BASING DIAGRAM (Bottom View)

Pin 1 – Triode Cathode
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate



90X

AMPLIFIER — Class A_1

Design-Maximum Ratings

	Triode Unit	*Pentode Unit*	
Plate Voltage	300	300 max	V
Grid-No.2 (Screen-Grid) Supply Voltage	-	300 max	V
Grid-No.2 Voltage	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Grid-No.1 (Control-Grid) Voltage, Positive-bias value	0	0 max	V
Grid-No.2 Input			
For grid-No.2 voltages up to 150 V.	-	1 max	W
For grid-No.2 voltages between 150 and 300 V.	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	1	5 max	W

Maximum Circuit Values

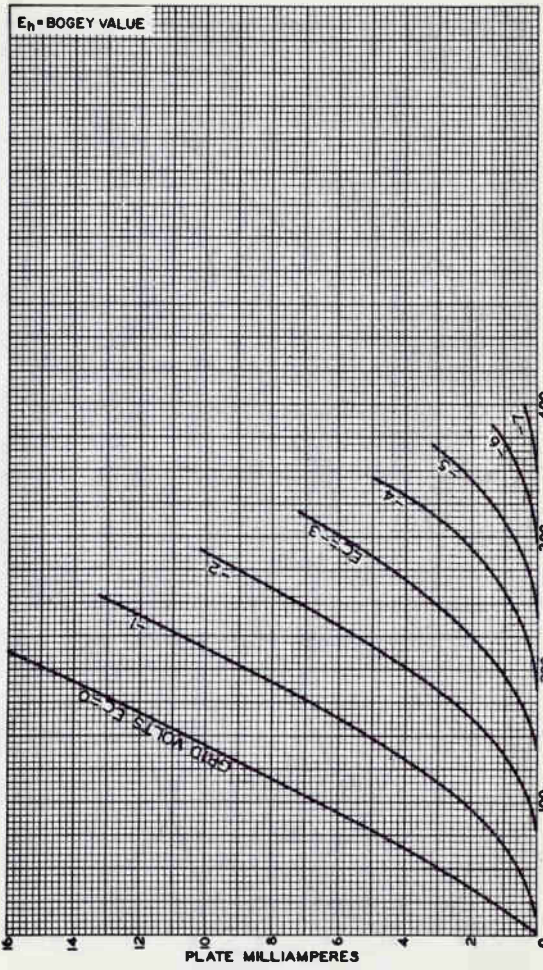
	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance			
For fixed-bias operation	0.5	0.1 max	MΩ
For cathode-bias operation	1	0.25 max	MΩ

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

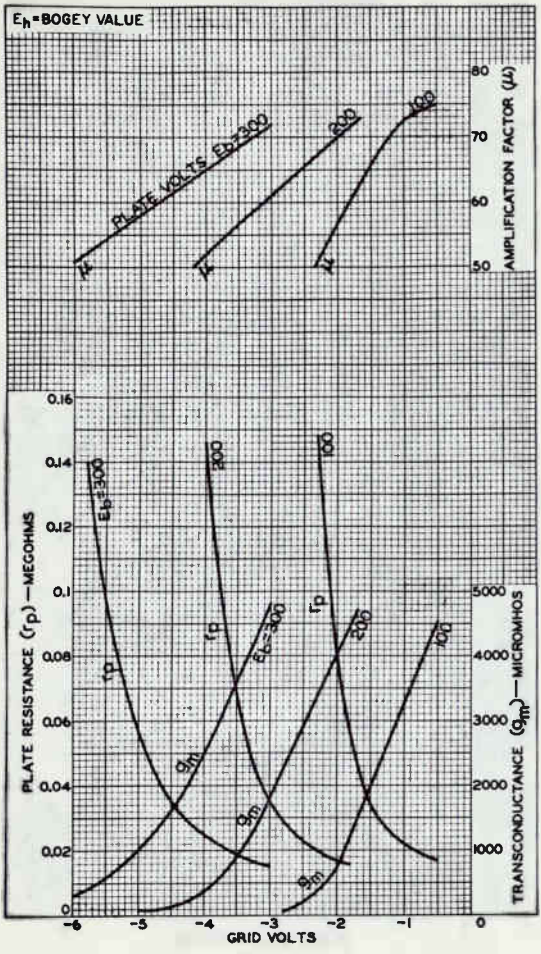
RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Average Plate Characteristics
Triode Unit



92CM-8644RI

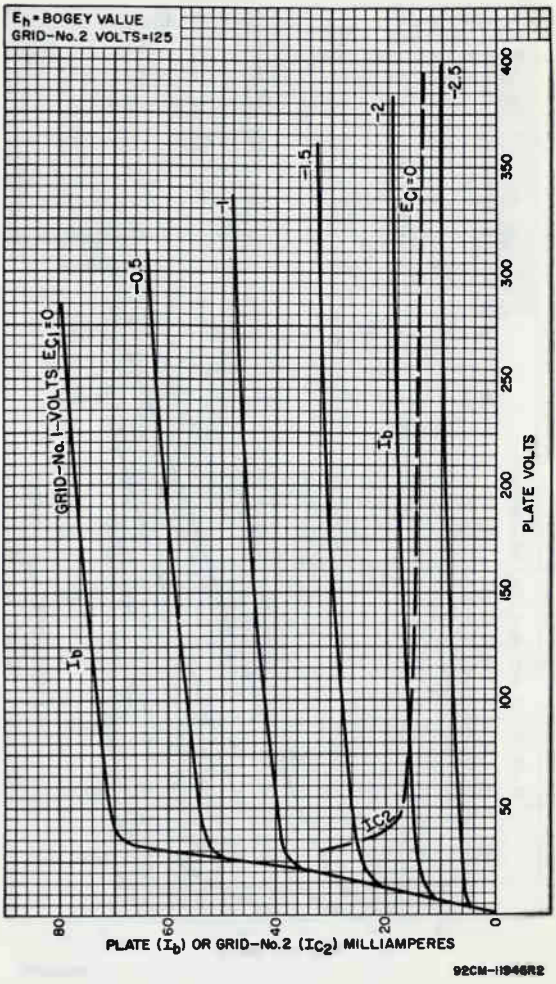
Average Characteristics
Triode Unit



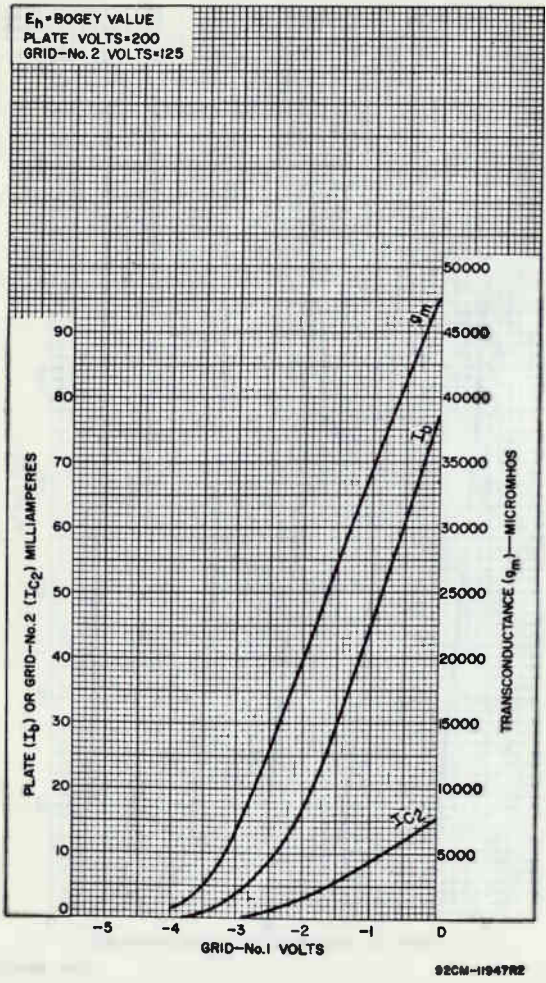
92CM-10874R1

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Average Characteristics
Pentode Unit



Average Characteristics
Pentode Unit



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

FRAME-GRID CONSTRUCTION **DARK HEATER**

For Video-Output-Amplifier Service in Color-TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values[a]

Heater Voltage (AC or DC)	E_h	6.3	V
Heater Current	I_h	0.520	A
Direct Interelectrode Capacitances			
Without external shield			
Grid No.1 to plate	c_{g1-p}	0.16 max	pF
Input: G1 to (K, G3 + IS, G2, H)	c_i	14	pF
Output: P to (K, G3 + IS, G2, H)	c_o	6.0	pF

For the following characteristics, see Conditions

Plate Resistance (Approx.)	r_p	40	kΩ
Transconductance	g_m	30000	μmho
DC Plate Current	I_b	30	mA
DC Grid-No.2 Current	I_{c2}	5.2	mA
Cutoff DC Grid-No.1 Voltage	$E_{c1(co)}$	-4.5	V
Plate μA = 100			

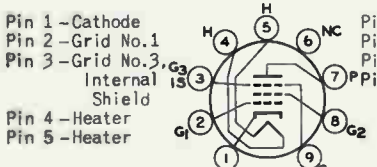
Conditions

Heater Voltage	E_h	Bogey Value	V
Plate Supply Voltage	E_{bb}	200	V
Grid-No.3		connected to cathode at socket	
Grid-No.2 Supply Voltage	E_{cc2}	135	V
Grid-No.1 Supply Voltage	E_{cc1}	0	V
Cathode Resistor	R_k	47	Ω

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.625 in
Maximum Seated Length	2.375 in
Length, Base Seat to Bulb Top	
Excluding tip	1.906 to 2.094 in
Maximum Diameter	0.875 in
Dimensional Outline (JEDEC 6-3)	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)



DESIGN-MAXIMUM RATINGS

For operation as a Class A_1 Amplifier

Plate Voltage	E_b	330	V
Grid-No.2 (Screen-Grid) Supply Voltage	E_{cc2}	330	V
Grid-No.2 Voltage	E_{c2}	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Grid-No.1 (Control-Grid) Voltage			
Positive-bias value	E_{c1}	0	V
Heater-Cathode Voltage			
Peak	e_{hkm}	±200	V
DC	E_{hk}	100	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V
Grid-No.2 Input	P_{g2}		
For $E_{c2} \leq 165$ V		1	W
For $E_{c2} > 165$ V and ≤ 330 V	-	See *Grid-No.2-Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	P_b	9	W

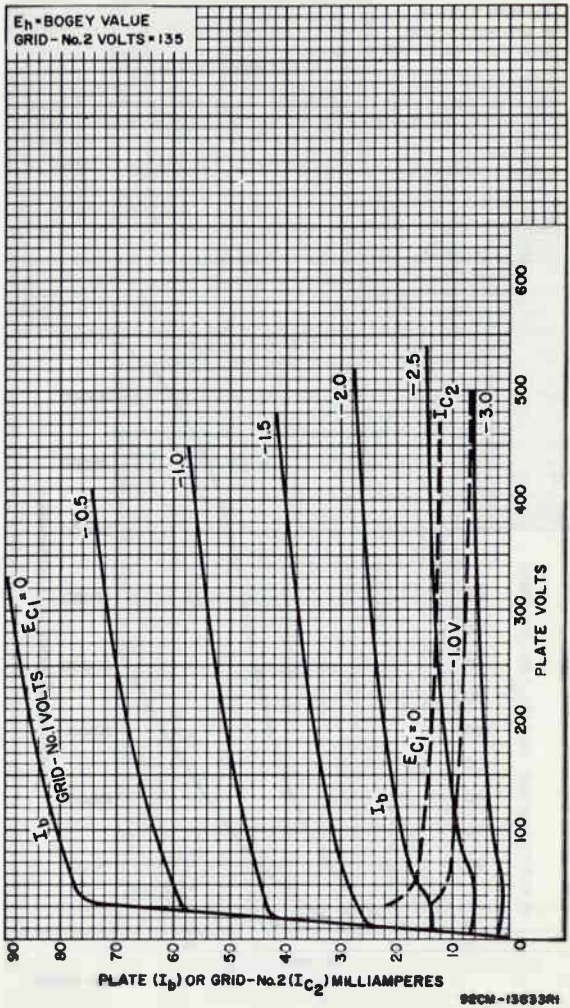
MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance	$R_{g1(ckt)}$		
For fixed-bias operation	-	0.1	MΩ
For cathode-bias operation	-	0.25	MΩ

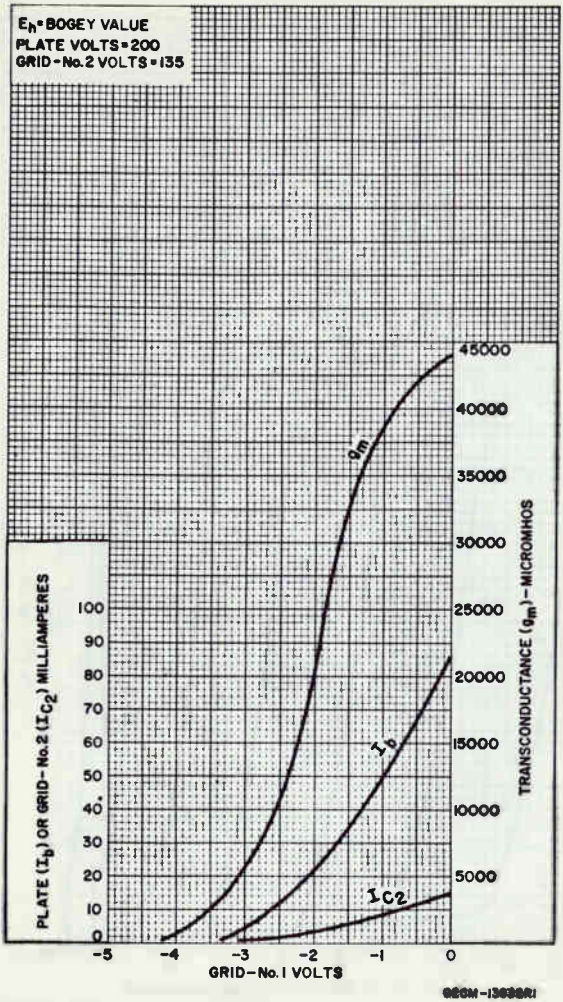
● **Unless otherwise specified.**

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics



Typical Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

High-Mu Triode—Beam Power Tube

NOVAR TYPE

For Combined Vertical-Deflection Oscillator and Amplifier Service in TV Receivers

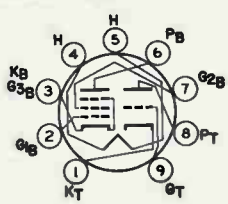
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	1.100	amp
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Direct Interelectrode Capacitances (Approx.):[b]		
Triode Unit:		
Grid to plate	0.44	pf
G_T to (K_T,H)	15.0	pf
P_T to (K_T,H)	7.0	pf
Beam Power Unit:		
Grid No.1 to plate	0.048	pf
$G1_B$ to (K_B+$G3_B$,$G2_B$,H)	2.6	pf
P_B to (K_B+$G3_B$,$G2_B$,H)	0.28	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.380"
Seated Length	1.750" to 2.000"
Diameter	1.062" to 1.188"
Dimensional Outline	See *General Section*
Bulb	T9
Base	Small Button Novar 9-Pin with Exhaust Tip (JEDEC No.E9-89)
Basing Designation for BOTTOM VIEW	9QT

Pin 1 – Triode Cathode
Pin 2 – Beam Power Grid No.1
Pin 3 – Beam Power Cathode & Grid No.3
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Beam Power Plate
Pin 7 – Beam Power Grid No.2
Pin 8 – Triode Plate
Pin 9 – Triode Grid



Characteristics, Class A_1 Amplifier:

	Triode Unit	*Beam Power Unit*			
Plate Voltage	250	50	135	120	volts
Grid-No.2 Voltage	–	120	120	*Connected to plate at socket*	volts
Grid-No.1 Voltage	−3	0	−10	−10	volts
Amplification Factor	64	–	–	7	

6KY8A

	Triode Unit		*Beam Power Unit*		
Plate Resistance (Approx.).	40000	–	18000	–	ohms
Transconductance.	1600	–	8400	–	μmhos
Plate Current	1.4	170[c]	39	–	ma
Grid–No.2 Current	–	20[c]	3	–	ma
Grid–No.1 Voltage (Approx.) for plate ma = 1	–	–	–24	–	volts

VERTICAL-DEFLECTION OSCILLATOR *(Triode Unit)*

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC Plate Voltage.	330 max.	volts
Peak Negative-Pulse Grid Voltage.	400 max.	volts
Peak Cathode Current.	77 max.	ma
Average Cathode Current	22 max.	ma
Plate Dissipation	1.5 max.	watts

Maximum Circuit Values:

Grid–Circuit Resistance:

For grid-resistor-bias operation. . . .	2.2 max.	megohms

VERTICAL-DEFLECTION AMPLIFIER *(Beam Power Unit)*

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[d]

DC Plate Voltage.	300 max.	volts
Peak Positive-Pulse Plate Voltage[e]. . . .	2000 abs.max.	volts
DC Grid–No.2 (Screen-Grid) Voltage. . . .	150 max.	volts
Peak Negative-Pulse Grid–No.1 (Control-Grid) Voltage.	250 max.	volts
Peak Cathode Current.	200 max.	ma
Average Cathode Current	70 max.	ma
Plate Dissipation	12 max.	watts
Grid–No.2 Input	1.9 max.	watts

Maximum Circuit Values:

Grid–No.1–Circuit Resistance:

For grid-resistor-bias operation. . . .	2.2 max.	megohms

[a] The dc component must not exceed 100 volts.

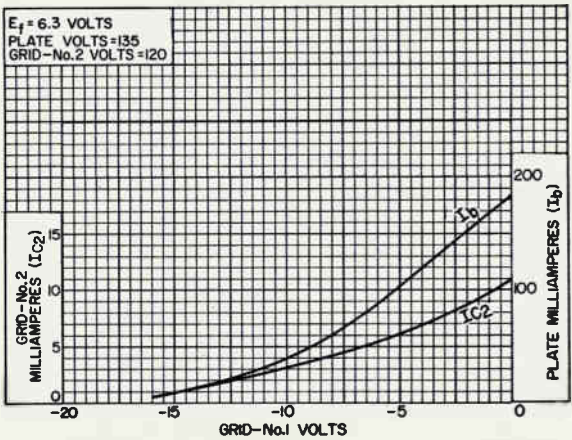
[b] Without external shield.

[c] This value can be measured by a method involving a recurrent wave form such that the plate dissipation and grid–No.2 input will be kept within ratings in order to prevent damage to the tube.

[d] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

[e] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

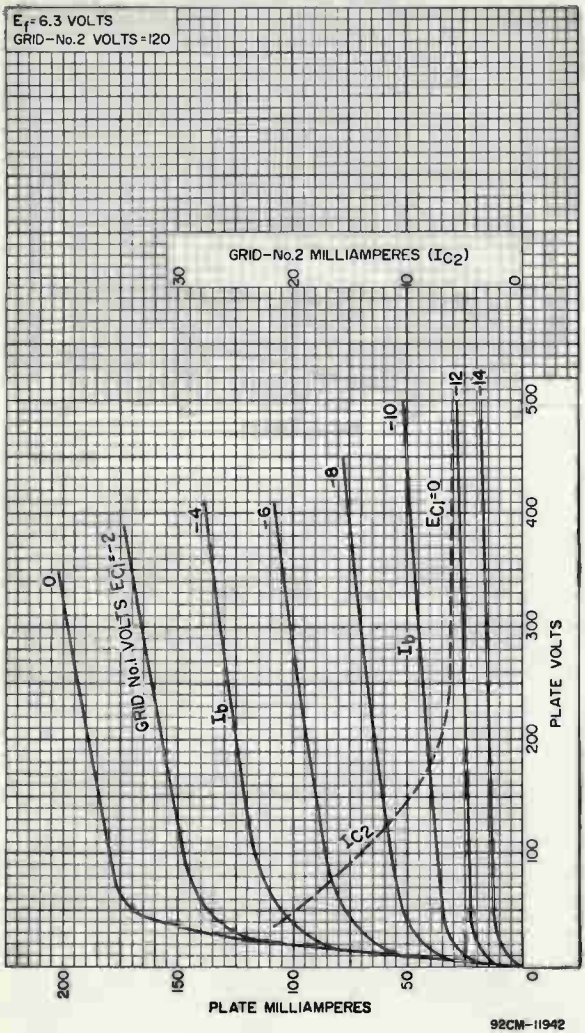
AVERAGE CHARACTERISTICS
Beam Power Unit



9ECS-11929

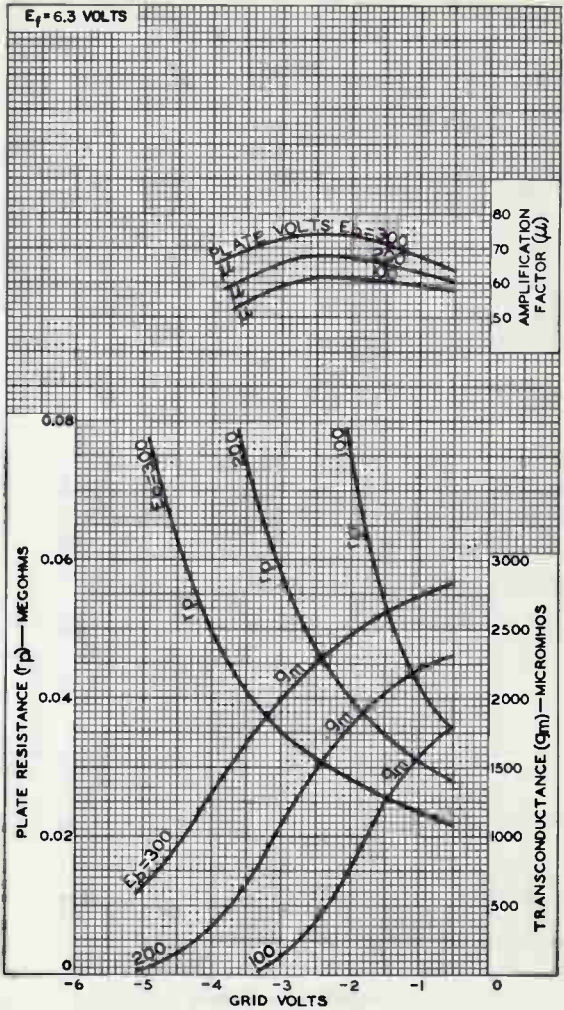
6KY8A

AVERAGE CHARACTERISTICS
Beam Power Unit



92CM-11942

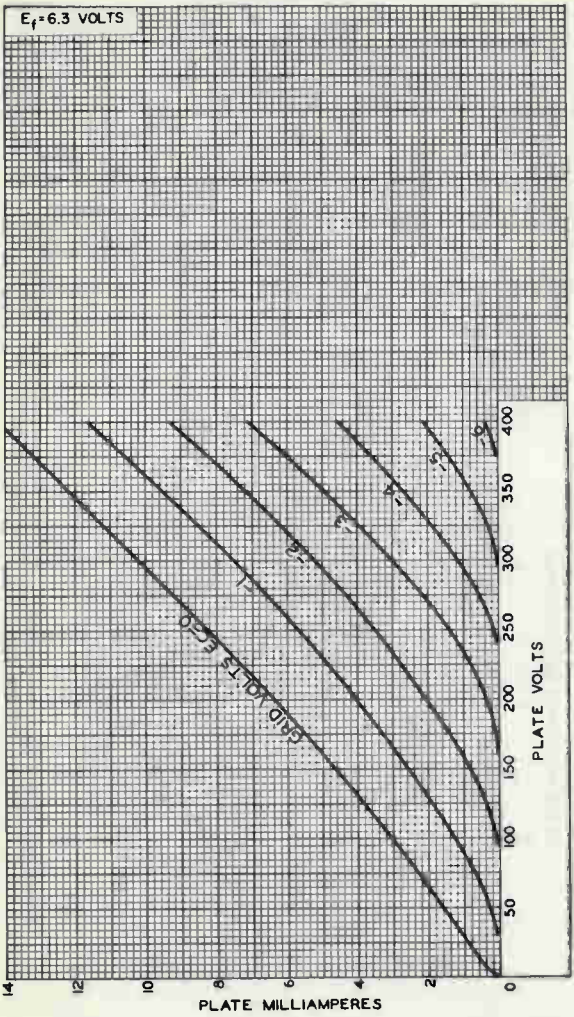
AVERAGE CHARACTERISTICS
Triode Unit



92CM-11945

6KY8A

AVERAGE CHARACTERISTICS
Triode Unit



92CM—11944

6KZ8

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Oscillator-Mixer Service in VHF TV-Tuner Applications

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC)	6.3[a]	6.3 ± 0.6	volts
Current	0.450 ± 0.030	0.450[b]	amp
Warm-up time (Average)	11	–	sec
Peak heater-cathode voltage (Each Unit):			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts
Direct Interelectrode Capacitances:[d]			
Triode Unit:			
G_T to P_T	1.6		pf
Input: G_T to $(K_T, G3_P+K_P+IS, H)$	3.2		pf
Output: P_T to $(K_T, G3_P+K_P+IS, H)$	1.8		pf
Pentode Unit:			
$G1_P$ to P_P	0.01 max.		pf
Input: $G1_P$ to $(K_P+G3_P+IS, G2_P, H)$	5.5		pf
Output: P_P to $(K_P+G3_P+IS, G2_P, H)$	3.4		pf
Heater to cathode (Each Unit)	3.2		pf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Voltage	125	125	volts
Grid-No.2 Voltage	–	125	volts
Grid-No.1 Voltage	-1	-1	volt
Amplification Factor	46	–	
Plate Resistance (Approx.)	5400	200000	ohms
Transconductance	8500	7500	μmhos
Plate Current	13.5	12	ma
Grid-No.2 Current	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-8	-8	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

6KZ8

Basing Designation for BOTTOM VIEW. 9FZ

Pin 1 – Triode Plate
Pin 2 – Pentode Grid No.1
Pin 3 – Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate
Pin 7 – Pentode Grid No.2
Pin 8 – Triode Cathode
Pin 9 – Triode Grid

AMPLIFIER — Class A_1

Maximum Ratings, ***Design-Maximum Values:***

	Triode Unit	*Pentode Unit*	
Plate Voltage.	330 max.	330 max.	volts
Grid-No.2 (Screen-Grid) Supply Voltage	–	330 max.	volts
Grid-No.2 Voltage.	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Grid-No.1 (Control-Grid) Voltage: Positive-bias value.	0 max.	0 max.	volts
Plate Dissipation.	2.5 max.	2.5 max.	watts
Grid-No.2 Input: For grid-No.2 voltages up to 165 volts.	–	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts.	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		

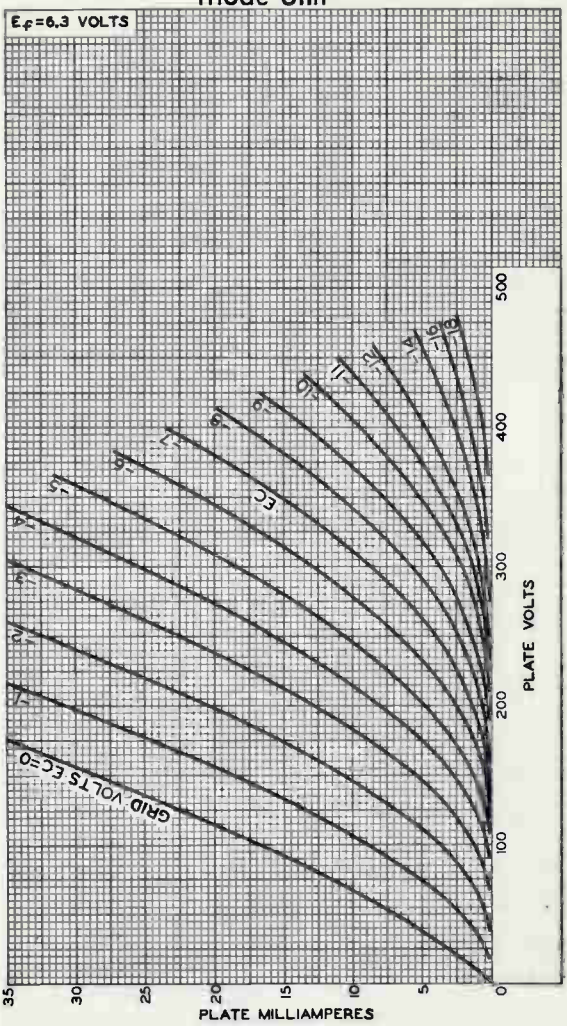
Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For fixed-bias operation.	0.25 max.	0.25 max.	megohm
For cathode-bias operation.	0.5 max.	0.5 max.	megohm

[a] At heater amperes = 0.450.
[b] At heater volts = 6.3.
[c] The dc component must not exceed 100 volts.
[d] With external shield JEDEC No.315 connected to cathode of unit under test.

AVERAGE PLATE CHARACTERISTICS

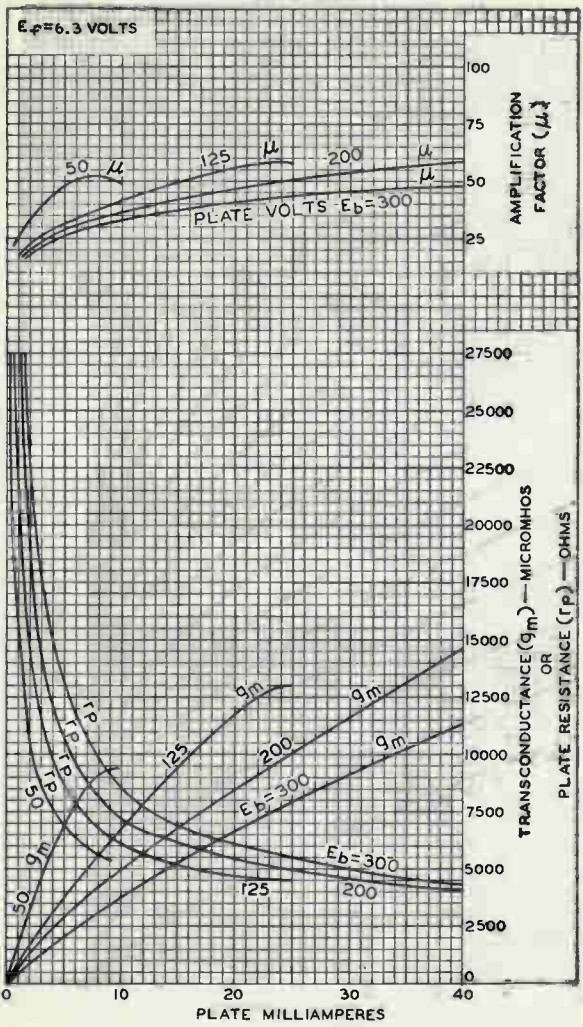
Triode Unit



92CM-10421RI

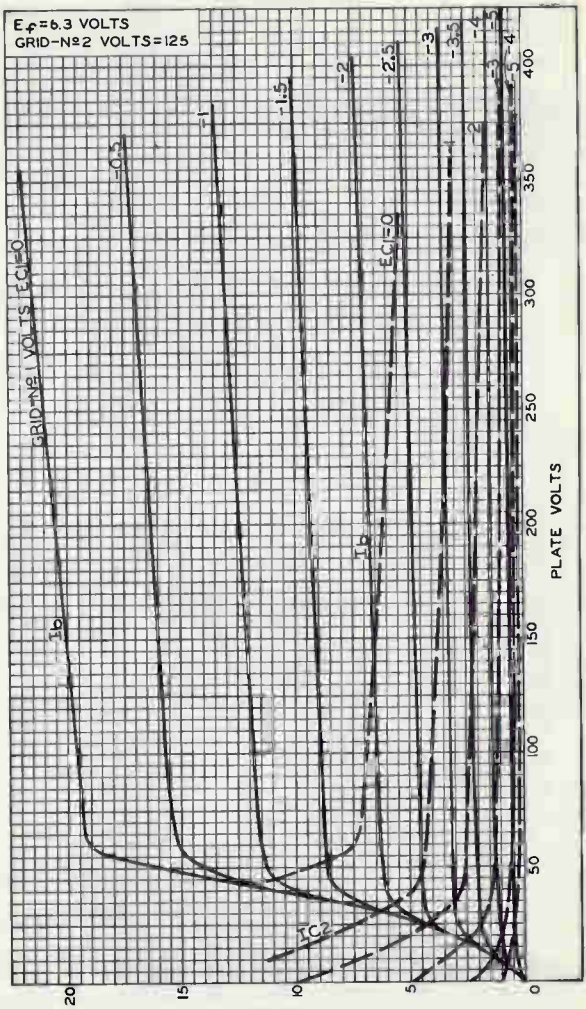
6KZ8

AVERAGE CHARACTERISTICS
Triode Unit

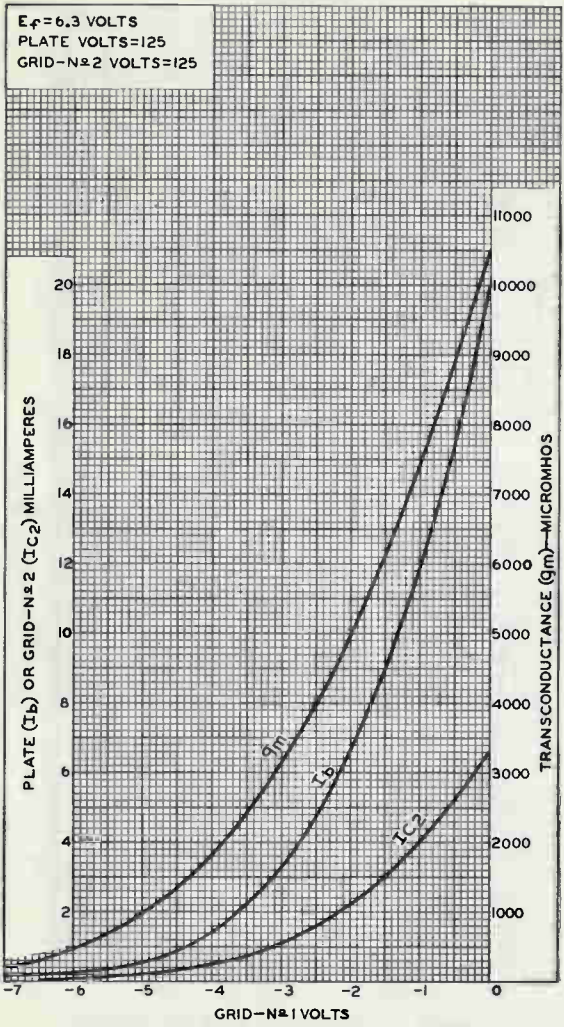


ELECTRON TUBE DIVISION 92CM—10428
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

AVERAGE CHARACTERISTICS
Pentode Unit



AVERAGE CHARACTERISTICS
Pentode Unit



92CM-10417

6L6, 6L6-G

BEAM POWER TUBE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:
Voltage . . . . . 6.3 . . . . . ac or dc volts
Current . . . . . 0.9 . . . . . amp

Direct Interelectrode Capacitances (Approx.):

	6L6°	*6L6-G°°*	
Grid No.1 to plate . .	0.4	0.9	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	10	11.5	μμf
Plate to cathode & grid No.3, grid No.2, and heater	12	9.5	μμf

Mechanical:	*6L6*	*6L6-G*
Mounting Position	Any	Any
Maximum Overall Length .	4-5/16"	5-5/16"
Maximum Seated Length . .	3-3/4"	4-3/4"
Maximum Diameter	1-5/8"	2-1/16"
Bulb	Metal Shell MT-10	ST-16
Base	Small-Wafer Octal 7-Pin (JETEC No.B7-22)	Medium-Shell Octal 7-Pin (JETEC No.B7-12)
Basing Designation	7AC	G-7AC

Pin 1 {6L6, Shell / 6L6-G, No Conn.}
Pin 2 - Heater
Pin 3 - Plate

Pin 4 - Grid No.2
Pin 5 - Grid No.1
Pin 7 - Heater
Pin 8 - Cathode, Grid No.3

AF POWER AMPLIFIER - Class A_1†

Triode Connection - Grid No.2 Connected to Plate

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	275 max.	volts
PLATE DISSIPATION	19 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	180 max.	volts
Heater positive with respect to cathode .	180 max.	volts

Typical Operation and Characteristics:

	Fixed Bias	*Cathode Bias*	
Plate Voltage	250	250	volts
Grid-No.1 (Control-Grid) Voltage . .	-20	-	volts
Cathode-Bias Resistor	-	490	ohms

°, °°, †: See next page.

→ indicates a change.

6L6, 6L6-G

BEAM POWER TUBE

	Fixed Bias	*Cathode Bias*	
Peak AF Grid-No.1 Voltage	20	20	volts
Zero-Signal Plate Current	40	40	ma
Max.-Signal Plate Current	44	42	ma
Amplification Factor	8	-	
Plate Resistance (Approx.)	1700	-	ohms
Transconductance	4700	-	μmhos
Load Resistance	5000	6000	ohms
Total Harmonic Distortion	5	6	%
Max.-Signal Power Output	1.4	1.3	watts

Maximum Circuit Values (For maximum rated conditions):

Grid-No.1-Circuit Resistance:

For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

AF POWER AMPLIFIER - Class A_1†

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	360 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	270 max.	volts
PLATE DISSIPATION	19 max.	watts
GRID-No.2 INPUT	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180 max.	volts

Typical Operation and Characteristics:

Fixed-Bias Operation

Plate Voltage	200	250	300	350	volts
Grid-No.2 Voltage	200	250	200	250	volts
Grid-No.1 Voltage	-11.5	-14	-12.5	-18	volts
Peak AF Grid-No.1 Voltage	11.5	14	12.5	18	volts
Zero-Signal Plate Current	52	72	48	54	ma
Max.-Signal Plate Current	57	79	55	66	ma
Zero-Signal Grid-No.2 Current	3.5	5.0	2.5	2.5	ma
Max.-Signal Grid-No.2 Current	5.7	7.3	4.7	7.0	ma
Plate Resistance (Approx.)	35000	22500	35000	33000	ohms
Transconductance	5300	6000	5300	5200	μmhos
Load Resistance	3000	2500	4500	4200	ohms
Total Harmonic Distortion	9	10	11	15	%
Max.-Signal Power Output	4	6.5	6.5	10.8	watts

Cathode-Bias Operation

Plate Voltage	200	250	300	volts
Grid-No.2 Voltage	200	250	200	volts

° With shell connected to cathode.
°° With no external shield.

†; See next page.

→ indicates a change.

6L6, 6L6-G

BEAM POWER TUBE

Cathode-Bias Resistor	186	167	218	ohms
Peak AF Grid-No.1 Voltage	11.5	14	12.7	volts
Zero-Signal Plate Current	55	75	51	ma
Max.-Signal Plate Current	56	78	54.5	ma
Zero-Signal Grid-No.2 Current	4.2	5.4	3.0	ma
Max.-Signal Grid-No.2 Current	5.6	7.2	4.6	ma
Load Resistance	3000	2500	4500	ohms
Total Harmonic Distortion	9	10	11	%
Max.-Signal Power Output	4	6.5	6.5	watts

Maximum Circuit Values (For maximum rated conditions):

Grid-No.1-Circuit Resistance:

For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER - Class A_1†

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	360 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	270 max.	volts
PLATE DISSIPATION	19 max.	watts
GRID-No.2 INPUT	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180 max.	volts

Typical Operation and Characteristics:

Unless otherwise specified, values are for 2 tubes

	Fixed Bias		*Cathode Bias*		
Plate Voltage	250	270	250	270	volts
Grid-No.2 Voltage	250	270	250	270	volts
Grid-No.1 Voltage	-16	-17.5	-	-	volts
Cathode-Bias Resistor	-	-	124	124	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	32	35	35.6	38.2	volts
Zero-Signal Plate Current	120	134	120	134	ma
Max.-Signal Plate Current	140	155	130	145	ma
Zero-Signal Grid-No.2 Current	10	11	10	11	ma
Max.-Signal Grid-No.2 Current	16	17	15	17	ma
Plate Resistance (Per tube) (Approx.)	24500	23500	-	-	ohms
Transconductance (Per tube)	5500	5700	-	-	μmhos
Effective Load Resistance (Plate to plate)	5000	5000	5000	5000	ohms
Total Harmonic Distortion	2	2	2	2	%
Max.-Signal Power Output	14.5	17.5	13.8	18.5	watts

†: See next page.

→ indicates a change

6L6, 6L6-G

BEAM POWER TUBE

→**Maximum Circuit Values (For maximum rated conditions):**

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER - Class AB_1†

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	360 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	270 max.	volts
PLATE DISSIPATION	19 max.	watts
GRID-No.2 INPUT	2.5 max.	watts
→PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180 max.	volts

→**Typical Operation:**

Values are for 2 tubes

	Fixed Bias		*Cathode Bias*	
Plate Voltage	360	360	360	volts
Grid-No.2 Voltage▲	270	270	270	volts
Grid-No.1 Voltage	-22.5	-22.5	-	volts
Cathode-Bias Resistor	-	-	248	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	45	45	40.6	volts
Zero-Signal Plate Current	88	88	88	ma
Max.-Signal Plate Current	132	140	100	ma
Zero-Signal Grid-No.2 Current	5	5	5	ma
Max.-Signal Grid-No.2 Current	15	11	17	ma
Effective Load Resistance (Plate to plate)	6600	3800	9000	ohms
Total Harmonic Distortion	2	2	4	%
→Max.-Signal Power Output	26.5	18	24.5	watts

→**Maximum Circuit Values (For maximum rated conditions):**

Grid-No.1-Circuit Resistance:▲		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER - Class AB_2♦

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	360 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	270 max.	volts
PLATE DISSIPATION	19 max.	watts
GRID-No.2 INPUT	2.5 max.	watts

▲,†,♦: see next page.

→indicates a change.

6L6, 6L6-G

BEAM POWER TUBE

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. .	180 max.	volts
Heater positive with respect to cathode. .	180 max.	volts

Typical Operation:

Values are for 2 tubes

	Fixed Bias		
Plate Voltage.	360	360	volts
Grid-No.2 Voltage.	225	270	volts
Grid-No.1 Voltage.	-18	-22.5	volts
Peak AF Grid-No.1-to Grid-No.1 Voltage	52	72	volts
Zero-Signal Plate Current.	78	88	ma
Max.-Signal Plate Current.	142	205	ma
Zero-Signal Grid-No.2 Current.	3.5	5	ma
Max.-Signal Grid-No.2 Current.	11	16	ma
Effective Load Resistance (Plate to plate).	6000	3800	ohms
Peak Grid-Input Power.	140	270	mw
Total Harmonic Distortion.	2	2	%
Max.-Signal Power Output	31	47	watts

Maximum Circuit Values (For maximum rated conditions):

Grid-No.1-Circuit Resistance‡:

For fixed-bias operation	0.1 max. megohm
For cathode-bias operation	Not recommended

† Subscript 1 indicates that grid-No.1 current does not flow during any part of input cycle.

♦ Subscript 2 indicates that grid-No.1 current flows during some part of input cycle.

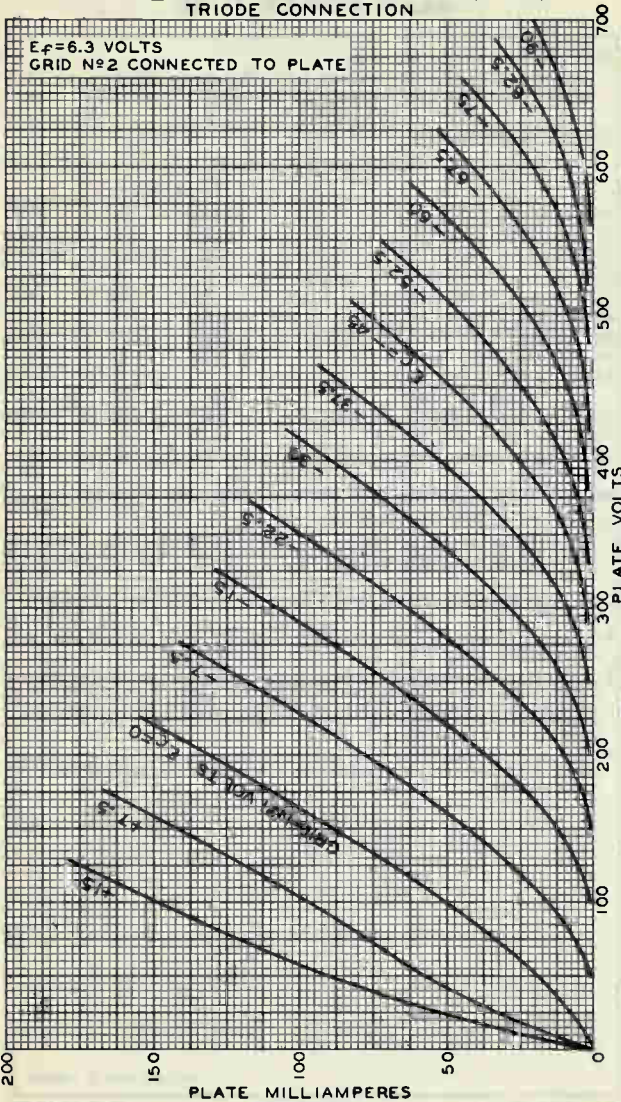
‡ Driver stage should be capable of supplying the specified driving power at low distortion to the No.1 grids of the AB_2 stage. To minimize distortion, the effective resistance per grid-No.1 circuit of the AB_2 stage should be held at a low value. For this purpose, the use of transformer coupling is recommended.

▲ The type of input coupling used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.

←Indicates a change.

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



SEPT. 6 1938

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-4966RI

6L6

6L6
AVERAGE PLATE CHARACTERISTICS
WITH E_{C1} AS VARIABLE

$E_f = 6.3$ VOLTS SCREEN VOLTS = 250

LOAD LINE CORRECTED TO COMPENSATE FOR EFFECTS OF RECTIFICATION WITH LARGE SIGNALS

PLATE VOLTS

PLATE (I_b) OR SCREEN (I_{C2}) MILLIAMPERES

CONTROL-GRID VOLTS E_{C1}

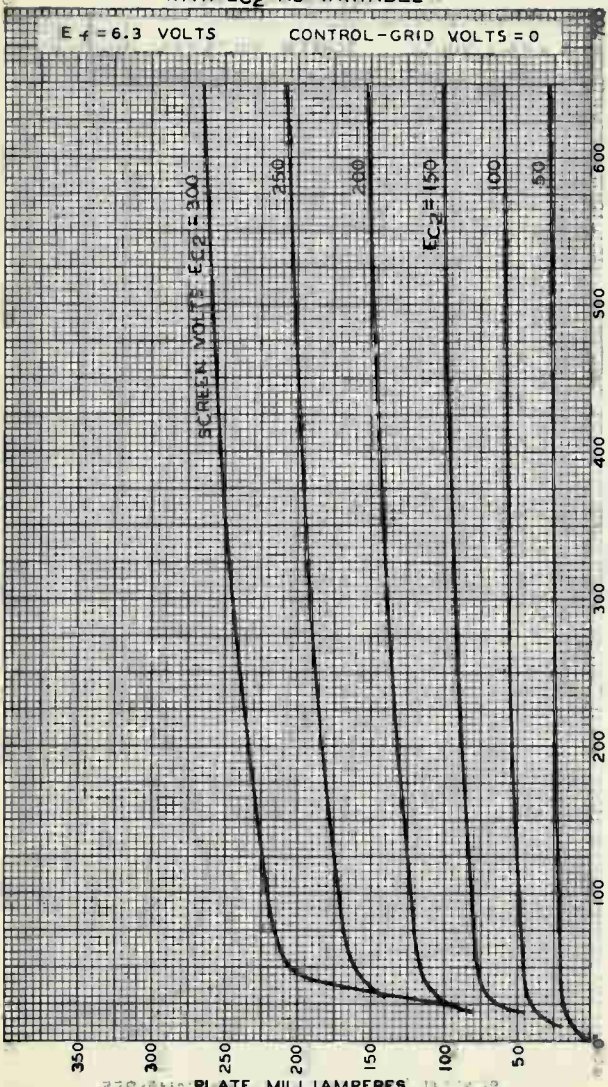
MAY 6, 1936

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4561R1

6L6

6L6
AVERAGE PLATE CHARACTERISTICS
WITH E_{C2} AS VARIABLE

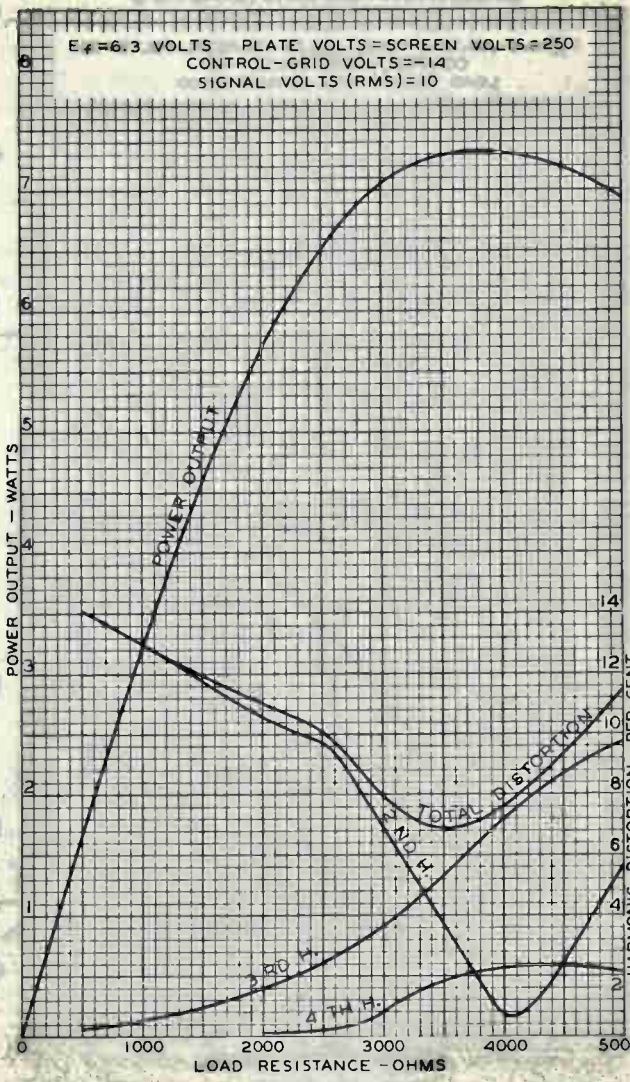


MAY 8, 1938 RCA RADIOTRON DIVISION RCA MANUFACTURING COMPANY, INC. 82C-4580R1

RCA

6L6

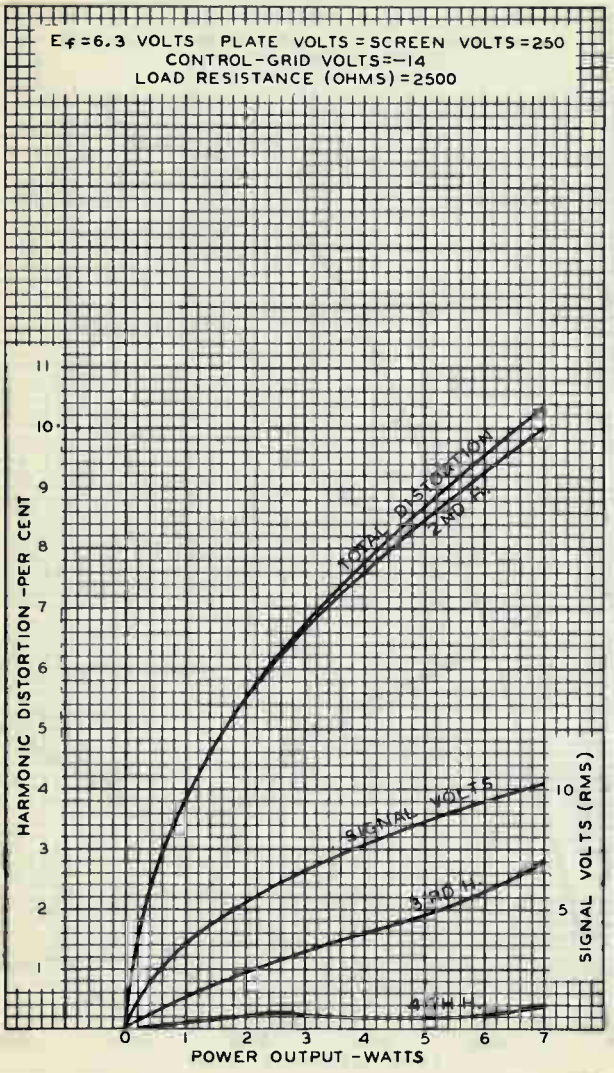
OPERATION CHARACTERISTICS



6L6

6L6

OPERATION CHARACTERISTICS



Beam Power Tube

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.9	amp
Direct Interelectrode Capacitances (Approx.):▲		
Grid-No.1 to plate	0.6	μμf
Grid-No.1 to cathode & grid No.3, grid No.2, and heater	10	μμf
Plate to cathode & grid No.3, grid No.2, and heater	8.5	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage	-14	volts
Plate Resistance (Approx.)	22500	ohms
Transconductance	6000	μmhos
Plate Current	72	ma
Grid-No.2 Current	5	ma

Mechanical:

Operating Position . . . . . Any
Maximum Overall Length . . . . . 4-1/4"
Maximum Seated Length . . . . . 3-11/16"
Diameter . . . . . 1.438" to 1.562"
Bulb T-12
Base . . . Medium-Shell Octal 7-Pin (JEDEC Group 1, No.B7-12),
Short Medium-Shell Octal 7-Pin with External Barriers
Style A (JEDEC Group 1, No.B7-111) or
Style B (JEDEC Group 1, No.B7-119), or
Short Medium-Shell Octal 6-Pin with External Barriers
Style A (JEDEC Group 1, No.B6-148) or
Style B (JEDEC Group 1, No.B6-122)
Basing Designation for BOTTOM VIEW 7AC

Pin 1● - No Connection
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grid No.2

Pin 5 - Grid No.1
Pin 7 - Heater
Pin 8 - Cathode, Grid No.3

AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	500	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	450	max.	volts
GRID-No.2 INPUT	5	max.	watts
PLATE DISSIPATION	30	max.	watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. .	200	max.	volts
Heater positive with respect to cathode. .	200*	max.	volts

Typical Operation and Characteristics:

Fixed-Bias Operation

Plate Voltage.	200	250	300	350	volts
Grid-No.2 Voltage.	200	250	200	250	volts
Grid-No.1 (Control-Grid) Voltage.	-11.5	-14	-12.5	-18	volts
Peak AF Grid-No.1 Voltage.	11.5	14	12.5	18	volts
Zero-Signal Plate Current.	52	72	48	54	ma
Max.-Signal Plate Current.	57	79	55	66	ma
Zero-Signal Grid-No.2 Current.	3.5	5	2.5	2.5	ma
Max.-Signal Grid-No.2 Current.	5.7	7.3	4.7	7	ma
Plate Resistance (Approx.).	35000	22500	35000	33000	ohms
Transconductance	5300	6000	5300	5200	μmhos
Load Resistance.	3000	2500	4500	4200	ohms
Total Harmonic Distortion.	9	10	11	15	%
Max.-Signal Power Output .	4	6.5	6.5	10.8	watts

Cathode-Bias Operation

Plate Supply Voltage	200	250	300	volts
Grid-No.2 Supply Voltage	200	250	200	volts
Cathode Resistor	186	167	218	ohms
Peak AF Grid-No.1 Voltage.	11.5	14	12.7	volts
Zero-Signal Plate Current.	55	75	51	ma
Max.-Signal Plate Current.	56	78	54.5	ma
Zero-Signal Grid-No.2 Current. . . .	4.2	5.4	3	ma
Max.-Signal Grid-No.2 Current. . . .	5.6	7.2	4.6	ma
Load Resistance.	3000	2500	4500	ohms
Total Harmonic Distortion.	9	10	11	%
Max.-Signal Power Output	4	6.5	6.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation	0.1	max.	megohm
For cathode-bias operation	0.5	max.	megohm

AF POWER AMPLIFIER — Class A_1

Triode Connection — Grid No.2 Connected to Plate

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE.	450	max.	volts
PLATE DISSIPATION.	30	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode. .	200	max.	volts
Heater positive with respect to cathode. .	200*	max.	volts

Typical Operation and Characteristics:

	Fixed Bias	*Cathode Bias*	
Plate Supply Voltage	250	250	volts
Grid-No.1 (Control-Grid) Voltage	-20	-	volts
Cathode Resistor	-	490	ohms
Peak AF Grid-No.1 Voltage	20	20	volts
Zero-Signal Plate Current	40	40	ma
Maximum-Signal Plate Current	44	42	ma
Plate Resistance (Approx.)	1700	-	ohms
Amplification Factor	8	-	
Transconductance	4700	-	μmhos
Load Resistance	5000	6000	ohms
Total Harmonic Distortion	5	6	%
Maximum-Signal Power Output	1.4	1.3	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	500 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	450♦ max.	volts
GRID-No.2 INPUT	5 max.	watts
PLATE DISSIPATION	30 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200* max.	volts

Typical Operation and Characteristics:

Unless otherwise specified, values are for 2 tubes

	Fixed Bias		*Cathode Bias*		
Plate Supply Voltage	250	270	250	270	volts
Grid-No.2 Supply Voltage	250	270	250	270	volts
Grid-No.1 Voltage	-16	-17.5	-	-	volts
Cathode Resistor	-	-	124	124	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	32	35	35.6	28.2	volts
Zero-Signal Plate Current	120	134	120	134	ma
Max.-Signal Plate Current	140	155	130	145	ma
Zero-Signal Grid-No.2 Current	10	11	10	11	ma
Max.-Signal Grid-No.2 Current	16	17	15	17	ma
Plate Resistance (Approx., per tube)	24500	23500	-	-	ohms
Transconductance (Per tube)	5500	5700	-	-	μmhos
Effective Load Resistance (Plate to plate)	5000	5000	5000	5000	ohms
Total Harmonic Distortion	2	2	2	2	%
Max.-Signal Power Output	14.5	17.5	13.8	18.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	500 max.	volts
GRID-No.2 VOLTAGE	450♦ max.	volts
GRID-No.2 INPUT	5 max.	watts
PLATE DISSIPATION	30 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200* max.	volts

Typical Operation:

Values are for 2 tubes

	Fixed Bias			*Cathode Bias*	
Plate Supply Voltage	360	450	450	360	volts
Grid-No.2 Supply Voltage	270	350	400	270	volts
Grid-No.1 (Control-Grid) Voltage♦	-22.5	-30	-37	-	volts
Cathode Resistor	-	-	-	248	ohms
Peak Af Grid-No.1-to-Grid-No.1 Voltage	45	60	70	40.6	volts
Zero-Signal Plate Current	88	95	116	88	ma
Max.-Signal Plate Current	132	194	210	100	ma
Zero-Signal Grid-No.2 Current	5	3.4	5.6	5	ma
Max.-Signal Grid-No.2 Current	15	19.2	22	17	ma
Effective Load Resistance (Plate to plate)	6600	6000	5600	9000	ohms
Total Harmonic Distortion	2	1.5	1.8	4	%
Max.-Signal Power Output	26.5	50	55	24.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:♦		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF AMPLIFIER — Class AB_2

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	500 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	450♦ max.	volts
GRID-No.2 INPUT	5 max.	watts
PLATE DISSIPATION	30 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200* max.	volts

Typical Operation:

Values are for 2 tubes

	Fixed Bias		
Plate Voltage	360	360	volts
Grid-No.2 Voltage	225	270	volts
Grid-No.1 (Control-Grid) Voltage♦	-18	-22.5	volts
Peak AF Grid-No.1 to Grid-No.1 Voltage	52	72	volts
Zero-Signal Plate Current	78	88	ma
Max.-Signal Plate Current	142	205	ma
Zero-Signal Grid-No.2 Current	3.5	5	ma
Max.-Signal Grid-No.2 Current	11	16	ma
Effective Load Resistance (Plate to plate)	6000	3800	ohms
Peak Grid-Input Power♠	140	270	mw
Total Harmonic Distortion	2	2	%
Max.-Signal Power Output	31	47	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:♠

For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	Not recommended	

▲ Without external shield.

● On the 6-pin bases, pin 1 as well as pin 6 is omitted.

★ The dc component must not exceed 100 volts.

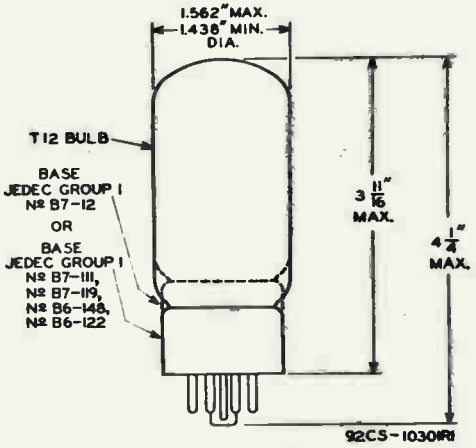
♦ In push-pull circuits where grid No.2 of each tube is connected to a tap on the plate winding of the output transformer, it is permissible for this voltage to be as high as 500 volts.

♣ The type of input coupling used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.

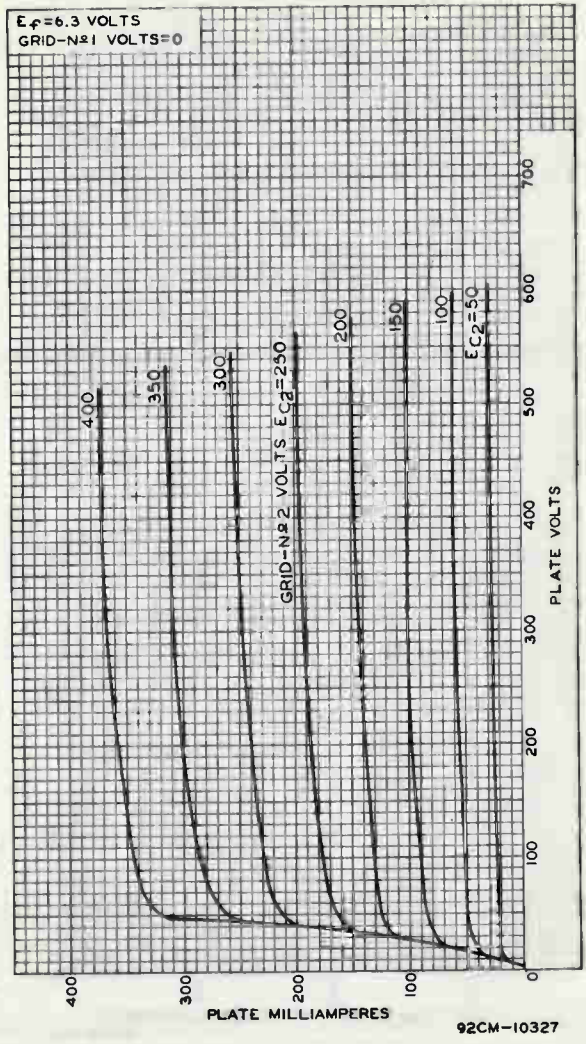
♠ Driver stage should be capable of supplying the specified driving power at low distortion to the No.1 grids of the AB_2 stage. To minimize distortion, the effective resistance per grid-No.1 circuit of the AB_2 stage should be held at a low value. For this purpose, the use of transformer coupling is recommended.

OPERATING CONSIDERATIONS

The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided.

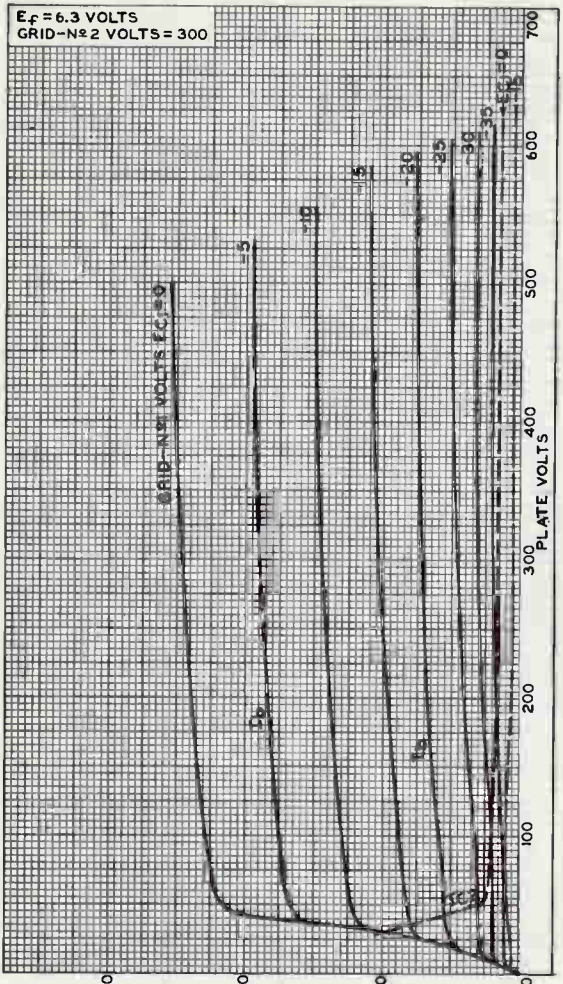

1.562" MAX.
1.438" MIN.
DIA.
T12 BULB
BASE
JEDEC GROUP 1
Nº B7-12
OR
BASE
JEDEC GROUP 1
Nº B7-111,
Nº B7-119,
Nº B6-148,
Nº B6-122
3 11/16"
MAX.
4 1/4"
MAX.
92CS-10301RI

AVERAGE PLATE CHARACTERISTICS



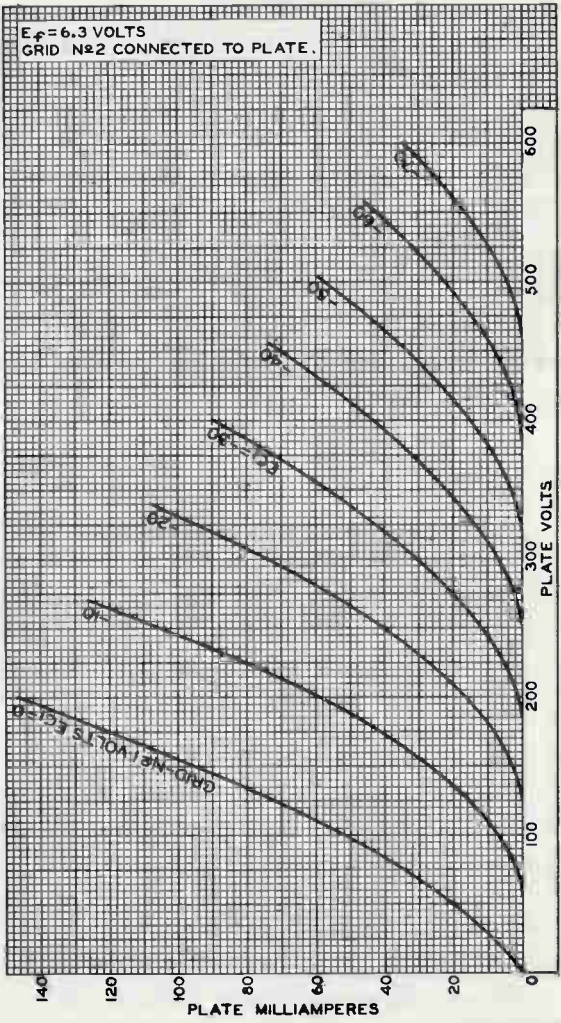
6L6-GC

AVERAGE CHARACTERISTICS



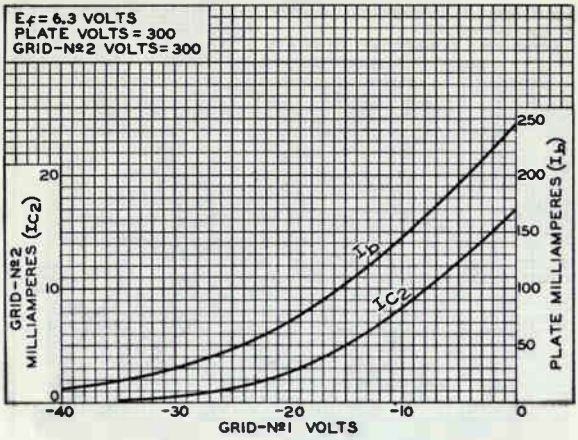
92CM-10133

AVERAGE PLATE CHARACTERISTICS
Triode Connection



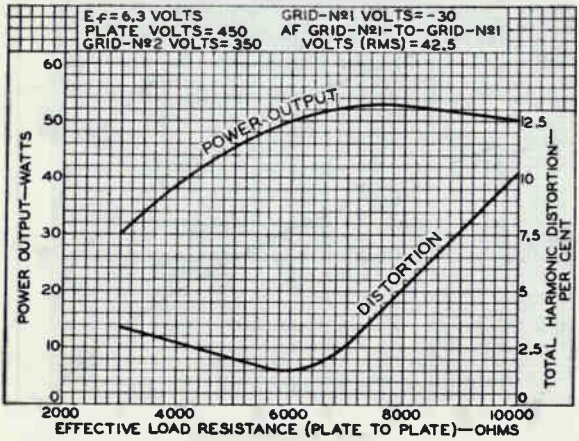
92CM-9568

AVERAGE CHARACTERISTICS



92CS-10126

OPERATION CHARACTERISTICS
Push-Pull Class AB_1



92CS-9575

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

Beam Power Tube

Duodecar Type

For Color-TV Horizontal-Deflection Amplifier Circuits Using 240 V to over 400 V "B" Supplies

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc. . .	E_h			6.3		V
Heater Current	I_h			2.25		A
Direct Interelectrode Capacitances:[a]						
Grid No.1 to plate	c_{g1-p}			0.44		pF
Input: G1 to (K,G3,G2,H) .	c_i			33		pF
Output: P to (K,G3,G2,H).	c_o			18		pF
For the following characteristics, see Conditions below:						
Amplification Factor (Triode Connection)[b] . . .	μ	–	–	–	4[c]	
Plate Resistance (approx.)	r_p	–	–	–	6600	Ω
Transconductance	g_m	–	–	–	13400	μmho
DC Plate Current	I_b	–	900[d]	560[d]	105	mA
DC Grid-No.2 Current. . . .	I_{c2}	–	110[d]	46[d]	2.0	mA
Cutoff DC Grid-No.1 Voltage for I_b = 1 mA	$E_{c1(co)}$	-125	–	–	-40	V
Conditions:						
Heater Voltage	E_h	←		6.3		→ V
Peak Positive-Pulse Plate Voltage[e]	e_{bm}	5000	–	–	–	V
DC Plate Voltage	E_b	–	45	50	150	V
Grid No.3		Connected to cathode at socket				
DC Grid-No.2 Voltage . . .	E_{c2}	110	160	110	110	V
DC Grid-No.1 Voltage . . .	E_{c1}	–	0	–	-20	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length. . . . . 4.375 in (111.12 mm)
Maximum Seated Length . . . . . 4.000 in (101.6 mm)
Maximum Diameter. . . . . 1.563 in (39.7 mm)
Dimensional Outline . . . . . JEDEC No.12-90
Envelope. . . . . JEDEC T12
Top Cap[f] . . . . . Small (JEDEC C1-1 or C1-34)

Base . . . . . Large-Button Duodecar 12-Pin (JEDEC E12-74)
Terminal Diagram . . . . . .JEDEC 12GJ
Type of Cathode . . . . . Coated Unipotential
Operating Position . . . . . .Any

MAXIMUM RATINGS – Design-Maximum Values[g]

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system

DC Plate Supply Voltage	E_{bb}	990	V
Peak Positive-Pulse Plate Voltage[h]	e_{bm}	7000[k]	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	100	V
DC Grid-No.3 Voltage	E_{c3}	0	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	200	V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	$-e_{c1m}$	300	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	±200	V
Average[m]	E_{hk}	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Cathode Current:			
Peak	i_{km}	1100	mA
Average[m]	$I_{k(av)}$	315	mA
Grid-No.2 Input	P_{g2}	5.0	W
Plate Dissipation[n]	P_b	30	W
Envelope Temperature	T_E	200[p]	°C

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance	R_{g1}	1.2	MΩ
With Feedback-Type High Voltage Regulation			
Grid-No.1-Circuit Resistance	R_{g1}	10	MΩ
With Shunt-Type High Voltage Regulation			
Grid-No.3-Circuit Resistance	R_{g3}	0	Ω

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] With grid No.3 and grid No.2 connected, respectively, to cathode and plate at socket.

[c] Conditions: $E_b = E_{c2} = 125$ V, $E_{c1} = -25$ V.

[d] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

[e] Under pulse-duration condition specified in Footnote h.

[f] Designed to mate with connector of 0.250-inch cap, generally available from your local RCA distributor.

[g] As defined in the current issue of EIA Standard RS-239, unless otherwise specified.

[h] This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 μs.

[k] Absolute-Maximum Value.

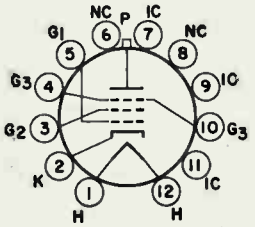
[m] Measured with a DC meter.

[n] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

[p] This rating is applicable when measurement is made using a thermocouple attached to a 0.1-inch wide phosphor-bronze ring placed at the hottest location on the envelope. A maximum rating of 220°C is applicable to direct thermocouple measurements taken at the hottest point on the envelope surface.

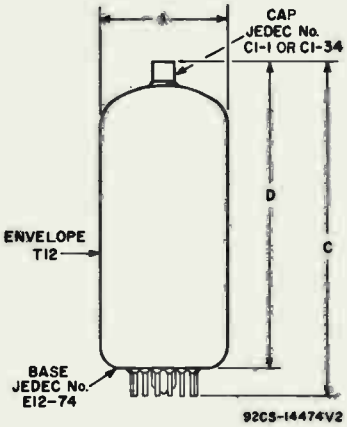
TERMINAL DIAGRAM (Bottom View)

Pin 1 – Heater
Pin 2 – Cathode
Pin 3 – Grid No.2
Pin 4 – Grid No.3
Pin 5 – Grid No.1
Pin 6 – No Internal Connection
Pin 7 – Do Not Use
Pin 8 – No Internal Connection
Pin 9 – Do Not Use
Pin 10 – Grid No.3
Pin 11 – Do Not Use
Pin 12 – Heater
Cap – Plate



JEDEC 12GJ

DIMENSIONAL OUTLINE (JEDEC No.12-90)



DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
A	1.437*	1.563	36.5*	39.7
C	–	4.375	–	111.12
D	3.750	4.000	95.3	101.6

MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION

* Applies to the minimum diameter except in the area of the seal.

High-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Sync-Separator and Noise-Immune Gated-AGC-Amplifier Applications in Color and Black-and White TV Receivers

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC) . . .	6.3[a]	6.3 ± 0.6	volts
Current.	0.600 ± 0.040	0.600[b]	amp
Warm-up time (Average) .	11	-	sec
Peak heater-cathode voltage (Each unit):			
Heater negative with respect to cathode	200 max.		volts
Heater positive with respect to cathode	200[c] max.		volts
Direct Interelectrode Capacitances:[d]			
Triode Unit:			
Grid to plate.	2.2		pf
Grid to cathode & pentode grid No.3 & internal shield, and heater	2.8		pf
Plate to cathode & pentode grid No.3 & internal shield, and heater	2.2		pf
Pentode Unit:			
Grid No.1 to plate	0.1 max.		pf
Grid No.1 to cathode, triode cathode & grid No.3 & internal shield, grid No.2, and heater	10.0		pf
Grid No.3 & triode cathode & internal shield to plate . .	3.4		pf
Grid No.1 to grid No.3 & triode cathode & internal shield	0.36		pf
Grid No.3 & triode cathode & internal shield to plate, cathode, grid No.2, grid No.1, and heater.	12.5		pf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit*	
Plate Supply Voltage	200	150	volts
Grid No.3.	-	•	

6LC8

	Triode Unit	Pentode Unit	
Grid-No.2 Supply Voltage	–	100	volts
Grid-No.1 Voltage	−2	–	volts
Grid No.1	–	•	
Cathode Resistor	–	180	ohms
Amplification Factor	70	–	
Plate Resistance (Approx.)	17500	100000	ohms
Transconductance, Grid No.1 to Plate	4000	4400	μmhos
Transconductance, Grid No.3 to Plate[f]	–	600	μmhos
Plate Current	4	4	ma
Grid-No.2 Current	–	2.8	ma
Grid-No.1 Supply Voltage (Approx.) for plate μa =			
10	−5	–	volts
20	–	−4	volts
Grid-No.3 Supply Voltage (Approx.) for plate μa = 20[f]	–	−7	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ±3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9QY

Pin 1 – Triode Plate
Pin 2 – Triode Grid
Pin 3 – Triode Cathode, Pentode Grid No.3, Internal Shield
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Pentode Grid No.1
Pin 7 – Pentode Cathode
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate

GATED AGC AMPLIFIER & NOISE INVERTER

Pentode Unit

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system

DC PLATE VOLTAGE	300 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[h]	600 max.	volts

GRID-No.3 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	100 max.	volts
Positive-bias value	0 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2-Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts	1.1 max.	watts
For grid-No.2 voltages between 150 and 300 volts	See *Grid-No.2-Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2 max.	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1 max.	megohm

AMPLIFIER — Class A_1

Triode Unit

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative-bias value	50 max.	volts
Positive-bias value	0 max.	volts
PLATE DISSIPATION	1.1 max.	watts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1 max.	megohm

[a] At heater amperes = 0.600.

[b] At heater volts = 6.3.

[c] The dc component must not exceed 100 volts.

[d] Without external shield.

[e] Connected to negative end of cathode resistor.

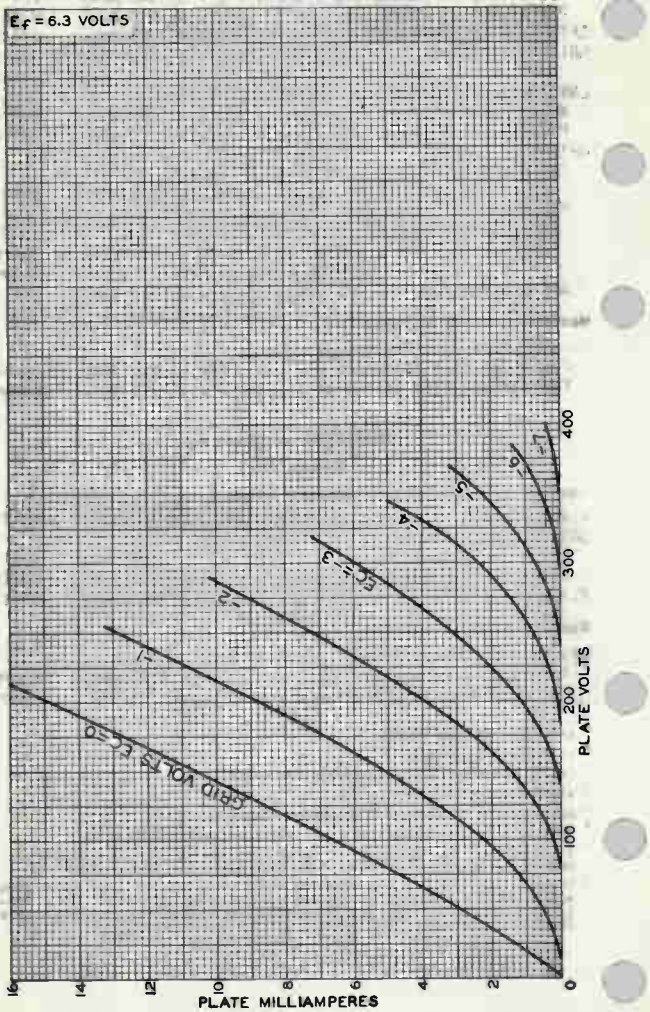
[f] With no external connection to triode plate and triode grid.

[g] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[h] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

6LC8

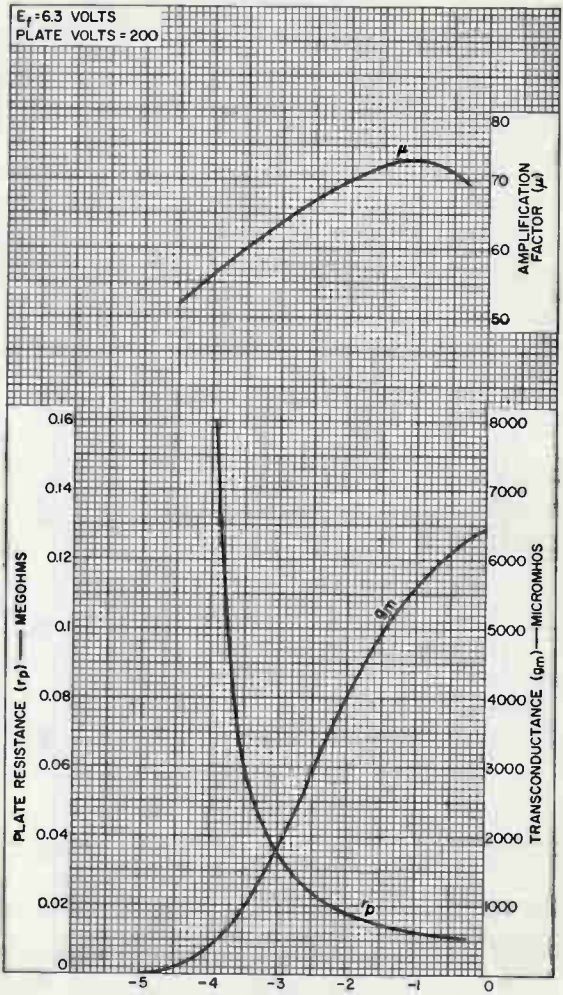
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-8644

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

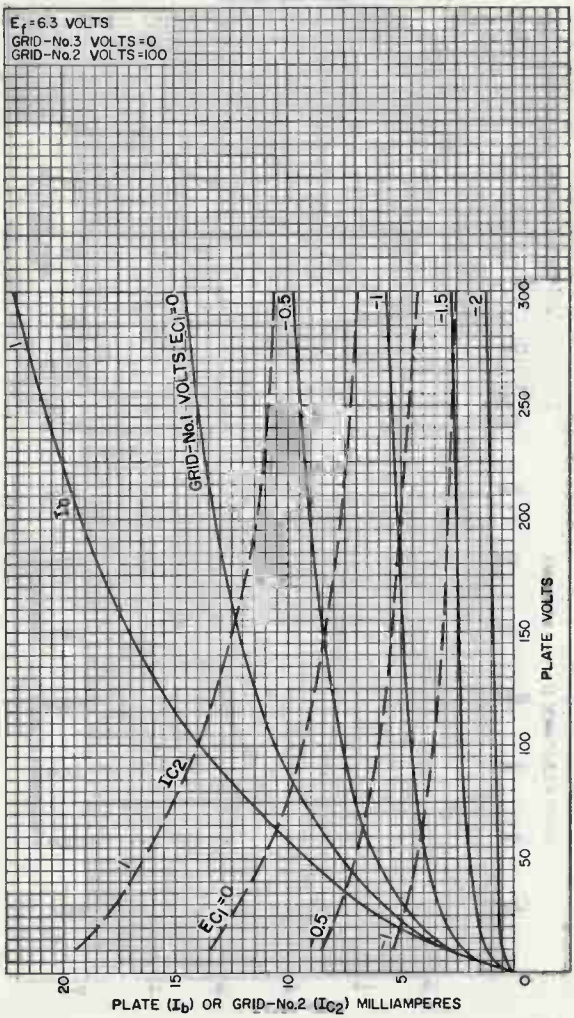
AVERAGE CHARACTERISTICS
Triode Unit



92CM-8647

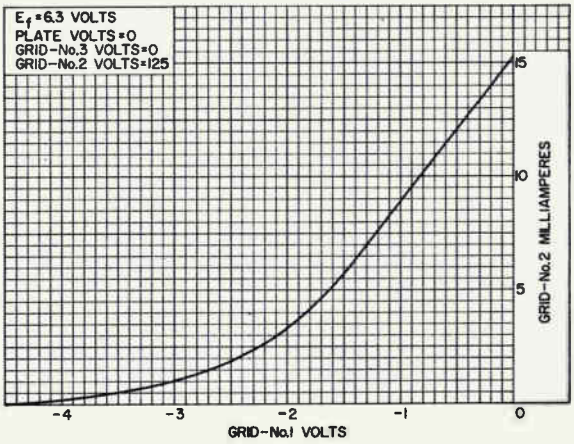
6LC8

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-11594

AVERAGE CHARACTERISTICS
Pentode Unit



92CS-11803

Twin Dual-Control Pentodes

9-PIN MINIATURE TYPE

COMMON-CATHODE, GRID No.1 & GRID No.2 · DARK HEATER

For Combined Color Demodulator and Matrix Amplifier Applications in Color TV Receivers Having High-Level Demodulation Systems

ELECTRICAL CHARACTERISTICS

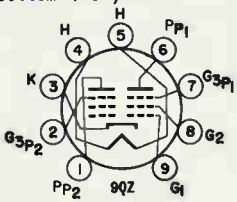
		Bogey Values	
Heater Voltage, AC or DC	E_f	6.3	V
Heater Current	I_f	760	mA
Direct Interelectrode Capacitances			
Without external shield			
G3 to P (each unit, with other unit connected to ground)	C_{g3-p}	2.7	pF
G1 to (K, P_{P2}, P_{P1}, $G3_{P2}$, $G3_{P1}$, G2, H)	C_{g1-all}	15.5	pF
$G3_{P1}$ to (K, P_{P2}, P_{P1}, $G3_{P2}$, G2, G1, H)	C_{g3-all}	6.0	pF
$G3_{P2}$ to (K, P_{P2}, P_{P1}, $G3_{P1}$, G2, G1, H)			
P_{P1} to (K, P_{P2}, $G3_{P2}$, $G3_{P1}$, G2, G1, H)	C_{p-all}	3.7	pF
P_{P2} to (K, P_{P1}, $G3_{P2}$, $G3_{P1}$, G2, G1, H)			
$G3_{P1}$ to $G3_{P2}$	C_{g3-g3}	0.10	pF
For the following characteristics, with both units operating, see **Conditions**			
Plate Resistance (Approx., each unit)	r_p	50000	Ω
Grid-No.1-to-Plate Transconductance (Each unit)	$g_{m(g1p)}$	5800	μmhos
Grid-No.3-to-Plate Transconductance (Each unit)	$g_{m(g3p)}$	350	μmhos
DC Plate Current (Each unit)	I_b	7.6	mA
DC Grid-No.2 Current[a]	I_{c2}	14.5	mA
Cutoff DC Grid-No.1 Voltage (Approx., each unit; For I_b = 100 μA)	$E_{c1(co)}$	-6.3	V
Cutoff DC Grid-No.3 Voltage[b] (Approx., each unit; For I_b = 100 μA)	$E_{c3(co)}$	-16.5	V
	Conditions		
Heater Voltage	E_f	6.3	V
DC Plate Voltage (Each unit)	E_b	100	V
DC Grid-No.3 (Control-Grid) Voltage (Each unit)	E_{c3}	0	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	100	V
DC Grid-No.1 (Control-Grid) Voltage	E_{c1}	-2.5	V

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3-1/16 in
Maximum Seated Length	3-13/16 in
Length, Base Seat to Bulb Top (Excluding tip)	2-7/16 ± 3/32 in
Diameter	0.750 to 0.875 in
Envelope	JEDEC T6-1/2
Dimensional Outline (JEDEC 6-4)	See *General Section*
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Plate of Unit No.2
Pin 2 – Grid No.3 of Unit No.2
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Plate of Unit No.1
Pin 7 – Grid No.3 of Unit No.1
Pin 8 – Grid No.2
Pin 9 – Grid No.1



DESIGN MAXIMUM RATINGS

DC Plate Voltage (Each unit)	E_b	300	V
DC Grid-No.2 Voltage	E_{c2}	150	V
Heater-Cathode Voltage			
Peak	e_{hkm}	+200 / -300	V / V
Average[c]	$E_{hk(av)}$	100	V
Heater Voltage, AC or DC	E_f	5.7 to 6.9	V
Grid-No.2 Input	P_{g2}	2	W
Plate Dissipation (Each unit)	P_b	2	W

[a] Units in parallel (P_{P1} connected to P_{P2}; $G3_{P1}$ connected to $G3_{P2}$).

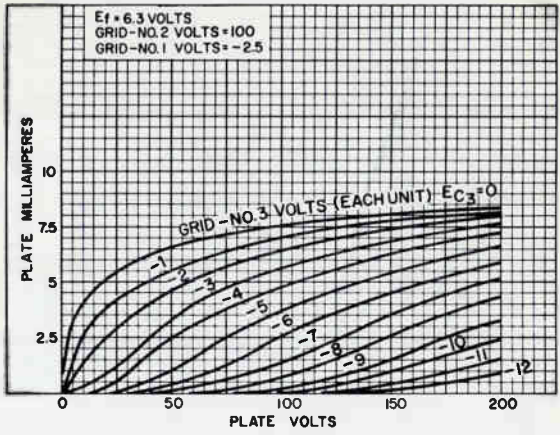
[b] For this test, E_{c1} = -3 V so that the Grid-No.2 Input rating will not be exceeded.

[c] Measured with a dc meter.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Plate Characteristics

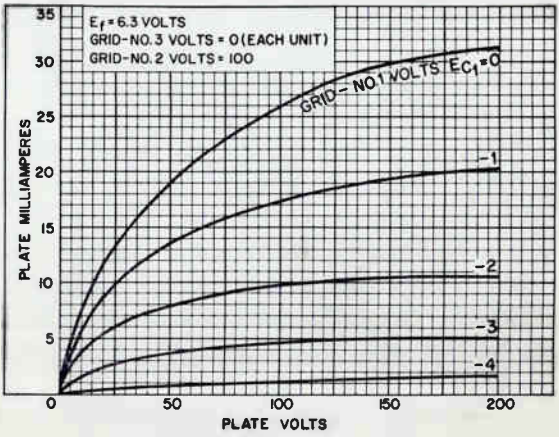
Each Unit, with Both Units Operating



92CS-13459

Typical Plate Characteristics

Each Unit, with Both Units Operating



92CS-13460

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Video-Amplifier Service in Color-TV Receivers and Other Applications Using Positive Triode-Grid Operation

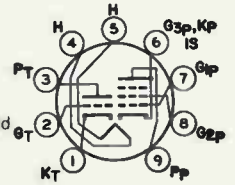
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6[a]	volts
Current at heater volts = 6.3	0.600[b]	amp
Warm-up time (Average)	11	sec
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[c] max.	volts
Direct Interelectrode Capacitances:[d]		
Triode Unit:		
G_T to P_T	2.2	pf
Input: G_T to (K_T, Kp+G3p+IS, H)	3.2	pf
Output: P_T to (K_T, Kp+G3p+IS, H)	1.8	pf
Pentode Unit:		
G1p to Pp	0.060 max.	pf
Input: G1p to (Kp+G3p+IS, G2p, H)	10	pf
Output: Pp to (Kp+G3p+IS, G2p, H)	3.6	pf
G1p to P_T	0.008 max.	pf
Pp to P_T	0.15 max.	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ±3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9DX

Pin 1 – Triode Cathode
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Cathode, Grid No.3, Internal Shield
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate



Characteristics, Class A Amplifier:

	Triode Unit		Pentode Unit		
Plate Voltage	200	40	75	100	volts
Grid-No.2 Voltage	–	–	150	150	volts
Grid-No.1 Voltage	-2	+3	0	-2.5	volts
Amplification Factor	70	40	–	–	
Plate Resistance (Approx.)	17500	10000	–	200000	ohms
Transconductance	4000	4000	–	11000	μmhos
Plate Current	4	11	50[e]	20	ma
Grid-No.2 Current	–	–	12[e]	5	ma
Grid-No.1 Current	0	2.7	0	0	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-5	–	–	-8	volts

AMPLIFIER — Class A[f]

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit as Class A_1 or A_2 Amplifier	Pentode Unit as Class A_1 Amplifier	
Plate Voltage	330 max.	330 max.	volts
Grid-No.2 (Screen-Grid) Supply Voltage	–	330 max.	volts
Grid-No.2 Voltage	–	See *Grid-No.2-Input Rating Chart* at front of Receiving Tube Section	
Grid-No.1 (Control-Grid) Voltage:			
Negative-bias value	55 max.	55 max.	volts
Positive-bias value	4 max.	0 max.	volts
Grid-No.1 Current	8 max.	0 max.	ma
Grid-No.2 Input:			
For grid-No.2 voltages up to 165 volts	–	1.1 max.	watts
For grid-No.2 voltages between 165 and 330 volts	–	See *Grid-No.2-Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	1.1 max.	3.75 max.	watts

Maximum Circuit Values:

	Triode Unit	Pentode Unit	
Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.5 max.	0.25 max.	megohm
For cathode-bias operation	1 max.	1 max.	megohm

[a] For parallel heater operation.

[b] For series heater operation current must be limited to 0.600±0.040 amperes.

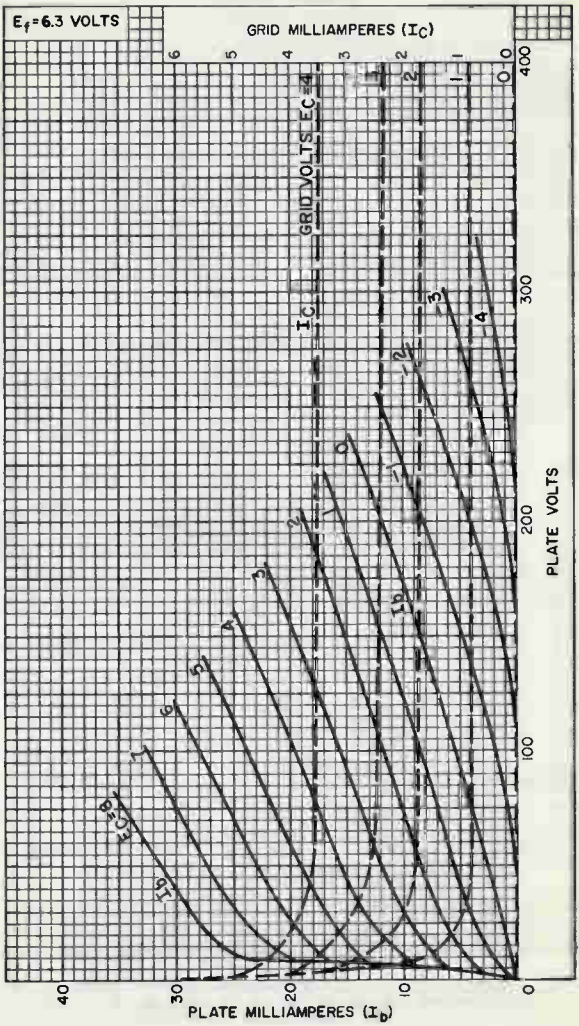
[c] The dc component must not exceed 100 volts.

[d] Without external shield.

[e] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

[f] A Class A amplifier is an amplifier in which the grid bias and varying grid voltages are such that plate current flows at all times. The subscript 1 added to the class letter denotes that *grid current* does not flow during any part of the input cycle. The subscript 2 denotes that *grid current* flows during some part of the cycle.

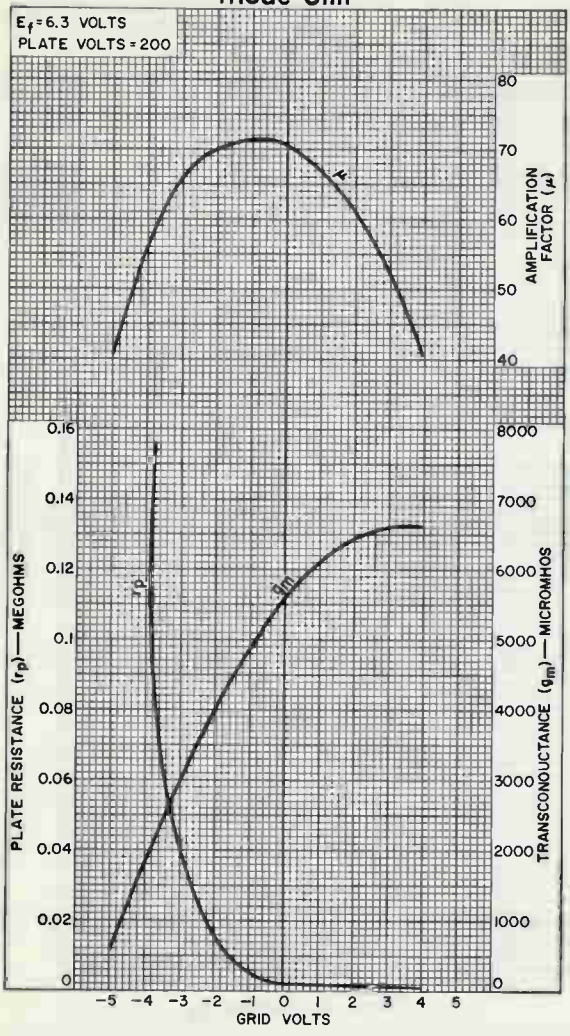
AVERAGE CHARACTERISTICS
Triode Unit



92CM-12384

6LF8

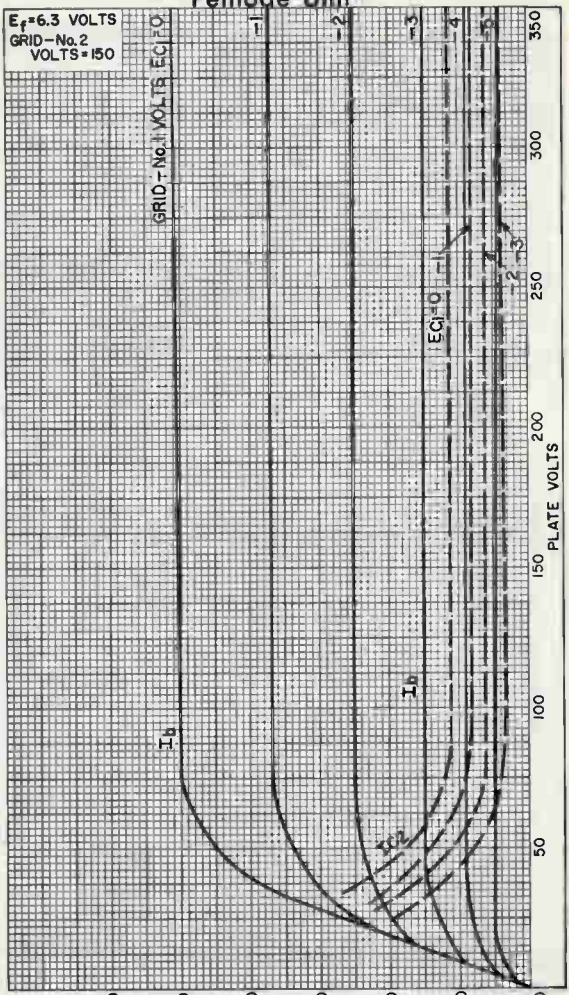
AVERAGE CHARACTERISTICS
Triode Unit



92CM-12388

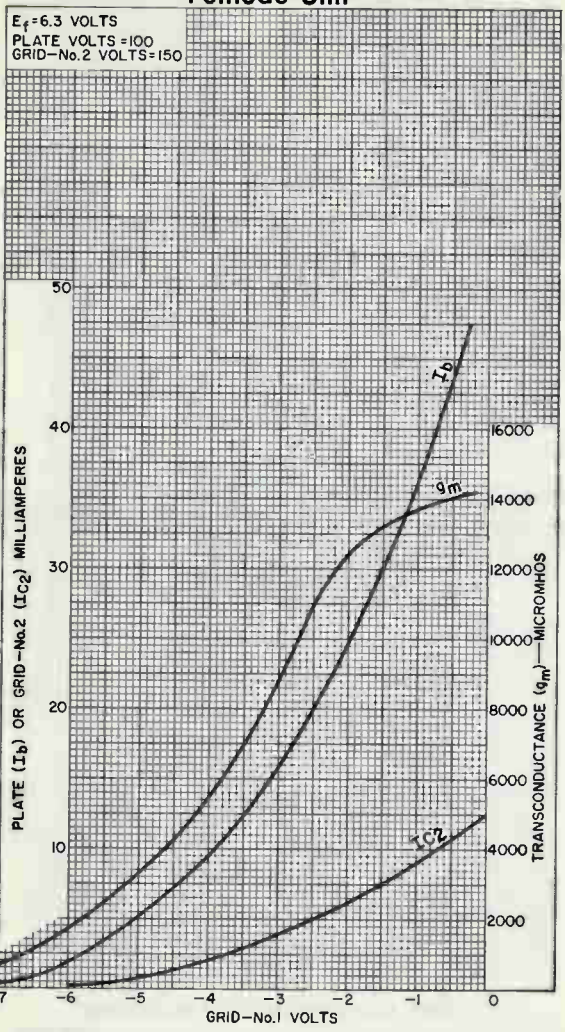
AVERAGE CHARACTERISTICS

Pentode Unit



92CM-12398

AVERAGE CHARACTERISTICS
Pentode Unit



92CM—12403

Medium-Mu Triode—Semiremote-Cutoff Pentode

9-PIN MINIATURE TYPE

SEPARATE CATHODE BASE-PIN CONNECTIONS

For Color and Black-and-White TV Receivers. Pentode Unit is Particularly Suited for Burst-Amplifier Circuit in Color TV. Triode Unit is Useful as a General-Purpose Amplifier.

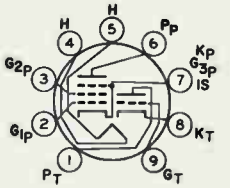
Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3±0.6	volts
Current at heater volts = 6.3	0.450	amp
Peak heater-cathode voltage (Each unit):		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Direct Interelectrode Capacitances:[b]		
Triode Unit:		
Grid to plate	1.8	pf
Input: G_T to (K_T,K_P+$G3_P$+IS,H)	3.2	pf
Output: P_T to (K_T,K_P+$G3_P$+IS,H)	1.9	pf
Pentode Unit:		
Grid No.1 to plate	0.015 max.	pf
Input: $G1_P$ to (K_P+$G3_P$+IS,$G2_P$,H)	5.5	pf
Output: P_P to (K_P+$G3_P$+IS,$G2_P$,H)	3.8	pf
Heater to cathode (Each unit)	3.2	pf

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length from Base Seat to Bulb Top (Excluding Tip)	1-9/16" ±3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AE

Pin 1 – Triode Plate
Pin 2 – Pentode Grid No.1
Pin 3 – Pentode Grid No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate
Pin 7 – Pentode Cathode, Pentode Grid No.3, and Internal Shield
Pin 8 – Triode Cathode
Pin 9 – Triode Grid

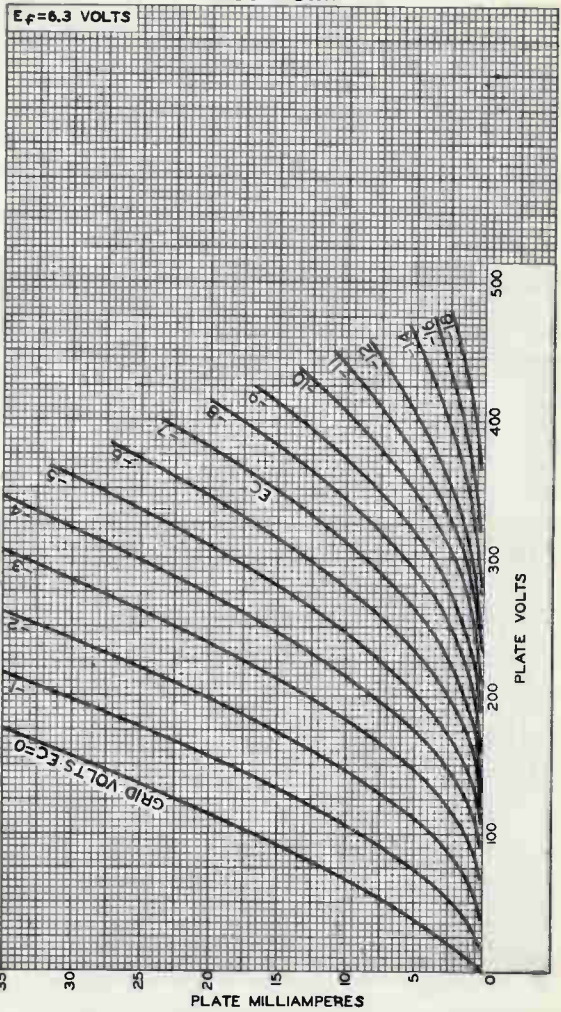


	Triode Unit	*Pentode Unit*	
Characteristics:			
Plate Voltage	125	125	volts
Grid-No.2 Voltage	–	125	volts
Grid-No.1 Voltage	-1	-2	volts
Amplification Factor	46	–	
Plate Resistance (Approx.)	5400	150000	ohms
Transconductance	8500	6000	μmhos
Plate Current	13.5	12	ma
Grid-No.2 Current	–	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-8	-14	volts
Maximum Ratings, *Design-Maximum Values:*			
Plate Voltage	330 max.	350 max.	volts
Grid-No.2 (Screen-Grid) Supply Voltage	–	330 max.	volts
Grid-No.2 Voltage	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Grid-No.1 (Control-Grid) Voltage: Positive-bias value	0 max.	0 max.	volts
Grid-No.2 Input: For grid-No.2 voltages up to 165 volts	–	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Plate Dissipation	2.5 max.	2.5 max.	watts
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance: For fixed-bias operation	0.5 max.	0.25 max.	megohm
For cathode-bias operation	1 max.	0.5 max.	megohm

[a] The dc component must not exceed 100 volts.

[b] With external shield JEDEC No.315 measured in accordance with EIA Standard RS-191-A.

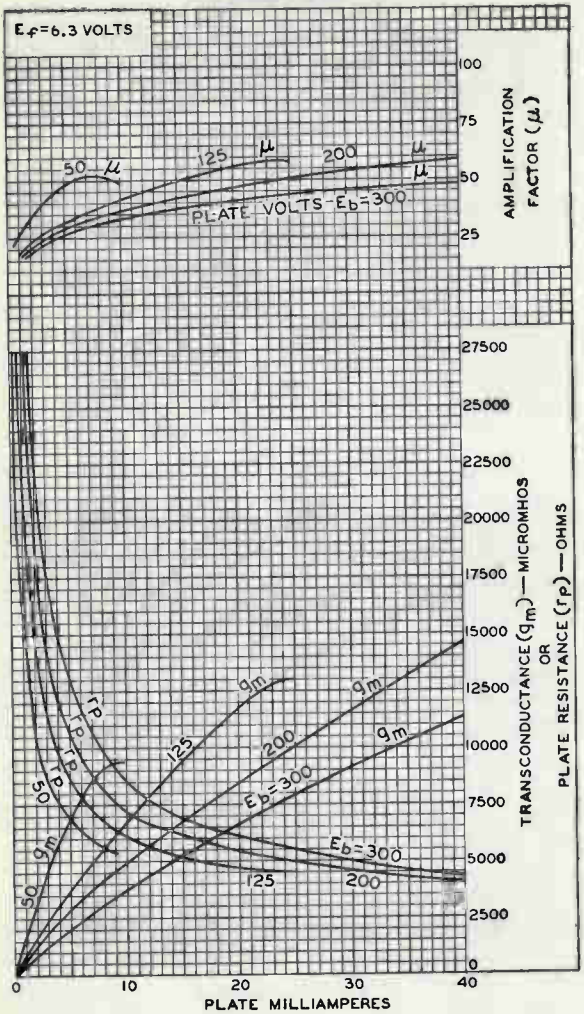
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-10421R1

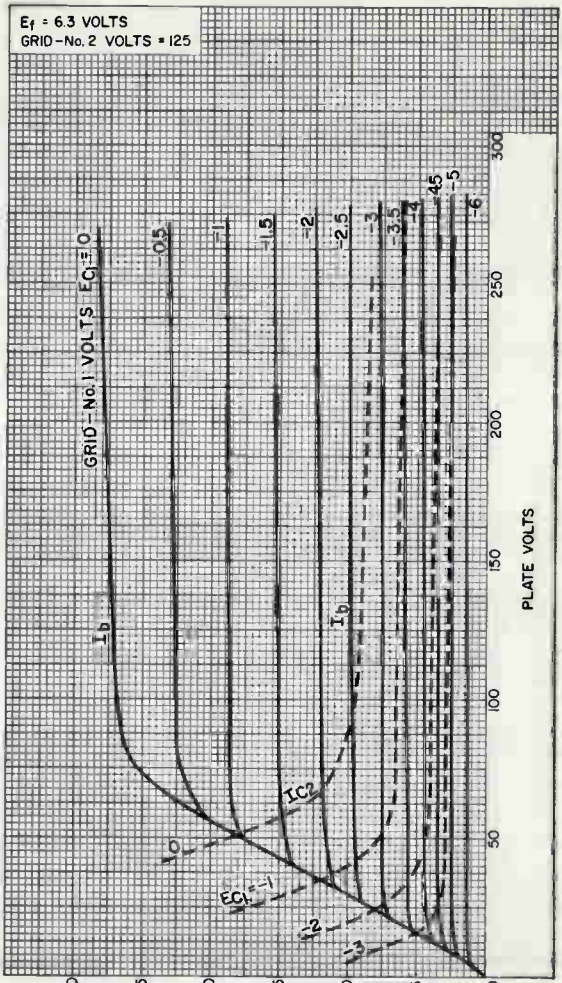
6LM8

AVERAGE CHARACTERISTICS
Triode Unit



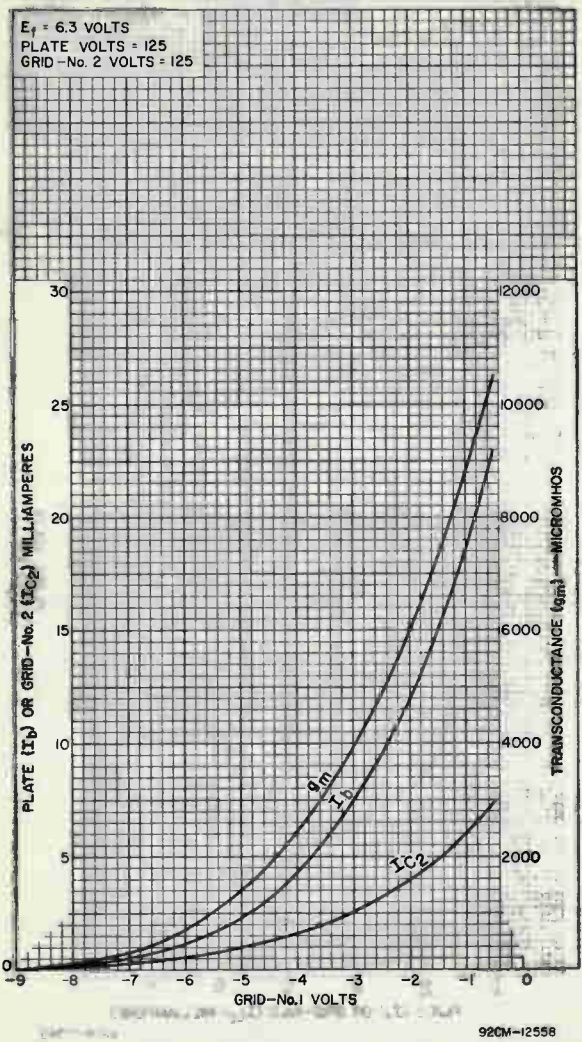
92CM—10428

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-12560

Pentode Unit



92CM-12558

6LQ6

Beam Power Tube

Pb = 30 W Novar Type **Overload Pb = 200 W**

For Color-TV Horizontal-Deflection Amplifier Circuits Using 270 V to over 400 V "B" Supplies

ELECTRICAL CHARACTERISTICS—Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	2.5	A
Direct Interelectrode Capacitances:[a]			
Grid No.1 to plate	c_{g1-p}	0.56	pF
Input: G1 to (K,G3,G2,H)	c_i	22	pF
Output: P to (K,G3,G2,H)	c_o	11	pF

For the following characteristics, see Conditions below:

Amplification Factor (Triode Connection)[b]	μ	-	-	3[c]	-	-	2.8[d]	
Plate Resistance (Approx.)	r_p	-	-	5800	-	-	7000	Ω
Transconductance	g_m	-	-	9600	-	-	7500	μmho
DC Plate Current	I_b	-	580[e]	130	-	710[e]	95	mA
DC Grid-No.2 Current	I_{c2}	-	40[e]	2.8	-	55[e]	2.4	mA
Cutoff DC Grid-No.1 Voltage for I_b = 1 mA	$E_{c1(co)}$	-120	-	-54	-125	-	-60	V
Conditions:								
Heater Voltage	E_h	←		6.3			→	V
Peak Positive-Pulse Plate Voltage[f]	e_{bm}	5000	-	-	5000	-	-	V
DC Plate Voltage	E_b	-	55	175	-	60	175	V
DC Grid-No.3 Voltage	E_{c3}	30	30	30	30	30	30	V
DC Grid-No.2 Voltage	E_{c2}	125	125	125	145	145	145	V
DC Grid-No.1 Voltage	E_{c1}	-	0	-25	-	0	-35	V

MECHANICAL CHARACTERISTICS

Dimensional Outline . . . . . JEDEC No.12-117

Envelope. . . . . JEDEC Designation T12

Top Cap[g] . . . . . Small (JEDEC Designation C1-1)

Base[h] . . . . . Large-Button Novar 9-Pin with Exhaust Tip (JEDEC Designation E9-88)

Terminal Connections
(See *TERMINAL DIAGRAM*) ..... JEDEC Designation 9QL

Type of Cathode ..... Coated Unipotential

MAXIMUM RATINGS—Design-Maximum Values[k]

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system

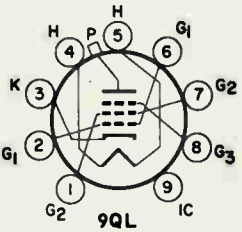
DC Plate Supply Voltage	E_{bb}	990	V
Peak Positive-Pulse Plate Voltage[m]	e_{bm}	7500	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1100	V
DC Grid-No.3 Voltage[n]	E_{c3}	75	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	220	V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	$-e_{c1m}$	330	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	±200	V
Average	E_{hk}	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V
Cathode Current:			
Peak	i_{km}	1200	mA
Average	$I_{k(av)}$	350	mA
Grid-No.2 Input	P_{g2}	5	W
Plate Dissipation[p]	P_b	30	W
Temporary Overload Plate Dissipation[q] ...	P_b	200	W
Envelope Temperature (at hottest point on envelope surface)	T_E	250	°C

MAXIMUM CIRCUIT VALUES

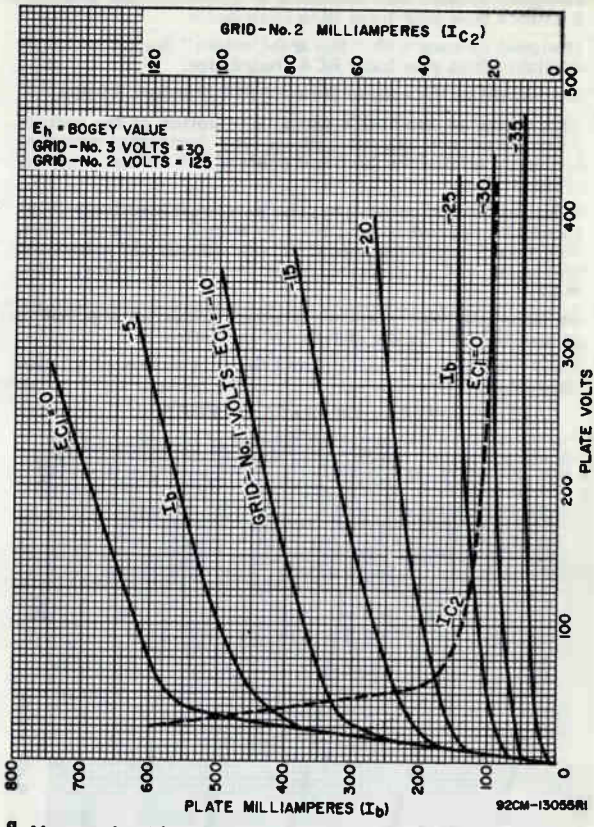
Grid-No.1-Circuit Resistance:	$R_{g1(ckt)}$		
For grid-No.1-resistor-bias operation	-	0.47	MΩ
For plate-pulsed operation (horizontal-deflection circuits only)	-	10	MΩ

TERMINAL DIAGRAM (Bottom View)

Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.1
Pin 7 - Grid No.2
Pin 8 - Grid No.3
Pin 9 - Do Not Use
Top Cap - Plate



TYPICAL CHARACTERISTICS



[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] With grid No.3 and grid No.2 connected, respectively, to cathode and plate at socket.

[c] Conditions: $E_b = E_{c2} = 125$ V, $E_{c1} = -25$ V.

[d] Conditions: $E_b = E_{c2} = 145$ V, $E_{c1} = -35$ V.

[e] This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

[f] Under pulse-duration condition specified in *Footnote* m.

g Designed to mate with connector of 0.360-inch cap, generally available from your local RCA Distributor.

h Designed to mate with "Novar 9-Contact" Socket generally available from your local RCA Distributor.

k As defined in the current issue of EIA Standard RS-239.

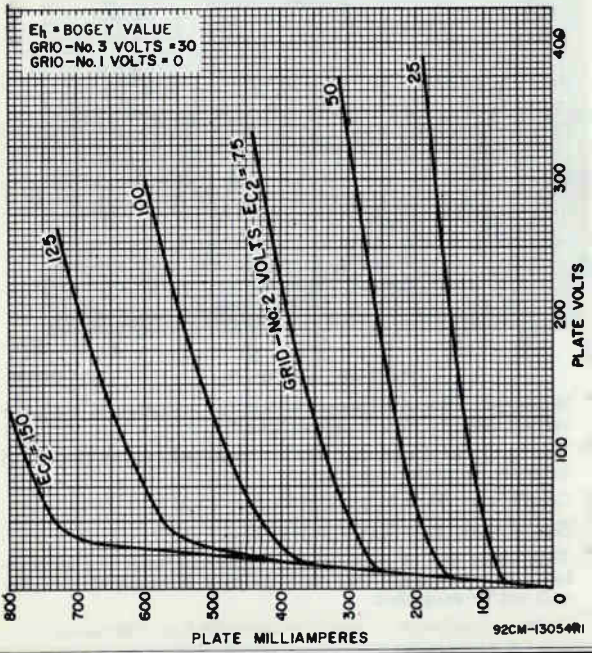
m This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one scanning cycle is 10 μs.

n In horizontal-deflection-amplifier service, a positive voltage should be applied to grid No.3 to reduce interference from "snivets", which may occur in both vhf and uhf television receivers, and to increase power output. A typical value is 30 V.

p An adequate bias resistor or other means is required to protect the tube is the absence of excitation.

q Total continuous or accumulated time not to exceed 40 seconds.

TYPICAL CHARACTERISTICS



Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Use in Low-B+ Black-and-White TV Receivers Having Low-Voltage Power Supplies

ELECTRICAL CHARACTERISTICS

		Bogey Values[a]		
Heater Voltage (AC or DC)	E_h	6.3		V
Heater Current	I_h	0.775		A
Direct Interelectrode Capacitances				
Without external shield				
Triode Unit:				
Grid to plate	C_{g-p}	2.8		pF
Input: G_T to (K_T, K_P+G3P+IS, H)	C_i	4.2		pF
Output: P_T to (K_T, K_P+G3P+IS, H)	C_o	2.4		pF
Pentode Unit:				
Grid No.1 to plate	C_{g1-p}	0.12	max	pF
Input: G1P to (K_P+G3P+IS, G2P, H)	C_i	14		pF
Output: PP to (K_P+G3P+IS, G2P, H)	C_o	4.8		pF
Triode grid to pentode plate	-	0.015	max	pF
Pentode plate to triode plate	-	0.17	max	pF

For the following characteristics, see Conditions

		Triode Unit	*Pentode Unit*		
Amplification Factor	μ	46	-	-	
Plate Resistance (Approx.)	r_p	4400	55000	75000	Ω
Transconductance	g_m	10400	21000	23000	μmho
DC Plate Current	I_b	15	16.5	20	mA
DC Grid-No.2 Current	I_{c2}	-	3.1	3.5	mA
Cutoff DC Grid-No.1 Voltage (Plate μA = 100)	$E_{c1(co)}$	-6	-4.2	-4.2	V

Conditions

Heater Voltage	E_h	Bogey value			V
DC Plate Supply Voltage	E_{bb}	125	125	200	V
DC Grid-No.2 Supply Voltage	E_{cc2}	-	125	125	V
Grid No.1	-	Connected to negative end of R_k			
Cathode Resistor	R_k	68	82	68	Ω

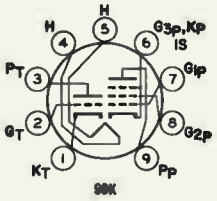
MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.625 in
Maximum Seated Length	2.375 in
Maximum Diameter	0.875 in
Dimensional Outline	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

6LQ8

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Triode Cathode
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Grid No.3, Pentode Cathode, Internal Shield
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate



DESIGN-MAXIMUM RATINGS

For operation as a Class A_1 Amplifier Tube

		Triode Unit	Pentode Unit	
DC Plate Voltage	E_b	300	300	V
DC Grid-No.2 (Screen-Grid) Supply Voltage	E_{cc2}	-	300	V
DC Grid-No.2 Voltage	E_{c2}	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
DC Grid-No.1 (Control-Grid) Voltage				
Positive-bias value	E_{c1}	0	0	V
Heater-Cathode Voltage				
Peak	e_{hkm}	±200		V
Average[b]	$E_{hk(av)}$	100		V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9		V
Grid-No.2 Input	P_{g2}			
For $E_{c2} \leq 150$ V	-	-	1	W
For $E_{c2} \geq 150$ V and ≤ 300 V	-	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	P_b	2	5	W

MAXIMUM CIRCUIT VALUES

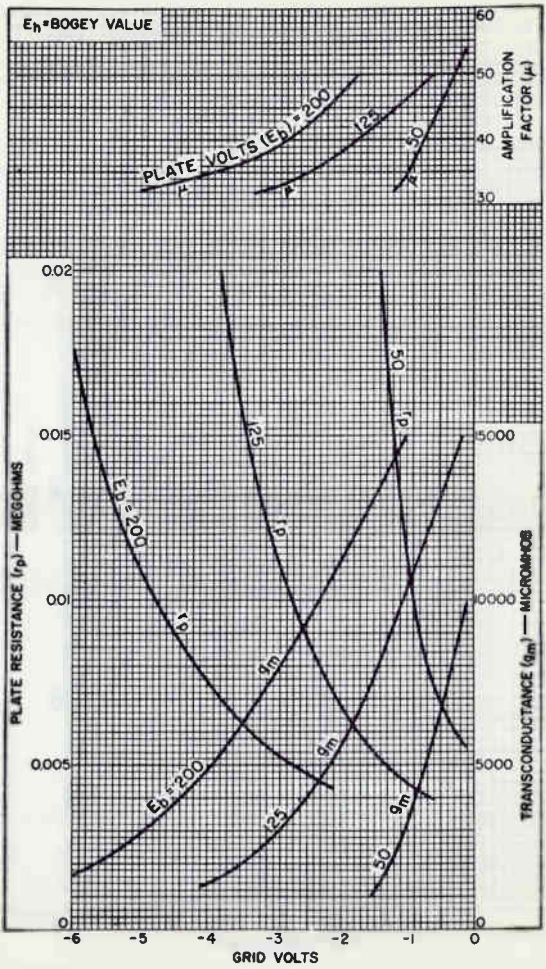
		Triode Unit	Pentode Unit	
Grid-No.1 Circuit Resistance	$R_{g1(ckt)}$			
For fixed-bias operation	-	0.5	0.1	MΩ
For cathode-bias operation	-	1	0.25	MΩ

[a] Unless otherwise specified.
[b] Measured with a dc meter.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics

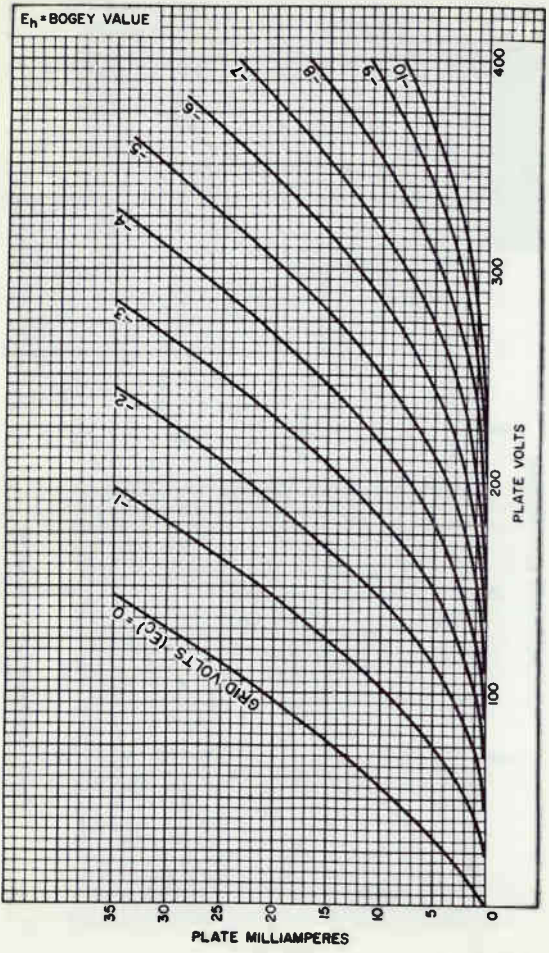
Triode Unit



92CM-12623RI

Typical Plate Characteristics

Triode Unit

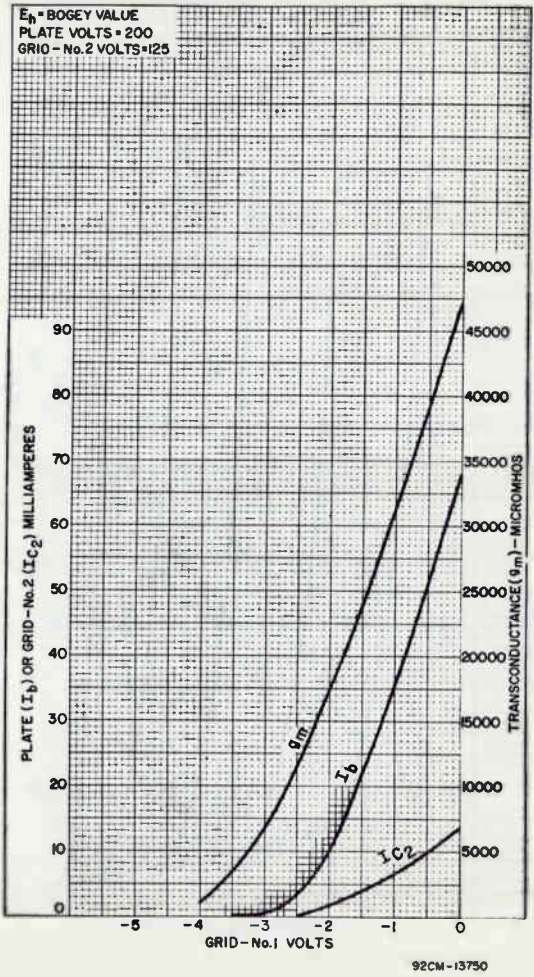


98CM-12616R1

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

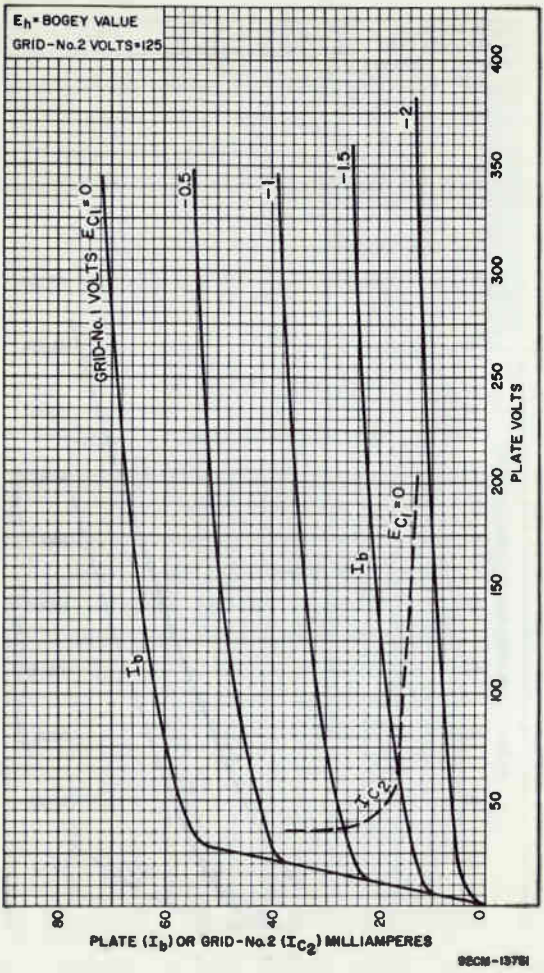
Typical Characteristics

Pentode Unit



Typical Plate Characteristics

Pentode Unit



92CM-13751

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Beam Power Tube

NOVAR TYPE

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc .... E_h	6.3	V
Heater Current ..... I_h	2.3	A

Direct Interelectrode Capacitances:[a]

Grid No. 1 to plate ..... c_{g1-p}	0.6	pF
Input: G1 to (K, G3, G2, H) c_i	22	pF
Output: P to (K, G3, G2, H) c_o	11	pF

For the following characteristics, see Conditions below:

Amplification Factor (Triode Connection)[b]	μ	–	–	3[c]	
Plate Resistance (Approx.)	r_p	–	–	6000	Ω
Transconductance	g_m	–	–	11000	μmho
DC Plate Current	I_b	–	800[d]	140	mA
DC Grid-No. 2 Current ..	I_{c2}	–	56[d]	2.0	mA
Cutoff DC Grid-No. 1 Voltage for I_b = 1 mA ..	$E_{c1(co)}$	-125	–	-50	V

Conditions:

Heater Voltage	E_h	← Bogey Value →			V
Peak Positive-Pulse Plate Voltage[e]	e_{bm}	5000	–	–	V
DC Plate Voltage	E_b	–	55	175	V
DC Grid-No. 3 Voltage ..	E_{c3}	30	30	30	V
DC Grid-No. 2 Voltage ..	E_{c2}	130	125	125	V
DC Grid No. 1 Voltage ..	E_{c1}		0	-25	V

MECHANICAL CHARACTERISTICS

Dimensional Outline..... JEDEC No. 12-117
Envelope ..... JEDEC T12
Top Cap ..... Small (JEDEC C1-1)
Base ..... Large-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-88)

Terminal Connections
(See *TERMINAL DIAGRAM*) ..... JEDEC 9QL
Type of Cathode..... Coated Unipotential
Operating Position ..... Any

MAXIMUM RATINGS – Design-Maximum Values [f]

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system

DC Plate Supply Voltage	E_{bb}	990	V
Peak Positive-Pulse Plate Voltage[g]	e_{bm}	7500	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1100	V
DC Grid-No. 3 Voltage[h]	E_{c3}	75	V
DC Grid-No. 2 (Screen-Grid) Voltage	E_{c2}	220	V
Peak Negative-Pulse Grid-No. 1 (Control-Grid) Voltage	$-e_{c1m}$	330	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	+200	V
Average	E_{hk}	100	V
Heater Voltage:	E_h	5.7 to 6.9	V
Cathode Current:			
Peak	i_{km}	1200	mA
Average	$I_{k(av)}$	350	mA
Grid-No. 2 Input	P_{g2}	5	W
Plate Dissipation[j]	P_b	30	W
Temporary Overload Plate Dissipation[k]	P_b	200	W
Envelope Temperature (at hottest point on envelope surface)	T_E	250	°C

MAXIMUM CIRCUIT VALUES

Grid-No. 1-Circuit Resistance:	$R_{g(ckt)}$	
Cathode bias (with min. R_K = 100 Ω)	1.0	megohm
Grid-leak bias (with signal peak clamped to zero bias)	10.0	megohms
Fixed bias (where positive grid current is not drawn)	0.47	megohm

a Measured without external shield in accordance with the current issue of EIA Standard RS-191B.

b With grid No. 3 and grid No. 2 connected, respectively, to cathode and plate at socket.

c Conditions: $E_b = E_{c2} = 125V$, $E_{c1} = -25V$.

d This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

e Under pulse-duration condition specified in *Footnote* **g**.

f As defined in the current issue of EIA Standard RS-239A.

g This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one scanning cycle is 10 μs.

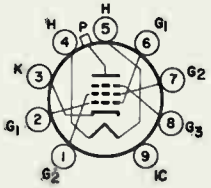
h In horizontal-deflection-amplifier service, a positive voltage should be applied to grid No. 3 to reduce interference from "snivets", which may occur in both vhf and uhf television receivers, and to increase power output. A typical value is 30V.

j An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

k Total continuous or accumulated time not to exceed 40 seconds.

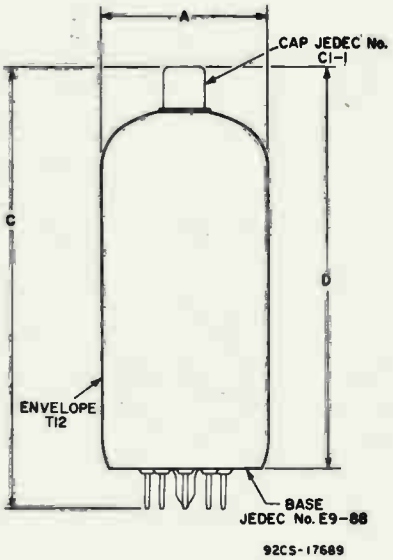
TERMINAL DIAGRAM – JEDEC 9QL (Bottom View)

Pin 1 - Grid No. 2
Pin 2 - Grid No. 1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater



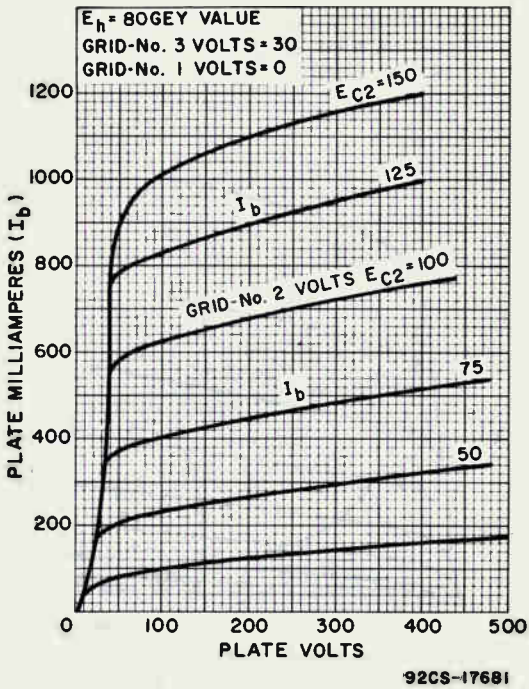
Pin 6 - Grid No. 1
Pin 7 - Grid No. 2
Pin 8 - Grid No. 3
Pin 9 - Do Not Use
Top Cap - Plate

DIMENSIONAL OUTLINE – JEDEC No. 12-117



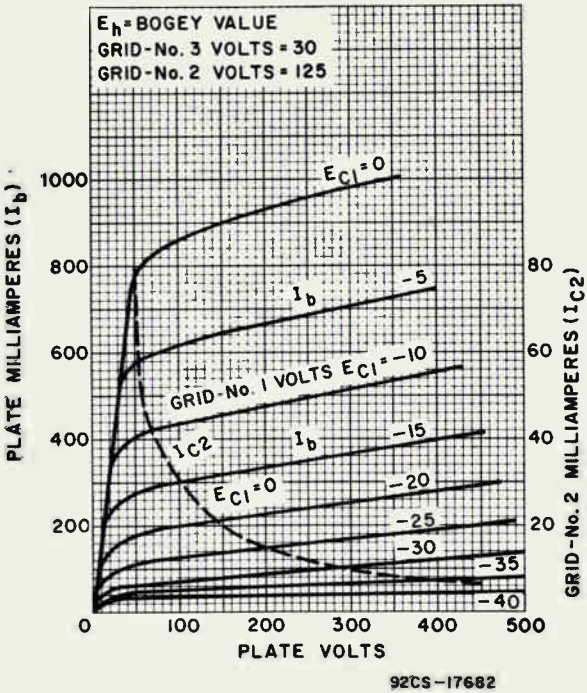
DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
A	1.438*	1.562	36.6*	39.6
C		4.380	95.3	111.25
D	3.750	4.000	95.3	101.6
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				
*Applies to the minimum diameter except in the area of the seal.				

TYPICAL CHARACTERISTICS



92CS-17681

TYPICAL CHARACTERISTICS



Beam Power Tube

T12 Novar Type

High Perveance Beam Power Tube
For Horizontal-Deflection Amplifier
Service in Low B+ Color-TV Receivers

- **Plate Dissipation = 33 W**
- **RCA Dark Heater**
- **Peak Cathode Current = 1400 mA**

ELECTRICAL CHARACTERISTICS – Bogey Values

Heater Voltage, ac or dc	E_h	6.3	V
Heater Current	I_h	2.85	A
Direct Interelectrode Capacitances:[a]			
Grid No. 1 to plate	c_{g1-p}	1.0	pF
Input: G1 to (K, G3, G2, H)	c_i	40	pF
Output: P to (K, G3, G2, H)	c_o	16	pF

For the following characteristics, see Conditions below:

Amplification Factor (Triode Connection)[b]	μ	–	–	–	4[c]	
Plate Resistance (Approx.)	r_p	–	–	–	6000	Ω
Transconductance	g_m	–	–	–	14000	μmho
DC Plate Current	I_b	–	1100[d]	750[d]	125	mA
DC Grid-No. 2 Current	I_{c2}	–	110[d]	42[d]	3.3	mA
Cutoff DC Grid-No. 1 Voltage for I_b = 1 mA	$E_{c1(co)}$	-125	–	0	-40	V

Conditions:

Heater Voltage	E_h	← Bogey Value →				V
Peak Positive-Pulse Plate Voltage[e]	e_{bm}	5000	–	–	–	V
DC Plate Voltage	E_b	–	45	60	175	V
DC Grid-No. 3 Voltage	E_{c3}	30	30	30	0	V
DC Grid-No. 2 Voltage	E_{c2}	110	160	110	110	V
DC Grid-No. 1 Voltage	E_{c1}	–	0	0	-21	V

MECHANICAL CHARACTERISTICS

Envelope . . . . . JEDEC T-12
Top Cap . . . . . Small (JEDEC C1-1)
Base . . . . . Large-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-88)

Terminal Connections
(See *TERMINAL DIAGRAM*) . . . . . JEDEC 9QL
Type of Cathode . . . . . Coated Unipotential
Operating Position . . . . . Any

MAXIMUM RATINGS – Design-Maximum Values [f]

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system.

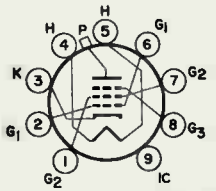
DC Plate Supply Voltage	E_{bb}	990	V
Peak Positive-Pulse Plate Voltage[g]	e_{bm}	7000	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1100	V
DC Grid-No. 3 Voltage[h]	E_{c3}	75	V
DC Grid-No. 2 (Screen-Grid) Voltage	E_{c2}	250	V
Peak Negative-Pulse Grid-No. 1 (Control-Grid) Voltage	$-e_{c1m}$	330	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	±200	V
Average	E_{hk}	100	V
Heater Voltage: 6MC6	E_h	5.7 to 6.9	V
Heater Current: 36MC6	I_h	0.42 to 0.48	A
Cathode Current:			
Peak	i_{km}	1400	mA
Average	$i_{k(av)}$	400	mA
Grid-No. 2 Input	P_{g2}	5	W
Plate Dissipation[i]	P_b	33	W
Envelope Temperature (at hottest point on envelope surface)	T_E	250	°C

MAXIMUM CIRCUIT VALUES

Grid-No. 1 Circuit Resistance:	$R_{g(ckt)}$	
Cathode bias (with min. R_K = 100 Ω)	1.0	megohm
Grid-resistor bias (with signal peak clamped to zero bias)	10.0	megohms
Fixed bias (where positive grid current is not drawn)	0.47	megohm

TERMINAL DIAGRAM – JEDEC 9QL (Bottom View)

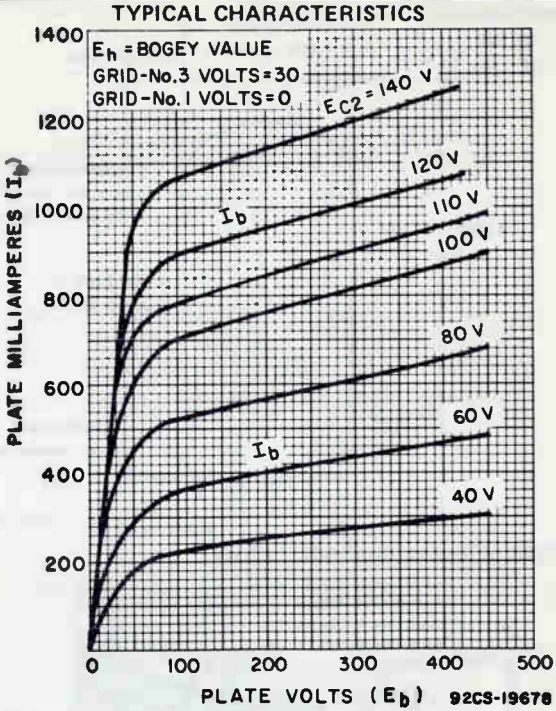
Pin 1 – Grid No. 2
Pin 2 – Grid No. 1
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Grid No. 1
Pin 7 – Grid No. 2
Pin 8 – Grid No. 3
Pin 9 – Do Not Use
Top Cap – Plate

[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191B.

[b] With grid No. 3 and grid No. 2 connected, respectively, to cathode and plate at socket.



c Conditions: $E_b = E_{c2} = 175$ V, $E_{c1} = -21$ V.

d This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

e Under pulse-duration condition specified in *Footnote* g.

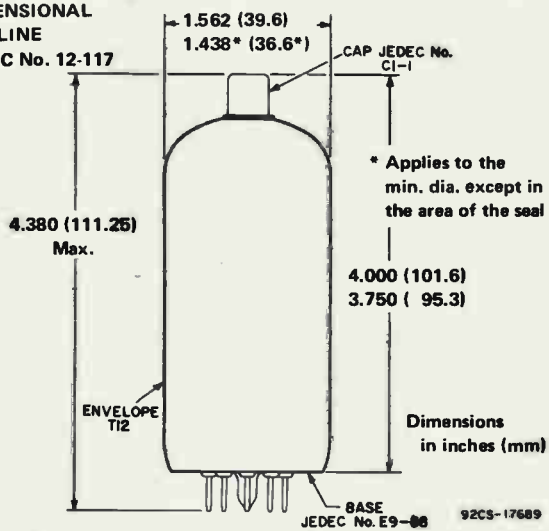
f As defined in the current issue of EIA Standard RS-239A.

g This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one scanning cycle is 10 μs.

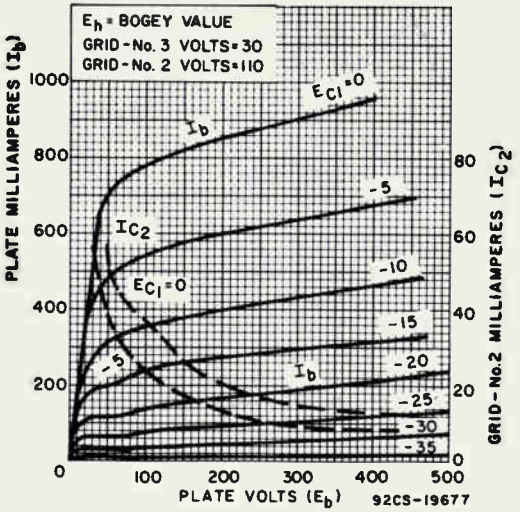
h In horizontal-deflection-amplifier service, a positive voltage should be applied to grid No. 3 to reduce interference from "snivets", which may occur in both vhf and uhf television receivers, and to increase power output. A typical value is 30 V.

j An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

DIMENSIONAL OUTLINE
JEDEC No. 12-117



TYPICAL PLATE CHARACTERISTICS



6MD8

Medium-Mu Triple Triode

NOVAR TYPE

For Matrix-Amplifier Applications in Color-TV Receivers

ELECTRICAL

Heater Characteristics and Ratings		
Voltage (AC or DC)	6.3 ± 0.6	V
Current at 6.3 V	0.900	A
Maximum heater–cathode voltage (Each unit):		
Heater negative with respect to cathode:		
Peak	200	V
Heater positive with respect to cathode:		
Peak	200	V
DC Component	100	V

Direct Interelectrode Capacitances (Approx.)[a]

	Unit No. 1	Unit No. 2	Unit No. 3	
Grid to plate	3.0	3.0	3.0	pF
Input: G to (K, H)	3.6	3.6	3.4	pF
Output: P to (K, H)	0.48	0.48	0.36	pF

MECHANICAL

Operating Position	Any	
Type of Cathode	Coated Unipotential	
Maximum Overall Length	2.960	in
Maximum Seated Length	2.580	in
Length, Base Seat to Bulb Top (Excluding tip)	2.060 to 2.240	in
Diameter	1.062 to 1.188	in
Bulb	T9	

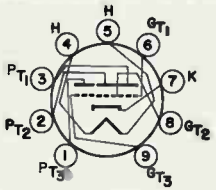
Bases (Alternates)

Small-Button Novar 9-Pin (JEDEC No. E9-75)

Small-Button Novar 9-Pin with Exhaust Tip 9-Pin (JEDEC No. E9-89)

Basing Designation for BOTTOM VIEW 9RQ

Pin 1 – Plate of Unit No. 3
Pin 2 – Plate of Unit No. 2
Pin 3 – Plate of Unit No. 1
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid of Unit No. 1
Pin 7 – Cathode
Pin 8 – Grid of Unit No. 2
Pin 9 – Grid of Unit No. 3



CHARACTERISTICS, CLASS A_1 AMPLIFIER

Values are for Each Unit

Plate Voltage	250	V
Grid Voltage	-10.5	V
Amplification Factor	17	
Plate Resistance (Approx.)	5500	Ω
Transconductance	3100	μmho

Plate Current	11.5	mA
Plate Current for grid volts = -14	4	mA
Grid Voltage (Approx.) for plate μA = 50	-23	V

AMPLIFIER — CLASS A_1

Values are for Each Unit

Maximum Ratings, Design-Maximum Values

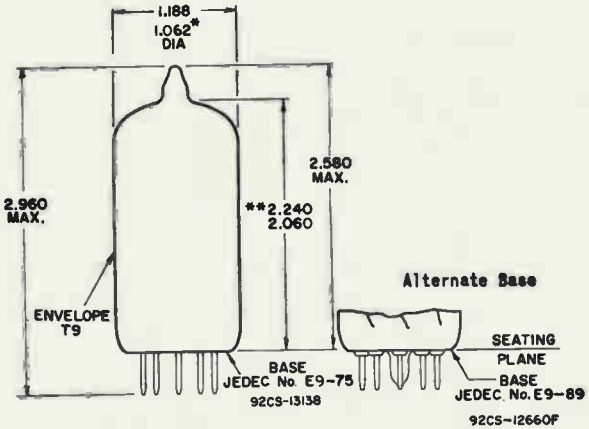
Plate Voltage	330	V
Grid Voltage		
Positive-bias value	0	V
Plate Dissipation	3	W

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance		
For fixed-bias operation	1	MΩ

[a] Without external shield.

DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

Bottom-exhaust version has the same dimensions for maximum overall length and seated length as the top-exhaust outline shown.

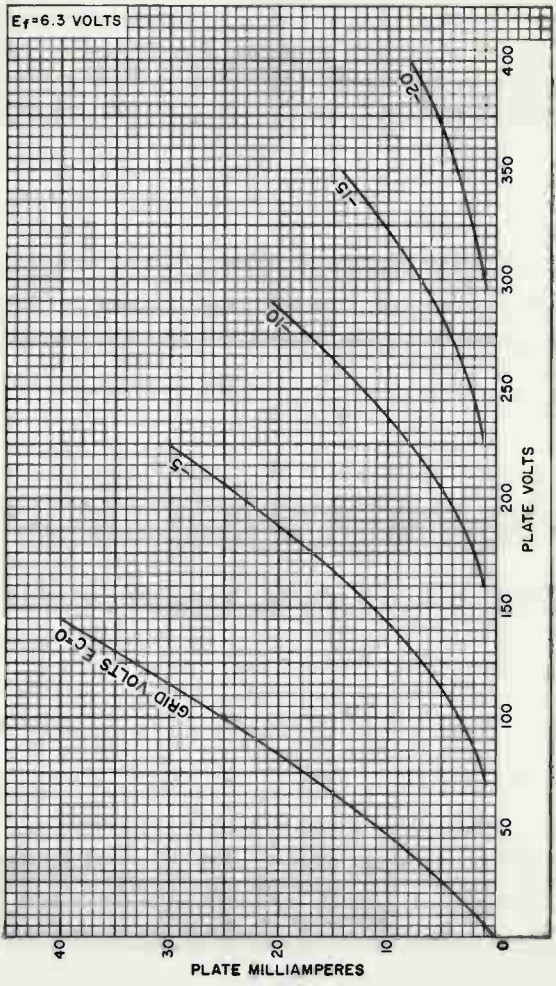
* Applies to the minimum diameter except in the area of the seal.

** Measured from the base seat to bulb-top line as determined by arcing gauge of 0.600" I.D.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Average Plate Characteristics

EACH UNIT



92CM-11986

Beam Power Tube

T12 NOVAR TYPE

P_b = 30 W **Overload P_b = 200 W**

Electrical Characteristics — Bogey Values

Heater Voltage, ac or dc	E_h			6.3	V
Heater Current	I_h			2.3	A
Direct Interelectrode Capacitances:[a]					
Grid No. 1 to plate	$c_{g1\text{-}p}$			0.6	pF
Input: G1 to (K, G3, G2, H)	c_i			22	pF
Output: P to (K, G3, G2, H)	c_o			11	pF
For the following characteristics, see Conditions below:					
Amplification Factor (Triode Connection)[b]	μ	—	—	3.5[c]	
Plate Resistance (Approx.)	r_p	—	—	5800	Ω
Transconductance	g_m	—	—	9600	μmho
DC Plate Current	I_b	—	580[d]	130	mA
DC Grid-No. 2 Current	I_{c2}	—	40[d]	2.8	mA
Cutoff DC Grid-No. 1 Voltage for I_b = 1 mA	$E_{c1(co)}$	−125	—	−44	V
Conditions:					
Heater Voltage	E_h	←	6.3	→	V
Peak Positive-Pulse Plate Voltage[e]	e_{bm}	5000	—	—	V
DC Plate Voltage	E_b	—	55	175	V
DC Grid-No. 3 Voltage	E_{c3}	0	30	30	V
DC Grid-No. 2 Voltage	E_{c2}	125	125	125	V
DC Grid No. 1 Voltage	E_{c1}		0	−25	V

Mechanical Characteristics

Dimensional Outline	JEDEC No. 12-117
Envelope	JEDEC T-12
Top Cap	Small (JEDEC C1-1)
Base	Large-Button Novar 9-Pin with Exhaust Tip (JEDEC E9-88)
Terminal Connections (See *TERMINAL DIAGRAM*)	JEDEC 9QL
Type of Cathode	Coated Unipotential
Operating Position	Any

Maximum Ratings — Design-Maximum Values[f]

For operation as a Horizontal-Deflection-Amplifier Tube in a 525-line, 30-frame system.

DC Plate Supply Voltage	E_{bb}	990	V
Peak Positive-Pulse Plate Voltage[e]	e_{bm}	7500	V
Peak Negative-Pulse Plate Voltage	$-e_{bm}$	1100	V

DC Grid-No. 3 Voltage[h]	E_{c3}	75	V
DC Grid-No. 2 (Screen-Grid) Voltage	E_{c2}	220	V
Peak Negative-Pulse Grid-No. 1 (Control-Grid) Voltage	$-e_{c1m}$	330	V
Heater-Cathode Voltage:			
Peak	e_{hkm}	±200	V
Average	E_{hk}	100	V
Heater Voltage	E_h	5.7 to 6.9	V
Cathode Current:			
Peak	i_{km}	1200	mA
Average	$I_{k(av)}$	350	mA
Grid-No. 2 Input	P_{g2}	5	W
Plate Dissipation[j]	P_b	30	W
Temporary Overload Plate Dissipation[k]:	P_b	200	W
Envelope Temperature (at hottest point on envelope surface)	T_E	250	°C

Maximum Circuit Values

Grid-No. 1-Circuit Resistance: $R_{g(ckt)}$

Cathode Bias (with min. R_K = 100 Ω	1.0	megohm
Grid-leak Bias (with signal peak clamped to zero bias)	10.0	megohms
Fixed Bias (where positive grid current is not drawn)	0.47	megohm

a Measured without external shield in accordance with the current issue of EIA Standard RS-191B.

b With grid No. 3 and grid No. 2 connected, respectively, to cathode and plate at socket.

c Conditions: $E_b = E_{c2} = 125$ V, $E_{c1} = -25$ V.

This value can be measured by a method involving a recurrent waveform such that the Maximum Ratings of the tube will not be exceeded.

e Under pulse-duration condition specified in *Footnote* g.

f As defined in the current issue of EIA Standard RS-239A.

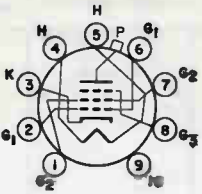
g This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one scanning cycle is 10 μs.

h In horizontal-deflection-amplifier service, a positive voltage should be applied to grid No. 3 to reduce interference from "snivets", which may occur in both vhf and uhf television receivers, and to increase power output. A typical value is 30 V.

j An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

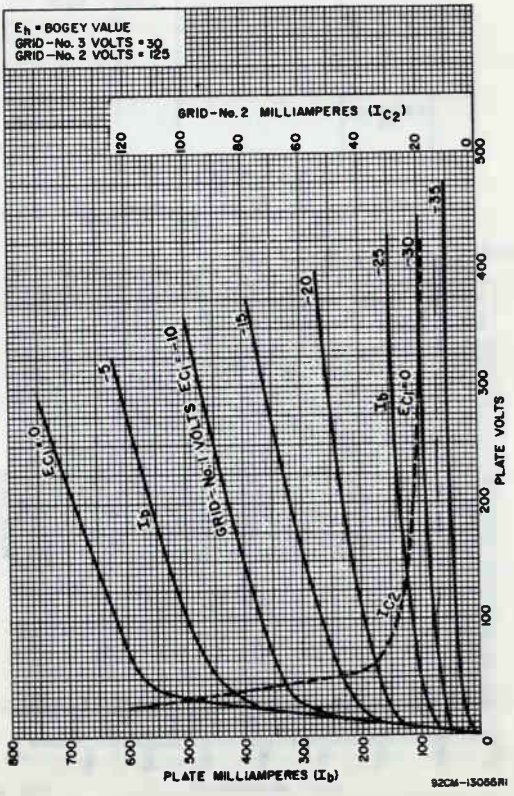
k Total continuous or accumulated time not to exceed 40 seconds.

TERMINAL DIAGRAM (BOTTOM VIEW)



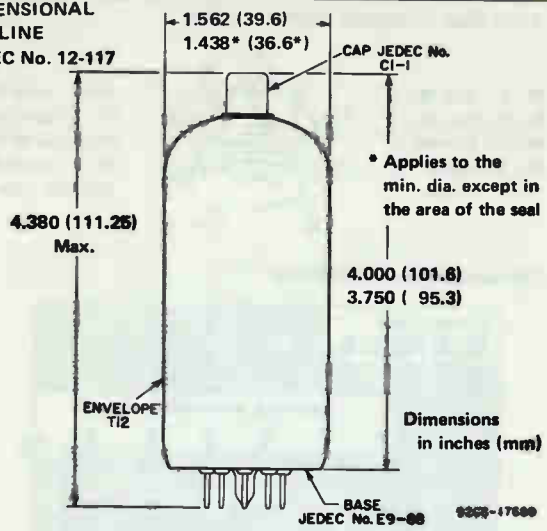
Pin 1 - Grid No. 2
Pin 2 - Grid No. 1
Pin 3 - Cathode
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No. 1
Pin 7 - Grid No. 2
Pin 8 - Grid No. 3
Pin 9 - Do Not Use
Top Cap - Plate

TYPICAL CHARACTERISTICS

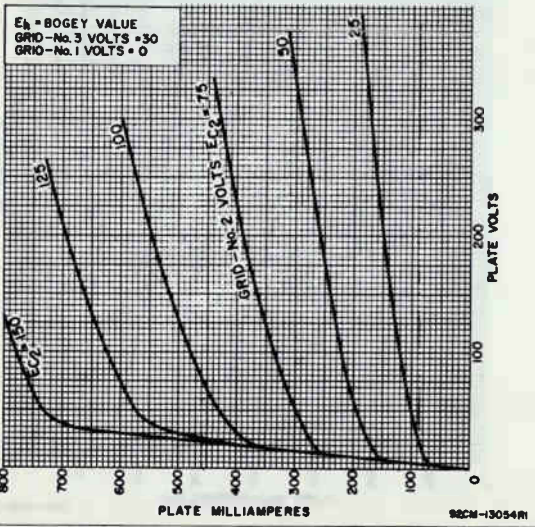


6ME6

DIMENSIONAL OUTLINE
JEDEC No. 12-117



TYPICAL CHARACTERISTICS



Two-Plate Beam-Deflection Tube

BALANCED OUTPUT **9-PIN MINIATURE TYPE** **DARK HEATER**

For Color-Demodulator Applications in Color-TV Receivers and a Variety of Other Switching and Gating Applications

ELECTRICAL CHARACTERISTICS

Bogey Values[a]

Heater Voltage (AC or DC)	E_h	6.3	V
Heater Current at E_h = bogey value	I_h	0.300	A
Direct Interelectrode Capacitances			
Without external shield			
Grid No.1 to all except plates		7.5	pF
Either plate to all	C_{p-all}	6.0	pF
Either deflecting electrodes to all other electrodes	C_{dj-all}	6.0	pF
Plate No.1 to Plate No.2	C_{p1-p2}	0.4	pF
Deflecting-electrode No.1 to deflecting-electrode No.2	$C_{dj1-dj2}$	0.4	pF
Grid No.1 to deflecting-electrode No.1	C_{g1-dj1}	0.07 max	pF
Grid No.1 to deflecting-electrode No.2	C_{g1-dj2}	0.1 max	pF

For the following characteristics see Conditions "A"

Transconductance, grid No.1 to both plates	g_m	4400	μmho
Total DC Plate Current (plate-No.1 + plate-No.2 current)	$I_{b(tot)}$	14.5	mA
DC Grid-No.3 Current	I_{c3}	0.7	mA
Cutoff DC Grid-No.1 Voltage for $I_{b(tot)}$ = 10 μA	$E_{c1(co)}$	-16	V

Conditions "A"

Heater Voltage	E_h	Bogey Value	V
DC Plate-No.1 Supply Voltage	E_{bb1}	250	V
Plate No.2	-	Connected to plate No.1	
DC Deflecting-Electrode-No.1 Supply Voltage	-	75	V
DC Deflecting-Electrode-No.2 Supply Voltage	-	75	V
DC Grid-No.3 Supply Voltage	E_{cc3}	350	V
DC Grid-No.1 Supply Voltage	E_{cc1}	0	V
Cathode Resistor	R_k	390	Ω

For the following deflecting-electrode characteristics, see Conditions "B"

Deflecting-Electrode Switching Voltage[b]	$E_{dj(switching)}$	30 max	V
Voltage Difference between Deflecting Electrodes for equal plate currents ($I_{b1} = I_{b2}$)	-	0	V

Plate-No.1 Current with deflecting electrode-No.1 voltage (E_{dj1}) = 55 V and deflecting-electrode-No.2 voltage (E_{dj2}) = 95 V.	I_{b1}	1.3 max	mA
Plate-No.2 Current with (E_{dj1}) = 95 V and (E_{dj2}) = 55 V	I_{b2}	1.3 max	mA
Deflecting-Electrode-No.1 Current with E_{dj1} = 125 V and E_{dj2} = 25 V	I_{dj1}	0.04 max	mA
Deflecting-Electrode-No.2 Current with E_{dj1} = 25 V and E_{dj2} = 125 V	I_{dj2}	0.04 max	mA

Conditions "B"

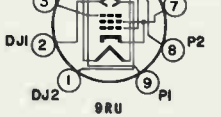
Heater Voltage	E_h	6.3	V
DC Plate-No.1 Supply Voltage	E_{bb1}	250	V
DC Plate-No.2 Supply Voltage	E_{bb2}	250	V
DC Grid-No.3 Supply Voltage	E_{cc3}	350	V
DC Grid-No.1 Supply Voltage	E_{cc1}	0	V
Cathode Resistor	R_k	390	Ω

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.625 in
Maximum Seated Length	2.375 in
Length, Base Seat to Bulb Top Excluding tip	1.906 to 2.094 in
Maximum Diameter	0.875 in
Dimensional Outline (JEDEC 6-3)	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Deflecting Electrode No.2
Pin 2 – Deflecting Electrode No.1
Pin 3 – Grid No.3
Pin 4 – Heater End B
Pin 5 – Heater End A, Internal Shield▲
Pin 6 – Grid No.1
Pin 7 – Grid No.2, Cathode
Pin 8 – Plate No.2
Pin 9 – Plate No.1



9RU

▲ Pin No.5 should be connected directly to ground.

DESIGN-MAXIMUM RATINGS

DC Plate Voltage, each plate	E_b	400	V
DC Deflecting-Electrode Voltage, each electrode	E_{dj}	100	V
Peak Deflecting-Electrode Voltage, each electrode	e_{djm}	±200	V
DC Grid-No.3 (Accelerating-Grid) Voltage	E_{c3}	400	V
DC Grid-No.1 (Control-Grid) Voltage Positive-bias value	E_{c1}	0	V
Heater Voltage (AC or DC)	E_h	5.7 to 6.9	V

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

DESIGN-MAXIMUM RATINGS (Cont'd)

Average Cathode Current	$I_{K(av)}$	30	mA
Grid-No.3 Input	P_{g3}	2	W
Plate Dissipation, each plate	P_b	2	W

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance	$R_{g1(ckt)}$		
For fixed-bias operation		0.1	MΩ
For cathode-bias operation		0.25	MΩ

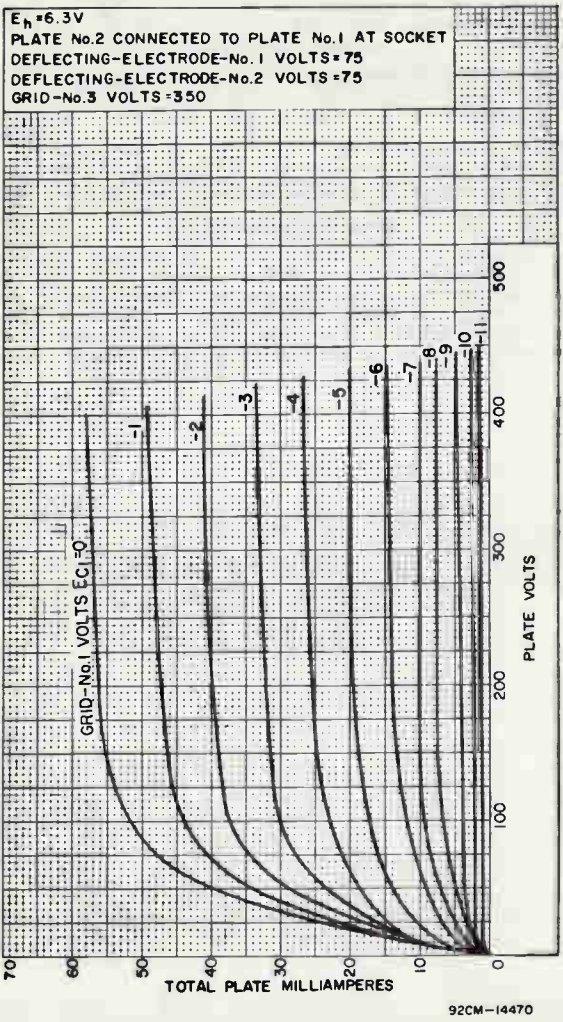
[a] Unless otherwise specified.

[b] Defined as the total voltage change from 75 volts on either deflecting electrode with an equal and opposite change on the other deflecting electrode required to switch the plate current from one plate to the other.

OPERATING CONSIDERATIONS

Magnetic fields adversely affect the intrinsic operating plate-current balance of the 6ME8. To minimize this effect, the tube should be mounted as far as possible from all devices producing extraneous magnetic fields such as transformers, chokes, or similar components. It is recommended that an external shield be used in those applications critical for plate-current balance.

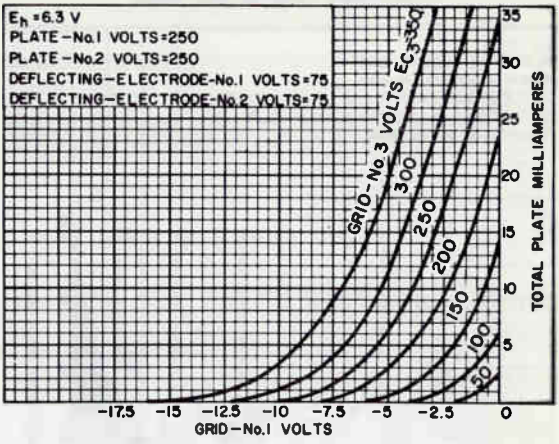
Typical Plate Characteristics



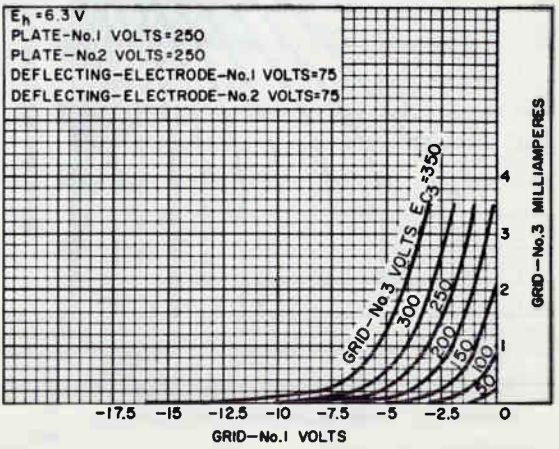
92CM-14470

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Transfer Characteristics

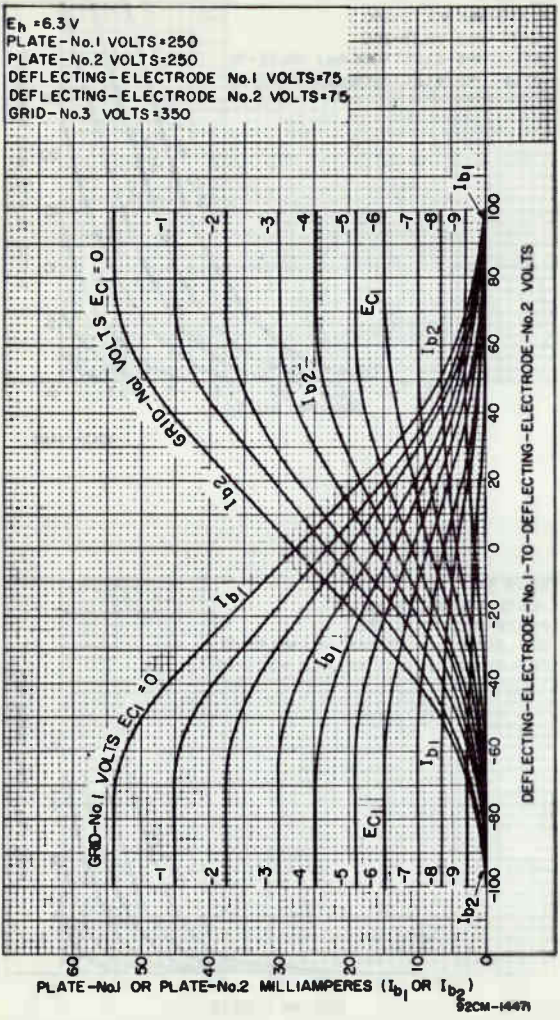


92CS-14468



92CS-14469

Transfer Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Medium-Mu Triple Triode

For Matrix-Amplifier Applications in Color-TV Receivers

ELECTRICAL CHARACTERISTICS

Heater Voltage (ac or dc)	E_h	6.3			V
Heater Current	I_h	0.900			A
Direct Interelectrode Capacitances:[a]		*Unit No.1*	*Unit No.2*	*Unit No.3*	
Grid to plate	C_{gp}	2.8	2.8	2.8	pF
Input: G to (K, H)	C_{in}	2.9	2.9	3.0	pF
Output: P to (K, H)	C_{out}	0.36	0.60	0.70	pF

For the following characteristics, see Conditions below: Values are for each unit.

Amplification Factor	μ	17	
Plate Resistance (Approx.)	r_p	5600	Ω
Transconductance	G_m	3000	μmho
Plate Current	I_b	10	mA
Plate Current for grid volts = -14		4	mA
Grid Voltage (Approx.) for $I_b = 50\mu A$		-23	V

Conditions:

Heater Voltage	E_h	6.3	V
Plate Voltage	E_b	250	V
Grid Voltage	E_c	-10.5	V

MECHANICAL CHARACTERISTICS

Maximum Overall Length	2.875 in (73.02 mm)
Maximum Seated Length	2.50 in (63.5 mm)
Maximum Diameter	1.188 in (30.1 mm)
Dimensional Outline	JEDEC E9-60
Envelope	T9
Base	Small-Button Duodecar 12-Pin with Exhaust Tip (JEDEC No.E12-70)
Terminal Diagram	JEDEC 12HG
Type of Cathode	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS – Design-Maximum Values[b]

Values are for Each Unit

Plate Voltage	E_{bb}	330	V
Grid Voltage:			
Positive-bias value	E_{cc}	0	V
Plate Dissipation	P_b	3	W
Heater-cathode voltage (Each unit):			
Peak	e_{hkm}	±200	V
Average[c]	$E_{hk(av)}$	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance:			
For fixed-bias operation	R_{g1}	1	MΩ

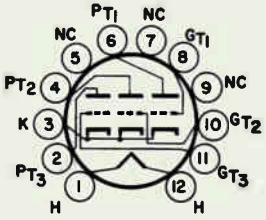
[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] As defined in the current issue of EIA Standard RS-239.

[c] Measured with a dc meter.

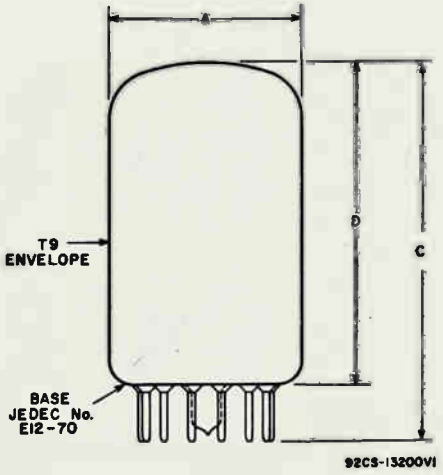
TERMINAL DIAGRAM – Bottom View

Pin 1 - Heater
Pin 2 - Plate of Unit No.3
Pin 3 - Cathode
Pin 4 - Plate of Unit No.2
Pin 5 - No Internal Connection
Pin 6 - Plate of Unit No.1
Pin 7 - No Internal Connection
Pin 8 - Grid of Unit No.1
Pin 9 - No Internal Connection
Pin 10 - Grid of Unit No.2
Pin 11 - Grid of Unit No.3
Pin 12 - Heater



JEDEC 12HG

DIMENSIONAL OUTLINE – JEDEC E9-60

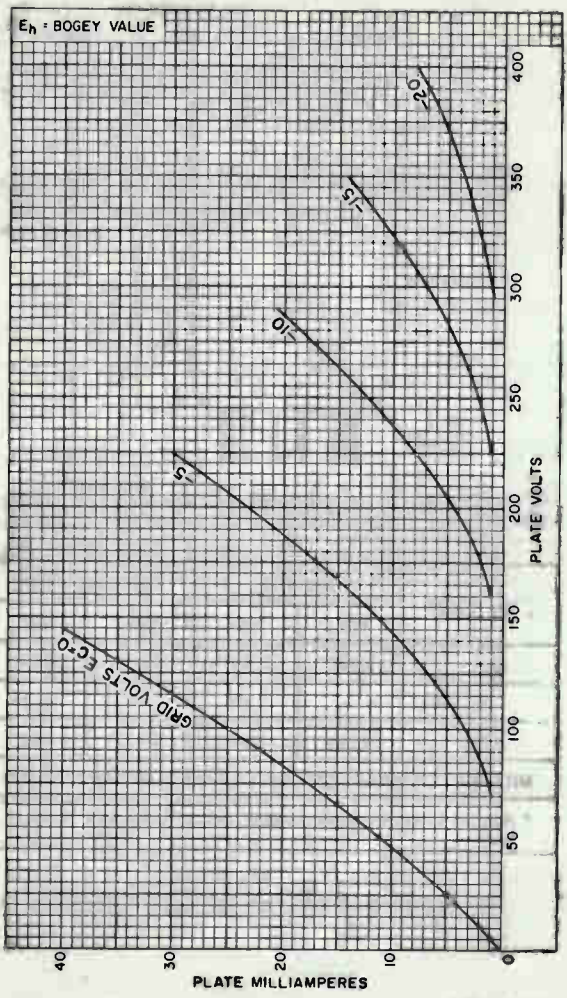


DIMENSION	INCHES		MILLIMETERS	
	Min.	Max.	Min.	Max.
A	1.062*	1.188	27.0*	30.1
C	–	2.875	–	73.02
D	2.250	2.500	57.2	63.5
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION				

* Applies to the minimum diameter except in the area of the seal.

AVERAGE PLATE CHARACTERISTICS

Each Unit



92CM-11966RI

High-Mu Triple Triode

Duodecar Type
For Matrix-Amplifier Applications in Color-TV Receivers

ELECTRICAL CHARACTERISTICS - Bogey Values

Heater Voltage (ac or dc)	E_h	6.3		V
Heater Current	I_h	0.9		A
Direct Interelectrode Capacitances:[a]		*Unit No.1*	*Unit No.2*	*Unit No.3*	
Grid to plate	C_{gp}	2.6	2.6	2.6	pF
Input: G to (K, H)	C_{in}	4.6	4.6	4.6	pF
Output: P to (K, H)	C_{out}	0.33	0.57	0.65	pF
For the following characteristics, see Conditions below: Values are for each unit.					
Amplification Factor	μ	47	40		
Plate Resistance (Approx.)	r_p	6250	10,000		Ω
Transconductance	G_m	7500	4000		μmho
Plate Current	I_b	11	4.8		mA
Grid Voltage (Approx.) for $I_b = 50\mu A$		-5	-11		V
Conditions:					
Heater Voltage	E_h	6.3	6.3		V
Plate Voltage	E_b	125	200		V
Grid Voltage	E_c	-1	-4		V

MECHANICAL CHARACTERISTICS

Maximum Overall Length . . . . . 2.875 in (73.02 mm)

Maximum Seated Length . . . . . 2.50 in (63.5 mm)

Maximum Diameter . . . . . 1.188 in (30.1 mm)

Dimensional Outline . . . . . JEDEC E9-60
See *Outlines, Glass Tubes* in *General Section*

Envelope T9

Base . . . . . Small-Button Duodecar 12-Pin with Exhaust Tip (JEDEC No.E12-70)

Terminal Diagram . . . . . JEDEC 12HU

Type of Cathode . . . . . Coated Unipotential

Operating Position . . . . . Any

MAXIMUM RATINGS – Design-Maximum Values[b]

Values are for Each Unit

Plate Voltage	E_{bb}	330	V
Grid Voltage:			
Positive-bias value	E_{cc}	0	V
Plate Dissipation	P_b	3	W
Heater-cathode voltage (Each unit):			
Peak	e_{hkm}	±200	V
Average[c]	$E_{hk(av)}$	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9	V

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance:

For fixed-bias operation	R_g	1	MΩ

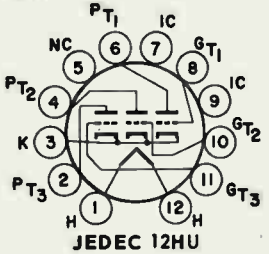
[a] Measured without external shield in accordance with the current issue of EIA Standard RS-191.

[b] As defined in the current issue of EIA Standard RS-239.

[c] Measured with a dc meter.

TERMINAL DIAGRAM – Bottom View

Pin 1 - Heater
Pin 2 - Plate of Unit No.3
Pin 3 - Cathode
Pin 4 - Plate of Unit No.2
Pin 5 - No Internal Connection
Pin 6 - Plate of Unit No.1
Pin 7 - Do Not Use
Pin 8 - Grid of Unit No.1
Pin 9 - Do Not Use
Pin 10 - Grid of Unit No.2
Pin 11 - Grid of Unit No.3
Pin 12 - Heater



JEDEC 12HU

Medium-Mu Triode—Sharp-Cutoff Pentode

9-Pin Miniature Type

For Use as a General-Purpose-Amplifier Tube in Color- and Black-and-White TV Receivers

ELECTRICAL CHARACTERISTICS — Bogey Values[a]

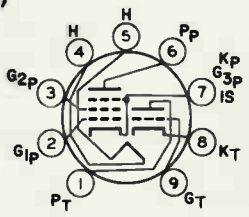
Heater Voltage, ac or dc	E_h	6.3 ± 10%	V
Heater Current	I_h	535	mA
Direct Interelectrode Capacitances:[b] *(Without External Shield)*			
Triode Unit:			
Grid to plate	c_{g-p}	1.7	pF
Input: G_T to (K_T, $G3_P$ + K_P + IS, H)	c_i	3.0	pF
Output: P_T to (K_T, $G3_P$ + K_P + IS, H)	c_o	1.4	pF
Pentode Unit:			
Grid No.1 to plate	c_{g1-p}	0.045	pF
Input: $G1_P$ to (K_P + $G3_P$ + IS, $G2_P$, H)	c_i	7.5	pF
Output: P_P to (K_P + $G3_P$ + IS, $G2_P$, H)	c_o	2.2	pF

For the following characteristics, see Conditions below:

		Triode Unit	Pentode Unit	
Amplification Factor	μ	40	-	
Plate Resistance (Approx.)	r_p	5	150	kΩ
Transconductance	g_m	8500	10000	μmho
DC Plate Current	I_b	18	12	mA
DC Grid-No.2 Current	I_{c2}	-	4.5	mA
Cutoff DC Grid-No.1 Voltage for I_b = 20 μA.	$E_{c1(co)}$	-12	-7	V
Conditions:				
Heater Voltage	E_h	6.3	6.3	V
DC Plate Voltage	E_b	150	125	V
DC Grid-No.2 Voltage	E_{c2}	-	125	V
Cathode Resistance	R_k	56	62	Ω

TERMINAL DIAGRAM (Bottom View)

Pin 1 - Triode Plate
Pin 2 - Pentode Grid No.1
Pin 3 - Pentode Grid No.2
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Plate
Pin 7 - Pentode Cathode, Grid No.3 and Internal Shield
Pin 8 - Triode Cathode
Pin 9 - Triode Grid



JEDEC 9AE

MECHANICAL CHARACTERISTICS

Maximum Overall Length	2.187 in (55.54 mm)
Maximum Seated Length	1.937 in (49.19 mm)
Maximum Diameter	0.875 in (22.12 mm)
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)
Dimensional Outline	JEDEC 6-2
Terminal Diagram	JEDEC 9AE
Type of Cathodes	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS - Design-Maximum Values[c]

		Triode Unit	*Pentode Unit*	
DC Plate Voltage	E_b	330	330	V
DC Grid-No.2 Supply Voltage	E_{c_2}	-	330	V
DC Grid-No.2 Voltage	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section.			
DC Grid-No.1 Voltage: Positive-bias value	E_{c1}	0	0	V
Heater-Cathode Voltage: Peak	e_{hkm}	±200	±200	V
DC	E_{hk}	100	100	V
Heater Current	I_h	500 to 570		mA
Grid-No.2 Input: For grid-No.2 voltages up to 165 volts	P_{g2}	-	0.55	W
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section.			
Plate Dissipation	P_b	2.7	2.5	W

MAXIMUM CIRCUIT VALUES

Grid-No.1 Circuit Resistance: For fixed-bias operation	$R_{g1(ckt)}$	0.5	0.25	MΩ
For cathode-bias operation	$R_{g1(ckt)}$	0.5	0.5	MΩ

INTERELECTRODE LEAKAGE

Minimum Leakage Resistance between grid No.1 of each unit and all other electrodes of both units tied together	R_{g1-all}		100	MΩ

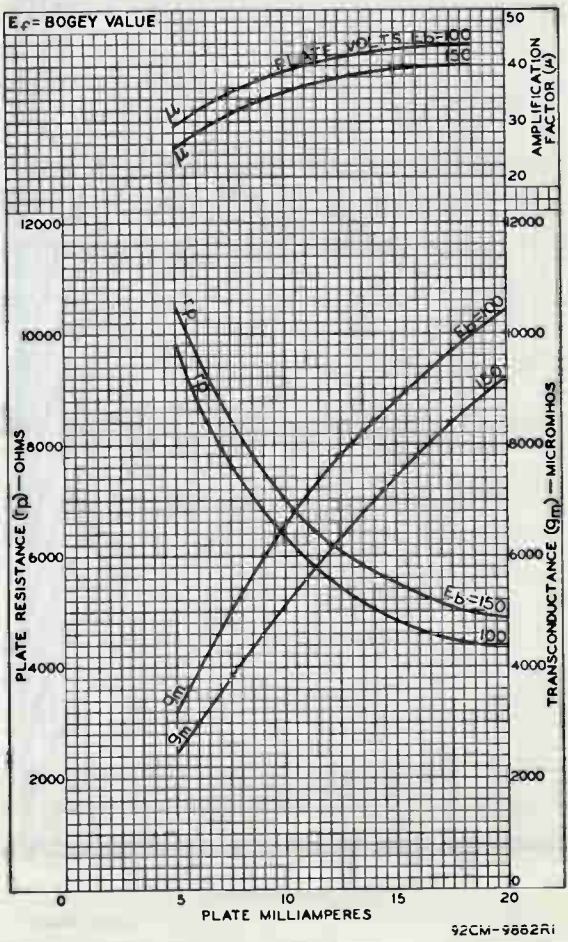
Conditions:
E_h = bogey value, E_{c1} = -100 V with respect to all other electrodes tied together.

[a] Unless otherwise specified.

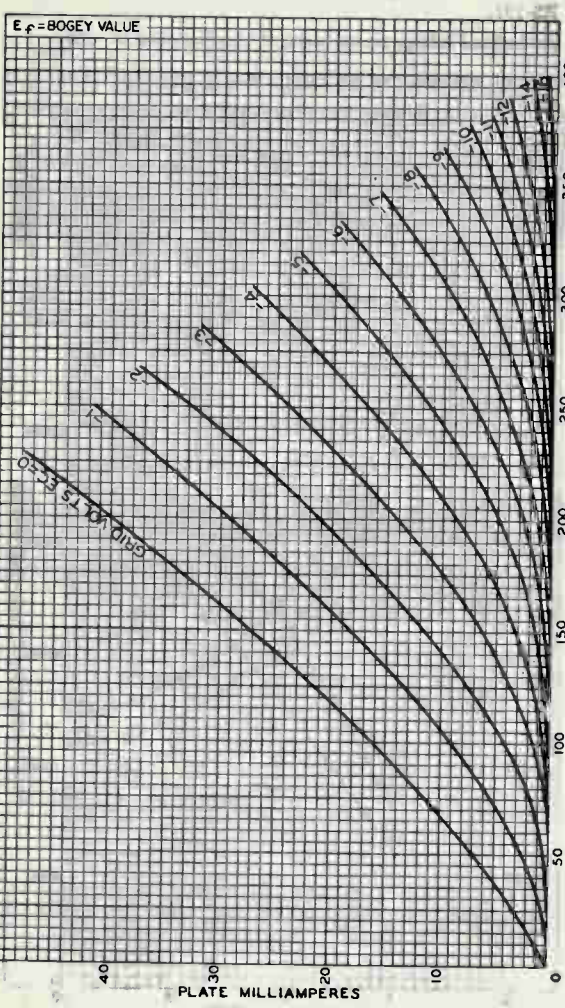
[b] Measured in accordance with the current issue of EIA Standard RS-191.

[c] As defined in the current issue of EIA Standard RS-239.

TYPICAL CHARACTERISTICS – Triode Unit

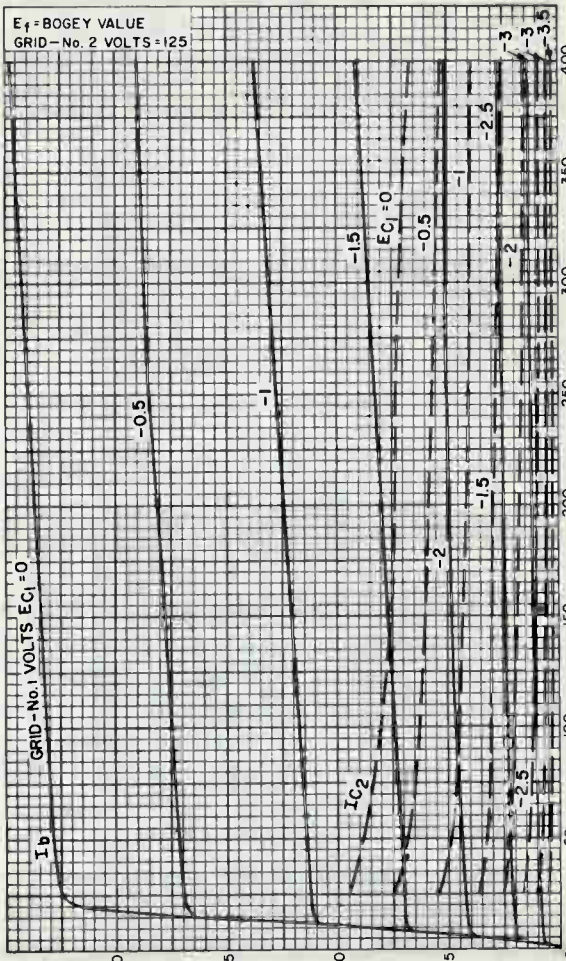


TYPICAL CHARACTERISTICS – Triode Unit



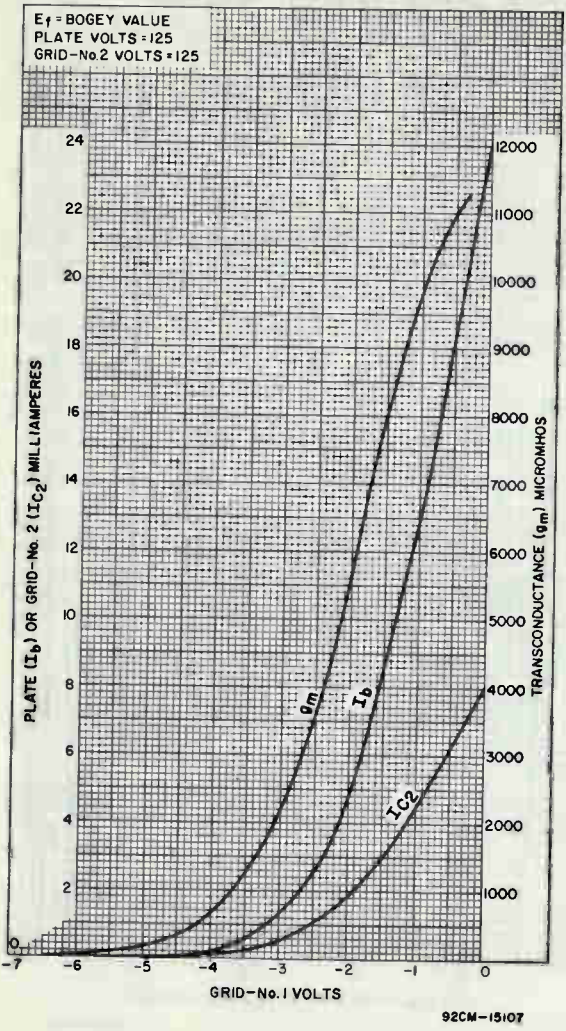
92CM-9866RI

TYPICAL CHARACTERISTICS – Pentode Unit



92CM-15102

TYPICAL CHARACTERISTICS – Pentode Unit



Medium-Mu Triode—Sharp-Cutoff Pentode

9-Pin Miniature Type

For Use as a Burst Amplifier and General-Purpose-Amplifier Tube in Color- and Black-and-White TV Receivers

ELECTRICAL CHARACTERISTICS – Bogey Values [a]

Heater Voltage, ac or dc	E_h	6.3		V
Heater Current	I_h	600		mA
Direct Interelectrode Capacitances: [b]		*Without External Shield*	*With External Shield* [c]	
Triode Unit:				
Grid to plate	c_{g-p}	2.2	2.2	pF
Input: G_T to (K_T, $G3_P$ + K_P + IS, H)	c_i	3.0	3.2	pF
Output: P_T to (K_T, $G3_P$ + K_P + IS, H)	c_o	2.2	2.4	pF
Heater to cathode	c_{h-k}	4.4	4.8[d]	pF
Pentode Unit:				
Grid No. 1 to plate	c_{g1-p}	0.05	0.05	pF
Input: $G1_P$ to (K_P + $G3_P$ + IS, $G2_P$, H)	c_i	9.0	9.0	pF
Output: P_P to (K_P + $G3_P$ + IS, $G2_P$, H)	c_o	3.6	4.4	pF
Heater to cathode	c_{h-k}	5.5	7.5[d]	pF
Pentode grid No. 1 to triode plate	P_{g1}-T_p	0.17max.	0.2max.	pF
Pentode plate to triode plate	P_p-T_p	0.09max.	0.008max	pF

For the following characteristics, see **Conditions**		*Triode Unit*	*Pentode Unit*	
Amplification Factor	μ	35	-	
Plate Resistance (Approx.)	r_p	5.8	165	kΩ
Transconductance	g_m	6000	9000	μmho
DC Plate Current	I_b	11.5	19	mA
DC Grid-No.2 Current	I_{c2}	-	4.2	mA
Cutoff DC Grid-No.1 Voltage(Approx.):				
For I_b=10μA	$E_{c1(co)}$	-5.8	-	V
For I_b=20μA	$E_{c1(co)}$	-	-9.5	V

6MU8

Conditions		Triode Unit	Pentode Unit	
Heater Voltage	E_h	6.3	6.3	V
DC Plate Voltage	E_b	125	150	V
DC Grid-No.2 voltage	E_{c2}	-	150	V
DC Grid-No.1 voltage	E_{c1}	-1	-	V
Cathode Resistance	R_k	-	150	Ω

MECHANICAL CHARACTERISTICS

Maximum Overall Length	2.625 in (66.67 mm)
Maximum Seated Length	2.375 in (60.32 mm)
Maximum Diameter *(See Dimensional Outline)*	0.875 in (22.12 mm)
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin(JEDEC E9-1)
Dimensional Outline	JEDEC 6-3
Terminal Diagram	JEDEC 9AE
Type of Cathodes	Coated Unipotential
Operating Position	Any

MAXIMUM RATINGS - Design-Maximum Values

		Triode Unit	Pentode Unit	
DC Plate Voltage	E_b	330	330	V
DC Grid-No.2 Supply Voltage	E_{c2}	-	330	V
DC Grid-No.2 Voltage		*See Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
DC Grid-No.1 Voltage:				
Positive-bias value	E_{c1}	0	0	V
Heater-Cathode Voltage:				
Peak	e_{hkm}	±200	±200	V
DC	E_{hk}	100	100	V
Heater Voltage, ac or dc	E_h	5.7 to 6.9		V
Grid-No.2 Input: For grid-No.2 voltages up to 165 volts	P_{g2}	-	1.1	W
For grid-No.2 voltages between 165 and 330 volts		*See Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Plate Dissipation	P_b	2.5	3.75	W

MAXIMUM CIRCUIT VALUES

Grid-No.1 Circuit Resistance:				
For fixed-bias operation	R_{g1}	0.5	0.25	MΩ
For cathode-bias operation	R_{g1}	1.0	1.0	MΩ

[a] Unless otherwise specified.

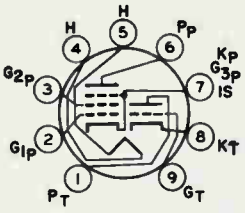
[b] Measured in accordance with the current issue of EIA Standard RS-191.

[c] With external shield JEDEC No. 315 connected to cathode of unit under test except as noted.

[d] With external shield JEDEC No. 315 connected to ground.

[•] As defined in the current issue of EIA Standard RS-239.

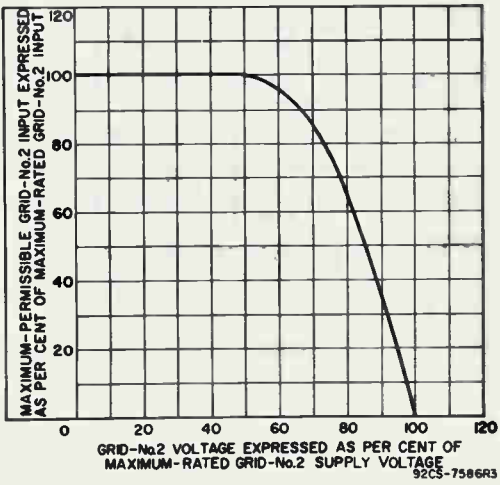
TERMINAL DIAGRAM(Bottom View)



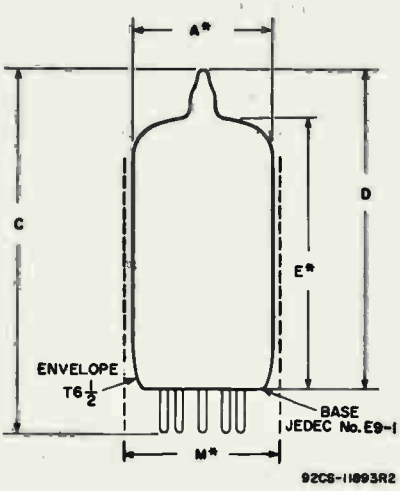
JEDEC 9AE

Pin 1 - Triode Plate
Pin 2 - Pentode Grid No.1
Pin 3 - Pentode Grid No.2
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Plate
Pin 7 - Pentode Cathode, Grid No.3 and Internal Shield
Pin 8 - Triode Cathode
Pin 9 - Triode Grid

GRID-NO. 2 INPUT RATING CHART



DIMENSIONAL OUTLINE JEDEC 6-3



DIMENSION	INCHES			MILLIMETERS		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A*	0.800	-	0.845	20.32	-	21.46
C	-	-	2.625	-	-	66.67
D	-	-	2.375	-	-	60.32
E*	1.906	2.000	2.094	48.41	50.80	53.19
M*	-	-	0.875	-	-	22.22
MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION						

* As defined in the current issue of EIA standards RS-209-A1.

Medium-Mu Triode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances (Approx.):[a]		
Grid to plate	2.4	μμf
Grid to cathode and heater	4.2	μμf
Plate to cathode and heater	0.6	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid Voltage	-8	volts
Amplification Factor	16.5	
Plate Resistance (Approx.)	3700	ohms
Transconductance	4500	μmhos
Plate Current	24	ma
Plate Current for grid volts = -15	4	ma
Grid Voltage (Approx.) for plate μa = 50	-22	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AC

Pin 1 – Internal Connection—Do Not Use
Pin 2 – Cathode
Pin 3 – Grid
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Grid
Pin 7 – Same as Pin 1
Pin 8 – Same as Pin 1
Pin 9 – Plate

VERTICAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[b]

DC PLATE VOLTAGE	550	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[c]	2200	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts

← Indicates a change.

CATHODE CURRENT:			
Peak	105	max.	ma
Average	30	max.	ma
PLATE DISSIPATION	8.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[d]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For cathode-bias operation	2.2	max.	megohms

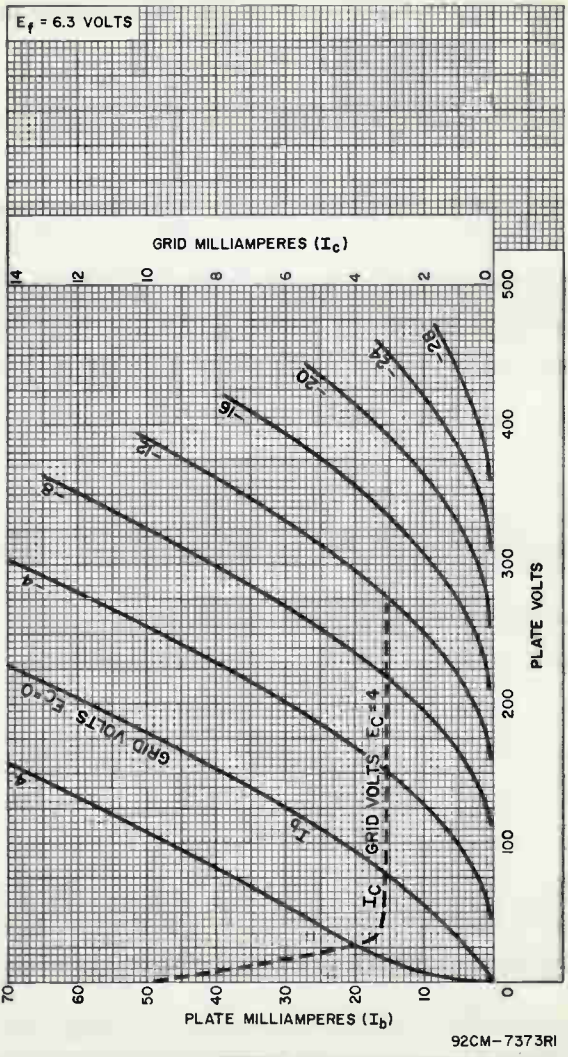
[a] Without external shield.

[b] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[c] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

[d] The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS



92CM-7373RI

6SA7, 6SA7-GT/G

PENTAGRID CONVERTER

Heater ■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.

Direct Interelectrode Capacitances:	6SA7	6SA7-GT/G	
Grid #3 to All Other Electrodes (R-F Input)	9.5▲	11▲▲	μμf
Plate to All Other Electrodes (Mixer Output)	12▲	11▲▲	μμf
Grid #1 to All Other Electrodes (Osc. Input)	7▲	8▲▲	μμf
Grid #3 to Plate	0.13 max.▲	0.5 max.▲▲	μμf
Grid #3 to Grid #1	0.15 max.▲	0.4 max.▲▲	μμf
Grid #1 to Plate	0.06 max.▲	0.2 max.▲▲	μμf
Grid #1 to Shell, Grid #5, and All Other Electrodes except Cathode	4.4	–	μμf
Grid #1 to All Other Electrodes except Cathode & Grid #5	–	5	μμf
Grid #1 to Cathode	2.6	–	μμf
Grid #1 to Cathode & Grid #5	–	3	μμf
Cathode to Shell, Grid #5, and All Other Electrodes except Grid #1	5	–	μμf
Cathode and Grid #5 to All Other Electrodes except Grid #1	–	14	μμf
Maximum Overall Length	2-5/8"	3-5/16"	
Maximum Seated Height	2-1/16"	2-3/4"	
Maximum Diameter	1-5/16"	1-5/16"	
Bulb	Metal Shell MT-8	T-9	
Base	Small Wafer	Intermed. Sh. Octal 8-Pin	

Pin 1 { 6SA7, Shell, Grid #5 / 6SA7-GT/G, No Conn.
Pin 2 – Heater
Pin 3 – Plate
Pin 4 – Grids #2 & #4
Pin 5 – Grid #1
Pin 6 { 6SA7, Cathode / 6SA7-GT/G, Cathode & Grid #5
Pin 7 – Heater
Pin 8 – Grid #3

BOTTOM VIEW (8R)

BOTTOM VIEW (G-8AD)

Mounting Position: Any

Maximum And Minimum Ratings Are Design-Center Values

CONVERTER SERVICE

Plate Voltage	300 max. volts
Grids #2 & #4 Voltage	100 max. volts
Grids #2 & #4 Supply Voltage	300 max. volts
Grid #3 Voltage *	0 min. volts
Plate Dissipation	1.0 max. watt
Screen Dissipation	1.0 max. watt
Total Cathode Current	14 max. ma.

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
▲ With shell connected to cathode.
▲▲ With external shield connected to cathode.
* For self-excited oscillator.
← Indicates a change.

6SA7, 6SA7-GT/G

PENTAGRID CONVERTER

(continued from preceding page)

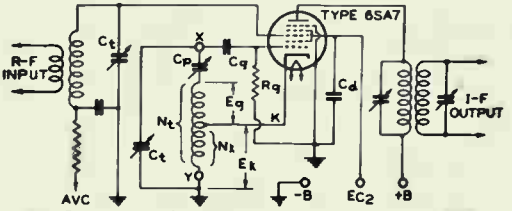
Characteristics:	*Self-excitation**		*Separate Excitation*		
Plate Voltage	100	250	100	250	volts
Grids #2 & #4 Volt.	100	100	100	100	volts
Grid #3 (Control) Volt.	0	0	−2	−2	volts
Grid #1 Resistor	20000	20000	20000	20000	ohms
Plate Res. (Approx.)	0.5	1.0	0.5	1.0	megohm
Conversion Transcond.	425	450	425	450	μmhos
Conversion Transcond. (Approx.) ‡	2	2	2	2	μmhos
Plate Current	3.3	3.5	3.3	3.5	ma.
Grids #2 & #4 Current	8.5	8.5	8.5	8.5	ma.
Grid #1 Current	0.5	0.5	0.5	0.5	ma.
Total Cathode Current	12.3	12.5	12.3	12.5	ma.

NOTE: The transconductance between Grid #1 and Grids #2 & #4 connected to plate (not oscillating) is approximately 4500 μmhos under the following conditions: Grids #1, #3, and shell at 0 volts; Grids #2 & #4 and plate at 100 volts.

* Characteristics are approximate only and are shown for a Hartley circuit with a feedback of approximately 2 volts peak in the cathode circuit.

‡ With Grid #3 bias of −35 volts.

TYPICAL SELF-EXCITED CONVERTER CIRCUIT FOR TYPE 6SA7



Cd = BY-PASS COND.
Cg = 50 μμf
Cp = PADDING COND.
Ct = TUNING COND.

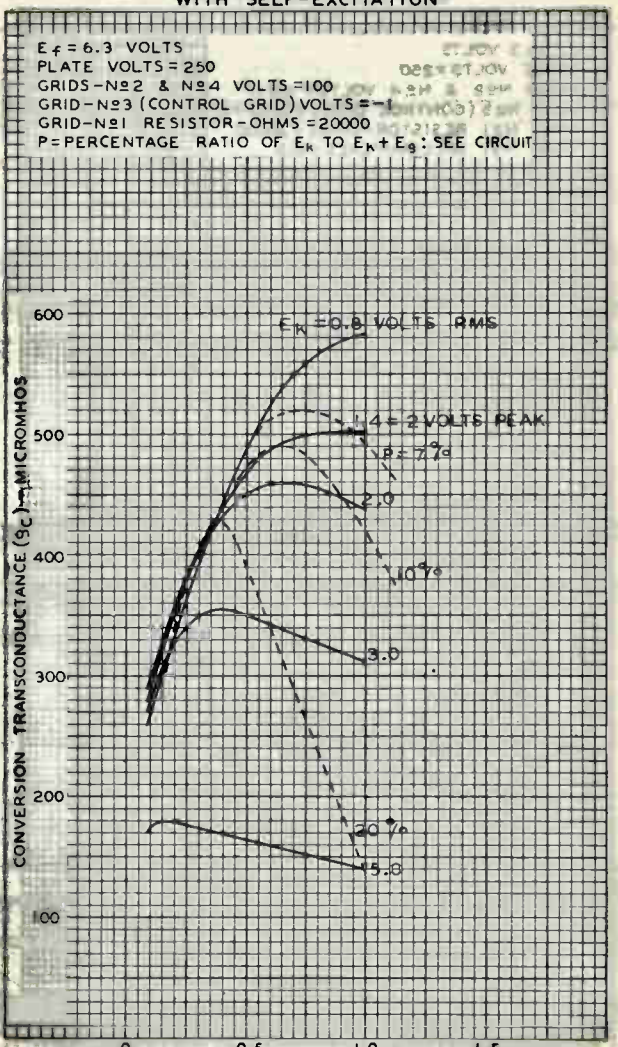
Nt = TOTAL TURNS IN OSC. COIL
Nk = TURNS IN CATHODE SECTION OF OSC. COIL
Rg = 20000 OHMS

CE-4992

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6SA7

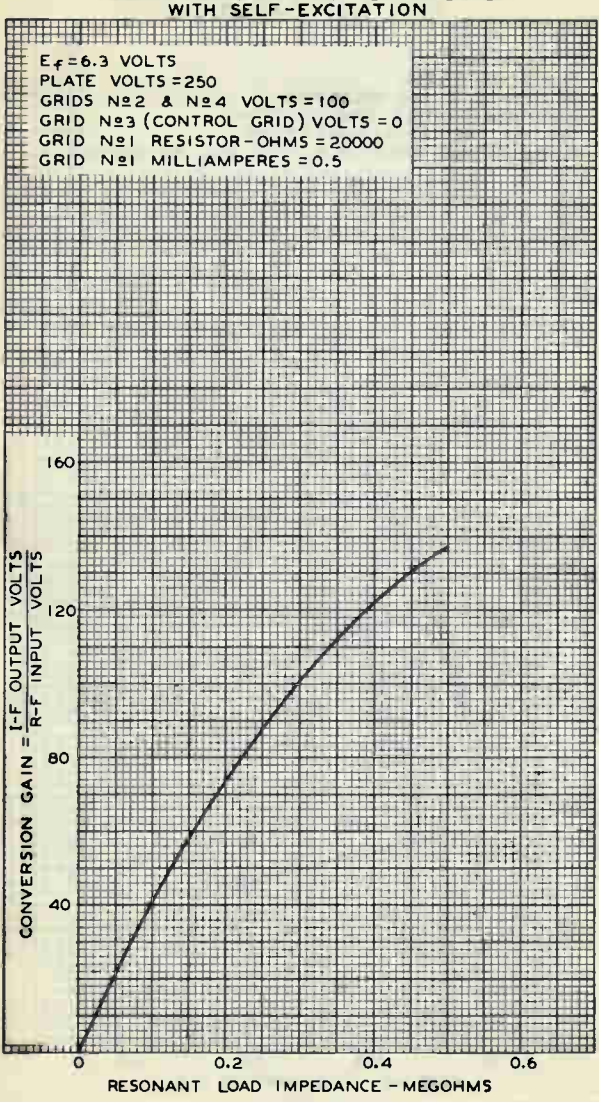
OPERATION CHARACTERISTICS
WITH SELF-EXCITATION



6SA7

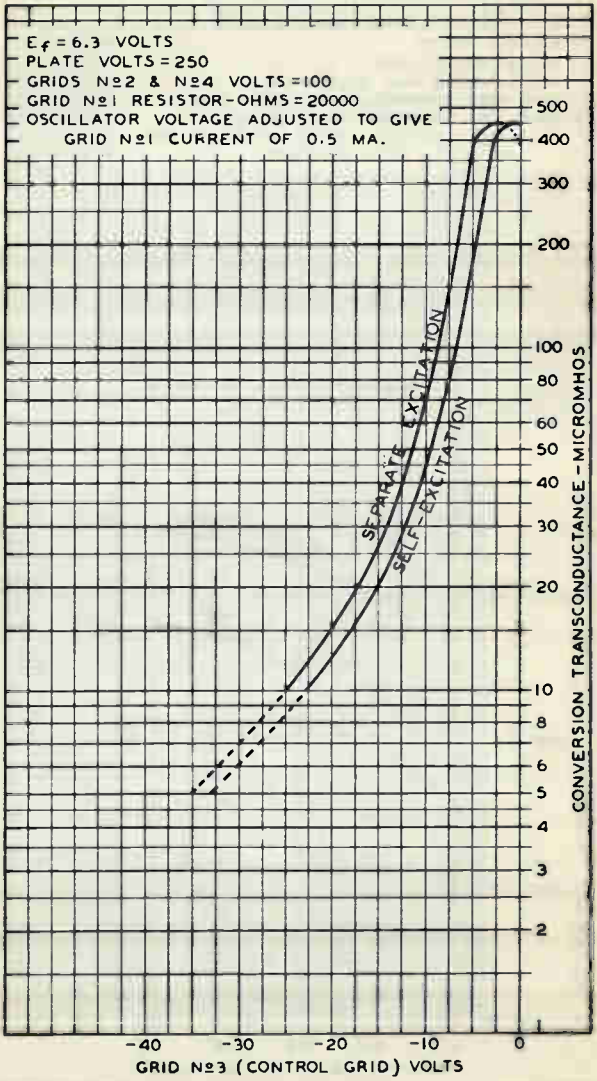
6SA7

OPERATION CHARACTERISTIC
WITH SELF-EXCITATION



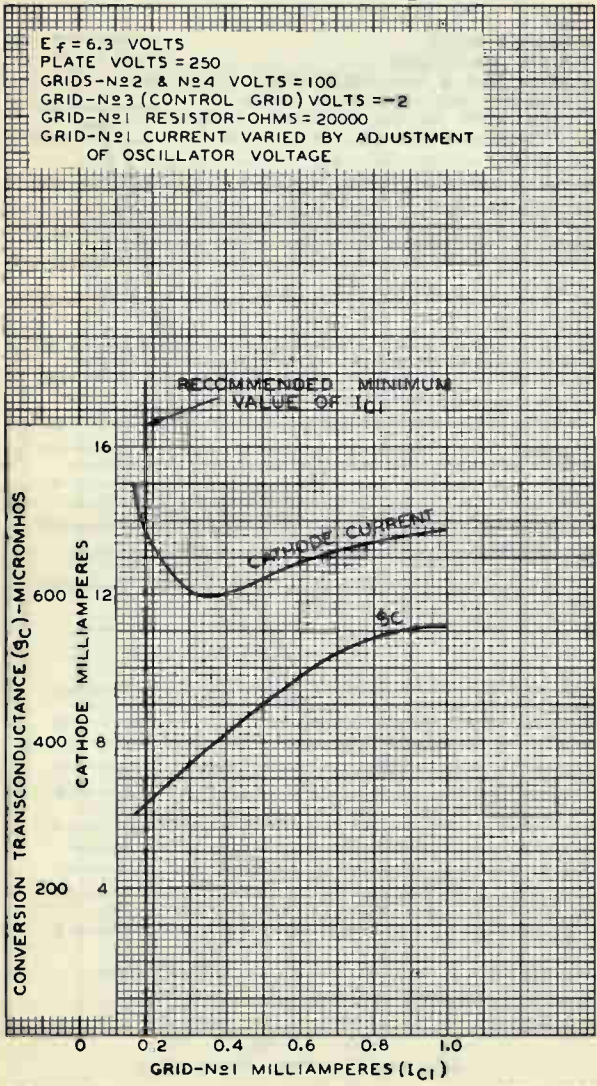
6SA7

OPERATION CHARACTERISTICS



6SA7

OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION



6SJ7, 6SJ7-GT
SHARP-CUTOFF PENTODE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	6.3	ac or dc volts
Current	0.3	amp

Direct Interelectrode Capacitances:

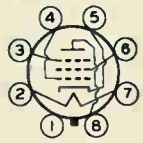
	6SJ7°	6SJ7-GT°°	
Pentode Connection:			
Grid No.1 to Plate	0.005 max.	0.005 max.	μμf
Input	6	7	μμf ←
Output	7	7	μμf ←
Triode Connection:*			
Grid No.1 to Plate	2.8	2.8	μμf
Grid No.1 to Cathode	3.4	3.4	μμf
Plate to Cathode	11	11	μμf

° With shell connected to cathode.
°° With external shield connected to cathode.
* With grid No.2 and grid No.3 connected to plate.

Mechanical:

Mounting Position	Any	Any
Maximum Overall Length	2-5/8"	3-5/16"
Maximum Seated Length	2-1/16"	2-3/4"
Maximum Diameter	1-5/16"	1-5/16"
Bulb	Metal Shell, MT8G	T-9
Base	Small-Wafer Octal 8-Pin	Sm.-Wafer Octal 8-Pin, Sleeve
Basing Designation	8N	GT-8N

BOTTOM VIEW



Pin 1 { 6SJ7, Shell / 6SJ7-GT, Base Sleeve
Pin 2 – Heater
Pin 3 – Grid No.3
Pin 4 – Grid No.1
Pin 5 – Cathode
Pin 6 – Grid No.2
Pin 7 – Heater
Pin 8 – Plate

AMPLIFIER – Class A_1

Pentode Connection

Maximum Ratings, ***Design-Center Values*:**

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	125 max.	volts
GRID-No.2 SUPPLY VOLTAGE	300 max.	volts
PLATE DISSIPATION	2.5 max.	watts
GRID-No.2 DISSIPATION	0.7 max.	watt ←
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		←
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

← indicates a change.

6SJ7, 6SJ7-GT
SHARP-CUTOFF PENTODE

Typical Operation and Characteristics:

Plate voltage	100	250	. .	volts
Grid No.3 (Suppressor) . Connected to cathode at socket				
Grid-No.2 Voltage	100	100	. .	volts
Grid-No.1 Voltage	−3	−3	. .	volts
Plate Resistance (Approx.)	0.7	#	. .	megohm
Transconductance	1575	1650	. .	μmhos
Grid-No.1 Bias (Approx.) for plate current of 10 μamp	−8	−8	. .	volts
Plate Current	2.9	3.0	. .	ma
Grid-No.2 Current	0.9	0.8	. .	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . . 1 max. megohm

AMPLIFIER – Class A_1

Triode Connection – Grids No.2 and No.3 Connected to Plate

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	250 max.	volts
PLATE DISSIPATION (Total)	2.5 max.	watts
GRID-No.1 VOLTAGE:		
Positive bias value	0 max.	volts
→PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	180	250	. .	volts
Grid-No.1 Voltage	−6	−8.5	. .	volts
Amplification Factor	19	19		
Plate Resistance (Approx.)	8250	7600	. .	ohms
Transconductance	2300	2500	. .	μmhos
Plate Current	6.0	9.2	. .	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . . 1 max. megohm

Greater than 1 megohm.

For additional data, see RESISTANCE-COUPLED AMPLIFIER CHART at the front of this Section

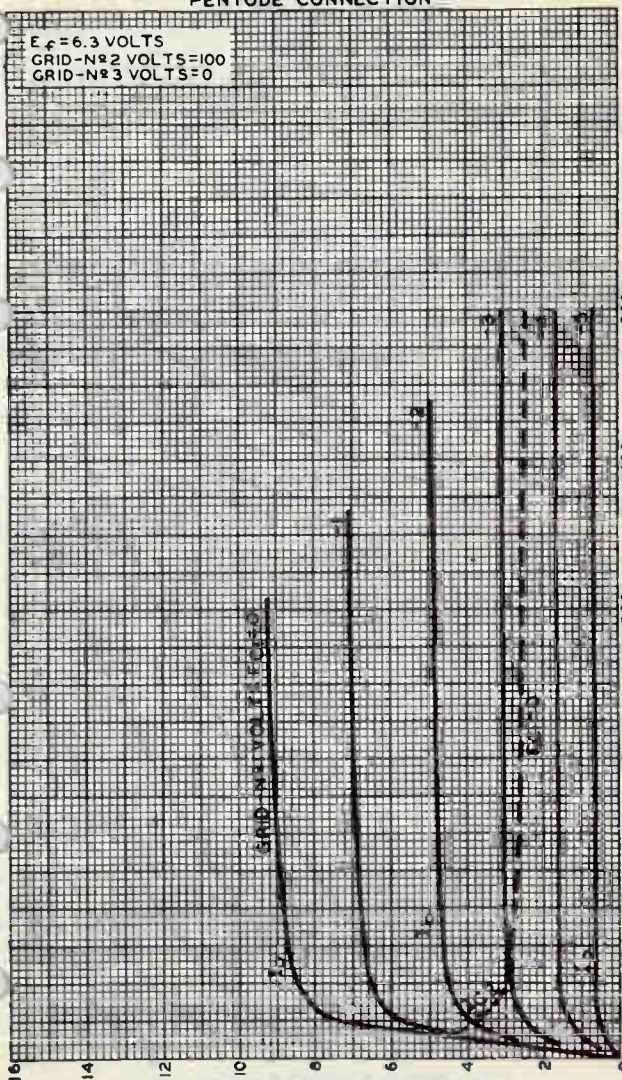
→Indicates a change.

RCA

6SJ7

AVERAGE PLATE CHARACTERISTICS

PENTODE CONNECTION



6SJ7

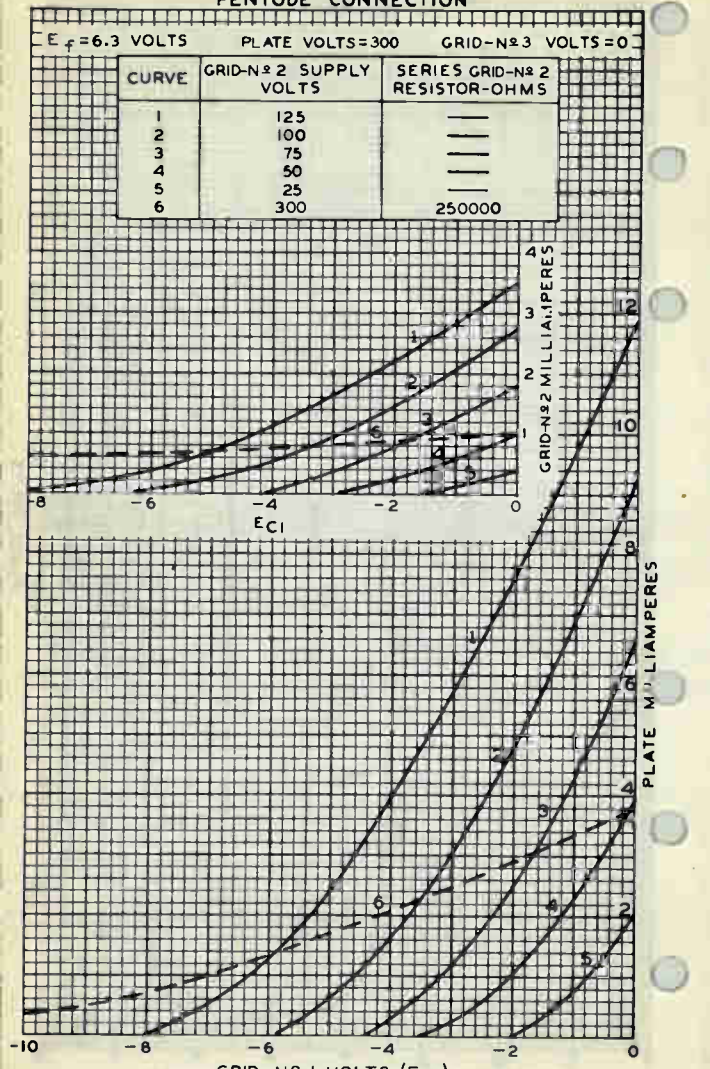
RCA

6SJ7

AVERAGE CHARACTERISTICS
PENTODE CONNECTION

E_f = 6.3 VOLTS PLATE VOLTS = 300 GRID-№3 VOLTS = 0

CURVE	GRID-№2 SUPPLY VOLTS	SERIES GRID-№2 RESISTOR-OHMS
1	125	—
2	100	—
3	75	—
4	50	—
5	25	—
6	300	250000



MARCH 5, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8443R1

RCA

6SJ7

AVERAGE CHARACTERISTICS
PENTODE CONNECTION

E_f = 6.3 VOLTS PLATE VOLTS = 300 GRID-№3 VOLTS = 0

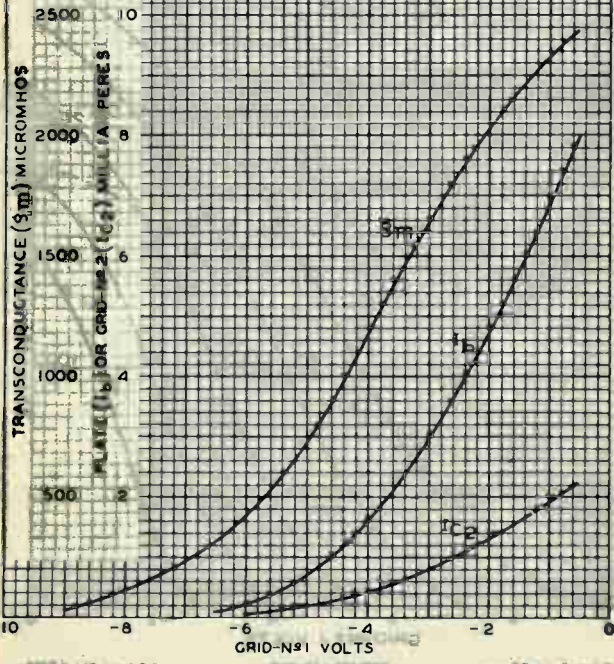
CURVE	GRID-№2-SUPPLY VOLTS	SERIES GRID-№2 RESISTOR-OHMS
1	125	—
2	100	—
3	75	—
4	50	—
5	25	—
6	300	250000

6SJ7

6SJ7

AVERAGE CHARACTERISTICS
PENTODE CONNECTION

E_f = 6.3 VOLTS
GRID-No.3 VOLTS = 0
PLATE VOLTS = 250
GRID-No.2 VOLTS = 100

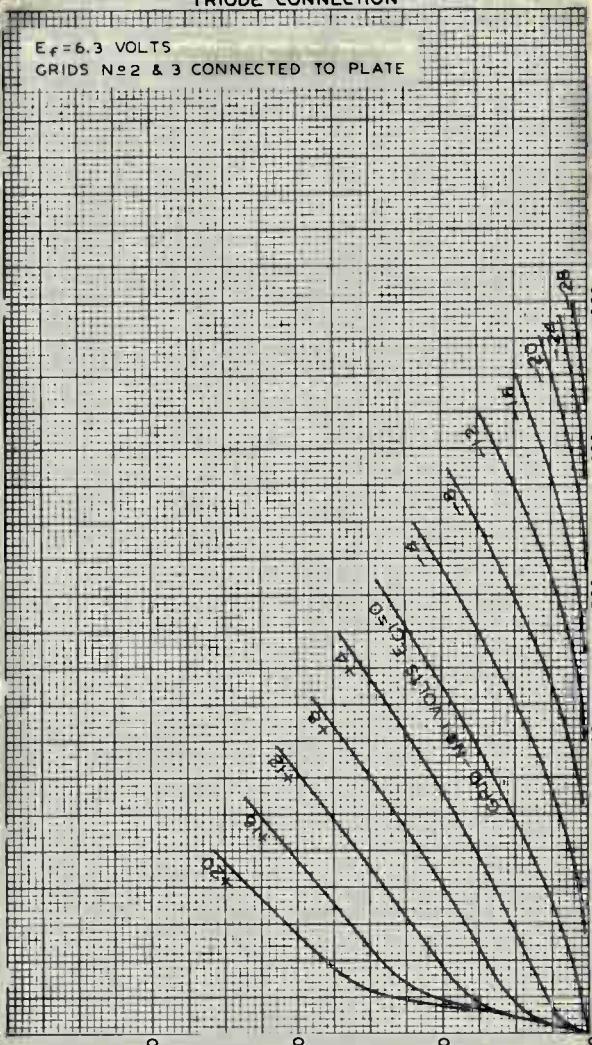


RCA

6SJ7

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



MAY 12, 1948

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92CM-6409RI

6SL7-GT

HIGH-MU TWIN TRIODE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:
Voltage. . . . . 6.3 . . . . . ac or dc volts
Current. . . . . 0.3 . . . . . amp

Direct Interelectrode Capacitances (Approx.):[o]

	Unit No.1	Unit No.2	
Grid to plate	2.8	2.8	. . . . μμf
Grid to cathode and heater . . .	3.0	3.4	. . . . μμf
Plate to cathode and heater . . .	3.8	3.2	. . . . μμf

Mechanical:

Mounting Position. . . . . Any
Maximum Overall Length . . . . . 3-5/16"
Maximum Seated Length. . . . . 2-3/4"
Maximum Diameter . . . . . 1-9/32" ←
Bulb T-9
Base . . . . . Intermediate-Shell Octal 8-Pin (JETEC No.B8-6) ←
or Short Intermediate-Shell Octal 8-Pin (JETEC No.B8-46)
Basing Designation for BOTTOM VIEW 8BD

Pin 1 - Grid of Unit No.2
Pin 2 - Plate of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Grid of Unit No.1

Pin 5 - Plate of Unit No.1
Pin 6 - Cathode of Unit No.1
Pin 7 - Heater
Pin 8 - Heater

AMPLIFIER—Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values*: ←

PLATE VOLTAGE.	300 max.	volts
GRID VOLTAGE:		
Positive bias value.	0 max.	volts
PLATE DISSIPATION.	1 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. . .	90 max.	volts
Heater positive with respect to cathode. . .	90 max.	volts

Characteristics:

Plate Voltage.	250	volts

[o] With close-fitting shield (JETEC No.306) connected to cathode. ←

←Indicates a change.

6SL7-GT

HIGH-MU TWIN TRIODE

Grid Voltage	−2	volts
Amplification Factor	70	
Plate Resistance (Approx.)	44000	ohms
Transconductance	1600	μmhos
Plate Current	2.3	ma

→ **Typical Operation as Resistance-Coupled Amplifier:**

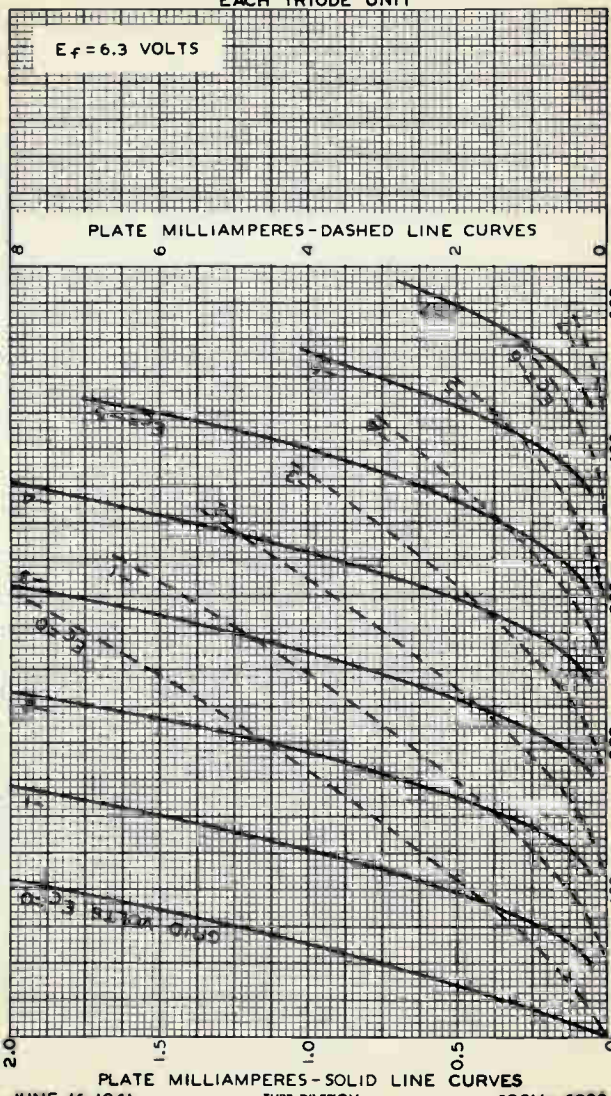
See RESISTANCE-COUPLED AMPLIFIER CHART No.7 at front of this Section

→indicates a change.

6SL7-GT

AVERAGE PLATE CHARACTERISTICS

EACH TRIODE UNIT



JUNE 16, 1941 TUBE DIVISION 92CM-6298
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6SN7-GT

TWIN-TRIODE AMPLIFIER

Heater	Coated Unipotential Cathodes		
Voltage	6.3		a-c or d-c volts
Current	0.6		amp.
Direct Interelectrode Capacitances (Approx.):[C]	*Triode Unit T_1*	*Triode Unit T_2*	
Grid to Plate	3.8	4.0	μμf
Grid to Cathode	2.8	3.0	μμf
Plate to Cathode	0.8	1.2	μμf
Maximum Overall Length			3-5/16"
Maximum Seated Height			2-3/4"
Maximum Diameter			1-5/16"
Bulb			T-9
Base		Intermediate Shell Octal 8-Pin	
Pin 1 - Grid T_2		Pin 5 - Plate T_1	
Pin 2 - Plate T_2		Pin 6 - Cathode T_1	
Pin 3 - Cathode T_2		Pin 7 - Heater	
Pin 4 - Grid T_1		Pin 8 - Heater	
Mounting Position			Any

BOTTOM VIEW (8BD)

For convenience, one triode unit is identified as T_1; the other as T_2.

Maximum And Minimum Ratings Are Design-Center Values

AMPLIFIER-Each Unit

Plate Voltage		300 max.	volts
Grid Voltage		0 min.	volts
Plate Dissipation		2.5 max.	watts
D-C Heater-Cathode Potential		90 max.	volts
Cathode Current		20 max.	ma.
Characteristics — Class A_1 Amplifier:			
Plate	90	250	volts
Grid #	0	-8	volts
Amp. Fact.	20	20	
Plate Res.	6700	7700	ohms
Transcond.	3000	2600	μmhos
Plate Cur.	10	9	ma.

Typical Operation with Resistance Coupling:
Same as for Type 6F8-G in RESISTANCE-COUPLED AMPLIFIER CHAR

° With no external shield.

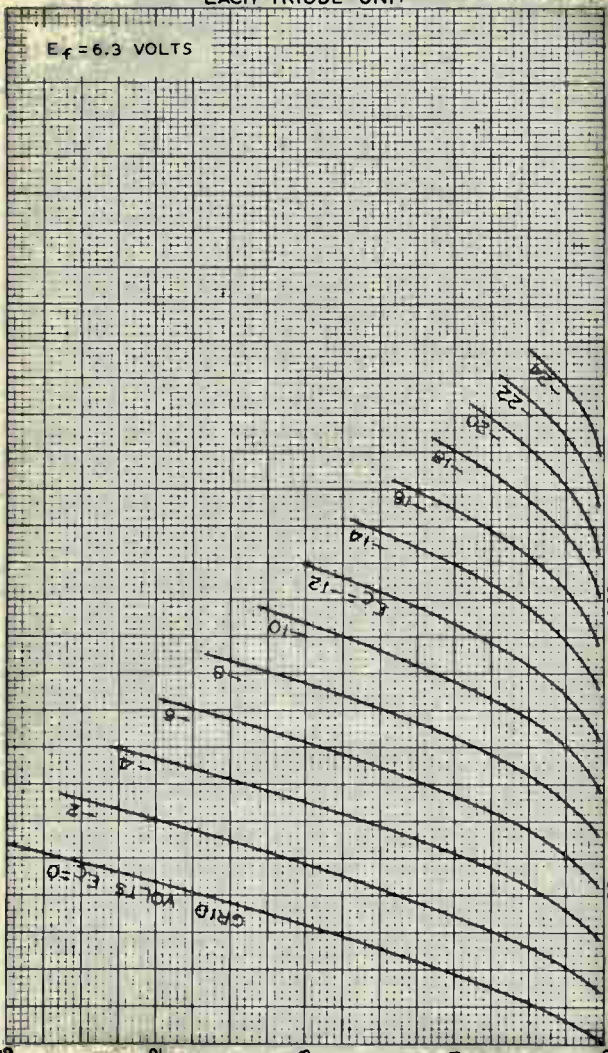
Under maximum rated conditions, the d-c resistance in the grid circuit should not exceed 1.0 megohm per unit.

The curves under Type 6J5 also apply to each unit of the 6SN7-GT.

→ Indicates a change.

6SN7-GT

6SN7-GT
AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



FEB. 21, 1941

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6257

6SN7-GTB

MEDIUM-MU TWIN TRIODE

Intended for use in equipment having series heater-string arrangement

The 6SN7-GTB is the same as the 6SN7-GTA except for the following item:

Heater, for Unipotential Cathodes:
Warm-up time (Average) . 11 . . . . . .sec.

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

6SQ7, 6SQ7-GT/G

DUPLEX-DIODE HIGH-MU TRIODE

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.

	6SQ7	6SQ7-GT/G
Direct Interelectrode Cap.	▲	•
Triode Unit:		
Grid to Plate	1.6	1.8 μμf
Grid to Cathode	3.2	4.2 μμf
Plate to Cathode	3.0	3.4 μμf
Maximum Overall Length	2-5/8"	3-5/16"
Maximum Seated Height	2-1/16"	2-3/4"
Maximum Diameter	1-5/16"	1-5/16"
Bulb	Metal Shell, MT-8	T-9
Base	Small Wafer Octal 8-Pin	Small Wafer Octal 8-Pin, Sleeve
Basing Designation	8Q	GT-8Q
Pin 1	6SQ7, Shell 6SQ7-GT/G, Base Sleeve	Pin 4 - Diode Plate #2
Pin 2	Triode Grid	Pin 5 - Diode Plate #1
Pin 3	Cathode	Pin 6 - Triode Plate
		Pin 7 - Heater
		Pin 8 - Heater
Mounting Position		Any

BOTTOM VIEW

Maximum Ratings Are Design-Center Values

TRIODE UNIT

Plate Voltage	300 max.	volts
D-C Heater-Cathode Potential	100 max.	volts

Characteristics - Class A_1 Amplifier:			
Heater	6.3	6.3	volts
Plate	100	250	volts
Grid	-1	-2	volts
Amp. Fact.	100	100	
Plate Res.	110000	91000	ohms
Transcond.	900	1100	μmhos
Plate Cur.	0.4	0.9	ma.

Typical Operation—Resistance-Coupled Amplifier:
Same as Type 75 in RESISTANCE-COUPLED AMPLIFIER CHART.

DIODE UNITS - Two

Consideration of these units is given under Type 85. Circuits will be similar to those shown for Type 55 with fixed bias. Diode biasing of the triode unit of the 6SQ7 or 6SQ7-GT/G is not suitable. Diode curves under Type 6B7 apply to the 6SQ7 and 6SQ7-GT/G.

▲ With shell connected to cathode. Values are approximate.
• With no external shield. Values are approximate.

The curve under Type 75 also applies to the 6SQ7 and the 6SQ7-GT/G.

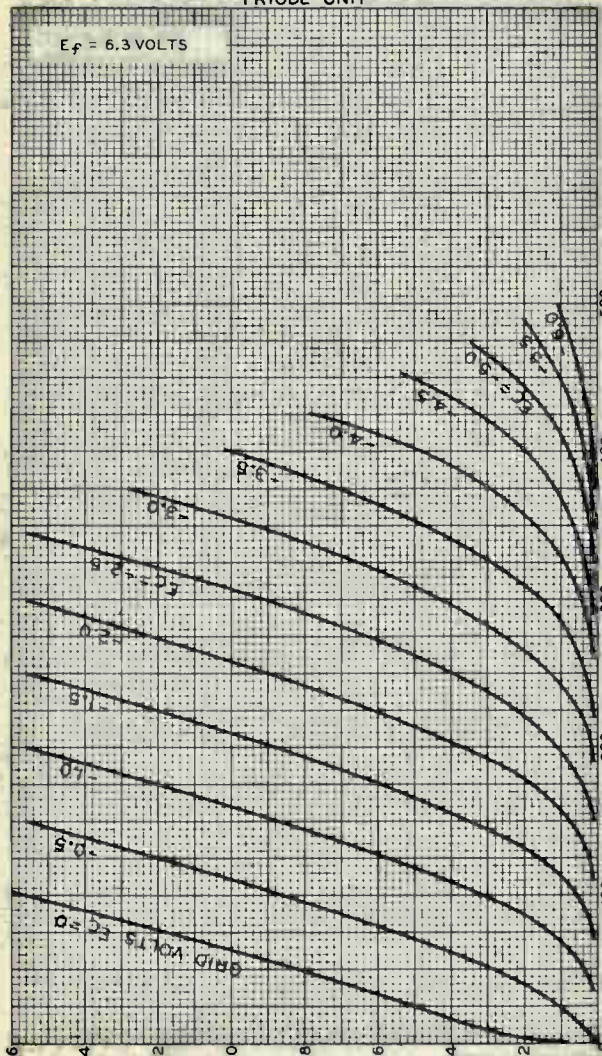
←Indicates a change.

6SQ7

6SQ7

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



DEC. 14, 1943

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

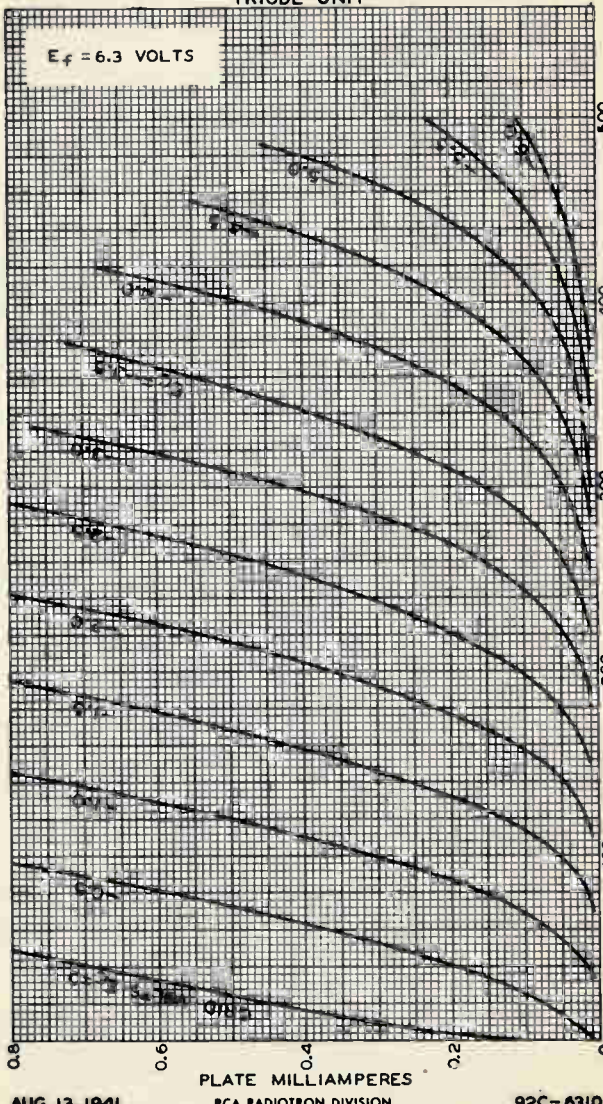
92CM-4975R2

RCA

6SQ7

AVERAGE PLATE CHARACTERISTICS

TRIODE UNIT



AUG. 13, 1941

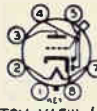
RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6310

6T7-G

DUPLEX-DIODE HIGH-MU TRIODE

Heater ■	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances: °		
Triode Unit:		
Grid to Plate	1.7	μμf
Grid to Cathode	1.8	μμf
Plate to Cathode	3.1	μμf
Overall Length		4-7/32" to 4-15/32"
Seated Height		3-21/32" to 3-29/32" ←
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature
Base		Small Shell Octal 7-Pin
Pin 1 - No Connection		Pin 5 - Diode Plate #1
Pin 2 - Heater		Pin 7 - Heater
Pin 3 - Triode Plate		Pin 8 - Cathode
Pin 4 - Diode Plate #2		Cap - Triode Grid
Mounting Position		Any



BOTTOM VIEW (G-7V)

TRIODE UNIT

Plate Voltage		250 max.	volts
Characteristics - Class A_1 Amplifier:			
Plate Voltage	135	250	volts
Grid Voltage	-1.5	-3	volts
Amp. Factor	65	65	
Plate Res.	65000	62000	ohms
Transcond.	1000	1050	μmhos
Plate Cur.	0.9	1.2	ma.

Typical Operation - Resistance-Coupled Amplifier:
See RESISTANCE-COUPLED AMPLIFIER CHART.

DIODE UNITS - Two

Consideration of these units is given under Type 85. Circuits will be similar to those shown for Type 55 with fixed bias. Diode biasing of the triode unit of the 6T7-G is not suitable. Diode curves under Type 6B7 apply to the 6T7-G.

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

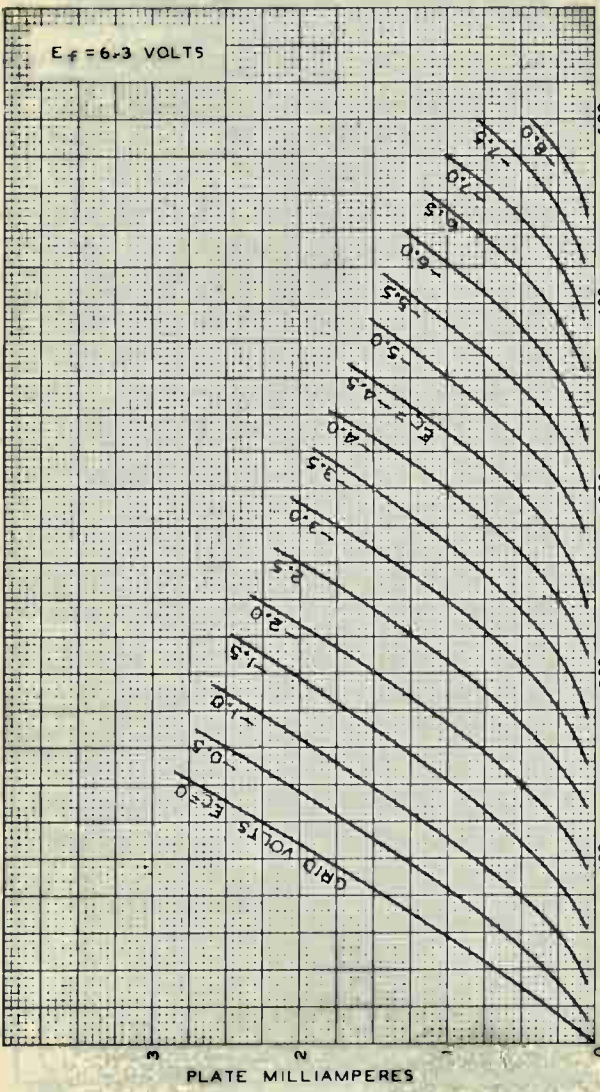
° With close-fitting shield connected to cathode. Values are approximate.

← Indicates a change.

6T7-G

6T7-G

AVERAGE PLATE CHARACTERISTICS



6T8-A

TRIPLE DIODE—HIGH-MU TRIODE

9-PIN MINIATURE TYPE

With heater having controlled warm-up time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	6.3	ac or dc volts
Current	0.45 ± 6%	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield**	
Triode Unit:			
Grid to plate	1.7	1.7	μμf
Grid to cathode & internal shield (pin 7), and heater	1.6	1.7	μμf
Plate to cathode & internal shield (pin 7), and heater	1.2	2.4	μμf
Diode Units:			
Diode-No.1 plate to cathode & internal shield (pin 7), and heater	3.8	3.8	μμf
Diode-No.2 plate to cathode & internal shield (pin 3), and heater	3.8	3.8●	μμf
Diode-No.3 plate to cathode & internal shield (pin 7), and heater	3.4	3.6	μμf
Diode-No.2 cathode & internal shield (pin 3) to all other electrodes, and heater	7.5	8.5●	μμf
Triode grid to any diode plate	0.034 max.	0.034 max.	μμf

Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	100	250	volts
Grid Voltage	-1	-3	volts
Amplification Factor	70	70	
Plate Resistance (Approx.)	54000	58000	ohms
Transconductance	1300	1200	μmhos
Plate Current	0.8	1	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"

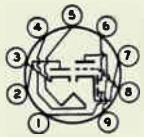
*, ●, ■: See next page.

6T8-A

TRIPLE DIODE—HIGH-MU TRIODE

Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9E

Pin 1 – Diode–No.3 Plate
Pin 2 – Diode–No.2 Plate
Pin 3 – Diode–No.2 Cathode, Internal Shield
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Diode–No.1 Plate
Pin 7 – Cathode of Triode & Diodes No.1 & No.3, Internal Shield
Pin 8 – Triode Grid
Pin 9 – Triode Plate

TRIODE UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values.*

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Positive-bias value	0 max.	volts
PLATE DISSIPATION	1.1 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART No.7 at front of this Section

DIODE UNITS — Three

Maximum Ratings, *Design-Maximum Values:*

PLATE CURRENT (For each diode)	5.5 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Characteristics (Each Unit):

Plate Voltage	5	volts
Plate Current	20	ma

Diode Considerations:

Diode No.1, diode No.3, and the triode have a common cathode, and diode No.2 has a separate cathode. Diode No.2 (pins 2 & 3) and diode No.3 (pins 1 & 7) are recommended for use in FM detector applications, while diode No.1 (pins 6 & 7) is recommended for use as an AM detector.

6T8-A

TRIPLE DIODE—HIGH-MU TRIODE

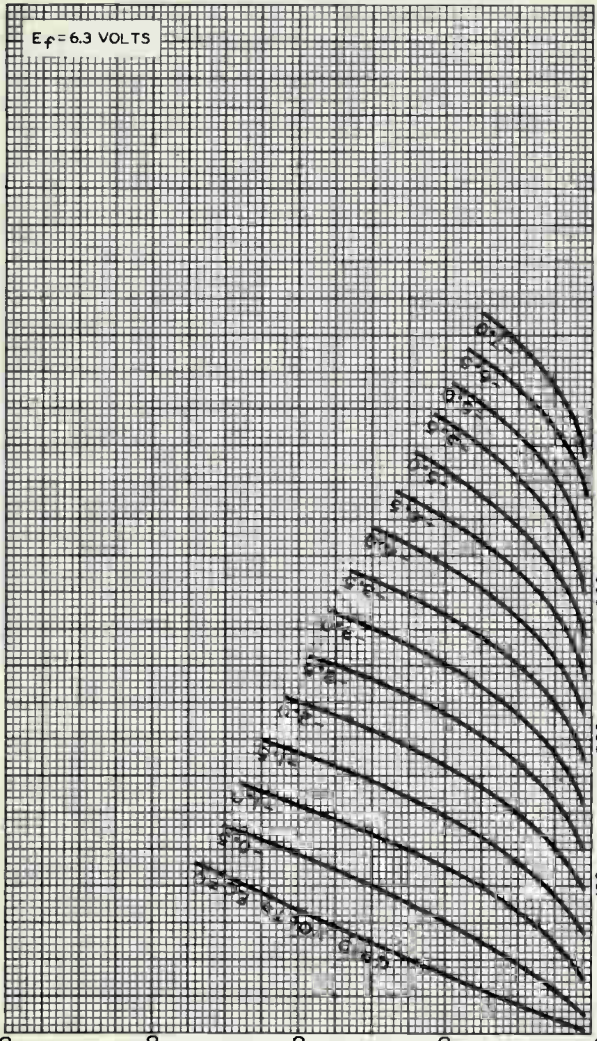
* With external shield JEDEC No.315 connected to pin 7 except as noted.
● With external shield JEDEC No.315 connected to pin 3.
■ With external shield JEDEC No.315 connected to pins 4 and 5.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 2

6T8-A

6T8-A
AVERAGE PLATE CHARACTERISTICS
TRIODE UNIT



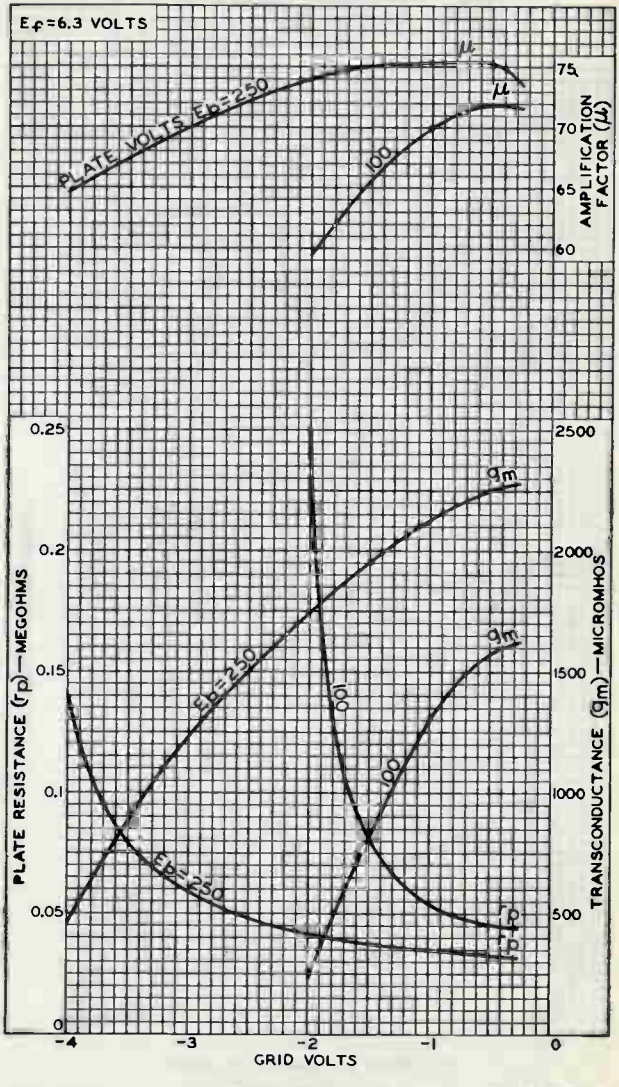
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7063

6T8-A

AVERAGE CHARACTERISTICS

TRIODE UNIT



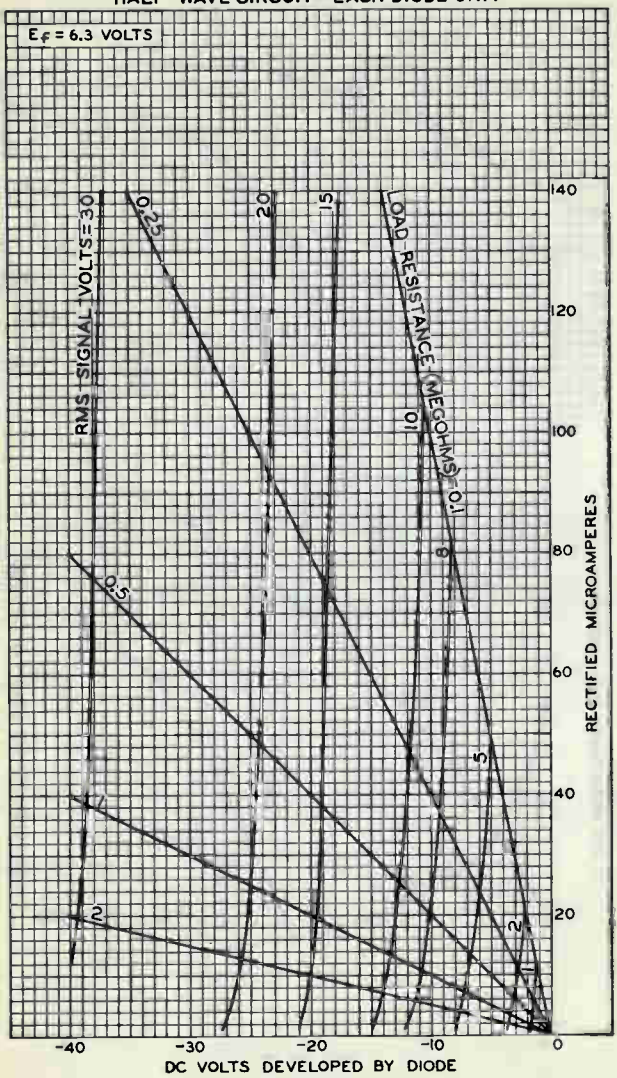
6T8-A

RCA

6T8-A

AVERAGE CHARACTERISTICS

HALF-WAVE CIRCUIT—EACH DIODE UNIT



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9610

6U8-A

Medium-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage (AC or DC)	6.3	volts
Current	0.45 ± 6%	amp
Warm-up time (Average)	11	sec

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield▲*	
Triode Unit:			
Grid to plate	1.8	1.8	μμf
Grid to cathode and heater	2.8	2.8	μμf
Plate to cathode and heater	1.5	2	μμf
Pentode Unit:			
Grid No.1 to plate	0.015 max.	0.007 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, and heater	5	5	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, and heater	2.6	3.5	μμf
Pentode grid No.1 to triode plate	0.2 max.	0.2 max.	μμf
Pentode plate to triode plate	0.1 max.	0.02 max.	μμf
Heater to cathode (Each unit)	3	3●	μμf

Characteristics, Class A$_1$ Amplifier:

	Triode Unit	*Pentode Unit*		
Plate Voltage	125	100	125	volts
Grid-No.2 Voltage	–	70	110	volts
Grid-No.1 Voltage	-1	–	-1	volt
Amplification Factor	40	–	–	
Plate Resistance (Approx.)	5400	–	200000	ohms
Transconductance	7500	5500	5000	μmhos
Plate Current	13.5	–	9.5	ma
Grid-No.2 Current	–	–	3.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-9	–	-8	volts

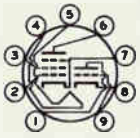
← Indicates a change.

6U8-A

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
→ Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AE

Pin 1 – Triode Plate
Pin 2 – Pentode Grid No.1
Pin 3 – Pentode Grid No.2
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Plate



Pin 7 – Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 8 – Triode Cathode
Pin 9 – Triode Grid

→ **AMPLIFIER — Class A_1**

Maximum Ratings, *Design-Maximum Values:*

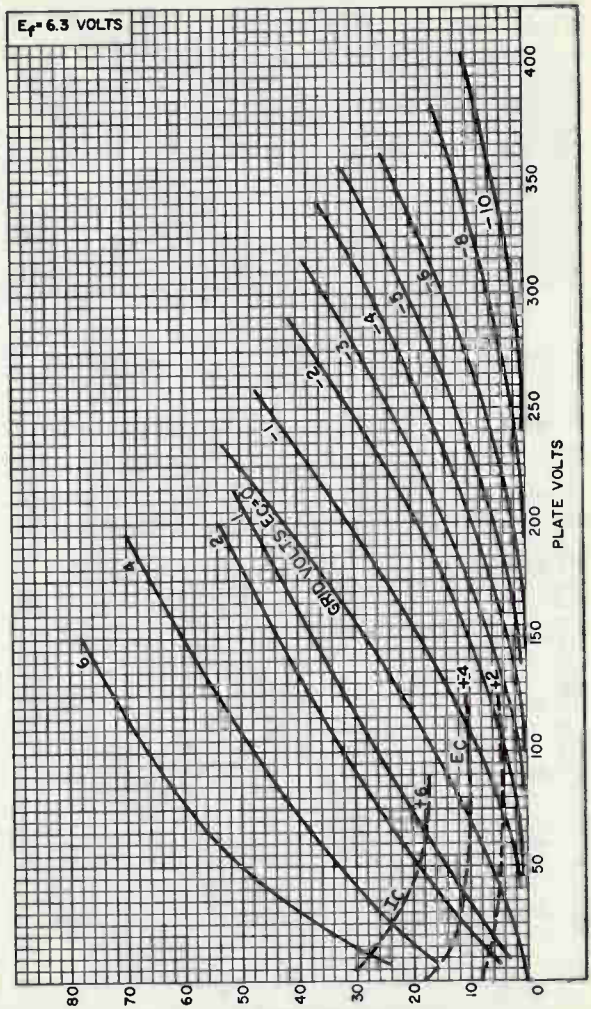
	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	330 max.	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	330 max.	volts
GRID-No.2 VOLTAGE	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0 max.	0 max.	volts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 165 volts	–	0.55 max.	watt
For grid-No.2 voltages between 165 and 330 volts	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.5 max.	3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200 max.	200* max.	volts
Heater positive with respect to cathode	200 max.	200* max.	volts

Maximum Circuit Values:	*Triode Unit*	*Pentode Unit*	
Grid-No.1-Circuit Resistance:			
For fixed-bias operation	–	0.5 max.	megohm
For cathode-bias operation	–	1 max.	megohm

▲ With external shield JEDEC No.315 connected to pin 8 except as noted.
● With external shield JEDEC No.315 connected to pin 6.
★ The dc component must not exceed 100 volts.

→ Indicates a change.

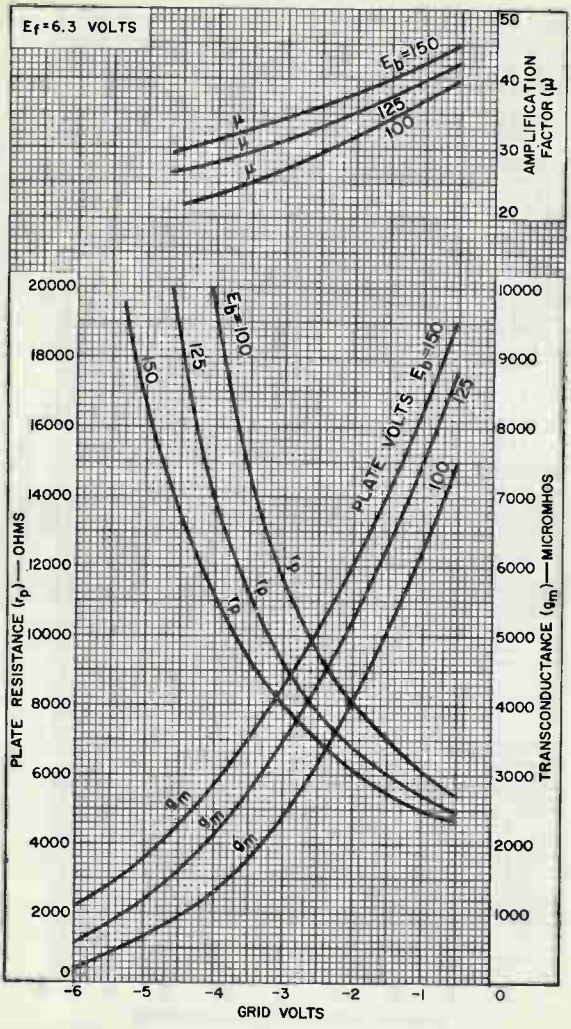
AVERAGE CHARACTERISTICS
Triode Unit



92CM-7873R2

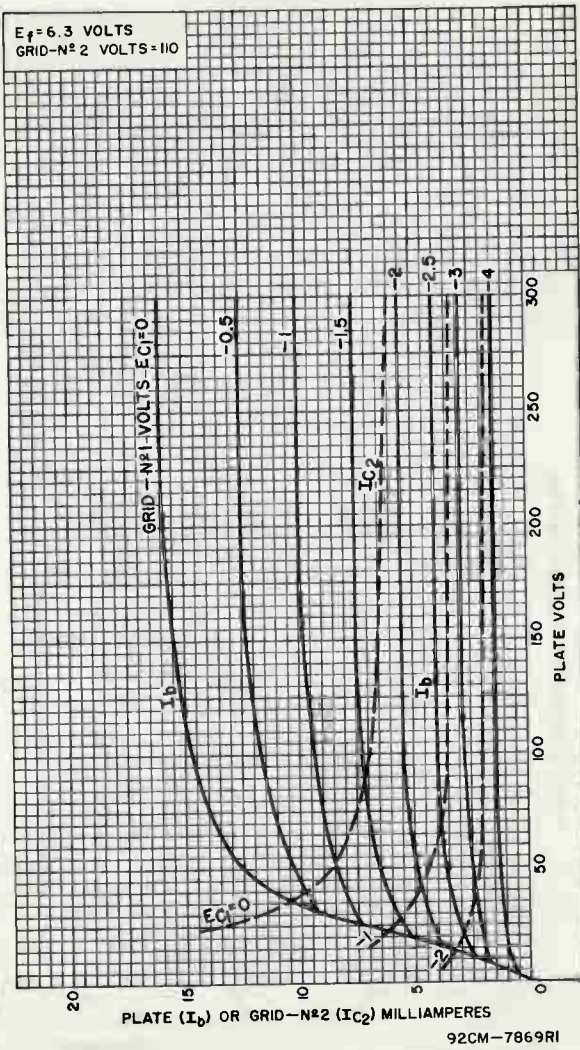
6U8-A

AVERAGE CHARACTERISTICS
Triode Unit



92CM-10900

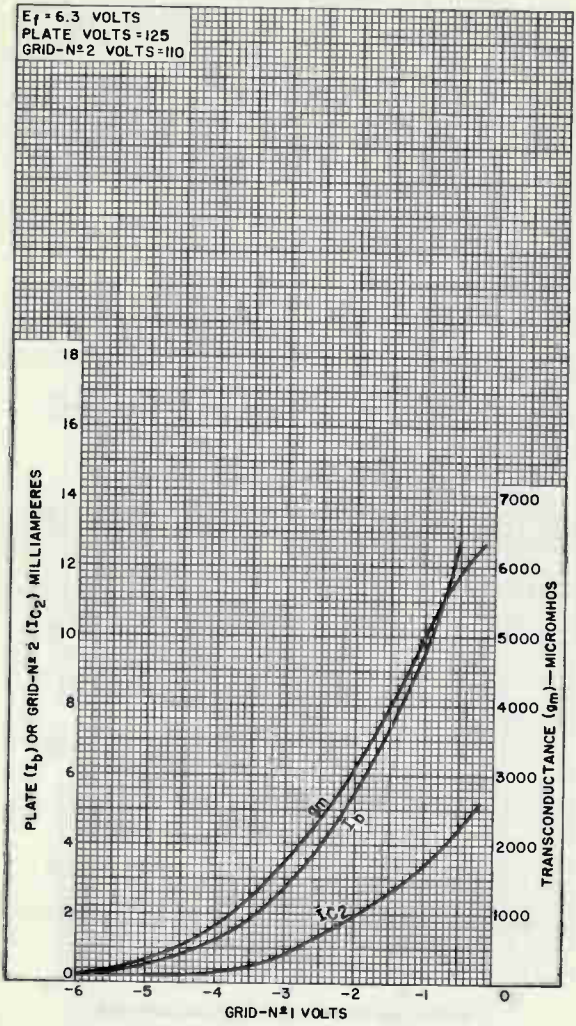
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-7869RI

6U8-A

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-10902

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

6V3-A

HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

For Television Damper Service

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	1.75	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Heater to cathode	1.5	μμf
Plate to cathode and heater	8	μμf
Cathode to plate and heater	9	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-1/16"
Seated Length	2-21/32" ± 1/8"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Cap	Skirted Miniature (JETEC No.C1-2 or C1-33)
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9BD

Pin 1 – No Connection
Pin 2 – Plate
Pin 3 – Same as Pin 1
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Same as Pin 1
Pin 7 – Plate
Pin 8 – Same as Pin 1
Pin 9 – Plate
Cap – Cathode

DAMPER SERVICE

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system[□]

PEAK INVERSE PLATE VOLTAGE (Absolute maximum)[#]	6000[■] max.	volts
PEAK PLATE CURRENT	800 max.	ma
DC PLATE CURRENT	135 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode (Absolute maximum)[#]	6750[■▲] max.	volts
Heater positive with respect to cathode	300[●] max.	volts

[o] Without external shield.

[□] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

[#] This rating is applicable where the duty cycle of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[■] Under no circumstances should this absolute value be exceeded.

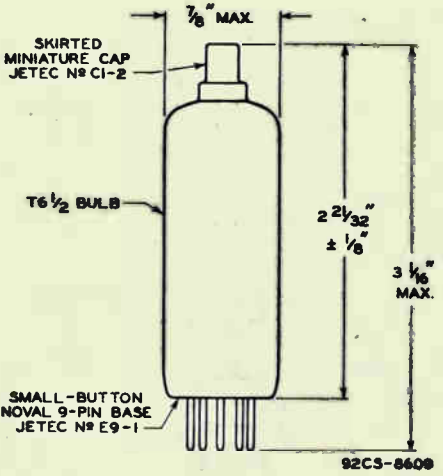
[▲] The dc component must not exceed 750 volts.

[●] The dc component must not exceed 100 volts.

6V3-A

6V3-A

HALF-WAVE VACUUM RECTIFIER



Typical Operation and Characteristics:

Values are for two tubes

Plate Voltage	250	285	volts
Grid-No.2 Voltage	250	285	volts
Grid-No.1 (Control-Grid) Voltage	−15	−19	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	30	38	volts
Zero-Signal Plate Current	70	70	ma
Max.-Signal Plate Current	79	92	ma
Zero-Signal Grid-No.2 Current	5	4	ma
Max.-Signal Grid-No.2 Current	13	13.5	ma
Effective Load Resistance (Plate to plate)	10000	8000	ohms
Total Harmonic Distortion	5	3.5	%
Maximum-Signal Power Output	10	14	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

VERTICAL-DEFLECTION AMPLIFIER

Triode Connection — Grid No.2 Connected to Plate

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[e]

DC PLATE VOLTAGE	350 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[f]	1200 max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	275 max.	volts
CATHODE CURRENT:		
Peak	115 max.	ma
Average	40 max.	ma
PLATE DISSIPATION	10 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[d] max.	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For cathode-bias operation	2.2 max.	megohms

[a] Without external shield.

[b] Grid No.2 connected to plate.

[c] On the 6-pin bases, pin 1 as well as pin 6 is omitted.

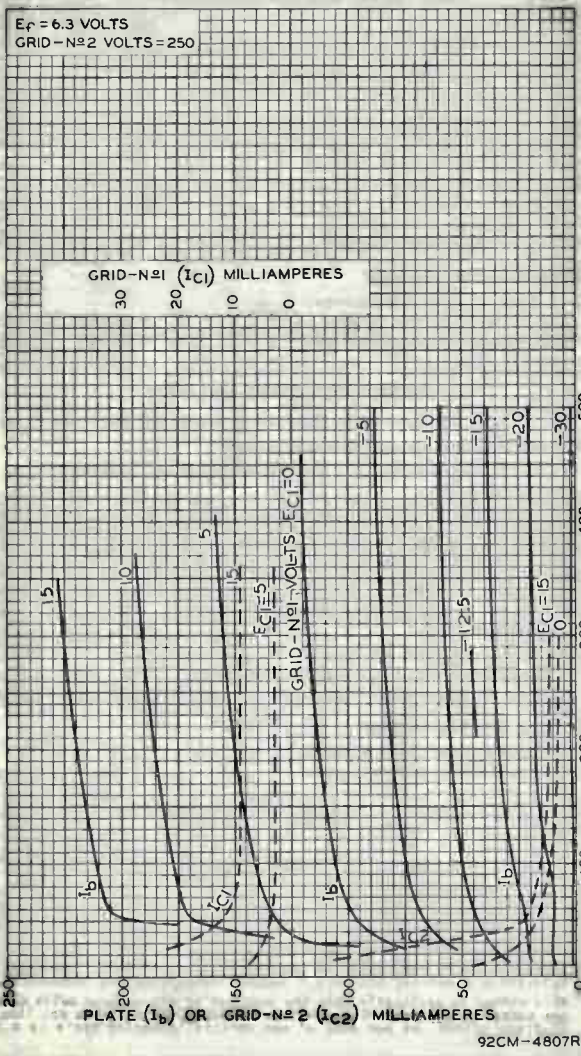
[d] The dc component must not exceed 100 volts.

[e] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[f] This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

6V6GTA

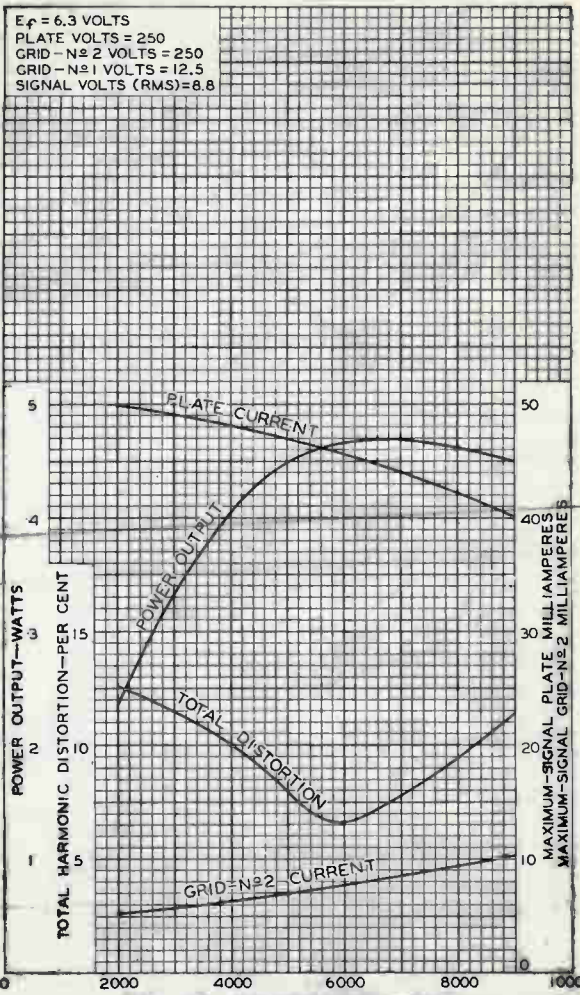
AVERAGE CHARACTERISTICS



92CM-4807R2

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

OPERATION CHARACTERISTICS



92CM-6339R2

Half-Wave Vacuum Rectifier

For Television Damper Service

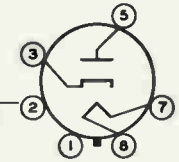
GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	1.2	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Plate to cathode and heater	6	μμf
Cathode to plate and heater	13	μμf
Heater to cathode	7	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	See *General Section*
Bulb	T9
Bases (Alternates):	
Intermediate-Shell Octal:	
6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-8)	
5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-82)	
Short Intermediate-Shell Octal with External Barriers:	
6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-60)	
5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-85)	
~~Basing Designation for BOTTOM VIEW~~	~~4CG~~



Pin 1[b] – Same as Pin 2
Pin 2 – Internal Connection – Do Not Use[c]
Pin 3 – Cathode
Pin 5 – Plate
Pin 7 – Heater
Pin 8 – Heater

DAMPER SERVICE

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system[d]

PEAK INVERSE PLATE VOLTAGE (Absolute maximum)[e]	3850[f]	max.	volts
PEAK PLATE CURRENT	750	max.	ma
DC PLATE CURRENT	125	max.	ma
PLATE DISSIPATION	3.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	2300[g]	max.	volts
Heater positive with respect to cathode	300[h]	max.	volts

→ Indicates a change.

Characteristics, Instantaneous Value:

Tube Voltage Drop for plate ma. = 250. . . . 21 volts

[a] Without external shield.

[b] On the 5-pin bases, pin 1 as well as pins 4 and 6 is omitted.

[c] Socket terminals 1, 2, 4 and 6 should not be used as tie points.

[d] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[e] This rating is applicable when the duty cycle of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[f] Under no circumstances should this absolute-maximum value be exceeded.

[g] The dc component (Absolute maximum) must not exceed 500 volts.

[h] The dc component must not exceed 100 volts.

6W6-GT

BEAM POWER AMPLIFIER

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	1.2	amp
Direct Interelectrode Capacitances (Approx.):		
Grid No.1 to Plate	0.5 max.	μμf
Input	15	μμf
Output	9	μμf

Characteristics as Beam Power Amplifier:
See AMPLIFIER—Class A_1 below:

Characteristics as Triode-Connected Amplifier:
(Grid No.2 connected to plate)

Plate Voltage	225	volts
Grid-No.1 Voltage	−30	volts
Amplification Factor	6.2	
Plate Resistance	1600	ohms
Transconductance	3800	μmhos
Plate Current	22	ma
Grid-No.1 Voltage (Approx.) for plate current of 0.5 ma	−42	volts ←

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Bulb	T-9
Base	Intermediate-Shell Octal 6-Pin (JETEC No.B6-8) ← or Intermediate-Shell Octal 7-Pin (JETEC No.B7-7) or Short Intermediate-Shell Octal 6-Pin with External Barriers (JETEC No.B6-60) or Short Intermediate-Shell Octal 7-Pin with External Barriers (JETEC No.B7-59)
Basing Designation for BOTTOM VIEW	G-7AC

Pin 1 – No Connection
Pin 2 – Heater
Pin 3 – Plate
Pin 4 – Grid No.2

Pin 5 – Grid No.1
Pin 7 – Heater
Pin 8 – Cathode, Grid No.3

AMPLIFIER—Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	150 max.	volts
PLATE DISSIPATION	10 max.	watts
GRID-No.2 INPUT	1.25 max.	watts

← Indicates a change.

6W6-GT

6W6-GT

BEAM POWER AMPLIFIER

PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode		200 max.	volts
Heater positive with respect to cathode		200▲max.	volts
Typical Operation and Characteristics:			
Plate Supply Voltage	110	200	volts
Grid-No.2 Voltage	110	125	volts
Grid-No.1 (Control-Grid) Voltage	-7.5	-	volts
Cathode-Bias Resistor	-	180	ohms
Peak AF Grid-No.1 Voltage	7.5	8.5	volts
Zero-Signal Plate Current	49	46	ma
Max.-Signal Plate Current	50	47	ma
Zero-Signal Grid-No.2 Current	4	2.2	ma
Max.-Signal Grid-No.2 Current	10	8.5	ma
Plate Resistance (Approx.)	13000	28000	ohms
Transconductance	8000	8000	μmhos
Load Resistance	2000	4000	ohms
Total Harmonic Distortion (Approx.)	10	10	%
Max.-Signal Power Output	2.1	3.8	watts
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance:			
For fixed-bias operation		0.1 max.	megohm
For cathode-bias operation		0.5 max.	megohm

VERTICAL DEFLECTION AMPLIFIER

Triode Connected--Grid No.2 Connected to Plate

Maximum Ratings, *Design-Center Values Except As Noted:*

For operation in a 525-line, 30-frame system●

DC PLATE VOLTAGE	300 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE○	1200▲max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 (CONTROL-GRID) VOLTAGE	-250 max.	volts
CATHODE CURRENT:		
Peak	140 max.	ma
DC	40 max.	ma
PLATE DISSIPATION	7.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts
Maximum Circuit Values:		
Grid-No.1-Circuit Resistance:		
For cathode-bias operation	2.2 max.	megohms

▲ The dc component must not exceed 100 volts.

● As described in "Standards of Good Engineering Practice for Television Broadcast Stations", Federal Communications Commission.

○ The duration of the voltage pulse must not exceed 15 per cent of one scanning cycle. In a 525-line, 30-frame system, 15 per cent of one scanning cycle is 2.5 milliseconds.

▲ Under no circumstances should this absolute value be exceeded.

RCA

6W6-GT

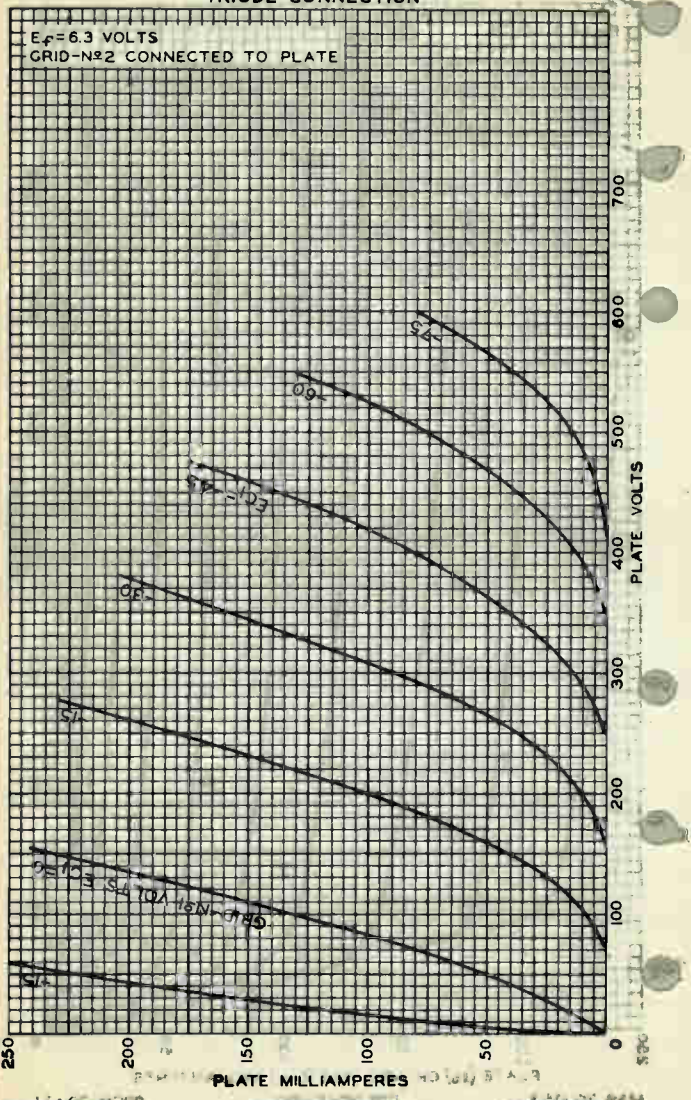
AVERAGE PLATE CHARACTERISTICS

PENTODE CONNECTION

6W6-GT

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



MAR. 11, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, N.J.

92CM-7643

6X4
FULL-WAVE VACUUM RECTIFIER

MINIATURE TYPE

GENERAL DATA

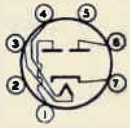
Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.6	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length from Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base ..... Small-Button Miniature 7-Pin (JETEC No.E7-1)	
Basing Designation for BOTTOM VIEW	7CF

Pin 1 – Plate No.2
Pin 2 – No Connection
Pin 3 – Heater
Pin 4 – Heater



Pin 5 – No Connection
Pin 6 – Plate No.1
Pin 7 – Cathode

RECTIFIER SERVICE

Maximum Ratings, *Design-Center Values:* ←

PEAK INVERSE PLATE VOLTAGE	1250 max.	volts
PEAK PLATE CURRENT PER PLATE	210 max.	ma
AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE	See Rating Chart I	
DC OUTPUT CURRENT PER PLATE	See Rating Chart I	

HOT-SWITCHING CURRENT:

If hot-switching is regularly required in operation, the use of choke-input circuits is recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current. When capacitor-input circuits are used, a maximum peak current value per plate of 1 ampere during the initial cycles of the hot-switching transient should not be exceeded.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	450 max.	volts
Heater positive with respect to cathode	450 max.	volts

Typical Operation as Full-Wave Rectifier with Capacitor-Input to Filter: ←

AC Plate-to-Plate Supply Voltage (RMS)	650	volts
Filter Input Capacitor	10	μf
Effective Plate-Supply Impedance per Plate*	520	ohms

* Higher values of capacitance than indicated may be used but the effective plate-supply impedance should be increased to prevent exceeding the maximum rating for peak plate current.

← Indicates a change

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

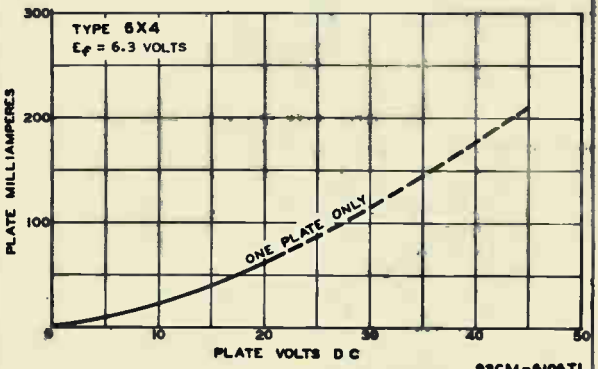
6X4

6X4

FULL-WAVE VACUUM RECTIFIER

DC Output Voltage at Input to Filter (Approx.):		
At half-load current of 35 ma.	360	volts
At full-load current of 70 ma.	300	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	60	volts
→ **Typical Operation as Full-Wave Rectifier with Choke-Input to Filter:**		
AC Plate-to-Plate Supply Voltage (RMS) . . .	900	volts
Minimum Filter Input Choke	10	henries
DC Output Voltage at Input to Filter (Approx.):		
At half-load current of 35 ma.	385	volts
At full-load current of 70 ma.	370	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	15	volts

AVERAGE PLATE CHARACTERISTIC



92CM-6106TI

RATING CHARTS AND OPERATION CHARACTERISTICS

Rating Chart I represents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

Rating Chart II represents graphically the relationship between maximum rectification efficiency and maximum dc output current per plate for conditions of capacitor input to filter.

→Indicates a change

6X4

FULL-WAVE VACUUM RECTIFIER

Rating Chart III represents graphically the relationships between minimum plate-supply resistance per plate and maximum ac plate-supply voltage per plate under no-load conditions for conditions of capacitor input to filter when occasional hot-switching is employed.

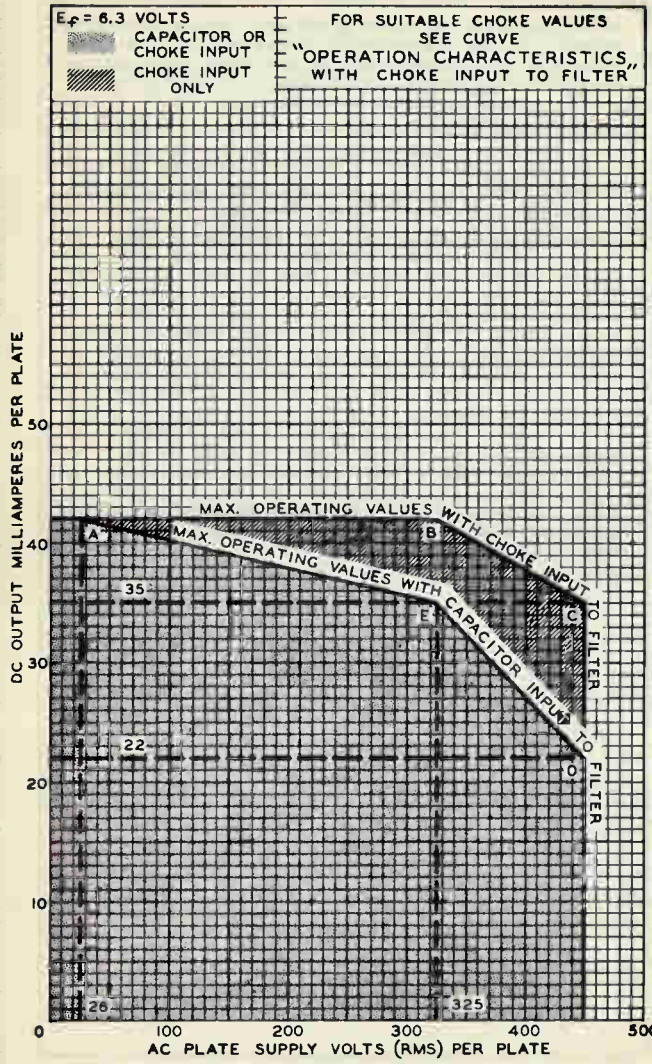
The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input Filter* show not only the typical operating curves for such a circuit, but also show by means of boundary-lines "DEA" the limiting current and voltage relationships presented on *Rating Chart I*.

The *Operation Characteristics for Full-Wave Circuit with Choke-Input Filter* show the typical operating curves for such a circuit. They not only show by means of boundary line "ABC" the limiting current and voltage relationships presented on *Rating Chart I*, but also give information as to the effect on regulation of various sizes of chokes. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.

RCA

6X4

RATING CHART I



6X4

RATING CHART II
CAPACITOR INPUT TO FILTER

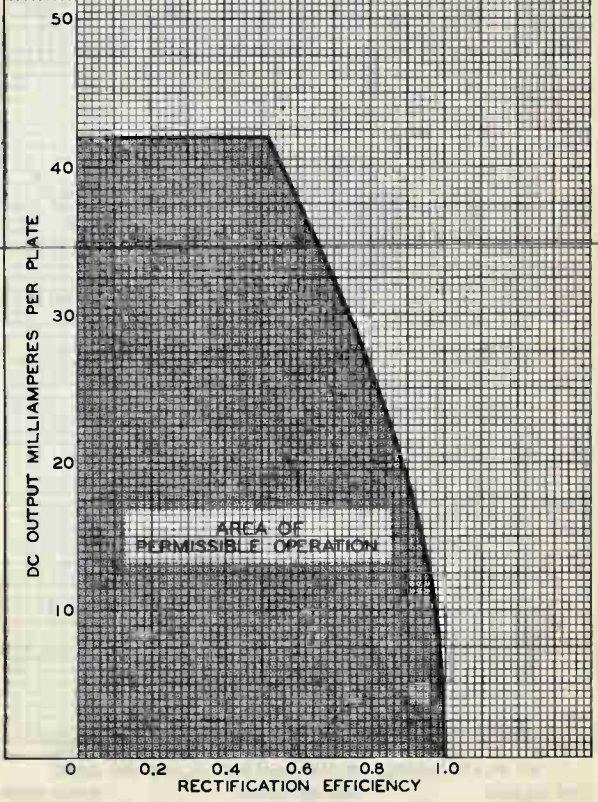
E_f = 6.3 VOLTS

MAX. PEAK PLATE CURRENT PER PLATE = 210 MA.

RECTIFICATION EFFICIENCY = $\frac{\bar{E}}{\sqrt{2}\ E_S}$

WHERE $\bar{E}$ = DC OUTPUT VOLTS AT INPUT TO FILTER

E_S = AC PLATE SUPPLY VOLTS (RMS) PER PLATE



6X4

RCA

6X4

RATING CHART III
CAPACITOR INPUT TO FILTER

E_f = 6.3 VOLTS MAX. HOT SWITCHING CUR. = 1 AMP.

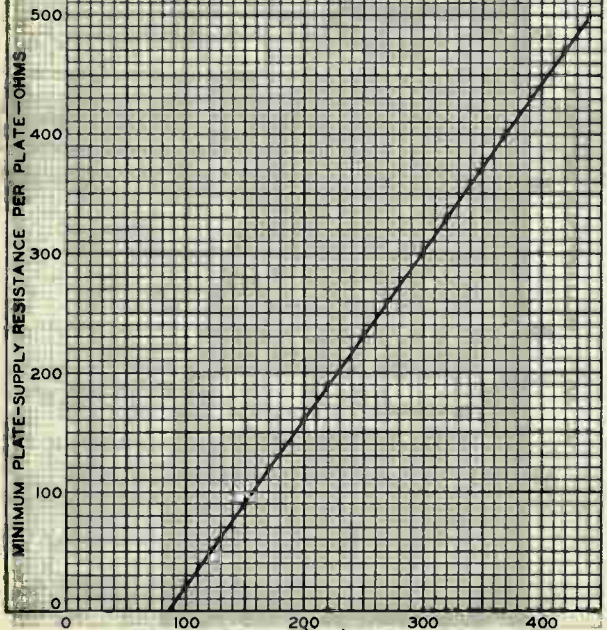
PLATE-SUPPLY RESISTANCE PER PLATE = $R_{SEC} + N^2 R_{PRI} + R_A$

WHERE R_{SEC} = DC RESISTANCE OF TRANSFORMER SECONDARY PER SECTION

R_{PRI} = DC RESISTANCE OF TRANSFORMER PRIMARY

R_A = DC RESISTANCE OF ADDED SERIES RESISTANCE PER PLATE

N = TRANSFORMER VOLTAGE STEP-UP RATIO PER SECTION



RCA

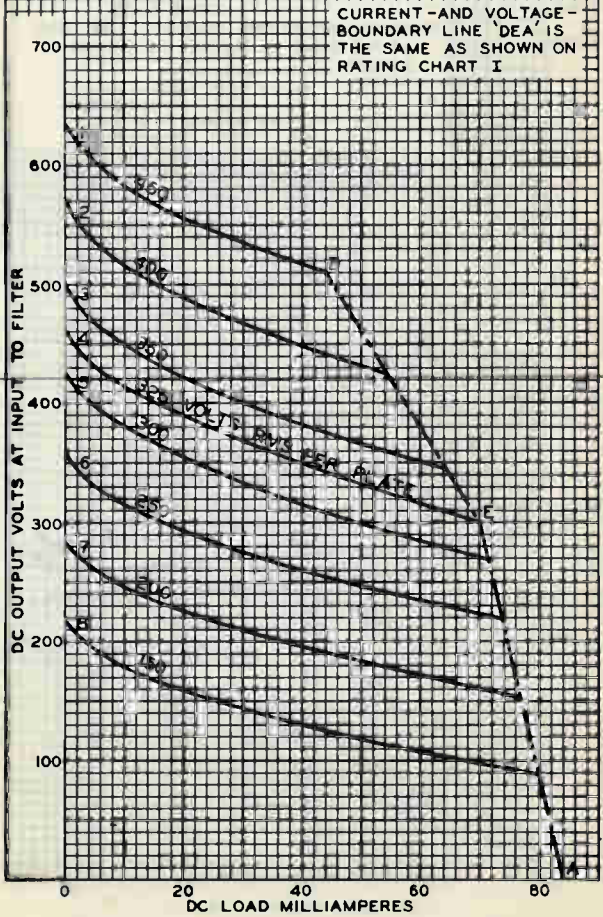
6X4

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER

E_f = 6.3 VOLTS
CAPACITOR (C) INPUT TO FILTER: C = 10 μf
TOTAL EFFECTIVE PLATE-SUPPLY RESISTANCE PER PLATE {520 OHMS FOR CURVES 1-5; 400 OHMS FOR CURVES 6-8}
SUPPLY FREQUENCY = 60 CPS

CURRENT-AND VOLTAGE-BOUNDARY LINE 'DEA' IS THE SAME AS SHOWN ON RATING CHART I

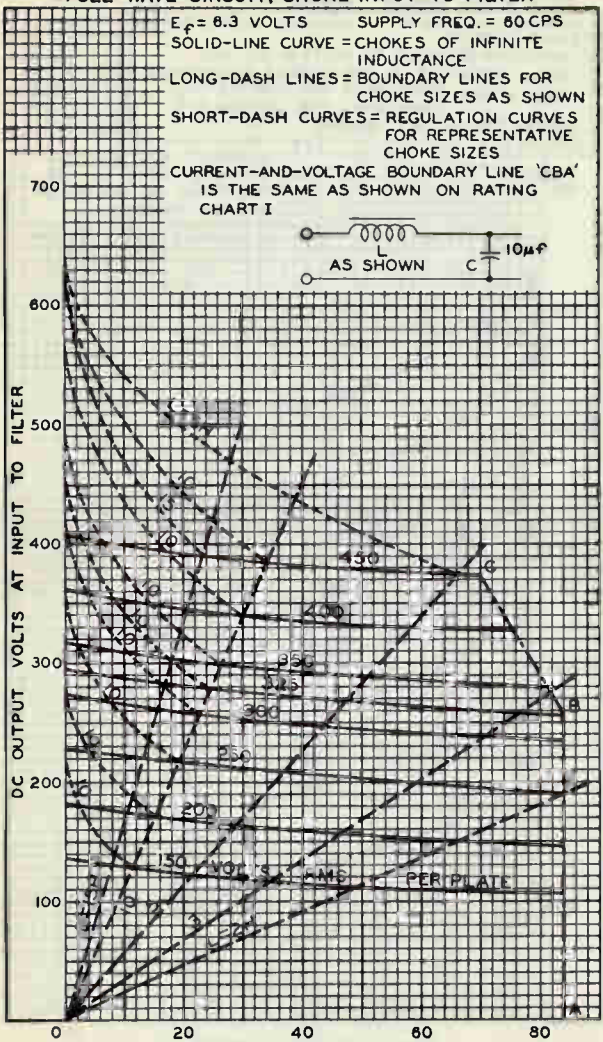


6X4

6X4

OPERATION CHARACTERISTICS

FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER



6X5
6X5-GT/G

6X5, 6X5-GT/G

FULL-WAVE HIGH-VACUUM RECTIFIER

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.6	amp.
	6X5	*6X5-GT/G*
Maximum Overall Length	3-1/4"	3-5/16"
Maximum Seated Height	2-11/16"	2-3/4"
Maximum Diameter	1-5/16"	1-5/16"
Bulb	Metal Shell, MT-8	T-9
Base	{Small Wafer	{Intermed. Sh. Octal 6-Pin
Basing Designation	6S	G-6S
Pin 1	{6X5 - Shell; 6X5-GT/G, No Con.	Pin 5 - Plate #1
Pin 2 - Heater		Pin 7 - Heater
Pin 3 - Plate #2		Pin 8 - Cathode
Mounting Position		{6X5: Vertical◊ 6X5-GT/G: Any

BOTTOM VIEW

Maximum Ratings Are Design-Center Values

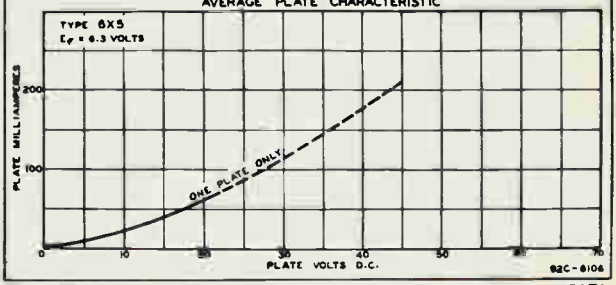
FULL-WAVE RECTIFIER

Peak Inverse Plate Voltage	1250 max. volts
Peak Plate Current per Plate	210 max. ma.
D-C Output Current:	
With condenser input to filter	70 max. ma.
With choke input to filter	70● max. ma.
D-C Heater-Cathode Potential	450 max. volts

Typical Operation:	*Condenser-Input Filter*	*Choke-Input Filter*	
A-C Plate-to-Plate Supply Voltage (RMS)	650	900	volts
Filter Input Condenser	4	–	µf
Min. Total Effect. Plate-Supply Imped. per Plate	150	–	ohms
Filter Input Choke	–	8	henries
D-C Output Current	70	70	ma.
D-C Voltage (At input to filter):*			
At half-load current (35 ma.)	405	385	volts
At full-load current (70 ma.)	370	380	volts
Difference (Voltage Regulation)	35	5	volts
Percentage Regulation	8.5	1.3	%

◊ Horizontal operation permitted if pins 3 & 5 are in a horizontal plane.
● For choke not less than 8 henries.
* Approximate values.

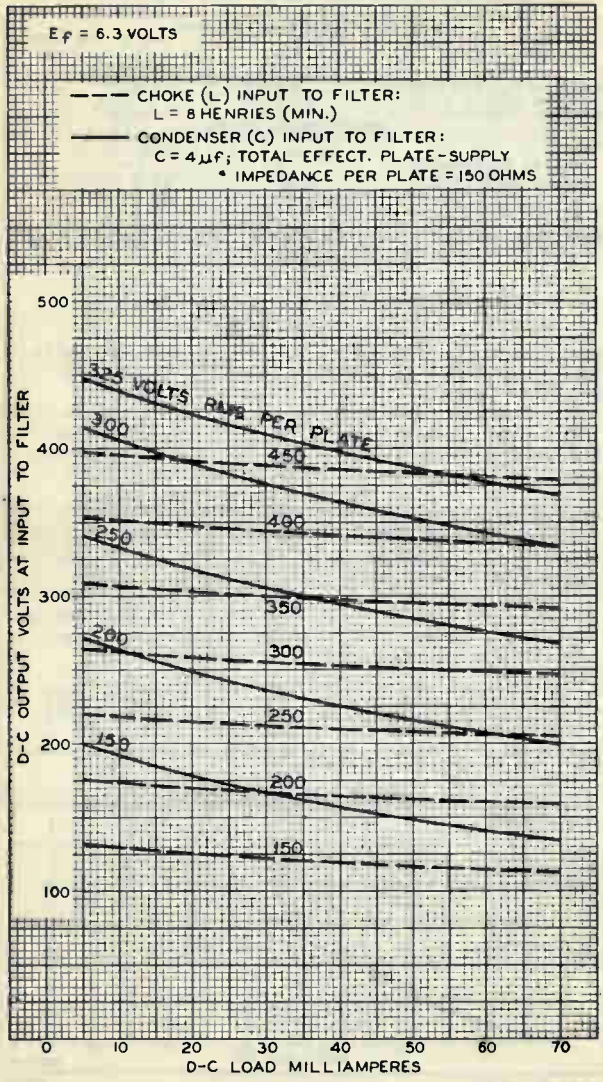
AVERAGE PLATE CHARACTERISTIC



6X5

6X5

OPERATION CHARACTERISTICS



NOV. 15, 1939 RCA VICTOR DIVISION 92C-4576RI
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Medium-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical: ←

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		6.3 ± 10%	volts
Current at 6.3 volts		0.45	amp
Direct Interelectrode Capacitances:	*Without External Shield*	*With External Shield*▲	
Triode Unit:			
Grid to plate	1.5	1.5	μμf
Grid to cathode and heater	2	2.4	μμf
Plate to cathode and heater	0.5	1	μμf
Pentode Unit:			
Grid No.1 to plate	0.09 max.	0.06 max.	μμf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	4.6	4.8	μμf
Plate to cathode, grid No.3, grid No.2, and heater	0.9	1.6	μμf
Pentode grid No.1 to triode plate	0.05 max.	0.04 max.	μμf
Pentode plate to triode plate	0.05 max.	0.008 max.	μμf
Heater to cathode	6.5	6.5●	μμf

Characteristics, Class A$_1$ Amplifier: ←

	Triode Unit	*Pentode Unit*		
Plate Voltage	125	100	125	volts
Grid No.3	–	*Connected to cathode at socket*		
Grid-No.2 Voltage	–	70	125	volts
Grid-No.1 Voltage	-1	–	-1	volt
Amplification Factor	40	–	–	
Plate Resistance (Approx.)	6000	–	300000	ohms
Transconductance	6500	5700	5500	μmhos
Plate Current	12	–	9	ma
Grid-No.2 Current	–	–	2.2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-7	–	-6.5	volts

← Indicates a change.

6X8

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
→Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AK

Pin 1 – Pentode Grid No.3
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Cathode
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate

→ **AMPLIFIER — Class A_1**

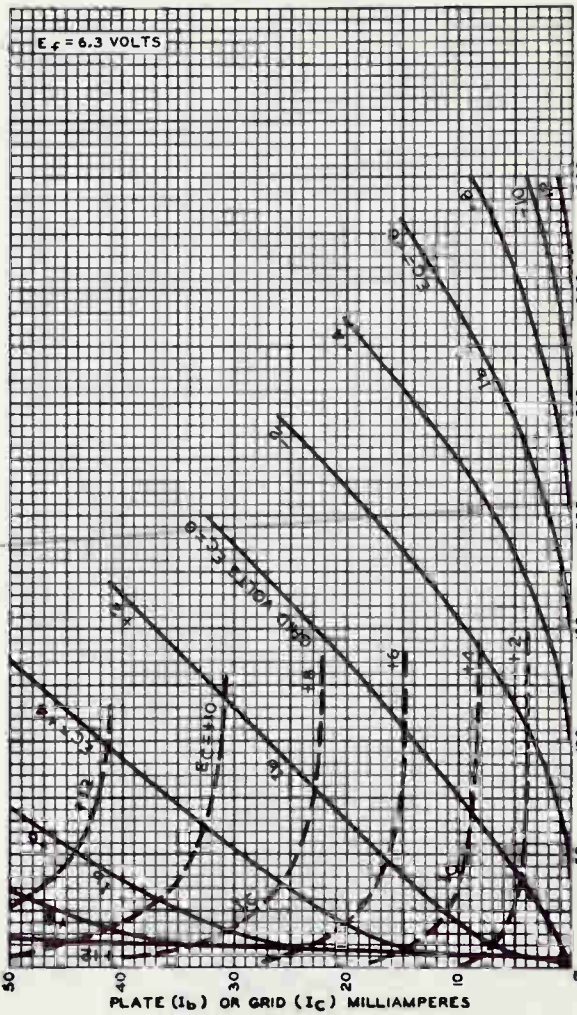
Maximum Ratings, ***Design-Maximum Values:***

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	275 max.	275 max.	volts
GRID No.3 (SUPPRESSOR GRID)	–	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	275 max.	volts
GRID-No.2 VOLTAGE	–	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 137.5 volts	–	0.45 max.	watt
For grid-No.2 voltages between 137.5 and 275 volts	–	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
PLATE DISSIPATION	1.7 max.	2.3 max.	watts
PEAK HEATER-CATHODE VOLTAGE: Heater negative with respect to cathode	200 max.	200 max.	volts
Heater positive with respect to cathode	200★ max.	200★ max.	volts

▲ With external shield JEDEC NO.315 connected to cathode except as noted.
● With external shield JEDEC NO.315 connected to pentode plate.
★ The dc component must not exceed 100 volts.

→ Indicates a change.

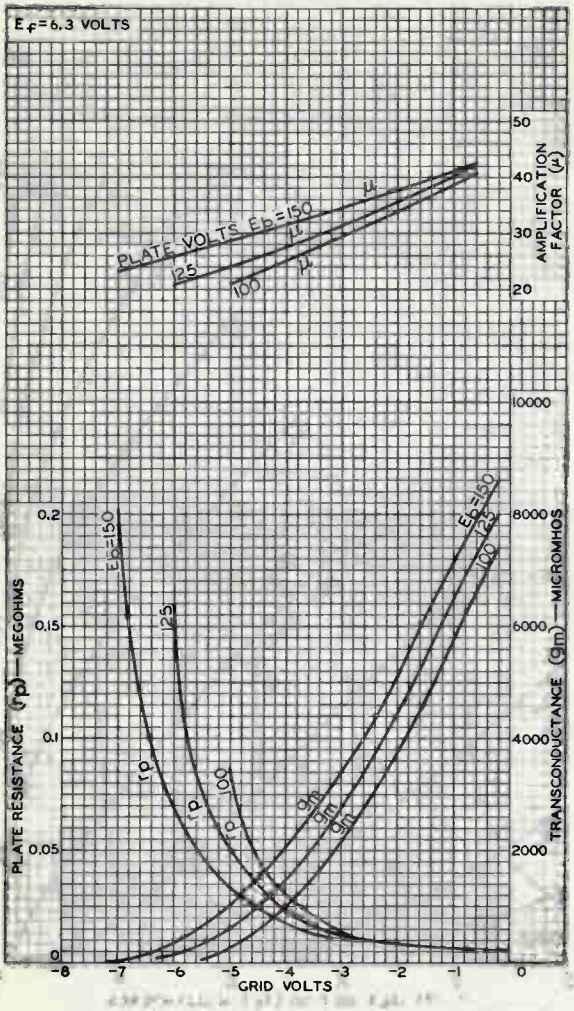
AVERAGE CHARACTERISTICS
Triode Unit



92CM-7531

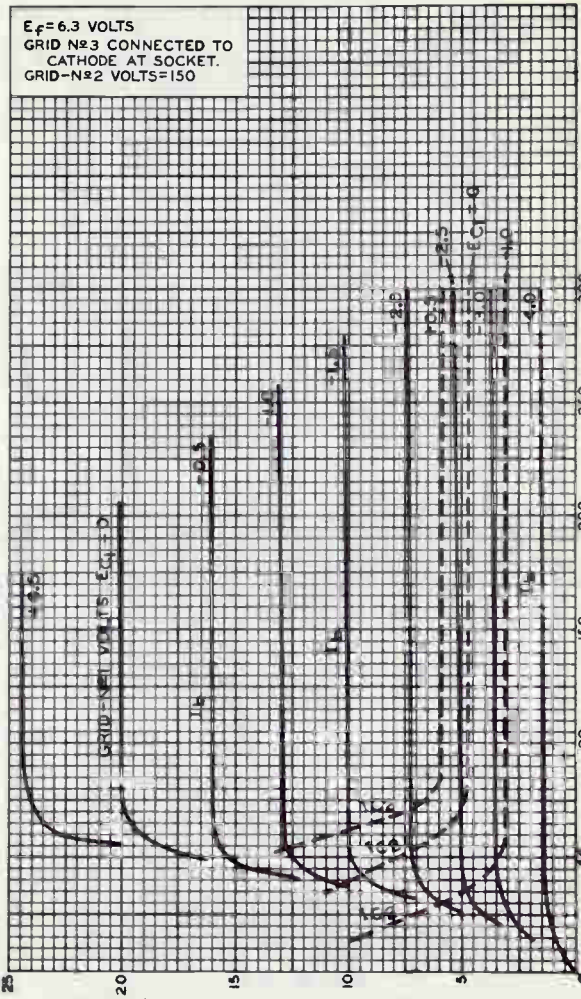
6X8

AVERAGE CHARACTERISTICS
Triode Unit



92CM-10809

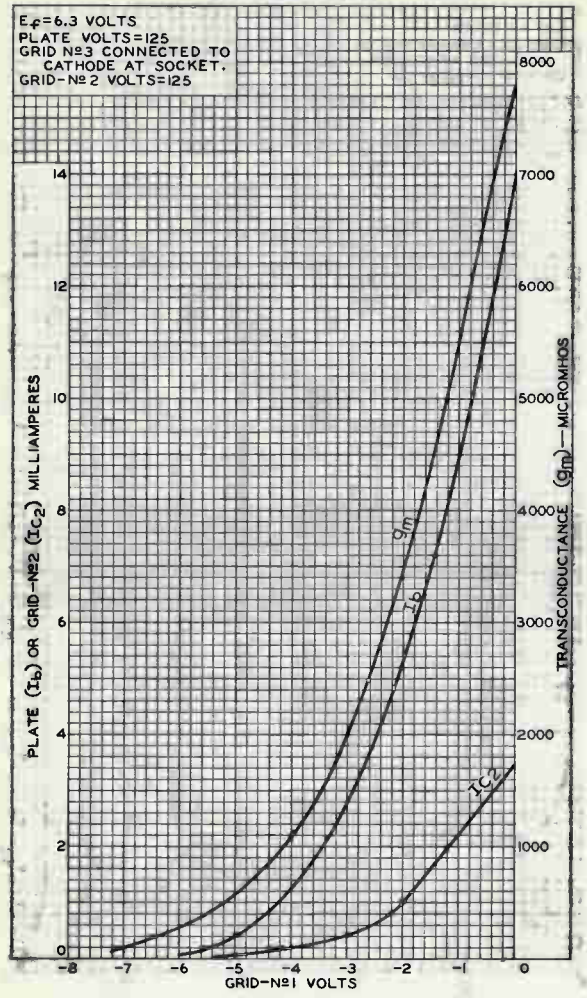
AVERAGE CHARACTERISTICS
Pentode Unit



92CM-7532R1

6X8

AVERAGE CHARACTERISTICS
Pentode Unit



92CM-10810

6Y6-GA
BEAM POWER TUBE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	1.25	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Grid No.1 to plate	0.66	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	12	μμf
Plate to cathode & grid No.3, grid No.2, and heater	7.5	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-7/8"
Maximum Seated Length	3-5/16"
Diameter	1.438" to 1.562"
Bulb	T12
Base. . . Medium-Shell Octal 7-Pin (JEDEC Group 1, No.B7-12), or Short Medium-Shell Octal 7-Pin with External Barriers, Style B (JEDEC Group 1, No.B7-119)	
Basing Designation for BOTTOM VIEW	7S

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grid No.2
Pin 5 - Grid No.1
Pin 7 - Heater
Pin 8 - Cathode, Grid No.3

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	200 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	200 max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 100 volts	1.75 max.	watts
For grid-No.2 voltages between 100 and 200 volts	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
PLATE DISSIPATION	12.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180 max.	volts

[o] Without external shield.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6Y6-GA

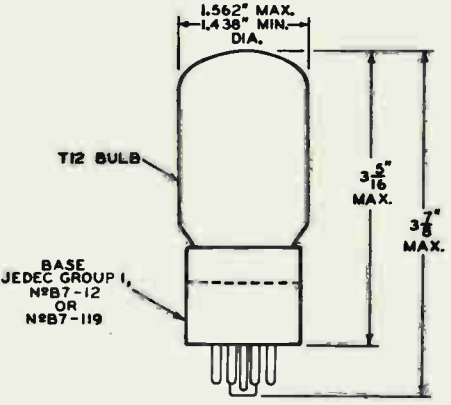
BEAM POWER TUBE

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation.	1 max.	megohm
For cathode-bias operation.	0.5 max.	megohm

Typical Operation and Characteristics:

Plate Voltage	135	200	volts
Grid-No.2 Voltage	135	135	volts
Grid-No.1 Voltage	-13.5	-14	volts
Peak AF Grid-No.1 Voltage	13.5	14	volts
Zero-Signal Plate Current	58	61	ma
Max.-Signal Plate Current	60	66	ma
Zero-Signal Grid-No.2 Current	3.5	2.2	ma
Max.-Signal Grid-No.2 Current . . .	11.5	9	ma
Plate Resistance (Approx.).	9300	18300	ohms
Transconductance.	7000	7100	μmhos
Load Resistance	2000	2600	ohms
Total Harmonic Distortion	10	10	%
Max.-Signal Power Output.	3.6	6	watts



92CS-10248

Pentode—Beam Power Tube

DUODECAR TYPE

For Combined Limiter, Discriminator, and Audio Power Output Applications in FM Radio and TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Voltage	E_h	6.3	V
Heater Current	I_h	0.950	A
Direct Interelectrode Capacitances			
Without external shield			
Pentode Unit:			
$G1_P$ to $G3_P$	$c_{g1\text{-}g3}$	0.009	pF
$G1_P$ to (K_P+IS, P_P, $G3_P$, $G2_P$, H)	$c_{g1\text{-}all}$	4.4	pF
$G3_P$ to (K_P+IS, P_P, $G2_P$, $G1_P$, H)	$c_{g3\text{-}all}$	3.2	pF
Beam Power Unit:			
$G1_B$ to P_B	$c_{g1\text{-}p}$	0.22	pF
Input: $G1_B$ to (K_B+$G3_B$, $G2_B$, H)	c_i	11	pF
Output: P_B to (K_B+$G3_B$, $G2_B$, H)	c_o	7.5	pF

Pentode Unit

For the following characteristics, see **Conditions**

Transconductance, Grid No.1 to Plate	g_m	-	-	360	μmho
Transconductance, Grid No.3 to Plate	$g_{m(g3\text{-}p)}$	-	-	700	μmho
DC Plate Current	I_b	-	5	-	mA
DC Grid-No.2 Current	I_{c2}	4.5	-	-	mA
Cutoff DC Grid-No.1 Voltage for I_b = 20 μA	$E_{c1(co)}$	-	-	-4	V
Cutoff DC Grid-No.3 Voltage for I_b = 20 μA	$E_{c3(co)}$	-	-	-4	V

Conditions

Heater Voltage	E_h	Bogey value			V
DC Plate Voltage	E_b	135	135	135	V
DC Grid-No.3 Voltage	E_{c3}	4	4	0	V
DC Grid-No.2 Supply Voltage	E_{cc2}	-	280	280	V
DC Grid-No.2 Voltage	E_{c2}	75	-	-	V
DC Grid-No.1 Voltage	E_{c1}	0	0	0	V
Grid-No.2 Resistor	R_{g2}	-	33	33	kΩ

Beam Power Unit

For the following characteristics, see **Conditions**

Plate Resistance (Approx.)	r_p	100	kΩ
Transconductance	g_m	6500	μmho
DC Plate Current	I_b	35	mA
DC Grid-No.2 Current	I_{c2}	3	mA

Conditions

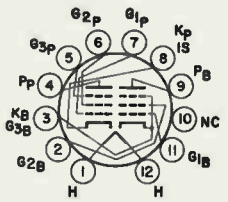
Heater Voltage	Eh	Bogey value	V
DC Plate Voltage	Eb	250	V
DC Grid-No.2 Voltage	E_{c2}	250	V
DC Grid-No.1 Voltage	E_{c1}	-8	V

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2.375 in
Maximum Seated Length	2.000 in
Maximum Diameter	1.188 in
Dimensional Outline (JEDEC 9-58)	See *General Section*
Envelope	JEDEC T9
Base	Small-8utton Duodecar 12-Pin (JEDEC E12-70)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Heater
Pin 2 – Beam Power Grid No.2
Pin 3 – Beam Power Cathode, Beam Power Grid No.3
Pin 4 – Pentode Plate
Pin 5 – Pentode Grid No.3
Pin 6 – Pentode Grid No.2
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Cathode, Internal Shields
Pin 9 – Beam Power Plate
Pin 10 – No Internal Connection
Pin 11 – Beam Power Grid No.1
Pin 12 – Heater



12BT

DESIGN-MAXIMUM RATINGS

Pentode Unit for FM and TV Limiter and Discriminator Service; Beam Power Unit for Audio Power Output Service

		Pentode Unit	Beam Power Unit	
DC Plate Supply Voltage	E_{bb}	330	-	V
DC Plate Voltage	E_b	-	275	V
DC Grid-No.2 (Accelerator-Grid) Supply Voltage	E_{cc2}	330	-	V
DC Grid-No.2 (Screen-Grid) Voltage	E_{c2}	-	275	V
Peak Positive-Pulse Grid-No.1 (Limiter-Grid) Voltage	e_{c1m}	60	-	V
Heater-Cathode Voltage:				
Peak	e_{hkm}	±200	±200	V
DC	E_{hk}	100	100	V
Heater Voltage (AC or DC)	E_h	← 5.7 to 6.9 →		V
Average Cathode Current	$I_{k(av)}$	13	-	mA
Grid-No.2 Input	P_{g2}	-	2	W
Plate Dissipation	P_b	-	10	W

MAXIMUM CIRCUIT VALUES

Beam Power Unit

Grid-No.1-Circuit Resistance:	$R_{g1(ckt)}$		
For fixed-bias operation	-	0.25	MΩ
For cathode-bias operation	-	0.5	MΩ

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

TYPICAL OPERATION

Beam Power Unit

Heater Voltage	E_h	Bogey value	V
DC Plate Voltage	E_b	250	V
DC Grid-No.2 Voltage	E_{c1}	250	V
DC Grid-No.1 Voltage	E_{c2}	-8	V
Peak AF Grid-No.1 Voltage	e_{c1m}	8	V
Plate Resistance (Approx.)	r_p	100	kΩ
Transconductance	g_m	6500	μmho
Zero-Signal Plate Current	I_b	35	mA
Maximum-Signal Plate Current	I_b	39	mA
Zero-Signal Grid-No.2 Current	I_{c2}	3	mA
Maximum-Signal Grid-No.2 Current	I_{c2}	13	mA
Load Resistance	R_L	5000	Ω
Total Harmonic Distortion		8.5	%
Maximum-Signal Power Output	P_o	4.2	W

6ZY5-G

FULL-WAVE HIGH-VACUUM RECTIFIER

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Maximum Overall Length		4-1/8"
Maximum Seated Height		3-9/16" ←
Maximum Diameter		1-9/16"
Bulb		ST-12
Base		Small Shell Octal 6-Pin
Pin 1 - No Connection		Pin 5 - Plate #1
Pin 2 - Heater		Pin 7 - Heater
Pin 3 - Plate #2		Pin 8 - Cathode
Mounting Position		Any

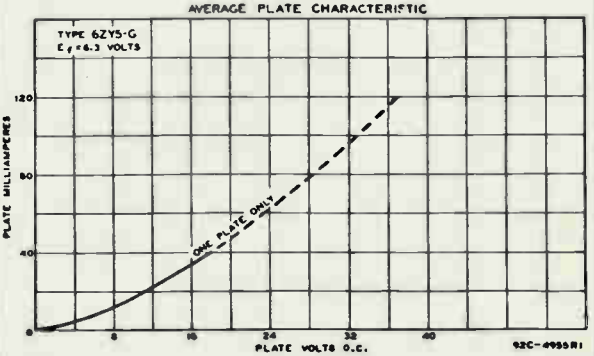
BOTTOM VIEW (G-6S)

FULL-WAVE RECTIFIER

Peak Inverse Voltage	1250 max. volts
Peak Plate Current per Plate	120 max. ma.
D-C Heater-Cathode Potential	450 max. volts
With Condenser-Input Filter:	
A-C Plate Voltage per Plate (RMS)	325 max. volts
Total Effective Plate-Supply Impedance per Plate ▲	225 min. ohms
D-C Output Current	40 max. ma.
With Choke-Input Filter:	
A-C Plate Voltage per Plate (RMS)	450 max. volts
Input-Choke Inductance	13.5 min. henries
D-C Output Current	40 max. ma.

▲ When a filter-input condenser larger than 40 μf is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

AVERAGE PLATE CHARACTERISTIC



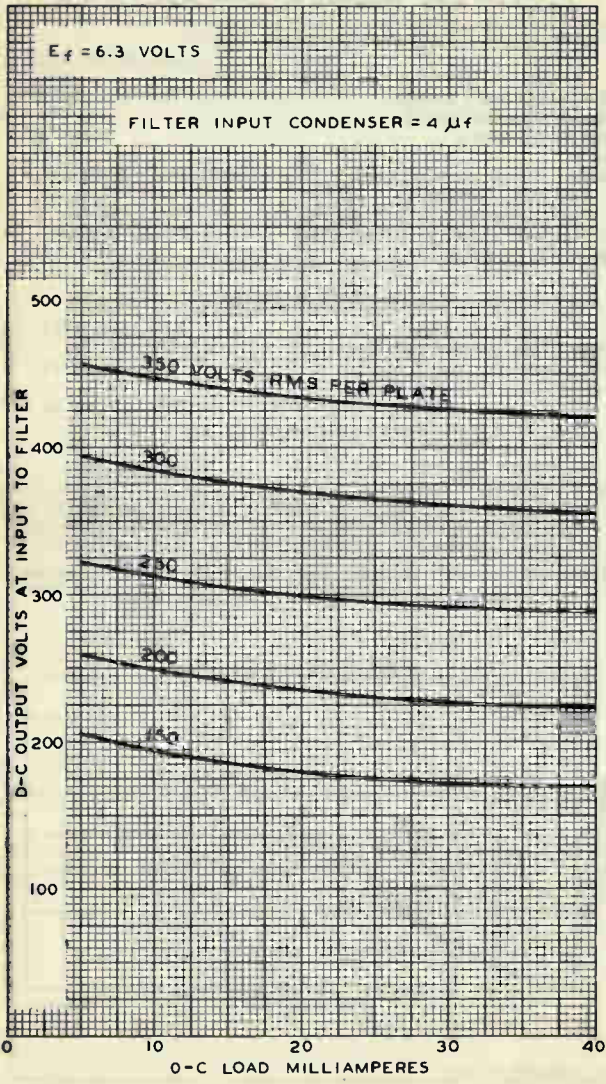
← Indicates a change.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY INC

6ZY5-G

6ZY5-G

OPERATION CHARACTERISTICS



7AU7

Medium-Mu Twin Triode

The 7AU7 is the same as the 12AU7A except for the following items:

Heater Characteristics and Ratings

	Parallel	*Series*	
Heater-section arrangement			
Voltage (AC or DC)	3.5[a]	7.0 ± 0.7	V
Current	0.600 ± 0.040	0.300[b]	A
Warm-up time (Average)	11	-	s

[a] At 0.600 ampere.
[b] At 7.0 volts.

7EY6

Beam Power Tube

The 7EY6 is the same as the 6EY6 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	7.2	V
Warm-up time (Average)	11	s

7KY6

Sharp-Cutoff-Pentode

The 7KY6 is the same as the 6KY6 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	7.3	V
Warm-up time (Average)	11	s

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

FRAME-GRID CONSTRUCTION — **DARK HEATER**

For Video-Output Service in Color-TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values[a]

Heater Voltage (AC or DC)	E_h	7.3	V
Heater Current	I_h	0.450	A
Heater Warm-up Time		11	s
Direct Interelectrode Capacitances			
Without external shield			
Grid No.1 to plate	C_{g1-p}	0.16 max	pF
Input: G1 to (K, G3 + IS, G2, H)	C_i	13.0	pF
Output: P to (K, G3 + IS, G2, H)	C_o	6.0	pF

For the following characteristics, see Conditions

Plate Resistance (Approx.)	r_p	45	kΩ
Transconductance	g_m	24000	μmho
DC Plate Current	I_b	25	mA
DC Grid-No.2 Current	I_{c2}	3.6	mA
Cutoff DC Grid-No.1 Voltage	$E_{c1(co)}$	-5.2	V

Conditions

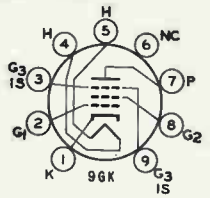
Heater Voltage	E_h	7.3	V
DC Plate Supply Voltage	E_{bb}	250	V
Grid No.3		- Connected to cathode at socket	
DC Grid-No.2 Supply Voltage	E_{cc2}	115	V
DC Grid-No.1 Supply Voltage	E_{cc1}	0	V
Cathode Resistor	R_k	75	Ω

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.625 in
Maximum Seated Length	2.375 in
Length, Base Seat to Bulb Top, Excluding tip	1.906 to 2.094 in
Maximum Diameter	0.875 in
Dimensional Outline (JEDEC 6-3)	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Grid No.3 Internal Shield
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – No Internal Connection
Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Same as Pin 3



DESIGN-MAXIMUM RATINGS

For operation as a Class A_1 Amplifier Tube

Plate Voltage	E_b	330	V
Grid-No.2 (Screen-Grid) Supply Voltage	E_{cc2}	330	V
Grid No.2 Voltage	E_{c2}	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Grid-No.1 (Control-Grid) Voltage			
Positive-bias value	E_{c1}	0	V
Heater-Cathode Voltage			
Peak	e_{hkm}	±200	V
DC	E_{hk}	100	V
Heater Current	I_h	0.420 to 0.480	A
Grid-No.2 Input			
For $E_{c2} \leq 165$ V	-	1	W
For $E_{c2} \geq 165$ and ≤ 330 V	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	P_b	9	W

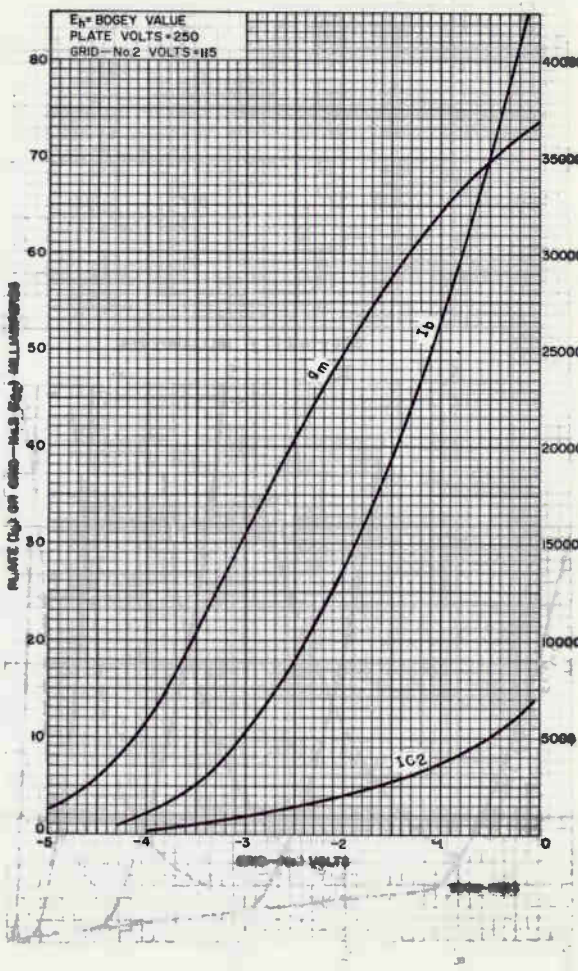
MAXIMUM CIRCUIT VALUES

Grid-No.1 Circuit Resistance	$R_{g1(ckt)}$		
For fixed-bias operation	-	0.1	MΩ
For cathode-bias operation	-	0.25	MΩ

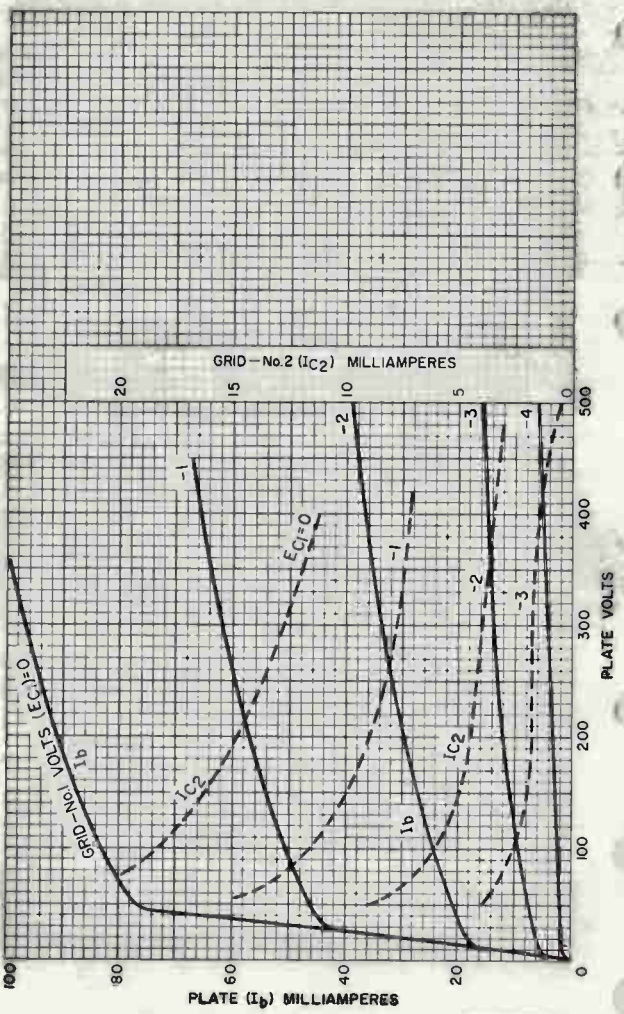
[a] **Unless otherwise specified.**

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics



Typical Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

7S7
TRIODE-HEPTODE CONVERTER

GENERAL DATA

Electrical:

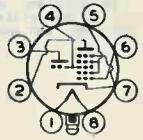
Heater, for Unipotential Cathode:		
Voltage	6.3[□]	ac or dc volts
Current	0.3[□□]	amp
Direct Interelectrode Capacitances:[○]		
Heptode Grid No.1 to Heptode Plate	0.03 max.	μμf
Heptode Grid No.1 to Triode Plate	0.1 max.	μμf
Heptode Grid No.1 to Triode Grid & Heptode Grid No.3	0.35 max.	μμf
Triode Grid & Heptode Grid No.3 to Triode Plate	1	μμf
Heptode Grid No.1 to All Other Electrodes (RF Input)	5	μμf
Heptode Plate to All Other Electrodes (Mixer Output)	8	μμf
Triode Grid & Heptode Grid No.3 to All Other Electrodes Except Triode Plate (Oscillator Input)	7	μμf
Triode Plate to All Other Electrodes Except Triode Grid & Heptode Grid No.3 (Oscillator Output)	3.5	μμf

[○] With external shield connected to cathode.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	8BL

Pin 1 - Heater
Pin 2 - Heptode Plate
Pin 3 - Triode Plate
Pin 4 - Triode Grid, Heptode Grid No.3
Pin 5 - Heptode Grids No.2 & No.4
Pin 6 - Heptode Grid No.1
Pin 7 - Cathode, Heptode Grid No.5, Internal Shield
Pin 8 - Heater
Plug - Base Shell



CONVERTER

Maximum Ratings, *Design-Center Values*:

HEPTODE PLATE VOLTAGE	300 max.	volts
HEPTODE GRIDS-No.2 & No.4 (SCREEN) VOLTAGE	100 max.	volts
HEPTODE GRIDS-No.2 & No.4 SUPPLY VOLTAGE	300 max.	volts

[□] Nominal voltage = 7.0 volts. [□□] Nominal current = 0.32 ampere.

7S7
TRIODE-HEPTODE CONVERTER

HEPTODE GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive bias value		0 max.	volts
HEPTODE PLATE DISSIPATION		0.6 max.	watt
HEPTODE GRIDS-No.2 & No.4 DISSIPATION		0.4 max.	watt
TRIODE PLATE VOLTAGE		175 max.	volts
TRIODE PLATE-SUPPLY VOLTAGE		300 max.	volts
TRIODE PLATE DISSIPATION		1 max.	watt
TOTAL CATHODE CURRENT		14 max.	ma
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode		90 max.	volts
Heater positive with respect to cathode		90 max.	volts

Typical Operation:

Heptode Plate Voltage	100	250	volts
Heptode Grids-No.2 & No.4 Voltage	100	100	volts
Triode (Oscillator) Plate-Supply Volt.	100	250†	volts
Heptode Grid-No.1 Voltage	-2	-2	volts
Cathode-Bias Resistor	240	195	ohms
Triode Grid & Heptode Grid-No.3 Resistor	50000	50000	ohms
Heptode Plate Current	1.9	1.8	ma
Heptode Grids-No.2 & No.4 Current	3	3	ma
Triode Plate Current	3	5	ma
Triode Grid & Heptode Grid-No.3 Current	0.3	0.4	ma
Heptode Plate Resistance	0.5	1.25	megohms
Conversion Conductance	500	525	μmhos
Conversion Conductance (Approx.) for heptode grid-No.1 bias of -21 volts	2	2	μmhos
Total Cathode Current	8.2	10.2	ma

† Applied through a 20000-ohm dropping resistor, properly bypassed.

NOTE: The transconductance of the triode section, not oscillating, is approximately 1650 μmhos under the following conditions: triode plate volts = 100, triode grid and heptode grid No.3 volts = 0. Under the same conditions, triode plate current is 6.5 ma., triode plate resistance is 11000 ohms, and amplification factor is 18.

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Current	0.450 ±0.030		amp
Voltage (AC or DC) at heater amperes = 0.450	8.4		volts
Warm-up time (Average)	11		sec
Peak heater-cathode voltage (Each Unit):			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances:[b]			
Triode Unit:			
Grid to plate	2.2		pf
Grid to cathode and heater	2.6		pf
Plate to cathode and heater	0.34		pf
Pentode Unit:			
Grid No.1 to plate	0.044		pf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	7.5		pf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	2.4		pf
Triode grid to pentode plate	0.022	max.	pf
Pentode grid No.1 to triode plate	0.006	max.	pf
Pentode plate to triode plate	0.12	max.	pf

Characteristics, Class A_1 Amplifier:

	Triode Unit	*Pentode Unit.*	
Plate Supply Voltage	150	200	volts
Grid-No.2 Supply Voltage	–	125	volts
Cathode Resistor	150	82	ohms
Amplification Factor	40	–	
Plate Resistance (Approx.)	8200	150000	ohms
Transconductance	4900	7000	μmhos
Plate Current	9	15	ma
Grid-No.2 Current	–	3.4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	-6.5	8	volts

Mechanical:

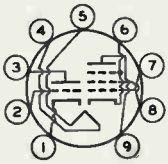
Operating Position . . . . . Any

Type of Cathodes . . . . . Coated Unipotential

8AU8

Maximum Overall Length. . . . . 2-5/8"
Maximum Seated Length . . . . . 2-3/8"
Length, Base Seat to Bulb Top (Excluding tip). . . 2" ± 3/32"
Diameter. . . . . .0.750" to 0.875"
Dimensional Outline . . . . . See *General Section*
Bulb. T6-1/2
Base. . . . . .Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW. 9DX

Pin 1 - Triode Cathode
Pin 2 - Triode Grid
Pin 3 - Triode Plate
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Pentode Cathode, Grid No.3, Internal Shield
Pin 7 - Pentode Grid No.1
Pin 8 - Pentode Grid No.2
Pin 9 - Pentode Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

	Triode Unit	*Pentode Unit*	
PLATE VOLTAGE	300 max.	300 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE.	–	300 max.	volts
GRID-No.2 VOLTAGE	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 150 volts	–	1 max.	watt
For grid-No.2 voltages between 150 and 300 volts . .	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.5 max.	3 max.	watts

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance:			
For fixed-bias operation. . .	0.5 max.	0.25 max.	megohm
For cathode-bias operation. .	1 max.	1 max.	megohm

OPERATING CONSIDERATIONS

Because the *internal shield* is connected to the cathode and grid No.3, the impedance in the cathode circuit should be kept as low as possible to minimize cross-coupling effects.

[a] The dc component must not exceed 100 volts.
[b] Without external shield.

8AW8A

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 8AW8A is the same as the 6AW8A except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	8.4	volts
Warm-up time (Average)	11	sec

8B10

Twin Diode—
Medium-Mu-Twin Triode

DUODECAR TYPE

The 8B10 is the same as the 6B10 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	8.5	volts
Warm-up time (Average)	11	sec

8BA8A

Medium-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 8BA8A is the same as the 6BA8A except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	8.4	volts
Warm-up time (Average)	11	sec

8BH8

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 8BH8 is the same as the 6BH8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	8.4	volts
Warm-up time (Average)	11	sec

8BN8

Twin Diode—High-Mu Triode

9-PIN MINIATURE TYPE

The 8BN8 is the same as the 6BN8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	8.4	volts
Warm-up time (Average)	11	sec

8BQ5

Power Pentode

9-PIN MINIATURE TYPE

The 8BQ5 is the same as the 6BQ5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	8.0	volts
Warm-up time (Average)	11	sec

8CG7

Medium-Mu Twin Triode

CONTROLLED HEATER WARM-UP TIME

The 8CG7 is the same as the 6CG7 except for the following items:

Heater Characteristics and Ratings:

Current	0.450 ± 0.030	amp
Voltage (AC or DC) at 0.450 amp	8.4	volts

8CM7

Medium-Mu Dual Triode

With Dissimilar Units

CONTROLLED HEATER WARM-UP TIME

The 8CM7 is the same as the 6CM7 except for the following items:

Heater Characteristics and Ratings:

Current	0.450 ± 0.090	amp
Voltage (AC or DC) at 0.450 amp	8.4	volts

8CN7

Twin Diode—High-Mu Triode

CONTROLLED HEATER WARM-UP TIME

The 8CN7 is the same as the 6CN7 except for the following items:

Heater Characteristics and Ratings:

Heater-section arrangement	*Parallel*	*Series*	*Series*	
Voltage (AC or DC)	4.2[a]	8.4[b]	8.4 ± 0.8	volts
Current	0.450 ± 0.030	0.225 ± 0.010	0.225[c]	amp

[a] At 0.450 ampere.
[b] At 0.225 ampere.
[c] At 8.4 volts.

Medium-Mu Dual Triode

With Dissimilar Units

CONTROLLED HEATER WARM-UP TIME

The 8CS7 is the same as the 6CS7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at 0.450 amp.	8.4	volts

8CW5

Beam Power Tube

The 8CW5 is the same as the 6CW5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at 0.600 amp.	8.0	volts

8CX8

Medium-Mu Triode—Sharp-Cutoff Pentode

The 8CX8 is the same as the 6CX8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at 0.600 amp.	8.0	volts
Warm-up time (Average)	11	sec

8EB8

High-Mu Triode—Sharp-Cutoff Pentode

The 8EB8 is the same as the 6EB8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at 0.600 amp.	8.0	volts
Warm-up time (Average)	11	sec

Beam Power Tube

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 8EM5 is the same as the 6EM5 except for the following items:

Heater Characteristics and Ratings *(Design-Center Values)*:

Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	8.4	volts
Warm-up time (Average)	11	sec

Twin Diode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	8	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances:[a]		
Diode Units:		
Either plate to cathode & internal shield, pentode grid No.3 & pentode cathode & pentode internal shield, and heater	1.5	μμf
Cathode & internal shield to either plate, pentode grid No.3 & pentode cathode & pentode internal shield, and heater	7.5	μμf
Pentode Unit:		
Grid No.1 to plate	0.1 max.	μμf
Grid No.1 to cathode & grid No.3 & internal shield, grid No.2, diode-units cathode & diode-units internal shield, and heater	10	μμf
Plate to cathode & grid No.3 & internal shield, grid No.2, diode-units cathode & diode-units internal shield, and heater	4.2	μμf
Pentode grid No.1 to either diode plate	0.005 max.	μμf
Pentode plate to either diode plate	0.02 max.	μμf

Characteristics, Class A_1 Amplifier (Pentode Unit):

Plate Supply Voltage	60	200	volts
Grid-No.2 Supply Voltage	150	150	volts
Grid-No.1 Voltage	0	–	volts
Cathode Resistor	–	100	ohms
Plate Resistance (Approx.)	–	60000	ohms
Transconductance	–	11500	μmhos
Plate Current	55[b]	25	ma
Grid-No.2 Current	18[b]	5.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	–	-10	volts

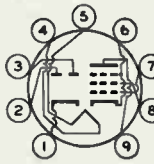
Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"

8ET7

Dimensional Outline. . . . . .See *General Section*
Bulb T6-1/2
Base . . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW 9LT

Pin 1 - Diode-Units Cathode, Internal Shield
Pin 2 - Diode Plate No.2
Pin 3 - Diode Plate No.1
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Pentode Grid No.3, Cathode, Internal Shield
Pin 7 - Pentode Grid No.1
Pin 8 - Pentode Grid No.2
Pin 9 - Pentode Plate

PENTODE — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE.	330	max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE . .	330	max.	volts
GRID-No.2 VOLTAGE. . . . . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value.	0	max.	volts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 165 volts .	1.1	max.	watts
For grid-No.2 voltages between 165 and 330 volts. . . . . See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section			
PLATE DISSIPATION.	5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	200	max.	volts
Heater positive with respect to cathode.	200[c]	max.	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.1	max.	megohm
For cathode-bias operation	0.25	max.	megohm

DIODE UNITS — Two

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

DC PLATE CURRENT	3	max.	ma
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	200	max.	volts
Heater positive with respect to cathode.	200[c]	max.	volts

Characteristics, Instantaneous Test Condition:

Plate Current for plate volts = 10	1.5	ma

[a] Without external shield.
[b] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.
[c] The dc component must not exceed 100 volts.

8FQ7

Medium-Mu Twin Triode

The 8FQ7 is the same as the 6FQ7 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	8.4	V
Warm-up time (Average)	11	s

8GJ7

Medium-Mu Triode—Sharp-Cutoff Pentode

The 8GJ7 is the same as the 6GJ7 except for the following items:

Heater Characteristics and Ratings

Current	0.300 ± 0.020	A
Voltage (AC or DC) at 0.300A	8.0	V
Warm-up time (Average)	11	s

8GN8

High-Mu Triode—Sharp-Cutoff Pentode

The 8GN8 is the same as the 6GN8 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	8.0	V
Warm-up time (Average)	11	s

8GU7

Medium-Mu Twin Triode

The 8GU7 is the same as the 6GU7 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	8.4	V
Warm-up time (Average)	11	s

8JU8A

Quadruple Diode

The 8JU8A is the same as the 6JU8A except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	8.4	V
Warm-up time (Average)	11	s

8JV8

High-Mu Triode—Sharp-Cutoff Pentode

The 8JV8 is the same as the 6JV8 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	8.5	V
Warm-up time (Average)	11	s

8KA8

High-Mu Triode—Sharp-Cutoff Pentode

Pentode Unit Has Two Independent Control Grids

The 8KA8 is the same as the 6KA8 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	8.4	V
Warm-up time (Average)	11	s

8LC8

High-Mu Triode—Sharp-Cutoff Pentode

The 8LC8 is the same as the 6LC8 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	8.4	V
Warm-up time (Average)	11	s

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

9AU7

Medium-Mu Twin Triode

The 9AU7 is the same as the 12AU7A except for the following items:

Heater, for Unipotential Cathodes

	Series	*Parallel*	
Heater arrangement			
Voltage (AC or DC)	9.4 ±10%	4.7	V
Current	0.225	0.45 ± 6%	A
Warm-up time (Average)	-	11	s

10AL11

Beam Power Tube—Sharp-Cutoff Pentode

DUODECAR TYPE

The 10AL11 is the same as the 6AL11 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	9.8	V
Warm-up Time (Average)	11	s

10DE7

Dual Triode

With Medium-Mu Unit and Low-Mu Unit

The 10DE7 is the same as the 6DE7 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	9.7	V
Warm-up time (Average)	11	s

10DR7

Dual Triode

With Medium-Mu Unit and Low-Mu Unit

The 10DR7 is the same as the 6DR7 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	9.7	V
Warm-up time (Average)	11	s

10DX8

High-Mu Triode — Sharp-Cutoff Pentode

The 10DX8 is the same as the 6DX8 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	10.2	V

10DE7

Dual Triode

With Medium-Mu Unit and Low-Mu Unit

9-PIN MINIATURE TYPE

The 10DE7 is the same as the 6DE7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	9.7	volts
Warm-up time (Average)	11	sec

10DR7

Dual Triode

With High-Mu Unit and Low-Mu Unit

9-PIN MINIATURE TYPE

The 10DR7 is the same as the 6DR7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	9.7	volts
Warm-up time (Average)	11	sec

10DX8

High-Mu Triode
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 10DX8 is the same as the 6DX8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	10.2	volts

10EG7

Dual Triode

With Medium-Mu Unit and Low-Mu Unit

For Equipment Having Series Heater-String Arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	9.7	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances (Approx.):		

	Unit No.1	Unit No.2	
Grid to plate	4.4	9.5	μμf
Grid to cathode and heater	2.2	7	μμf
Plate to cathode and heater	0.6	1.6	μμf

Characteristics, Class A_1 Amplifier:

	Unit No.1	Unit No.2	
Plate Voltage	250	150	volts
Grid Voltage	-11	-17.5	volts
Amplification Factor	17.5	6	
Plate Resistance (Approx.)	8750	800	ohms
Transconductance	2000	7500	μmhos
Plate Current	5.5	45	ma
Plate Current for grid volts = -25.	-	8	ma
Plate Current for plate volts = 60 and grid volts = 0	-	95*	ma
Grid Voltage (Approx.) for plate μa = 10	-20	-	volts
Grid Voltage (Approx.) for plate μa = 100	-	-40	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	3"
Maximum Seated Length	2-7/16"
Maximum Diameter	1-9/32"
Bulb	T9
Base	Short Intermediate-Shell Octal 8-Pin with External Barriers (JEDEC Group 1, No.88-58)
Basing Designation for BOTTOM VIEW	8BD

Pin 1 - Grid of Unit No.2
Pin 2 - Plate of Unit No.2
Pin 3 - Cathode of Unit No.2
Pin 4 - Grid of Unit No.1

Pin 5 - Plate of Unit No.1
Pin 6 - Cathode of Unit No.1
Pin 7 - Heater
Pin 8 - Heater

10EG7

VERTICAL-DEFLECTION OSCILLATOR

Values are for Unit No.1

Maximum Ratings, *Design-Maximum Values:*

*For operation in a 525-line, 30-frame system**

DC PLATE VOLTAGE	330	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400	max.	volts
CATHODE CURRENT:			
Peak	77	max.	ma
Average	22	max.	ma
PLATE DISSIPATION	1.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200♦	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For cathode-bias operation	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Unit No.2

Maximum Ratings, *Design-Maximum Values:*

*For operation in a 525-line, 30-frame system**

DC PLATE VOLTAGE	330	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE♦	1500	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	175	max.	ma
Average	50	max.	ma
PLATE DISSIPATION	10	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200♦	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For cathode-bias operation	2.2	max.	megohms

▲ Without external shield.

● This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

* As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

♦ The dc component must not exceed 100 volts.

♦ This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

DIMENSIONAL OUTLINE

shown under Type 6EM7 also applies to the 10EG7

10EM7

Dual Triode
With High-Mu Unit and Low-Mu Unit

The 10EM7 is the same as the 6EM7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	9.7	volts
Warm-up time (Average)	11	sec

10GF7

Dual Triode
With High-Mu Unit and Low-Mu Unit

NOVAR TYPE

The 10GF7 is the same as the 6GF7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	9.7	volts
Warm-up time (Average)	11	sec

10GF7A

Dual Triode
With High-Mu Unit and Low-Mu Unit

NOVAR TYPE

The 10GF7A is the same as the 6GF7A except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	9.7	volts
Warm-up time (Average)	11	sec

10GN8

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 10GN8 is the same as the 6GN8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	10.5	volts
Warm-up time (Average)	11	sec

10HF8

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

The 10HF8 is the same as the 6HF8 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	10.5	volts
Warm-up time (Average)	11	sec

High-Mu Triode—
Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Use in Sync-Separator, Sync-Clipper, Voltage Amplifier, Phase-Inverter, and Video Output Amplifier Circuits in TV Receivers

Electrical:

Heater Characteristics and Ratings:			
Current	0.450 ± 0.030		amp
Voltage (AC or DC) at heater amperes = 0.450	10.5		volts
Warm-up time (Average)	11		sec
Peak heater-cathode voltage (Each Unit):			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances:[b]			
Triode Unit:			
G_T to P_T	4.0		pf
Input: G_T to (K_T,Kp+G3p+IS,H)	2.6		pf
Output: P_T to (K_T,Kp+G3p+IS,H)	2.6		pf
Pentode Unit:			
G1p to Pp	0.1	max.	pf
Input: G1p to (Kp+G3p+IS,G2p,H)	11		pf
Output: Pp to (Kp+G3p+IS,G2p,H)	4.4		pf
G1p to P_T	0.005	max.	pf
Pp to G_T	0.018	max.	pf
Pp to P_T	0.17	max.	pf

Characteristics, Class A_1 Amplifier:

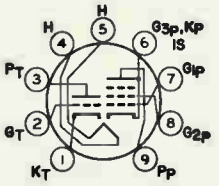
		Triode Unit		
Plate Voltage		135	200	volts
Grid Voltage		-2	-2	volts
Amplification Factor		60	70	
Plate Resistance (Approx.)		39000	19000	ohms
Transconductance		1550	3700	μmhos
Plate Current		1	3.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10		-4.8	-7	volts
		Pentode Unit		
Plate Voltage	30	135	200	volts
Grid-No.2 Voltage	135	135	135	volts
Grid-No.1 Voltage	0	-1.5	-1.5	volts
Plate Resistance (Approx.)	-	66000	70000	ohms
Transconductance	-	12600	14000	μmhos
Plate Current	32[c]	17	18	ma
Grid-No.2 Current	14[c]	4.2	4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-	-5	-5	volts

10JA8

Mechanical:

Operating Position	Any
Types of Cathodes	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9DX

Pin 1 – Triode Cathode
Pin 2 – Triode Grid
Pin 3 – Triode Plate
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 7 – Pentode Grid No.1
Pin 8 – Pentode Grid No.2
Pin 9 – Pentode Plate



AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

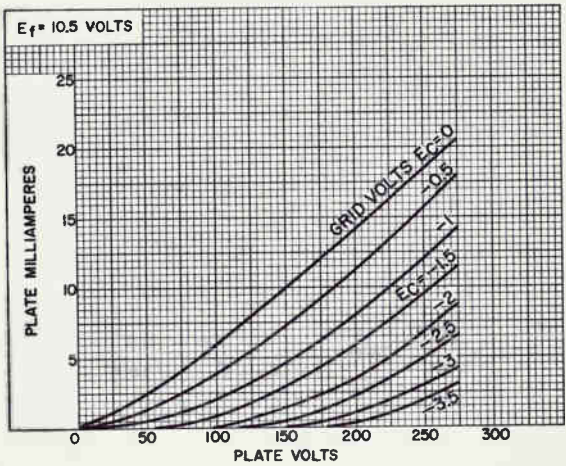
	Triode Unit	*Pentode Unit*	
Plate Voltage	300 max.	330 max.	volts
Grid-No.2 (Screen-Grid) Supply Voltage	–	330 max.	volts
Grid-No.2 Voltage	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		
Grid-No.1 (Control-Grid) Voltage: Positive-bias value	0 max.	0 max.	volts
Plate Dissipation	1 max.	5 max.	watts
Grid-No.2 Input: For grid-No.2 voltages up to 165 volts	–	1.5 max.	watts
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section		

Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1 Circuit Resistance:			
For cathode-bias operation	1.0 max.	1.0 max.	megohm
For fixed-bias operation	0.5 max.	0.25 max.	megohm

[a] The dc component must not exceed 100 volts.
[b] Without external shield.
[c] This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

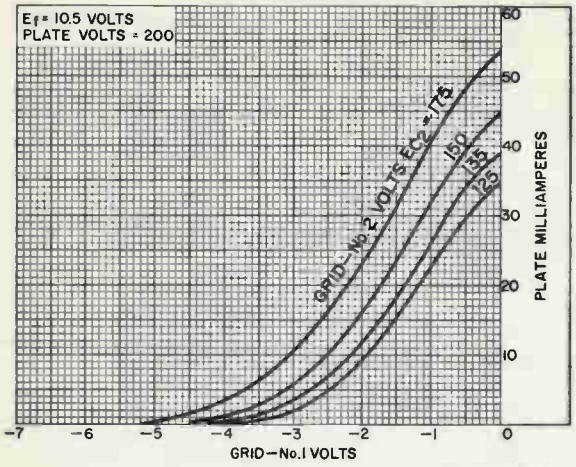
AVERAGE PLATE CHARACTERISTICS
Triode Unit



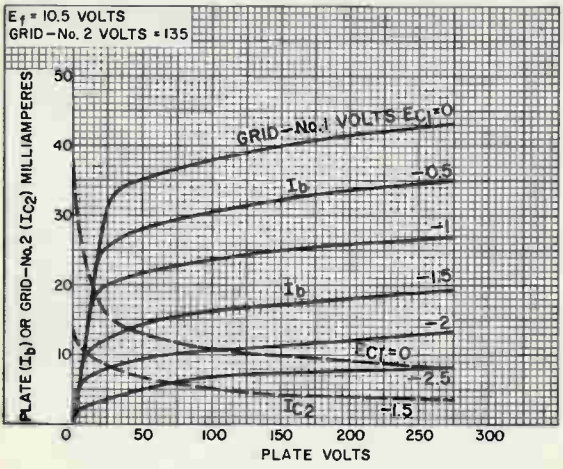
92CS-12158

10JA8

AVERAGE CHARACTERISTICS
Pentode Unit



92CS-12160



92CS-12159

10LE8

Twin Dual-Control Pentode

The 10LE8 is the same as the 6LE8 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	10	V
Warm-up time (Average)	11	s

11AR11

Semiremote-Cutoff Twin Pentode

DUODECAR TYPE

The 11AR11 is the same as the 6AR11 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	11.2	V
Warm-up time (Average)	11	s

11CY7

Dual Triode

With High-Mu Unit and Low-Mu Unit

The 11CY7 is the same as the 6CY7 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	11.0	V
Warm-up time (Average)	11	s

11DS5

Beam Power Tube

The 11DS5 is the same as the 6DS5 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	11.2	V
Warm-up time (Average)	11	s

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

FRAME-GRID CONSTRUCTION

g_m = 30000 μmho

For Video-Output Amplifier Service in Color-TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values[a]

		Series	Parallel	
Heater Voltage (AC or DC)	E_h	11.0	5.50	V
Heater Current	I_h	300	600	mA
Direct Interelectrode Capacitances				
Without external shield				
Grid No.1 to plate	c_{g1-p}		0.15 max	pF
Input: G1 to (K, G3 + IS, G2, H)	c_i		14	pF
Output: P to (K, G3 + IS, G2, H)	c_o		5.0	pF

For the following characteristics, see Conditions

Plate Resistance (Approx.)	r_p	40	kΩ
Transconductance	g_m	30000	μmho
DC Plate Current	I_b	30	mA
DC Grid-No.2 Current	I_{c2}	5.2	mA
Cutoff DC Grid-No.1 Voltage. Plate μA = 100	$E_{c1(co)}$	-4.5	V

Conditions

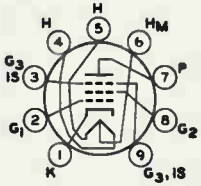
Heater Voltage	E_h	Bogey Value	V
DC Plate Supply Voltage	E_{bb}	200	V
DC Grid-No.3 Voltage	E_{c3}	0	V
DC Grid-No.2 Supply Voltage	E_{cc2}	135	V
DC Grid-No.1 Supply Voltage	E_{cc1}	0	V
Cathode Resistor	R_k	47	Ω

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.625 in
Maximum Seated Length	2.375 in
Maximum Diameter	0.875 in
Dimensional Outline (JEDEC 6-3)	See *General Section*
Envelope	JEDEC T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC E9-1)

TERMINAL DIAGRAM (Bottom View)

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Grid No.3, Internal Shield
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Heater Tap
Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Grid No.3, Internal Shield



9BF

DESIGN-MAXIMUM RATINGS

For operation as a Class A_1 Amplifier Tube

DC Plate Voltage	E_b		330	V
DC Grid-No.2 (Screen-Grid) Supply Voltage	E_{cc2}		See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
DC Grid-No.1 (Control-Grid) Voltage				
Positive-bias value	E_{c1}		0	V
Heater-Cathode Voltage				
Peak	e_{hkm}		±200	V
Average[b]	$E_{hk(av)}$		100	V
Heater Voltage (AC or DC)	E_f			
Series	-	9.9 min	12.1 max	V
Parallel	-	4.95 min	6.05 max	V
Grid-No.2 Input	P_{g2}			
For $E_{c2} \leq 165$ V	-		1	W
For $E_{c2} > 165$ V and ≤ 330 V	-		See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	P_b		7	W

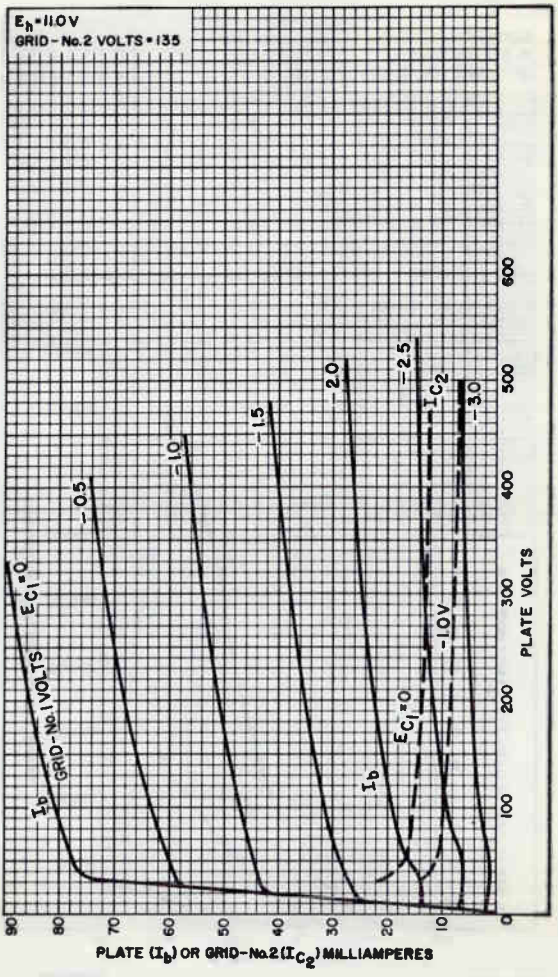
MAXIMUM CIRCUIT VALUES

Grid-No.1 Circuit Resistance	$R_{g1(ckt)}$			
For fixed-bias operation	-		0.1	MΩ
For cathode-bias operation	-		0.25	MΩ

[a] Unless otherwise specified.
[b] Measured with a dc meter.

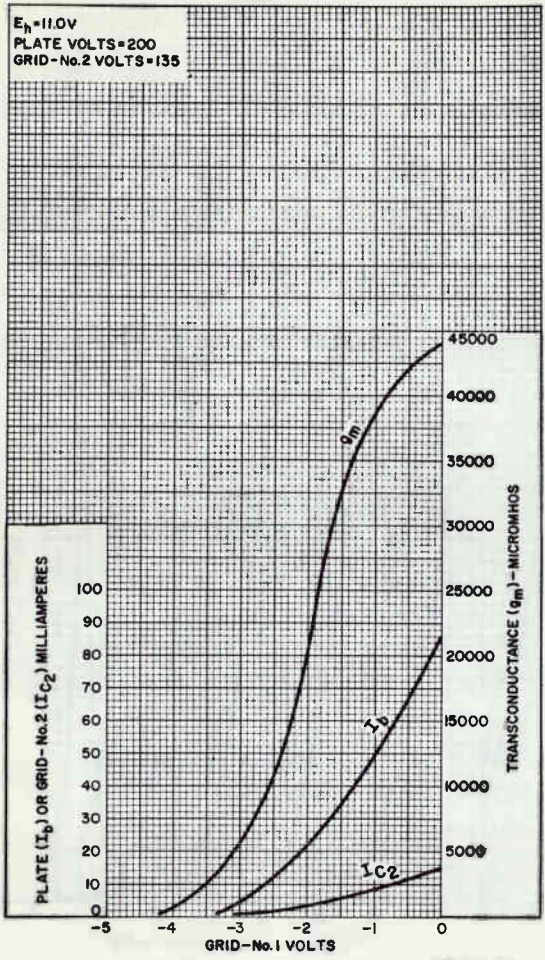
RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Characteristics



92CM-13833

Typical Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

11KV8

High-Mu Triode—
Sharp-Cutoff Pentode

The 11KV8 is the same as the 6KV8 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	10.9	V
Warm-up time (Average)	11	s

11LQ8

Medium-Mu Triode—
Sharp-Cutoff Pentode

The 11LQ8 is the same as the 6LQ8 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	10.9	V
Warm-up time (Average)	11	s

RCA

12AB5

BEAM POWER TUBE

9-PIN MINIATURE TYPE

For use in automobile radio receivers operating from 12-volt storage batteries

GENERAL DATA

Electrical:

Heater●, for Unipotential Cathode:

Voltage range	10.0 to 15.9	dc volts
This voltage range is on an absolute basis. For longest life, it is recommended that the heater be operated within the voltage range of 11 to 14 volts.		
Current (Approx.), at 12.6 volts	0.2	amp
Direct Interelectrode Capacitances:○		
Grid No.1 to plate	0.7 max.	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	8	μμf
Plate to cathode & grid No.3, grid No.2, and heater	8.5	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	7/8"
Dimensional Outline	*See General Section*
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9EU

Pin 1 – Grid No.2
Pin 2 – No Connection
Pin 3 – Grid No.1
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Grid No.1
Pin 7 – Cathode, Grid No.3
Pin 8 – Grid No.2
Pin 9 – Plate

AF POWER AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

For application of these design-center ratings to storage-battery operation, see Operating Considerations

PLATE VOLTAGE	315 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	285 max.	volts
PLATE DISSIPATION	12 max.	watts
GRID-No.2 INPUT	2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	°C

●,○: see next page.

RCA

12AB5

BEAM POWER TUBE

Characteristics with 12.6 volts on heater:			
Plate Voltage	250	250	volts
Grid-No.2 Voltage	200	250	volts
Grid-No.1 (Control-Grid) Voltage	–	-12.5	volts
Cathode-Bias Resistor	270	–	ohms
Peak AF Grid-No.1 Voltage	10.5	12.5	volts
Zero-Signal Plate Current	33.5	45	ma
Max.-Signal Plate Current	36	47	ma
Zero-Signal Grid-No.2 Current (Approx.)	1.6	4.5	ma
Max.-Signal Grid-No.2 Current (Approx.)	3.2	7	ma
Plate Resistance (Approx.)	75000	50000	ohms
Transconductance	4000	4100	μmhos
Load Resistance	6000	5000	ohms
Total Harmonic Distortion	8	8	%
Max.-Signal Power Output	3.3	4.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER - Class AB_1

Maximum Ratings, *Design-Center Values:*

For application of these design-center ratings to storage-battery operation, see Operating Considerations

PLATE VOLTAGE	315 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	285 max.	volts
PLATE DISSIPATION	12 max.	watts
GRID-No.2 INPUT	2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	°C

Characteristics with 12.6 volts on heater: *Values are for 2 tubes*		
Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 (Control-Grid) Voltage	-15	volts
Peak Af Grid-No.1-to-Grid-No.1 Voltage	30	volts
Zero-Signal Plate Current	70	ma
Max.-Signal Plate Current	79	ma

• operation of heater in series with other heaters is not recommended.
o without external shield.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12AB5

BEAM POWER TUBE

Zero-Signal Grid-No.2 Current (Approx.)	5	ma
Max.-Signal Grid-No.2 Current (Approx.)	13	ma
Effective Load Resistance (Plate to plate)	10000	ohms
Total Harmonic Distortion	5	%
Max.-Signal Power Output	10	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

OPERATING CONSIDERATIONS

The *maximum ratings* in the tabulated data for the 12AB5 are working design-center maximums established according to the standard design-center system of rating electron tubes. Tubes so rated will give satisfactory performance in storage-battery-operated equipment provided the following stipulations are observed:

In the case of storage-battery-with-charger supply or similar supplies, the normal battery-voltage fluctuation may be as much as 35 per cent or more. This fluctuation imposes severe operating conditions on tubes. Under these conditions, the equipment should be designed so that 90 per cent of the design-center maximum values of plate voltage, grid-No.2 voltage, plate dissipation, and grid-No.2 input is never exceeded for a battery terminal potential of 13.2 volts. Although the operating voltages of the 12AB5 in this service will, at times, exceed the design-center maximum values, satisfactory performance with probable sacrifice in life will be obtained.

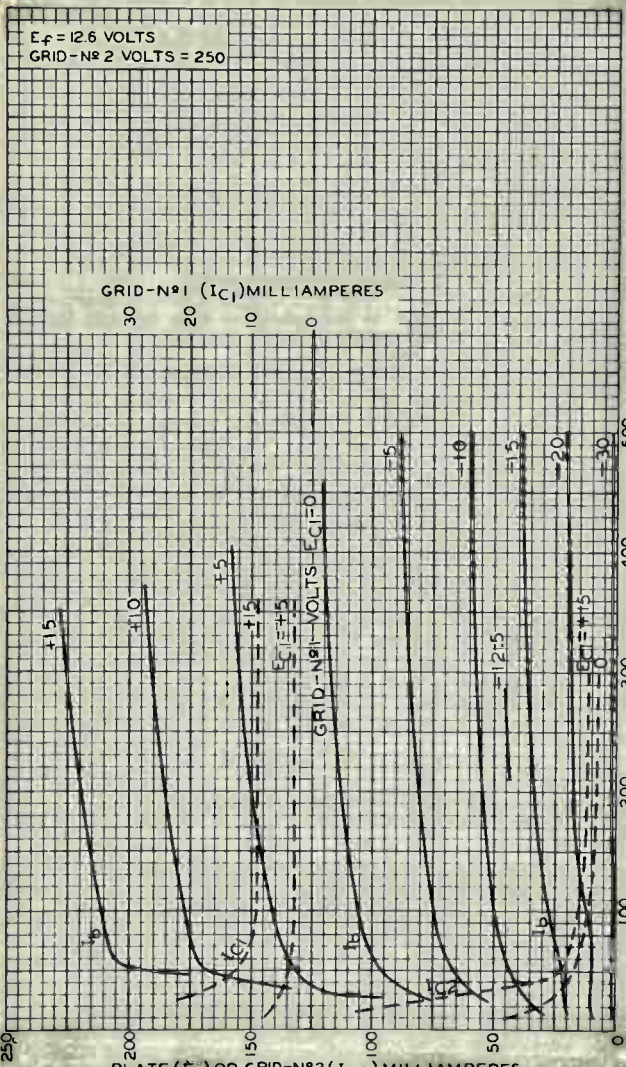
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12AB5

RCA

12AB5

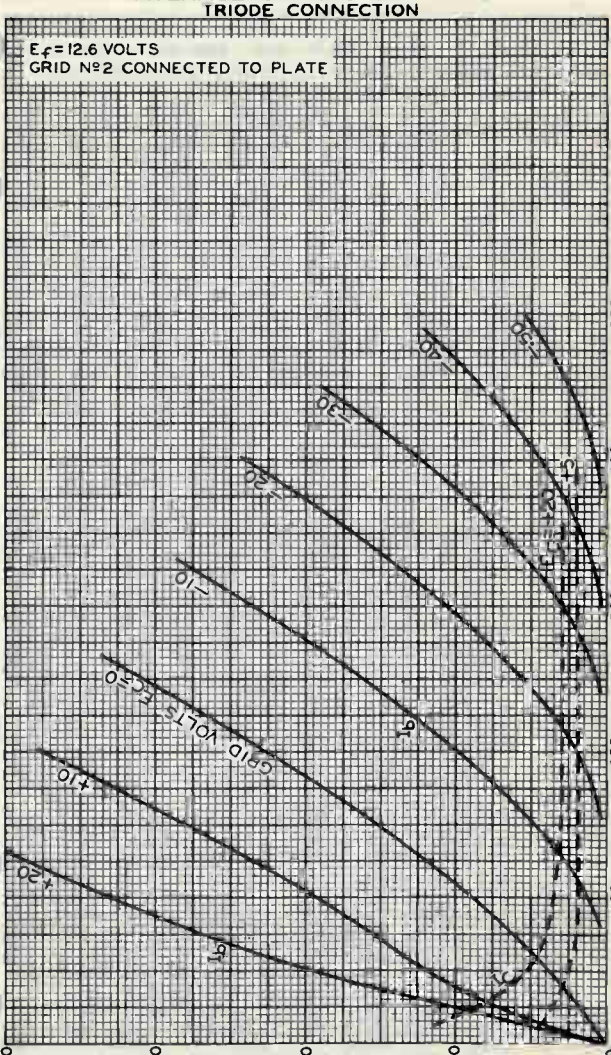
AVERAGE CHARACTERISTICS



RCA

12AB5

AVERAGE CHARACTERISTICS
TRIODE CONNECTION



AUG. 19, 1955

TUBE DIVISION

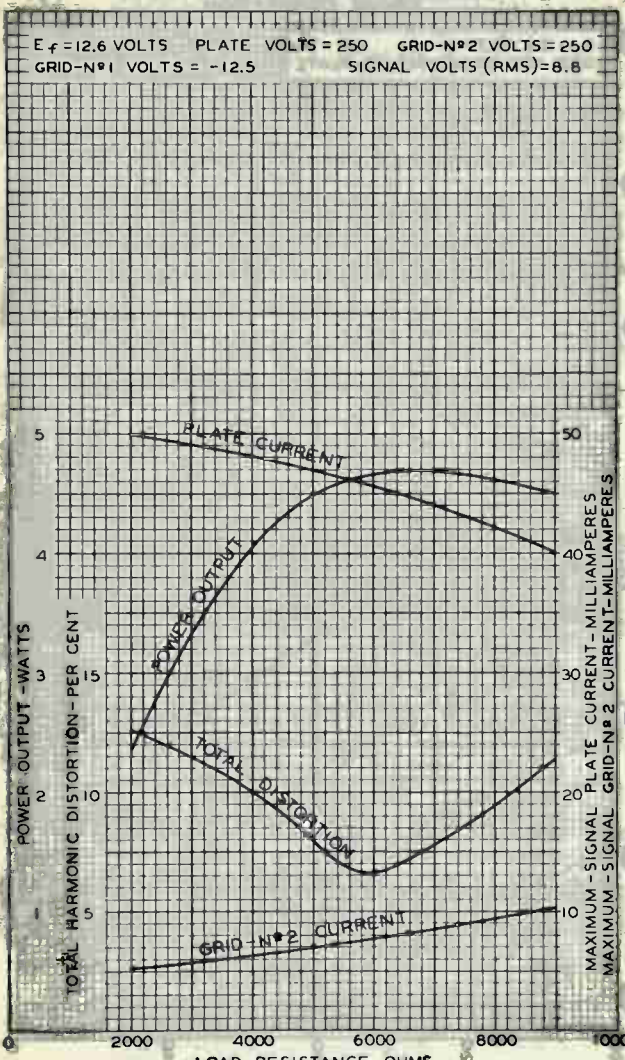
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8756

RCA

12AB5

OPERATION CHARACTERISTICS



12AC6

REMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

For use in automobile radio receivers operating directly from 6-cell storage-battery systems

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage range (AC or DC)	10 to 15.9		volts
This voltage range is on an absolute basis. For longest life, it is recommended that the heater be operated within the voltage range of 11 to 14 volts.			
Current (Approx.) at 12.6 volts	0.15		amp
Direct Interelectrode Capacitances (Approx.):	*Without External Shield*	*With External Shield*[D]	
Grid No.1 to plate	0.005	0.004	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	4.3	4.3	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	5	5	μμf

Characteristics, Class A_1 Amplifier:

Heater Voltage	12.6	volts
Plate Voltage	12.6	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Voltage	12.6	volts
Grid-No.1 Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	2.2	megohms
Plate Resistance (Approx.)	0.5	megohm
Transconductance, Grid No.1 to Plate	730	μmhos
Plate Current	550	μa
Grid-No.2 Current	200	μa
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 10	-5.2	volts
Grid-No.3 Voltage (Approx.) for transconductance (μmhos) = 10	-3.7	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

[D] With external shield JEDEC No.316 connected to cathode.

12AC6

12AC6

REMOTE-CUTOFF PENTODE

Basing Designation for BOTTOM VIEW. 7BK

Pin 1 – Grid No.1
Pin 2 – Grid No.3, Internal Shield
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Cathode

AMPLIFIER — Class A_1

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE.	30 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE.	30 max.	volts
CATHODE CURRENT.	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	30 max.	volts
Heater positive with respect to cathode .	30 max.	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	10 max.	megohms

Pentagrid Converter

7-PIN MINIATURE TYPE

For Automobile Radio Receivers Operating Directly from 6-Cell Storage Batteries

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage range (DC)	10 to 15.9	volts
For longest life, it is recommended that the heater be operated within the voltage range of 11 to 14 volts.		
Current (Approx.) at 12.6 volts	0.15	amp

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield*[a]	
Grid No.3 to all other electrodes (RF input)	7	7	μμf
Plate to all other electrodes (Mixer output)	7	12	μμf
Grid No.1 to cathode & grid No.5, plate, grid No.3, and heater (Oscillator input)	3.2	3.2	μμf
Grid No.3 to plate	0.3 max.	0.26 max.	μμf
Grid No.3 to grid No.1	0.15 max.	0.15 max.	μμf
Grid No.1 to grid No.2 & grid No.4	2.2	2.2	μμf
Grid No.2 & grid No.4 to all other electrodes except grid No.1 (Oscillator output)	11	11	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CH

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.5
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2, Grid No.4
Pin 7 - Grid No.3

→ Indicates a change.

12AD6

→ **CONVERTER**

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	16 max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:		
Negative-bias value	16 max.	volts
Positive-bias value	0 max.	volts
GRIDS-No.2 & No.4 (SCREEN-GRID) SUPPLY VOLTAGE	16 max.	volts
GRIDS-No.2 & No.4 VOLTAGE	16 max.	volts
TOTAL CATHODE CURRENT	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	16 max.	volts
Heater positive with respect to cathode	16 max.	volts

Typical Operation and Characteristics:

With separate excitation[b] *and with heater voltage of 12.6 volts*				
Plate Voltage	10.6	12.6	14.6	volts
Grids-No.2 & No.4 Voltage	10.6	12.6	14.6	volts
Grid-No.3 Supply Voltage	0	0	0	volts
Grid-No.3 Resistor	2.2	2.2	2.2	megohms
Peak-to-Peak Grid-No.1 (Oscillator-Grid) Voltage	4.5	4.5	4.5	volts
Grid-No.1 Resistor	33000	33000	33000	ohms
Plate Resistance (Approx.)	0.5	0.4	0.2	megohm
Conversion Transconductance	–	320	–	μmhos
Grid-No.3 Voltage (Approx.) for conversion transconductance (μmhos) =				
5.	–	-3	–	volts
0.5.	–	-4	–	volts
Plate Current	–	0.35	–	ma
Grid-No.1 Current	–	0.06	–	ma
Total Cathode Current	–	1.6	–	ma

Oscillator Characteristics (Not Oscillating):

With grids No.2 & No.4 connected to plate and with heater voltage of 12.6 volts		
Plate and Grids-No.2 & No.4 Voltage	12.6	volts
Grid-No.3 Voltage	0	volts
Grid-No.1 Voltage	0	volts
Amplification Factor between grid No.1 and grids No.2 & No.4 connected to plate	9.4	
Transconductance between grid No.1 and grids No.2 & No.4 connected to plate	3600	μmhos
Cathode Current	4.5	ma
Grid-No.1 Voltage (Approx.) for plate $\mu a = 10$	-3.7	volts

Maximum Circuit Values:

Grid-No.3-Circuit Resistance	10 max.	megohms

[a] With external shield JEDEC No.316 connected to cathode & grid No.5.

[b] The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

→ Indicates a change.

12AE6

TWIN DIODE—MEDIUM-MU TRIODE

7-PIN MINIATURE TYPE

For use in automobile radio receivers operating directly from 12-volt storage batteries

GENERAL DATA

Electrical:

Heater•, for Unipotential Cathode:		
Voltage range. . . . 10.0 to 15.9		dc volts
This voltage range is on an absolute basis. For longest life, it is recommended that the heater be operated within the voltage range of 11 to 14 volts.		
Current (Approx.)		
at 12.6 volts. . . . 0.15		amp
Direct Interelectrode Capacitances (Approx.):°		
Triode grid to triode plate.	2	μμf
Triode grid to cathode and heater.	1.8	μμf
Triode plate to cathode and heater	1.1	μμf
Plate of diode unit No.1 to plate of diode unit No.2.	0.9	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length.	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip). .	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Dimensional Outline.	*See General Section*
Bulb	T5-1/2
Base . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1)	
Basing Designation for BOTTOM VIEW	7BT

Pin 1 – Grid of Triode Unit
Pin 2 – Cathode of Triode Unit and Diode Units No.1 and No.2
Pin 3 – Heater
Pin 4 – Heater

Pin 5 – Plate of Diode Unit No.2
Pin 6 – Plate of Diode Unit No.1
Pin 7 – Plate of Triode Unit

TRIODE UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE.	330 max.	volts
CATHODE CURRENT.	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	330 max.	volts
Heater positive with respect to cathode. .	330 max.	volts

•,°: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12AE6

TWIN DIODE—MEDIUM-MU TRIODE

Characteristics with 12.6 Volts on Heater:		
Plate Voltage	12.6	volts
Grid Voltage	0	volts
Amplification Factor	15	
Plate Resistance (Approx.)	15000	ohms
Transconductance	1000	μmhos
Plate Current	750	μa
Typical Operation as Resistance-Coupled Amplifier with 12.6 Volts on Heater:		
Plate-Supply Voltage	14.4	volts
Grid Voltage	0	volts
Plate Load Resistor	0.47	megohm
Grid Resistor	2.2	megohms
Grid Resistor of Following Stage	2.2	megohms
Input Capacitor	0.01	μf
Output Capacitor	0.01	μf
Voltage Gain at 400 cps with RMS output volts = 1	10	
Max.-Signal Source Impedance	1000	ohms
Maximum Circuit Values:		
Grid-Circuit Resistance	10 max.	megohms

DIODE UNITS — Two

Maximum Ratings, *Design-Center Values:*
Values are for Each Unit

PLATE CURRENT	1 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	30 max.	volts
Heater positive with respect to cathode.	30 max.	volts
Characteristics with 12.6 Volts on Heater:		
Plate Current for plate volts = 10	2	ma

• Operation of heater in series with other heaters is not recommended.
○ Without external shield.

OPERATING CONSIDERATIONS

The *maximum ratings* in the tabulated data for the 12AE6 are working design-center maximums established according to the standard design-center system of rating electron tubes. Tubes so rated will give satisfactory performance in storage-battery-operated equipment provided the following stipulations are observed:

In the case of storage-battery-with-charger supply or similar supplies, the normal battery-voltage fluctuation may be as much as 35 per cent or more. This fluctuation imposes severe operating conditions on tubes. Under these

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12AE6

TWIN DIODE—MEDIUM-MU TRIODE

conditions, the equipment should be designed so that 90 per cent of the design-center maximum value of plate voltage is never exceeded for a battery-terminal potential of 13.2 volts. Although the operating voltages of the 12AE6 in this service will, at times, exceed the design-center maximum values, satisfactory performance with probable sacrifice in life will be obtained.

12AF3
HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

For damper service in TV receivers having series heater-string arrangement

The 12AF3 is the same as the 6AF3 except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

12AH7-GT

MEDIUM-MU TWIN TRIODE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage	12.6	ac or dc volts
Current	0.15	amp

Direct Interelectrode Capacitances (Approx.):[o]

	Unit No.1	Unit No.2	
Grid to plate	3	2.2	μμf
Grid to cathode and heater	2.8	3.2	μμf
Plate to cathode and heater	2.6	3	μμf
Plate of unit No.1 to plate of unit No.2	0.4		μμf
Grid of unit No.1 to grid of unit No.2	0.06		μμf

Characteristics, Class A_1 Amplifier (Each unit):

Plate Voltage	100	180	volts
Grid Voltage	-3.6	-6.5	volts
Amplification Factor	16	16	
Plate Resistance (Approx.)	10300	8400	ohms
Transconductance	1550	1900	μmhos
Plate Current	3.7	7.6	ma
Grid Voltage (Approx.) for plate current of 10 μamp	-8.5	-16	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-1/2"
Maximum Diameter	1-9/32" ←
Dimensional Outline	*See General Section*
Bulb	T-9
Base	Intermediate-Shell Octal 8-Pin (JETEC No.B8-6) ←
Basing Designation for BOTTOM VIEW	8BE

Pin 1 – Grid of Unit No.2
Pin 2 – Cathode of Unit No.2
Pin 3 – Plate of Unit No.2
Pin 4 – Cathode of Unit No.1

Pin 5 – Grid of Unit No.1
Pin 6 – Plate of Unit No.1
Pin 7 – Heater
Pin 8 – Heater

[o] With external shield JETEC No.308 connected to cathode of unit under test.

← Indicates a change.

12AH7-GT

MEDIUM-MU TWIN TRIODE

AMPLIFIER - Class A_1

Values are for Each Unit

Maximum Ratings, ***Design-Center Values:***

PLATE VOLTAGE	180 max.	volts
PLATE-SUPPLY VOLTAGE	300 max.	volts
PLATE DISSIPATION	1.5 max.	watts
→ PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲ max.	volts

▲ The dc component must not exceed 100 volts.

→ Indicates a change.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12AL5

TWIN DIODE

MINIATURE TYPE

Heater, for Unipotential Cathodes:		
Voltage	12.6	ac or dc volts
Current	0.15	amp

The 12AL5 is the same as the 6AL5 except for heater rating.

Beam Power Tube—Sharp-Cutoff Pentode

DUODECAR TYPE

The 12AL11 is the same as the 6AL11 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	12.6	volts
Warm-up time (Average)	11	sec

12AQ5

BEAM POWER AMPLIFIER

MINIATURE TYPE

GENERAL DATA

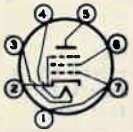
Electrical:

Heater, for Unipotential Cathode:		
Voltage	12.6	ac or dc volts
Current	0.225	amp
Direct Interelectrode Capacitances (Approx., without external shield):		
Grid No.1 to Plate	0.35	μμf
Input	8.3	μμf
Output	8.2	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding Tip)	2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

BOTTOM VIEW



Pin 1 - Grid No.1
Pin 2 - Grid No.3, Cathode
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Grid No.1

AF POWER AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	250 max.	volts
PLATE DISSIPATION	12 max.	watts
GRID-No.2 INPUT	2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)*	250 max.	°C

Typical Operation and Characteristics:

Plate Voltage	180	250	volts
Grid-No.2 Voltage	180	250	volts
Grid-No.1 (Control-Grid) Voltage	-8.5	-12.5	volts
Peak AF Grid-No.1 Voltage	8.5	12.5	volts
Zero-Signal Plate Current	29	45	ma
Max.-Signal Plate Current	30	47	ma

*: See next page.

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

12AQ5

BEAM POWER AMPLIFIER

Zero-Signal Grid-No.2 Current (Approx.)	3	4.5	ma
Max.-Signal Grid-No.2 Current (Approx.)	4	7	ma
Plate Resistance (Approx.)	58000	52000	ohms
Transconductance	3700	4100	μmhos
Load Resistance	5500	5000	ohms
Total Harmonic Distortion	8	8	per cent
Max.-Signal Power Output	2.0	4.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed bias	0.1 max.	megohm
For cathode bias	0.5 max.	megohm

AF POWER AMPLIFIER - Class AB_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	250 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	250 max.	volts
PLATE DISSIPATION	12 max.	watts
GRID-No.2 INPUT	2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)●	250 max.	°C

Typical Operation:

Unless otherwise indicated, values are for 2 tubes

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 (Control-Grid) Voltage‡	-15	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	30	volts
Zero-Signal Plate Current	70	ma
Max.-Signal Plate Current	79	ma
Zero-Signal Grid-No.2 Current (Approx.)	5	ma
Max.-Signal Grid-No.2 Current (Approx.)	13	ma
Plate Resistance (Approx. per tube)	60000	ohms
Transconductance (Per tube)	3750	μmhos
Effective Load Resistance (Plate to plate)	10000	ohms
Total Harmonic Distortion	5	per cent
Max.-Signal Power Output	10	watts

● High ambient temperature and shielding may necessitate a reduction in operating dissipation. When tube shields are used, it is advisable to paint the inside and outside surfaces of the tube shield a dull black and to provide ventilation slots to reduce operating temperature.

‡: See next page.

12AQ5

BEAM POWER AMPLIFIER

Maximum Circuit Values Per Tube:▲

Grid-No.1-Circuit Resistance:#

For fixed bias	0.1 max.	megohm
For cathode bias	0.5 max.	megohm

The type of input coupling used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.

▲ If the grid-No.1-circuit resistance is common to two tubes, the indicated maximum values per tube should be halved.

Curves shown under Type 6V6 also apply to 12AQ5

12AT6

12AT6
TWIN DIODE—HIGH-MU TRIODE

MINIATURE TYPE

Heater, for Unipotential Cathode:

Voltage	12.6	ac or dc volts
Current	0.15	amp

The 12AT6 is the same as the 6AT6 except for heater rating.

12AT7
HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

	Series	Parallel	
Heater Arrangement			
Voltage	12.6	6.3	ac or dc volts
Current	0.15	0.3	amp

Direct Interelectrode Capacitances (Approx.)[o]:

	Unit No.1	Unit No.2	
Grid-Drive Operation:			
Grid to Plate	1.5	1.5	μμf
Grid to Cathode	2.2	2.2	μμf
Plate to Cathode	0.5	0.4	μμf
Heater to Cathode	2.4	2.4	μμf
Cathode-Drive Operation:			
Plate to Cathode	0.2	0.2	μμf
Grid & Heater to Cathode	4.6	4.6	μμf
Grid & Heater to Plate	1.8	1.8	μμf
Grid to Grid	0.005 max.		μμf
Plate to Plate	0.4 max.		μμf

[o] With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2"
Base	Small-Button Noval 9 Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Cathode of Unit No.2
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – Plate of Unit No.1
Pin 7 – Grid of Unit No.1
Pin 8 – Cathode of Unit No.1
Pin 9 – Heater Center-Tap

AMPLIFIER – Class A_1

Values are for each unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative Bias Value	-50 max.	volts
PLATE DISSIPATION	2.5 max.	watts

← Indicates a change

12AT7

HIGH-MU TWIN TRIODE

PEAK HEATER-CATHODE VOLTAGE:

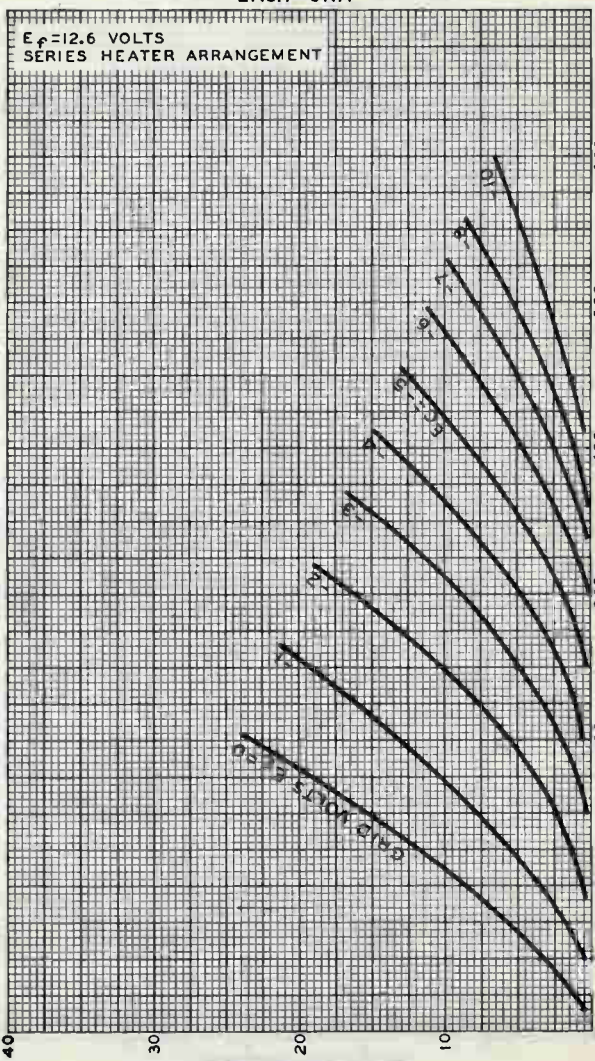
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

→ **Characteristics:**

Plate Supply Voltage	100	250	volts
Cathode-Bias Resistor	270	200	ohms
Amplification Factor	60	60	
Plate Resistance (Approx.)	15000	10900	ohms
Transconductance	4000	5500	μmhos
Grid Voltage (Approx.) for plate current of 10 μamp	-5	-12	volts
Plate Current	3.7	10	ma

→ Indicates a change

12AT7
AVERAGE PLATE CHARACTERISTICS
EACH UNIT



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-7056

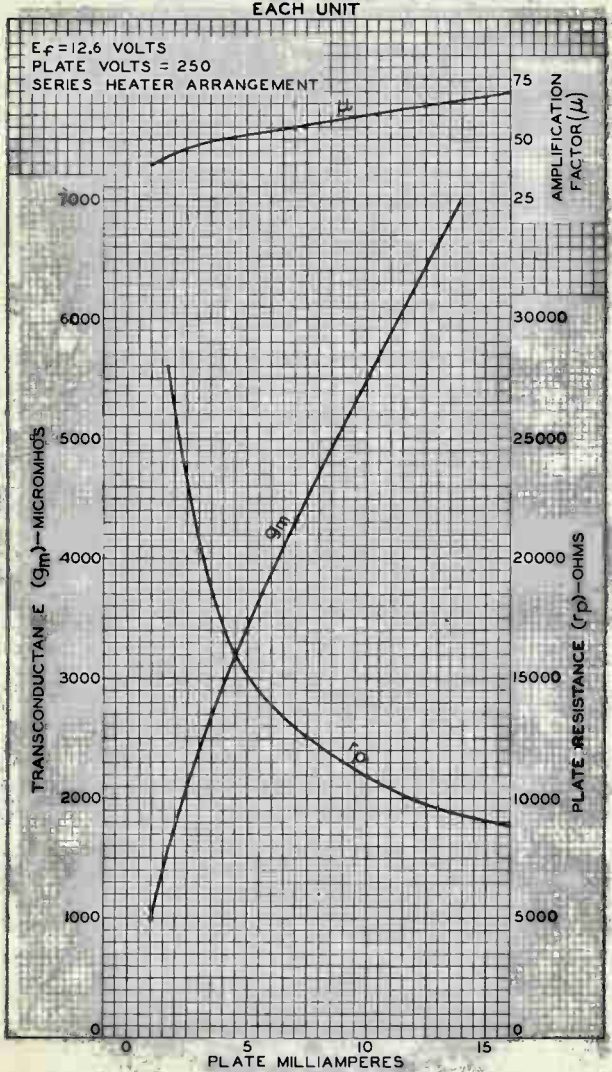
12AT7

RCA

12AT7

AVERAGE CHARACTERISTICS

EACH UNIT



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9314

12AU6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

The 12AU6 is the same as the 6AU6 except for the following items:

Heater, for Unipotential Cathode:		
Voltage	12.6	ac or dc volts
Current	0.15	amp

Medium-Mu Twin Triode

9-PIN MINIATURE TYPE

For Applications Critical as to Microphonics

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

	Series	*Parallel*	
Heater arrangement			
Voltage (AC or DC)	12.6	6.3 ± 10%	volts
Current	0.15 ± 6%	0.3	amp

Direct Interelectrode Capacitances (Approx.):[a]

	Unit No.1	*Unit No.2*	
Grid to plate	1.5	1.5	μμf
Grid to cathode and heater	1.6	1.6	μμf
Plate to cathode and heater	0.5	0.35	μμf

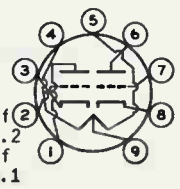
Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	100	250	volts
Grid Voltage	0	-8.5	volts
Amplification Factor	19.5	17	
Plate Resistance (Approx.)	6250	7700	ohms
Transconductance	3100	2200	μmhos
Plate Current	11.8	10.5	ma
Grid Voltage (Approx.) for plate μa = 10	-	-24	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1 - Plate of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Cathode of Unit No.2
Pins 4 & 9 - Heater of Unit No.2
Pins 5 & 9 - Heater of Unit No.1



Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Tap

← Indicates a change.

12AU7A

AMPLIFIER — Class A_1

Values are for Each Unit

→Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330	max.	volts
CATHODE CURRENT	22	max.	ma
PLATE DISSIPATION:			
Either plate	2.75	max.	watts
Both plates (Both units operating)	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See *RESISTANCE-COUPLED AMPLIFIER CHART No.10* at front of this Section

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias operation	1	max.	megohm

HORIZONTAL-DEFLECTION OSCILLATOR

Values are for Each Unit

→Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC PLATE VOLTAGE	330	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	660	max.	volts
CATHODE CURRENT:			
Peak	330	max.	ma
Average	22	max.	ma
PLATE DISSIPATION:			
Either plate	2.75	max.	watts
Both plates (Both units operating)	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance	2.2	max.	megohms

VERTICAL-DEFLECTION OSCILLATOR

Values are for Each Unit

→Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC PLATE VOLTAGE	330	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	440	max.	volts
CATHODE CURRENT:			
Peak	66	max.	ma
Average	22	max.	ma

→Indicates a change.

PLATE DISSIPATION:			
Either plate	2.75	max.	watts
Both plates (Both units operating)	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance	2.2	max.	megohms

VERTICAL-DEFLECTION AMPLIFIER

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC PLATE VOLTAGE	300	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[d]	1200	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	275	max.	volts
CATHODE CURRENT:			
Peak	66	max.	ma
Average	22	max.	ma
PLATE DISSIPATION:			
Either plate	2.75	max.	watts
Both plates (Both units operating)	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For cathode-bias operation	2.2	max.	megohms

[a] Without external shield.

[b] The dc component must not exceed 100 volts.

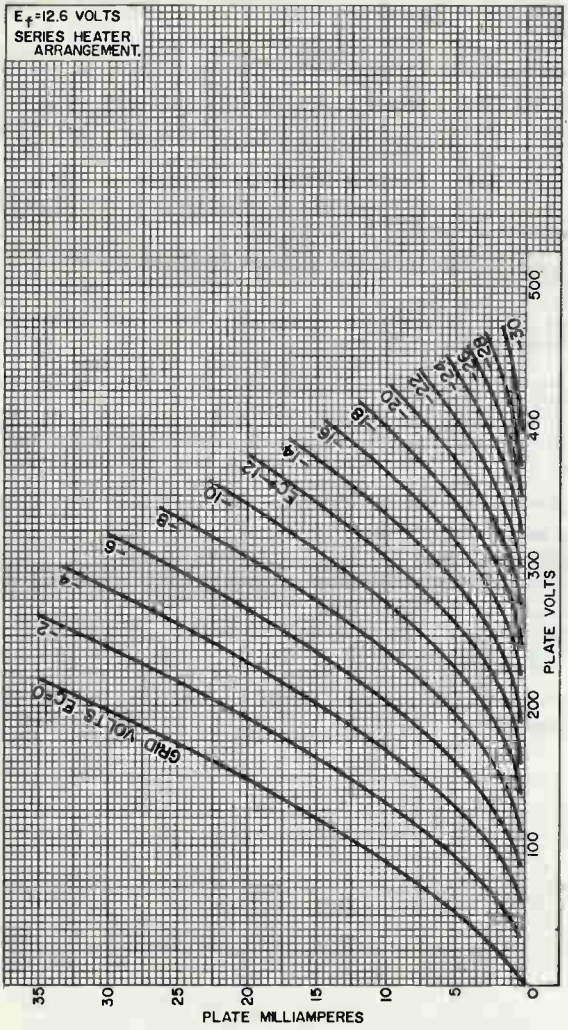
[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[d] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

◄ Indicates a change.

12AU7A

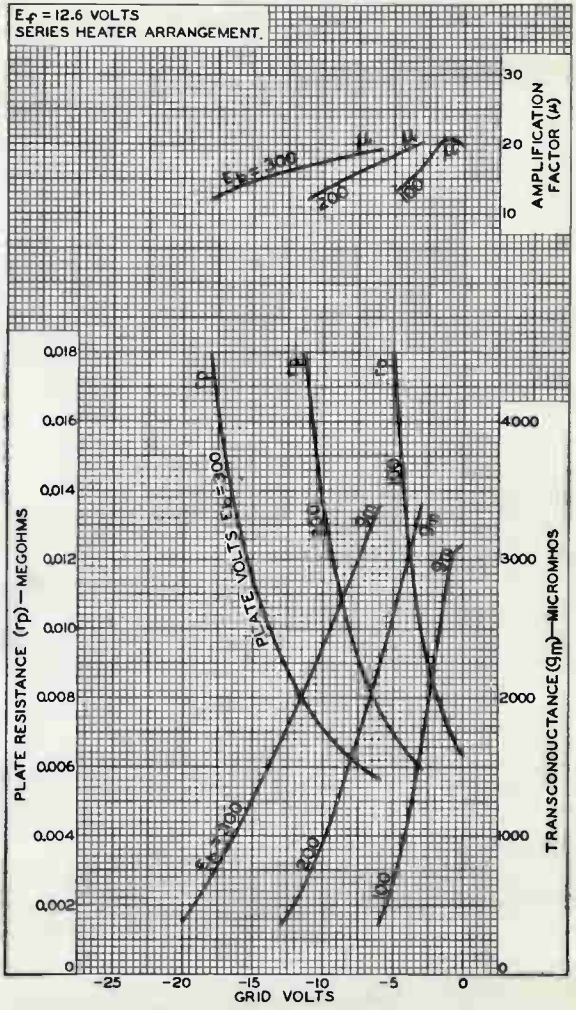
AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-10548

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

AVERAGE CHARACTERISTICS
Each Unit



92CM-8564R2

12AV5-GA
BEAM POWER TUBE

Intended for use in equipment having series heater-string arrangement

The 12AV5-GA is the same as the 6AV5-GA except for the following items:

Heater, for Unipotential Cathode:		
Voltage	12.6	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

12AV6
TWIN DIODE—HIGH-MU TRIODE

7-PIN MINIATURE TYPE

The 12AV6 is the same as the 6AV6 except for the following items:

Heater, for Unipotential Cathode:		
Voltage	12.6	ac or dc volts
Current	0.15	amp

12AX3

Half-Wave Vacuum Rectifier

DUODECAR TYPE
With Heater Having Controlled Warm-Up Time

The 12AX3 is the same as the 6AX3 except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values):*

Voltage (AC or DC)	12.6[a]	12.6 ± 1.2	volts
Current	0.600 ± 0.040	0.600[b]	amp
Warm-up time (Average)	11	–	sec

12AX4GTA

Half-Wave Vacuum Rectifier

For Damper Service in TV Equipment With
Heater Having Controlled Warm-Up Time

The 12AX4GTA is the same as the 6AX4GT except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values):*

Voltage (AC or DC)	12.6[a]	12.6 ± 1.2	volts
Current	0.600 ± 0.040	0.600[b]	amp
Warm-up time (Average)	11	–	sec

12AX4GTB

Half-Wave Vacuum Rectifier

For Damper Service in TV Equipment With
Heater Having Controlled Warm-Up Time

The 12AX4GTB is the same as the 6AX4GTB except for the following items:

Heater Characteristics and Ratings *(Design-Maximum Values):*

Voltage (AC or DC)	12.6[a]	12.6 ± 1.2	volts
Current	0.600 ± 0.040	0.600[b]	amp
Warm-up time (Average)	11	–	sec

[a] At heater amperes = 0.600.
[b] At heater volts = 12.6.

High-Mu Twin Triode

9-PIN MINIATURE TYPE

For High-Fidelity Audio-Amplifier Applications Critical as to Noise and Hum

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Heater arrangement	*Series*	*Parallel*	
Voltage (AC or DC)	12.6	6.3 ± 10%	volts
Current	0.15 ± 6%	0.3	amp

Direct Interelectrode Capacitances (Approx.):[A]

	Unit No. 1	*Unit No. 2*	
Grid to plate	1.7	1.7	μμf
Grid to cathode and heater	1.6	1.6	μμf
Plate to cathode and heater	0.46	0.34	μμf

Equivalent Noise and Hum Voltage (Referenced to Grid, Each Unit):

Average Value (RMS) . . . . . 1.8 μvolts

Measured in "true rms" units under the following conditions: Heater volts (AC) = 6.3; center-tap of heater transformer connected to ground; plate supply volts (DC) = 250; plate load resistor (megohms) = 0.1; cathode resistor (ohms) = 2700; cathode bypass capacitor (μf) = 100; grid resistor (ohms) = 0; amplifier frequency range 25 to 10000 cps.

Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−2	volts
Amplification Factor	100	100	
Plate Resistance (Approx.)	80000	62500	ohms
Transconductance	1250	1600	μmhos
Plate Current	0.5	1.2	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No. E9-1)

12AX7-A

Basing Designation for BOTTOM VIEW 9A

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Cathode of Unit No.2
Pins 4 & 9 – Heater of Unit No.2
Pins 5 & 9 – Heater of Unit No.1

Pin 6 – Plate of Unit No.1
Pin 7 – Grid of Unit No.1
Pin 8 – Cathode of Unit No.1
Pin 9 – Heater Tap

AMPLIFIER — CLASS A_1

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

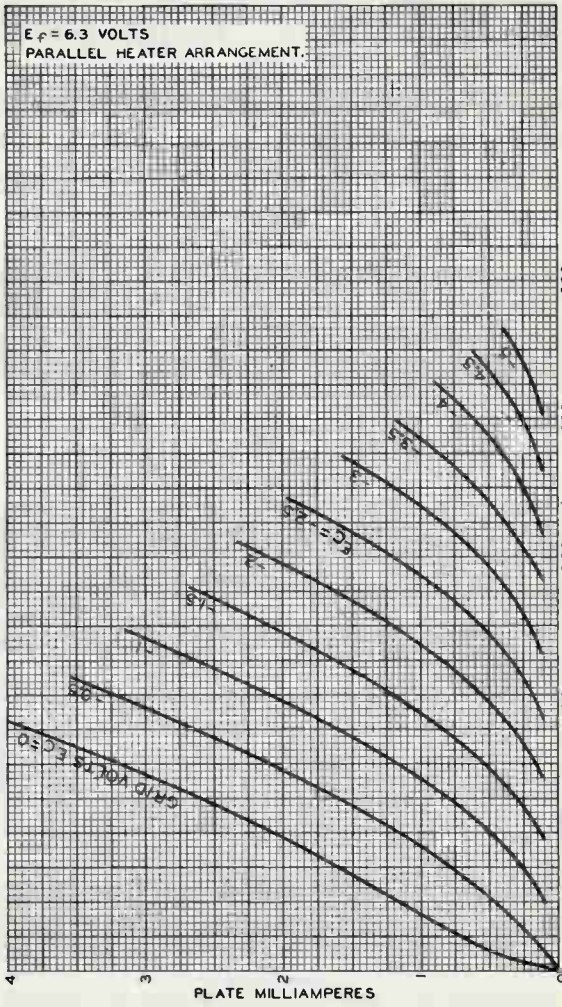
PLATE VOLTAGE.	330	max.	volts
GRID VOLTAGE:			
Negative-bias value.	55	max.	volts
Positive-bias value.	0	max.	volts
PLATE DISSIPATION.	1.2	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	200	max.	volts
Heater positive with respect to cathode.	200●	max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See *RESISTANCE-COUPLED-AMPLIFIER CHART No.25* at front of this Section

▲ Without external shield.
● The dc component must not exceed 100 volts.

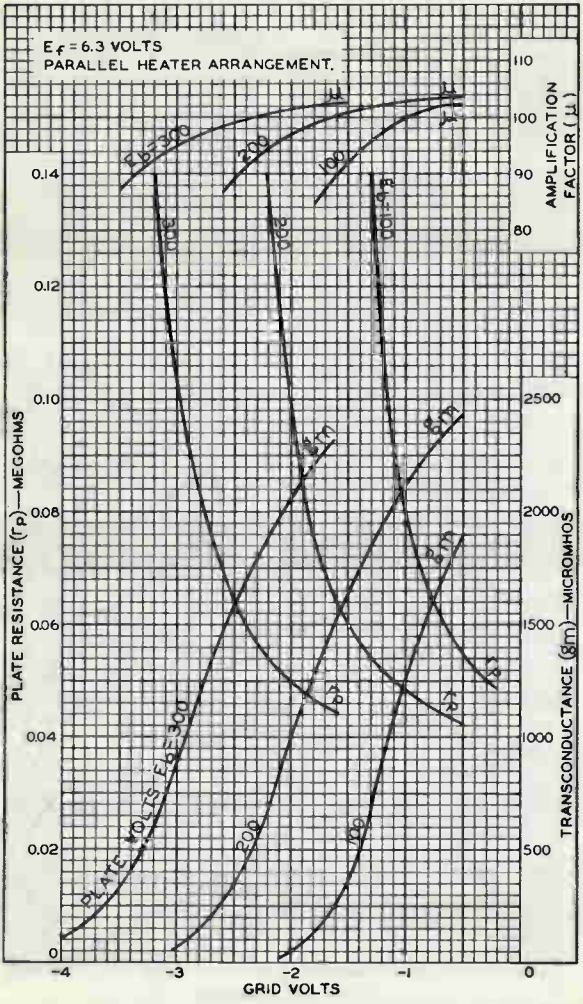
AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-6879

12AX7-A

AVERAGE CHARACTERISTICS
Each Unit



92CM-6880

12AY3

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 12AY3 is the same as the 6AY3 except for the following items:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	amp
Voltage (AC or DC)	12.6	volts
Warm-up time (Average)	11	sec

12AY3A

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 12AY3A is the same as the 6AY3 B except for the following items:

Heater Characteristics and Ratings:

Current	0.600 ± 0.040	amp
Voltage (AC or DC)	12.6	volts
Warm-up time (Average)	11	sec

12AY7

MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

	Series	*Parallel*	
Heater Arrangement			
Voltage	12.6*	6.3	ac or dc volts
Current	0.15	0.3	amp

Direct Interelectrode Capacitances (Without External Shield)—Each Unit:

Grid to Plate	1.3	μμf
Input	1.3	μμf
Output	0.6	μμf

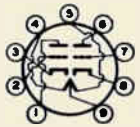
Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	250	volts
Grid Voltage	−4	volts
Amplification Factor	40	
Plate Resistance (Approx.)	22800	ohms
Transconductance	1750	μmhos
Plate Current	3	ma
Grid Voltage (Approx.) for plate current of 10 μamp	−11	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No. E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Cathode of Unit No.2
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Plate of Unit No.1
Pin 7 – Grid of Unit No.1
Pin 8 – Cathode of Unit No.1
Pin 9 – Heater Mid-Tap

* Use of the 12.6-volt connection with an ac-heater supply is not recommended for applications involving low hum.

(continued on next page)

12AY7

12AY7

MEDIUM-MU TWIN TRIODE

AMPLIFIER-Class A_1

Values are for each unit

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	1.5 max.	watts
CATHODE CURRENT	10 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

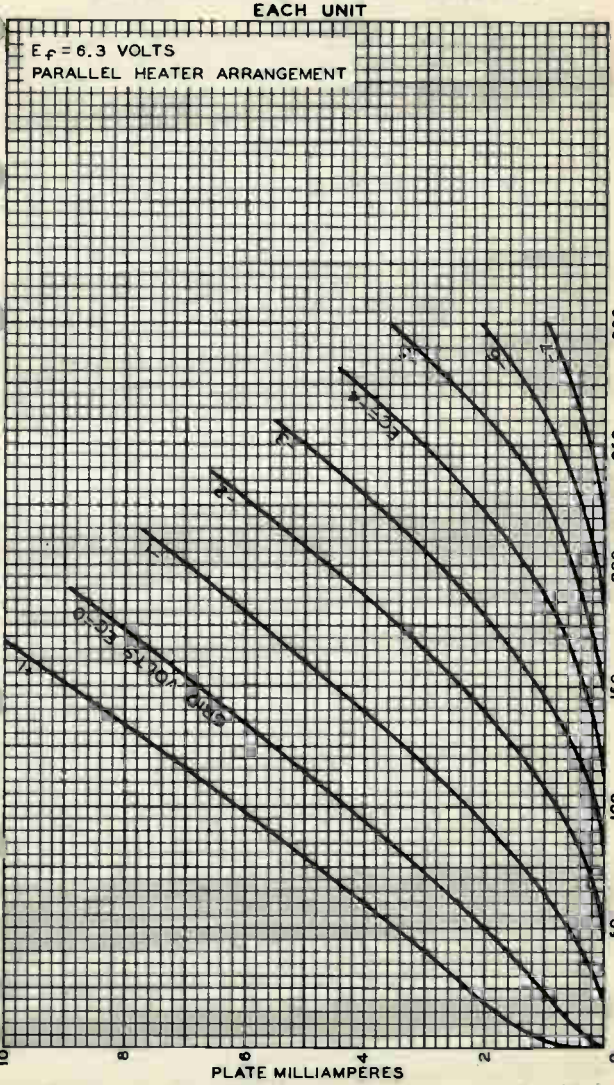
Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART No. 8 at front of Receiving Tube Section

RCA

12AY7

AVERAGE PLATE CHARACTERISTICS
EACH UNIT



High-Mu Twin Triode

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

	Series	*Parallel*	
Heater arrangement			
Voltage (AC or DC)	12.6 ± 10%	6.3	volts
Current	0.225	0.45 ± 6%	amp
Warm-up time (Average)	–	11	sec

Direct Interelectrode Capacitances (Approx.):

	Without External Shield	*With External Shield*[a]	
Unit No.1:			
Grid to plate	2	1.9	μμf
Grid to cathode and heater	2.6	2.8	μμf
Plate to cathode and heater	0.44	1.4	μμf
Unit No.2:			
Grid to plate	2	1.9	μμf
Grid to cathode and heater	2.6	2.8	μμf
Plate to cathode and heater	0.36	1.6	μμf

Characteristics, Class A_1 Amplifier (Each Unit):

Plate Supply Voltage	100	250	volts
Cathode Resistor	270	200	ohms
Amplification Factor	60	60	
Plate Resistance (Approx.)	15000	10900	ohms
Transconductance	4000	5500	μmhos
Plate Current	3.7	10	ma
Grid Voltage (Approx.) for plate μa = 10	–5	–12	volts

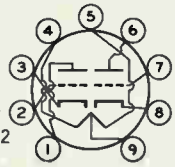
Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ±3-32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

12AZ7A

Basing Designation for BOTTOM VIEW. 9A

Pin 1 – Plate of Unit No.2
Pin 2 – Grid of Unit No.2
Pin 3 – Cathode of Unit No.2
Pins 4 & 9 – Heater of Unit No.2
Pins 5 & 9 – Heater of Unit No.1
Pin 6 – Plate of Unit No.1
Pin 7 – Grid of Unit No.1
Pin 8 – Cathode of Unit No.1
Pin 9 – Heater Tap



AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	330	max.	volts
GRID VOLTAGE:			
Negative-bias value	55	max.	volts
PLATE DISSIPATION	2.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode. .	200	max.	volts
Heater positive with respect to cathode. .	200[b]	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias operation.	0.25	max.	megohm
For cathode-bias operation.	1	max.	megohm

[a] With external shield JEDEC No. 315 connected to cathode of unit under test.
[b] The dc component must not exceed 100 volts.

CURVES
shown under Type 12AT7 also apply to the 12AZ7A

12B4-A
LOW-MU TRIODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Heater arrangement	*Series*	*Parallel*	
Voltage	12.6	6.3	ac or dc volts
Current	0.300	0.600	amp
Warm-up time (Average)	–	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):[a]		
Grid to plate	4.8	μμf
Grid to cathode and heater	5	μμf
Plate to cathode and heater	1.5	μμf

Characteristics, Class A_1 Amplifier:		
Plate Voltage	150	volts
Grid Voltage	-17.5	volts
Amplification Factor	6.5	
Plate Resistance (Approx.)	1030	ohms
Transconductance	6300	μmhos
Plate Current	34	ma
Grid Voltage (Approx.) for plate current of 200 μamp	-32	volts
Plate Current for grid voltage of -23 volts	9.6	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9AG

Pin 1 – Cathode
Pin 2 – Grid
Pin 3 – Heater Mid-Tap
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – No Connection
Pin 7 – Grid
Pin 8 – No Connection
Pin 9 – Plate

[a] With external shield JETEC No.315 connected to cathode.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12B4-A

LOW-MU TRIODE

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	550	max.	volts
GRID VOLTAGE:			
Negative bias value	50	max.	volts
PLATE DISSIPATION	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For fixed-bias operation	0.47	max.	megohm
For cathode-bias operation	2.2	max.	megohms

VERTICAL DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system□

DC PLATE VOLTAGE	550	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)#	1000●	max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250	max.	volts
CATHODE CURRENT:			
Peak	105	max.	ma
Average	30	max.	ma
PLATE DISSIPATION	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater negative with respect to cathode	200▲	max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:			
For cathode-bias operation	2.2	max.	megohms

▲ The dc component must not exceed 100 volts.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

● Under no circumstances should this absolute value be exceeded.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12BA6

Remote-Cutoff Pentode

7-PIN MINIATURE TYPE

The 12BA6 is the same as the 6BA6 except for the following items:

Heater Characteristics and Ratings

Voltage (AC or DC)	12.6	V
Current	0.150	A

12BA7

Pentagrid Converter

9-PIN MINIATURE TYPE

The 12BA7 is the same as the 6BA7 except for the following items:

Heater Characteristics and Ratings

Voltage (AC or DC)	12.6	V
Current	0.150	A

12BD6

Remote-Cutoff Pentode

7-PIN MINIATURE TYPE

The 12BD6 is the same as the 6BD6 except for the following items:

Heater Characteristics and Ratings

Voltage (AC or DC)	12.6	V
Current	0.150	A

12BE3

Half-Wave Vacuum Rectifier

DUODECAR TYPE

The 12BE3 is the same as the 6BE3 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A.	12.6	V
Warm-up time (Average)	11	s

12BE6

Pentagrid Converter

7-PIN MINIATURE TYPE

The 12BE6 is the same as the 6BE6 except for the following items:

Heater Characteristics and Ratings

Voltage (AC or DC)	12.6 V
Current	0.150 A

12BF6

Twin Diode—Medium-Mu Triode

7-PIN MINIATURE TYPE

The 12BF6 is the same as the 6BF6 except for the following items:

Heater Characteristics and Ratings

Voltage (AC or DC)	12.6 V
Current	0.150 A

12BF11

Dual Control Sharp-Cutoff Pentode—Beam Power Tube

DUODECAR TYPE

The 12BF11 is the same as the 6BF11 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A.	12.6	V
Warm-up time (Average)	11	s

RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

RCA

12BH7-A

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater arrangement	*Series*	*Parallel*	
Voltage	12.6	6.3	ac or dc volts
Current	0.3	0.6	amp
Warm-up time (Average)	—	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):[o]

	Unit No.1	*Unit No.2*	
Grid to plate	2.6	2.6	μμf
Grid to cathode and heater	3.2	3.2	μμf
Plate to cathode and heater	0.5	0.4	μμf
Plate of unit No.1 to plate of unit No.2	0.8		μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ±3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1 - Plate of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Cathode of Unit No.2
Pins 4 & 9 - Heater of Unit No.2
Pins 5 & 9 - Heater of Unit No.1
Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Mid-Tap

AMPLIFIER - Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max. volts

[o] without external shield.

12BH7-A

MEDIUM-MU TWIN TRIODE

GRID VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
CATHODE CURRENT	20 max.	ma
PLATE DISSIPATION	3.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

Characteristics:

Plate Voltage	250	volts
Grid Voltage	-10.5	volts
Amplification Factor	16.5	
Plate Resistance (Approx.)	5300	ohms
Transconductance	3100	μmhos
Plate Current	11.5	ma
Plate Current for grid voltage of -14 volts	4	ma
Grid Voltage (Approx.) for plate current of 50 μamp	-23	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	1.0 max.	megohm

HORIZONTAL DEFLECTION OSCILLATOR

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

For operation in a 525-line, 30-frame system□

DC PLATE VOLTAGE	450 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE♦	600 max.	volts
CATHODE CURRENT:		
Peak	300 max.	ma
Average	20 max.	ma
PLATE DISSIPATION	3.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias, grid-resistor bias, or cathode-bias operation	2.2 max.	megohms

♦ This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

▲,□: See next page.

RCA

12BH7-A

MEDIUM-MU TWIN TRIODE

VERTICAL DEFLECTION OSCILLATOR

Values are for Each Unit

Maximum Ratings, *Design-Center Values:*

For operation in a 525-line, 30-frame system□

DC PLATE VOLTAGE	450 max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	400 max.	volts
CATHODE CURRENT:		
Peak	70 max.	ma
Average	20 max.	ma
PLATE DISSIPATION	3.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias, grid-resistor bias, or cathode-bias operation	2.2 max.	megohms

VERTICAL DEFLECTION AMPLIFIER

Values are for Each Unit

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system□

DC PLATE VOLTAGE	450 max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE# (Absolute Maximum)	1500■max.	volts
PEAK NEGATIVE-PULSE GRID VOLTAGE	250 max.	volts
CATHODE CURRENT:		
Peak	70 max.	ma
Average	20 max.	ma
PLATE DISSIPATION	3.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200▲max.	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For cathode-bias operation	2.2 max.	megohms

▲ The dc component must not exceed 100 volts.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycle is 2.5 milliseconds.

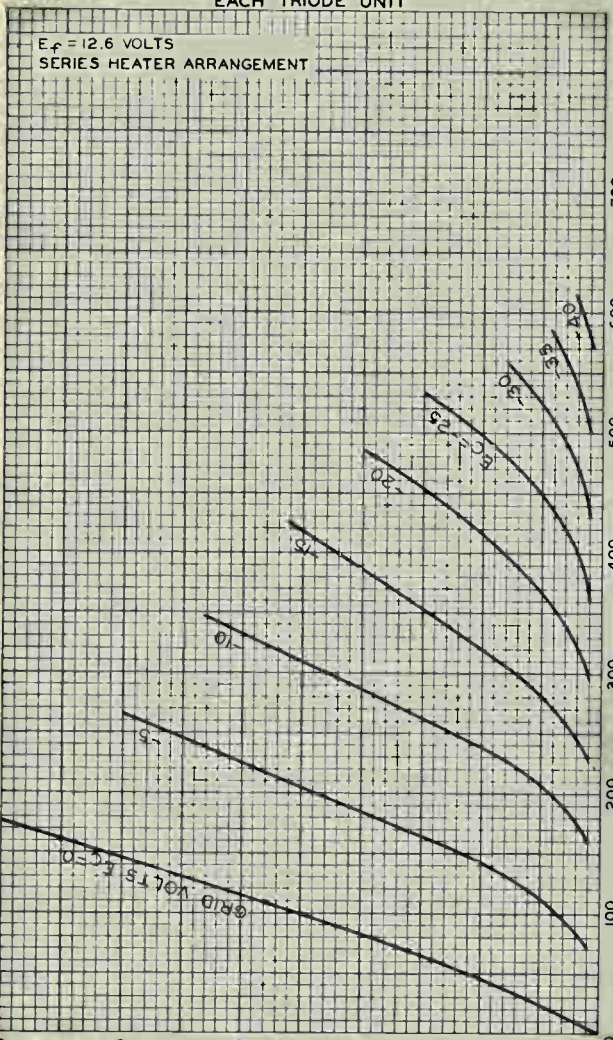
■ Under no circumstances should this absolute value be exceeded.

12BH7-A

12BH7-A

AVERAGE PLATE CHARACTERISTICS

EACH TRIODE UNIT



MAR. 1, 1955

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7742RI

RCA

12BL6

REMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

For use in automobile radio receivers operating directly from 12-volt storage batteries

GENERAL DATA

Electrical:

Heater•, for Unipotential Cathode:
Voltage range. . . . 10.0 to 15.9 . . . . . dc volts
This voltage range is on an absolute basis. For longest life, it is recommended that the heater be operated within the voltage range of 11 to 14 volts.
Current (Approx.)
at 12.6 volts. . . 0.15 . . . . . amp

Direct Interelectrode Capacitances:°

Grid No.1 to plate	0.006 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater.	5.5	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater.	4.8	μμf

Mechanical:

Operating Position . . . . . Any
Maximum Overall Length . . . . . 2-1/8"
Maximum Seated Length. . . . . 1-7/8"
Length, Base Seat to Bulb Top (Excluding tip). . 1-1/2" ± 3/32"
Maximum Diameter . . . . . 3/4"
Dimensional Outline. . . . . *See General Section*
Bulb T5-1/2
Base . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW 7BK

Pin 1 – Grid No.1
Pin 2 – Grid No.3, Internal Shield
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Cathode

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE.	30 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE.	30 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value.	0 max.	volts
CATHODE CURRENT.	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode . .	30 max.	volts
Heater positive with respect to cathode . .	30 max.	volts

Characteristics with 12.6 Volts on Heater:

Plate Voltage.	12.6	volts
Grid-No.3 (Suppressor-Grid) Voltage.	0	volts

•,°: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

12BL6

REMOTE-CUTOFF PENTODE

Grid-No.2 Voltage	12.6	volts
Grid-No.1 Supply Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	2.2	megohms
Plate Resistance (Approx.)	0.5	megohm
Transconductance	1350	μmhos
Plate Current	1.35	ma
Grid-No.2 Current	0.5	ma
Grid-No.1 Voltage (Approx.) for transconductance of 10 μmhos	-6	volts
Grid-No.1 and Grid-No.3 Voltage (Approx.) for transconductance of 10 μmhos	-5	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	10 max.	megohms

• Operation of heater in series with other heaters is not recommended.
° With external shield JETEC No.916 connected to cathode.

OPERATING CONSIDERATIONS

The *maximum ratings* in the tabulated data for the 12BL6 are working design-center maximums established according to the standard design-center system of rating electron tubes. Tubes so rated will give satisfactory performance in storage-battery-operated equipment provided the following stipulations are observed:

In the case of storage-battery-with-charger supply or similar supplies, the normal battery-voltage fluctuation may be as much as 35 per cent or more. This fluctuation imposes severe operating conditions on tubes. Under these conditions, the equipment should be designed so that 90 per cent of the design-center maximum value of plate voltage and grid-No.2 voltage is never exceeded for a battery-terminal potential of 13.2 volts. Although the operating voltages of the 12BL6 in this service will, at times, exceed the design-center maximum values, satisfactory performance with probable sacrifice in life will be obtained.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
TENTATIVE DATA

12BQ6GTB/12CU6

Beam Power Tube

The 12BQ6GTB/12CU6 is the same as the 6BQ6GTB/6CU6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

12BS3

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 12BS3 is the same as the 6BS3 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

12BS3A

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 12BS3A is the same as the 6BS3A except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Equipment Having Series Heater-String Arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Series	*Parallel*	
Heater arrangement			
Voltage (AC or DC)	12.6 ± 10%	6.3	volts
Current	0.3	0.6 ± 6%	amp
Warm-up time (Average)	–	11	sec

Direct Interelectrode Capacitances:[a]

Grid No.1 to plate	0.063	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	10.2	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	3.5	μμf

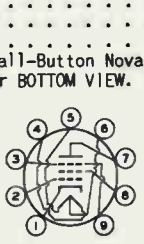
Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	250	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	180	volts
Cathode Resistor	100	ohms
Plate Resistance (Approx.)	93000	ohms
Transconductance	11000	μmhos
Plate Current	26	ma
Grid-No.2 Current	5.75	ma
Grid-No.1 Voltage (Approx.) for plate μa = 20	-11.6	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	98F

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Grid No.3, Internal Shield
Pin 4 – Heater
Pin 5 – Heater



Pin 6 – Heater Tap
Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Grid No.3, Internal Shield

Indicates a change.

12BY7-A

→ AMPLIFIER — Class A_1

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	330	max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*		
GRID-No.2 (SCREEN-GRID) VOLTAGE	190	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	55	max.	volts
Positive-bias value	0	max.	volts
GRID-No.2 INPUT	1.2	max.	watts
PLATE DISSIPATION	6.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

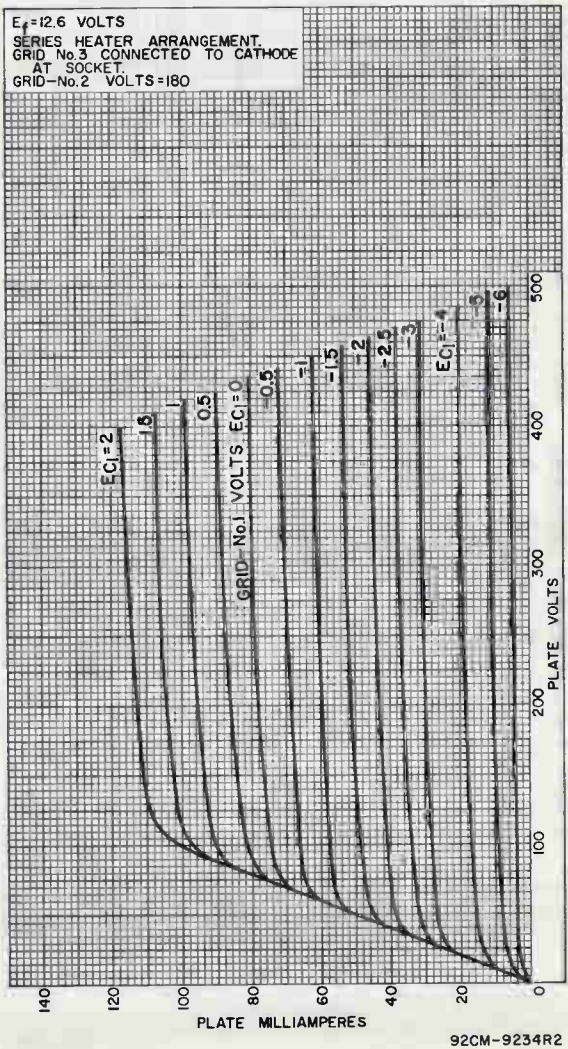
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.25	max.	megohm
For cathode-bias operation	1	max.	megohm

[a] Without external shield.
[b] The dc component must not exceed 100 volts.

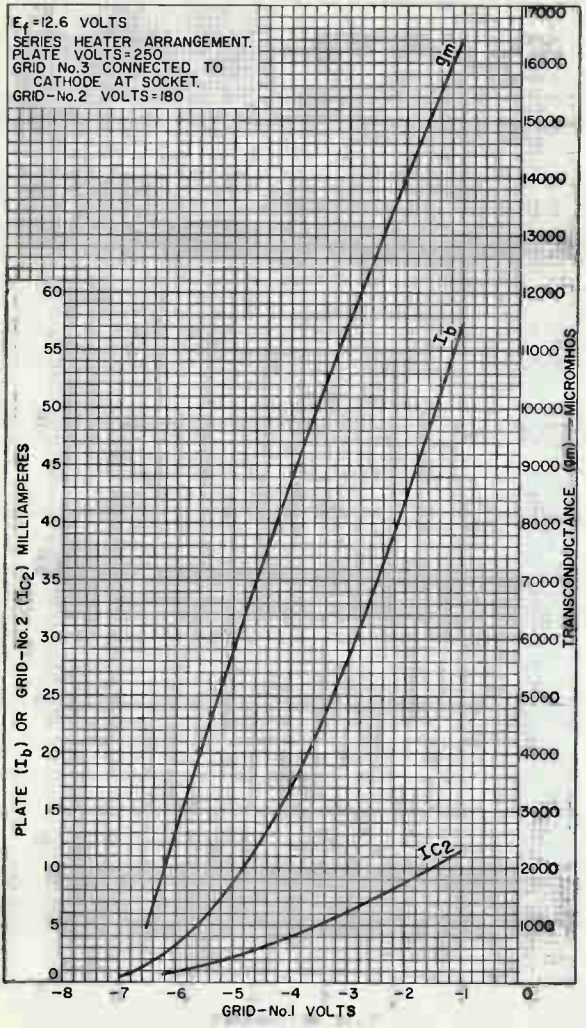
→ Indicates a change.

AVERAGE PLATE CHARACTERISTICS



92CM-9234R2

AVERAGE CHARACTERISTICS



92CM-11051

Semiremote-Cutoff Pentode

7-PIN MINIATURE TYPE

The 12BZ6 is the same as the 6BZ6 except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6 ± 10%	volts
Current.	0.15	amp

RCA

12CA5

BEAM POWER TUBE

MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	12.6	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):[C]		
Grid No.1 to plate	0.5	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	15	μμf
Plate to cathode & grid No.3, grid No.2, and heater	9	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 – Cathode, Grid No.3
Pin 2 – Grid No.1
Pin 3 – Heater

Pin 4 – Heater
Pin 5 – Grid No.1
Pin 6 – Grid No.2
Pin 7 – Plate

AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	130 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	130 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PLATE DISSIPATION	5 max.	watts
GRID-No.2 INPUT	1.4 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[A] max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	180 max.	°C

[C] Without external shield.

[A] The dc component must not exceed 100 volts.

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12CA5

12CA5

BEAM POWER TUBE

Typical Operation and Characteristics:

Plate Voltage	110	125	volts
Grid-No.2 Voltage	110	125	volts
Grid-No.1 Voltage	−4	−4.5	volts
Peak AF Grid-No.1 Voltage	4	4.5	volts
Zero-Signal Plate Current	32	37	ma
Max.-Signal Plate Current	31	36	ma
Zero-Signal Grid-No.2 Current	3.5	4	ma
Max.-Signal Grid-No.2 Current	7.5	11	ma
Plate Resistance (Approx.)	16000	15000	ohms
Transconductance	8100	9200	μmhos
Load Resistance	3500	4500	ohms
Total Harmonic Distortion	5	6	%
Max.-Signal Power Output	1.1	1.5	watts

Maximum Circuit Values:

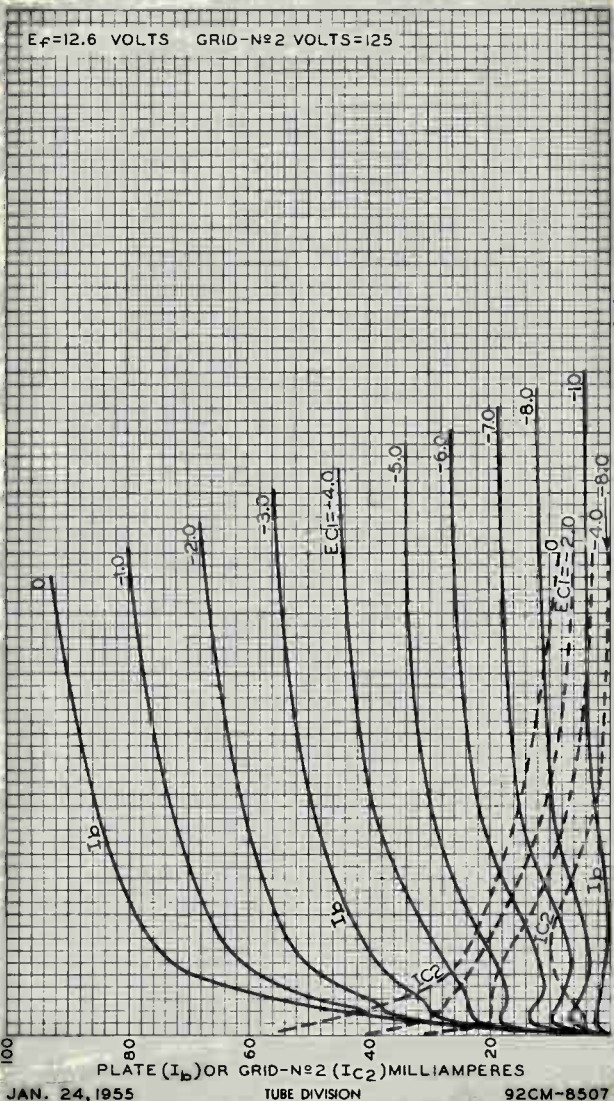
Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

12CA5

AVERAGE PLATE CHARACTERISTICS



JAN. 24, 1955

TUBE DIVISION

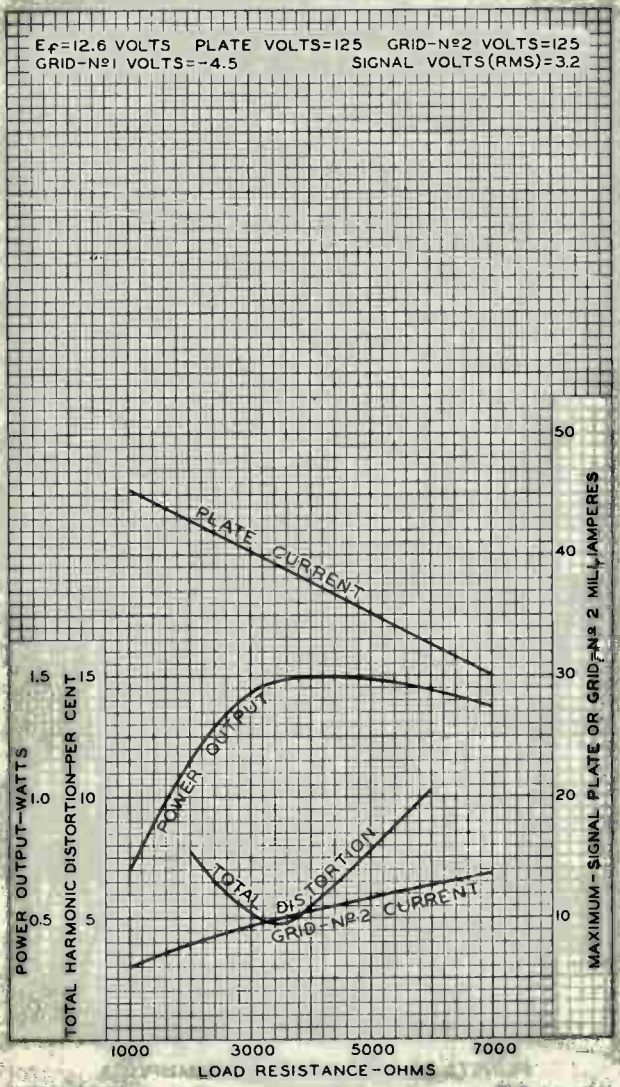
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8507

RCA

12CA5

OPERATION CHARACTERISTICS



Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 12CK3 is the same as 6CK3 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage	12.6	V
Warm-up time (Average)	11	s

12CR6

DIODE–REMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	12.6	ac or dc volts
Current	0.15	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Dimensional Outline	*See General Section*
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No. E7-1)
Basing Designation for BOTTOM VIEW	7EA

Pin 1 – Cathode, Pentode Grid No. 3
Pin 2 – Diode Plate
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Pentode Plate
Pin 6 – Pentode Grid No. 2
Pin 7 – Pentode Grid No. 1

PENTODE UNIT – Class A_1 Amplifier

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	300 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	300 max.	volts
GRID-No.2 VOLTAGE	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value	0 max.	volts
PLATE DISSIPATION	2.5 max.	watts
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 150 volts	0.3 max.	watt
For grid-No.2 voltages between 150 and 300 volts	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Characteristics:

Plate Voltage	250	volts
Grid-No.2 Voltage	100	volts
Grid-No.1 Voltage	−2	volts
Plate Resistance (Approx.)	0.8	megohm
Transconductance	2200	μmhos

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

12CR6

DIODE—REMOTE-CUTOFF PENTODE

Plate Current	9.6	ma
Grid-No.2 Current	2.6	ma
Grid-No.1 Voltage (Approx.) for transconductance of 10 μmhos	-32	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

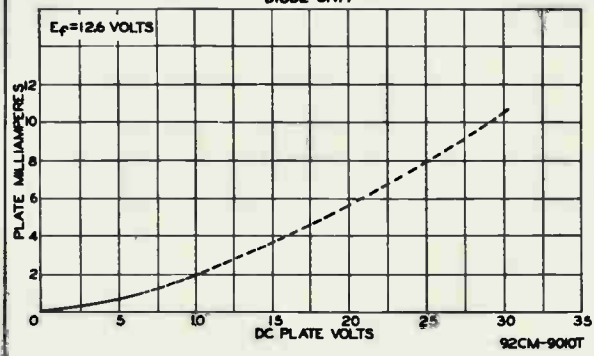
For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation	0.25 max.	megohm

DIODE UNIT

Maximum Ratings, *Design-Center Values:*

PLATE CURRENT	1.0 max.	ma

AVERAGE PLATE CHARACTERISTIC
DIODE UNIT



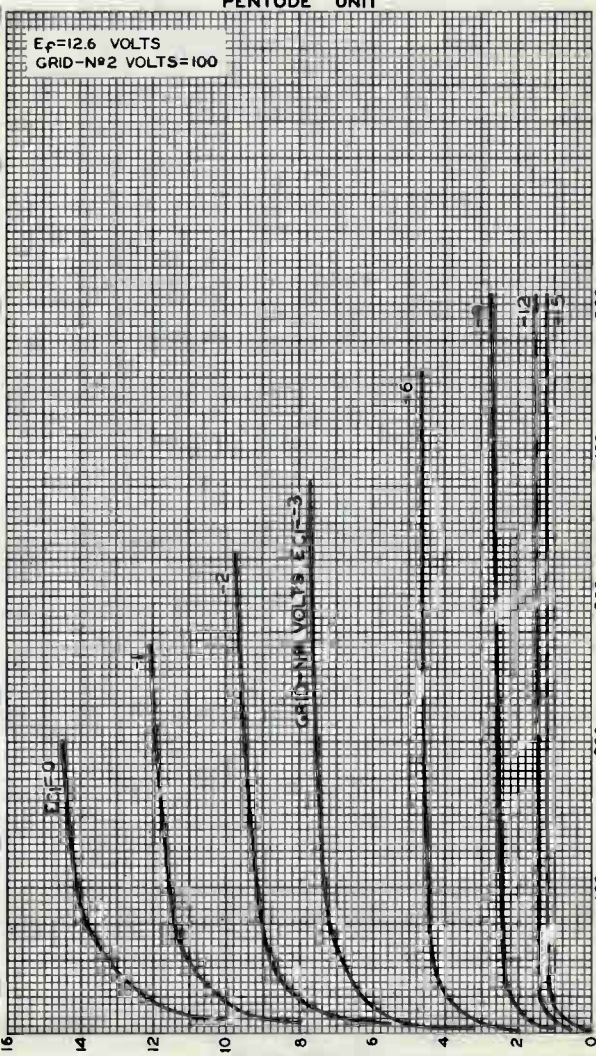
TENTATIVE DATA

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

12CR6

AVERAGE PLATE CHARACTERISTICS
PENTODE UNIT



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

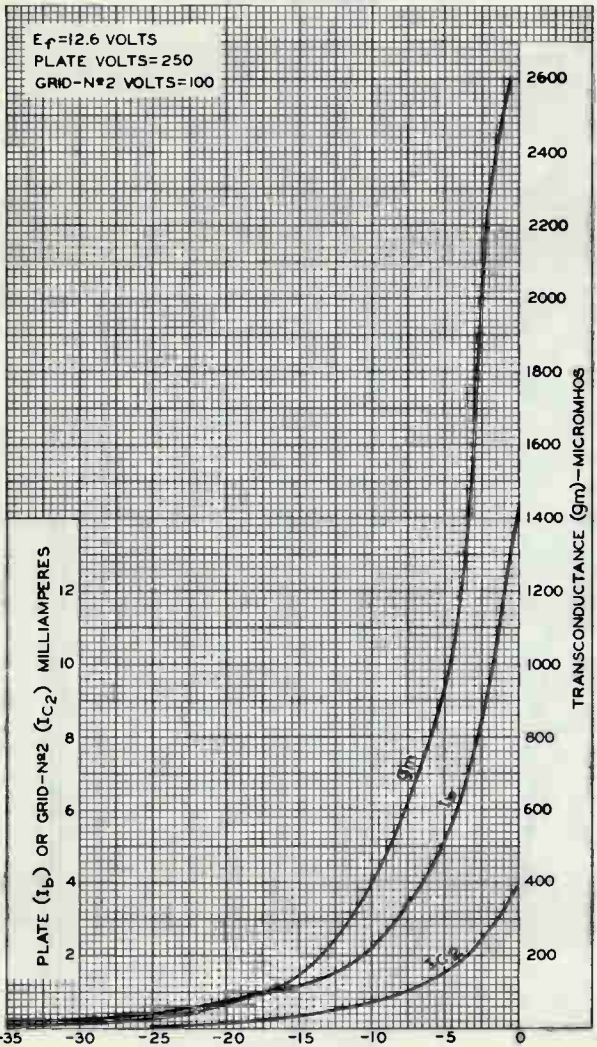
92CM-9006

12CR6

RCA

12CR6

AVERAGE CHARACTERISTICS
PENTODE UNIT



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, N.J.

92CM-9004

12D4

HALF-WAVE VACUUM RECTIFIER

Intended for TV damper service in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	12.6	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):°

Plate to cathode and heater	6	μμf
Cathode to plate and heater	8	μμf
Heater to cathode	3	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	*See General Section*
Bulb	T9
Base	Intermediate-Shell Octal 5-Pin, Arrangement 2 (JEDEC Group 1, No.B5-82), Intermediate-Shell Octal 6-Pin, Arrangement 1 (JEDEC Group 1, No.B6-8), Short Intermediate-Shell Octal 5-Pin with External Barriers, Arrangement 2 (JEDEC Group 1, No.B5-85), or Short Intermediate-Shell Octal 6-Pin with External Barriers, Arrangement 1 (JEDEC Group 1, No.B6-60)
Basing Designation for BOTTOM VIEW	4CG

Pin 1♦ - Same as Pin 2
Pin 2 - Internal Connection - Do Not Use●

Pin 3 - Cathode
Pin 5 - Plate
Pin 7 - Heater
Pin 8 - Heater

DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system□

PEAK INVERSE PLATE VOLTAGE*	4400	max.	volts
PEAK PLATE CURRENT	900	max.	ma
DC PLATE CURRENT	155	max.	ma

°, ♦, ●, □, *: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

12D4

HALF-WAVE VACUUM RECTIFIER

PLATE DISSIPATION.	5.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	4400▲	max.	volts
Heater positive with respect to cathode.	300#	max.	volts

○ without external shield.

◆ On the 5-pin bases, pin 1 as well as pins 4 and 6 is omitted.

● Socket terminals 1, 2, 4 and 6 should not be used as tie points.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

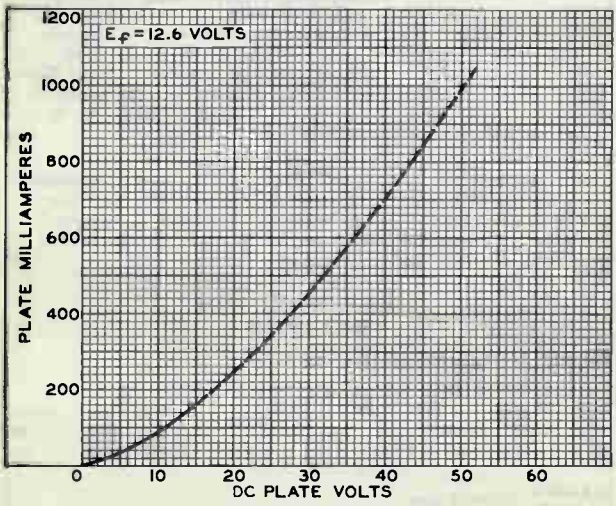
* This rating is applicable when the duty cycle of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

▲ The dc component must not exceed 900 volts.

The dc component must not exceed 100 volts.

4-59 TENTATIVE DATA

AVERAGE PLATE CHARACTERISTIC



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CS-9757

Beam Power Tube

9-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

The 12DB5 is the same as the 6DB5 except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

12DL8
TWIN DIODE—POWER TETRODE

9-PIN MINIATURE TYPE

For use in automobile radio receivers operating directly from 12-volt storage batteries

GENERAL DATA

Electrical:

Heater•, for Unipotential Cathodes:		
Voltage range. . . . 10.0 to 15.9		dc volts
This voltage range is on an absolute basis. For longest life, it is recommended that the heater be operated within the voltage range of 11 to 14 volts.		
Current (Approx.) at 12.6 volts 0.55		amp
Direct Interelectrode Capacitances:°		
Tetrode Unit:		
Grid No.2 to plate	14	μμf
Grid No.2 to cathode, grid No.1, and heater	12	μμf
Plate to cathode, grid No.1, and heater	1.3	μμf
Diode Units:		
Diode plate No.1 to diode cathode and heater	1.6	μμf
Diode plate No.2 to diode cathode and heater	1.6	μμf
Diode plate No.1 to diode plate No.2	0.03	μμf
Tetrode grid No.2 to diode plate No.1. .	0.02 max.	μμf
Tetrode grid No.2 to diode plate No.2. .	0.006 max.	μμf

Characteristics, Class A_1 Amplifier with 12.6 Volts on Heater (Tetrode Unit):

Plate Voltage.	12.6	volts
Grid-No.2 (Control-Grid) Voltage: Developed across a 2.2-megohm resistor	-0.5	volt
Grid-No.1 (Space-Charge-Grid) Voltage.	12.6	volts
Plate Resistance (Approx.)	480	ohms
Amplification Factor, Grid No.2 to Plate	7.2	
Transconductance, Grid No.2 to Plate . .	15000	μmhos
Plate Current.	40	ma
Grid-No.1 Current.	75	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip). . .	2" ± 3/32"
Maximum Diameter	7/8"
Dimensional Outline.	*See General Section*
Bulb	T6-1/2

•,°: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

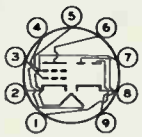
RCA

12DL8

TWIN DIODE—POWER TETRODE

Base . . . . . Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW 9HR

Pin 1 - Plate of Diode Unit No.2
Pin 2 - Cathode of Tetrode Unit
Pin 3 - Grid No.1 of Tetrode Unit
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Plate of Tetrode Unit
Pin 7 - Grid No.2 of Tetrode Unit
Pin 8 - Cathode of Diode Units No.1 & No.2
Pin 9 - Plate of Diode Unit No.1

TETRODE UNIT — AUDIO DRIVER

Maximum Ratings, ***Design-Center Values Except as Noted:***

PLATE VOLTAGE.	30	max.	volts
GRID-No.2 (CONTROL-GRID) VOLTAGE:			
Negative bias value.	-20	max.	volts
GRID-No.1 (SPACE-CHARGE-GRID) VOLTAGE (Absolute maximum)	16■	max.	volts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	30	max.	volts
Heater positive with respect to cathode	30	max.	volts

Typical Operation with 12.6 Volts on Heater:

Plate Voltage.	12.6		volts
Grid-No.2 Voltage:			
Obtained by rectification through 2.2-megohm resistor.	-2		volts
Peak AF Grid-No.2 Voltage:			
Obtained from 100000-ohm source. . . .	2.5		volts
Grid-No.1 Voltage.	12.6		volts
Zero-Signal Plate Current (Approx.). . .	40		ma
Max.-Signal Plate Current.	8		ma
Grid-No.1 Current.	75		ma
Load Resistance.	800		ohms
Total Harmonic Distortion.	10		%
Max.-Signal Power Output	40		mw

Maximum Circuit Values:

Grid-No.2-Circuit Resistance	10	max.	megohms

DIODE UNITS — Two

Maximum Ratings, ***Design-Center Values:***
Values are for Each Unit

PLATE CURRENT.	5	max.	ma

●.○.■: See next page.

12DL8

TWIN DIODE—POWER TETRODE

PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	30 max.	volts
Heater positive with respect to cathode .	30 max.	volts
Characteristics with 12.6 Volts on Heater:		
Plate Current for plate volts = 10.	3	ma

● Operation of heater in series with other heaters is not recommended.
○ Without external shield.
■ Under no circumstances should this absolute value be exceeded.

OPERATING CONSIDERATIONS

The *maximum ratings* in the tabulated data for the 12DL8, except the rating for grid-No.1 (space-charge-grid) voltage, are working design-center maximums established according to the standard design-center system of rating electron tubes. Tubes so rated will give satisfactory performance in storage-battery-operated equipment provided the following stipulations are observed:

In the case of storage-battery-with-charger supply or similar supplies, the normal battery-voltage fluctuation may be as much as 35 per cent or more. This fluctuation imposes severe operating conditions on tubes. Under these conditions, the equipment should be designed so that 90 per cent of the design-center maximum value of plate voltage is never exceeded for a battery terminal potential of 13.2 volts. Although the operating voltages of the 12DL8 in this service will, at times, exceed the design-center maximum values, satisfactory performance with probable sacrifice in life will be obtained.

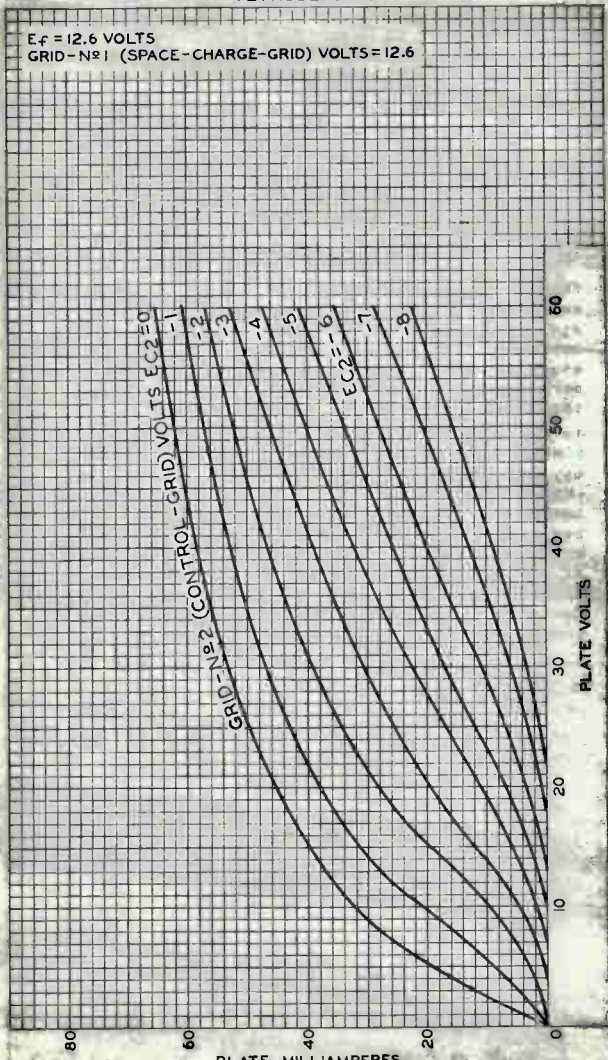
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12DL8

12DL8

AVERAGE PLATE CHARACTERISTICS

TETRODE UNIT



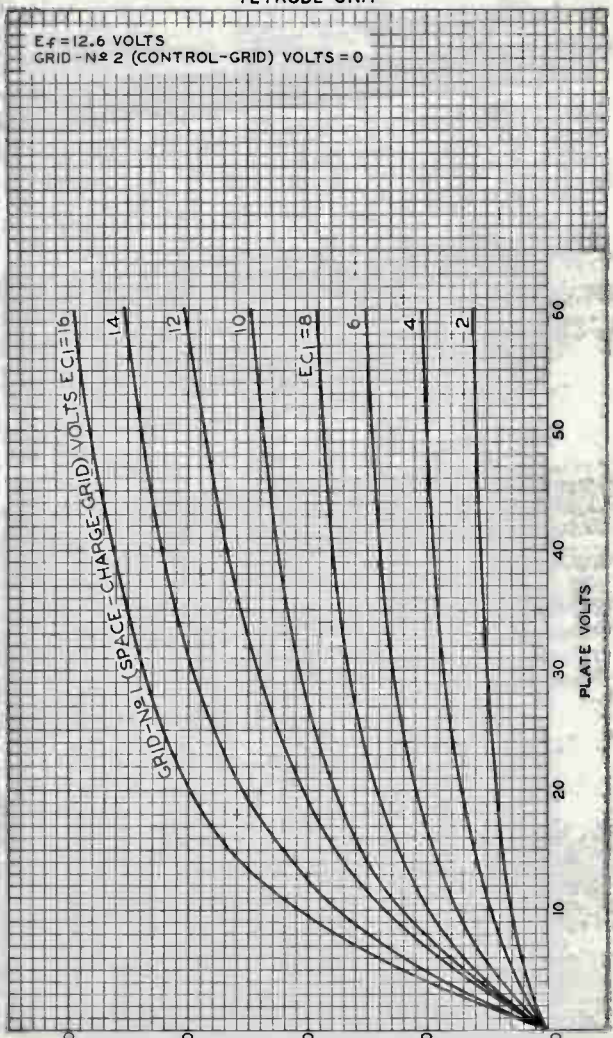
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-9422

RCA

12DL8

AVERAGE PLATE CHARACTERISTICS

TETRODE UNIT



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92CM-9423

12DM4

Half-Wave Vacuum Rectifier

For Damper Service in TV Equipment Having Series Heater-String Arrangement

The 12DM4 is the same as the 6DM4 except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

12DQ6A

Beam Power Tube

For Equipment Having Series Heater-String Arrangement

The 12DQ6A is the same as the 6DQ6A except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

12DQ6B

Beam Power Tube

For Equipment Having Series Heater-String Arrangement

The 12DQ6B is the same as the 6DQ6B except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec

12DT5
BEAM POWER TUBE

9-PIN MINIATURE TYPE

Intended for use in equipment having series heater-string arrangement

The 12DT5 is the same as the 6DT5 except for the following items:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)	12.6		volts
Current	0.6	± 6%	amp
Warm-up time (Average)	11		sec

12DT8
HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

The 12DT8 is the same as the 6DT8 except for the following items:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)	12.6		volts
Current	0.15		amp

RCA

12DZ6

REMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

For use in automobile radio receivers operating directly from 6-cell storage-battery systems

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage range (DC)	10 to 15.9	volts
For longest life, it is recommended that the heater be operated within the voltage range of 11 to 14 volts.		
Current (Approx.) at 12.6 volts	0.19	amp
Direct Interelectrode Capacitances:[o]		
Grid No.1 to plate	0.05 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	9.5	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	4	μμf

Characteristics, Class A_1 Amplifier:

Heater Voltage	12.6	volts
Plate Voltage	12.6	volts
Grid No.3 and Internal Shield	*Connected to cathode at socket*	
Grid-No.2 Voltage	12.6	volts
Grid-No.1 Supply Voltage	0	volts
Grid-No.1 Resistor (Bypassed)	10	megohms
Grid-No.3 Resistor (Bypassed)	10	megohms
Plate Resistance (Approx.)	25000	ohms
Transconductance	3800	μmhos
Plate Current	4.5	ma
Grid-No.2 Current	2.2	ma
Grids No.1 and No.3 Supply Voltage (Approx.) for transconductance, grid No.1 to plate (μmhos) = 10	-10	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BK

Pin 1 - Grid No.1
Pin 2 - Grid No.3, Internal Shield
Pin 3 - Heater

Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode

[o] Without external shield.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

12DZ6

REMOTE-CUTOFF PENTODE

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	16 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) VOLTAGE	16 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	16 max.	volts
Heater positive with respect to cathode	16 max.	volts

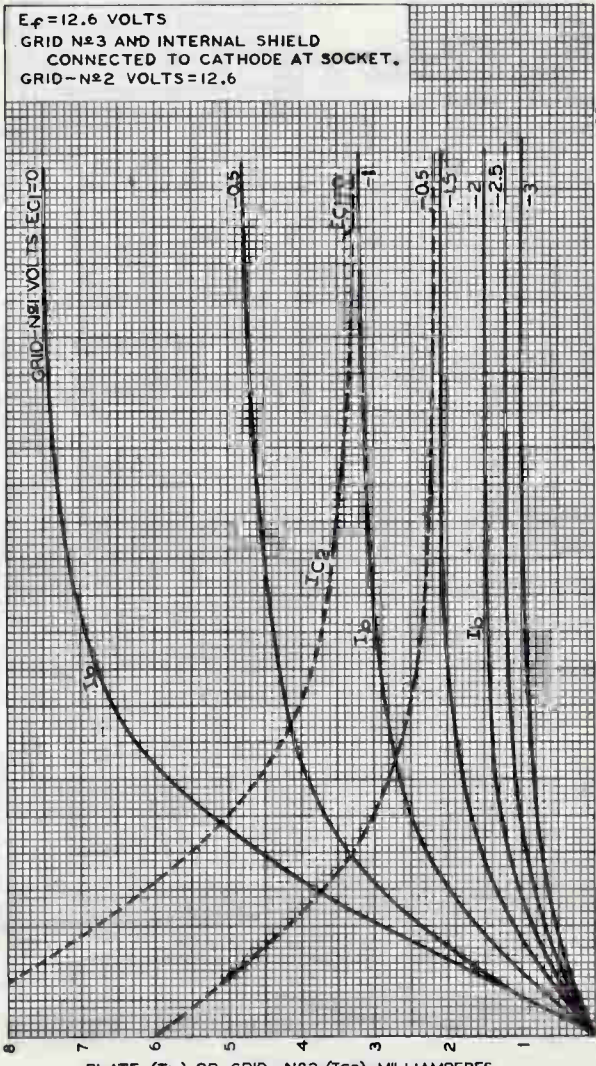
Maximum Circuit Values:

Grid-No.1-Circuit Resistance	10 max.	megohms
Grid-No.3-Circuit Resistance	10 max.	megohms

RCA

12DZ6

AVERAGE CHARACTERISTICS



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

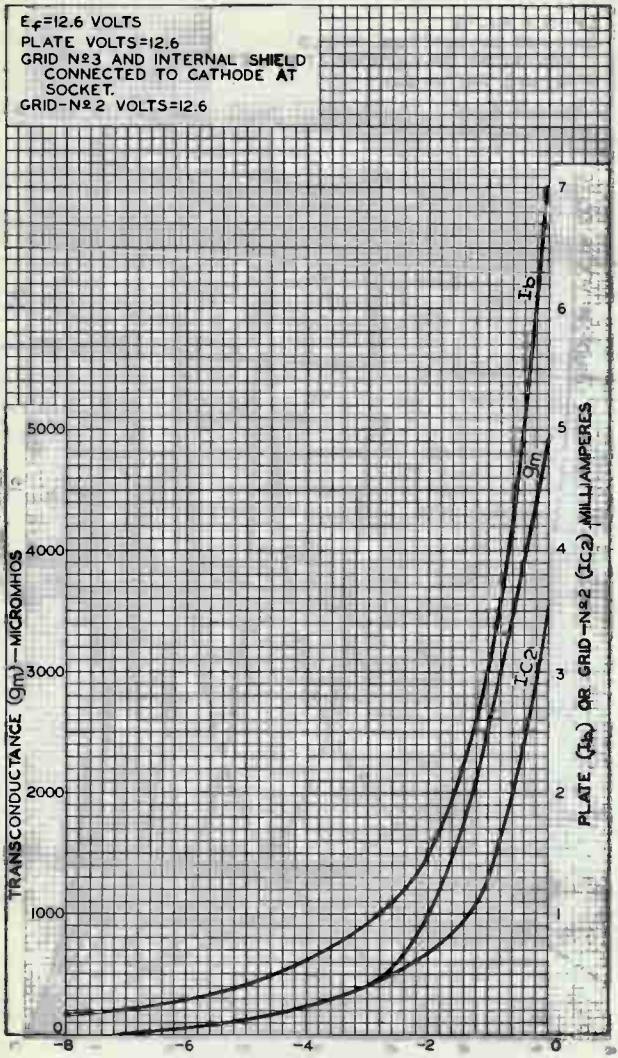
92CM-10399

12DZ6

RCA

12DZ6

AVERAGE CHARACTERISTICS



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, N.J.
92CM—10404

12FQ7

Medium-Mu Twin Triode

9-Pin Miniature Type

Controlled Heater Warm-up Time

The 12FQ7 is the same as the 6FQ7 except for:

Heater Characteristics and Ratings

Current	0.300 + 0.020 A
Voltage (ac or dc) at 0.300 A	12.6 V

High-Mu Twin Double-Plate Triode

9-PIN MINIATURE TYPE

For Frequency-Divider and Complex-Wave-Generator Circuits of Electronic Musical Instruments

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6 ± 10%	volts
Current at 12.6 volts	0.15	amp
Direct Interelectrode Capacitances (Approx.):[A]		
Grid to either plate (Each unit)	0.9	μμf
Grid to cathode and heater (Each Unit)	1.8	μμf
Plate A of unit No.1 to cathode and heater	0.34	μμf
Plate B of unit No.1 to cathode and heater	0.24	μμf
Plate A of unit No.2 to cathode and heater	0.3	μμf
Plate B of unit No.2 to cathode and heater	0.18	μμf
Plate A to plate B (Each unit)	0.7	μμf
Plate A of unit No.1 to plate A of unit No.2	0.4	μμf

Characteristics, Class A$_1$ Amplifier (Each Unit):

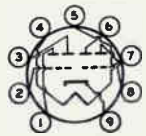
Using either plate A or plate B, with plate not in use connected to ground

Plate Voltage	250	volts
Grid Voltage	-1.5	volts
Amplification Factor	95	
Plate Resistance (Approx.)	76000	ohms
Transconductance	1250	μmhos
Plate Current	1.5	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9KT

Pin 1 - Plate B of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Plate A of Unit No.2
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Plate B of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Plate A of Unit No.1
Pin 9 - Cathode

12FQ8

FREQUENCY-DIVIDER & COMPLEX-WAVE-GENERATOR SERVICE

Values are for Each Unit

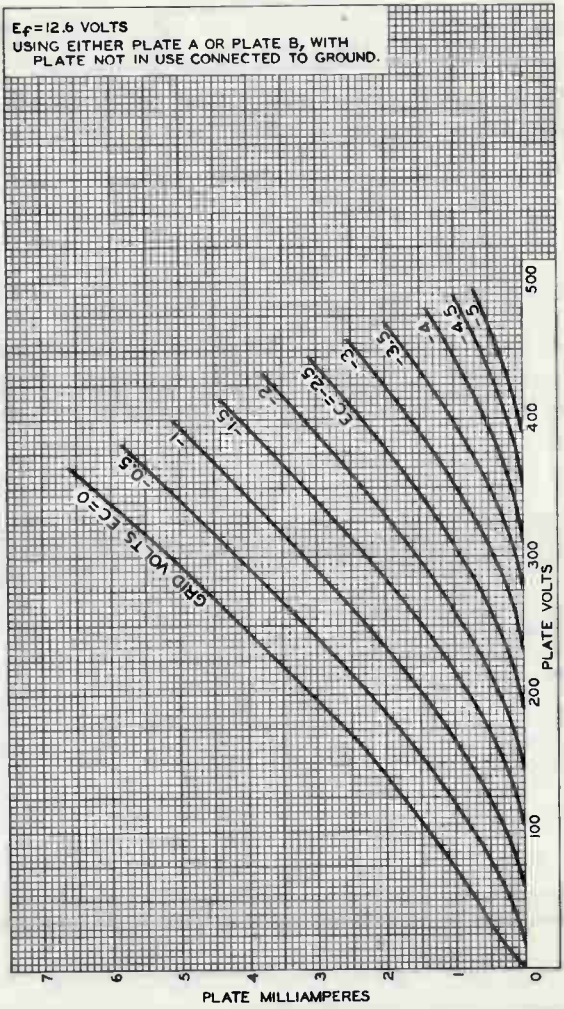
Maximum Ratings, ***Design-Maximum Values:***

PLATE A VOLTAGE	330	max.	volts
PLATE B VOLTAGE	330	max.	volts
GRID VOLTAGE:			
Positive-bias value	0	max.	volts
PLATE A DISSIPATION	0.5	max.	watt
PLATE B DISSIPATION	0.5	max.	watt
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200●	max.	volts

▲ Without external shield.

● The dc component must not exceed 100 volts.

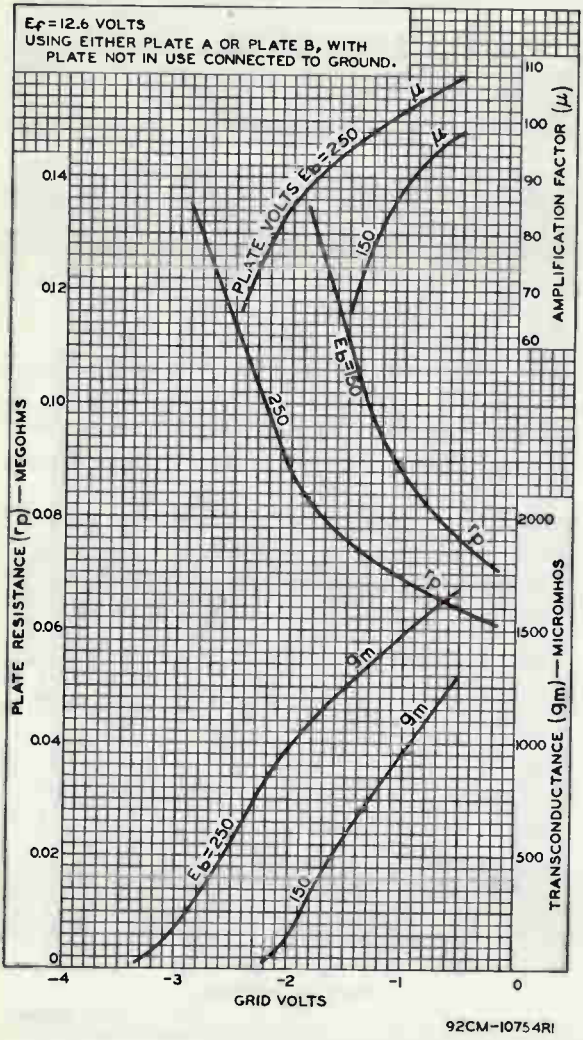
AVERAGE PLATE CHARACTERISTICS
Each Unit



92CM-10755RI

12FQ8

AVERAGE CHARACTERISTICS
Each Unit



92CM-10754RI

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

Power Pentode

7-PIN MINIATURE TYPE

The 12FX5 is the same as the 6oFX5 except for the following items:

Heater Characteristics and Ratings:				
Voltage (AC or DC)	12.6[a]		12.6 ± 1.3	volts
Current	0.450 ± 0.030		0.450[b]	amp
Warm-up time (Average)	11		–	sec

[a] At heater amperes = 0.450.
[b] At heater volts = 12.6.

Beam Power Tube

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	12.6	volts
Current	0.6 ± 6%	amp
Warm-up time (Average)	11	sec
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.55	μμf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	15	μμf
Plate to cathode, grid No.3, grid No.2, and heater	7	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	60	250	volts
Grid-No.2 Voltage	150	150	volts
Grid-No.1 Voltage	0	-22.5	volts
Triode Amplification Factor for plate volts = grid-No.2 volts = 150	–	4.1	
Plate Resistance (Approx.)	–	20000	ohms
Transconductance	–	6600	μmhos
Plate Current	345[b]	75	ma
Grid-No.2 Current	30[b]	2.4	ma
Grid-No.1 Voltage (Approx.) for plate ma. = 1	–	-46	volts
Grid-No.1 Voltage (Approx.) for peak positive-pulse plate volts = 5000, grid-No.2 volts = 150, and plate ma. = 1	–	-100	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	4-1/4"
Seated Length	3-1/2" ± 3/16"
Maximum Diameter	1-9/16"
Bulb	T12
Cap	Skirted Miniature (JEDEC No.C1-3)
Base	Short Medium-Shell Octal 6-Pin with External Barriers, Arrangement 2, Style B, (JEDEC Group 1, No.B6-122)
Basing Designation for BOTTOM VIEW	8JX

Pin 2 - Heater
Pin 3 - Cathode, Grid No.3
Pin 4 - Grid No.2
Pin 5 - Grid No.1
Pin 7 - Heater
Pin 8 - Grid No.2
Cap - Plate

HORIZONTAL-DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

DC PLATE VOLTAGE	770	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE[d]	6500	max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1500	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	220	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE	330	max.	volts
CATHODE CURRENT:			
Peak	550	max.	ma
Average	175	max.	ma
GRID-No.2 INPUT	4.5	max.	watts
PLATE DISSIPATION[e]	17.5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[f]	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	220	max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1	max.	megohm

[a] Without external shield.

[b] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[d] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[e] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

[f] The dc component must not exceed 100 volts.

12GE5

Beam Power Tube

DUODECAR TYPE

The 12GE5 is the same as the 6GE5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

12GJ5

Beam Power Tube

NOVAR TYPE

The 12GJ5 is the same as the 6GJ5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

12GT5

Beam Power Tube

NOVAR TYPE

The 12GT5 is the same as the 6GT5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

12GT5A

Beam Power Tube

NOVAR TYPE

The 12GT5A is the same as the 6GT5A except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

12GW6

Beam Power Tube

The 12GW6 is the same as the 6GW6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.600 ± 0.040	amp
Voltage (AC or DC) at heater amperes = 0.600	12.6	volts
Warm-up time (Average)	11	sec

12H6

Twin Diode

The 12H6 is the same as the 6H6 except for the following items:

Heater Characteristics and Ratings:

Voltage (AC or DC)	12.6	volts
Current	0.150	amp

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Sharp-Cutoff Pentode

FRAME-GRID CONSTRUCTION **T9 ENVELOPE**
9-PIN LARGE-BUTTON NEONOVAL BASE

For Video Output Amplifier Service in Color TV Receivers

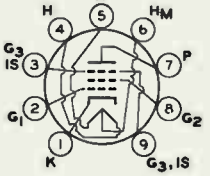
Electrical:

Heater Characteristics and Ratings:			
Heater-section arrangement	Series	Parallel	
Voltage (AC or DC)	12.6 ± 1.3[a]	6.3 ± 0.6	volts
Current	0.260	0.520[b]	amp
Maximum heater-cathode voltage:			
Heater negative with respect to cathode		200	volts
Heater positive with respect to cathode:			
Peak		200	volts
DC component		100	volts
Direct Interelectrode Capacitances:[c]			
Grid No.1 to plate		0.15 max.	pf
Input: G1 to (K,G3 + IS,G2,H)		14.0	pf
Output: P to (K,G3 + IS,G2,H)		4.4	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2.930"
Maximum Seated Length	2.620"
Length, Base Seat to Bulb Top (Excluding tip)	2.070" to 2.310"
Diameter	1.062" to 1.188"
Dimensional Outline	(JEDEC No.9-70)
Bulb	T9
Base	Large-Button Neonoval 9-Pin (JEDEC No.E9-68)
Basing Designation for BOTTOM VIEW	9BF

Pin 1 – Cathode
Pin 2 – Grid No.1
Pin 3 – Grid No.3, Internal Shield
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Heater Tap
Pin 7 – Plate
Pin 8 – Grid No.2
Pin 9 – Grid No.3, Internal Shield



Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	300	volts
Grid No.3	Connected to cathode at socket	
Grid-No.2 Supply Voltage	135	volts
Grid No.1	Connected to negative end of cathode resistor	
Cathode Resistor	47	ohms
Plate Resistance (Approx.)	60000	ohms
Transconductance	32000	μmhos
Plate Current	31	ma

Grid-No.2 Current	4.8	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	-4.5	volts

CLASS A$_1$ AMPLIFIER

Maximum Ratings, *Design-Maximum Values:*

Plate Voltage	400	volts
Grid-No.2 (Screen-Grid) Supply Voltage	330	volts
Grid-No.2 Voltage	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Grid-No.1 (Control-Grid) Voltage:		
Positive-bias value	0	volts
Grid-No.2 Input:		
For grid-No.2 voltages up to 165 volts	1	watt
For grid-No.2 voltages between 165 and 330 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
Plate Dissipation	10	watts

Maximum Circuit Values:

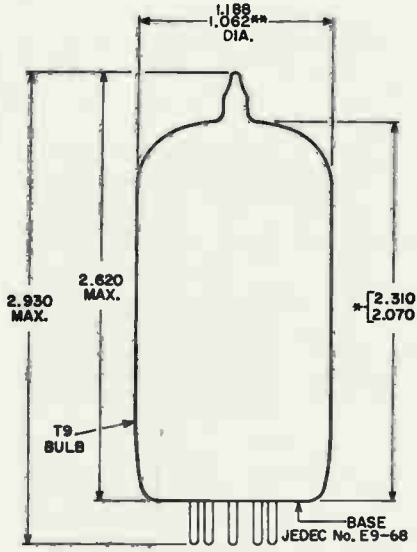
Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1	megohm
For cathode-bias operation	0.25	megohm

[a] At heater amperes = 0.260.
[b] At heater volts = 6.3.
[c] Without external shield.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

DIMENSIONAL OUTLINE

JEDEC No. 9-70



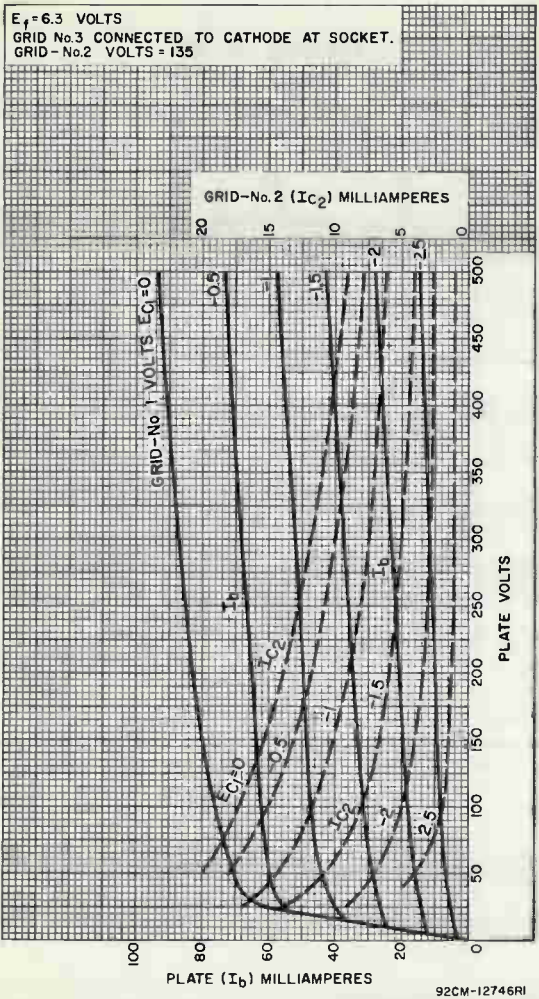
92CS-11115R2

DIMENSIONS IN INCHES

** Applies in zone starting 0.375" from base seat.

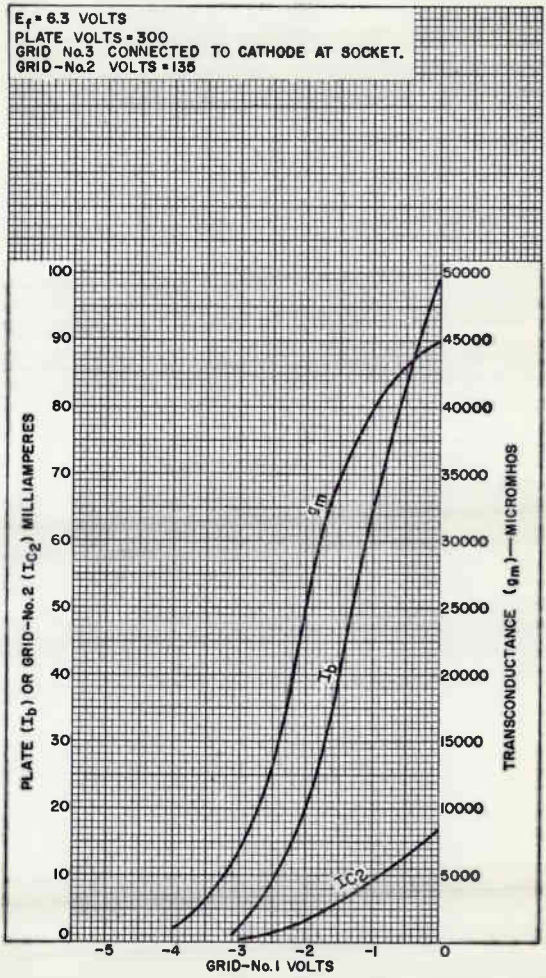
* Measured from base seat to bulb-top line as determined by a ring gauge of 0.600" inside diameter.

AVERAGE CHARACTERISTICS



RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

AVERAGE CHARACTERISTICS



92CM-12747RI

12JB6A

Beam Power Tube

NOVAR TYPE

The 12JB6A is the same as the 6JB6A except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	12.6	V
Warm-up time (Average)	11	s

12JQ6

Beam Power Tube
with an Integral Diode

The 12JQ6 is the same as the 6JQ6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	12.6	V
Warm-up time (Average)	11	s

12JT6A

Beam Power Tube

NOVAR TYPE

The 12JT6A is the same as the 6JT6A except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	12.6	V
Warm-up time (Average)	11	s

12MN8

High-Mu Triple Triode

DUODECAR TYPE

The 12MN8 is the same as the 6MN8 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	12.6	V
Warm-up time (Average)	11	s

12SA7

Pentagrid Converter

The 12SA7 is the same as the 6SA7 except for the following items:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	12.6	volts
Current	0.150	amp

12SJ7

Sharp-Cutoff Pentode

The 12SJ7 is the same as the 6SJ7 except for the following items:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	12.6	volts
Current	0.150	amp

12SL7GT

High-Mu Twin Triode

The 12SL7GT is the same as the 6SL7GT except for the following items:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	12.6	volts
Current	0.150	amp

12SN7GTA

Medium-Mu Twin Triode

The 12SN7GTA is the same as the 6SN7GTA except for the following items:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	12.6	volts
Current	0.300	amp

12SQ7

Twin Diode-Medium-Mu Triode

The 12SQ7 is the same as the 6SQ7 except for the following items:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	12.6	volts
Current	0.150	amp

12V6GT

Beam Power Tube

The 12V6GT is the same as the 6V6GT except for the following items:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	12.6	volts
Current	0.225	amp

12W6GT

Beam Power Tube

The 12W6GT is the same as the 6W6GT except for the following items:

Heater Characteristics and Ratings:		
Current	0.600	amp
Voltage (AC or DC)	12.6	volts
Warm-up time (Average)	11	sec
Peak Heater-Cathode Voltage:		
Heater negative with respect to cathode	300 max.	volts
Heater positive with respect to cathode	200[a] max.	volts

[a] The dc component must not exceed 100 volts.

12X4

Full-Wave Vacuum Rectifier

The 12X4 is the same as the 6X4 except for the following items:

Heater Characteristics and Ratings:		
Current	0.300	amp
Voltage (AC or DC) at heater, amperes = 0.300	12.6	volts

13CW4

High-Mu Triode

NUVISTOR TYPE

For Use as Grounded-Cathode, Neutralized RF-Amplifier Tube in Tuners of VHF Television and FM Receivers

The 13CW4 is the same as the 6CW4 except for the following items:

Heater Characteristics and Ratings:		
Current	0.060	amp
Voltage (AC or DC) at heater, amperes = 0.060	13.5	volts

13DE7

Dual Triode

With Medium-Mu Unit and Low-Mu Unit

9-PIN MINIATURE TYPE

The 13DE7 is the same as the 6DE7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater, amperes = 0.450	13.0	volts
Warm-up time (Average)	11	sec

13DR7

Dual Triode

With High-Mu Unit and Low-Mu Unit

The 13DR7 is the same as the 6DR7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ±0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	13.0	volts
Warm-up time (Average)	11	sec

13EM7

Dual Triode

With High-Mu Unit and Low-Mu Unit

The 13EM7 is the same as the 6EM7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	13.0	volts
Warm-up time (Average)	11	sec

13FD7

Dual Triode

With High-Mu Unit and Low-Mu Unit

The 13FD7 is the same as the 6FD7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	13.0	volts
Warm-up time (Average)	11	sec

13FM7

Dual Triode

With High-Mu Unit and Low-Mu Unit

DUODECAR TYPE

The 13FM7 is the same as the 6FM7 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	13.0	V
Warm-up time (Average)	11	s

13GB5

Beam Power Tube

The 13GB5 is the same as the 6GB5 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A.	13.3	V

13GF7

Dual Triode

With High-Mu Unit and Low-Mu Unit

NOVAR TYPE

The 13GF7 is the same as the 6GF7 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	13.0	V
Warm-up time (Average)	11	s

13GF7A

Dual Triode

With High-Mu Unit and Low-Mu Unit

NOVAR TYPE

The 13GF7A is the same as the 6GF7A except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	13.0	V
Warm-up time (Average)	11	s

13J10

Pentode — Beam Power Tube

DUODECAR TYPE

The 13J10 is the same as the 6J10 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	13.2	V
Warm-up time (Average)	11	s

13Z10

Pentode — Beam Power Tube

DUODECAR TYPE

The 13Z10 is the same as the 6Z10 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	13.2	V
Warm-up time (Average)	11	s

Twin Diode—High-Mu Triode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:		
Voltage (AC or DC)	14 ± 10%	volts
Current at 14 volts	0.15	amp
Direct Interelectrode Capacitances:▲		
Triode Unit:		
Grid to plate	1.8	μμf
Grid to cathode and heater	1.6	μμf
Plate to cathode and heater	0.24	μμf
Diode Units:		
Diode-No.1 plate to triode grid	0.09 max.	μμf
Diode-No.2 plate to triode grid	0.07 max.	μμf
Either diode cathode to all other tube electrodes	6.5	μμf
Diode plate to cathode and heater (Each unit)	2.4	μμf

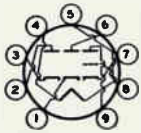
Characteristics, Class A_1 Amplifier (Triode Unit):

Plate Voltage	250	volts
Grid Voltage	-3	volts
Amplification Factor	72	
Plate Resistance (Approx.)	72000	ohms
Transconductance	1000	μmhos
Plate Current	0.7	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9KR

Pin 1 – Diode-No.2 Cathode
Pin 2 – Diode-No.1 Plate
Pin 3 – Diode-No.1 Cathode
Pin 4 – Heater



Pin 5 – Heater
Pin 6 – Diode-No.2 Plate
Pin 7 – Triode Cathode
Pin 8 – Triode Grid
Pin 9 – Triode Plate

TRIODE UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330 max.	volts

GRID VOLTAGE:			
Positive-bias value	0	max.	volts
PLATE DISSIPATION	1.1	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200●	max.	volts

DIODE UNITS — Two

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE CURRENT	5	max.	ma
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200●	max.	volts

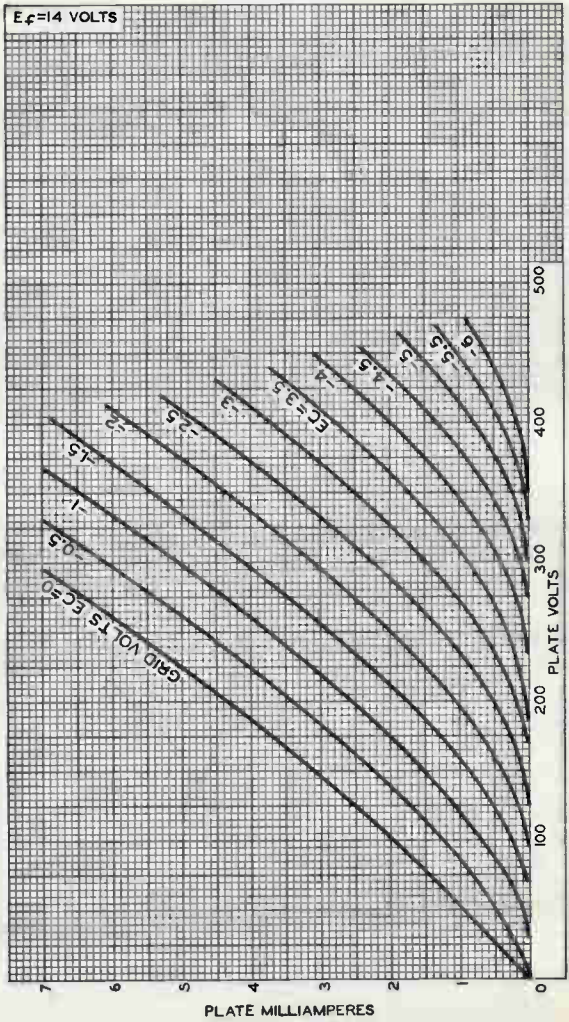
Characteristics, Instantaneous Test Condition:

Plate Current for plate volts = 5	18	ma

▲ Without external shield.

● The dc component must not exceed 100 volts.

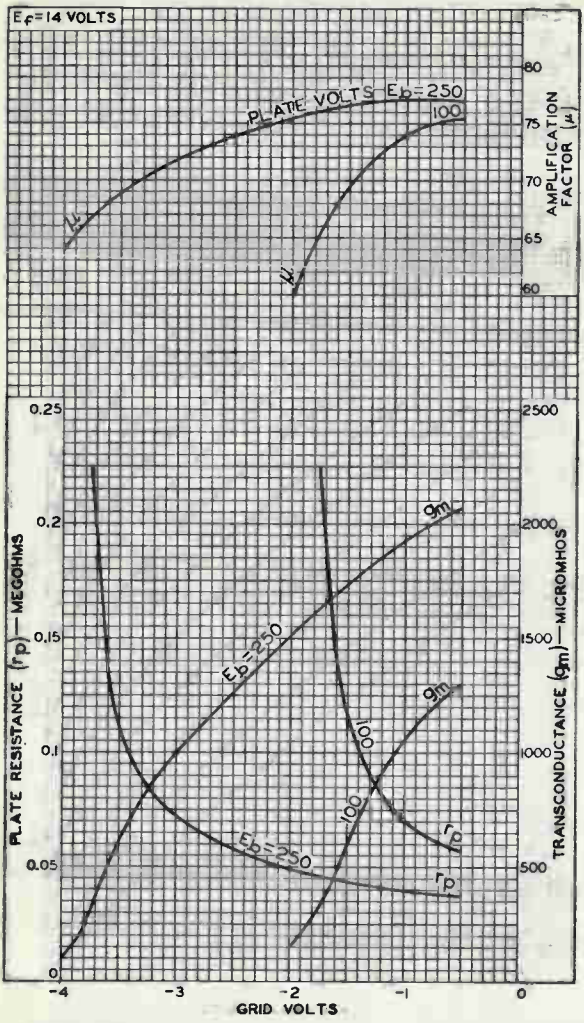
AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-10835

14GT8

AVERAGE CHARACTERISTICS
Triode Unit



92CM-10838

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

15AF11

Dual Triode—
Sharp-Cutoff Pentode

DUODECAR TYPE

The 15AF11 is the same as the 6AF11 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at 0.450 amp	14.7	volts
Warm-up time (Average)	11	sec

15BD11

Dual Triode—
Sharp-Cutoff Pentode

DUODECAR TYPE

The 15BD11 is the same as the 6BD11 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at 0.450 amp	14.7	volts
Warm-up time (Average)	11	sec

15CW5

Beam Power Tube

The 15CW5 is the same as the 6CW5 except for the following items:

Heater Characteristics and Ratings:		
Current	0.300 ± 0.020	amp
Voltage (AC or DC) at 0.300 amp	15.0	volts

15FM7

Dual Triode

DUODECAR TYPE

The 15FM7 is the same as the 6FM7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at 0.450 amp	14.8	volts
Warm-up time (Average)	11	sec

15FY7

Dual Triode

DUODECAR TYPE

The 15FY7 is the same as the 6FY7 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at 0.450 amp	14.7	volts
Warm-up time (Average)	11	sec

15HB6

Power Pentode

The 15HB6 is the same as the 6HB6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.300 ± 0.020	amp
Voltage (AC or DC) at 0.300 amp	14.7	volts
Warm-up time (Average)	11	sec

High-Mu Triode—Beam Power Tube

NOVAR TYPE

For Combined Vertical-Deflection Oscillator and Amplifier Service in TV Receivers

The 15KY8A is the same as the 6KY8A except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	15.0	volts
Warm-up time (Average)	11	sec

16GK6

Power Pentode

9-PIN MINIATURE TYPE

The 16GK6 is the same as the 6GK6 except for the following items:

Heater Characteristics and Ratings:		
Current	0.300 ± 0.020	amp
Voltage (AC or DC) at heater amperes = 0.300	16.0	volts
Warm-up time (Average)	11	sec

17AX3

Half-Wave Vacuum Rectifier

DUODECAR TYPE

The 17AX3 is the same as the 6AX3 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	16.8	volts
Warm-up time (Average)	11	sec

17AX4GTA

Half-Wave Vacuum Rectifier

For TV Damper Service

The 17AX4GTA is the same as the 6AX4GTB except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	16.8	volts
Warm-up time (Average)	11	sec

17AY3,17AY3A

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 17AY3 and 17AY3A are the same as the 6AY3 and 6AY3B, respectively, except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	16.8	volts
Warm-up time (Average)	11	sec

17BE3

Half-Wave Vacuum Rectifier

DUODECAR TYPE

The 17BE3 is the same as the 6BE3 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	16.8	volts
Warm-up time (Average)	11	sec

17BF11

Beam Power Tube— Sharp-Cutoff Pentode

DUODECAR TYPE

The 17BF11 is the same as the 6BF11 except for the following items:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	16.8	volts
Warm-up time (Average)	11	sec

17BH3A

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 17BH3A is the same as the 6BH3A except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A.	17	V
Warm-up time (Average)	11	s

17BS3A

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 17BS3A is the same as the 6BS3A except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	16.8	V
Warm-up time (Average)	11	s

17CK3

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 17CK3 is the same as the 6CK3 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A.	16.8	V
Warm-up time (Average)	11	s

17CT3

Half-Wave Vacuum Rectifier

9-PIN MINIATURE TYPE
For TV Damper Service

The 17CT3 is the same as the 6CT3 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	16.8	V
Warm-up time (Average)	11	s

17CU5

Beam Power Tube

7-PIN MINIATURE TYPE

The 17CU5 is the same as the 6CU5 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	16.8	V
Warm-up time (Average)	11	s

17D4

Half-Wave Vacuum Rectifier

For TV Damper Service

The 17D4 is the same as the 6DA4 except for the following items:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450 A	16.8	V
Warm-up time (Average)	11	s

17DE4

Half-Wave Vacuum Rectifier

For TV Damper Service

The 17DE4 is the same as the 6DE4 except for the following items:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (AC or DC) at 0.600 A	17	V
Warm-up time (Average)	11	s

Half-Wave Vacuum Rectifier

For Television Damper Service

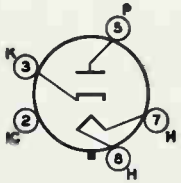
Electrical:

Heater Characteristics and Ratings:		
Current	0.450 ± 0.030	amp
Voltage (AC or DC) at heater amperes = 0.450	16.8	volts
Warm-up time (Average)	11	sec
Maximum heater–cathode voltage:		
Heater negative with respect to cathode[a]		
Peak	5000	volts
DC component	900	volts
Heater positive with respect to cathode		
Peak	300	volts
DC component	100	volts
Direct Interelectrode Capacitances (Approx.):		
P to (K,H)	8.5	pf
K to (P,H)	11.5	pf
Heater to cathode	4.0	pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3-13/16"
Maximum Seated Length	3-1/4"
Maximum Diameter	1-9/32"
Bulb	T9
Base . . Short Intermediate–Shell Octal 5–Pin (JEDEC No. B5-85)	
Basing Designation for BOTTOM VIEW	4CG

Pin 2 – Do Not Use[b]
Pin 3 – Cathode
Pin 5 – Plate
Pin 7 – Heater
Pin 8 – Heater



DAMPER SERVICE

Maximum Ratings, *Design-Maximum Values:*

For operation in a 525-line, 30-frame system[c]

Peak Inverse Plate Voltage[a]	5000	volts
Peak Plate Current	1200	ma
DC Plate Current	200	ma
Plate Dissipation	6.5	watts

Characteristics, Instantaneous Value:

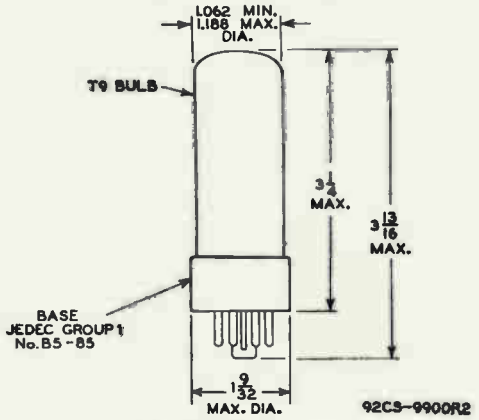
Tube Voltage Drop for plate ma = 400	35	volts

[a] This rating is applicable when the duty cycle of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30 frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

[b] Socket terminals 1, 2, 4 and 6 should not be used as tie points.

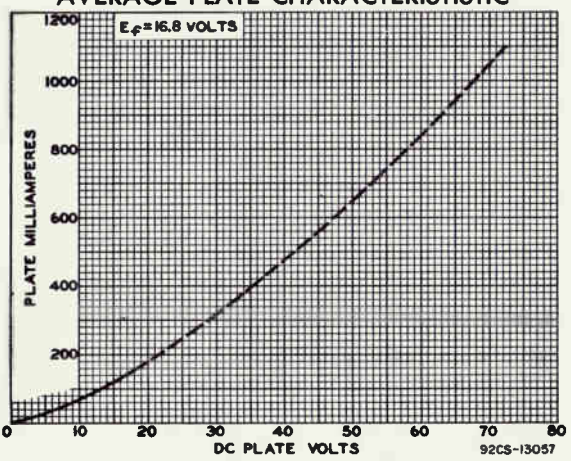
[c] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

AVERAGE PLATE CHARACTERISTISTIC



RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

17JQ6

Beam Power Tube
With an Integral Diode

The 17JQ6 is the same as the 6JQ6 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	17.0	V
Warm-up time (Average)	11	s

17JR6

Beam Power Tube

Novar Type

The 17JR6 is the same as the 6JR6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	16.8	V
Warm-up time (Average)	11	s

17JT6A

Beam Power Tube

Novar Type

The 17JT6A is the same as the 6JT6A except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	16.8	V
Warm-up time (Average)	11	s

17JZ8

Medium-Mu Triode—
Beam Power Tube

Duodecar Type

The 17JZ8 is the same as the 6JZ8 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	16.8	V
Warm-up time (Average)	11	s

17KV6

Beam Power Tube

Novar Type

The 17KV6 is the same as the 6KV6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600A	16.8	V
Warm-up time (Average)	11	s

17KV6A

Beam Power Tube

Novar Type

The 17KV6A is the same as the 6KV6A except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600A	16.8	V
Warm-up time (Average)	11	s

17GJ5A

Beam Power Tube

NOVAR TYPE

The 17GJ5A is the same as the 6GJ5A except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030 A
Voltage (AC or DC) at 0.450 A	16.8 V
Warm-up time (Average)	11 s

17GW6/17DQ6B

Beam Power Tube

NOVAR TYPE

The 17GW6/17DQ6B is the same as the 6GW6 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030 A
Voltage (AC or DC) at 0.450 A	16.8 V
Warm-up time (Average)	11 s

17JB6A

Beam Power Tube

NOVAR TYPE

The 17JB6A is the same as the 6JB6A except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030 A
Voltage (AC or DC) at 0.450 A	16.8 V
Warm-up time (Average)	11 s

17JF6

Beam Power Tube

NOVAR TYPE

The 17JF6 is the same as the 6JF6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040 A
Voltage (AC or DC) at 0.600 A	16.8 V
Warm-up time (Average)	11 s

17JG6A

Beam Power Tube

NOVAR TYPE

The 17JG6A is the same as the 6JG6A except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040 A
Voltage (AC or DC) at 0.600 A	16.8 V
Warm-up time (Average)	11 s

Remote-Cutoff Pentode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	18	volts
Current	0.1 ± 6%	amp
Warm-up time (Average)	20	sec
Direct Interelectrode Capacitances:[a]		
Grid No.1 to plate	0.0035 max.	μμf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	5.5	μμf
Plate to cathode, grid No.3, grid No.2, and heater	5	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	100	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	100	volts
Cathode Resistor	68	ohms
Plate Resistance (Approx.)	0.25	megohm
Transconductance	4400	μmhos
Plate Current	11	ma
Grid-No.2 Current	4.4	ma
Grid-No.1 Voltage (Approx.) for transconductance (μmhos) = 25	-20	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CC

Pin 1 – Grid No.1
Pin 2 – Grid No.3, Internal Shield
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Cathode

18FW6A

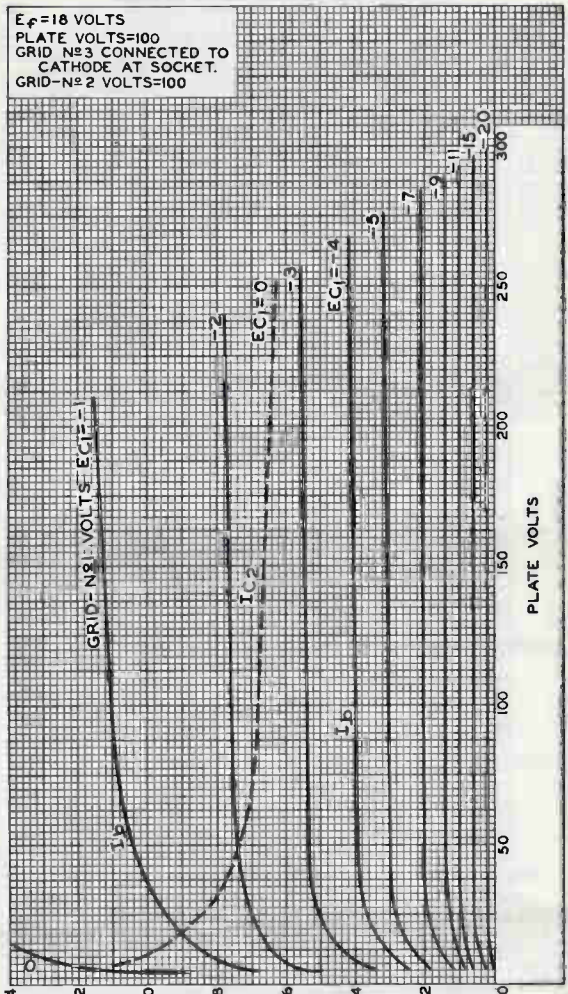
AMPLIFIER — Class A[1]

Maximum Ratings, *Design-Maximum Values;*

PLATE VOLTAGE	150 max.	volts
GRID No.3 (SUPPRESSOR GRID)	*Connected to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	150 max.	volts
GRID-No.2 VOLTAGE	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.2 INPUT:		
For grid-No.2 voltages up to 75 volts	0.6 max.	watt
For grid-No.2 voltages between 75 and 150 volts	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

[1] With external shield JEDEC No.316 connected to cathode.

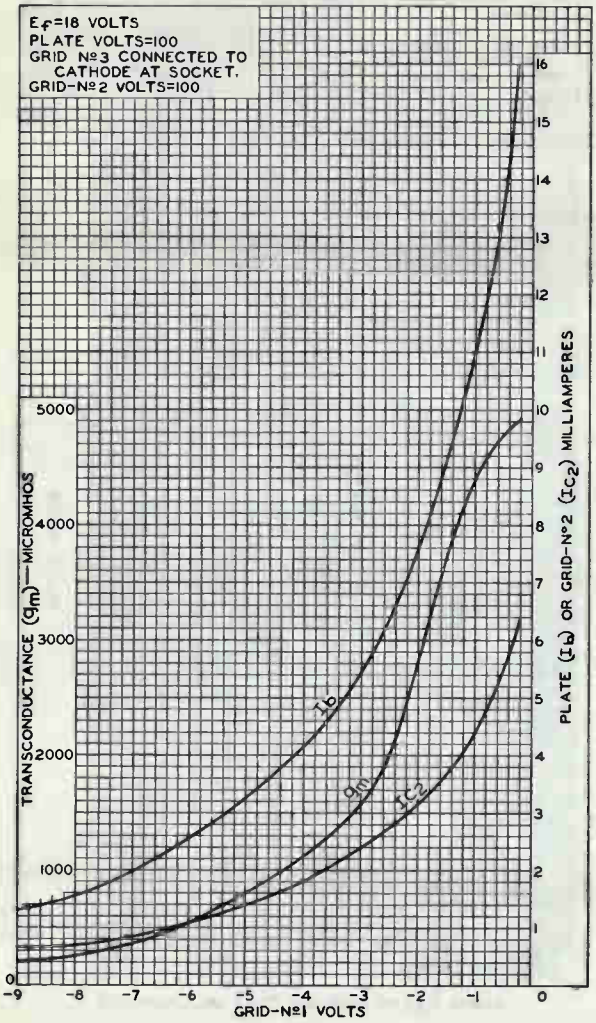
AVERAGE CHARACTERISTICS



92CM-10778

18FW6A

AVERAGE CHARACTERISTICS



92CM-10776

Pentagrid Converter

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)	18		volts
Current	0.1 ± 6%		amp
Warm-up time (Average)	20		sec
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[a]	
Grid No.3 to all other electrodes (RF input)	7	7	μμf
Plate to all other electrodes (Mixer input)	8	13	μμf
Grid No.1 to all other electrodes (Oscillator input)	5.5	5.5	μμf
Grid No.3 to plate	0.3 max.	0.25 max.	μμf
Grid No.3 to grid No.1	0.15 max.	0.15 max.	μμf
Grid No.1 to plate	0.1	0.05	μμf
Grid No.1 to cathode & grid No.5	3	3	μμf
Cathode & grid No.5 to all other electrodes except grid No.1	15	20	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CH

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.5
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2, Grid No.4
Pin 7 - Grid No.3

CONVERTER

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	150 max.	volts
GRIDS-No.2 & No.4 (SCREEN-GRIDS) SUPPLY VOLTAGE	150 max.	volts

18FX6A

GRIDS–No.2 & No.4 VOLTAGE.	110 max.	volts
GRIDS–No.2 & No.4 INPUT.	1.2 max.	watts
PLATE DISSIPATION.	1 max.	watt
PEAK HEATER–CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts

Characteristics:

With Separate Excitation[b]

Plate Voltage.	100	volts
Grids–No.2 & No.4 Voltage.	100	volts
Grid–No.3 Voltage.	–1.5	volts
Grid–No.1 Resistor	20000	ohms
Plate Resistance (Approx.)	0.4	megohm
Conversion Transconductance.	480	μmhos
Plate Current.	2.3	ma
Grids–No.2 & No.4 Current.	6.2	ma
Grid–No.1 Current.	0.5	ma
Total Cathode Current.	9	ma
Grid–No.3 Voltage (Approx.) for conversion transconductance (μmhos) = 10	–21	volts

Oscillator Characteristics (Not Oscillating):[c]

Plate & Grids–No.2 & No.4 Voltage.	100	volts
Grid–No.3 Voltage.	0	volts
Grid–No.1 Voltage.	0	volts
Amplification Factor[d].	22	
Oscillator Transconductance[d]	7000	μmhos
Cathode Current.	24	ma
Grid–No.1 Voltage (Approx.) for plate μa = 20.	–9.2	volts

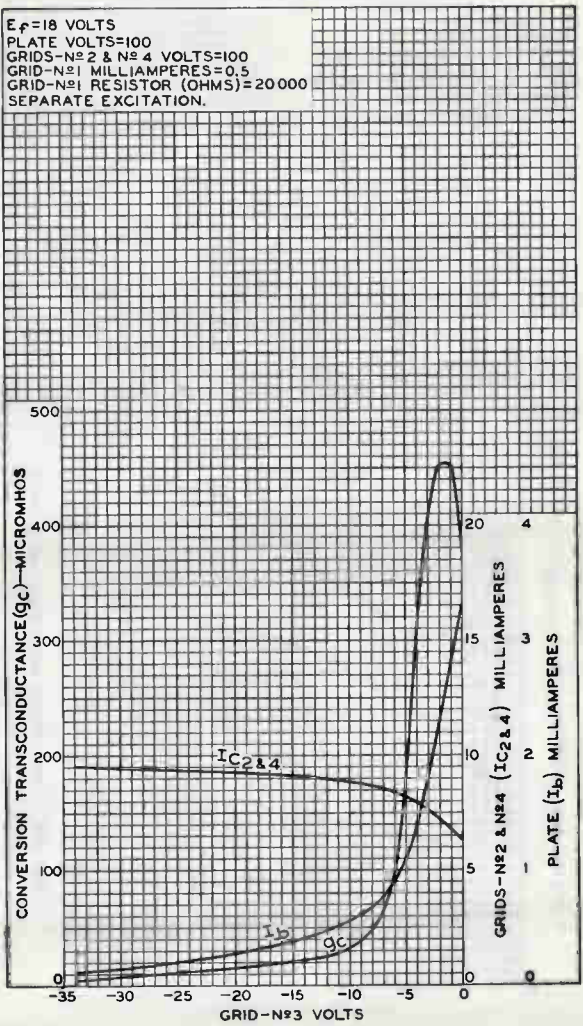
[a] With external shield JEDEC No.316 connected to cathode.

[b] The characteristics shown with separate excitation correspond very closely with those obtained in a self–excited–oscillator circuit operating with zero bias.

[c] With grids No.2 & No.4 connected to plate.

[d] Between grid No.1 and grids No.2 & No.4 connected to plate.

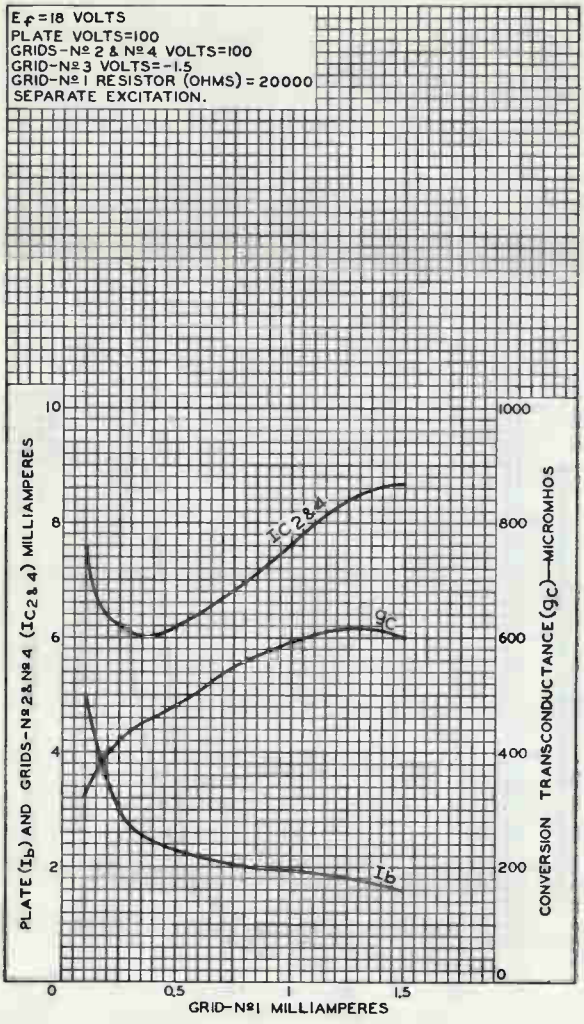
AVERAGE CHARACTERISTICS



92CM-10777

18FX6A

AVERAGE CHARACTERISTICS



92CM-10782

Twin Diode—High-Mu Triode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)		18	volts
Current		0.1 ± 6%	amp
Warm-up time (Average)		20	sec
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[a]	
Triode grid to triode plate	1.8	1.8	μμf
Triode grid to cathode and heater	2.4	2.4	μμf
Triode plate to cathode and heater	0.22	2	μμf
Plate of diode unit No.2 to triode grid	0.2 max.	0.2 max.	μμf

Characteristics, Class A₁ Amplifier (Triode Unit):

Plate Voltage	100	volts
Grid Voltage	-1	volt
Amplification Factor	100	
Plate Resistance (Approx.)	77000	ohms
Transconductance	1300	μmhos
Plate Current	0.6	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BT

Pin 1 – Grid of Triode Unit
Pin 2 – Cathode of Triode Unit and Diode Units No.1 and No.2
Pin 3 – Heater
Pin 4 – Heater

Pin 5 – Plate of Diode Unit No.2
Pin 6 – Plate of Diode Unit No.1
Pin 7 – Plate of Triode Unit

TRIODE UNIT — AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	150 max.	volts
GRID VOLTAGE:		
Positive-bias value	0 max.	volts
PLATE DISSIPATION	0.5 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

DIODE UNITS — Two

Maximum Ratings, *Design-Maximum Values:*

Values are for Each Unit

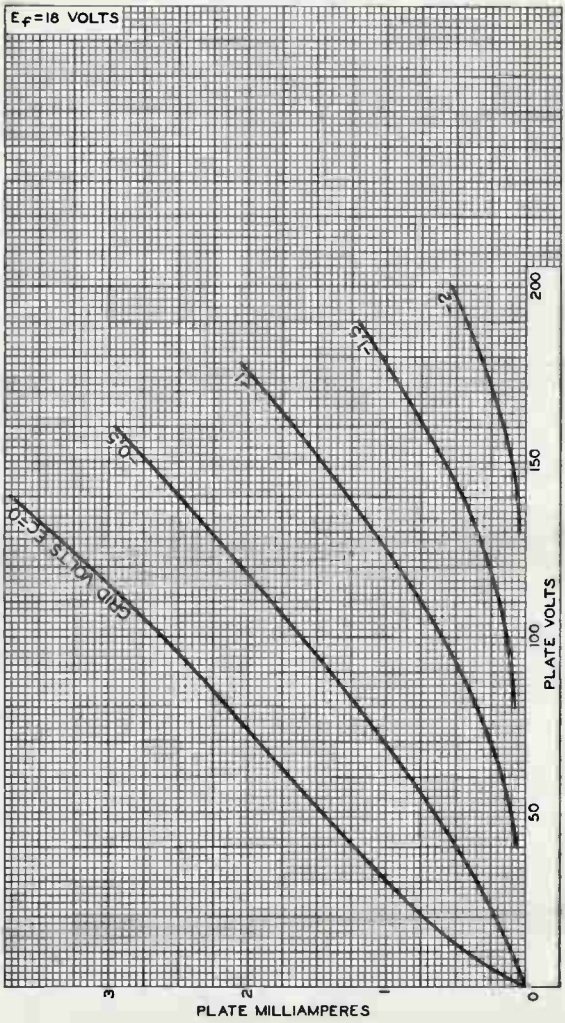
PLATE CURRENT	1 max.	ma

Characteristics, Instantaneous Test Condition:

Plate Current for plate volts = 10	2	ma

[a] With external shield JEDEC No.316 connected to cathode.

AVERAGE PLATE CHARACTERISTICS
Triode Unit



92CM-10775

18GD6A

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage (AC or DC)	18		volts
Current	0.1 ± 6%		amp
Warm-up time (Average)	20		sec
Direct Interelectrode Capacitances:			
	Without External Shield	*With External Shield*[a]	
Grid No.1 to plate	0.0035 max.	0.0035 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	6	6	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	5	5	μμf

Characteristics, Class A_1 Amplifier:

Plate Supply Voltage	100	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Supply Voltage	100	volts
Cathode Resistor	150	ohms
Plate Resistance (Approx.)	0.5	megohm
Transconductance	4300	μmhos
Plate Current	5	ma
Grid-No.2 Current	2	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-4.7	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ±3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)

18GD6A

Basing Designation for BOTTOM VIEW. 7BK

Pin 1 – Grid No.1
Pin 2 – Grid No.3, Internal Shield
Pin 3 – Heater

Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Cathode

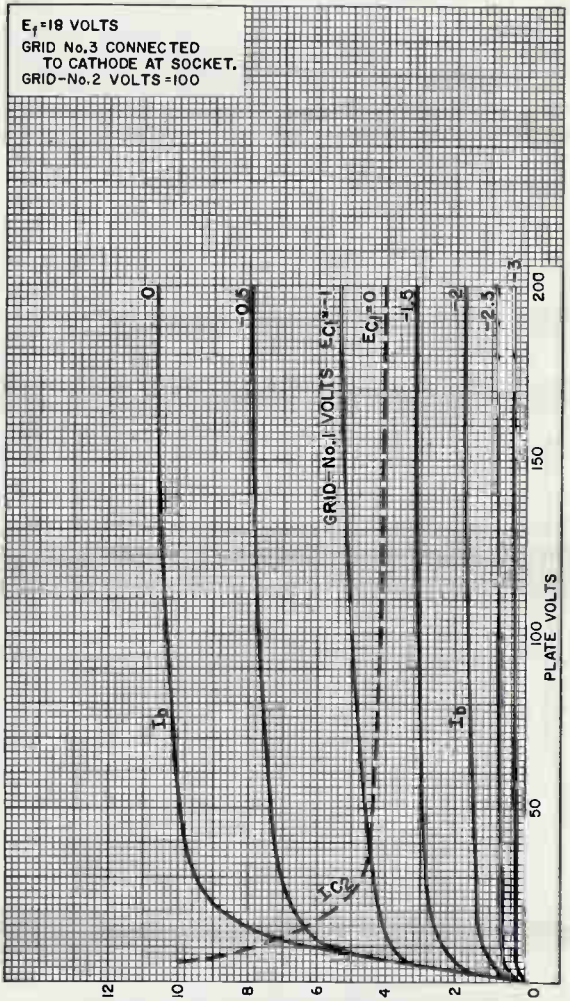
RF AMPLIFIER and AUTODYNE CONVERTER

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE . . . . . 150 max. volts
GRID No.3 (SUPPRESSOR GRID) . . . *Connect to cathode at socket*
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE. . . . 150 max. volts
GRID-No.2 VOLTAGE . . . . . .See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section
GRID-No.2 INPUT:
  For grid-No.2 voltages up to 75 volts . . . 0.6 max. watt
  For grid-No.2 voltages between 75 and 150 volts. . . . . .See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section
PLATE DISSIPATION . . . . . 2.5 max. watts
PEAK HEATER-CATHODE VOLTAGE:
  Heater negative with respect to cathode . . 100 max. volts
  Heater positive with respect to cathode . . 100 max. volts

[a] With external shield JEDEC No.316 connected to cathode.

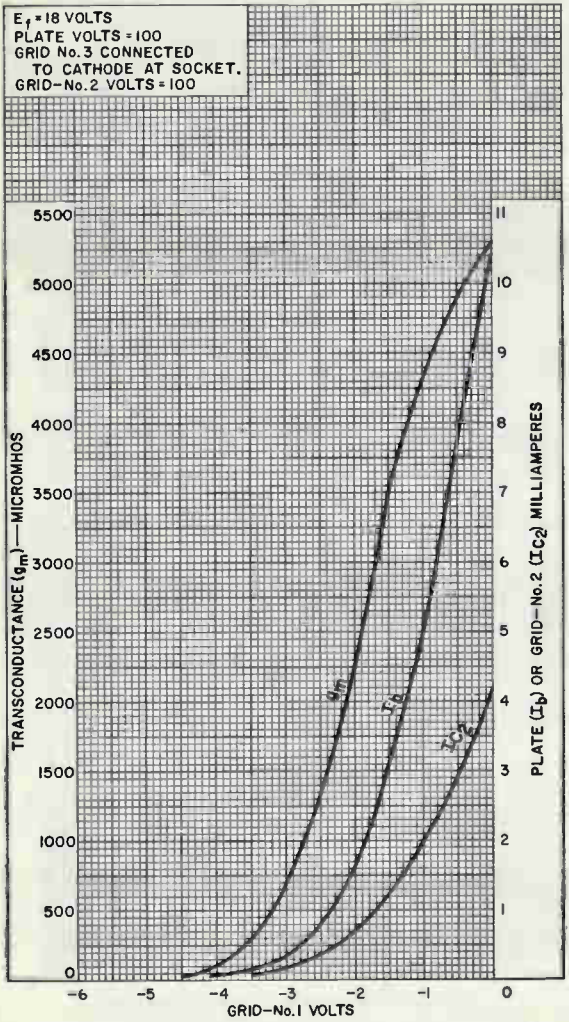
AVERAGE CHARACTERISTICS



92CM-11138RI

18GD6A

AVERAGE CHARACTERISTICS



92CM-11136R1

19CG3

Half-Wave Vacuum Rectifier

Duodecar Type

The 19CG3 is the same as the 6CG3 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040 A
Voltage (ac or dc) at 0.600 A	19.0 V
Warm-up time (Average)	11 s

19CL8A

Medium-Mu Triode—Sharp-Cutoff Tetrode

9-Pin Miniature Type

Controlled Heater Warm-up Time

The 19CL8A is the same as the 6CL8A except for:

Heater Characteristics and Ratings

Current	0.150 ± 0.010 A
Voltage (ac or dc) at 0.150 A	18.9 V

19EA8

Medium-Mu Triode—Sharp-Cutoff Pentode

9-Pin Miniature Type

Controlled Heater Warm-up Time

The 19EA8 is the same as the 6EA8 except for:

Heater Characteristics and Ratings

Current	0.150 ± 0.010 A
Voltage (ac or dc) at 0.150 A	18.9 V

19FX5

Power Pentode

7-Pin Miniature Type

The 19FX5 is the same as the 60FX5 except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020 A
Voltage (ac or dc) at 0.300 A	18.9 V
Warm-up time (Average)	11 s

19HR6

Semiremote-Cutoff Pentode

7-Pin Miniature Type

The 19HR6 is the same as the 6HR6 except for:

Heater Characteristics and Ratings

Current	0.150 ± 0.010 A
Voltage (ac or dc) at 0.150 A	18.9 V
Warm-up time (Average)	17 s

19HS6

Sharp-Cutoff Pentode

7-Pin Miniature Type

The 19HS6 is the same as the 6HS6 except for:

Heater Characteristics and Ratings

Current	0.150 ± 0.010 A
Voltage (ac or dc) at 0.150 A	18.9 V
Warm-up time (Average)	17 s

20EZ7

High-Mu Twin Triode

9-PIN MINIATURE TYPE

For High-Gain, Resistance-Coupled, Low-Level Audio-Amplifiers Operating at Low-Signal Levels, such as Preamplifiers for Low-Cost Stereophonic Phonographs

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:			
Voltage (AC or DC)		20	volts
Current		0.1 ± 6%	amp
Direct Interelectrode Capacitances (Approx.):[a]	*Unit No.1*	*Unit No.2*	
Grid to plate	1.5	1.5	μμf
Grid to cathode and heater	1.6	1.6	μμf
Plate to cathode and heater	0.2	0.3	μμf

Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−2	volts
Amplification Factor	100	100	
Plate Resistance (Approx.)	80000	62500	ohms
Transconductance	1250	1600	μmhos
Plate Current	0.5	1.2	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9PG

Pin 1 – Heater
Pin 2 – Heater
Pin 3 – Internal Connection—Do Not Use
Pin 4 – Cathode of Unit No.2
Pin 5 – Grid of Unit No.2

Pin 6 – Plate of Unit No.2
Pin 7 – Plate of Unit No.1
Pin 8 – Grid of Unit No.1
Pin 9 – Cathode of Unit No.1

AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	330 max. volts

→ Indicates a change.

20EZ7

GRID VOLTAGE:			
Negative-bias value	55	max.	volts
Positive-bias value	0	max.	volts
PLATE DISSIPATION	1.2	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts

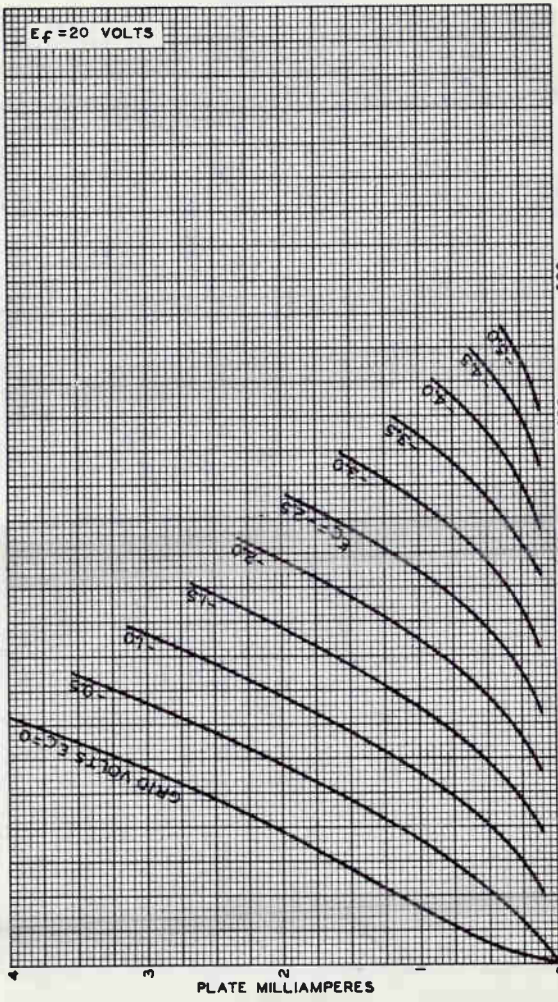
Typical Operation as Resistance-Coupled Amplifier:

See *RESISTANCE-COUPLED-AMPLIFIER CHART No.25* at front of this Section

[a] Without external shield.

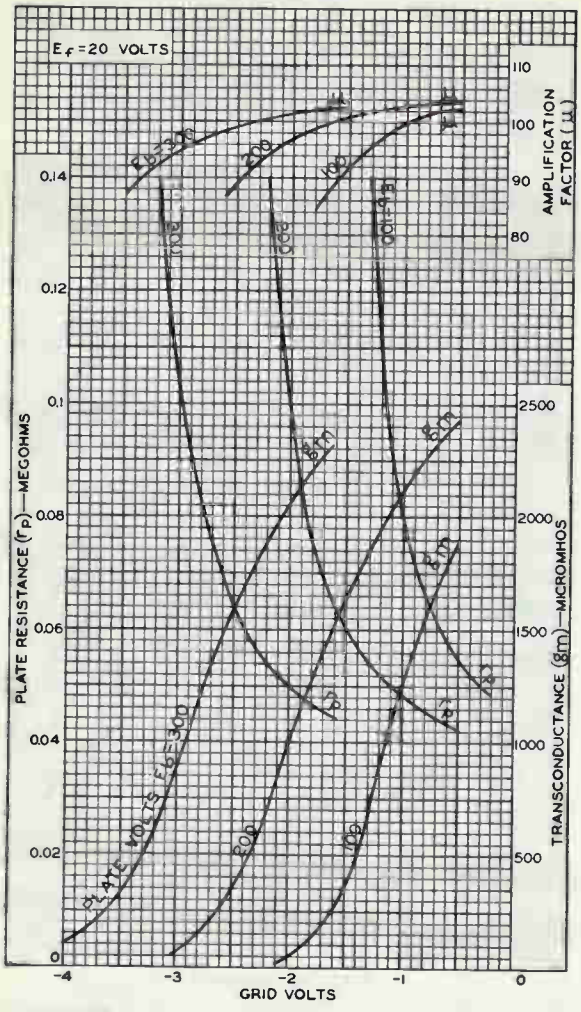
[b] The dc component must not exceed 100 volts.

AVERAGE PLATE CHARACTERISTICS
Each Unit



20EZ7

AVERAGE CHARACTERISTICS
Each Unit



92CM-10805

High-Mu Triode—Beam Power Tube

NOVAR TYPE

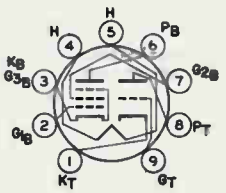
For Combined Vertical-Deflection Oscillator and Amplifier Service in Color TV Receivers

ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Current	I_f	450	mA
Heater Voltage (AC or DC) at I_f = 450 mA	E_f	21.0	V
Heater Warm-up Time (Average)		11	s
Direct Interelectrode Capacitances (Approx.)			
Without external shield			
Triode Unit:			
Grid to plate	c_{gp}	6.0	pF
Input: G_T to (K_T, H)	c_i	6.5	pF
Output: P_T to (K_T, H)	c_o	1.6	pF
Beam Power Unit:			
Grid No.1 to plate	c_{gp}	0.7 max	pF
$G1_B$ to (K_B + $G3_B$, $G2_B$, H)	c_i	16.0	pF
P_B to (K_B + $G3_B$, $G2_B$, H)	c_o	9.0	pF
$G1_B$ to P_T		0.12 max	pF
P_B to P_T		0.32 max	pF
Basing Designation for BOTTOM VIEW			9QT

Pin 1 – Triode Cathode
Pin 2 – Beam Power Grid No.1
Pin 3 – Beam Power Cathode & Grid No.3
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Beam Power Plate
Pin 7 – Beam Power Grid No.2
Pin 8 – Triode Plate
Pin 9 – Triode Grid



CLASS A_1 AMPLIFIER

For the following characteristics, see **Conditions**

		Triode Unit		*Beam Power Unit*		
Amplification Factor	μ	58	–	–	6.5[a]	
Plate Resistance (Approx.)	r_p	16000	–	12000	–	Ω
Transconductance	g_m	3600	–	9300	–	μmhos
DC Plate Current	I_b	2.3	200[b]	56	–	mA
DC Grid-No.2 Current	I_g	–	20[b]	3	–	mA
Cutoff DC Grid-No.1 Voltage						
I_b = 10 μA	$E_{c(co)}$	-6.6	–	–	–	V
I_b = 1 mA (Approx.)	$E_{c(co)}$	–	–	-26	–	V
I_b = 100 μA	$E_{c(co)}$	–	–	-30	–	V

Conditions

		Triode Unit	Beam Power Unit		
Heater Voltage	E_f	21.0	21.0	21.0	21.0 V
Plate Voltage	E_b	250	45	135	120 V
Grid-No.2 Voltage	E_c	-	125	120	120 V
Grid-No.1 Voltage	E_c	-4	0	-10	-10 V

MECHANICAL CHARACTERISTICS

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length (l_m)	3.710 in
Maximum Seated Length (l_m)	3.330 in
Length, Base Seat to Bulb Top (Excluding tip)	2.810 to 2.990 in
Diameter (d)	1.438 to 1.562 in
Envelope	T12
Bases (alternates)	
Small-Button Novar 9-Pin (JEDEC No.E9-76)	
Small-Button Novar 9-Pin with Exhaust Tip 9-Pin (JEDEC No.E9-88)	

VERTICAL-DEFLECTION OSCILLATOR *(Triode Unit)*

Maximum Ratings, Design-Maximum Values

For operation in a 525-line, 30-frame system

DC Plate Voltage	E_b	400 V
Peak Negative-Pulse Grid Voltage	e_{cm}	400 V
Peak Cathode Current	i_{km}	105 mA
Average Cathode Current	$I_{k(av)}$	30 mA
Plate Dissipation	P_b	2.5 W
Peak Power Output	P_o	2.5 W

Maximum Circuit Values

Grid-Circuit Resistance	$R_{g(ckt)}$	
For grid-resistor-bias operation		2.2 MΩ

VERTICAL-DEFLECTION AMPLIFIER *(Beam Power Unit)*

Maximum Ratings, Design-Maximum Values

For operation in a 525-line, 30-frame system

DC Plate Voltage	E_b	400 V
Peak Positive-Pulse Plate Voltage[c]	e_{bm}	2500[d] V
DC Grid-No.2 (Screen-Grid) Voltage	E_c	300 V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	e_{cm}	250 V
Peak Cathode Current	i_{km}	260 mA
Average Cathode Current	$I_{k(av)}$	75 mA
Plate Dissipation[e]	P_b	14 W
Grid-No.2 Input[e]	P_c	2.75 W
Envelope Temperature	T_E	210 °C

MAXIMUM CIRCUIT VALUES

Grid-Circuit Resistance	$R_{g(ckt)}$	
For fixed-bias operation		1 MΩ
For grid-resistor-bias operation		2.2 MΩ

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

[a] Triode connection.

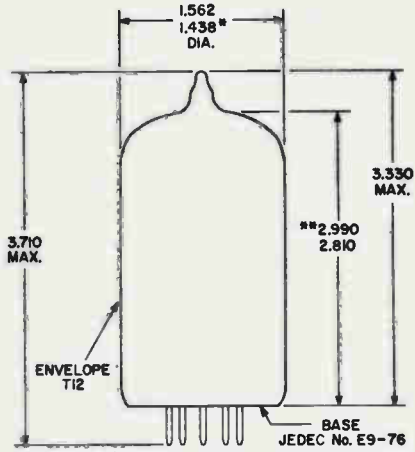
[b] This value can be measured by a method involving a recurrent wave form such that the plate dissipation and grid-No.2 input will be kept within ratings in order to prevent damage to the tube.

[c] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycles is 2.5 milliseconds.

[d] Absolute Maximum value.

[e] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

DIMENSIONAL OUTLINE
Top Exhaust (JEDEC No. 12-65)



92CS-13502A

92CS-11127R38

DIMENSIONS IN INCHES

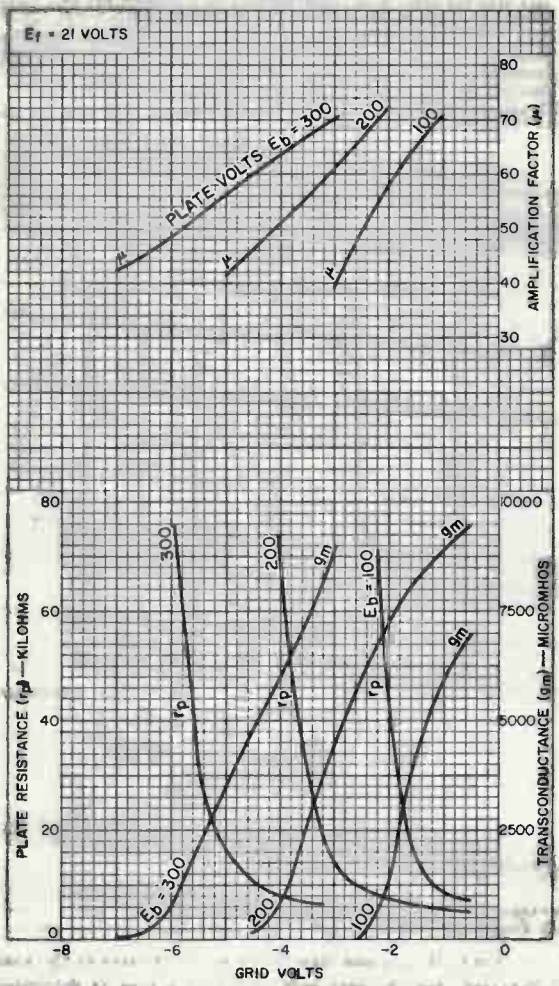
Bottom-exhaust version has the same dimensions for maximum overall length and seated length as the top-exhaust outline shown.

* Applies to the minimum diameter except in the area of the seal.

** Measured from the base seat to bulb-top line as determined by arcing gauge of 0.600" I.D.

Typical Characteristics

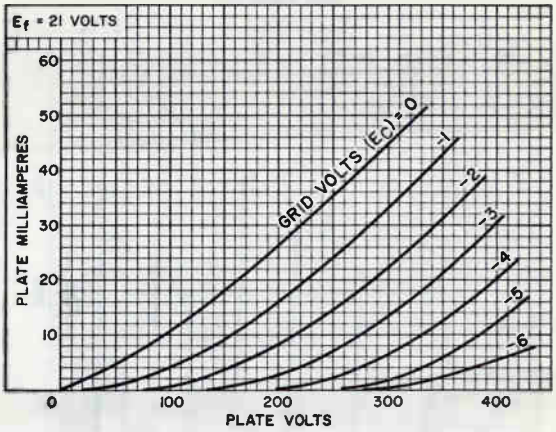
Triode Unit



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

Typical Plate Characteristics

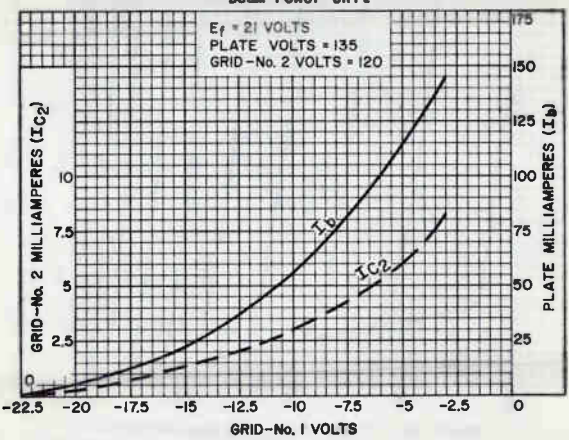
Triode Unit



92CS-13508

Typical Characteristics

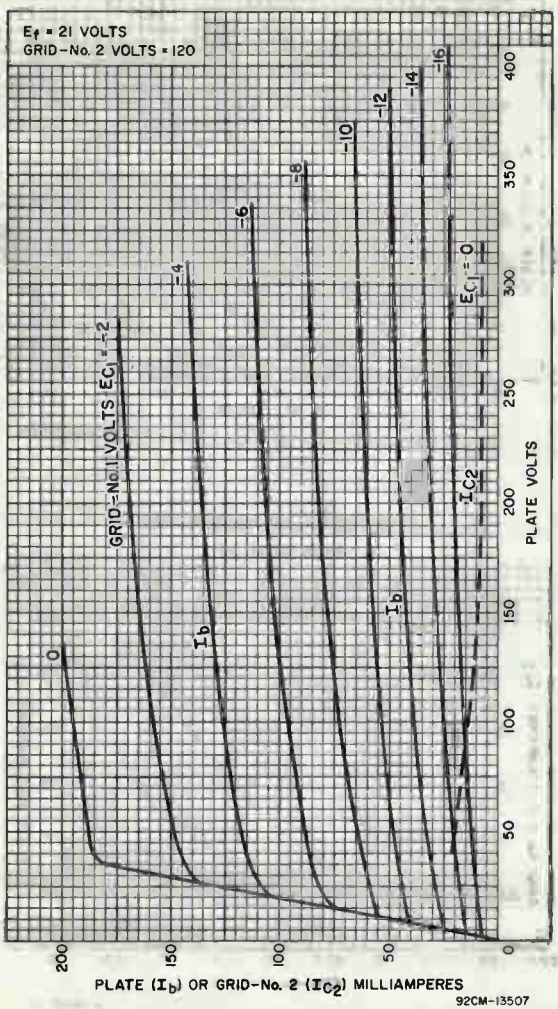
Beam Power Unit



92CS-13509

Typical Characteristics

Beam Power Unit



92CM-13507

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

22BH3

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 22BH3 is the same as the 6BH3 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450A	E_h	22.4	V
Warm-up time (Average)		11	s

22BH3A

Half-Wave Vacuum Rectifier

NOVAR TYPE

For TV Damper Service

The 22BH3A is the same as the 6BH3A except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450A	E_h	22.4	V
Warm-up time (Average)		11	s

22DE4

Half-Wave Vacuum Rectifier

For TV Damper Service

The 22DE4 is the same as the 6DE4 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450A	E_h	22.4	V
Warm-up time (Average)		11	s

22JF6

Beam Power Tube

NOVAR TYPE

For Horizontal-Deflection-Amplifier Service in Low-B+, Black-and-White TV Receivers

The 22JF6 is the same as the 6JF6 except for the following items:

Heater Characteristics and Ratings

Current	I_h	0.450 ± 0.030	A
Voltage (AC or DC) at 0.450A	E_h	22.0	V
Warm-up time (Average)		11	s

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

22JG6A

Beam Power Tube

Novar Type

The 22JG6A is the same as the 6JG6A except for:

Heater Characteristics and Ratings

Current	0.450 ±0.030	A
Voltage (ac or dc) at 0.450 A	22.0	V
Warm-up time (Average)	11	s

22JR6

Beam Power Tube

Novar Type

The 22JR6 is the same as the 6JR6 except for:

Heater Characteristics and Ratings

Current	0.450 ±0.030	A
Voltage (ac or dc) at 0.450 A	22.0	V
Warm-up time (Average)	11	s

22JU6

Beam Power Tube

Novar Type

The 22JU6 is the same as the 6JU6 except for:

Heater Characteristics and Ratings

Current	0.450 ±0.030	A
Voltage (ac or dc) at 0.450 A	22.0	V
Warm-up time (Average)	11	s

22KM6

Beam Power Tube

Novar Type

The 22KM6 is the same as the 6KM6 except for:

Heater Characteristics and Ratings

Current	0.450 ±0.030	A
Voltage (ac or dc) at 0.450 A	22.0	V
Warm-up time (Average)	11	s

22KV6A

Beam Power Tube

Novar Type

The 22KV6A is the same as the 6KV6A except for:

Heater Characteristics and Ratings

Current	0.450 ±0.030	A
Voltage (ac or dc) at 0.450 A	22.0	V
Warm-up time (Average)	11	s

24JE6A

Beam Power Tube

Novar Type

The 24JE6A is the same as the 6JE6A except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	24.0	V
Warm-up time (Average)	11	s

24LQ6

Beam Power Tube

Novar Type

The 24LQ6 is the same as the 6LQ6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	24.0	V
Warm-up time (Average)	11	s

24LZ6

Beam Power Tube

NOVAR TYPE

The 24LZ6 is the same as the 6LZ6 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040	A
Voltage (ac or dc) at 0.600 A	24	V

25AV5GA

Beam Power Tube

The 25AV5GA is the same as the 6AV5GA except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020	A
Voltage (ac or dc) at 0.300 A	25	V

25AX4GT

Half-Wave Vacuum Rectifier

FOR TV DAMPER SERVICE

The 25AX4GT is the same as the 6AX4GTB except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020	A
Voltage (ac or dc) at 0.300 A	25	V

25BK5

Beam Power Tube

9-PIN MINIATURE TYPE

The 25BK5 is the same as the 6BK5 excpet for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020	A
Voltage	25	V

25BQ6GTB/25CU6

The 25BQ6GTB/25CU6 is the same as the 6BQ6GTB/6CU6 except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020	A
Voltage	25	V

25C5

BEAM POWER TUBE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage	25	ac or dc volts
Current	0.3	amp
Direct Interelectrode Capacitances (Approx.)[○]:		
Grid No.1 to plate	0.6	μμf
Grid No.1 to cathode & grid No.3, grid No.2 and heater	13	μμf
Plate to cathode & grid No.3, grid No.2 and heater	8.5	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	3/4"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	135	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	117	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive bias value	0	max.	volts
GRID-No.2 INPUT	1.25	max.	watts
PLATE DISSIPATION	6	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200*	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	220	max.	°C

Typical Operation and Characteristics:

Plate Voltage	120	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 Voltage	-8	volts

○,*: see next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

25C5

BEAM POWER TUBE

Peak AF Grid-No.1 Voltage	8	volts
Zero-Signal Plate Current	49	ma
Max.-Signal Plate Current	50	ma
Zero-Signal Grid-No.2 Current	4	ma
Max.-Signal Grid-No.2 Current	8.5	ma
Plate Resistance (Approx.)	10000	ohms
Transconductance	7500	μmhos
Load Resistance	2500	ohms
Total Harmonic Distortion	10	%
Max.-Signal Power Output	2.3	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

© Without external shield.

* The dc component must not exceed 100 volts.

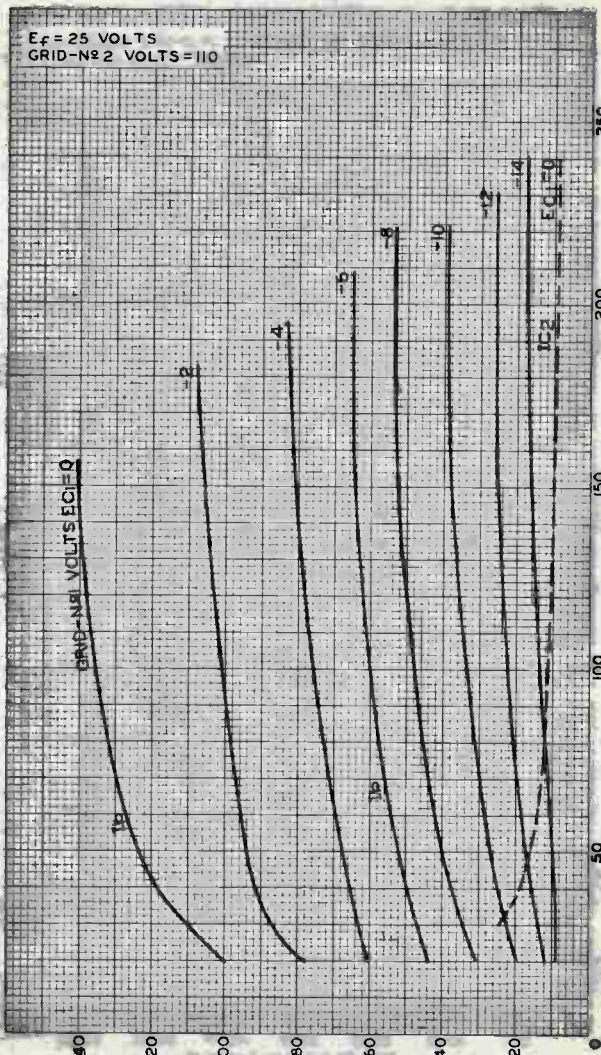
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

RCA

25C5

AVERAGE CHARACTERISTICS

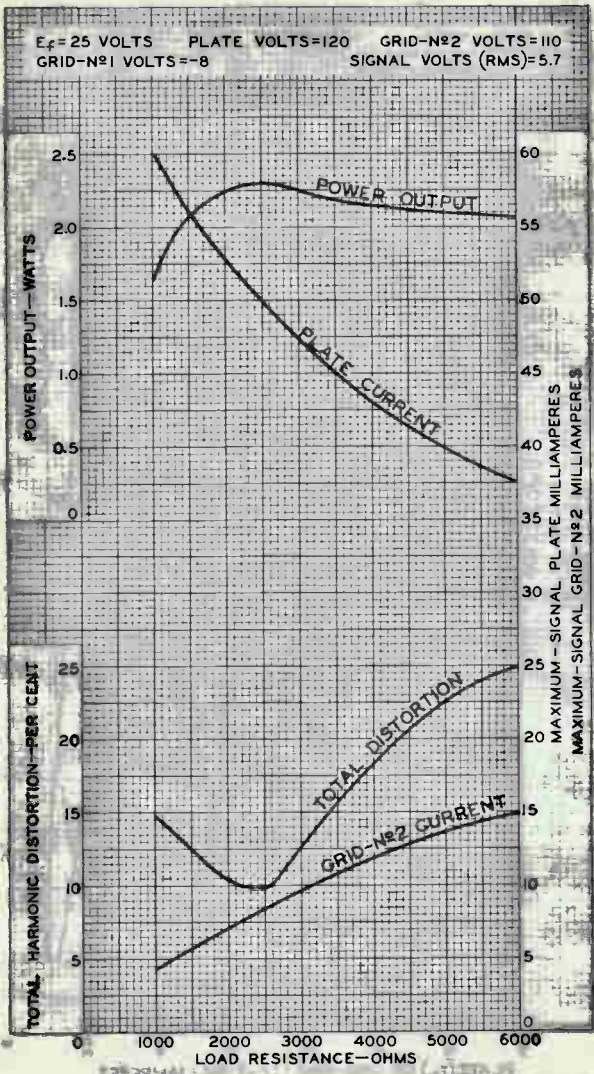


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-8908R2

RCA

25C5

OPERATION CHARACTERISTICS



25CD6GB

Beam Power Tube

The 25CD6GB is the same as the 6CD6GA except for:

Heater Characteristics and Ratings

Current	0.600 A
Voltage (ac or dc)	25.0 V
Warm-up time (Average)	11 s

25CG3

Half-Wave Vacuum Rectifier

Duodecar Type

The 25CG3 is the same as the 6CG3 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030 A
Voltage (ac or dc) at 0.450 A	25.0 V
Warm-up time (Average)	11 s

25CK3

Half-Wave Vacuum Rectifier

Novar Type

The 25CK3 is the same as the 6CK3 except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020 A
Voltage (ac or dc) at 0.300 A	25.2 V
Warm-up time (Average)	11 s

25CM3

Half-Wave Vacuum Rectifier

Novar Type

The 25CM3 is the same as the 6CM3 except for:

Heater Characteristics and Ratings

Current	0.600 ± 0.040 A
Voltage (ac or dc) at 0.600 A	25.0 V
Warm-up time (Average)	11 s

25CT3

Half-Wave Vacuum Rectifier

9-Pin Miniature Type

The 25CT3 is the same as the 6CT3 except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020 A
Voltage (ac or dc) at 0.300 A	25.2 V
Warm-up time (Average)	11 s

25DN6

BEAM POWER TUBE

Intended for use in equipment having series heater-string arrangement

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	25	ac or dc volts
Current	0.6	amp
Warm-up time (Average)	11	sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

Direct Interelectrode Capacitances (Approx.):°

Grid No.1 to plate	0.8	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	22	μμf
Plate to cathode & grid No.3, grid No.2, and heater	11.5	μμf

Characteristics, Class A$_1$ Amplifier:

Plate Voltage	50	125	volts
Grid-No.2 (Screen-Grid) Voltage	100	125	volts
Grid-No.1 (Control-Grid) Voltage	0	-18	volts
Mu Factor, Grid No.2 to Grid No.1	-	4.35	
Plate Resistance (Approx.)	-	4000	ohms
Transconductance	-	9000	μmhos
Plate Current	240*	70	ma
Grid-No.2 Current	30*	6.3	ma
Grid-No.1 Voltage (Approx.) for plate current of 0.5 ma	-	-36	volts

Mechanical:

Operating Position . . . . . Vertical, base up or down, or Horizontal with pins 1 and 3 in vertical plane

Maximum Overall Length . . . . . 5"

Seated Length . . . . . 4-1/4" ± 3/16"

Maximum Diameter . . . . . 1-9/16"

Bulb T12

Cap . . . . . Small (JETEC No.C1-1)

Base . . . . . Short Medium-Shell Octal 8-Pin with External Barriers, Style 8 (JETEC No.B8-118)

Basing Designation for BOTTOM VIEW 5BT

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Cathode, Grid No.3
Pin 4 - No Connection

Pin 5 - Grid No.1
Pin 6 - No Connection
Pin 7 - Heater
Pin 8 - Grid No.2
Cap - Plate

°,*: See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

25DN6

BEAM POWER TUBE

HORIZONTAL DEFLECTION AMPLIFIER

Maximum Ratings, *Design-Center Values Except as Noted:*

For operation in a 525-line, 30-frame system□

DC PLATE VOLTAGE	700	max.	volts
PEAK POSITIVE-PULSE PLATE VOLTAGE (Absolute maximum)●	6600■	max.	volts
PEAK NEGATIVE-PULSE PLATE VOLTAGE	1500	max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	175	max.	volts
PEAK NEGATIVE-PULSE GRID-No.1 VOLTAGE	200	max.	volts
CATHODE CURRENT:			
Peak	700	max.	ma
Average	200	max.	ma
GRID-No.2 INPUT	3	max.	watts
PLATE DISSIPATION†	15	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	225	max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance: For grid-resistor-bias operation†	0.47	max.	megohm

° Without external shield.

* These values can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

● This rating is applicable when the duration of the voltage pulse does not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

■ Under no circumstances should this absolute value be exceeded.

† It is essential that the plate dissipation be limited in the event of loss of grid-No.1 signal. For this purpose, some protective means such as a cathode resistor of suitable value should be employed.

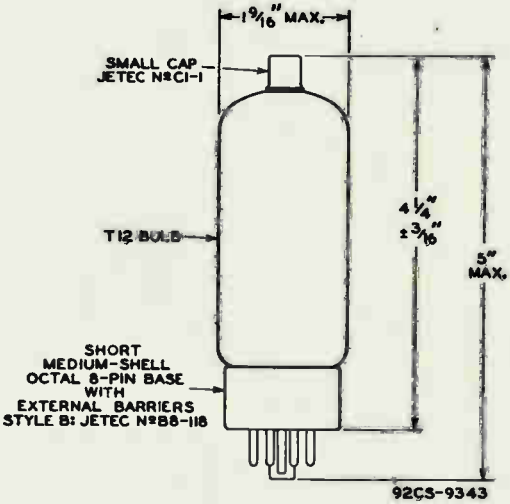
▲ The dc component must not exceed 100 volts.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

25DN6

BEAM POWER TUBE



25EH5
POWER PENTODE

7-PIN MINIATURE TYPE

The 25EH5 is the same as the 6EH5 except for the following items:

Heater, for Unipotential Cathode:		
Voltage	25	ac or dc volts
Current	0.3	amp

Beam Power Tube

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Current	0.150 ± 0.010		amp
Voltage (AC or DC) at heater amperes = 0.150	25.0		volts
Warm-up time (Average)	17		sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances (Approx.):[b]			
Grid No.1 to plate	0.44		pf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	12.0		pf
Plate to cathode & grid No.3, grid No.2, and heater	8.0		pf

Characteristics, Class A_1 Amplifier:

Plate Voltage	110	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 Voltage	-7.5	volts
Plate Resistance (Approx.)	13000	ohms
Transconductance	6400	μmhos
Plate Current	43	ma
Grid-No.2 Current	3.8	ma

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

25F5A

AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	150 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-No.2 INPUT	1.1 max.	watts
PLATE DISSIPATION	5.5 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface)	220 max.	°C

Typical Operation:

Plate Voltage	110	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 Voltage	-7.5	volts
Peak AF Grid-No.1 Voltage	7.5	volts
Zero-Signal Plate Current	43	ma
Max.-Signal Plate Current	45	ma
Zero-Signal Grid-No.2 Current	3.8	ma
Max.-Signal Grid-No.2 Current	7.3	ma
Effective Load Resistance	2500	ohms
Total Harmonic Distortion	7	%
Maximum-Signal Power Output	1.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	150 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive-bias value	0 max.	volts
GRID-No.2 INPUT	1.1 max.	watts
PLATE DISSIPATION	5.5 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface)	220 max.	°C

Typical Operation:

Values are for two tubes

Plate Voltage	110	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 Voltage	-8	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	14.4	volts
Zero-Signal Plate Current	82	ma
Max.-Signal Plate Current	88	ma
Zero-Signal Grid-No.2 Current	7.2	ma
Max.-Signal Grid-No.2 Current	12.5	ma
Effective Load Resistance (Plate-to-plate)	4500	ohms

Total Harmonic Distortion	2.6	%
Maximum-Signal Power Output	2.9	watts

Maximum Circuit Values:

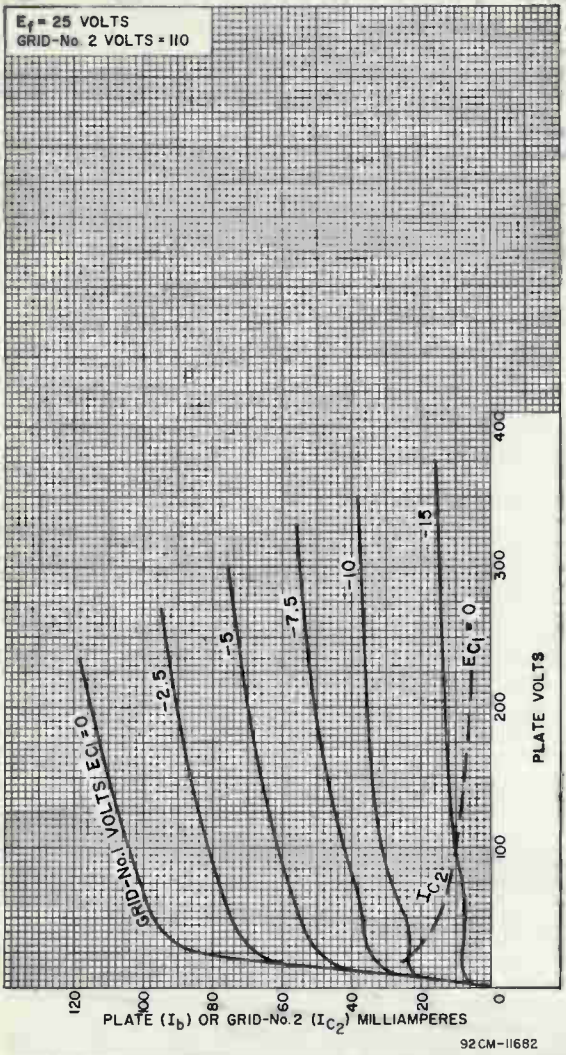
Grid-No.1-Circuit Resistance:

For fixed-bias operation.	0.1 max.	megohm
For cathode-bias operation.	0.5 max.	megohm

[a] The dc component must not exceed 100 volts.
[b] Without external shield.

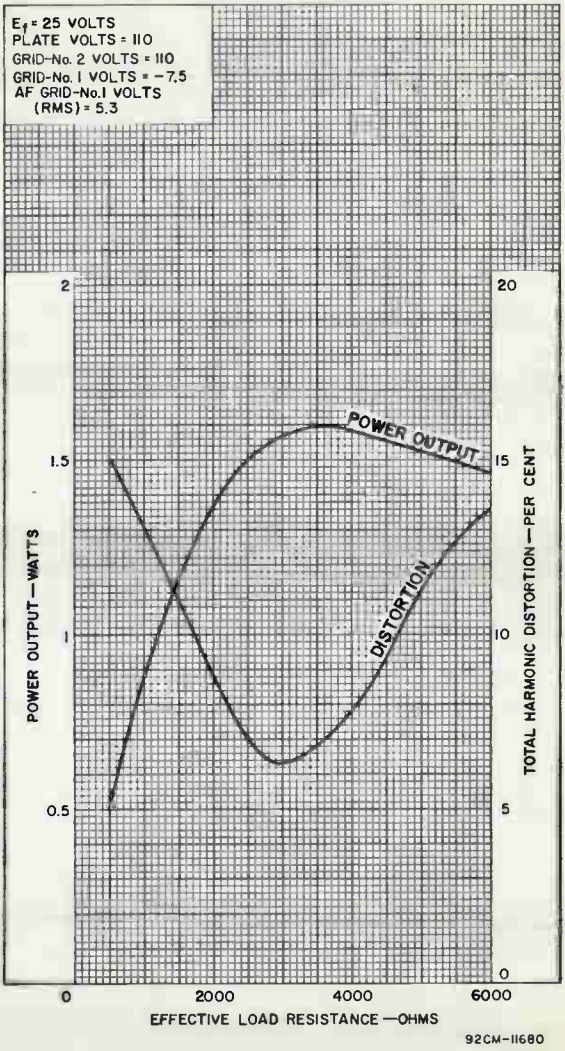
25F5A

AVERAGE CHARACTERISTICS



92CM-11682

OPERATION CHARACTERISTICS



25JQ6

Beam Power Tube
with an Integral Diode

The 25JQ6 is the same as the 6JQ6 except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020	A
Voltage (AC or DC) at 0.300 A.	25.2	V
Warm-up time (Average)	11	s

31LQ6

Beam Power Tube

Novar Type

The 31LQ6 is the same as the 6LQ6 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.020	A
Voltage (AC or DC) at 0.450 A	31.0	V
Warm-up time (Average)	11	s

32ET5A

Power Pentode

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:			
Current	0.100 ± 0.006		amp
Voltage (AC or DC) at heater amperes = 0.100	32		volts
Warm-up time (Average)	20		sec
Peak heater-cathode voltage:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances (Approx.):[b]			
Grid No.1 to plate	0.6		pf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	12.0		pf
Plate to cathode & grid No.3, grid No.2, and heater	6.0		pf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

AMPLIFIER — Class A_1

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	150	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.2 INPUT	1.2	max.	watts
PLATE DISSIPATION	5.4	max.	watts

32ET5A

Typical Operation and Characteristics:

Plate Voltage	110		volts
Grid-No.2 Voltage	110		volts
Grid-No.1 Voltage	-7.5		volts
Peak AF Grid-No.1 Voltage	7.5		volts
Zero-Signal Plate Current	30		ma
Zero-Signal Grid-No.2 Current	2.8		ma
Plate Resistance (Approx.)	21500		ohms
Transconductance	5500		μmhos
Load Resistance	2800		ohms
Total Harmonic Distortion	10		%
Max.-Signal Power Output	1.2		watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.1	max.	megohm
For cathode-bias operation	0.5	max.	megohm

[a] The dc component must not exceed 100 volts.
[b] Without external shield.

33JR6

Beam Power Tube

Novar Type

The 33JR6 is the same as the 6JR6 except for:

Heater Characteristics and Ratings

Current	0.300 ± 0.020	A
Voltage (ac or dc) at 0.300 A	33.0	V
Warm-up time (Average)	11	s

34CM3

Half-Wave Vacuum Rectifier

Novar Type

The 34CM3 is the same as the 6CM3 except for:

Heater Characteristics and Ratings

Current	0.450 ± 0.030	A
Voltage (ac or dc) at 0.450 A	33.5	V
Warm-up time (Average)	11	s

32L7-GT

RECTIFIER—BEAM POWER AMPLIFIER

Heater	Coated Unipotential Cathodes	
Voltage	32.5	a-c or d-c volts
Current	0.3	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base		Intermediate Shell Octal 8-Pin

Pin 1 - Rectifier Cathode
Pin 2 - Heater
Pin 3 - Amplifier Plate
Pin 4 - Amplifier Screen
Pin 5 - Amplifier Grid
Pin 6 - Rectifier Plate
Pin 7 - Heater
Pin 8 - Amplifier Cathode

BOTTOM VIEW (8Z)

RECTIFIER UNIT (Half-Wave)

With Condenser-Input Filter:

A-C Plate Voltage (RMS)	125 max. volts
D-C Output Current	60 max. ma.

AMPLIFIER UNIT

Typical Operation and Characteristics-Class A_1 Amplifier:

Plate	90	90	volts
Screen	90	90	volts
Grid*	-5	-7	volts
Plate Current	38	27	ma.
Screen Current	3.0	2.0	ma.
Plate Resistance	15000	17000	ohms
Transconductance	6000	4800	μmhos
Load Resistance	2600	2600	ohms
Total Harmonic Distortion	5.3	9.0	%
Second Harmonic Distortion	2.2	6.5	%
Third Harmonic Distortion	4.6	5.5	%
Max.-Sig. Power Output	0.8	1.0	watt

* The type of input coupling used should not introduce more than 0.5 megohm of resistance in the grid circuit.

Beam Power Tube

7-PIN MINIATURE TYPE
With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	34	volts
Current	0.1 ± 6%	amp
Warm-up time (Average)	20	sec
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.6	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	12	μμf
Plate to cathode & grid No.3, grid No.2, and heater	6	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

AMPLIFIER — Class A_1

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	150	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value	50	max.	volts
Positive-bias value	0	max.	volts
GRID-No.2 INPUT	1.1	max.	watts
PLATE DISSIPATION	5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

34GD5A

Typical Operation and Characteristics:

Plate Voltage	110	volts
Grid-No. 2 Voltage	110	volts
Grid-No. 1 Voltage	−7.5	volts
Peak AF Grid-No. 1 Voltage	7.5	volts
Zero-Signal Plate Current	35	ma
Zero-Signal Grid-No. 2 Current	3	ma
Plate Resistance (Approx.)	13000	ohms
Transconductance	5700	μmhos
Load Resistance	2500	ohms
Total Harmonic Distortion	10	%
Max.-Signal Power Output	1.4	watts

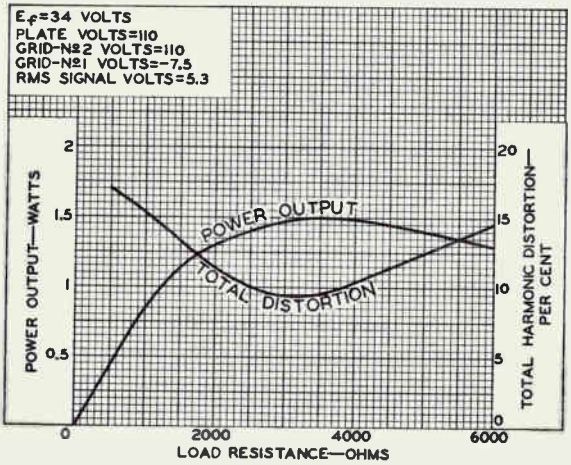
Maximum Circuit Values:

Grid-No. 1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

[a] Without external shield.

[b] The dc component must not exceed 100 volts.

OPERATION CHARACTERISTICS



92CS-10780

AVERAGE CHARACTERISTICS

92CM-10779

Beam Power Tube

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	35 ± 10%	volts ←
Current at 35 volts	0.15	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.6	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	12	μμf
Plate to cathode & grid No.3, grid No.2, and heater	9	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 – Cathode, Grid No.3
Pin 2 – Grid No.1
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Grid No.1
Pin 6 – Grid No.2
Pin 7 – Plate

AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:* ←

PLATE VOLTAGE	150	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0	max.	volts
GRID-No.2 INPUT	1.1	max.	watts
PLATE DISSIPATION	5.2	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[b]	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

←Indicates a change.

35C5

Typical Operation and Characteristics:

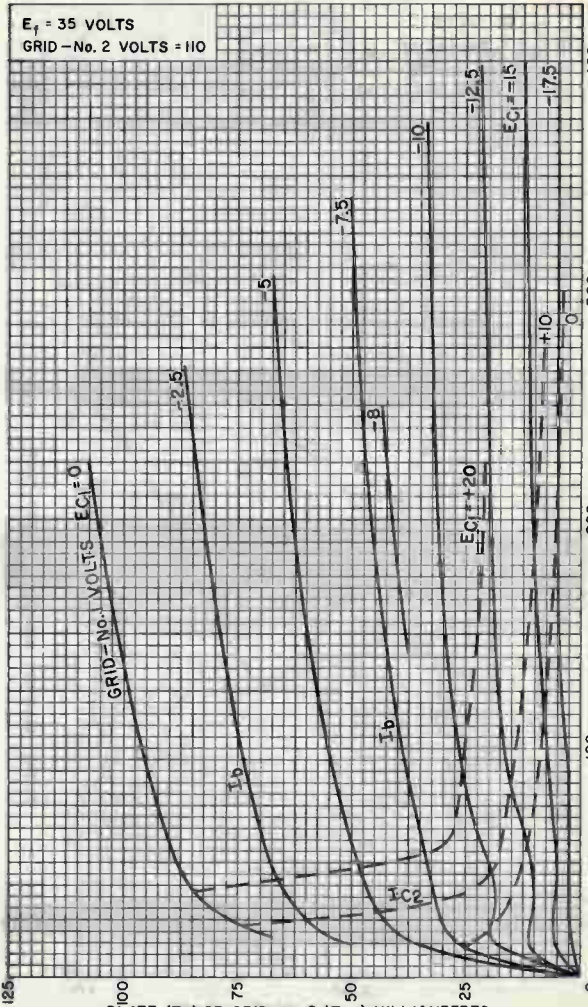
Plate Voltage	110	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 (Control-Grid) Voltage	-7.5	volts
Peak AF Grid-No.1 Voltage	7.5	volts
Zero-Signal Plate Current	40	ma
Max.-Signal Plate Current	41	ma
Zero-Signal Grid-No.2 Current	3	ma
Max.-Signal Grid-No.2 Current	7	ma
Plate Resistance (Approx.)	13000	ohms
Transconductance	5800	μmhos
Load Resistance	2500	ohms
Total Harmonic Distortion	10	%
Max.-Signal Power Output	1.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

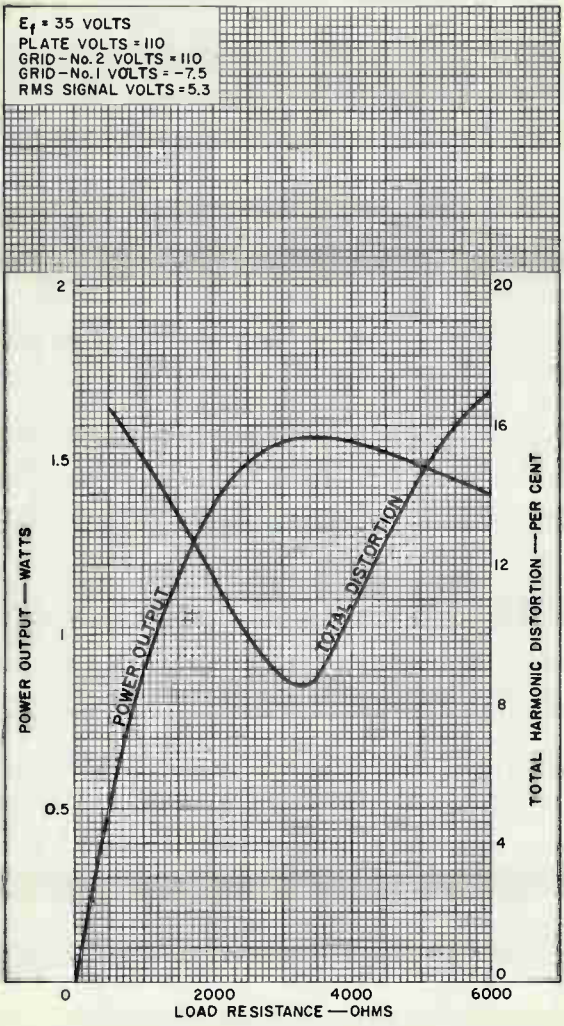
[a] Without external shield.
[b] The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS



92CM—6312R1

OPERATION CHARACTERISTICS



92CM-6794

Power Pentode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	35 ± 10%	volts
Current at 35 volts	0.15	amp
Direct Interelectrode Capacitances (Approx.):▲		
Grid No.1 to plate	0.65	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	17	μμf
Plate to cathode & grid No.3, grid No.2, and heater	9	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Heater

Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	150	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0	max.	volts
GRID-No.2 INPUT	1.75	max.	watts
PLATE DISSIPATION	5	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200●	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	225	max.	°C

35EH5

Typical Operation and Characteristics:

Plate Supply Voltage	110	volts
Grid-No.2 Supply Voltage	115	volts
Cathode Resistor	62	ohms
Peak AF Grid-No.1 Voltage	3	volts
Zero-Signal Plate Current	32	ma
Max.-Signal Plate Current	32	ma
Zero-Signal Grid-No.2 Current	7.2	ma
Max.-Signal Grid-No.2 Current	12	ma
Plate Resistance (Approx.)	14000	ohms
Transconductance	12000	μmhos
Load Resistance	3000	ohms
Total Harmonic Distortion	8	%
Max.-Signal Power Output	1.2	watts

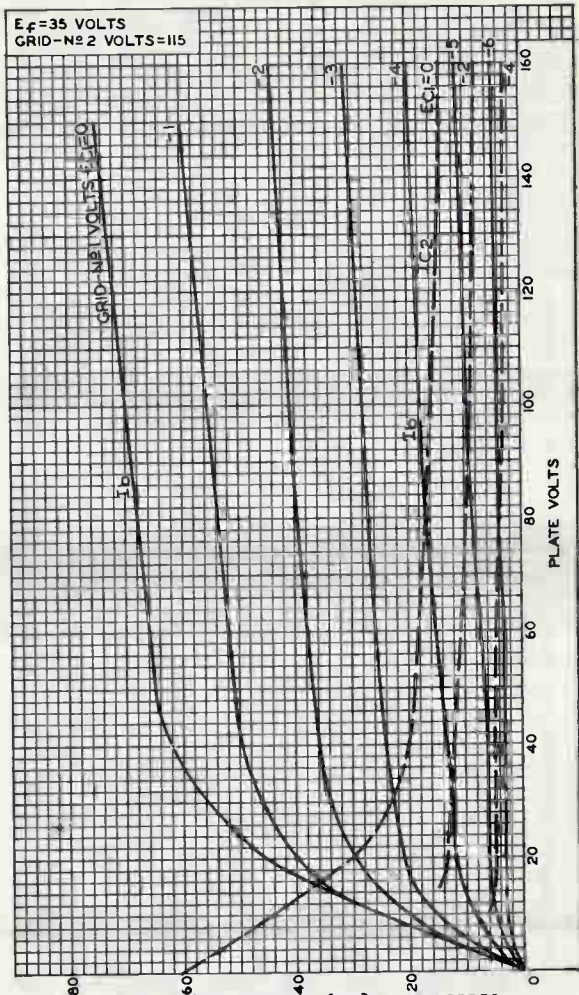
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

▲ Without external shield.

● The dc component must not exceed 100 volts.

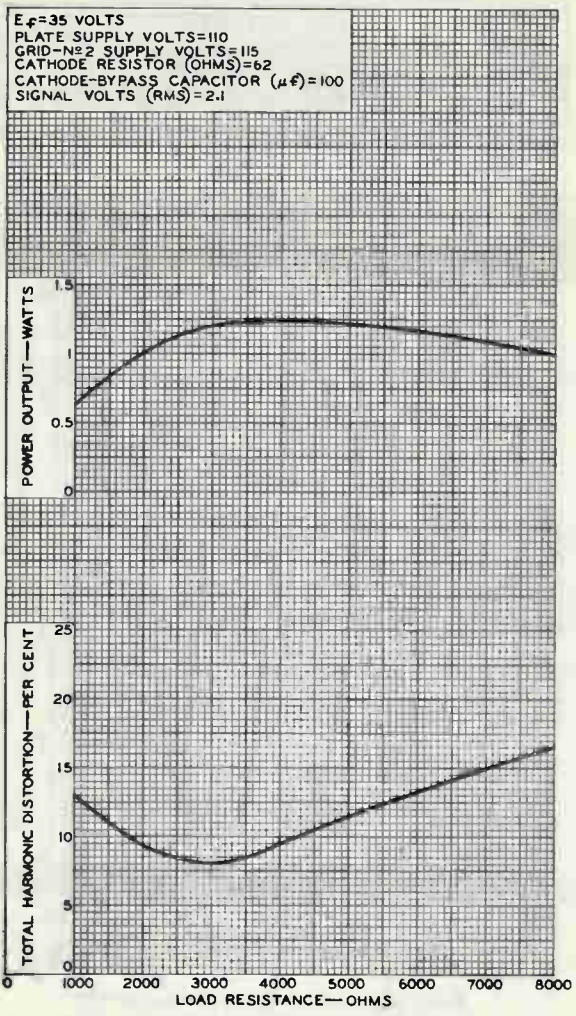
AVERAGE CHARACTERISTICS



92CM-10551

35EH5

OPERATION CHARACTERISTICS



92CM-10547

35L6-GT

BEAM POWER AMPLIFIER

GENERAL DATA

Electrical:

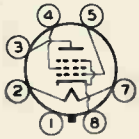
Heater, for Unipotential Cathode:		
Voltage	35	ac or dc volts
Current	0.15	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Grid No.1 to Plate	0.8	μμf
Input	13	μμf
Output	9.5	μμf

[o] With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-5/16"
Bulb	T-9
Base	Intermediate-Shell Octal 7-Pin
Basing Designation for BOTTOM VIEW	G-7AC

Pin 1 – No Connection
Pin 2 – Heater
Pin 3 – Plate
Pin 4 – Grid No.2



Pin 5 – Grid No.1
Pin 7 – Heater
Pin 8 – Cathode, Grid No.3

AF POWER AMPLIFIER – Class A_1

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	200 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	117 max.	volts
PLATE DISSIPATION	8.5 max.	watts
GRID-No.2 DISSIPATION	1.0 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	110	200	volts
Grid-No.2 Voltage	110	110	volts
Grid-No.1 (Control-Grid) Voltage	-7.5	-8	volts
Peak AF Grid-No.1 Voltage	7.5	8	volts
Zero-Signal Plate Current	40	41	ma.
Max.-Signal Plate Current	41	44	ma.
Zero-Signal Grid-No.2 Current	3	2	ma.
Max.-Signal Grid-No.2 Current	7	7	ma.
Plate Resistance (Approx.)	14000	40000	ohms
Transconductance	5800	5900	μmhos
Load Resistance	2500	4500	ohms
Total Harmonic Distortion	10	10	%
Max.-Sig. Power Output	1.5	3.3	watts

35L6-GT
BEAM POWER AMPLIFIER

Maximum Circuit Values (for maximum rated conditions):

Grid-No.1-Circuit Resistance:

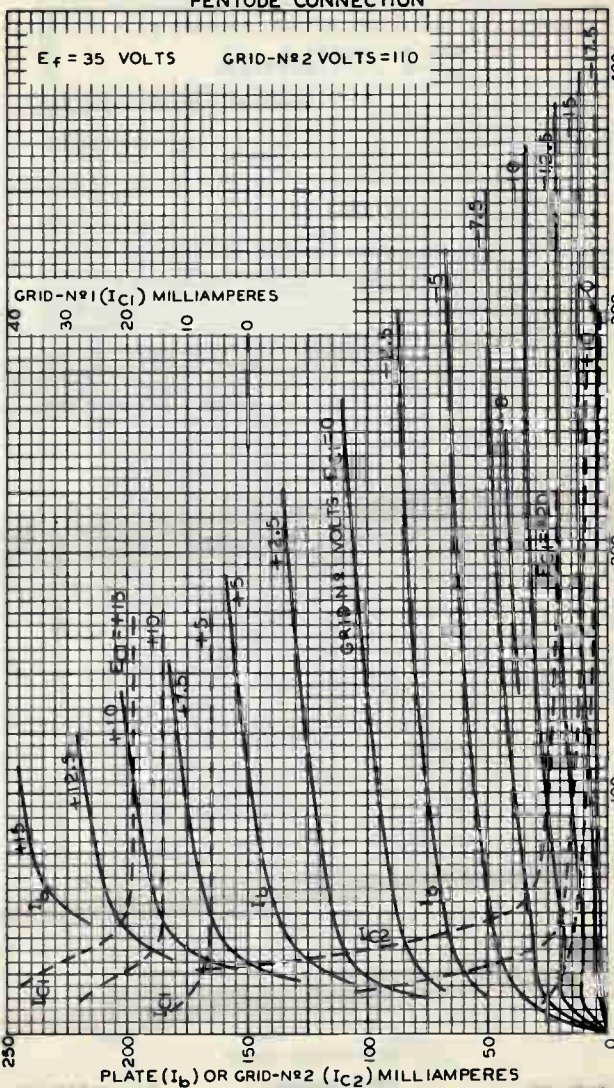
For fixed bias	0.1	. . megohm
For cathode bias	0.5	. . megohm

Curves shown under Type 35B5 are also applicable to the 35L6-GT.

RCA

35L6-GT

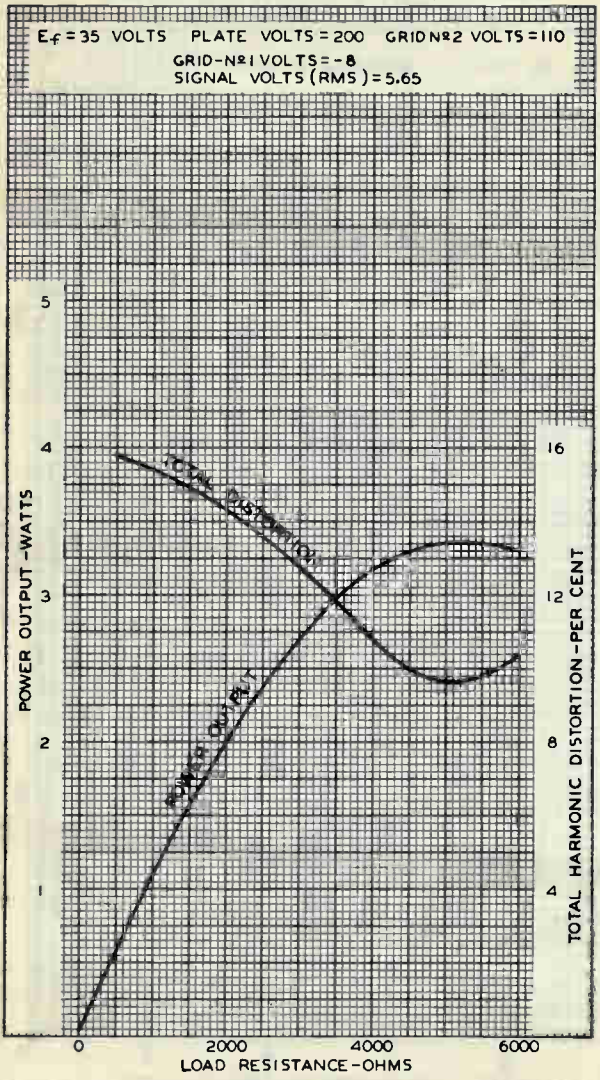
AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



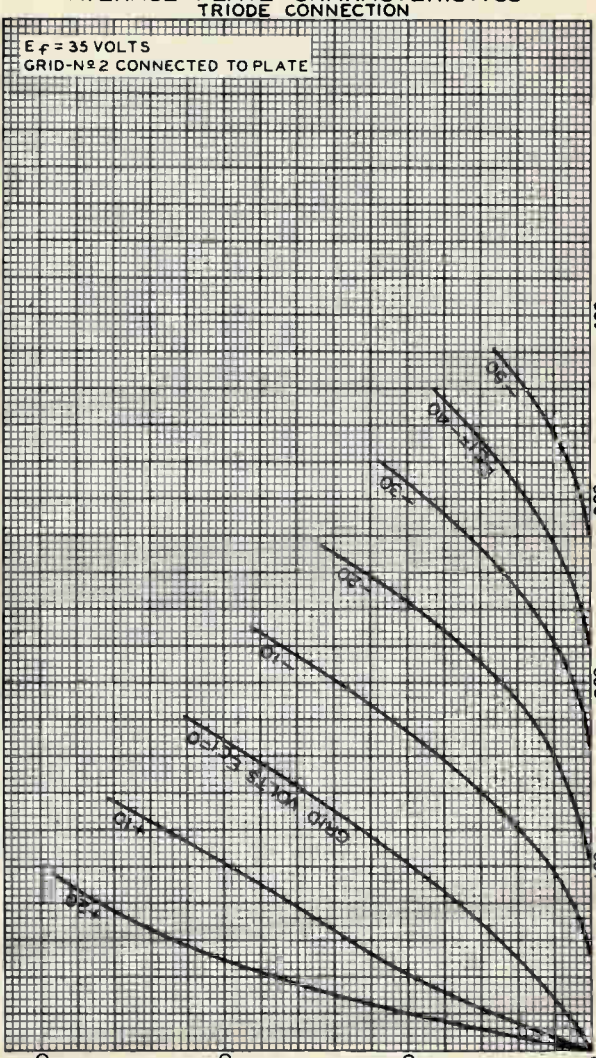
AUG. 11, 1941
TUBE DEPARTMENT
92CM-6309
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

35L6-GT

OPERATION CHARACTERISTICS



35L6-GT
AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION



35W4

HALF-WAVE VACUUM RECTIFIER

MINIATURE TYPE

GENERAL DATA

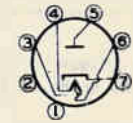
Electrical:

	Without Panel Lamp	With No. 40 or No. 47 Panel Lamp	
Heater, for Unipotential Cathode:			
Voltage (AC or DC):			
Entire Heater (pins 3 & 4). .	35	32	. . volts
Panel-Lamp Section (pins 4 & 6)	7.5	5.5	. . volts
Current (between pins 3 & 4 . .	0.15	–	. . amp
Current (between pins 3 & 6 . .	–	0.15	. . amp

Mechanical:

Mounting Position.	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length.	2-3/8"
Length from Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	5BQ

Pin 1 – No Connection
Pin 2 – No Connection
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate



Pin 6 – Heater Tap
Pin 7 – Cathode
Panel-Lamp Heater Section is between pins 4 & 6

HALF-WAVE RECTIFIER

Maximum Ratings, *Design-Center Values*:

PEAK INVERSE PLATE VOLTAGE	330	max.	volts
PEAK PLATE CURRENT	600	max.	ma
DC OUTPUT CURRENT:			
With Panel Lamp & No Shunting Resistor.	60	max.	ma
With Panel Lamp & Shunting Resistor . .	90	max.	ma
Without Panel Lamp	100	max.	ma
PANEL-LAMP-SECTION VOLTAGE (RMS):			
When panel lamp fails.	15	max.	volts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	330	max.	volts
Heater positive with respect to cathode.	330	max.	volts

Typical Operation with No.40 or No.47 Panel Lamp in Accompanying Half-Wave Circuit with Capacitor-Input Filter:

AC Plate-Supply Volt. (RMS).	117	117	117	117	. . volts
Filter-Input Capacitor . . .	40	40	40	40	. . µf
Min. Total Effective Plate-Supply Impedance . .	15	15	15	15	. . ohms
Panel-Lamp Shunting Res. . .	–	300	150	100	. . ohms
DC Output Current.	60	70	80	90	. . ma ←

+ indicates a change.

35W4

HALF-WAVE VACUUM RECTIFIER

Typical Operation Without Panel Lamp in Conventional Half-Wave Circuit with Capacitor-Input Filter:

AC Plate-Supply Voltage (RMS).	117	volts
Filter-Input Capacitor	40	μf
Min. Total Effective Plate-Supply Imped. .	15	ohms
DC Output Current.	100	ma
DC Output Voltage at Input to Filter (Approx.):		
→ At half-load current (50 ma.)	135	volts
At full-load current (100 ma.)	120	volts
Voltage Regulation (Approx.):		
→ Half-load to full-load current	15	volts

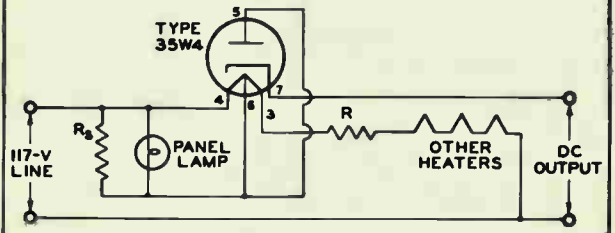
Maximum Circuit Values:

Panel-Lamp Shunting Resistor:*

For dc output current of 70 ma.	800 max.	ohms
For dc output current of 80 ma.	400 max.	ohms
For dc output current of 90 ma.	250 max.	ohms

*Required when dc output current is greater than 60 ma.

HALF-WAVE CIRCUIT
with No.43 or No.47 Panel Lamp

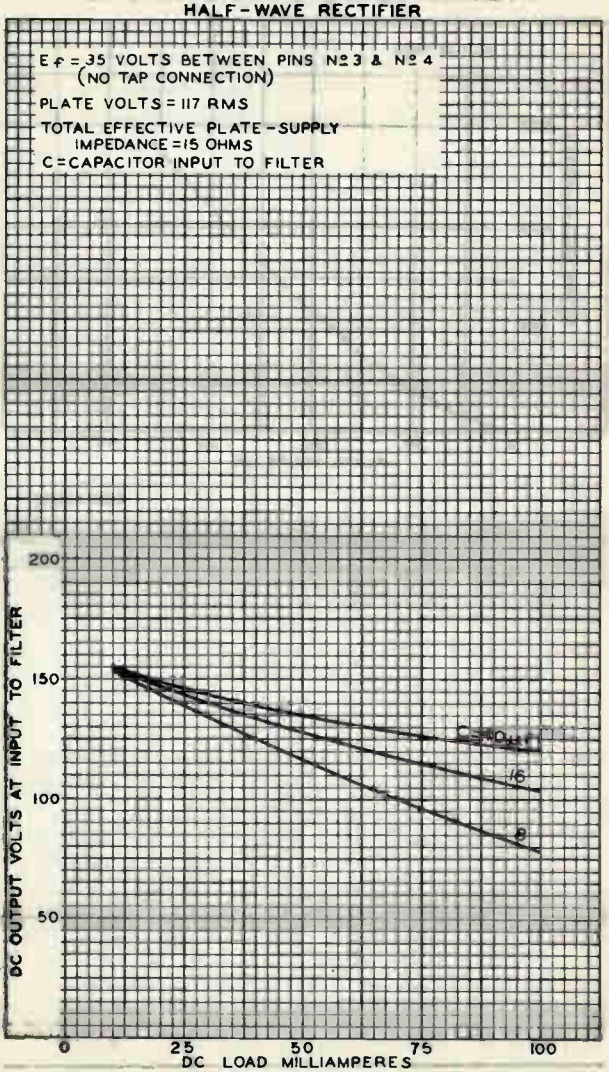


DROP ACROSS R AND ALL HEATERS (WITH PANEL LAMP) SHOULD EQUAL 117 VOLTS AT 0.15 AMPERE. R_s = SHUNTING RESISTOR REQUIRED WHEN DC OUTPUT CURRENT EXCEEDS 60 MILLIAMPERES

92CS-6826

→ Indicates a change.

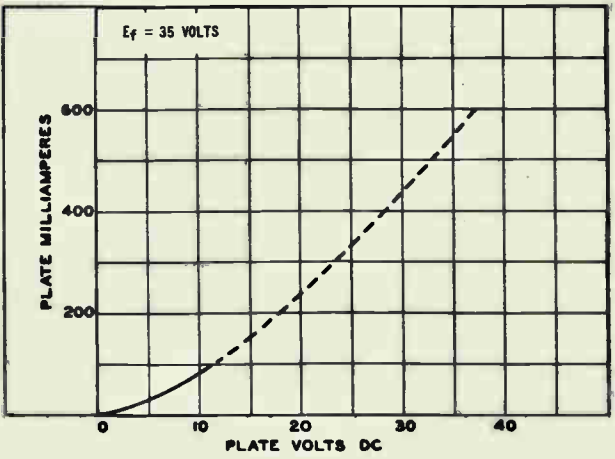
35W4
OPERATION CHARACTERISTICS
HALF-WAVE RECTIFIER



35W4

35W4

AVERAGE PLATE CHARACTERISTIC



92CM-6305TV

Half-Wave Vacuum Rectifier

7-PIN MINIATURE TYPE

With Heater Having Controlled Warm-Up Time

GENERAL DATA

Electrical:

Heater[a], for Unipotential Cathode:		
Voltage (AC or DC):		
Entire heater (Pins 3 and 4)	36	volts
Tap-section (Pins 3 and 6)	32	volts
Current:		
Tap-section (Pins 3 and 6)	0.1 ± 6%	amp
Warm-up time (Average)	20	sec

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	5BQ

Pin 1 – No Connection
Pin 2 – No Connection
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Heater Tap
Pin 7 – Cathode

HALF-WAVE RECTIFIER

Maximum Ratings, *Design-Maximum Values:*

PEAK INVERSE PLATE VOLTAGE	365	max.	volts
PEAK PLATE CURRENT	530	max.	ma
DC OUTPUT CURRENT	82	max.	ma
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	350[b]	max.	volts
Heater positive with respect to cathode	200[c]	max.	volts

Typical Operation:

In accompanying typical half-wave circuit with capacitor-input filter

AC Plate Supply Voltage (RMS)	120	volts
Filter-Input Capacitor	40	μf
Total Effective Plate Supply Resistance	a	
DC Output Current	75	ma
DC Output Voltage at Input to Filter (Approx.)	118	volts

36AM3B

Characteristics:

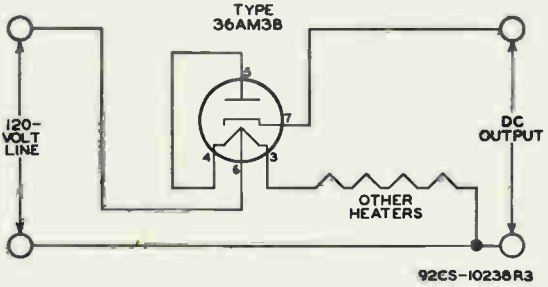
Tube-Voltage Drop for plate ma. = 150 . . . . 16 volts

[a] The *heater* of the 36AM3B is designed so that the heater section between pins 4 and 6 is used as a limiting resistance in the rectifier plate circuit (See accompanying *Typical Half-Wave Circuit*). This type is *not* designed for use with a panel lamp where the heater section between pins 4 and 6 is used as a panel-lamp shunt.

[b] The DC component must not exceed 350 volts.

[c] The DC component must not exceed 100 volts.

TYPICAL HALF-WAVE CIRCUIT



92CS-10238R3

Beam Power Tube

The 36MC6 is the same as the 6MC6 except for:

Heater Characteristics and Ratings

Current	0.450 + 0.030	A
Voltage (AC or DC) at 0.450 A	36.0	V

45Z5-GT

HALF-WAVE HIGH-VACUUM RECTIFIER

Heater	Coated Unipotential Cathode	
Voltage (Entire Heater (pins 2 & 7))	45	a-c or d-c volts
Voltage (Panel Lamp Section (pins 2 & 3) with 0.15 amp. between pins 2 & 7)	7.5	a-c or d-c volts
Current	0.15	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4" ←
Maximum Diameter		1-5/16"
Bulb		T-9
Base	Intermediate Shell Octal 6-Pin	
Pin 1 - No Connection	Pin 5 - Plate	
Pin 2 - Heater	Pin 7 - Heater	
Pin 3 - Heater Tap	Pin 8 - Cathode	
Mounting Position		Any

BOTTOM VIEW (G-6AD)

HALF-WAVE RECTIFIER

A-C Plate Voltage	235 max.	volts ←
Peak Inverse Voltage	700 max.	volts ←
Peak Plate Current	600 max.	ma.
D-C Output Current:		
With Panel Lamp and (No Shunting Resistor)	60 max.	ma.
With Panel Lamp and (Shunting Resistor)	90 max.	ma. ←
Without Panel Lamp	100 max.	ma.
Shunting Resistor:		
For D-C Output Current of 70 ma.	800 max.	ohms ←
80 ma.	400 max.	ohms ←
90 ma.	250 max.	ohms ←
D-C Heater-Cathode Potential	350 max.	volts ←
Panel-Lamp-Sect. Volt. (RMS) when panel lamp fails	15 max.	volts ←
Typical Operation:		←

With #40 or #47 Panel Lamp in Circuit Below with Condenser-Input Filter

Heater Cur. between Pins 3 & 7	0.15	0.15	0.15	0.15	0.15	amp.
Heater Volt. between Pins 2 & 7	42	42	42	42	42	volts
Section Volt. between Pins 2 & 3	5.5	5.5	5.5	5.5	5.5	volts
A-C Plate Voltage (RMS)	117	117	117	117	235	volts
Tot. Eff. Plate-Supply Imped.▲	15	15	15	15	100	min. ohms
D-C Output Current	60	70	80	90	60	ma.
Shunting Resistance	-	300	150	100	-	ohms

Without Panel Lamp - Conventional Half-Wave Circuit with Condenser-Input Filter

Heater Cur. between Pins 3 & 7	0.15	0.15	amp.
Heater Volt. between Pins 2 & 7	85	85	volts
Section Volt. between Pins 2 & 3	7.5	7.5	volts
A-C Plate Voltage (RMS)	117	235	volts
Total Effective Plate-Supply Impedance▲	15	100	min. ohms
D-C Output Current	100	100	ma.

▲ When a filter-input condenser larger than 40 μf is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

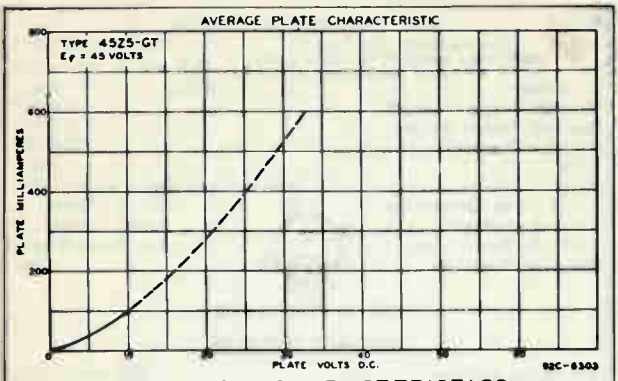
The Circuit under Type 5Z5-GT also applies to the 45Z5-GT.

← Indicates a change.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

45Z5-GT

HALF-WAVE HIGH-VACUUM RECTIFIER



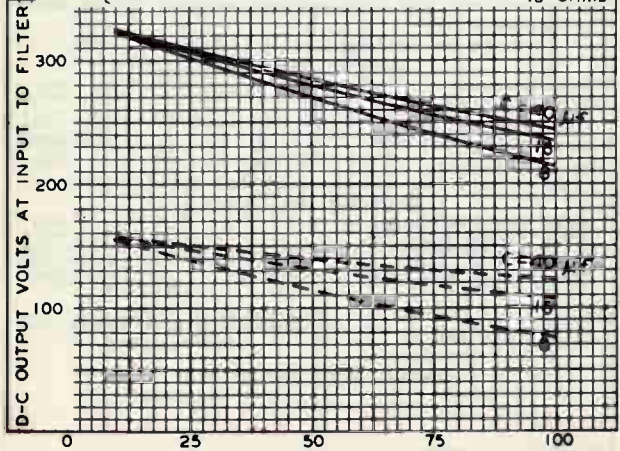
OPERATION CHARACTERISTICS
HALF-WAVE RECTIFIER

E_f = 45 VOLTS BETWEEN PINS №2 & №7
(NO TAP CONNECTION)

C = CONDENSER INPUT TO FILTER

——— { PLATE VOLTS = 235 RMS
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE = 100 OHMS

– – – { PLATE VOLTS = 117 RMS
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE = 15 OHMS



50B5

BEAM POWER AMPLIFIER

MINIATURE TYPE

GENERAL DATA

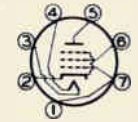
Electrical:

Heater, for Unipotential Cathode:		
Voltage	50	ac or dc volts
Current	0.15	amp.
Direct Interelectrode Capacitances (Approx.):[a]		
Grid-No.1 to Plate	0.5	μμf
Input	13	μμf
Output	6.5	μμf

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length from Base Seat to Bulb Top (excluding tip)	2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Miniature Button 7-Pin
Basing Designation for BOTTOM VIEW	7BZ

Pin 1 – Grid No.1
Pin 2 – Cathode, Grid No.3
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate
Pin 6 – Grid No.2
Pin 7 – Grid No.1



CLASS A_1 AMPLIFIER

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	117 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	117 max.	volts
PLATE DISSIPATION	5.5 max.	watts
GRID-No.2 DISSIPATION	1.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation and Characteristics:

Plate Voltage	110	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 Voltage	-7.5	volts
Peak A-F Grid-No.1 Voltage	7.5	volts
Zero-Signal Plate Current	49	ma.
Max.-Signal Plate Current	50	ma.

[a] With no external shield.

50B5

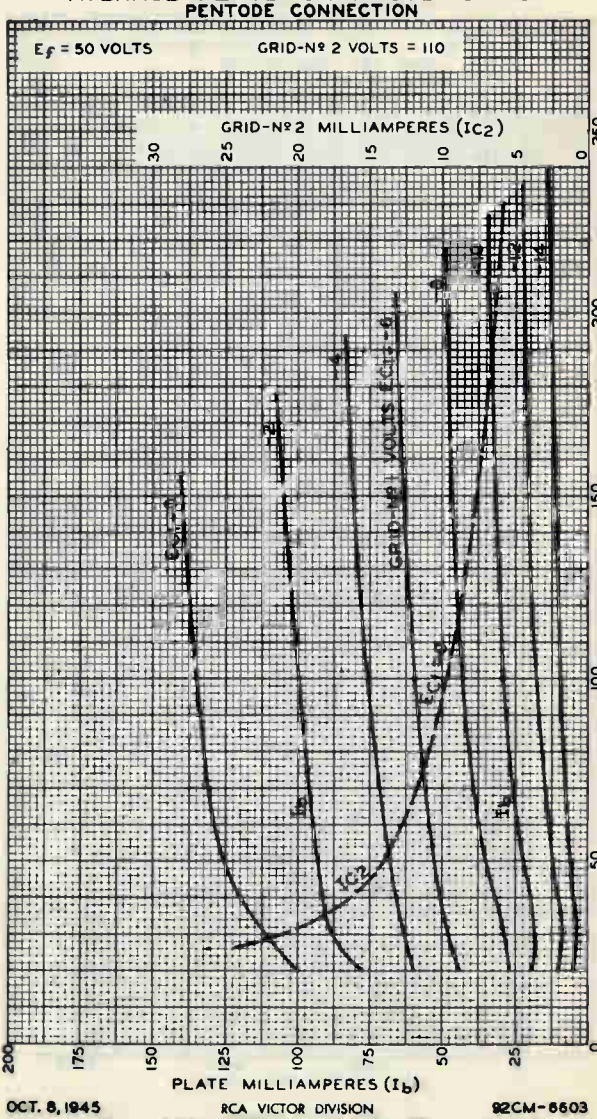
BEAM POWER AMPLIFIER

Zero-Signal Grid-No.2 Current (Approx.)	4	ma.
Max.-Signal Grid-No.2 Current (Approx.)	8.5	ma.
Plate Resistance (Approx.)	14000	ohms
Transconductance	7500	μmhos
Load Resistance	2500	ohms
Total Harmonic Distortion	9	%
Max.-Sig. Power Output	1.9	watts

Maximum Circuit Values (for maximum rated conditions):

Grid-No.1-Circuit Res.	fixed bias	0.1	megohm
	cathode bias	0.5	megohm

50B5
AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



OCT. 8, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

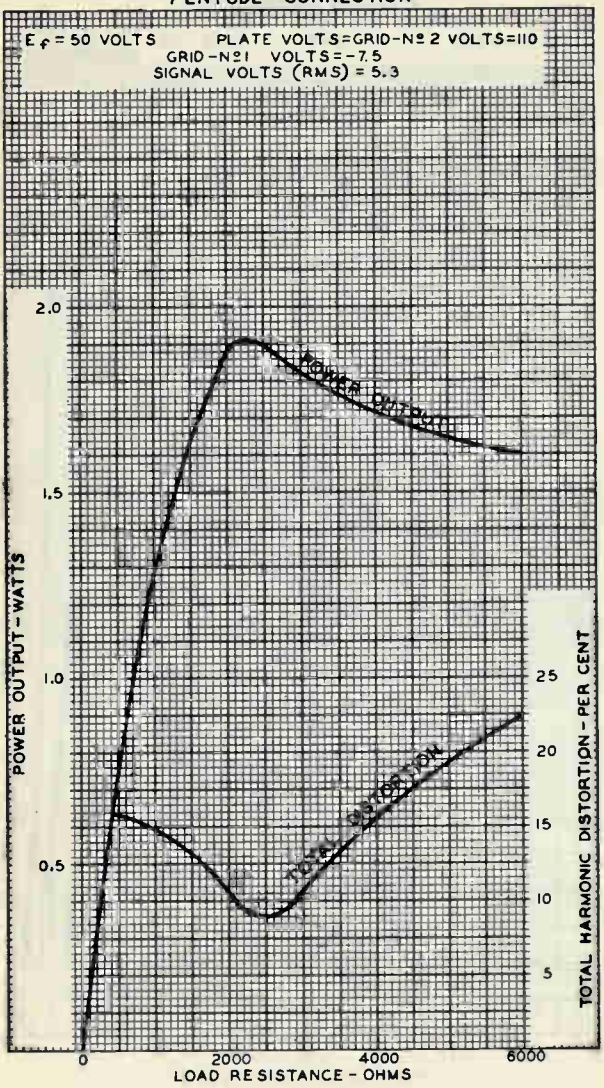
92CM-6603

50B5

RCA

50B5

OPERATION CHARACTERISTICS
PENTODE CONNECTION



50C5

BEAM POWER TUBE

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	50 + 10%	volts
Current	0.15	amp
Direct Interelectrode Capacitances (Approx.):[o]		
Grid No.1 to plate	0.6	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	13	μμf
Plate to cathode & grid No.3, grid No.2, and heater	8.5	μμf

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Heater

Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	150	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE	0	max.	volts
GRID-No.2 INPUT	1.4	max.	watts
PLATE DISSIPATION	7	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[Δ]	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	220	max.	°C

→ Indicates a change.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

50C5

BEAM POWER TUBE

Typical Operation and Characteristics:

Plate Voltage	120	volts
Grid-No.2 Voltage	110	volts
Grid-No.1 Voltage	−8	volts
Peak AF Grid-No.1 Voltage	8	volts
Zero-Signal Plate Current	49	ma
Max.-Signal Plate Current	50	ma
Zero-Signal Grid-No.2 Current	4	ma
Max.-Signal Grid-No.2 Current	8.5	ma
Plate Resistance (Approx.)	10000	ohms
Transconductance	7500	μmhos
Load Resistance	2500	ohms
Total Harmonic Distortion	10	%
Max.-Signal Power Output	2.3	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

[o] Without external shield.

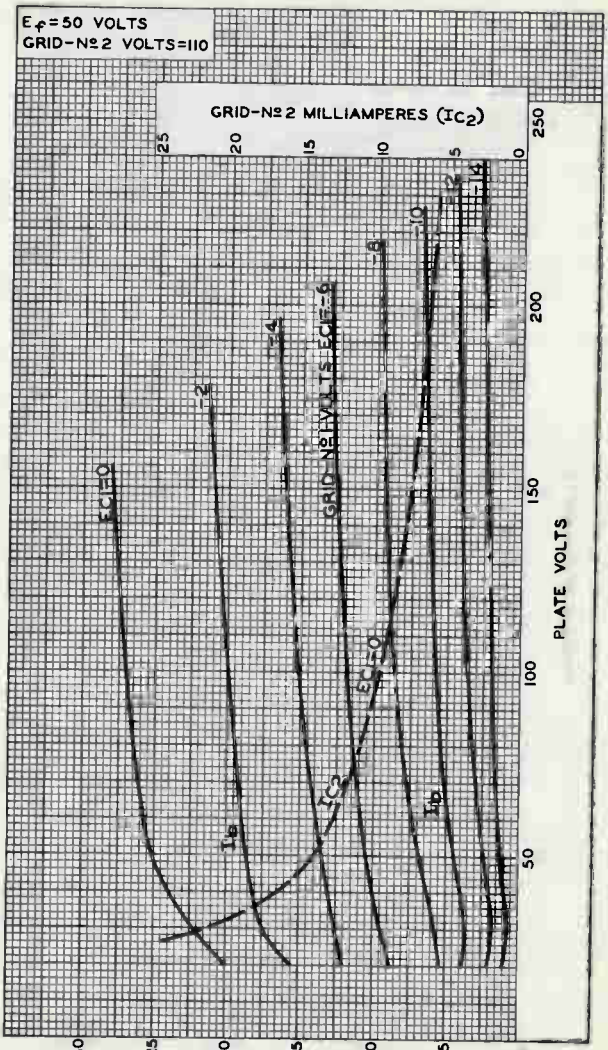
[▲] The dc component must not exceed 100 volts.

NOTE: Except for a different basing arrangement, which simplifies the problem of meeting Underwriters' Laboratories requirements in the design of ac/dc receivers, the 50C5 is similar to the miniature type 50B5.

→ Indicates a change.

50C5

AVERAGE CHARACTERISTICS

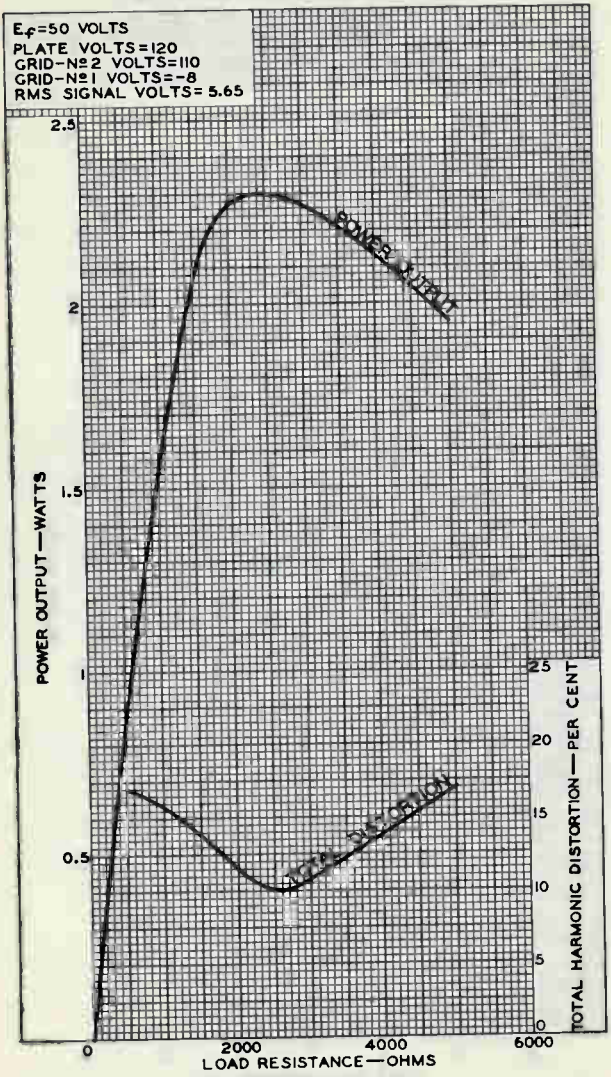


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-6603

RCA

50C5

OPERATION CHARACTERISTICS



50C6-G

BEAM POWER AMPLIFIER

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage	50	ac or dc volts
Current	0.15	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-5/8"
Seated Length	3-7/8" + 3/16" - 5/16"
Maximum Diameter	1-13/16"
Bulb	ST-14
Base	Medium-Shell Octal 7-Pin
Basing Designation for BOTTOM VIEW	G-7AC

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grid No.2

Pin 5 - Grid No.1
Pin 7 - Heater
Pin 8 - Cathode, Grid No.3

AF POWER AMPLIFIER - Class A_1

Maximum Ratings, *Design-Center Values*:

PLATE VOLTAGE	200 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	135 max.	volts
PLATE DISSIPATION	12.5 max.	watts
GRID-No.2 INPUT	1.75 max.	watts

Typical Operation and Characteristics:

Plate Voltage	135	200	volts
Grid-No.2 Voltage	135	135	volts
Grid-No.1 (Control-Grid) Voltage	-13.5	-14	volts
Peak AF Grid-No.1 Voltage	13.5	14	volts
Zero-Signal Plate Current	58	61	ma
Max.-Signal Plate Current	60	66	ma
Zero-Signal Grid-No.2 Current	3.5	2.2	ma
Max.-Signal Grid-No.2 Current	11.5	9.0	ma
Plate Resistance (Approx.)	9300	18300	ohms
Transconductance	7000	7100	μmhos
Load Resistance	2000	2600	ohms
Total Harmonic Distortion	10	10	%
Max.-Signal Power Output	3.6	6.0	watts

Curves shown under Type 6Y6-G also apply to the 50C6-G.

50DC4

HALF-WAVE VACUUM RECTIFIER

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

	Without Panel Lamp	*With No.40 or No.47 Panel Lamp*	
Heater, for Unipotential Cathode:			
Voltage:			
Entire heater (Pins 3 and 4)	50 ± 10%	45 ± 10%	ac or dc volts
Panel-lamp section (Pins 4 and 6)	7.5	5.5	ac or dc volts
Current:			
Between pins 3 and 4	0.15	–	amp
Between pins 3 and 6	–	0.15	amp

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	5BQ

Pin 1 – No Connection
Pin 2 – No Connection
Pin 3 – Heater
Pin 4 – Heater
Pin 5 – Plate

Pin 6 – Heater Tap
Pin 7 – Cathode

Panel-lamp heater section is between pins 4 and 6.

HALF-WAVE RECTIFIER

Maximum Ratings, *Design-Maximum Values:*

PEAK INVERSE PLATE VOLTAGE	330 max.	volts
PEAK PLATE CURRENT	720 max.	ma
DC OUTPUT CURRENT:		
With panel lamp and no shunting resistor	70 max.	ma
With panel lamp and shunting resistor†	110 max.	ma
Without panel lamp	120 max.	ma
PANEL-LAMP-SECTION VOLTAGE (RMS):		
When panel lamp fails	16.5 max.	volts

† Required when the dc output current is greater than 70 milliamperes.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

50DC4

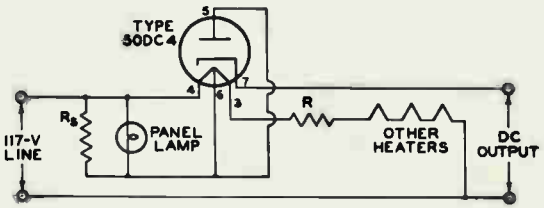
HALF-WAVE VACUUM RECTIFIER

PEAK HEATER-CATHODE VOLTAGE:					
Heater negative with respect to cathode.			330 max.		volts
Heater positive with respect to cathode.			330 max.		volts
Typical Operation:					
With panel lamp in accompanying half-wave circuit with capacitor input to filter					
AC Plate-Supply Voltage (RMS). . .	117	117	117	117	volts
Filter-Input Capacitor	40	40	40	40	μf
Minimum Total Effective Plate-Supply Impedance	15	15	15	15	ohms
Panel-Lamp Shunting Resistor . . .	450	200	100	75	ohms
DC Output Current.	70	80	90	100	ma

Without panel lamp in half-wave circuit with capacitor input to filter		
AC Plate-Supply Voltage (RMS).	117	volts
Filter-Input Capacitor	40	μf
Minimum Total Effective Plate-Supply Impedance .	15	ohms
DC Output Current.	110	ma
DC Output Voltage at Input to Filter (Approx.):		
At half-load current of 55 ma.	130	volts
At full-load current of 110 ma..	110	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	20	volts

HALF-WAVE CIRCUIT

With panel lamp No.40 or No.47



DROP ACROSS R AND ALL HEATERS (WITH PANEL LAMP) SHOULD EQUAL 117 VOLTS AT 0.15 AMPERE. R_S = SHUNTING RESISTOR REQUIRED WHEN DC OUTPUT CURRENT EXCEEDS 70 MILLIAMPERES

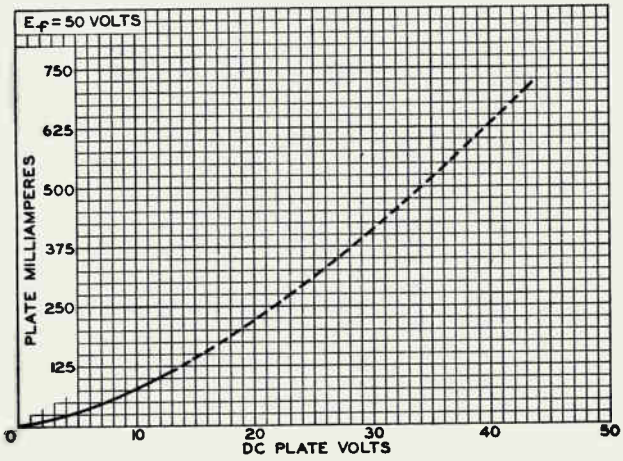
92CS-9923

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

50DC4

AVERAGE PLATE CHARACTERISTIC



92CS-9893

50EH5

Power Pentode

7-PIN MINIATURE TYPE

The 50EH5 is the same as the 6EH5 except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	50	volts
Current	0.15	amp

50FE5

Beam Power Tube

For Audio-Output Stages of Low-Cost, Compact Stereophonic Equipment

The 50FE5 is the same as the 6FE5 except for the following items:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	50 ± 10%	volts
Current at 50 volts	0.15	amp
Peak Heater–Cathode Voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200* max.	volts

* The dc component must not exceed 100 volts.

50L6-GT

BEAM POWER AMPLIFIER

Heater ■	Coated Unipotential Cathode	
Voltage	50	a-c or d-c volts
Current	0.15	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base	Intermediate Shell Octal 7-Pin	
Pin 1 - No Connection		Pin 5 - Grid
Pin 2 - Heater		Pin 7 - Heater
Pin 3 - Plate		Pin 8 - Cathode
Pin 4 - Screen		
Mounting Position		Any

BOTTOM VIEW (G-7AC)

AMPLIFIER

Plate Voltage		200 max.	volts
Screen Voltage		117 max.	volts
Plate Dissipation		10 max.	watts
Screen Dissipation		1.25 max.	watts
Typical Operation and Characteristics - Class A_1 Amplifier:			
Plate	110	200	volts
Screen	110	110	volts
Grid *	-7.5	-8	volts
Peak A-F Grid Voltage	7.5	8	volts
Zero-Sig. Plate Cur.	49	50	ma.
Max.-Sig. Plate Cur.	50	55	ma.
Zero-Sig. Screen Cur.	4	2 approx.	ma.
Max.-Sig. Screen Cur.	11	7 approx.	ma.
Plate Resistance	13000	30000 approx.	ohms
Transconductance	9000	9500	μmhos
Load Resistance	2000	3000	ohms
Total Harmonic Dist.	10	10	%
Power Output	2.1	4.3	watts

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

* The type of input coupling should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. When the grid circuit has a resistance not higher than 0.1 megohm, fixed bias may be used; for higher values, cathode bias is required. With cathode bias, the grid circuit may have a resistance not to exceed 0.5 megohm.

Curves under type 25L6-GT also apply to the 50L6-GT.

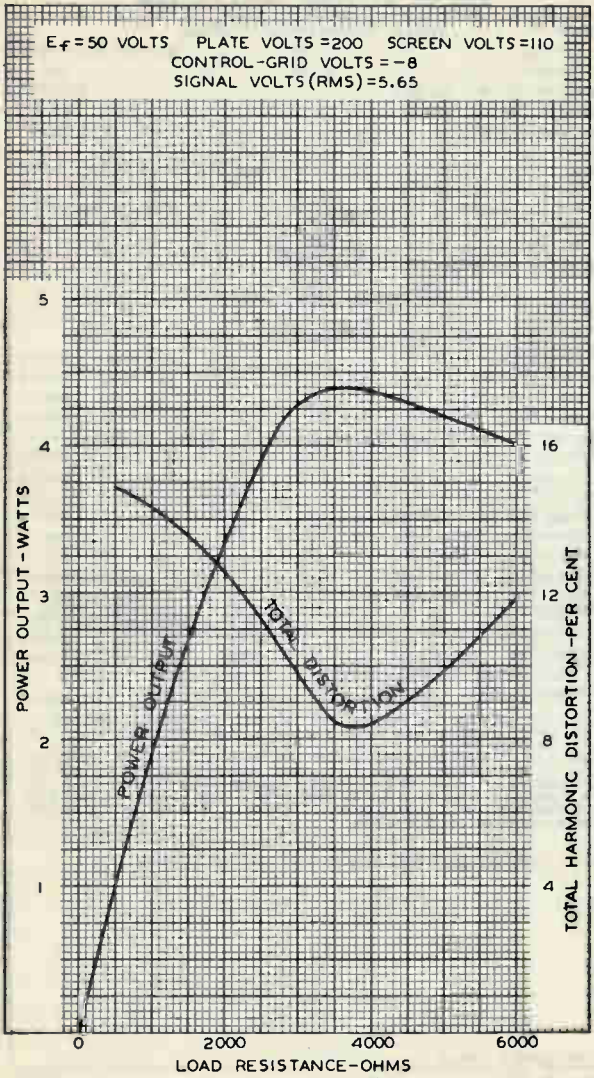
—Indicates a change.

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY INC

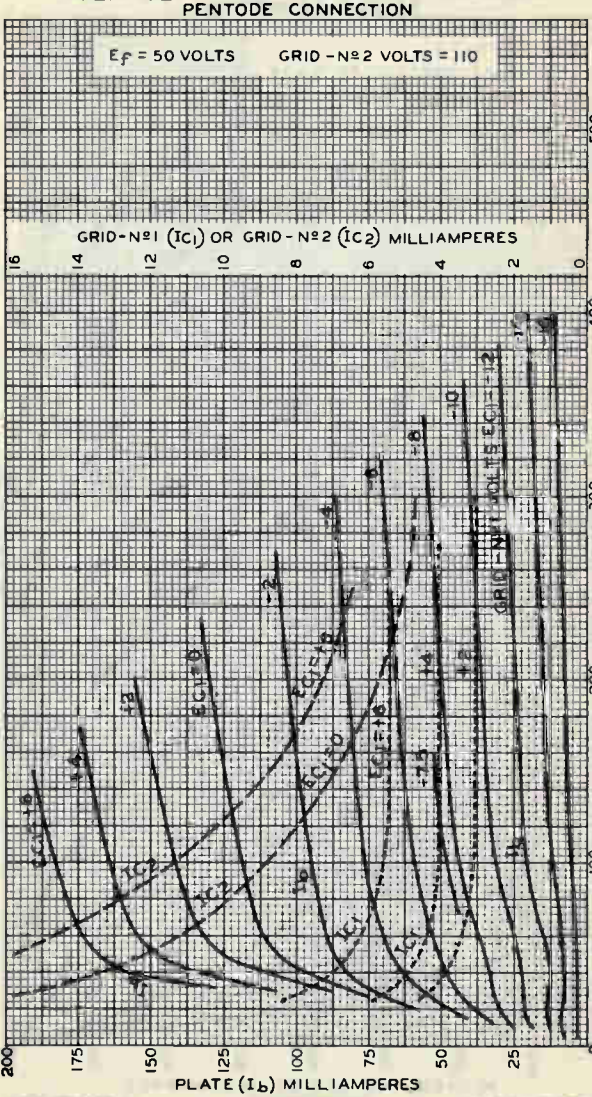
50L6-GT

50L6-GT

OPERATION CHARACTERISTICS



50L6-GT
AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION



JAN. 27, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

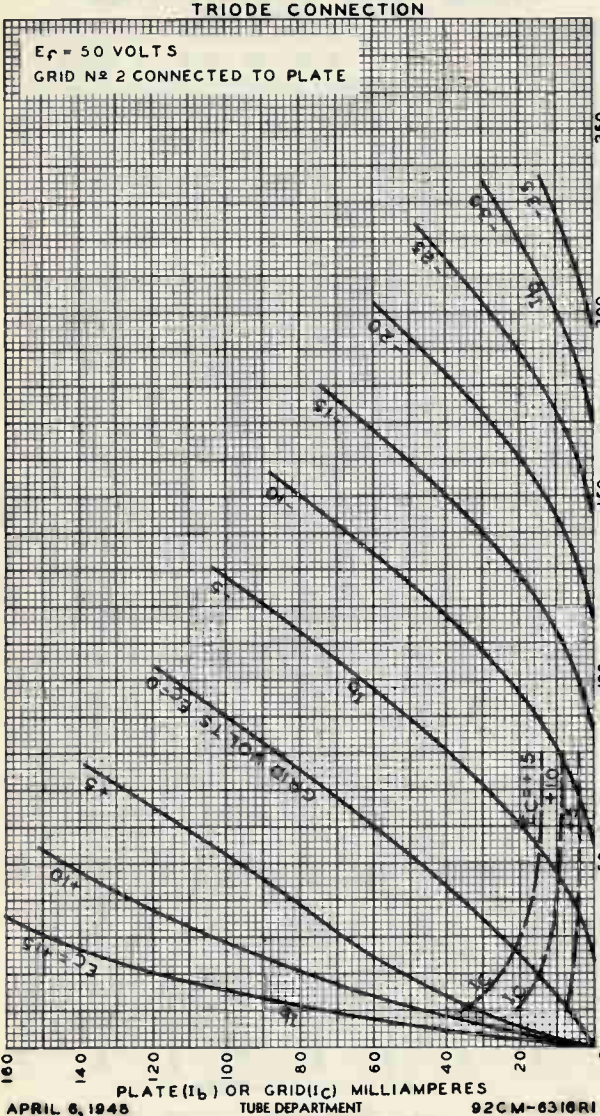
92CM-6314RI

50L6-GT

50L6-GT

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



APRIL 6, 1948

TUBE DEPARTMENT

92CM-6316RI

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

60FX5

Power Pentode

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	60 ± 10%	volts
Current at 60 volts	0.1	amp
Direct Interelectrode Capacitances (Approx.):▲		
Grid No.1 to plate	0.65	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	17	μμf
Plate to cathode & grid No.3, grid No.2, and heater	9	μμf

Characteristics, Class A1 Amplifier:

Plate Supply Voltage	110	volts
Grid-No.2 Supply Voltage	115	volts
Cathode Resistor	62	ohms
Plate Resistance (Approx.)	17500	ohms
Transconductance	13500	μmhos
Plate Current	36	ma
Grid-No.2 Current	10	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7CV

Pin 1 - Cathode, Grid No.3
Pin 2 - Grid No.1
Pin 3 - Heater

Pin 4 - Heater
Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Plate

AF POWER AMPLIFIER — Class A1

Maximum Ratings, ***Design-Maximum Values:***

PLATE VOLTAGE	150	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	130	max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Positive-bias value	0	max.	volts
GRID-No.2 INPUT	2	max.	watts
PLATE DISSIPATION	5.5	max.	watts

60FX5

PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200●	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	225	max.	°C

Typical Operation:

Plate Supply Voltage	110	volts
Grid-No.2 Supply Voltage	115	volts
Cathode Resistor	62	ohms
Peak AF Grid-No.1 Voltage	3	volts
Zero-Signal Plate Current	36	ma
Max.-Signal Plate Current	35	ma
Zero-Signal Grid-No.2 Current	10	ma
Max.-Signal Grid-No.2 Current	12	ma
Load Resistance	3000	ohms
Total Harmonic Distortion	8	%
Max.-Signal Power Output	1.3	watts

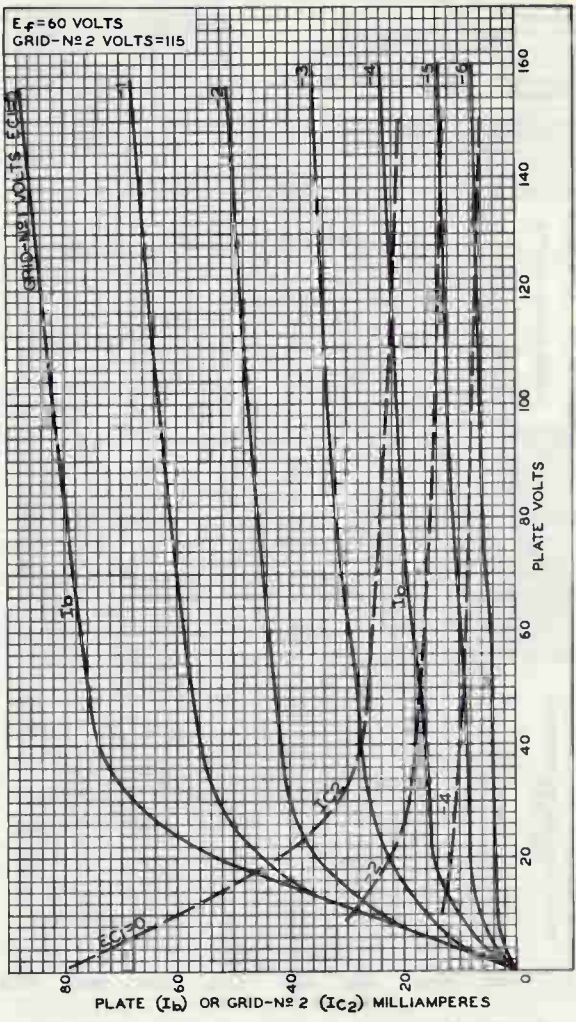
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:			
For fixed-bias operation	0.1	max.	megohm
For cathode-bias operation	0.5	max.	megohm

▲ Without external shield.

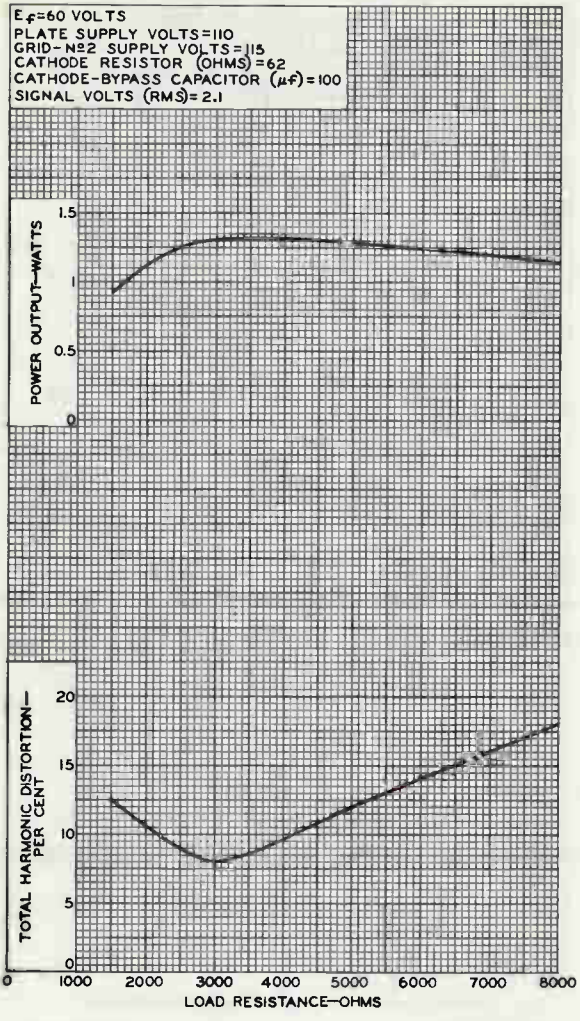
● The dc component must not exceed 100 volts.

AVERAGE CHARACTERISTICS



92CM-10546

OPERATION CHARACTERISTICS



92CM-10545

Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For Audio-Amplifier Applications Critical as to Microphonism, Leakage Noise, and Hum

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.15	amp
Direct Interelectrode Capacitances:[a]		
Pentode Connection:		
Grid No.1 to plate	0.11 max.	μμf
Grid No.1 to cathode, grid No.3, grid No.2, heater, and pins 2 and 6	2.7	μμf
Plate to cathode, grid No.3, grid No.2, heater, and pins 2 and 6	2.4	μμf
Triode Connection:[b]		
Grid No.1 to plate	1.4	μμf
Grid No.1 to cathode	1.4	μμf
Plate to cathode	0.85	μμf

Characteristics, Class A_1 Amplifier:

	Triode Connection[b]		*Pentode Connection*	
Plate Voltage	100	250	250	volts
Grid No.3	–	–	*Connected to cathode at socket*	
Grid-No.2 Voltage	–	–	100	volts
Grid-No.1 Voltage	-3	-8	-3	volts
Amplification Factor	21	21	–	
Plate Resistance (Approx.)	0.017	0.0137	2	megohms
Transconductance	1240	1530	1000	μmhos
Plate Current	2.2	5.5	1.8	ma
Grid-No.2 Current	–	–	0.4	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	–	–	-8	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)

→ Indicates a change.

Basing Designation for BOTTOM VIEW. 9AD

Pin 1 – Grid No.1
Pin 2 – No Connection
Pin 3 – Cathode
Pin 4 – Heater
Pin 5 – Heater

Pin 6 – No Connection
Pin 7 – Grid No.2
Pin 8 – Plate
Pin 9 – Grid No.3

AMPLIFIER — Class A_1

→Maximum Ratings, *Design-Maximum Values:*

	Triode Connection[b]	*Pentode Connection*	
PLATE VOLTAGE.	275 max.	330 max.	volts
GRID No.3 (SUPPRESSOR GRID).	–	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	–	330 max.	volts
GRID-No.2 VOLTAGE.	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Negative-bias value. . . .	55 max.	55 max.	volts
Positive-bias value. . . .	0 max.	0 max.	volts
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 165 volts	–	0.25 max.	watt
For grid-No.2 voltages between 165 and 330 volts.	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION.	1.7 max.	1.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode . . .	100 max.	100 max.	volts
Heater positive with respect to cathode . . .	100 max.	100 max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See *RESISTANCE-COUPLED-AMPLIFIER CHARTS No.26 & No.27* at front of this Section

Maximum Circuit Values:

	Triode Connection[b]	*Pentode Connection*	
Grid-No.1-Circuit Resistance	2.2 max.	2.2 max.	megohms

[a] Without external shield.
[b] Grid No.3 and grid No.2 connected to plate.

→Indicates a change.

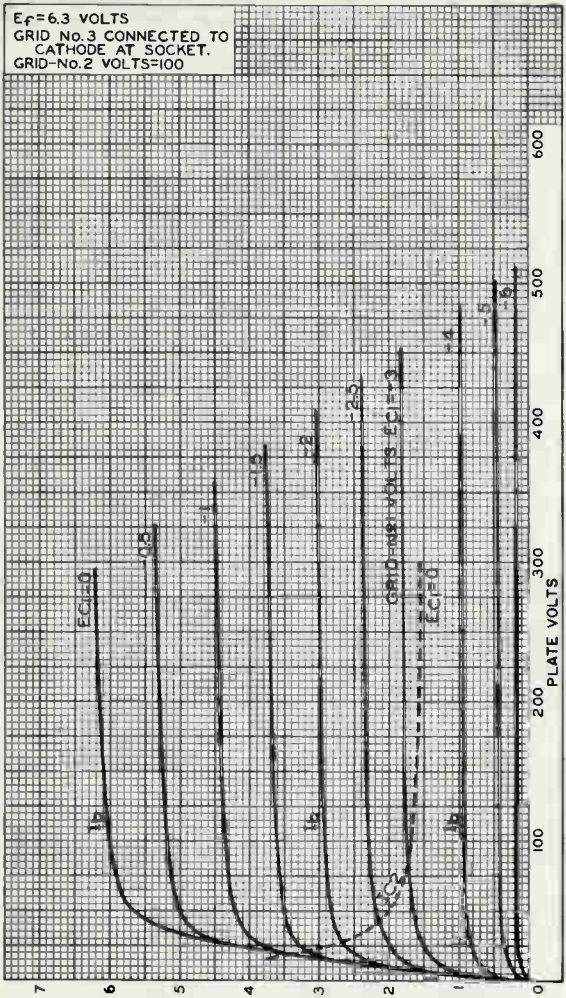
OPERATING CONSIDERATIONS

It is recommended that pins 2 and 6 be grounded in all applications. Grounding of these pins will effectively shield grid No.1 and plate from heater and help to reduce hum level when an ac heater supply is used.

→ Indicates a change.

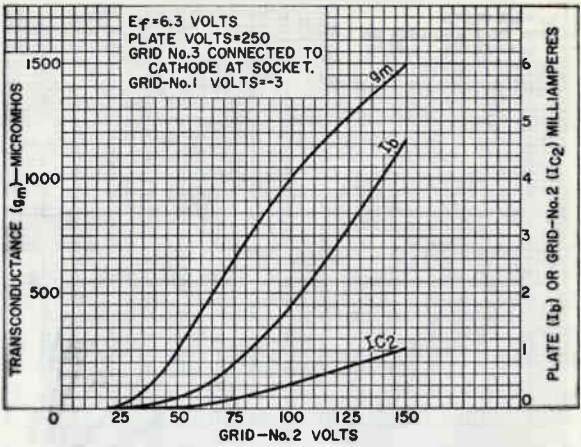
5879

AVERAGE CHARACTERISTICS
Pentode Connection

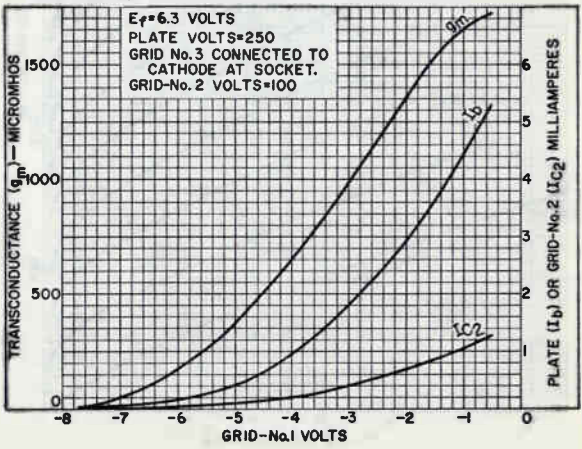


92CM-7439RI

AVERAGE CHARACTERISTICS
Pentode Connection

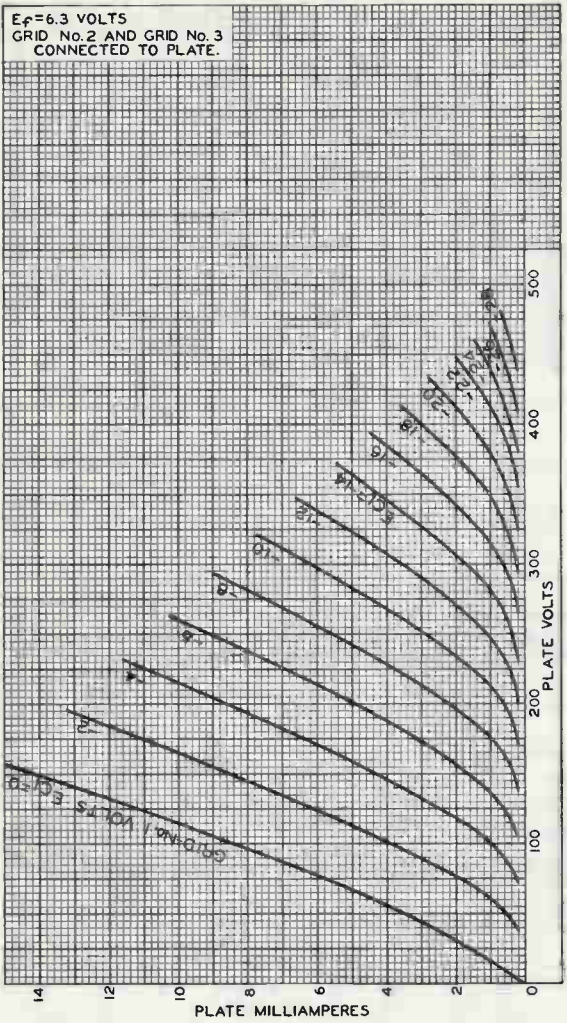


92CS-11053



92CS-11052

AVERAGE PLATE CHARACTERISTICS
Triode Connection



92CM-7446

Beam Power Tube

9-PIN MINIATURE TYPE
For High-Fidelity Audio-Amplifier Applications

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3 ± 10%	volts
Current at 6.3 volts	0.45	amp
Direct Interelectrode Capacitances:[o]		
Grid No.1 to plate	0.4 max.	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	9	μμf
Plate to cathode & grid No.3, grid No.2, and heater	6	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage	−15	volts
Plate Resistance (Approx.)	73000	ohms
Transconductance	4800	μmhos
Plate Current	46	ma
Grid-No.2 Current	3.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 100	−40	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-13/16"
Length, Base Seat to Bulb Top (Excluding tip)	2-7/16" ± 3/32"
Maximum Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9EU

Pin 1 - Grid No.2
Pin 2 - No Connection
Pin 3 - Grid No.1
Pin 4 - Heater
Pin 5 - Heater

Pin 6 - Grid No.1
Pin 7 - Grid No.3, Cathode
Pin 8 - Grid No.2
Pin 9 - Plate

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	440 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	330 max.	volts

→ indicates a change.

GRID-No.2 INPUT	2	max.	watts
PLATE DISSIPATION	12	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

Typical Operation with Fixed Bias:

Values are for 2 tubes

Plate Voltage	250	350	400	volts
Grid-No.2 Voltage	250	280	290	volts
Grid-No.1 (Control-Grid) Voltage●	−15	−22	−25	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	30	44	50	volts
Zero-Signal Plate Current	92	58	50	ma
Max.-Signal Plate Current	105	106	107	ma
Zero-Signal Grid-No.2 Current	7	3.5	2.5	ma
Max.-Signal Grid-No.2 Current	16	14	13.7	ma
Effective Load Resistance (Plate to plate)	8000	7500	8000	ohms
Total Harmonic Distortion	2	1.5	2	%
Max.-Signal Power Output	12.5	20	24	watts

Typical Operation with Cathode Bias:

Values are for 2 tubes

Plate Supply Voltage	300	310	volts
Grid-No.2 Supply Voltage	300	310	volts
Cathode Resistor	230	270	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	48	55	volts
Zero-Signal Plate Current	80	77	ma
Max.-Signal Plate Current	96	92	ma
Zero-Signal Grid-No.2 Current	6	5	ma
Max.-Signal Grid-No.2 Current	14	14	ma
Effective Load Resistance (Plate to plate)	5500	6000	ohms
Total Harmonic Distortion	2	4	%
Max.-Signal Power Output	15	17	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:●			
For fixed-bias operation	0.5	max.	megohm
For cathode-bias operation	1	max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Grid No.2 of each tube connected to tap on plate winding of output transformer

→Maximum Ratings, *Design-Maximum Values:*

PLATE AND GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	410	max.	volts

→Indicates a change.

6973

BEAM POWER TUBE

GRID-No.2 INPUT	1.75	max.	watts
PLATE DISSIPATION	12	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250	max.	°C

Typical Operation:

Values are for a tubes

	Fixed Bias	*Cathode Bias*	
Plate-Supply Voltage	375	370	volts
Grid-No.2 Supply Voltage	*	#	volts
Grid-No.1 (Control-Grid) Voltage●	-33.5	-	volts
Cathode Resistor	-	355	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	67	62	volts
Zero-Signal Cathode Current	62	74	ma
Max.-Signal Cathode Current	95	84	ma
Effective Load Resistance (Plate to plate)	12500	13000	ohms
Total Harmonic Distortion	1.5	1.2	%
Max.-Signal Power Output	18.5	15	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:●			
For fixed-bias operation	0.5	max.	megohm
For cathode-bias operation	1	max.	megohm

o Without external shield.

▲ The dc component must not exceed 100 volts.

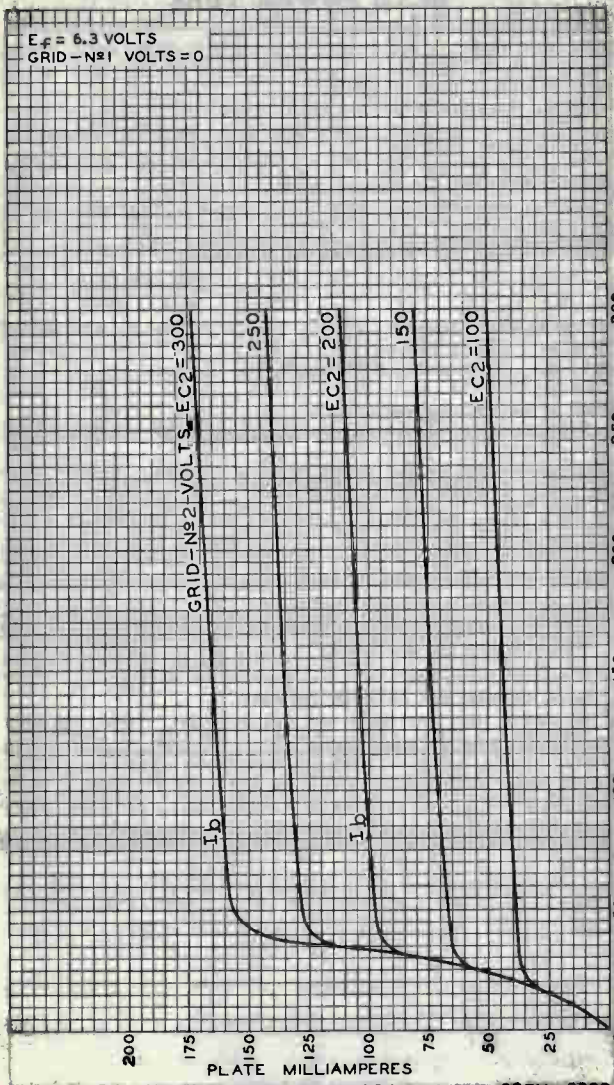
● The type of input coupling network used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.

* Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center tap (B+) so as to apply 50 per cent of the plate signal voltage to grid No.2 of each output tube.

\# Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center tap (B+) so as to supply 43 per cent of the plate signal voltage to grid No.2 of each output tube.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

AVERAGE PLATE CHARACTERISTICS



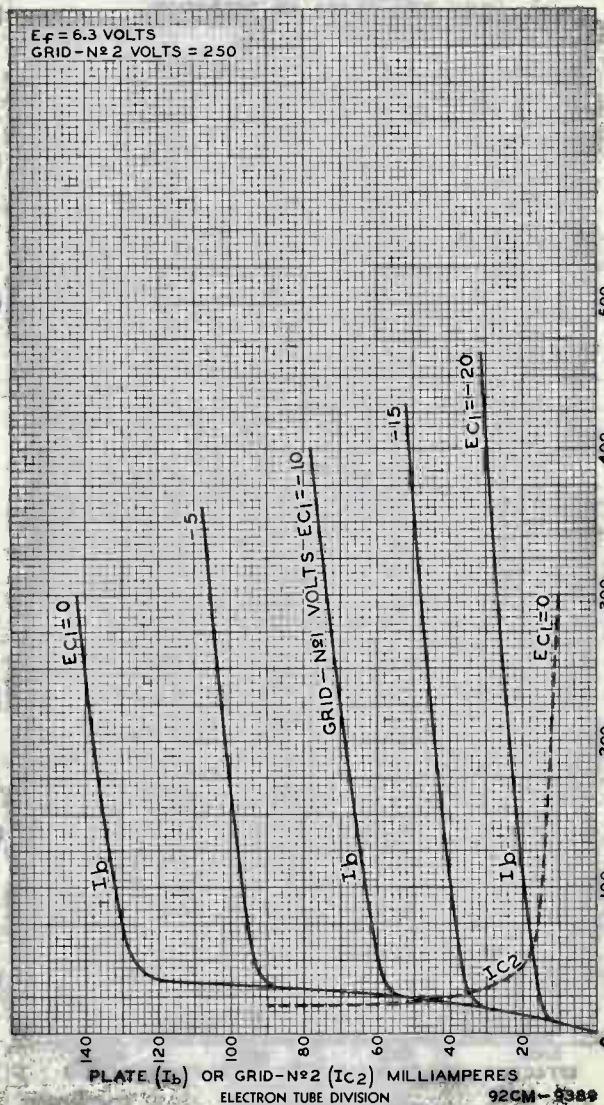
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9380

RCA

6973

AVERAGE CHARACTERISTICS



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9389

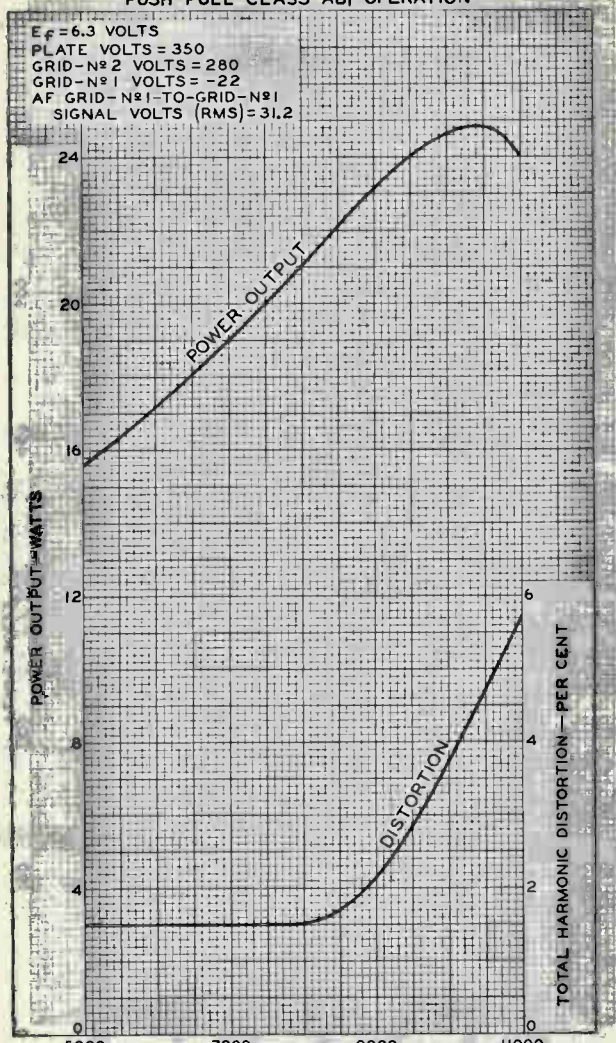
6973

RCA

6973

OPERATION CHARACTERISTICS

PUSH-PULL CLASS AB1 OPERATION



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9381

7025

HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For high-fidelity audio-amplifier applications critical as to noise and hum. In other respects, the 7025 is similar to the 12AX7.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater arrangement	*Series*	*Parallel*	
Voltage	12.6	6.3	ac or dc volts
Current	0.15	0.3	amp

Direct Interelectrode Capacitances (Approx.):[o]

	Unit No.1	*Unit No.2*	
Grid to plate	1.7	1.7	μμf
Grid to cathode and heater	1.6	1.6	μμf
Plate to cathode and heater	0.46	0.34	μμf

Equivalent-Noise and Hum Voltage (Referenced to Grid):

Values are for Each Unit

Average Value (RMS) . . . . . 1.8 microvolts

Measured in "true rms" units under the following conditions: heater volts = 6.3 ac (parallel connection), center-tap of heater transformer connected to ground, dc plate-supply volts = 250, plate load resistor (megohms) = 0.1, cathode resistor (ohms) = 2700, cathode-bypass capacitor (μf) = 100, grid resistor (ohms) = 0, and amplifier covering frequency range between 25 and 10,000 cps.

Maximum Value (RMS) . . . . . 7 microvolts

Measured in "true rms" units under the same conditions as for "Average Value" except that the cathode resistor is unbypassed, and grid resistor (megohms) = 0.05.

Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	100	250	volts
Grid Voltage	−1	−2	volts
Amplification Factor	100	100	
Plate Resistance (Approx.)	80000	62500	ohms
Transconductance	1250	1600	μmhos
Plate Current	0.5	1.2	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	*See General Section*
Bulb	T6-1/2

[o]: See next page.

7025

HIGH-MU TWIN TRIODE

Base . . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW 9A

Pin 1 - Plate of Unit No.2
Pin 2 - Grid of Unit No.2
Pin 3 - Cathode of Unit No.2
Pins 4 & 9 - Heater of Unit No.2
Pins 5 & 9 - Heater of Unit No.1

Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Mid-Tap

AMPLIFIER — Class A_1

Values are for Each Unit

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE.	330	max.	volts
GRID VOLTAGE:			
Negative-bias value.	55	max.	volts
Positive-bias value.	0	max.	volts
PLATE DISSIPATION.	1.2	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	200	max.	volts
Heater positive with respect to cathode.	200▲	max.	volts

Typical Operation as Resistance-Coupled Amplifier (Each Unit):

See RESISTANCE-COUPLED AMPLIFIER CHART No.25 at front of Receiving Tube Section

° Without external shield.
▲ The dc component must not exceed 100 volts.

OPERATING CONSIDERATIONS

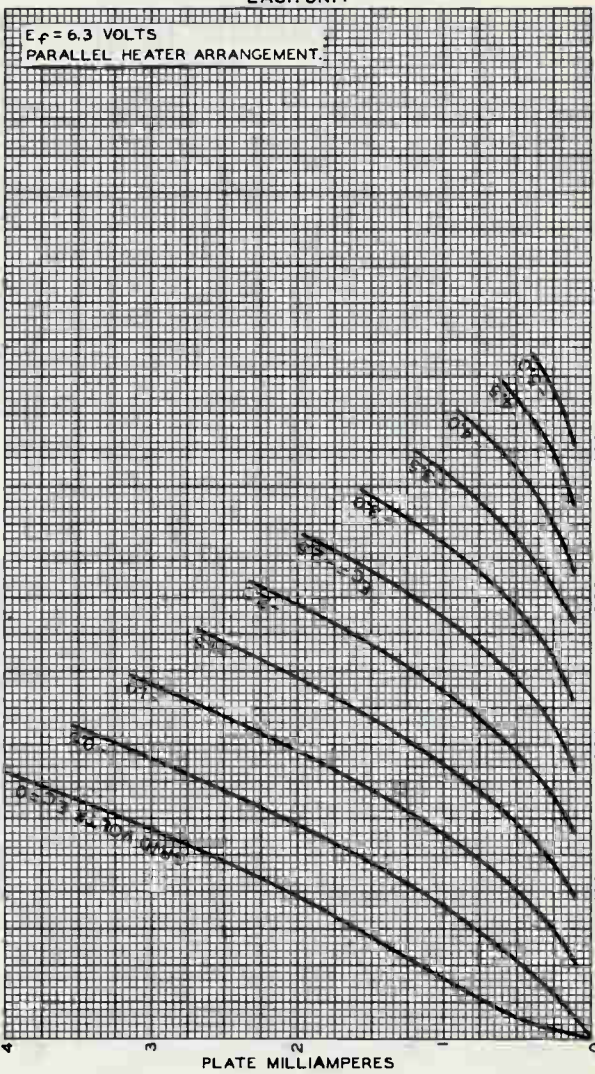
Parallel heater arrangement is recommended for use in high-gain, resistance-coupled-amplifier applications such as in the preamplifier stages of phonographs, microphones, and tape recorders. With closely paired, electrostatically shielded heater leads, a hum-balance control is unnecessary when the center-tap of the heater transformer is connected to ground. In applications where the heater-transformer winding does not have a center-tap, a 100-ohm hum-balancing potentiometer should be connected across the heater leads with the slider connected to ground.

RCA

7025

AVERAGE PLATE CHARACTERISTICS

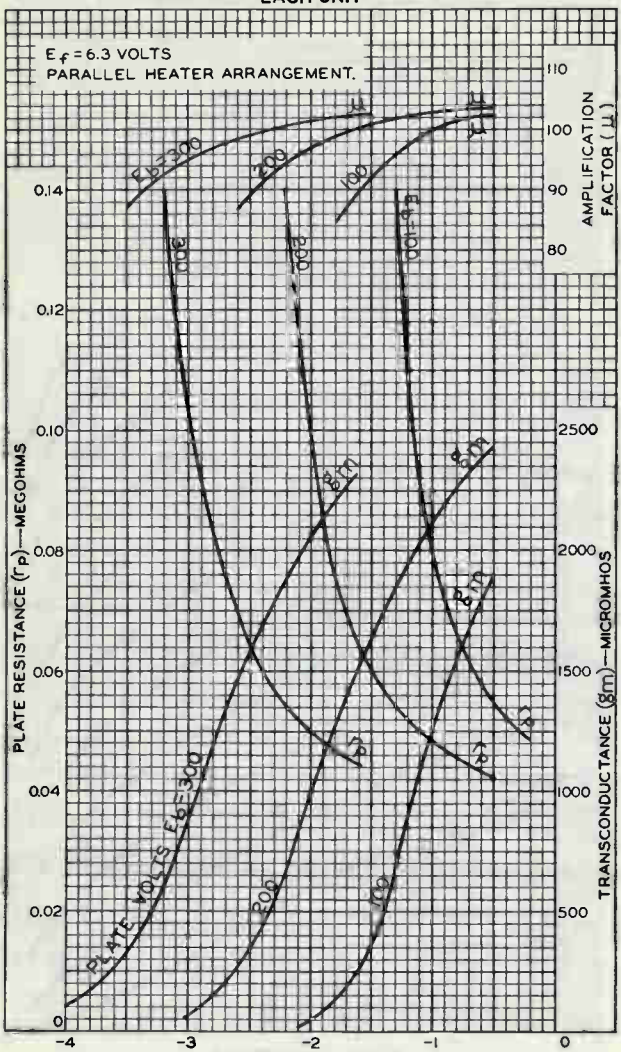
EACH UNIT



RCA

7025

AVERAGE CHARACTERISTICS
EACH UNIT



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6880

7027-A

BEAM POWER TUBE

For high-fidelity audio-amplifier applications

Supersedes Type 7027

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.9	amp
Direct Interelectrode Capacitances:°		
Grid No.1 to plate	1.5	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	10	μμf
Plate to cathode & grid No.3, grid No.2, and heater	7.5	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage	-14	volts
Plate Resistance (Approx.)	22500	ohms
Transconductance	6000	μmhos
Plate Current	72	ma
Grid-No.2 Current	5	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	4.62"
Maximum Seated Length	4.06"
Maximum Diameter	1.63"
Bulb	T12
Base	Small-Wafer Octal 8-Pin with "950" Sleeve (JEDEC Group 1, No.B8-191)
Basing Designation for BOTTOM VIEW	8HY

Pin 1 - Grid No.2
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grid No.2
Pin 5 - Grid No.1

Pin 6 - Grid No.1
Pin 7 - Heater
Pin 8 - Cathode, Grid No.3

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	600	max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	500	max.	volts
GRID-No.2 INPUT	5	max.	watts
PLATE DISSIPATION	35	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

BEAM POWER TUBE

Typical Operation with Fixed Bias:

Values are for 2 tubes

Plate Voltage	400	450	540	volts
Grid-No.2 Voltage	300	350	400	volts
Grid-No.1 (Control-Grid) Voltage●	-25	-30	-38	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	50	60	76	volts
Zero-Signal Plate Current	102	95	100	ma
Max.-Signal Plate Current	152	194	220	ma
Zero-Signal Grid-No.2 Current	6	3.4	5	ma
Max.-Signal Grid-No.2 Current	17	19.2	21.4	ma
Effective Load Resistance (Plate to plate)	6600	6000	6500	ohms
Total Harmonic Distortion	2	1.5	2	%
Max.-Signal Power Output	34	50	76	watts

Typical Operation with Cathode Bias:

Values are for 2 tubes

Plate Supply Voltage	400	380	425	volts
Grid-No.2 Supply Voltage	300	380	425	volts
Cathode Resistor	200	180	200	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	57	68.5	86	volts
Zero-Signal Plate Current	112	138	150	ma
Max.-Signal Plate Current	128	170	196	ma
Zero-Signal Grid-No.2 Current	7	5.6	8	ma
Max.-Signal Grid-No.2 Current	16	20	20	ma
Effective Load Resistance (Plate to plate)	6600	4500	3800	ohms
Total Harmonic Distortion	2	3.5	4	%
Max.-Signal Power Output	32	36	44	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:●		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Grid No.2 of each tube connected to tap on plate winding of output transformer

Maximum Ratings, *Design-Maximum Values:*

PLATE AND GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	600	max.	volts
GRID-No.2 INPUT	4.5	max.	watts
PLATE DISSIPATION	35	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200▲	max.	volts

7027-A

BEAM POWER TUBE

Typical Operation:

Values are for 2 tubes

Plate Supply Voltage	410	volts
Grid-No.2 Supply Voltage	*	volts
Cathode Resistor	220	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	68	volts
Zero-Signal Cathode Current	134	ma
Max.-Signal Cathode Current	155	ma
Effective Load Resistance (Plate to plate)	8000	ohms
Total Harmonic Distortion	1.6	%
Max.-Signal Power Output	24	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:● For cathode-bias operation	0.5 max.	megohm

○ Without external shield.

▲ The dc component must not exceed 100 volts.

● The type of input coupling network used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.

* Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center-tap (B+) so as to apply 43 per cent of the plate signal voltage to grid-No.2 of each output tube.

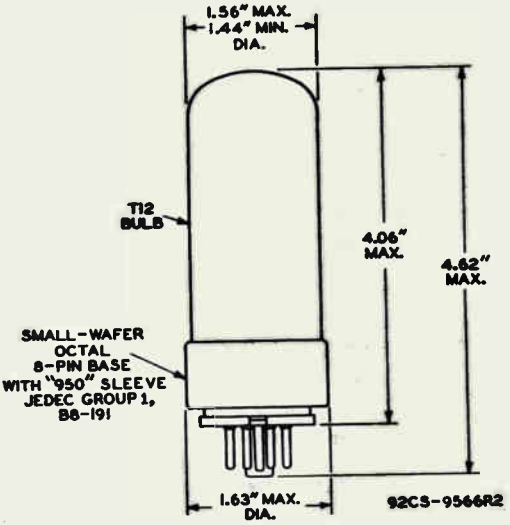
OPERATING CONSIDERATIONS

The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided around the 7027-A.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

7027-A

BEAM POWER TUBE

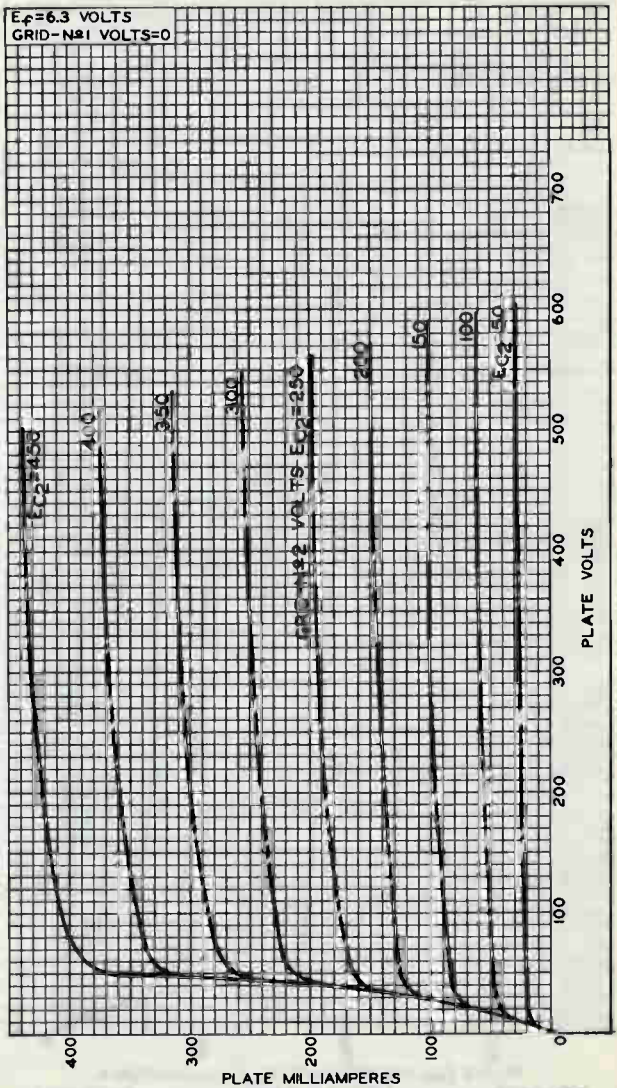


ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

7027-A

AVERAGE PLATE CHARACTERISTICS



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM-10132

7027-A

7027-A

AVERAGE CHARACTERISTICS

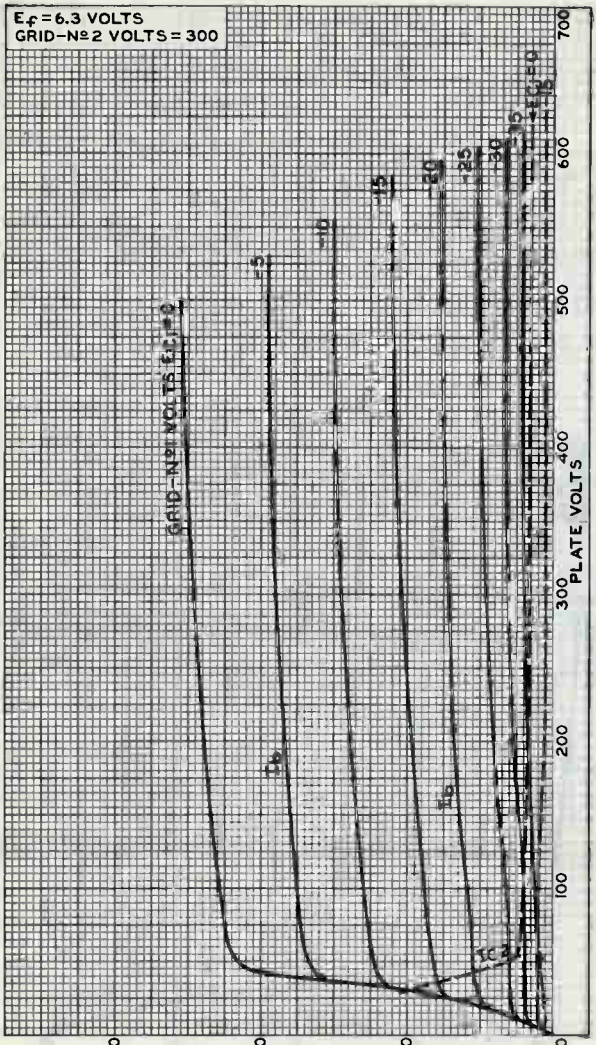


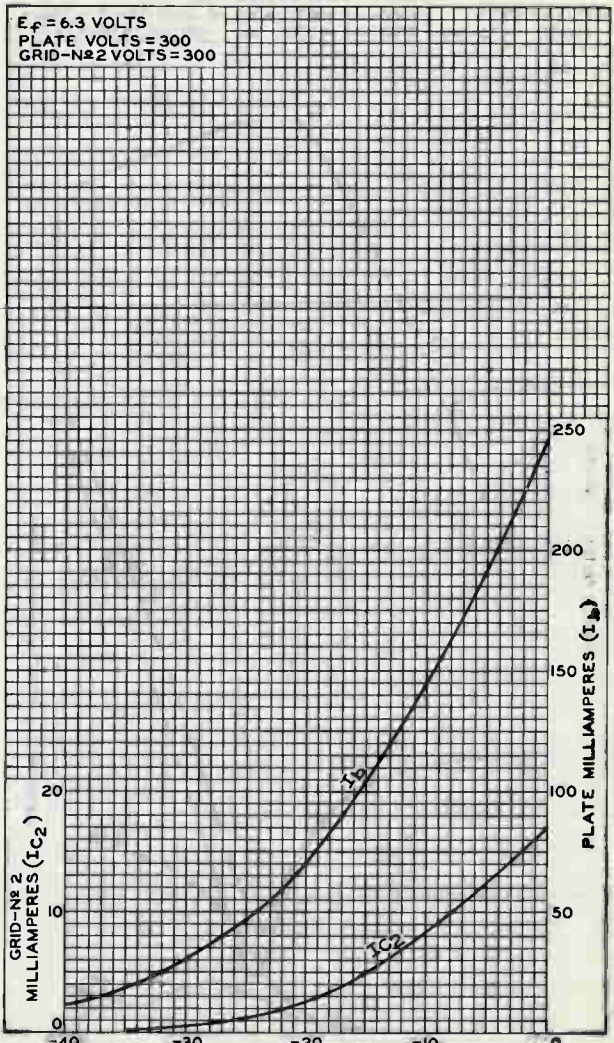
PLATE (I_b) OR GRID-No2 (I_{C_2}) MILLIAMPERES

ELECTRON TUBE DIVISION 92CM-10133

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

7027-A

AVERAGE CHARACTERISTICS



7027-A

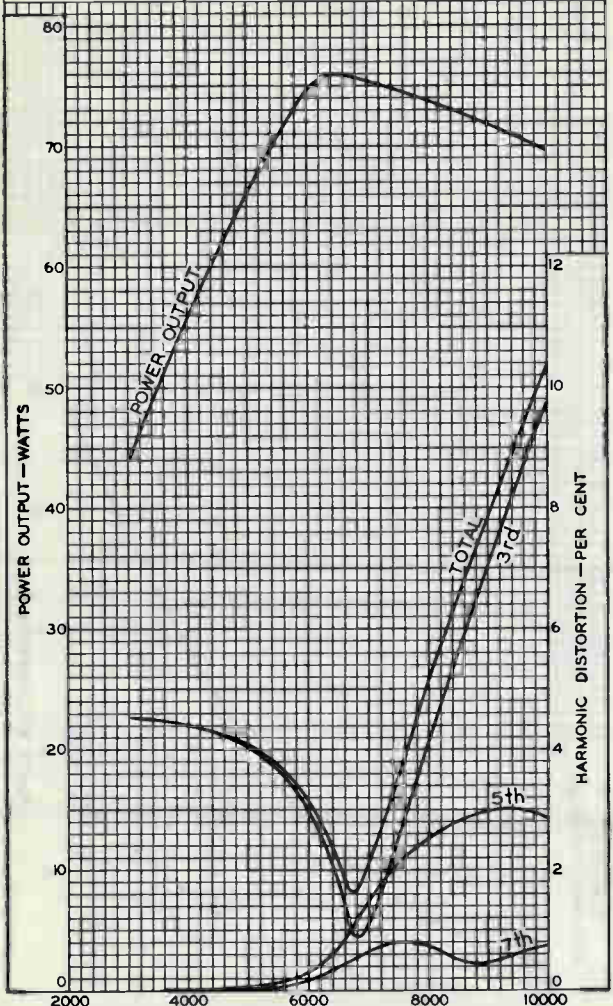
RCA

7027-A

OPERATION CHARACTERISTICS

PUSH-PULL CLASS AB_1

E_f = 6.3 VOLTS PLATE VOLTS = 540	GRID-№2 VOLTS = 400 GRID-№1 VOLTS = -38	AF GRID-№1-TO-GRID-№1 VOLTS (RMS) = 53.7



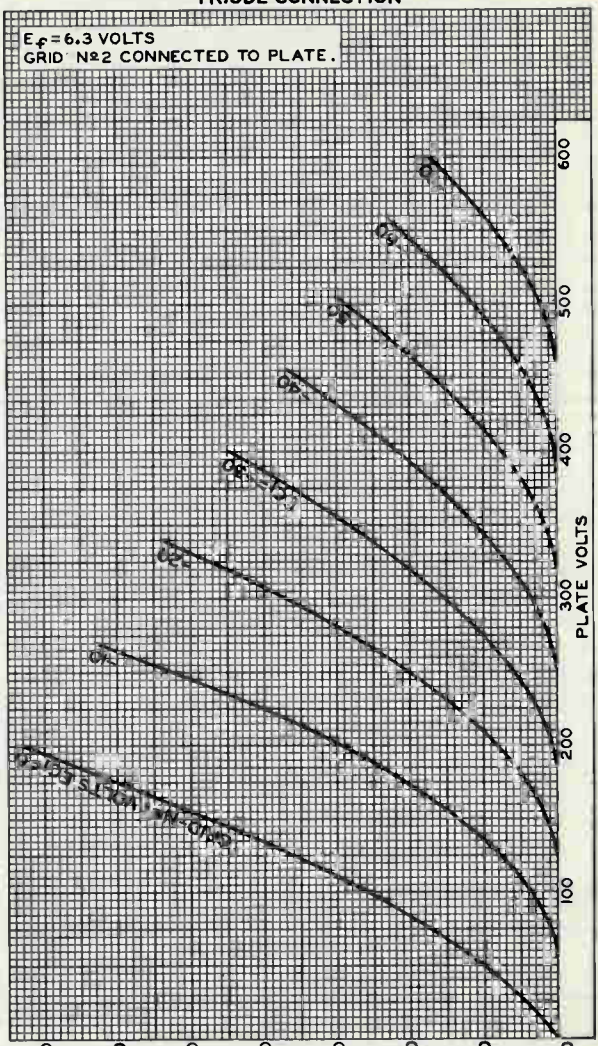
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-10128

7027-A

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



ELECTRON TUBE DIVISION

92CM-9568

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Power Pentode

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.76	amp
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.5	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	10.8	μμf
Plate to cathode & grid No.3, grid No.2, and heater	6.5	μμf
Grid No.1 to heater	0.25	μμf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage	-7.3	volts
Mu-Factor, Grid No.2 to Grid No.1	19.5	
Plate Resistance (Approx.)	40000	ohms
Transconductance	11300	μmhos
Plate Current	48	ma
Grid-No.2 Current	5.5	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	3-1/16"
Maximum Seated Length	2-13/16"
Length, Base Seat to Bulb Top (Excluding tip)	2-7/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9CV

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Maximum Ratings, *Design-Center Values:*

PLATE VOLTAGE	400 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	volts
CATHODE CURRENT	65 max.	ma
PLATE DISSIPATION	12 max.	watts
ZERO-SIGNAL GRID-No.2 INPUT	2 max.	watts

MAX.-SIGNAL GRID-No.2 INPUT.	4 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	100 max.	volts
Heater positive with respect to cathode. .	100 max.	volts

Typical Operation:

Values are for 2 tubes

Plate Voltage.	400	volts
Grid-No.2 Voltage.	300	volts
Grid-No.1 Voltage.	-15	volts
Peak AF Grid-No.1 Voltage.	14.8	volts
Zero-Signal Plate Current.	15	ma
Max.-Signal Plate Current.	105	ma
Zero-Signal Grid-No.2 Current.	1.6	ma
Max.-Signal Grid-No.2 Current.	25	ma
Effective Load Resistance (Plate to plate)	8000	ohms
Total Harmonic Distortion.	4	%
Max.-Signal Power Output	24	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3 max.	megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Grid No.2 of each tube connected to tap on plate winding of output transformer

Maximum Ratings, *Design-Center Values:*

→ PLATE AND GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	375 max.	volts
CATHODE CURRENT.	65 max.	ma
PLATE DISSIPATION.	12 max.	watts
ZERO-SIGNAL GRID-No.2 INPUT.	2 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT.	4 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	100 max.	volts
Heater positive with respect to cathode. .	100 max.	volts

Typical Operation:

Values are for 2 tubes

Plate Supply Voltage	375	volts
Grid-No.2 Supply Voltage	b	
Cathode Resistor	220	ohms
Peak AF Grid-No.1 Voltage.	17.7	volts
→ Zero-Signal Cathode Current.	70	ma
→ Max.-Signal Cathode Current.	81	ma
Effective Load Resistance (Plate to plate)	11000	ohms
Total Harmonic Distortion.	3	%
Max.-Signal Power Output	16.5	watts

→ Indicates a change.

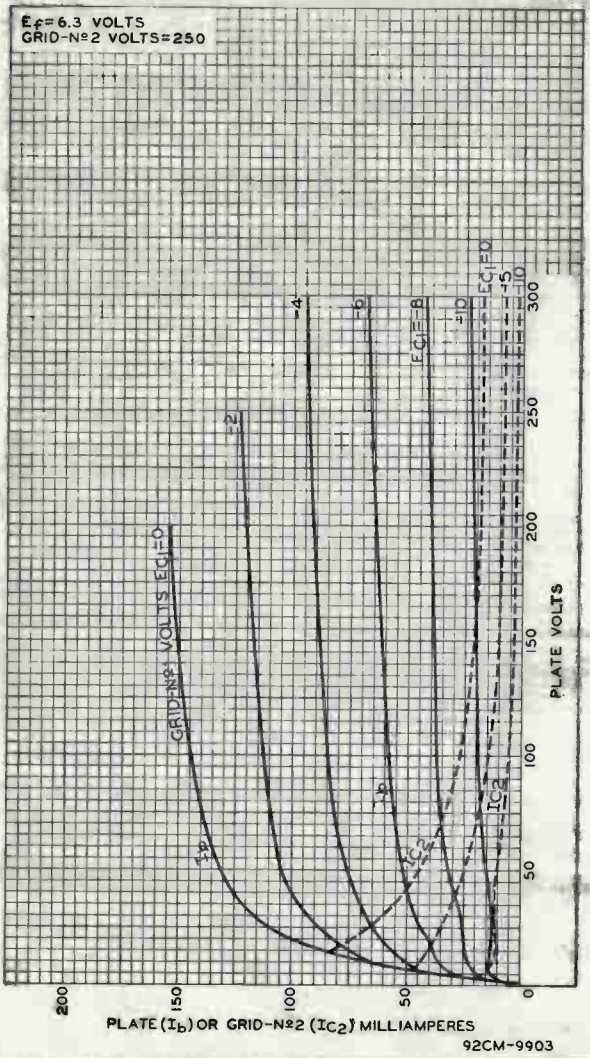
Maximum Circuit Values:

Grid-No.1-Circuit Resistance:
For cathode-bias operation. . . . . 1 max. megohm

[a] Without external shield.

[b] Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center-tap (B+) so as to supply 43 per cent of the plate signal voltage to grid No.2 of each output tube.

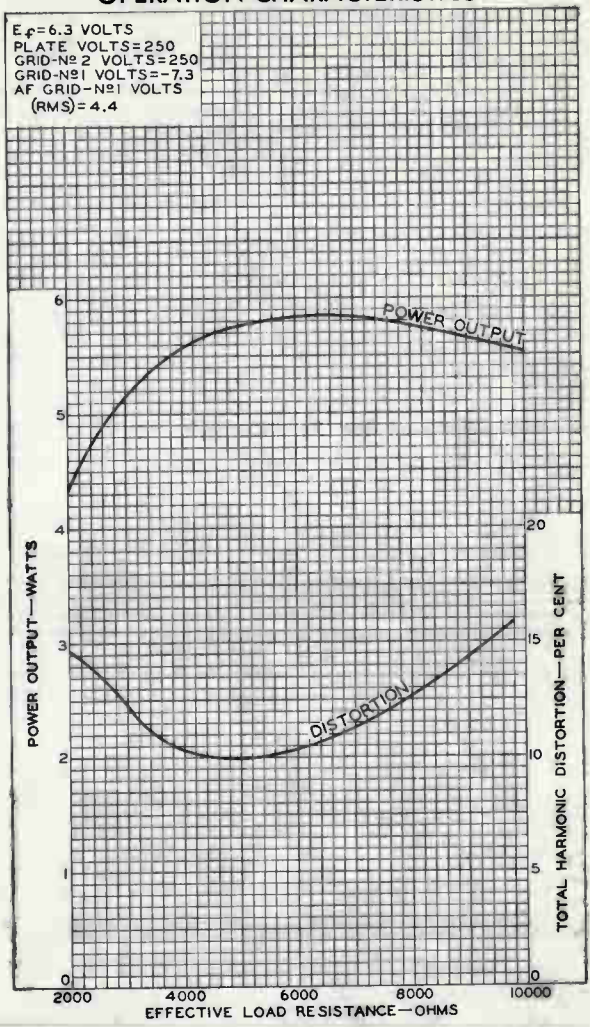
AVERAGE CHARACTERISTICS



92CM-9903

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

OPERATION CHARACTERISTICS



92CM-9902

Medium-Mu Triode—Sharp-Cutoff Pentode

9-PIN MINIATURE TYPE

For High-Fidelity Audio-Amplifier Applications Critical as to Noise and Hum

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:			
Voltage (AC or DC)	6.3 ± 0.6		volts
Current at heater volts = 6.3	0.450		amp
Peak heater-cathode voltage (Each Unit):			
Heater negative with respect to cathode	200	max.	volts
Heater positive with respect to cathode	200[a]	max.	volts
Direct Interelectrode Capacitances:[b]			
Triode Unit:			
Grid to plate	2		pf
Grid to cathode and heater	2.3		pf
Plate to cathode and heater	0.3		pf
Pentode Unit:			
Grid No.1 to plate	0.06	max.	pf
Grid No.1 to cathode & internal shield & grid No.3, grid No.2, and heater	5		pf
Plate to cathode & internal shield & grid No.3, grid No.2, and heater	2		pf

Equivalent-Hum and Noise Voltage (Referenced to Grid): ←

Triode Unit

Average Value (RMS)	10	microvolts
Maximum Value (RMS)	50	microvolts

Measured in "true rms" units under the following conditions: heater volts = 6.3 ac, center-tap of heater transformer connected to ground, plate-supply volts = 250, plate load resistor (megohms) = 0.1, cathode resistor (ohms) unbypassed = 1500, grid resistor (megohms) = 0.05, and amplifier covering frequency range between 25 and 10,000 cps.

Pentode Unit

Average Value (RMS)	15	microvolts
Maximum Value (RMS)	35	microvolts

Measured in "true rms" units under the following conditions: heater volts = 6.3 ac, center-tap of heater transformer connected to ground, plate-supply volts = 250, plate-load resistor (megohms) = 0.22, grid-No.2 supply volts = 250; grid No.2 voltage divider: resistor (megohm) from grid No.2 to B+ = 0.68, resistor (megohm) from grid-No.2 to ground = 0.33; bypass ca-

← Indicates a change.

pacitor (μf) from grid No.2 to cathode = 0.1; cathode resistor (ohms unbypassed) = 680; grid No.1 resistor (megohm) = 0.27; and amplifier covering frequency range between 25 and 10,000 cps.

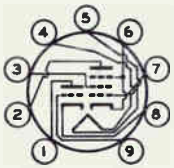
Characteristics, Class A_1 Amplifier:

	Triode Unit	Pentode Unit		
Plate-Supply Voltage	215	100	220	volts
Grid-No.2 Supply Voltage	-	50	130	volts
Grid-No.1 Voltage	-8.5	-	-	volts
Cathode Resistor	-	1000	62	ohms
Amplification Factor	17	-	-	
Plate Resistance (Approx.)	0.0081	1	0.4	megohm
Transconductance	2100	1500	7000	μmhos
Plate Current	9	1.1	12.5	ma
Grid-No.2 Current	-	0.35	3.5	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-40	-4	-	volts

Mechanical:

Operating Position	Any
Type of Cathodes	Coated Unipotential
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9JT

Pin 1 - Triode Plate
Pin 2 - Pentode Plate
Pin 3 - Pentode Grid No.2
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Pentode Cathode, Grid No.3, Internal Shield
Pin 7 - Pentode Grid No.1
Pin 8 - Triode Cathode
Pin 9 - Triode Grid

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

	Triode Unit	Pentode Unit	
PLATE VOLTAGE	330 max.	330 max.	volts
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	-	330 max.	volts
GRID-No.2 VOLTAGE	-	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	0 max.	volts

	Triode Unit	*Pentode Unit*	
GRID-No.2 INPUT:			
For grid-No.2 voltages up to 165 volts	–	0.6 max.	watt
For grid-No.2 voltages between 165 and 330 volts	–	See *Grid-No.2 Input Rating Chart* at front of Receiving Tube Section	
PLATE DISSIPATION	2.4 max.	3 max.	watts

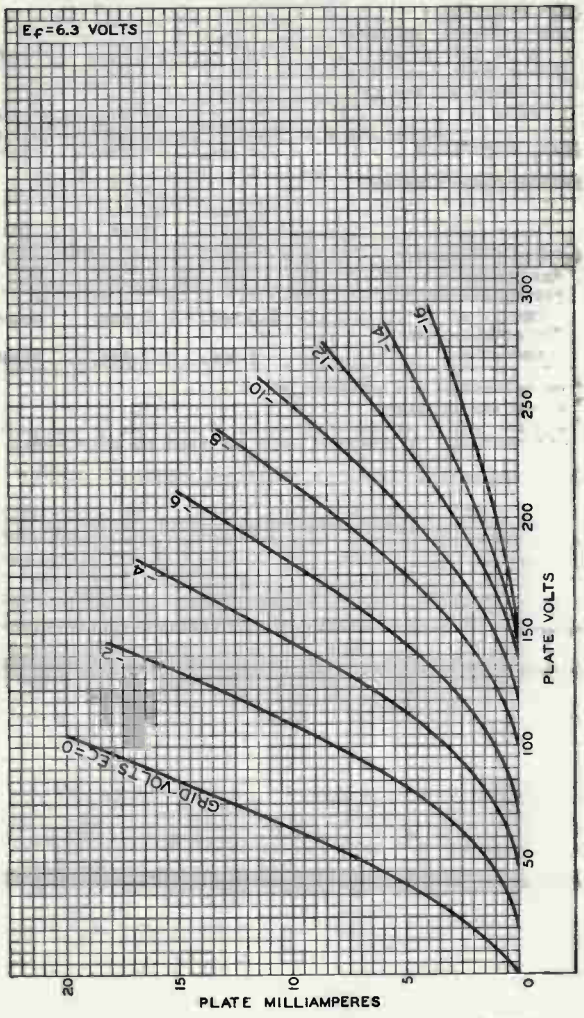
Maximum Circuit Values:

	Triode Unit	*Pentode Unit*	
Grid-No.1-Circuit Resistance:[c]			
For fixed-bias operation	0.5 max.	0.25 max.	megohm
For cathode-bias operation	1 max.	1 max.	megohm

[a] The dc component must not exceed 100 volts.
[b] Without external shield.
[c] If either unit is operated at maximum rated conditions, grid-No.1-circuit resistances for both units should not exceed the stated values.

7199

AVERAGE PLATE CHARACTERISTICS
Triode Unit

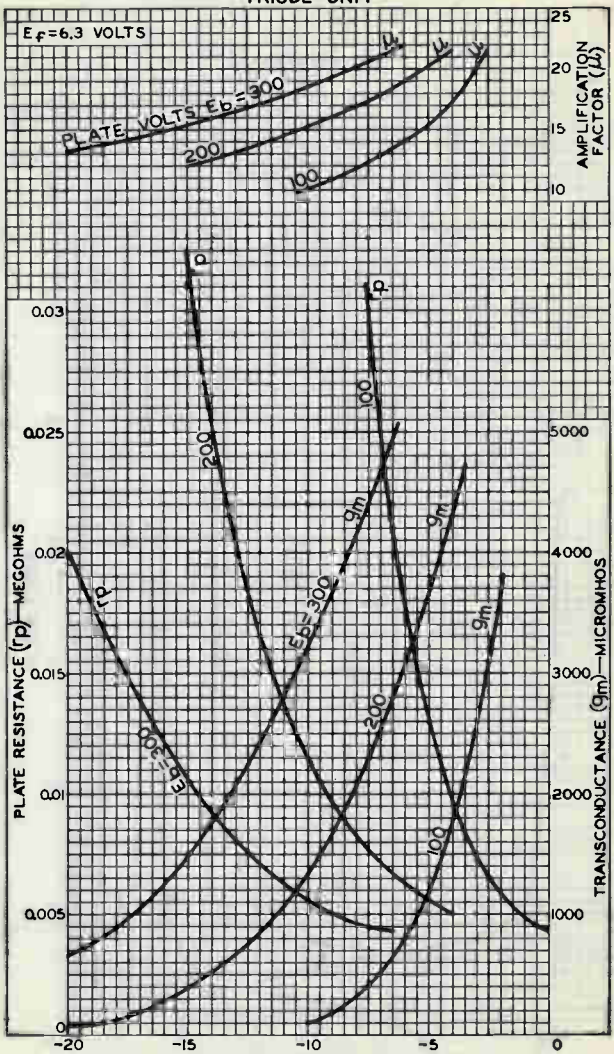


92CM-9693

RCA

7199

AVERAGE CHARACTERISTICS
TRIODE UNIT



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9704

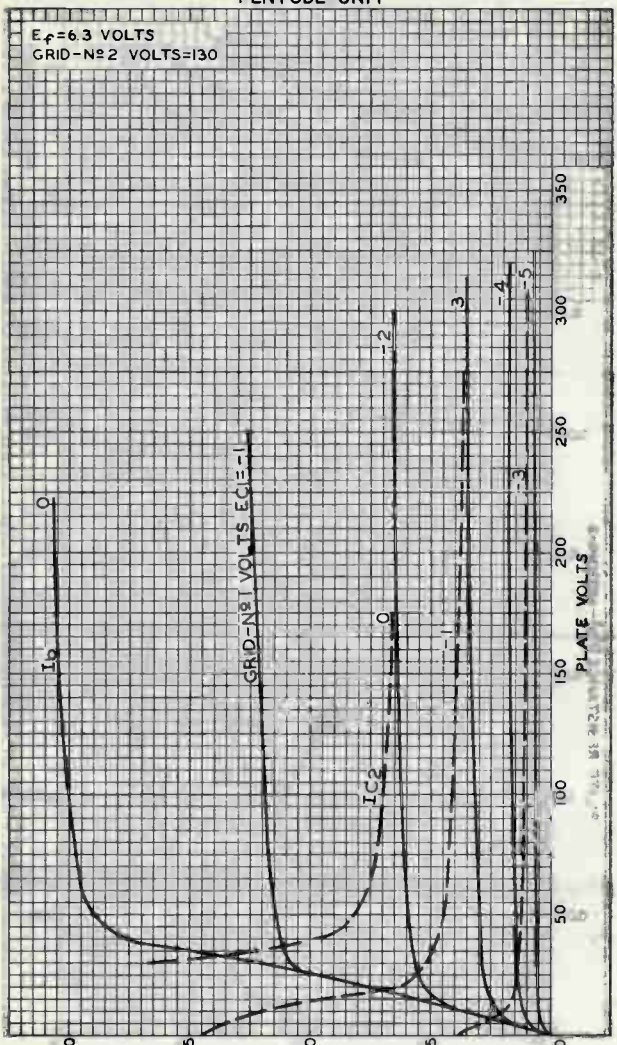
7199

RCA

7199

AVERAGE CHARACTERISTICS

PENTODE UNIT



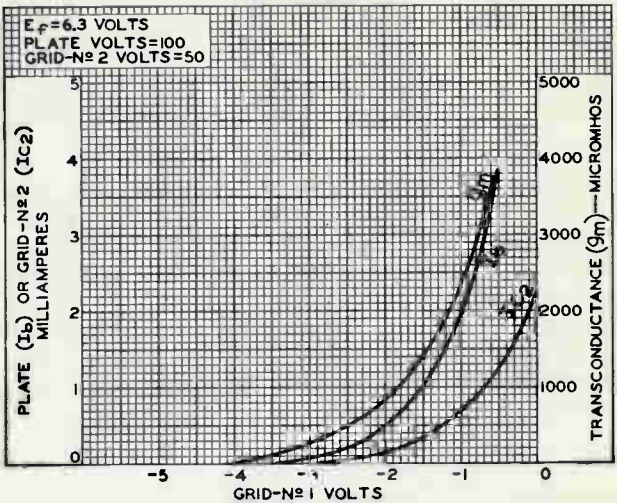
ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-970I

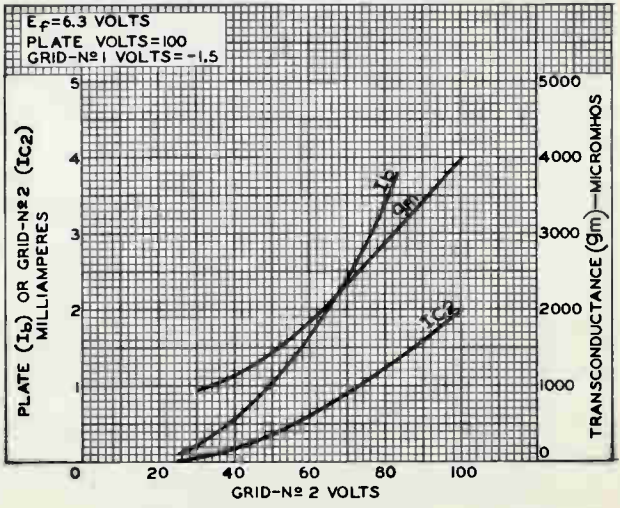
RCA

7199

AVERAGE CHARACTERISTICS
PENTODE UNIT



92CS-9702



92CS-9703

Beam Power Tube

GENERAL DATA

Electrical:

Heater Characteristics and Ratings *(Design-Maximum Values)*:

Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.450	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200[a] max.	volts
Direct Interelectrode Capacitances (Approx.):[b]		
Grid No.1 to plate	0.7	μμf
Grid No.1 to cathode & grid No.3, grid No.2, and heater	9	μμf
Plate to cathode & grid No.3, grid No.2, and heater	7.5	μμf

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3-5/16"
Maximum Seated Length	2-3/4"
Maximum Diameter	1-9/32"
Dimensional Outline	See *General Section*
Bulb	T9

Bases (Alternates):
- Intermediate-Shell Octal: 7-Pin, Arrangement 1 (JEDEC Group 1, No.B7-7)
- Short Intermediate-Shell Octal with External Barriers: 7-Pin, Arrangement 1 (JEDEC Group 1, No.B7-59)

Basing Designation for BOTTOM VIEW: 7S

Pin 1 - No Internal Connection
Pin 2 - Heater
Pin 3 - Plate
Pin 4 - Grid No.2
Pin 5 - Grid No.1
Pin 7 - Heater
Pin 8 - Cathode, Grid No.3

AF POWER AMPLIFIER — Class A_1

Maximum Ratings, *Design-Maximum Values:*

PLATE VOLTAGE	350 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	315 max.	volts
GRID-No.2 INPUT	2.2 max.	watts
PLATE DISSIPATION	14 max.	watts

Typical Operation and Characteristics:

Plate Voltage	60	250	volts
Grid-No.2 Voltage	250	250	volts
Grid-No.1 (Control-Grid) Voltage	0	-12.5	volts
Peak AF Grid-No.1 Voltage	-	12.5	volts

Zero-Signal Plate Current	100[c]	45	ma
Max.-Signal Plate Current	–	47	ma
Zero-Signal Grid-No.2 Current	22[c]	4.5	ma
Max.-Signal Grid-No.2 Current	–	7	ma
Plate Resistance (Approx.)	–	50000	ohms
Transconductance	–	4100	μmhos
Load Resistance	–	5000	ohms
Total Harmonic Distortion	–	7	%
Max.-Signal Power Output	–	4.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

[a] The dc component must not exceed 100 volts.

[b] Without external shield.

[c] This value can be measured by a method involving a recurrent wave form such that the maximum ratings of the tube will not be exceeded.

Sharp-Cutoff Pentode

7-PIN MINIATURE TYPE

For High-Gain, Resistance-Coupled-Amplifier Applications Critical as to Hum and Microphonism

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage (AC or DC)	6.3	volts
Current	0.3	amp

Direct Interelectrode Capacitances:

	Without External Shield	*With External Shield▲*	
Pentode Connection:			
Grid No.1 to plate	0.0035 max.	0.0035 max.	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	5.5	5.5	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	5	5	μμf
Triode Connection:●			
Grid No.1 to plate, grid No.3 & internal shield, and grid No.2	2.6	2.6	μμf
Grid No.1 to cathode and heater	3.2	3.2	μμf
Plate, grid No.3 & internal shield, and grid No.2 to cathode and heater	1.2	8.5	μμf

Hum Output Voltage:

Average Value (RMS, Cathode Bypassed) . . . . 1.2 millivolts
Measured in "true rms" units under the following conditions: heater volts = 6.3; center-tap of heater transformer connected to ground; plate and grid-No.2 supply volts = 250; plate load resistor (megohms) = 0.27; grid No.3 and internal shield connected to cathode at socket; grid-No.2 resistor (megohms) = 0.68; grid-No.1 resistor (megohms) = 0.1; cathode resistor (ohms) = 1000; grid resistor of following stage (megohms) = 10; and stage gain of 340.

Average Value (RMS, Cathode Unbypassed) . . . 0.9 millivolt
Measured in "true rms" units under the same conditions as for "Average Value" except that the cathode resistor is unbypassed, and the stage gain is 110.

Characteristics, Class A_1 Amplifier:

	Pentode Connection		
Plate Supply Voltage	100	250	250 volts
Grid No.3 & Internal Shield	*Connected to cathode at socket*		

7543

Grid-No.2 Supply Voltage	100	125	150	volts
Cathode Resistor	150	100	68	ohms
Plate Resistance (Approx.)	0.5	1.5	1	megohms
Transconductance	3900	4500	5200	μmhos
Plate Current	5	7.6	10.6	ma
Grid-No.2 Current	2.1	3	4.3	ma
Grid-No.1 Voltage (Approx.) for plate μa = 10	-4.2	-5.5	-6.5	volts

Triode Connection●

Plate Supply Voltage	250	volts
Cathode Resistor	330	ohms
Amplification Factor	36	
Plate Resistance (Approx.)	7500	ohms
Transconductance	4800	μmhos
Plate Current	12.2	ma

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Diameter	0.650" to 0.750"
Dimensional Outline	See *General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JEDEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BK

Pin 1 - Grid No.1
Pin 2 - Grid No.3, Internal Shield
Pin 3 - Heater

Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode

AMPLIFIER — Class A_1

Maximum Ratings, *Design-Center Values:*

	Triode Connection●	*Pentode Connection*	
PLATE VOLTAGE	250 max.	300 max.	volts
GRID No.3 (SUPPRESSOR GRID)	-	*Connect to cathode at socket*	
GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE	-	300 max.	volts
GRID-No.2 VOLTAGE	-	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	
GRID-No.1 (CONTROL-GRID) VOLTAGE: Positive-bias value	0 max.	0 max.	volts
GRID-No.2 INPUT: For grid-No.2 voltages up to 150 volts	-	0.65 max.	watt
For grid-No.2 voltages between 150 and 300 volts	-	*See Grid-No.2 Input Rating Chart at front of Receiving Tube Section*	

PLATE DISSIPATION.	3.2 max.	3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	200 max.	200 max.	volts
Heater positive with respect to cathode	200* max.	200* max.	volts

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED-AMPLIFIER CHART No.8 at front of this Section

▲ With external shield JEDEC No.316 connected to cathode.

● Grid No.3 & internal shield and grid No.2 connected to plate.

★ The dc component must not exceed 100 volts.

CURVES

For the 7543, within its ratings, are the same as those shown for Type 6AU6

Power Pentode

NOVAR TYPE

For Output Stages of High Fidelity Audio-Amplifiers and Radio Receivers

ELECTRICAL

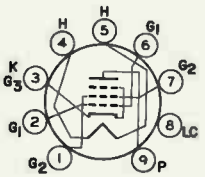
Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 0.6	volts
Current at heater volts = 6.3	0.800	amp
Maximum Heater-Cathode Voltage:		
Heater negative with respect to cathode	200	volts
Heater positive with respect to cathode		
Peak	200	volts
DC component	100	volts
Direct Interelectrode Capacitances (Approx.):[a]		
Grid No.1 to plate	0.15	pf
Input: G1 to (K + G3, G2, H)	11.0	pf
Output: P to (K + G3, G2, H)	4.4	pf

MECHANICAL

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	3.110 in
Maximum Seated Length	2.730 in
Diameter	1.062 to 1.188 in
Bulb	T9
Dimensional Outline	See *General Section*
Bases (Alternates):	
Small-Button Novar 9-Pin	(JEDEC No.E9-75)
Small-Button Novar 9-Pin with Exhaust Tip	(JEDEC No.E9-89)

BASING DESIGNATION (Bottom View) ←

Pin 1 - Grid No.2
Pin 2 - Grid No.1
Pin 3 - Cathode, Grid No.3
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Grid No.1
Pin 7 - Grid No.2
Pin 8 - LC - See *Note*
Pin 9 - Plate



9RW

Note: May be used as tie point for components operating at or near the DC voltage of either the grid No.2 or plate, or between these voltages. Otherwise, do not use.

AF POWER AMPLIFIER — Class A1

Maximum Ratings, *Design-Maximum Values:*

Plate Voltage	550	volts
Grid-No.2 (Screen-Grid) Voltage	440	volts
Cathode Current	90	ma
Grid-No.2 Input	3.3[b]	watts
Plate Dissipation	19	watts
Bulb Temperature (At hottest point on bulb surface)	240	°C

← Indicates a change.

Typical Operation and Characteristics:

Plate Voltage	300	volts
Grid-No.2 Voltage	300	volts
Grid-No.1 (Control-Grid) Voltage	-10	volts
Peak AF Grid-No.1 Voltage	10	volts
Zero-Signal Plate Current	60	ma
Max.-Signal Plate Current	75	ma
Zero-Signal Grid-No.2 Current	8	ma
Max.-Signal Grid-No.2 Current	15	ma
Plate Resistance (Approx.)	29000	ohms
Transconductance	10200	μmhos
Effective Load Resistance	3000	ohms
Total Harmonic Distortion	13	%
Max.-Signal Power Output	11	watts

Maximum-Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3	megohm
For cathode-bias operation	1	megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Maximum Ratings, *Design-Maximum Values:*

Plate Voltage	550	volts
Grid-No.2 (Screen-Grid) Voltage	440	volts
Cathode Current	90	ma
Grid-No.2 Input	3.3[b]	watts
Plate Dissipation	19	watts
Bulb Temperature (At hottest point on bulb surface)	240	°C

Typical Operation:

Values are for 2 tubes

	Fixed Bias					Cathode Bias	
Plate Supply Voltage	300	350	400	450	450	450	volts
Grid-No.2 Supply Voltage	300	350	350	350	400	400	volts
Grid-No.1 Voltage	-12.5	-15.5	-16	-16.5	-21	c	volts
Cathode Resistor (Common to both cathodes)	-	-	-	-	-	170	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	25	31	32	33	42	31	volts
Zero-Signal Plate Current	74	72	64	60	40	86	ma
Max.-Signal Plate Current	116	130	135	142	145	94	ma
Zero-Signal Grid-No.2 Current	10	9.5	8	7.2	5	10	ma
Max.-Signal Grid-No.2 Current	28	32	28	26	30	20	ma

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

	Fixed Bias					Cathode Bias	
Effective Load Resistance (Plate to plate)	6600	6600	6600	6600	6600	10000	ohms
Total Haromonic Distortion	5	2.5	2	2.5	5	2	%
Max.-Signal Power Output	24	30	34	38	44	28	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3	megohm
For cathode-bias operation	1	megohm

PUSH-PULL AF POWER AMPLIFIER — Class AB_1

Grid No.2 of each tube connected to tap on plate winding of output transformer

Maximum Ratings, *Design-Maximum Values:*

Plate and Grid-No.2 (Screen-Grid) Supply Voltage	440	volts
DC Cathode Current	90	ma
Grid-No.2 Input	3.3[b]	watts
Plate Dissipation	19	watts
Bulb Temperature (At hottest point on bulb surface)	240	°C

Typical Operation:

Values are for 2 tubes

	Fixed Bias	Cathode Bias	
Plate Supply Voltage	400	425	volts
Grid-No.2 Supply Voltage	d	d	volts
Grid-No.1 Voltage	-20.5	c	volts
Cathode Resistor (Common to both cathodes)	-	185	ohms
Peak AF Grid-No.1-to-Grid-No.1 Voltage	41	42	volts
Zero-Signal Plate Current	60	88	ma
Max.-Signal Plate Current	115	100	ma
Zero-Signal Grid-No.2 Current	8	12	ma
Max.-Signal Grid-No.2 Current	18	16	ma
Effective Load Resistance (Plate to plate)	6600	6600	ohms
Total Harmonic Distortion	2.5	3.5	%
Max.-Signal Power Output	23	21	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.3	megohm
For cathode-bias operation	1	megohm

[a] Without external shield.

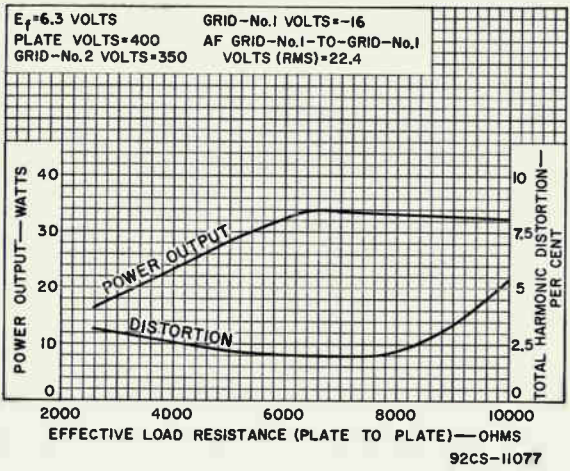
[b] Grid-No. 2 input may reach 6 watts during peak levels of speech and music signals.

[c] Connected to negative end of cathode resistor.

[d] Obtained from taps on the primary winding of the output transformer. The taps are located on each side of the center-tap (B+) so as to supply 50 per cent of the plate signal voltage to the grid No. 2 of each output tube.

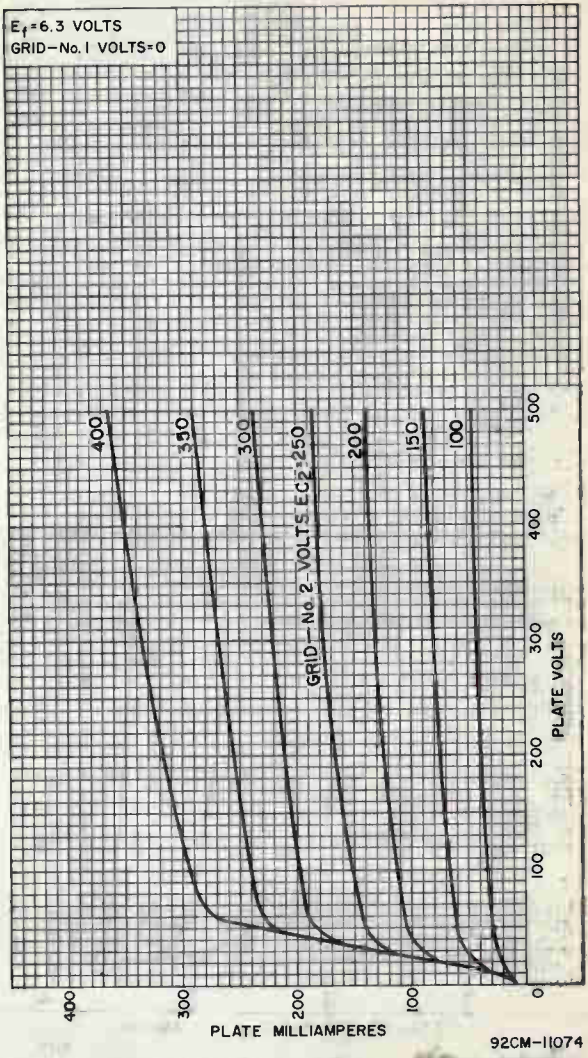
Operation Characteristics

Push-Pull Class AB_1



RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

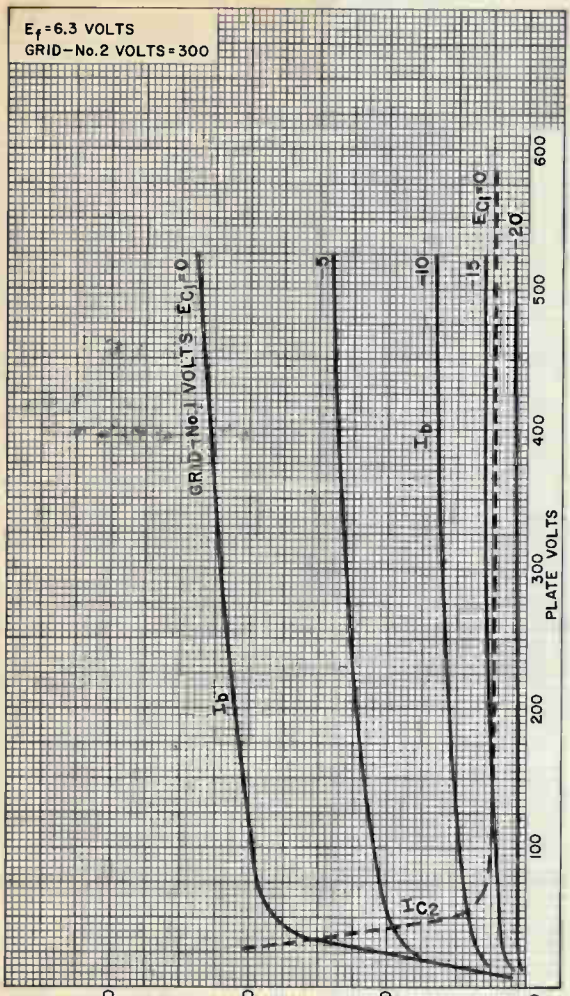
AVERAGE PLATE CHARACTERISTICS



92CM-11074

7868

AVERAGE CHARACTERISTICS



92CM-11075

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.