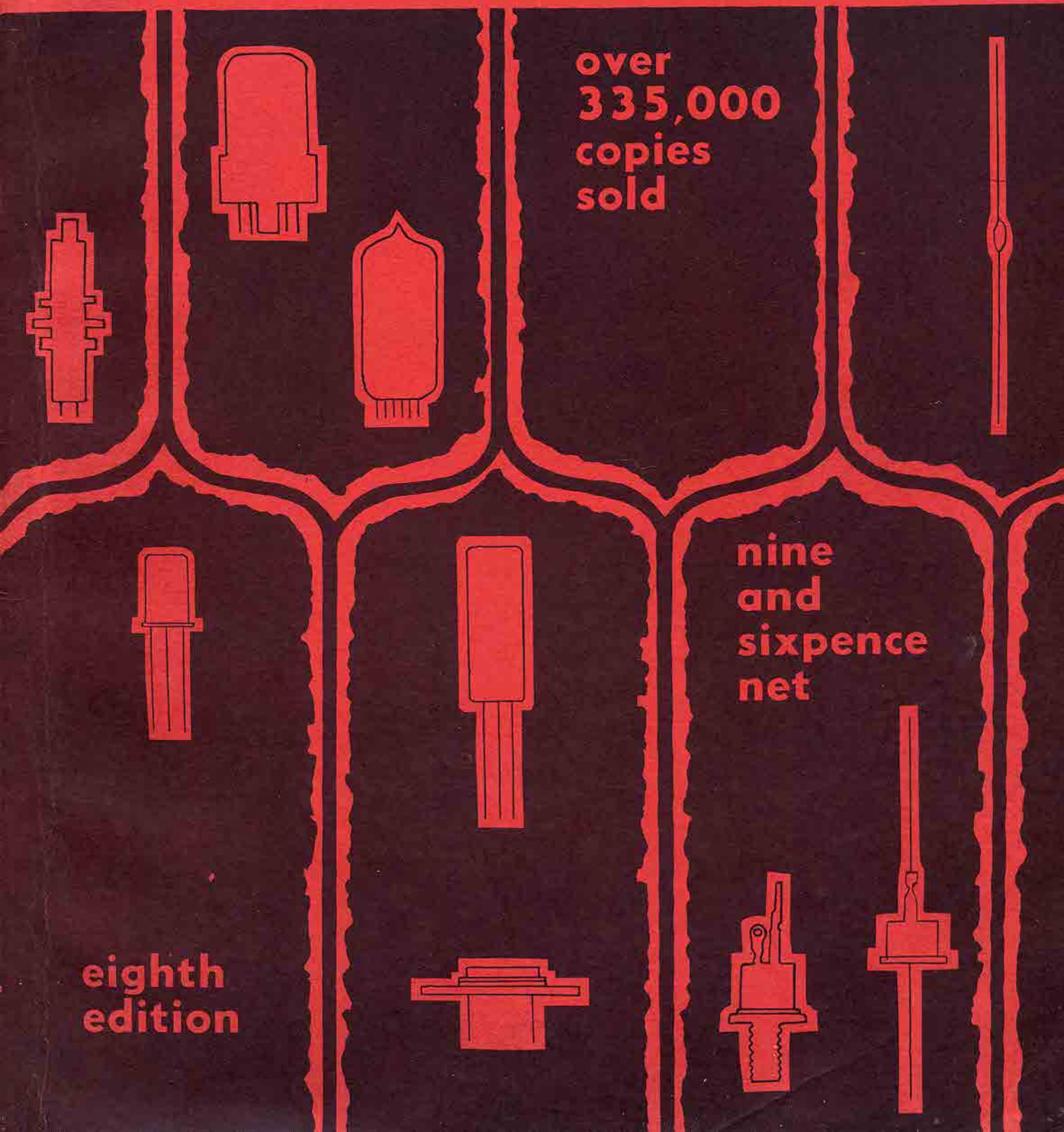
RADIO VALVE DATA

CHARACTERISTICS OF SEVEN THOUSAND VALVES - TRANSISTORS - SEMICONDUCTOR DIODES & RECTIFIERS - CATHODE RAY TUBES



over 335,000 copies sold

nine and sixpence net

eighth edition

RADIO VALVE DATA

Characteristics of 7,000 Valves, Transistors, Semiconductor Diodes and Rectifiers, and Cathode-Ray Tubes

First published February 1949

LONDON ILIFFE BOOKS LTD

CONTENTS

Printed in Great Britain by Butler & Tanner Ltd, Frome and London

SYMBOLS AND ABBREVIATIONS

VALVES

a-a	Anode-to-anode
BT	Beam tetrode
c_{ak}	Anode-cathode capacitance
c_{ga}	Grid-anode capacitance
c_{gk}	Grid-cathode capacitance
CT	Centre tap
D	Distortion
DD	Double-diode
DBT	Double-beam tetrode
DP	Double pentode
DT	Double triode
F.W.	Full-wave
g-g	Grid-to-grid
g_c	Conversion conductance
g_m	Mutual conductance
H.W.	Half-wave
H	Heptode
H_x	Hexode
I_k	Cathode current
MV	Mercury vapour
O	Octode
P	Pentode
P_a	Anode Dissipation
PIV	Peak inverse volts
R	Rectifier
r_a	Anode a.c. resistance
R_k	Cathode bias resistance
R_L	Optimum load resistance
SD	Single diode
SE	Secondary emission
SQ	Special quality
T	Triode
TD	Triple diode
TH	Triode heptode
TH_x	Triode hexode
TP	Triode pentode
TT	Tetrode
VD	Voltage-doubler
VM	variable mu

'Used in Valve Data Tables'

*appended to the 'Heater Volts' column indicates a directly-heated cathode. Valves without the asterisk have indirectly-heated cathodes.

† appended to the 'Heater Amps' column indicates that the valve has a centre-tapped filament or heater. The figures given are invariably for the parallel connection of the two parts; for the series connection the voltage is doubled and the current halved.

SEMICONDUCTOR DEVICES

Note - All ratings and characteristics referred to in these tables are at 25°C ambient temperature unless otherwise stated.

f_T	Gain - bandwidth product. Product of the small-signal, common emitter current gain and frequency of measurement, at a frequency where the current gain is decreasing at a rate of 6 dB per octave.
f_1	Frequency at which common-emitter current gain has fallen to unity.
$f_{\alpha b}$	Frequency at which the common-base current gain has fallen to 0.707 times its low-frequency value.
h_{fe}	Small-signal current gain, common emitter.
h_{FE}	Large-signal current gain, common emitter.
I_c	Continuous collector current.
I_{CBO}	Collector leakage current, collector to base junction reverse biased, emitter open-circuited.
P_c	Collector dissipation.
V_{CBO}	Collector to base voltage, emitter open-circuited.
V_{CEO}	Collector to emitter voltage, base open-circuited.
V_{EBO}	Emitter to base voltage, collector open-circuited.
V_{CB}	Collector to base voltage.

Construction

A	- Alloy	M	- Mesa
D	- Diffused	μA	- Micro-alloy
DD	- Double diffused	P	- Planar
tD	- Triple diffused	S	- Surface passivated
E	- Epitaxial		
J	- Junction	Sy	- Symmetrical

EXPLANATION OF TABLES

The information given refers to the main electrical characteristics of valve and semiconductor devices together with their base connections and is classified under main headings according to their type. In each section they are divided according to manufacturer and then subdivided into obsolete, replacement and current types where these terms are used in the following senses:-

Obsolete: No longer manufactured and normally unobtainable. The object has been to include only those types which may be still in use in old sets to assist by giving their characteristics, in the choice of the most suitable replacement.

Replacement: No longer manufactured in large quantities, but still made in small batches for replacement purposes.

Current: Includes the latest types and those which are still being produced in quantity.

The tables are largely self-explanatory, but the following notes should be read carefully if the tables are to be fully understood.

Valve Sections

FREQUENCY-CHANGERS

Valves in this section are intended primarily for use as frequency-changers in superheterodynes and the figures given are the normal operating conditions for this application. Some of the valves included are occasionally used for other purposes, however, and the voltages and currents may then be very different. Even in their normal application differences may be found in individual receivers, since not all designers adopt the 'normal' conditions; this is particularly so on short-wave bands.

It is to be noted that some valves which do not include an oscillator section, and which thus apparently require a separate oscillator, can actually be used as complete frequency-changers by using an oscillator circuit coupled between cathode and another electrode.

SCREENED TETRODES AND PENTODES

The main application of valves in this section is to r.f. and i.f. amplification and the operating conditions are normal ratings for this condition. No distinction is made between tetrodes and pentodes because in most cases the type of valve is immaterial as long as its characteristics are otherwise suitable.

Some of the valves in this section are also listed under Amplifier Triodes. The characteristics given there are obtained with the screen-grid connected to the anode.

OUTPUT VALVES 1

Triodes, beam-tetrodes and pentodes are all included here with normal maximum operating conditions as output valves for single-valve Class-A operation for a.f. application. They are distinguished by the letters (T), (BT) and (P) following the type number and those containing other systems have additional letters (SD), (DD) and (T) for single or double diode and triode, respectively.

A few contain the elements of an h.t. rectifier in addition and these are distinguished by the letter (R).

In some cases the conditions for a tetrode or pentode operating as a triode with the screen-grid joined to the anode are also given. This condition can be distinguished by the absence of a figure for screen voltage, but in addition the letter (T) placed after the type number indicates that the conditions are those of a triode. The fact that the electrode structure is that of a tetrode or a pentode is obvious as the valve appears in another row followed by letters (BT) or (P).

Even under Class A conditions the anode and screen currents rise with the signal input to a small extent. The anode current with full drive is about 2 per cent. greater than the quiescent value. With some valves the screen current increases much more and may become as high as three or four times the quiescent value. This increase is usually greatest when the valve is of a type drawing a very low quiescent current.

Since there is no standard method of rating valves, the figures quoted in the tables are sometimes for the no-signal condition and sometimes for full drive. The differences are, in practice, unimportant for they are less than the normal variations between individual specimens of the same type.

OUTPUT VALVES 2

The conditions included here are those for push-pull operation of a.f. output stages. Five modes of push-pull are recognised and distinguished in the 'Class' column; they are A, AB_1,

AB_2, B_1 and B_2. In Class A both valves are conductive over the whole input cycle and the anode current with full drive is substantially the same as that with no drive. In Class AB the valves are worked individually under non-linear conditions and may be individually cut-off over a small part of the input cycle; the anode current for full output is appreciably higher than that with no input. In Class B each valve is cut-off for about one-half of the input cycle and the anode current at full output is much greater than that with no input signal. The subscripts 1 and 2 show that operation is respectively without and with grid current. The anode and screen currents quoted for Class A and Class AB operation are with the maximum input signal voltage; the currents for Class AB_2, Class B_1 and Class B_2 operation, however, are subject to considerable variation with input, so it is more useful here to give figures for the quiescent conditions. With Class AB and Class B operation the manufacturer's literature should, in any case, be consulted.

For Classes AB_2 and B_2, the minimum grid-to-grid input resistance is given. The figure, together with that of the input voltage, is necessary for the design of the driver stage.

The valves included in this section fall into two groups. One consists of double triodes and double pentodes intended mainly for Class B_1 and Class B_2 operation. They are chiefly battery types which used to be designated as q.p.p. and Class B stages. There are also a few indirectly-heated-cathode types (for example 6A6) which have other applications; these last will also be found in the appropriate section (usually Amplifier Triodes) with the figures appropriate to one section of the valve as an amplifier.

Figures for anode and screen currents are quoted per valve (or per unit in the case of double valves) and in some cases several sets of different figures are given for the same valve under different conditions. Apart from double valves, most of the valves in the section appear also in Output Valves 1.

Very few Class A conditions are given because they are usually obtainable directly from Output Valves 1. For push-pull Class A the currents and anode-to-anode load are normally twice the figures for single-valve operation. The power output for the same odd-order distortion is usually a little more than double.

The differences between fixed-bias and cathode-bias are considerable under Class AB and Class B conditions. Where no value is quoted for a bias resistor it is to be understood that operation with a fixed bias is required; where a bias-resistor value is given, the other figures refer to cathode-bias operation. With fixed bias, it is usually necessary for the bias source to be of low impedance; with positive drive it is essential.

The value of bias resistor quoted (R_k) is that required per valve, or per unit in the case of double valves.

OUTPUT VALVES 3

The valves in this section are designed to withstand short-duration high-voltage peaks and the figures given are for television line-scan output-stage working.

The amount of information provided in this section is necessarily limited, and operating conditions vary so widely with circuit application that in all cases of doubt the manufacturer's literature should be consulted.

AMPLIFIER TRIODES

The conditions given are those pertaining to operation as transformer-coupled a.f. amplifiers at maximum rating, which is the most suitable condition for comparing valve characteristics. Conditions for R-C coupling depend too much upon the circuit constants to be useful. At the reduced voltages normally applied to the electrodes with R-C coupling, the a.c. resistance and mutual conductance are usually 20 to 50% higher and lower respectively than the figures listed.

SMALL TRANSMITTING VALVES

All categories are included in this section (triodes, pentodes, beam tetrodes, etc.) having up to 50 watts anode dissipation. The figures given are for Class C r.f. amplification on telegraphy. It should be noted that in the case of double valves (identified by letters (DT), (DBT), etc., in the 'Type' column) the figures for anode, screen and grid currents, dissipation and output refer to the pair.

Regarding the operating frequency column, the figures under 'Reduced Rating' can generally be taken to be the maximum frequencies at which the valves will give a useful power output. As the efficiency of a valve decreases at these higher frequencies, it is necessary to make some reduction to the ratings (or power input) in order to ensure that the power dissipated in the valve does not exceed the safe limit. The percentage reduction varies from valve to valve, however, so it is advisable to consult the manufacturer's literature if the reduced ratings are required.

EFFICIENCY DIODES

The purpose of these diodes, applied to television line-scan circuits, is to provide a section of the line-scan sawtooth waveform from energy stored in the deflector coils during the flyback, thereby reducing the amount of anode current required in the line-scan output stage.

VALVE RECTIFIERS

Included in this section are types which have simultaneous ratings up to 10kV peak inverse and 500mA maximum rectified current.

Valves designed for the production of e.h.t. supplies (i.e. over 1kV at less than 50mA or so) will be found in the E.H.T. Rectifiers section.

The ratings given are maximum ones and assume a supply frequency of 50 c/s.

E.H.T. RECTIFIERS

Used mainly for the production of the high-tension supplies for cathode-ray tubes, the thermionic diodes and metal rectifiers listed here are capable of producing supplies of over 1kV at currents of less than 50mA. Rectifiers capable of producing high-voltage high-current supplies (i.e. for transmitter h.t.) are listed in the Valve Rectifiers section. Three methods of e.h.t.-supply production are recognised in the data. First, the 'rectification' of the high-voltage pulse appearing at line-flyback time in a television receiver; here the ratings assume a pulse duration of about 10μsec. Secondly, the rectification of the output of an r.f. oscillator (100 kc/s and upwards) and, thirdly, by rectification of a low-frequency supply (possibly derived from the mains via a step-up transformer). Characteristics for this last case are marked by relatively large values for the reservoir capacitor.

METAL RECTIFIERS

Copper oxide and selenium rectifiers are both made in basic units of low voltage rating and in various sizes for different currents. Different voltages are catered for by stacking together various numbers of the basic units and there are also different stacking methods for units for use as half-wave, full-wave, voltage-doubler and bridge rectifiers. The total number of rectifier assemblies possible with only a few basic units is thus very large. In order to reduce the numbers, therefore, a few examples are listed as guides and from these the other possible ratings can be deduced.

TRANSISTORS

Unless otherwise stated, parameters are given for an ambient temperature of 25°C. To facilitate comparisons between various types the transistors have been arranged (1) in ascending order of collector dissipation (2) in ascending order of cut-off frequency and (3) alpha-numerically in order of type number. Comparisons should only be made at the same temperature; in cases of doubt the manufacturers' fuller data should be consulted, but, in general, the major effects of elevated temperature are to reduce the permissible dissipation and increase the collector leakage current.

The figures quoted for Absolute Maximum Ratings, the voltages V_{CBO}, V_{CEO}, V_{EBO} and the collector current I_C, should never be exceeded in normal use - these ratings represent the extreme capabilities of a transistor and are not recommended as design conditions.

A brief description of the main purpose for which the transistor has been designed is given in the 'Application' column; this is intended as a quick guide for determining general suitability, in many cases a much wider range of application is possible.

Diagrams showing the transistor base connections are given after the data sections.

SEMICONDUCTOR SIGNAL DIODES

This section includes germanium and silicon diodes with ratings not exceeding 400 PIV or 300 mA maximum rectified current, i.e. the devices listed are intended mainly for use in signal operation, switching and as low-power rectifiers. A column giving typical applications for each of the devices listed is included as an aid to determining general suitability.

SEMICONDUCTOR POWER RECTIFIERS DIODES

This section includes germanium and silicon devices with ratings which exceed 400 PIV or with a rectified current between 300 mA and 10 A, and are thus more suited to power rectification. This, however, is not their only use and other specific applications include switching, magnetic amplifiers, power supplies, etc.

SILICON REFERENCE DIODES

This section includes all diodes which have been categorised as voltage-limiting devices. These are also often referred to as Zener or avalanche diodes.

These devices operate in the breakdown region under reverse bias and are characterised by abrupt avalanching as the reference voltage is reached. If the diode is biased beyond the reverse turnover voltage, the current flow in the reverse direction will be limited only by the low slope resistance of the device; it is important to ensure that circuit conditions are adjusted so that the maximum dissipation of the device cannot be exceeded at this point.

INDEXES AND EQUIVALENTS

In view of the greatly increased number of devices included in this new edition separate indexes have been provided for the valve and semiconductor device sections. All items in the indexes are listed in alphabetical and numerical order of their type numbers (figures precede letters) and against each entry is the page number where it can be found. Also, where applicable, against each valve is a list of equivalents. These equivalents have been taken from the catalogues supplied by the various manufacturers concerned and whilst every care has been taken in the compilation of this list, the Publishers cannot accept any responsibility or liability for the accuracy thereof.

Acknowledgement

The Publishers wish to express their gratitude to the following Manufacturers who have so kindly made available the data from which these tables have been compiled, for their continuing help throughout the preparation of this book and for reading the proofs for each of their 'named' sections.

Associated Electrical Industries Ltd.,
British Tungsram Radio Works Ltd.,
Cathodeon Electronic Ltd.,
Electronic Tubes Ltd.,
English Electric Valve Co. Ltd.,
Ferranti Ltd.,
Hivac Ltd.,
Hughes International (U.K.) Ltd.,
International Rectifier Co. (G.B.) Ltd.,
Messrs. Joseph Lucas (Electrical) Ltd.,
The M-O Valve Co. Ltd.,
Mullard Ltd.,
Newmarket Transistors Ltd.,
Salford Electrical Instruments Ltd.,
Semiconductors Ltd.,
SGS Fairchild Ltd.,
Standard Telephone & Cables Ltd.,
Texas Instruments Ltd.,
Thorn-AEI Radio Valves & Tubes Ltd.,
Westinghouse Brake & Signal Co. Ltd.,
20th Century Electronics Ltd.,

FREQUENCY CHANGERS

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR																	
Obsolete Types																	
1A7	(H)	mix	1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	7.0	7.0	10.0	0.5	IO	76
		osc			90	-	-	1.2	-	-	-	-	3.4	4.4	0.9		
1LA6	(H)	mix	1.4*	0.05	90	45	0	0.55	0.6	0.75	0.25	7.0	7.7	8.0	0.4	B8B	29
		osc			90	-	-	1.2	-	-	-	-	2.9	3.3	0.6		
15A2	(H)	mix	4.0	0.65	250	100	-3.0	3.5	2.7	0.36	0.55	20.0	7.5	9.5	0.2	B7	2
		osc			170	-	-	4.0	-	-	-	-	-	-	-		
20A1	(TH_x)	mix	4.0	1.2	250	80	-1.5	2.2	3.0	0.7	0.65	12.5	7.0	21.0	0.05	B7	3
		osc			100	-	-	2.3	-	-	-	-	-	-	-	B7	
6A7 } 6A8 }	(H)	mix	6.3	0.3	250	100	-3.0	3.5	2.7	0.36	0.55	20.0	9.5	12.0	0.26	UX7	1
		osc			170	-	-	4.0	-	-	-	-	6.0	4.6	1.1	IO	1
6F7	(TP)	mix	6.3	0.3	250	100	-3.0	2.8	0.6	2.0	0.3	7.0	3.2	12.5	0.008	UX7	13
		osc			100	-	-	2.4	-	-	-	-	2.5	3.0	2.0		
15D1	(H)		13.0	0.2	Other data as Type 15A2												
15D2	(H)		13.0	0.15	Other data as Type 15A2												
20D2	(TH_x)	mix	13.0	0.15	250	100	-3.0	2.5	6.0	0.6	0.36	7.5	4.5	5.0	0.03	B7	3
		osc			100	-	-	3.8	-	-	-	-	-	-	-		
Replacement Types																	
DK91/1R5	(H)		1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.0	0.4	B7G	3
DK92/1AC6	(H)		1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	3.1	7.5	8.5	0.4	B7G	54
DK96/1AB6	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	6.0	7.4	8.1	0.36	B7G	54
		osc			-	-	-	-	-	-	-	-	-	-	-		
6K8	(TH_x)	mix	6.3	0.3	250	100	-3.0	2.5	6.0	0.6	0.36	7.5	4.6	4.8	0.08	IO	4
		osc			100	-	-	3.8	-	-	-	-	6.5	3.4	1.8		
7S7	(TH)	mix	6.3	0.3	250	100	-2.0	1.8	3.0	1.25	0.53	20.0	5.0	8.0	0.03	B8B	8
		osc			150	-	-	5.0	-	-	-	-	7.0	3.5	1.0		
12AH8	(TH)	mix	6.3	0.3†	250	100	-3.0	2.6	4.4	1.5	0.55	9.4	5.0	8.0	0.025	B9A	9
		osc			100	-	-	5.7	-	-	-	-	7.0	2.5	1.2		
20D4	(TH)	mix	6.3	0.3	250	100	-2.0	3.0	3.6	0.9	0.850	12.5	4.5	8.2	0.034	B9A	52
		osc			100	-	-	5.0	-	-	-	-	2.1	0.87			
ECF80	(TP)	mix	6.3	0.43	250	180	-5.8	5.7	1.4	1.5	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.5	1.8	1.6		
ECH42	(TH_x)	mix	6.3	0.23	250	85	-2.0	3.0	3.0	1.0	0.75	9.4	4.0	9.2	0.1	B8A	3
		osc			115	-	-	4.8	-	-	-	-	5.5	2.3	1.2		
PCF82/9U8	(TP)		9.5	0.3	Other data as Type ECF82/6U8												
12AD6	(H)		12.6	0.15	12.6	12.6	0	0.45	1.5	1.0	0.26	2.2	8.0	8.0	0.3	B7G	29
12K8	(TH_x)	mix	12.6	0.15	Other data as Type 6K8												
14S7	(TH)		12.6	0.15	Other data as Type 7S7												
UCH42	(TH)	mix	14.0	0.1	200	85	-2.0	3.0	3.0	1.0	0.75	9.4	3.8	9.2	0.1	B8A	3
		osc			100	-	-	3.1	-	-	-	-	5.5	2.3	1.2		
Current Types																	
6BE6 } 5750(SQ) }	(H)		6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
ECF82 / 6U8	(TP)	mix	6.3	0.45	170	170	-	6.6	2.5	0.4	1.65	5.0	5.0	3.5	0.006	B9A	25
		osc			100	-	-	7.0	-	-	-	-	2.5	1.0	1.8		
ECF86	(TP)	mix	6.3	0.39	190	140	-1.5	8.5	2.7	0.35	4.5	3.2	6.0	3.5	0.012	B9A	64
		osc			120	-	-	6.0	-	-	-	-	2.4	1.1	2.0		
ECF805	(T,VMP)	mix	6.3	0.35	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	72
		osc			77	-	-	7.8	-	-	-	-	2.4	2.2	2.0		
ECH81	(TH)	mix	6.3	0.3	250	103	-2.0	3.25	6.7	1.0	0.78	12.0	4.8	7.9	0.006	B9A	24
		osc			100	-	-	4.5	-	-	-	-	2.6	2.1	1.0		
EK90	(H)		6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
PCF805	(T,VMP)	mix	7.4	0.3	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	72
		osc			77	-	-	7.8	-	-	-	-	2.4	2.2	2.0		
PCF86	(TP)	mix	8.0	0.3	190	140	-1.5	8.5	2.7	0.35	4.5	3.2	6.0	3.6	0.025	B9A	64
		osc			120	-	-	6.0	-	-	-	-	2.5	-	2.3		
PCF801	(TP)	mix	8.5	0.3	175	120	-1.4	10.0	3.0	0.35	5.0	2.3	6.2	3.7	0.009	B9A	73
		osc			60	-	-	12.0	-	-	-	-	3.3	1.7	1.8		
PCF80	(TP)	mix	9.0	0.3	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
12BE6	(H)		12.6	0.15	Other data as Type 6BE6												
UCH81	(TH)	mix	19.0	0.1	200	119	-2.6	3.7	8.1	1.0	0.78	14.0	4.8	7.9	0.006	B9A	24
		osc			100	-	-	4.5	-	-	-	-	2.6	2.1	1.0		

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
COSSOR																	
Obsolete Types																	
1A7	(H)	mix	1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	-	7.0	10.0	0.5	IO	76
		osc			90	-	-	1.2	-	-	-	-	3.4	4.4	0.9		
210PG	(H)	osc			150	-	-	1.1	-	-	-	-	-	-	-		
220TH	(TH)	osc			100	-	-	1.7	-	-	-	-	-	-	-		
4THA	(TH_x)	osc			100	-	-	1.5	-	-	-	-	-	-	-		
41STH	(TH_x)	mix	4.0	1.15	250	100	-1.5	3.0	4.0	-	0.6	12.0	6.5	14.5	0.001	B7	3
		osc			100	-	-	2.0	-	-	-	-	-	-	-		
7S7	(TH)	mix	6.3	0.3	250	100	-2.0	1.8	3.0	1.25	0.525	20.0	5.0	8.0	0.03	B8B	8
		osc			150	-	-	5.0	-	-	-	-	-	-	-		
OM10	(TH_x)	mix	6.3	0.2	250	100	-2.0	2.7	3.8	0.6	0.7	11.0	5.0	11.9	0.002	IO	3
		osc			70	-	-	3.0	-	-	-	-	5.9	-	-		
14S7	(TH)	mix	12.6	0.15	Other data as Type 7S7												
Replacement Types																	
DK91	(H)	mix	1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.5	0.4	B7G	3
DK92 / 1AC6	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	8.5	0.4	B7G	54
		osc			-	-	-	-	-	-	-	-	-	-	-		
DK96	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	6.0	7.6	8.4	0.36	B7G	54
		osc			-	-	-	-	-	-	-	-	-	-	-		
ECF80	(TP)	mix	6.3	0.43	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
ECF82	(TP)	mix	6.3	0.45	250	117	0	5.2	1.9	-	1.9	4.25	5.0	2.6	0.01	B9A	25
		osc			150	-	-1.0	18.0	-	0.005	-	-	2.5	0.4	1.8		
ECH42 / 62TH	(TH_x)	mix	6.3	0.23	250	85	-2.0	3.2	3.75	1.0	0.71	11.0	4.0	9.2	0.1	B8A	3
		osc			115	-	-	4.2	-	-	-	-	5.5	2.3	1.2		
ECH81	(TH)	mix	6.3	0.3	250	103	-2.0	3.25	6.7	1.0	0.775	-	4.8	7.9	0.006	B9A	24
		osc			100	-	-	13.5	-	-	-	-	2.6	2.1	1.0		
PCF86	(TP)	mix	8.0	0.3	190	140	-	8.5	2.7	0.6	4.5	3.2	6.0	3.5	0.012	B9A	64
		osc			100	-	-3.0	14.0	-	0.003	-	-	2.4	1.1	2.0		
PCF80 / 8A8	(TP)	mix	9.0	0.3	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
PCF84	(TP)	mix	9.0	0.3	170	170	0	8.0	2.7	0.4	2.5	-	-	-	-	B9A	65
		osc			100	-	-2.0	14.0	-	0.004	-	-	-	-	-		
PCF82	(TP)	mix	9.5	0.3	170	170	-	6.6	2.5	0.4	1.65	5.0	5.0	2.6	0.01	B9A	25
		osc			100	-	-	7.0	-	-	-	-	2.5	0.4	1.8		
UCH42	(TH_x)	mix	14.0	0.1	200	85	-2.0	3.2	3.35	1.25	0.69	13.0	4.0	9.2	0.1	B8A	3
141TH		osc			110	-	-	4.2	-	-	-	-	5.5	2.3	1.2		
UCH81	(TH)	mix	19.0	0.1	200	120	-2.6	3.7	8.1	1.0	0.78	-	4.8	7.9	0.006	B9A	24
		osc			100	-	0	13.5	-	-	-	-	2.6	2.1	1.0		
UCF 80	(TP)	mix	27.0	0.1	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
EMITRON																	
Current Types																	
6BE6	(H)		6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
7S7	(TH)	mix	6.3	0.3	250	100	-2.0	1.8	3.0	1.25	0.525	20.0	5.0	8.0	0.03	B8B	8
		osc			150	-	-	5.0	-	-	-	-	-	-	-	-	
14S7	(TH)	mix	12.6	0.15	Other data as Type 7S7												
FERRANTI																	
Obsolete Types																	
VHT2A	(H)	mix	2.0*	0.1	120	45	0	-	1.9	0.75	0.35	10.0	11.5	7.0	0.3	B7	1
		osc			120	-	-	-	-	-	-	-	6.0	5.0	4.0		
VHT4	(H)	mix	4.0	1.0	250	100	-3.0	2.6	5.1	0.5	0.7	15.0	15.0	16.0	0.3	B7	2
		osc			100	-	-	1.2	-	-	-	-	11.0	9.0	5.0		
6A7 }	(H)	mix	6.3	0.3	250	100	-3.0	3.5	2.7	0.36	0.55	20.0	12.0	12.0	0.06	UX7	1
6A8 }		osc			100	-	-	4.0	-	-	-	-	6.5	5.0	0.8	IO	1
6L7	(H)	mix	6.3	0.3	250	150	-6.0	3.3	8.3	1.0	0.35	18.0	7.5	11.0	0.001	IO	2

(*Continued*)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
FERRANTI *(Continued)*																	
Obsolete Types (Continued)																	
6SA7 6SA7GT/G	(H)		6.3	0.3	250	100	-2.0	3.5	8.5	1.0	0.45	-	9.5	12.0	0.13	IO IO	6 7
VHTA	(H)	mix	13.0	0.2	250	100	-1.5	3.2	5.6	0.5	0.65	15.0	15.0	16.0	0.3	B7	2
		osc			100	-	-	1.3	-	-	-	-	-	-	-		
VHTS	(H)	mix	13.0	3.0	200	100	-3.0	2.6	5.1	0.5	0.65	15.0	15.0	16.0	0.3	B7	2
		osc			100	-	-	1.2	-	-	-	-	-	-	-		
Replacement Types																	
1AC6/ DK92	(H)		1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	8.5	0.4	B7G	54
1R5/ DK91	(H)		1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.0	0.4	B7G	3
6K8	(TH_x)	mix	6.3	0.3	250	100	-3.0	2.5	6.0	0.6	0.35	7.5	4.6	4.8	0.08	IO	4
		osc			100	-	-	3.8	-	-	-	-	6.5	3.4	1.8		
7S7	(TH)	mix	6.3	0.3	250	100	-2.0	1.8	3.0	1.25	0.525	20.0	5.0	8.0	0.03	B8B	8
		osc			150	-	-	5.0	-	-	-	-	-	-	-		
ECF82	(TP)	mix	6.3	0.45	250	117	0	5.2	1.9	-	1.9	4.25	5.0	2.6	0.01	B9A	25
		osc			150	-	-1.0	18.0	-	0.005	-	-	2.5	0.4	1.8		
ECH42/ 6CU7	(TH_x)	mix	6.3	0.23	250	85	-2.0	3.0	3.0	1.0	0.75	11.0	4.0	9.2	0.1	B8A	3
		osc			115	-	-	4.8	-	-	-	-	5.5	2.3	1.2	IO	4
12K8GT			12.6	0.15	Other data as Type 6K8												
UCH42	(TH_x)	mix	14.0	0.1	200	85	-2.0	3.0	3.0	1.0	0.75	13.0	3.8	9.2	0.1	B8A	3
		osc			100	-	-	3.1	-	-	-	-	5.5	2.3	1.2		
UCF80	(TP)	mix	27.0	0.1	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
Current Types																	
1AB6/ DK96	(H)		1.4*	0.025	85	64	0	0.6	1.5	1.0	0.3	6.0	7.6	8.4	0.36	B7G	54
6BE6/ EK90	(H)		6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
ECF80	(TP)	mix	6.3	0.43	250	180	-5.8	5.7	1.4	1.5	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.5	1.8	1.5		
ECH81/ 6AJ8	(TH)	mix	6.3	0.3	250	100	-2.0	3.2	6.7	1.0	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	-	0	4.5	-	-	-	-	2.6	2.1	1.0		
PCF86	(TP)	mix	8.0	0.3	190	140	-	8.5	2.7	0.6	4.5	3.2	6.0	3.5	0.012	B9A	64
		osc			100	-	-3.0	14.0	-	0.003	-	-	2.4	1.1	2.0		
PCF806	(TP)	mix	8.0	0.3	250	150	-	10.0	3.3	0.35	4.5	-	6.0	3.5	0.012	B9A	73
		osc			125	-	-	15.0	-	-	-	-	2.4	1.1	2.0		
PCF801	(TP)	mix	8.5	0.3	170	120	-1.4	10.0	3.0	0.35	5.0	-	6.2	3.7	0.009	B9A	73
		osc			100	-	-3.0	15.0	-	-	-	-	-	-	-		
9A8/ PCF80	(TP)	mix	9.0	0.3	170	170	-	6.3	2.5	0.7	2.05	4.0	5.5	3.8	0.02	B9A	25
		osc			100	-	-	14.0	-	-	-	-	2.5	1.8	1.5		
PCF802	(TP)	mix	9.0	0.3	100	100	-1.0	6.0	1.7	0.4	-	-	5.4	-	0.06	B9A	25
		osc			-	-	-	-	-	-	-	-	-	-	-		
9U8/ PCF82	(TP)	mix	9.5	0.3	250	110	-	5.2	2.0	0.4	1.0	5.0	5.0	2.5	0.006	B9A	25
		osc			170	-	-	3.3	-	-	-	-	2.5	0.4	1.8		
UCH81	(TH)	mix	19.0	0.1	200	120	-2.6	3.7	8.1	1.0	0.78	-	4.8	7.9	0.006	B9A	24
		osc			100	-	0	4.5	-	-	-	-	2.6	2.1	1.0		
MARCONI																	
Obsolete Types																	
X14	(H)	mix	1.4*	0.05	90	45	0	0.45	0.6	-	0.25	10.0	7.0	7.6	0.47	IO	76
		osc			90	-	-	-	-	-	-	-	5.1	5.4	1.25		
X21	(H)	mix	2.0*	0.1	150	70	0	-	-	-	0.24	10.0	11.8	19.2	0.55	B7	1
		osc			150	-	-	-	-	-	-	-	7.4	-	1.8		
X22	(H)	mix	2.0*	0.15	150	70	0	-	-	-	0.35	10.0	13.8	20.5	0.4	B7	1
		osc			150	-	-	-	-	-	-	-	7.8	6.4	1.47		
X23	(TH_x)	mix	2.0*	0.3	150	60	-1.5	0.7	-	-	0.25	6.0	6.3	17.5	0.05	B7	34
		osc			150	-	-	2.1	-	-	-	-	21.5	9.8	4.1		
X24	(TH_x)	mix	2.0*	0.2	150	60	-1.5	0.7	1.7	-	0.25	6.0	7.5	17.5	-	B7	3
		osc			100	-	-	2.1	-	-	-	-	19.0	9.5	-		
MX40	(H)	mix	4.0	0.65	250	90	-1.5	1.6	2.0	-	0.6	10.0	13.3	-	0.3	B7	2
		osc			150	-	-	-	-	-	-	-	11.3	9.4	2.6		

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_o (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI *(Continued)*																	
Obsolete Types (Continued)																	
X41Met	(TH_x)	mix	4.0	1.2	250	70	-1.5	2.3	2.8	-	0.64	12.0	7.2	17.0	0.46	B7	3
		osc			150	-	-	2.2	-	-	-	-	15.5	6.0	-		
X42	(H)	mix	4.0	0.6	250	100	-3.0	-	-	-	0.49	25.0	8.6	-	0.95	B7	2
		osc			200	-	-	-	-	-	-	-	8.7	7.0	1.64		
X61M	(TH_x)	mix	6.3	0.3	250	100	-3.0	2.0	3.0	-	0.62	15.0	4.9	11.5	-	IO	3
		osc			100	-	-	5.0	-	-	-	-	10.5	6.0	-		
X64	(H)	mix	6.3	0.3	250	150	-6.0	-	-	-	0.31	18.0	11.3	8.5	1.0	IO	2
		osc			-	-	-	-	-	-	-	-	6.0	-	-		
X30, X32	(H)	mix	13.0	0.3	250	100	-3.0	4.0	-	-	0.75	10.0	15.6	-	0.36	B7	2
		osc			150	-	-	3.0	-	-	-	-	12.2	9.5	2.66		
X31	(TH_x)	mix	13.0	0.3	250	80	-1.5	-	-	-	0.55	12.0	7.0	21.5	0.046	B7	3
		osc			150	-	-	-	-	-	-	-	17.0	8.5	3.56		
X71M	(TH_x)	mix	13.0	0.16	250	100	-3.0	-	-	-	0.62	15.0	5.0	14.1	0.085	IO	3
		osc			100	-	-	-	-	-	-	-	11.0	7.1	2.3		
X101	(TH_x)	mix	19.0	0.1	Other data as Type X81												
Replacement Types																	
X63	(H)	mix	6.3	0.3	250	100	-3.0	5.0	2.7	0.3	0.49	25.0	8.0	8.9	0.38	IO	1
		osc			100	-	-	-	-	-	-	-	7.3	5.9	0.83		
X65	(TH_x)	mix	6.3	0.3	250	100	-3.0	1.75	-	2.5	0.225	10.0	3.5	5.5	0.21	IO	3
		osc			100	-	-	4.75	-	-	-	-	10.4	5.5	2.0		
X81	(TH_x)	mix	6.3	0.3	250	100	-2.0	3.0	2.4	1.0	0.65	10.0	6.0	11.5	0.07	B8B	8
		osc			100	-	-	3.6	-	-	-	-	9.6	4.8	1.15		
Current Types																	
DK91/X17	(H)	mix	1.4*	0.05	90	67.5	0	1.6	3.2	0.6	0.3	-	7.0	7.0	0.4	B7G	3
		osc			-	-	-	-	-	-	-	-	3.8	-	-		
DK92/X18	(H)		1.4*	0.05	85	60	0	0.7	1.6	0.65	0.325	15.0	7.0	7.0	0.4	B7G	54
DK96	(H)		1.4	0.25	85	6.8	0	0.6	0.14	0.8	0.3	5.6	7.4	8.1	0.036	B7G	54
ECF80	(TP)	mix	6.3	0.43	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
ECF82	(TP)	mix	6.3	0.45	250	117	0	5.2	1.9	-	1.9	4.25	5.0	2.6	0.01	B9A	25
		osc			150	-	-1.0	18.0	-	0.005	-	-	2.5	0.4	1.8		
ECH21/ X143	(TH)	mix	6.3	0.33	250	100	-2.0	3.0	6.2	1.4	0.75	10.0	6.8	9.5	0.002	B8B	42
		osc			100	-	-	12.0	-	-	-	-	4.5	3.5	1.1		
ECH35 / X147	(TH_x)	mix	6.3	0.225	250	100	-2.0	3.0	-	1.3	0.65	11.0	5.0	10.0	0.003	IO	3
		osc			100	-	-	3.3	-	-	-	-	9.0	3.0	1.6	B10	
ECH42 / X150	(TH_x)	mix	6.3	0.225	250	85	-2.0	3.0	3.0	1.0	0.75	10.0	4.0	9.2	0.05	B8A	3
		osc			100	-	-	10.0	-	-	-	-	-	-	-		
ECH81/ X719	(TH)	mix	6.3	0.3	250	100	-2.0	3.25	6.7	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	-	0	13.5	-	-	-	-	2.6	2.1	1.0		
ECH84	(TH)	mix	6.3	0.3	135	14	-	1.7	0.9	-	2.2	-	-	-	-	B9A	77
		osc	6.3	0.3	50	-	-	3.0	-	-	3.7	-	-	-	-		
X78	(TH_x)	mix	6.3	0.3	250	75	0	4.5	3.4	0.7	0.78	10.0*	4.1	4.34	0.11	B7G	48
		osc			100	-	-	10.0	-	-	2.8	-	-	-	-		
X79	(TH_x)	mix	6.3	0.3	250	75	0	4.5	3.4	0.7	0.78	10.0	4.1	4.34	0.08	B9A	21
		osc			100	-	-	10.0	-	-	2.8	-	5.47	1.5	1.48		
X148/7S7	(TH)	mix	6.3	0.3	250	100	-2.0	1.5	3.0	1.25	2.0	-	5.0	8.0	0.03	B8B	8
		osc			250	-	-	5.0	-	-	-	-	-	-	-		
X727/6BE6	(H)		6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
PCF86	(TP)	mix	8.0	0.3	170	150	-1.2	10.0	3.3	0.35	-	3.2	6.0	3.5	0.012	B9A	65
		osc			100	-	-3.0	14.0	-	3.0	-	-	2.4	1.1	2.0		
PCF/806	(TP)	mix	8.0	0.3	170	150	-1.2	10.0	3.3	-	-	-	6.0	3.3	0.012	B9A	73
		osc			100	-	-3.0	14.0	-	-	-	-	-	-	-		
PCF801	(TP)	mix	8.5	0.3	170	120	-1.4	10.0	3.0	0.35	5.0	2.3	6.2	3.7	0.009	B9A	73
		osc			100	-	-3.0	15.0	-	2.2	-	-	3.3	1.7	1.8		
LZ329	(TP)	mix	9.0	0.3	170	145	-	6.8	2.0	0.8	2.0	5.0	6.1	4.9	0.013	B9A	25
		osc			120	-	-	6.0	-	-	-	-	3.1	2.9	1.7		
LZ339	(TP)	mix	9.0	0.3	164	138	-	7.6	2.3	0.6	3.3	3.7	6.7	5.0	0.014	B9A	42
		osc			120	-	-	6.0	-	-	-	-	3.2	3.2	1.6		
PCF80 / LZ319	(TP)	mix	9.0	0.3	170	170	-5.5	5.2	1.5	0.7	2.1	4.0	4.5	4.0	0.02	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	3.0	0.05	2.0		

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI *(Continued)*																	
Current Types (Continued)																	
PCF802	(TP)	mix	9.0	0.3	100	100	-1.0	6.0	1.7	0.4	-	-	-	-	-	B9A	25
		osc			200	-	-2.0	3.5	-	2.0	-	-	-	-	-		
PCF82	(TP)	mix	9.5	0.3	250	110	-0.9	10.0	3.5	-	1.9	4.2	5.0	2.6	0.01	B9A	25
		osc			150	-	-1.0	18.0	-	-	1.65	-	2.5	0.4	1.8		
X76M	(TH_x)	mix	13.0	0.16	175	70	-3.0	4.0	3.5	0.1	0.62	15.0	4.7	13.1	-	IO	3
		osc			100	-	-	3.5	-	-	-	-	10.6	6.3	-		
UCH42/ X142	(TH_x)	mix	14.0	0.1	200	85	-2.0	3.0	3.0	1.25	0.75	13.0	4.0	9.2	0.05	B8A	3
		osc			100	-	-	10.0	-	-	-	-	6.4	2.7	1.5		
UCH81	(TH)	mix	19.0	0.1	200	119	-2.6	3.7	8.1	1.0	0.775	-	4.8	7.9	0.006	B9A	24
		osc			100	-	0	13.5	-	-	-	-	2.6	2.1	1.0		
X109	(TH_x)	mix	19.0	0.1	175	75	0	4.3	3.6	0.25	0.71	10.0	4.1	4.34	0.11	B9A	21
		osc			100	-	-	10.0	-	-	2.8	-	-	-	-		
X118	(TH)	mix	28.0	0.1	175	100	-2.5	3.0	6.0	2.2	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			80	-	-	5.0	-	-	-	-	7.7	1.7	1.8		
X145	(TH)	mix	28.0	0.1	175	100	-2.5	3.0	6.0	2.2	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			175	-	-	5.0	-	-	3.8	-	7.7	1.7	1.8		
MAZDA (EXPORT EDISWAN)																	
Obsolete Types																	
FC141	(H)	mix	1.4*	0.05	82	45	0	0.55	0.6	0.6	0.25	-	-	-	-	MO	5
		osc			75	-	-	1.2	-	-	-	-	-	-	-		
TP22	(TP)	mix	2.0*	0.25	150	60	-1.5	1.2	0.4	1.6	0.5	3.0	9.25	10.0	0.03	B9	1
		osc			100	-	-	0.8	-	-	-	-	4.5	6.5	4.5		
TP23	(TP)	mix	2.0*	0.25	120	60	-1.5	0.55	0.95	1.6	0.25	8.0	9.25	12.25	0.02	B7	34
		osc			80	-	-	2.5	-	-	-	-	13.75	8.75	4.5		
TP25	(TP)	mix	2.0*	0.2	120	60	-1.5	0.58	0.92	1.3	0.26	8.0	6.5	8.0	0.01	MO	23
		osc			80	-	-	2.5	-	-	-	-	9.0	3.75	2.0		
TP26	(TP)	mix	2.0*	0.2	103	65	-2.0	1.2	0.3	1.4	0.55	3.0	6.75	8.25	0.02	MO	22
		osc			65	-	-	0.9	-	-	-	-	3.75	4.25	2.0		
AC/TH1	(TH)	mix	4.0	1.3	250	100	-3.0	3.0	6.0	1.6	0.75	9.0	9.5	11.5	0.0015	B7	3
		osc			80	-	-	4.5	-	-	-	-	10.25	4.0	2.25		
AC/TH1A	(TH)	mix	4.0	1.3	250	100	-3.0	3.0	6.0	1.6	0.75	9.0	9.25	11.5	0.001	MO	12
		osc			80	-	-	4.5	-	-	-	-	10.5	4.0	2.25		
AC/TP	(TP)	mix	4.0	1.25	250	200	-5.0	6.5	2.5	0.9	0.7	3.0	8.0	7.75	0.07	B9	2
		osc			150	-	-	1.5	-	-	-	-	5.25	4.25	2.5		
6C31	(TH)	mix	6.3	0.85	250	100	-3.0	3.0	6.05	1.6	0.75	9.0	9.5	13.0	0.001	IO	3
		osc			80	-	-	5.0	-	-	-	-	11.5	4.4	3.0		
TP1340	(TP)	mix	13.0	0.4	250	200	-5.0	6.5	2.5	0.9	0.7	3.0	8.0	7.75	0.07	B9	2
		osc			150	-	-	1.5	-	-	-	-	5.25	4.25	2.5		
TH232	(TH)	mix	23.0	0.2	150	100	-3.0	3.0	6.0	1.0	0.65	9.0	9.5	11.5	0.0015	B7	3
		osc			80	0	-	4.5	-	-	-	-	10.25	4.0	2.25		
TH233	(TH)	mix	23.0	0.2	175	100	-3.0	2.6	5.6	1.3	0.64	8.0	9.25	11.25	0.0005	MO	12
		osc			80	-	-	4.5	-	-	-	-	10.5	3.5	2.4		
TH2320	(TH)	mix	23.0	0.2	150	100	-3.0	3.0	6.0	1.2	0.75	9.0	9.5	11.5	0.0015	B7	3
		osc			80	-	-	4.5	-	-	-	-	10.25	4.0	2.25		
TP2620	(TP)	mix	26.0	0.2	250	200	-5.0	6.5	2.5	0.9	0.7	3.0	8.0	7.75	0.07	B9	2
		osc			150	-	-	1.5	-	-	-	-	5.25	4.25	2.5		
Replacement Types																	
1C1 / 1R5	(H)	mix	1.4*	0.05	90	67.5	0	1.6	3.2	0.6	0.3	37.0	7.0	7.5	0.4	B7G	3
1C2	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	5.7	7.5	8.5	0.4	B7G	54
		osc			30	-	-	1.6	-	-	-	-	4.0	5.0	-		
1C3	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	5.7	7.4	8.1	0.36	B7G	54
		osc			35	-	-	1.5	-	-	-	-	3.9	4.8	-		
DK91	(H)	mix	1.4*	0.05	90	67.5	0	1.6	3.2	0.6	0.3	37.0	7.0	7.5	0.4	B7G	3
DK92	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	5.7	7.5	8.5	0.4	B7G	54
		osc			30	-	-	1.6	-	-	-	-	4.0	5.0	-		
DK96	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	5.7	7.4	8.1	0.36	B7G	54
		osc			35	-	-	1.5	-	-	-	-	3.9	4.8	-		

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*																	
Replacement Types (Continued)																	
TH41	(TH)	mix	4.0	1.3	250	100	-3.0	3.0	6.05	1.6	0.75	9.0	9.25	11.0	0.001	MO	12
		osc			80	-	-	5.0	-	-	-	-	10.5	3.75	2.4		
6C9	(TH)	mix	6.3	0.45	250	100	-2.5	3.0	6.0	3.0	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			80	-	-	5.0	-	-	-	-	7.7	1.7	1.8		
6C10	(TH_x)	mix	6.3	0.225	250	100	-2.5	3.6	3.75	1.03	0.71	17.0	4.0	9.2	0.05	B8A	3
		osc			115	-	-	5.0	-	-	-	-	6.4	2.7	1.5		
ECF80	(TP)	mix	6.3	0.43	250	180	-5.8	5.7	1.4	0.87	2.1	5.0	5.2	3.4	0.025	B9A	25
		osc			100	-	-	5.0	-	-	-	-	2.5	1.8	1.5		
ECH42	(TH_x)	mix	6.3	0.23	250	85	-2.0	3.0	3.0	1.0	0.75	9.4	4.0	9.2	0.1	B8A	3
		osc			115	-	-	4.8	-	-	-	-	5.5	2.3	1.2		
30C15	(TP)	mix	9.0	0.3	164	138	-	7.6	2.3	0.6	3.3	3.7	6.7	5.0	0.014	B9A	42
		osc			120	-	-	6.0	-	-	-	-	3.2	3.2	1.6		
PCF82	(TP)	mix	9.5	0.3	170	170	-	6.6	2.5	0.4	1.65	5.0	5.0	3.5	0.006	B9A	25
		osc			100	-	-	7.0	-	-	-	-	2.5	1.0	1.8		
UCH42	(TH_x)	mix	14.0	0.1	200	85	-2.0	3.0	3.0	1.0	0.75	9.4	3.8	9.2	0.1	B8A	3
		osc			100	-	-	3.1	-	-	-	-	5.5	2.3	1.2		
10C1	(TH)	mix	28.0	0.1	175	100	-2.5	3.0	6.0	2.2	0.65	9.0	8.3	3.0	0.003	B8A	3
		osc			80	-	-	5.0	-	-	-	-	7.7	1.7	1.8		
10C2	(TP)	mix	28.0	0.1	150	150	0	4.7	1.3	-	2.1	3.25	7.5	2.6	0.012	B8A	19
		osc			80	-	-	5.0	-	-	-	-	4.1	1.6	1.7		
Current Types																	
6C12	(TH)	mix	6.3	0.3	250	103	-2.0	3.25	6.7	1.0	0.775	12.0	4.8	7.9	0.006	B9A	24
		osc			100	-	-	4.5	-	-	-	-	2.6	2.1	1.0		
6C18	(T,VMP)	mix	6.3	0.35	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	72
		osc			77	-	-	7.8	-	-	-	-	2.4	2.2	2.0		
ECF805	(T,VMP)	mix	6.3	0.35	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	72
		osc			77	-	-	7.8	-	-	-	-	2.4	2.2	2.0		
ECH81	(TH)	mix	6.3	0.3	250	103	-2.0	3.25	6.7	1.0	0.78	12.0	4.8	7.9	0.006	B9A	24
		osc			100	-	-	4.5	-	-	-	-	2.6	2.1	1.0		
30C17	(T,VMP)	mix	7.4	0.3	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	42
		osc			60	-	-	7.0	-	-	-	-	3.3	2.1	1.9		
30C18	(T,VMP)	mix	7.4	0.3	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	72
					77	-	-	7.8	-	-	-	-	2.4	2.2	2.0		
PCF87	(T,VMP)	mix	7.4	0.3	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	42
		osc			60	-	-	7.0	-	-	-	-	3.3	2.1	1.9		
PCF805	(T,VMP)	mix	7.4	0.3	155	135	-3.0	7.8	2.4	0.4	4.7	2.0	6.7	2.7	0.007	B9A	72
		osc			77	-	-	7.8	-	-	-	-	2.4	2.2	2.0		
PCF86	(TP)	mix	8.0	0.3	190	140	-1.5	8.5	2.7	0.35	4.5	3.2	6.0	3.5	0.012	B9A	64
		osc			120	-	-	6.0	-	-	-	-	2.4	1.1	2.0		
PCF801	(TP)	mix	8.5	0.3	175	120	-1.4	10.0	3.0	0.35	5.0	2.3	6.2	3.7	0.009	B9A	73
		osc			60	-	-	12.0	-	-	-	-	3.3	1.7	1.8		
30C1	(TP)	mix	9.0	0.3	170	145	-	6.8	2.0	0.8	2.0	5.0	6.1	4.9	0.013	B9A	25
		osc			120	-	-	6.0	-	-	-	-	3.1	2.9	1.7		
PCF80	(TP)	mix	9.0	0.3	170	170	-	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			120	-	-	6.0	-	-	-	-	2.5	1.8	1.5		
10C14	(TH)	mix	19.0	0.1	200	119	-2.6	3.7	8.1	1.0	0.78	14.0	4.8	7.9	0.006	B9A	24
		osc			100	-	-	4.5	-	-	-	-	2.6	2.1	1.0		
UCH81	(TH)	mix	19.0	0.1	200	119	-2.6	3.7	8.1	1.0	0.78	14.0	4.8	7.9	0.006	B9A	24
		osc			100	-	-	4.5	-	-	-	-	2.6	2.1	1.0		
MULLARD																	
Obsolete Types																	
1A7	(H)		1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	7.0	7.0	10.0	0.5	IO	76
DK1	(H)	mix	1.4*	0.05	90	45	0	0.55	0.6	0.6	0.25	-	-	-	-	Ct8	31
		osc			90	-	-	1.2	-	-	-	-	-	-	-		
FC2	(O)	mix	2.0*	0.1	135	70	0	0.95	3.75	-	0.2	13.0	9.9	14.5	0.057	B7	1
		osc			135	-	-	-	-	-	-	-	-	-	-		
FC2A } KK32 }	(O)	mix	2.0*	0.13	135	45	0	0.7	0.7	2.5	0.27	12.0	9.0	11.0	0.07	B7	1
		osc			135	-	-	2.1	-	-	-	-	6.3	8.5	-	IO	76

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*																	
Obsolete Types (Continued)																	
KCF30	(TP)	mix	2.0*	0.2	120	60	-1.5	0.58	0.92	1.6	0.26	8.0	6.5	8.0	0.01	IO	98
		osc			100	-	-	-	-	-	-	-	9.0	4.0	2.0		
TH2	(TH_x)	mix	2.0*	0.23	135	60	-1.5	0.95	1.6	0.6	0.43	7.0	8.5	15.0	0.002	B7	34
		osc			100	-	-	4.0	-	-	-	-	21.0	1.4	7.7		
TH4A	(TH_x)	mix	4.0	1.5	275	100	-2.5	3.25	7.0	1.5	0.75	11.0	8.0	13.0	-	B7	3
		osc			100	-	-	22.0	-	-	-	-	16.5	3.1	3.25		
TH4B	(TH)	mix	4.0	1.45	250	100	-2.5	3.25	6.0	1.5	0.75	11.0	8.4	13.8	0.16	B7	3
		osc			100	-	-	9.5	-	-	-	-	13.6	3.5	-		
6A7	(H)	mix	6.3	0.3	250	100	-3.0	3.5	2.7	0.36	0.55	20.0	9.5	12.0	0.26	UX7	1
		osc			100	-	-	4.0	-	-	-	-	6.0	4.6	0.8		
6A8								Other data (except connections) as Type 6A7								IO	1
6K8	(TH_x)	mix	6.3	0.3	250	100	-3.0	2.5	6.0	0.6	0.36	7.5	6.6	3.5	0.03	IO	4
		osc			100	-	-	3.8	-	-	-	-	6.0	3.2	1.1		
ECH2	(TH)	mix	6.3	0.95	250	100	-2.5	3.25	6.0	1.5	0.75	11.0	8.4	13.8	0.015	Ct8	1
		osc			100	-	-	9.5	-	-	-	-	17.0	3.5	3.5		
ECH33	(TH_x)	mix	6.3	0.2	250	100	-2.0	3.0	3.0	1.3	0.65	11.0	4.9	9.0	0.003	IO	3
		osc			100	-	-	3.3	-	-	-	-	8.8	4.4	1.4		
EK32 } EK2	(O)	mix	6.3	0.2	250	50	-2.0	1.0	0.8	2.0	0.55	21.0	9.0	10.5	0.1	IO	1
		osc			200	-	-	2.5	-	-	-	-	6.0	5.0	-	Ct8	2
12K8			12.6	0.15				Other data as Type 6K8									
FC13 } FC13C	(O)	mix	13.0	0.2	200	70	-1.5	1.6	3.8	2.0	0.6	12.0	9.0	12.5	0.1	Ct8	2
		osc			90	-	-	2.0	-	-	-	-	9.4	6.1	-	B7	2
TH13C	(TH_x)		13.0	0.31				Other data as Type TH4A									
TH21C	(TH_x)	mix	21.0	0.2	250	70	-1.5	4.0	6.0	1.5	1.0	28.0	7.4	14.3	-	B7	3
		osc			130	-	-	6.0	-	-	-	-	-	-	1.8		
TH22C	(TH_x)		29.0	0.2				Other data as Type TH4A									
TH30C	(TH_x)	mix	29.0	0.2	250	100	-2.5	3.25	6.0	1.5	0.75	11.0	8.4	13.8	-	B7	3
		osc			100	-	-	9.5	-	-	-	-	13.6	3.5	-		
Replacement Types																	
DF97	(P)		1.4*	0.025	85	47	0	0.54	0.8	0.5	0.265	16.8	3.7	7.5	0.01	B7G	59
DK32	(H)	mix	1.4*	0.05	90	45	0	0.6	0.7	0.6	0.25	10.0	7.0	10.0	0.5	IO	76
		osc			90	45	0	1.2	-	-	-	-	4.0	4.4	0.9		
DK40	(O)	mix	1.4*	0.05	90	67.5	0	1.0	0.25	1.0	0.425	11.2	6.9	9.6	0.16	B8A	25
		osc			67.5	45	0	2.6	-	-	-	-	-	-	-		
DK91	(H)		1.4*	0.05	90	67.5	0	1.6	3.2	0.6	0.3	15.0	7.0	7.5	0.4	B7G	3
DK92	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	7.5	0.4	B7G	54
		osc			85	60	0	1.4	-	-	-	-	-	-	-		
DK96	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	1.0	0.3	5.6	7.4	8.1	0.36	B7G	54
		osc			85	64	0	1.5	-	-	-	-	-	-	-		
FC4	(O)	mix	4.0	0.65	250	70	-1.5	1.6	3.8	-	0.6	12.0	9.0	12.5	0.06	B7	2
		osc			90	-	-	2.0	-	-	-	-	9.4	6.1	-		
ECF80	(TP)	mix	6.3	0.43	250	250	-3.2	7.0	1.2	0.9	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.5	1.8	1.5		
ECF82	(TP)	mix	6.3	0.45	250	110	-0.9	5.2	1.9	-	1.9	4.25	5.0	2.6	0.01	B9A	25
		osc			150	-	-1.0	18.0	-	0.005	-	-	2.5	0.4	1.8		
ECH3	(TH_x)	mix	6.3	0.2	250	100	-2.0	3.0	3.0	1.3	0.65	11.0	4.9	9.0	0.003	Ct8	1
		osc			100	-	-	3.3	-	-	-	-	8.8	4.4	1.4		
ECH21	(TH)	mix	6.3	0.33	250	100	-2.0	3.0	6.2	1.4	0.75	14.0	6.8	9.5	0.002	B8B	42
		osc			160	-	-	4.5	-	-	-	-	4.5	3.5	1.1		
ECH35	(TH_x)	mix	6.3	0.225	250	100	-2.0	3.0	3.0	1.3	0.65	11.0	5.0	10.0	0.0003	IO	3
		osc			100	-	-	3.3	-	-	-	-	9.0	3.0	1.6		
ECH42	(TH_x)	mix	6.3	0.23	250	85	-2.0	3.0	3.0	1.0	0.75	11.0	4.0	9.2	0.1	B8A	3
		osc			115	-	-	4.8	-	-	-	-	5.5	2.3	1.2		
ECH83	(TH)	mix	6.3	0.3	12.6	12.6	0	0.10	0.35	3.8	0.16	2.5	4.8	7.9	0.01	B9A	24
		osc			12.6	-	0	0.40	0.042	-	-	-	2.6	2.1	1.0		
EK90	(H)		6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
CCH35	(TH)		7.0	0.2				Other data as Type ECH35									
PCF805	(T,VMP)	mix	7.4	0.3	160	140	-3.5	7.0	2.2	-	4.7	-	6.7	2.7	0.007	B9A	72
30C18		osc			110	-	-	10.5	-	-	-	-	2.4	2.2	2.0		
PCF806	(TP)	mix	8.0	0.3	190	141	-	8.5	2.7	-	4.5	3.25	6.0	3.3	0.012	B9A	73
		osc			100	-	-3.0	14.0	-	-	-	-	2.2	1.2	2.0		

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*																	
Replacement Types (Continued)																	
PCF84	(TP)	mix	9.0	0.3	170	170	0	8.0	2.7	0.4	2.5	-	-	-	-	B9A	65
		osc			100	-	-2.0	14.0	-	0.004	-	-	-	-	-		
PCF800 30C15	(TP)	mix	9.0	0.3	164	138	-	7.6	2.3	0.6	3.3	3.7	6.8	4.9	0.017	B9A	42
		osc			120	-	-	6.0	-	-	-	-	3.0	2.9	1.7		
PCF82	(TP)	mix	9.5	0.3	170	170	0	5.2	2.0	-	1.65	4.2	5.0	2.6	0.01	B9A	25
		osc			150	-	-1.0	18.0	-	-	-	-	2.5	0.4	1.8		
HK90	(H)		12.6	0.15	Other data as Type EK90												
UCH42	(TH_x)	mix	14.0	0.1	200	85	-2.0	3.0	3.0	1.0	0.75	13.0	3.8	9.2	0.1	B8A	3
		osc			100	-	-	3.1	-	-	-	-	5.5	2.3	1.2		
UCH21	(TH)	mix	20.0	0.1	200	100	-2.0	3.5	6.5	1.0	0.75	13.0	6.8	9.5	0.002	B8B	42
		osc			120	-	-	4.1	-	-	-	-	4.5	3.5	1.1		
UCF80	(TP)	mix	27.0	0.1	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
Current Types																	
E80CF	(SQ TP)	mix	6.3	0.33	170	170	-3.5	8.0	2.5	0.5	2.4	3.5	5.6	3.4	0.025	B9A	25
		osc			100	-	-	14.0	-	0.0036	-	-	2.5	1.5	1.5		
ECH81	(TH)	mix	6.3	0.3	250	103	-2.0	3.25	6.7	1.0	0.775	13.0	4.8	6.0	0.006	B9A	24
		osc			100	-	0	13.5	-	-	-	-	2.6	2.1	1.0		
ECH83	(TH)	mix	6.3	0.3	12.6	12.6	0	0.1	0.35	3.8	0.16	2.5	4.8	7.9	0.01	B9A	24
		osc			12.6	-	0	0.75	0.042	-	-	-	2.6	2.1	1.0		
EK90	(H)		6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.475	10.0	7.2	8.6	0.3	B7G	29
PCF86	(TP)	mix	8.0	0.3	190	140	-	8.5	2.7	0.6	4.5	3.2	6.0	3.5	0.012	B9A	64
		osc			100	-	-3.0	14.0	-	0.003	-	-	2.4	1.1	2.0		
PCF801	(T,VMP)	mix	8.5	0.3	173	119	-1.4	10.0	3.0	>0.35	5.0	2.3	6.2	3.7	0.009	B9A	73
		osc			100	-	-3.0	15.0	-	-	-	-	3.3	1.7	1.8		
PCF80	(TP)	mix	9.0	0.3	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
PCF84	(TP)	mix	9.0	0.3	170	170	0	8.0	2.7	0.4	2.5	-	-	-	-	B9A	65
		osc			100	-	-2.0	14.0	-	0.004	-	-	-	-	-		
HK90	(H)		12.6	0.15	Other data as Type EK90												
UCH81	(TH)	mix	19.0	0.1	200	120	-2.6	3.7	8.1	1.0	0.78	-	4.8	7.9	0.006	B9A	24
		osc			100	-	0	13.5	-	-	-	-	2.6	2.1	1.0		
S.T.C.																	
Replacement Type																	
6H1	(H_x)		6.3	0.2	250	100	-2.2	2.3	2.7	1.0	0.56	12.0	4.3	9.25	0.06	B7G	76
TUNGSRAM																	
Obsolete Types																	
VO2 / VO2S	(O)	mix	2.0*	0.13	135	45	0	0.7	0.6	2.5	0.27	11.0	9.1	14.3	0.07	B7	1
		osc			135	-	-	1.3	-	-	-	-	6.6	8.7	-	Ct8	31
VX2 / VX2S	(H)	mix	2.0*	0.13	150	60	-1.0	1.0	1.1	2.0	0.47	14.0	7.8	15.0	0.0015	B7	28
																Ct8	31
2A7	(H)	mix	2.5	0.8	250	100	-3.0	3.5	2.2	0.36	-	-	-	-	-	UX7	1
		osc			135	-	-	2.3	-	-	-	-	5.0	6.0	0.8		
MH4105	(H)	mix	4.0	0.5	250	100	-3.0	3.5	2.2	0.36	0.52	35.0	8.5	9.0	0.3	B7	2
		osc			200	-	-	4.0	-	-	-	-	7.0	5.5	1.0		
TH4A	(TH_x)	mix	4.0	1.45	250	100	-2.0	3.5	7.5	1.5	0.75	12.0	8.0	12.8	-	B7	3
		osc			125	-	-	5.0	-	-	-	-	16.5	3.0	3.2		
TX4	(TH_x)	mix	4.0	1.0	300	80	-1.5	5.5	6.0	1.5	1.0	17.0	6.2	13.0	0.05	B7	3
		osc			150	-	-	4.0	-	-	-	-	-	3.7	1.8		
VO4	(O)	mix	4.0	0.65	250	70	-1.5	1.6	3.8	1.0	0.6	12.0	9.0	12.5	0.06	B7	2
		osc			90	-	-	-	-	-	-	-	9.4	6.1	-		
VX4 / VX4S	(H)	mix	4.0	0.65	250	80	-2.0	1.8	1.5	1.5	0.55	12.5	7.4	15.7	0.003	B7	35
																Ct8	11
6E8	(TH_x)	mix	6.3	0.3	250	-	-2.0	-	-	-	-	-	-	-	-	IO	1

(Continued)

Type			Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Osc. Volts (peak)	Capacitances (pF)			Base	
			Volts	Amps	Anode	Screen	Grid	Anode	Screen				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM *(Continued)*																	
Obsolete Types (Continued)																	
6TH8	(TH_x)	mix	6.3	0.6	300	80	-1.5	5.5	6.0	2.0	1.0	17.0	6.2	13.0	0.05	IO	3
		osc			150	-	-	4.0	-	-	-	-	9.0	3.7	1.8		
ECH2	(TH_x)	mix	6.3	0.95	250	100	-2.5	3.25	7.0	1.5	0.75	12.0	8.0	13.0	0.8	Ct8	1
		osc			100	-	-	5.0	-	-	-	-	16.5	3.1	3.25		
ECH3	(TH_x)	mix	6.3	0.2	250	100	-2.0	3.2	3.0	1.0	0.65	10.0	4.7	9.0	0.0015	Ct8	1
		osc			150	-	-	3.3	-	-	-	-	8.8	4.6	1.5		
Current Types																	
1AB6	(H)	mix	1.4*	0.025	85	68	0	0.6	0.14	0.8	0.3	6.0	7.6	8.4	0.36	B7G	54
		osc			-	-	-	-	-	-	-	-	-	-	-		
1AC6	(H)	mix	1.4*	0.05	85	60	0	0.7	0.15	0.65	0.325	6.0	7.5	8.5	0.4	B7G	54
		osc			-	-	-	-	-	-	-	-	-	-	-		
1R5	(H)	mix	1.4*	0.05	90	45	0	0.8	1.9	0.8	0.25	15.0	7.0	7.5	0.4	B7G	3
6A7 }	(H)	mix	6.3	0.3	250	100	-3.0	3.5	2.7	0.36	0.55	20.0	12.0	12.0	0.06	UX7	1
6A8 }		osc			100	-	-	4.0	-	-	-	-	6.5	5.0	0.8	IO	1
6AJ8	(TH)	mix	6.3	0.3	250	100	-2.0	6.5	3.8	0.7	0.775	13.0	4.8	7.9	0.006	B9A	24
		osc			100	-	0	13.5	-	-	-	-	2.6	2.1	1.0		
6BE6 / EK90	(H)	mix	6.3	0.3	250	100	-1.5	3.0	7.1	1.0	0.47	10.0	7.2	8.6	0.3	B7G	29
6CU7	(TH_x)	mix	6.3	0.23	250	85	-2.0	3.0	3.0	1.0	0.75	11.0	4.0	9.2	0.1	B8A	3
		osc			115	-	-	4.8	-	-	-	-	5.5	2.3	1.2		
6K8	(TH_x)	mix	6.3	0.3	250	100	-3.0	2.5	6.0	0.6	0.35	7.5	6.6	3.5	0.03	IO	4
		osc			100	-	-	3.8	-	-	-	-	6.0	3.2	1.1		
6SA7	(H)	mix	6.3	0.3	250	100	-2.0	3.5	8.5	1.0	0.45	-	9.5	12.0	0.13	IO	6
6U8	(TP)	mix	6.3	0.45	250	100	0	5.2	1.9	0.4	1.9	4.0	5.0	2.6	0.01	B9A	25
		osc			150	-	-	5.7	-	-	-	-	2.5	0.4	1.8		
ECF80	(TP)	mix	6.3	0.43	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.2	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
ECH35	(TH_x)	mix	6.3	0.3	250	100	-2.0	2.3	3.0	1.25	0.65	4.0	4.5	9.0	0.0015	IO	3
		osc			150	-	-	-	-	-	-	-	8.8	4.0	1.5		
ECH83	(TH)	mix	6.3	0.3	12.6	12.6	-	0.15	0.35	1.5	0.2	2.5	4.8	7.9	0.01	B9A	24
		osc			12.6	-	0	0.75	0.042	-	-	-	2.6	2.1	1.0		
EH90	(H)	mix	6.3	0.3	100	30	-1.0	0.75	1.1	0.9	1.1	-	5.5	7.5	<0.007	B7G	29
CCH35	(TH_x)		7.0	0.2	Other data as Type ECH35												
7HG8	(TP)	mix	8.0	0.3	170	150	-1.2	10.0	3.3	0.735	4.5	2.3	6.0	3.5	<2.5	B9A	64
		osc			100	-	-3.0	14.0	-	-	-	-	2.2	1.1	2.2		
PCF806	(TP)	mix	8.0	0.3	170	150	-1.2	10.0	3.3	>0.35	12.0	-	6.0	3.3	0.012	B9A	73
		osc			100	-	-3.0	14.0	-	-	5.5	-	2.2	1.2	2.0		
PCF801	(TP)	mix	8.5	0.3	170	120	-1.4	10.0	3.0	>0.35	11.0	-	6.2	3.7	0.009	B9A	73
		osc			100	-	-3.0	15.0	-	-	9.0	-	3.3	1.7	1.8		
9A8	(TP)	mix	9.0	0.3	170	170	-5.5	5.2	1.5	0.87	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		
PCF84	(TP)	mix	9.0	0.3	170	170	0	8.0	2.7	0.4	2.5	-	-	-	-	B9A	65
		osc			100	-	-2.0	14.0	-	0.004	-		-	-	-		
9U8	(TP)	mix	9.5	0.3	170	100	0	5.2	1.9	0.4	1.9	4.0	.0	2.6	0.01	B9A	25
		osc			150	-	-	5.7	-	-	-	-	2.5	0.4	1.8		
12A8			12.6	0.15	Other data as Type 6A7											IO	1
12BE6			12.6	0.15	Other data as Type 6BE6											B7G	29
12K8			12.6	0.15	Other data as Type 6K8											IO	4
12SA7			12.6	0.15	Other data as Type 6SA7											IO	6
14K7	(TH_x)	mix	14.0	0.1	200	85	-2.0	3.0	3.0	1.0	0.75	13.0	3.8	9.2	0.1	B8A	3
		osc			100	-	-	3.1	-	-	-	-	5.5	2.3	1.2	IO	
UCH81	(TH_x)	mix	19.0	0.1	200	120	-2.6	3.7	8.1	1.0	0.78	-	4.8	7.9	0.006	B9A	24
		osc			100	-	0	13.5	-	-	-	-	2.6	2.1	1.0		
UCF80	(TP)	mix	27.0	0.1	170	170	-5.5	5.2	1.5	0.07	2.1	5.0	5.5	3.8	0.025	B9A	25
		osc			100	-	-2.0	14.0	-	-	-	-	2.3	0.3	1.5		

SCREENED TETRODES AND PENTODES

Type	Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR														
Obsolete Types														
1L4	1.4*	0.05	90	90	0	4.5	2.0	0.35	1.03	3.6	7.5	0.008	B7G	2
1LD5 (SD)	1.4*	0.05	90	45	0	0.6	0.1	0.75	0.58	3.2	6.0	0.18	B8B	31
1LN5	1.4*	0.05	90	90	0	1.6	0.35	1.1	0.8	3.4	0.8	0.007	B8B	28
32E	2.0*	0.06	135	67.5	-3.0	1.7	0.4	1.0	0.6	-	-	-	UX4	2
34E	2.0*	0.06	135	67.5	-3.0	2.8	1.0	0.6	0.6	-	-	-	UX4	2
24A/ 24E (TT)	2.5	1.75	250	90	-3.0	4.0	1.7	0.6	1.0	-	-	-	UX5	2
8A1	4.0	1.0	200	80	-1.5	3.5	0.7	0.6	4.0	10.7	8.0	0.007	B5 B7	2 5
9A1 (VM)	4.0	1.0	200	80	-1.5	5.0	1.0	0.6	4.25	11.0	8.0	0.007	B5 B7	2 5
6U7 (VM)	6.3	0.3	250	100	-3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	IO	8
7R7 (DD)	6.3	0.3	250	100	-1.0	6.2	1.6	1.0	3.2	5.6	5.3	0.004	B8B	13
36 (TT)	6.3	0.3	250	90	-3.0	3.2	1.7	0.55	1.1	-	-	-	UX5	2
39/ 44	6.3	0.3	250	90	-3.0	5.8	1.4	1.0	1.1	-	-	-	UX5	2
77	6.3	0.3	250	100	-3.0	2.3	0.5	1.0	1.25	4.7	11.0	0.007	UX6	2
78 (VM)	6.3	0.3	250	100	-3.0	7.0	1.7	0.8	1.45	4.5	11.0	0.007	UX6	2
12C8 (DD)	12.6	0.15	Other data as Type 6B8											
12J7	12.6	0.15	Other data as Type 6J7											
12K7 (VM)	12.6	0.15	Other data as Type 6K7											
14H7 (VM)	12.6	0.15	Other data as Type 7H7											
14R7 (DD)	12.6	0.15	Other data as Type 7R7											
8D2	13.0	0.2	250	100	-3.0	2.0	0.5	1.5	1.25	4.0	10.0	0.01	B7	6
9D2 (VM)	13.0	0.2	250	125	-3.0	10.5	2.6	0.6	1.65	4.0	10.0	0.005	B7	6
Replacement Types														
1U5 (SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.625	-	-	0.1	B7G	11
DAF91/ 1S5 (SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.625	2.2	2.4	0.2	B7G	5
DAF96/ 1AH5 (SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.055	-	0.17	1.8	2.7	0.3	B7G	65
DF91/ 1T4 (VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	3.6	7.5	0.01	B7G	2
DF96/ 1AJ4 (VM)	1.4*	0.025	85.0	64.0	0	1.65	0.55	1.0	0.85	3.3	7.8	0.01	B7G	64
6B8 (DD)	6.3	0.3	250	125	-3.0	9.0	2.3	0.6	1.12	4.5	10.0	0.005	IO	15
6C6	6.3	0.3	250	100	-3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX6	2
6D6 (VM)	6.3	0.3	250	100	-3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	UX6	2
6J7	6.3	0.3	250	100	-3.0	2.0	0.5	1.5	1.25	4.6	12.0	0.007	IO	8
6K7 (VM)	6.3	0.3	250	125	-3.0	10.5	2.6	0.6	1.65	5.0	12.0	0.007	IO	8
7B7 (VM)	6.3	0.15	250	100	-3.0	8.5	1.7	0.75	1.75	5.0	6.0	0.007	B8B	3
7H7 (VM)	6.3	0.3	250	150	-2.5	9.5	3.5	0.8	4.2	8.0	7.0	0.007	B8B	3
9D6/ 6065(SQ) (VM)	6.3	0.2	250	200	-2.5	8.0	2.1	1.0	2.5	4.5	7.0	0.004	B7G	21
9D7 (VM)	6.3	0.3	250	100	-1.3	10.0	3.3	0.75	8.4	9.0	3.0	0.01	B9A	10
7032(SQ). Gating Heptode	6.3	0.3	250	100	(g_1)-2.0 (g_3) 0	4.5	7.2	-	(g_1-a) 1.8 (g_3-a) 0.5	-	-	-	B7G	29
EBF80/ 6N8 (VM,DD)	6.3	0.3	250	85	-2.0	5.0	1.75	1.5	2.2	4.2	4.9	0.0025	B9A	12
ECF804 (TP)	6.3	0.45	150	150	-2.0	7.0	2.2	0.35	11.0	7.0	3.1	0.02	B9A	25
ECF80 (TP)	6.3	0.43	250	200	-3.2	7.0	1.8	0.9	5.5	5.5	3.8	0.025	B9A	25
EF41 (VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	18
EF92 (VM)	6.3	0.2	250	200	-2.5	8.0	2.1	1.0	2.5	4.5	7.0	0.004	B7G	21
12AC6 (VM)	12.6	0.15	12.6	12.6	0	0.55	0.2	0.5	0.73	4.3	5.0	0.005	B7G	16
12BL6 (VM)	12.6	0.15	12.6	12.6	0*	1.4	0.55	0.5	1.35	5.2	5.4	0.005	B7G	16
UF41 (VM)	12.6	0.1	200	115	-3.0	7.2	2.1	1.0	2.3	5.0	7.0	0.002	B8A	7
UF89 (VM)	12.6	0.1	170	110	-2.0	12.0	3.9	0.5	3.8	5.5	5.1	0.002	B9A	36
UBF89 (VM,DD)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.5	5.2	0.0025	B9A	12
Current Types														
6AK5 5654(SQ)	6.3	0.175	180	120	-1.8	7.7	2.4	0.5	5.1	4.0	2.1	0.03	B7G	14
6AM6/ 8D3 6064 (SQ)	6.3	0.3	250	250	-2.0	10.0	2.6	1.0	7.5	7.5	3.2	0.01	B7G	21
6AU6	6.3	0.3	250	150	-1.0	10.8	4.3	1.0	5.2	5.5	5.0	0.0035	B7G	16

(Continued)

Type	Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR *(Continued)*														
Current Types (Continued)														
6BA6 / 5749 (SQ) (VM)	6.3	0.3	250	100	-1.0	11.0	4.2	1.5	4.4	5.5	5.0	0.0035	B7G	16
6BH6	6.3	0.15	250	150	-1.0	7.4	2.9	1.4	4.6	5.4	4.4	0.0035	B7G	32
6BJ6 (VM)	6.3	0.15	250	100	-1.0	9.2	3.3	1.3	3.8	4.5	5.5	0.0035	B7G	32
6BR7/ 8D5 / 6059 (SQ)	6.3	0.15	250	100	-3.0	2.1	0.6	2.3	1.25	4.0	4.0	0.01	B9A	35
6BR8 (TP)	6.3	0.45	170	110	-0.9	9.5	3.3	0.5	5.25	5.0	2.6	0.01	B9A	67
6BS7	6.3	0.15	250	100	-3.0	2.1	0.6	2.3	1.25	4.0	4.0	0.01	B9A	20
6BW7	6.3	0.3	180	180	-1.5	9.5	3.5	0.6	9.3	9.5	3.5	0.01	B9A	10
8D8	6.3	0.15	250	140	-2.0	3.0	0.6	2.5	1.9	4.0	3.9	1.3	B9A	23
6688(SQ)	6.3	0.3	180	150	-1.3	13.0	3.3	0.09	16.5	7.5	3.0	0.018	B9A	45
6870(SQ)	6.3	0.6†	250	250	-3.4	25.0	3.5	0.23	8.5	8.5	7.0	0.025	B9A	44
EBF89 (VM,DD)	6.3	0.3	250	100	-2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.0025	B9A	12
ECH84 (TH)	6.3	0.3	135	14	0	1.7	0.9	-	2.2	-	-	0.009	B9A	77
EF80/ 6BX6	6.3	0.3	170	170	-2.0	10.0	2.5	0.5	7.4	7.5	3.3	0.007	B9A	10
EF85 (VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86	6.3	0.2	250	140	-2.0	3.0	0.6	2.5	2.0	3.8	5.4	0.025	B9A	23
EF89/ 6DA6 (VM)	6.3	0.2	250	100	-1.95	9.0	3.0	1.0	3.5	5.5	5.1	0.002	B9A	36
EF91	6.3	0.3	250	250	-2.0	10.0	2.5	1.0	7.5	7.5	3.2	0.01	B7G	21
EF93 (VM)	6.3	0.3	250	100	-1.0	11.0	4.2	1.5	4.4	5.5	5.0	0.0035	B7G	16
EF95	6.3	0.175	180	120	-1.8	7.7	2.4	0.5	5.1	4.0	2.1	0.03	B7G	14
EF183 (VM)	6.3	0.3	190	90	-2.0	12.0	4.5	0.5	13.0	9.0	3.0	0.005	B9A	10
EF184	6.3	0.3	200	200	-2.5	10.0	3.8	0.35	15.0	10.0	3.0	0.005	B9A	10
PCF808 (TP)	7.4	0.3	160	160	-1.7	12.0	4.0	0.25	14.5	6.4	2.7	0.008	B9A	78
PCF80 (TP)	9.0	0.3	170	170	-2.0	10.0	2.8	0.4	6.2	5.5	3.8	0.025	B9A	25
PCF802 (TP)	9.0	0.3	100	100	-1.0	6.0	1.7	0.4	5.5	5.4	-	0.06	B9A	25
PCE82 (T,BT)	10.0	0.3	180	180	-2.9	10.0	2.5	0.31	12.5	8.1	2.6	0.03	B9A	79
12AU6	12.6	0.15	Other data as Type 6AU6											
12BA6 (VM)	12.6	0.15	Other data as Type 6BA6											
PCL84 (TP)	15.0	0.3	220	220	-3.4	18.0	3.0	0.15	10.0	8.7	4.2	0.1	B9A	53
PFL200 (DP)	16.5	0.3	150	150	-2.3	10.0	3.0	0.16	8.5	10.0	11.0	0.14	B10B	1
			170	170	-2.6	30.0	6.5	0.04	21.0	12.0	7.0	0.095		

* Grid current biasing Rg_1 = 2.2 MΩ

COSSOR

Obsolete Types

1N5	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.0	10.0	0.007	IO	77
210SPT	2.0*	0.1	150	60	0	2.95	0.75	0.6	1.3	8.0	7.0	0.008	B7	4
210VPT (VM)	2.0*	0.1	150	60	0	2.9	0.75	0.6	1.1	8.0	7.0	0.008	B7	4
4TSA	4.0	1.0	250	100	0	5.0	-	-	1.6	-	-	-	B7	38
41MPT	4.0	1.0	250	100	-1.5	12.0	2.0	0.2	4.8	-	-	-	B7	5
42MPT	4.0	2.0	200	200	-3.0	34.0	-	-	8.5	-	-	-	B7	5
42SPT	4.0	2.0	250	250	-10.5	64.0	15.0	-	11.0	18.0	7.5	0.08	B7	5
MS/ Pen / MS/ PenB	4.0	1.0	200	100	-1.5	4.8	1.3	0.8	2.8	9.5	8.5	0.003	B7	5
													B7	6
MVS Pen (VM)	4.0	1.0	200	100	-1.5	4.3	1.3	0.6	2.2	9.5	8.5	0.003	B7	6
6J7	6.3	0.3	250	100	-3.0	2.0	0.5	1.5	1.25	5.0	12.0	0.007	IO	8
6K7 (VM)	6.3	0.3	250	125	-3.0	10.5	2.6	0.6	1.65	5.0	12.0	0.007	IO	8
202VP / 202VPB (VM)	20.0	0.2	250	100	-1.5	4.3	1.3	0.6	2.2	9.5	8.5	0.003	B7	5
													B7	6

Replacement Types

DAF91 (SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	2.4	0.2	B7G	5
DAF96 (SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.055	-	0.17	1.8	2.7	0.3	B7G	5
DF91 (VM)	1.4*	0.05	90	67.5	0	3.5	1.5	0.5	0.9	3.6	7.5	0.01	B7G	2
DF96	1.4*	0.025	85	64.0	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
6AS6	6.3	0.175	120	120	-2.0	5.2	3.5	0.11	3.2	4.0	3.0	0.02	B7G	32
6CB6	6.3	0.3	200	150	-	9.5	2.8	0.6	6.2	6.3	1.9	0.02	B7G	32
6CH6	6.3	0.75	250	250	-4.5	40.0	6.0	0.05	11.0 (Video output valve Pa=12W)				B9A	19
6F33	6.3	0.35	200	100	-1.5	5.0	2.0	-	4.35	7.3	4.5	0.01	B7G	21

(Continued)

Type	Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
COSSOR *(Continued)*														
Replacement Types (Continued)														
7B7 (VM)	6.3	0.15	250	100	-3.0	8.5	2.0	0.7	1.7	5.0	7.0	0.005	B8B	3
E180F	6.3	0.3	190	160	-1.0	13.0	3.0	0.035	16.5	7.9	2.9	0.02	B9A	45
EBF 80 (VM,DD)	6.3	0.3	250	85	-2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
EBF 89 (VM,DD)	6.3	0.3	250	100	-2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.002	B9A	12
EF41 62VP	6.3	0.2	250	100	-2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
EF50 63SPT	6.3	0.3	250	250	-2.0	10.0	3.0	1.0	6.5	8.3	5.2	0.007	B9G	1
EF80	6.3	0.3	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF85 (VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86	6.3	0.2	250	140	-2.0	3.0	0.6	2.5	1.8	4.0	5.5	0.025	B9A	23
EF89 (VM)	6.3	0.2	250	100	-2.0	9.0	3.0	1.0	3.5	5.5	5.1	0.002	B9A	36
EF91	6.3	0.3	250	250	-2.0	10.0	2.5	1.0	7.5	7.5	3.2	0.007	B7G	21
EF95	6.3	0.175	180	120	-2.0	7.7	2.4	0.69	5.1	4.0	2.8	0.02	B7G	14
EF183 (VM)	6.3	0.3	200	90	-2.0	12.0	4.5	0.5	12.5	9.0	3.0	<0.0055	B9A	10
EF184	6.3	0.3	170	170	-2.0	10.0	4.1	0.33	15.6	10.0	3.0	<0.005	B9A	10
EL91 6AM5	6.3	0.2	250	250	-	16.0	2.5	-	2.6	-	-	-	B7G	25
OM5B	6.3	0.2	250	100	-2.0	3.0	0.8	2.5	1.8	-	-	-	IO	8
OM5C	Characteristics as OM5B but suitable for use in d.c. amplifiers													
OM6 (VM)	6.3	0.2	250	100	-2.5	6.0	1.8	1.0	2.0	6.3	7.8	0.003	IO	8
UF41 (VM)	12.6	0.1	170	100	-2.5	6.0	1.75	1.0	2.2	5.0	7.0	0.002	B8A	7
UF89 (VM)	12.6	0.1	170	110	-2.0	12.0	3.9	0.525	3.8	5.5	5.1	0.002	B9A	36
UBF80/ 171DDP (VM,DD)	17.0	0.1	170	85	-2.0	5.0	1.75	0.9	2.2	4.0	4.6	0.0025	B9A	12
UBF89 (VM,DD)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.0	5.2	0.002	B9A	12
EMITRON														
Current Types														
1S5 (SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.625	2.2	2.4	0.2	B7G	5
1T4 (VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	3.6	7.5	0.01	B7G	2
6AM6	6.3	0.3	250	250	-2.0	10.0	2.5	1.0	7.5	7.5	3.2	0.007	B7G	21
6BA6	6.3	0.3	250	100	-1.0	11.0	4.2	1.0	4.4	5.5	5.0	0.0035	B7G	16
7B7 (VM)	6.3	0.15	250	100	-3.0	8.5	1.7	0.75	1.75	5.0	7.0	0.005	B8B	3
7H7 (VM)	6.3	0.3	250	150	-2.4	10.0	3.2	0.8	4.2	8.0	6.5	0.007	B8B	3
FERRANTI														
Obsolete Types														
1L4	1.4*	0.05	90	90	0	4.5	2.0	0.35	1.03	3.6	7.5	0.008	B7G	2
1LD5 (SD)	1.4*	0.05	90	45	0	0.6	0.1	0.75	0.58	3.2	6.0	0.18	B8B	31
S2	2.0*	0.15	120	60	-1.0	2.25	0.3	0.3	1.1	-	-	0.005	B4	2
SPT2	2.0*	0.1	120	120	0	2.8	0.9	2.0	1.5	10.0	10.5	0.008	B7	4
VPT2 (VM)	2.0*	0.1	120	60	-1.5	1.5	0.7	0.6	1.1	8.8	11.0	0.006	B4 / B7	2 / 4
VS2 (VM)	2.0*	1.15	120	60	-2.5	2.0	0.4	0.4	1.4	-	-	0.005	B4	2
SPT4A	4.0	1.0	250	100	-1.5	2.0	1.0	1.5	2.3	10.6	8.0	0.003	B7	5
VPT4 (VM)	4.0	1.0	250	100	-3.0	5.5	3.0	1.0	2.0	8.8	8.5	0.002	B5	2
VPT4B (VM)	4.0	1.0	250	100	-3.0	6.0	3.0	1.8	3.2	10.6	8.2	0.004	B7	5
6B8 (DD)	6.3	0.3	250	125	-3.0	10.0	2.3	0.6	1.33	3.5	9.5	0.007	IO	15
6C6	6.3	0.3	250	100	-3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX6	2
6D6 (VM)	6.3	0.3	250	100	-3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	UX6	2
6U7 (VM)	6.3	0.3	250	100	-3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	IO	8
7R7 (DD)	6.3	0.3	250	100	-1.0	5.7	1.7	1.0	3.2	5.6	5.3	0.004	B8B	13
77	6.3	0.3	250	100	-3.0	2.3	0.5	1.0	1.25	4.7	11.0	0.007	UX6	2
12C8 (DD)	12.6	0.15	250	125	-3.0	10.0	2.3	0.6	1.33	3.5	9.5	0.007	IO	15
SPTA	13.0	0.2	250	100	-2.5	2.2	0.5	1.5	1.4	8.9	8.5	0.003	B7	6
VPTA	13.0	0.2	250	100	-2.0	4.2	2.0	1.0	2.9	9.0	9.0	0.002	B7	5
VPTS	13.0	0.3	200	100	-3.0	5.5	2.0	1.0	2.6	8.8	8.4	0.002	B7	5

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_c (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
FERRANTI *(Continued)*															
Replacement Types															
1N5		1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.0	10.0	0.007	IO	77
1S5/ DAF91	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	2.4	0.2	B7G	5
1T4/ DF91	(VM)	1.4*	0.05	90	67.5	0	3.5	1.5	0.5	0.9	3.6	7.5	0.01	B7G	2
6AB7	(VM)	6.3	0.45	300	200	-3.0	12.5	3.2	0.7	5.0	8.0	5.0	0.015	IO	10
6AC7		6.3	0.45	300	150	-2.0	10.0	2.5	1.0	9.0	11.0	5.0	0.015	IO	10
6AG5		6.3	0.3	250	150	-1.8	7.0	2.0	0.8	5.0	6.5	1.8	0.025	B7G	14
6AM6 /EF91		6.3	0.3	250	250	-2.0	10.0	2.6	1.0	7.5	7.5	3.2	0.01	B7G	21
6J7		6.3	0.3	250	100	-3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	IO	8
6K7	(VM)	6.3	0.3	250	125	-3.0	10.5	2.6	0.6	1.65	5.0	12.0	0.007	IO	8
6SG7	(VM)	6.3	0.3	250	150	-2.5	9.2	3.4	1.0	4.0	8.5	7.0	0.003	IO	14
6SH7		6.3	0.3	250	150	-1.5	10.8	4.1	0.9	4.9	8.5	7.0	0.003	IO	14
6SJ7		6.3	0.3	250	100	-3.0	3.0	0.8	1.0	1.65	6.0	7.0	0.005	IO	10
6SK7	(VM)	6.3	0.3	250	100	-3.0	9.2	2.6	0.8	2.0	6.5	7.5	0.005	IO	10
6SS7	(VM)	6.3	0.15	250	100	-3.0	9.0	2.0	1.0	1.85	5.5	7.0	0.004	IO	10
7H7	(VM)	6.3	0.3	250	150	-2.5	9.5	3.5	0.8	3.8	8.0	7.0	0.007	B8B	3
EAF42/ 6CT7	(VM,SD)	6.3	0.2	250	85	-2.0	5.0	1.5	1.4	2.0	4.5	5.1	0.002	B8A	12
EF41/ 6CJ5	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
EF42		6.3	0.33	250	250	-2.0	10.0	2.3	0.44	9.5	9.5	4.5	0.005	B8A	8
12J7		12.6	0.15			Other data as Type 6J7									
12K7	(VM)	12.6	0.15			Other data as Type 6K7									
12SJ7		12.6	0.15			Other data as Type 6SJ7									
12SK7	(VM)	12.6	0.15			Other data as Type 6SK7									
UAF42	(VM,SD)	12.6	0.1	200	85	-2.0	5.0	1.5	1.0	2.0	4.5	5.1	0.002	B8A	12
UF41	(VM)	12.6	0.1	170	100	-2.5	6.0	1.75	1.0	2.2	5.0	7.0	0.002	B8A	7
Current Types															
DAF96 /1AH5	(SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.055	-	0.17	1.8	2.7	0.3	B7G	5
DF92		1.4*	0.05	90	67.5	0	3.7	1.4	0.5	1.0	3.6	7.5	0.01	B7G	2
DF96/ 1AJ4		1.4*	0.025	85	64.0	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
DF97		1.4*	0.025	85	60.0	0	1.7	0.7	0.4	0.9	3.7	7.5	0.01	B7G	59
6AK5/ EF95		6.3	0.175	180	120	-2.0	7.7	2.4	0.7	5.1	3.9	2.9	0.02	B7G	14
DP61		6.3	0.175	180	120	-2.0	7.7	2.4	0.7	5.1	4.0	2.8	0.02	B7G	14
EBF80/6N8	(VM,DD)	6.3	0.3	250	85	-2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
EBF89	(VM,DD)	6.3	0.3	250	100	-2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.002	B9A	12
EF80/ 6BX6		6.3	0.3	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF85 6BY7	(VM)	6.3	0.3	250	100	-2.0	10.0	2.4	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86		6.3	0.2	250	140	-2.0	3.0	0.6	2.5	1.8	3.8	5.3	0.025	B9A	23
EF89/ 6DA6	(VM)	6.3	0.3	250	100	-2.0	9.0	3.0	1.0	3.6	5.5	5.1	0.002	B9A	36
UF89	(VM)	12.6	0.1	170	100	-1.0	12.0	4.4	0.3	4.4	5.5	5.1	0.002	B9A	36
UBF80	(VM,DD)	17.0	0.1	170	85	-2.0	5.0	1.75	0.9	2.2	4.2	4.9	0.0025	B9A	12
UBF89	(VM,DD)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.0	5.2	0.0025	B9A	12
UF80		19.0	0.1	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	<0.01	<0.0007	B9A	10
UF85	(VM)	19.0	0.1	170	100	-2.0	9.7	2.6	0.3	5.9	6.9	3.2	0.006	B9A	10
HIVAC															
Obsolete Types															
XFW20		0.625*	0.0125	22.5	22.5	0	-	-	1.2	-	-	-	-	B5A	1
XFW30		0.625*	0.0125	22.5	22.5	0	-	-	-	-	-	-	-	B5A	1
XFW40		0.625*	0.01	22.5	22.5	0	-	-	-	-	-	-	-	B5A	1
XFW10		0.675*	0.025	22.5	22.5	0	-	-	1.2	-	-	-	-	B5A	1
Replacement Types															
XFW50		0.625*	0.0075	22.5	22.5	0	-	-	-	-	-	-	-	B5A	1
XFR5		1.25*	0.02	67.5	67.5	0	1.8	0.5	-	1.1	3.7	4.6	0.01	B5A	2
XR6		6.3	0.15	100	100	-1.4	7.0	2.2	0.3	5.0	-	-	-	B8D	4
Current Types															
XFR1		1.25*	0.1	45	45	0	3.0	0.9	-	2.0	4.0	4.0	0.01	B5A	2
XFR2		1.25*	0.05	67.5	67.5	0	1.8	0.5	-	1.1	3.7	4.6	0.01	B5A	2

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI															
Obsolete Types															
Z14		1.4*	0.05	90	90	0	1.2	0.24	1.5	0.75	2.8	10.8	0.007	IO	77
S12		2.0*	0.06	100	30	0	2.5	0.4	0.2	0.7	5.6	3.4	0.3	Sm4	2
S23		2.0*	0.1	150	70	0	2.8	0.7	0.3	1.1	8.3	9.0	0.003	B4	2
S24		2.0*	0.15	150	70	0	3.2	1.0	0.3	1.4	9.3	8.9	0.004	B4	2
VS24	(VM)	2.0*	0.15	150	75	0	4.4	0.2	0.25	1.5	9.2	8.7	0.003	B4	2
VP21	(VM)	2.0*	0.1	150	60	0	2.8	0.7	-	1.1	11.5	9.0	0.03	B7	4
MS4		4.0	1.0	200	70	-1.5	2.4	0.3	-	1.1	9.9	4.8	0.002	B5	2
VMP4G	(VM)	4.0	1.0	250	100	-2.0	8.0	5.0	-	2.7	14.0	8.7	0.0025	B7	5
VMS4	(VM)	4.0	1.0	200	80	0	14.0	3.0	-	2.4	11.3	7.7	0.002	B5	2
VMS4B	(VM)	4.0	1.0	200	80	0	8.0	1.5	-	2.9	12.0	8.1	0.0024	B5	2
KTW61	(VM)	6.3	0.3	250	100	-3.0	8.0	2.7	0.46	2.9	7.8	10.0	0.0025	IO	8
W81	(VM)	6.3	0.3	250	100	-3.6	9.6	3.6	-	2.8	7.25	6.0	0.006	B8B	3
Z62		6.3	0.45	300	150	-2.0	10.0	2.7	0.75	7.5	10.9	8.0	0.02	IO	8
W30	(VM)	13.0	0.3	250	250	-1.0	12.0	6.0	1.0	4.0	5.7	10.0	0.002	B7	5
W31	(VM)	13.0	0.3	200	100	-2.0	8.0	5.0	-	2.7	14.0	8.7	0.0026	B7	5
W101	(VM)	19.0	0.1	Other data as Type W81											
W21Met	(VM)	2.0*	0.1	150	120	0	3.6	1.2	-	1.4	8.8	6.0	0.0045	B4	2
Z21Met		2.0*	0.1	150	120	0	2.5	0.8	-	1.7	9.7	6.1	0.005	B4	2
Z22Met		2.0*	0.1	150	120	0	2.5	0.8	-	1.7	9.7	11.0	0.0075	B7	4
KTZ41		4.0	1.5	250	250	-1.5	18.0	5.25	-	12.0	14.0	14.5	0.008	B7	30
MS4B		4.0	1.0	250	80	0	3.4	1.2	0.35	3.2	12.7	5.6	0.002	B5	2
MSP4		4.0	1.0	250	100	-1.75	3.4	1.0	-	2.4	17.2	10.0	0.01	B5 B7	2 5
MSP41		4.0	1.0	250	240	-4.0	9.0	3.2	-	3.2	17.2	10.0	0.01	B5 B7	2 5
W42Met	(VM)	4.0	0.6	250	100	-3.0	2.0	2.0	-	1.5	5.1	10.4	0.005	B7	6
KTZ63		6.3	0.3	260	100	-3.0	1.0	0.25	1.5	1.23	4.7	7.5	0.0038	IO	8
KTW63	(VM)	6.3	0.3	250	100	-3.0	7.6	1.5	-	1.5	4.5	7.5	0.005	IO	9
Z359		12.6	0.3	250	250	-2.0	20.0	5.25	0.05	15.0	13.0	2.5	0.007	B9A	47
Z66		6.3	0.63	250	200	-1.85	8.0	2.0	1.5	7.5	11.0	5.5	0.006	IO	8
Replacement Types															
W61M	(VM)	6.3	0.3	250	80	-3.0	8.0	2.3	1.7	2.9	7.8	10.0	0.002	IO	8
Z63		6.3	0.3	250	100	-3.0	2.0	0.5	1.5	1.25	4.7	7.5	0.0038	IO	8
W76	(VM)	13.0	0.16	175	100	-3.0	8.5	1.7	0.5	1.5	4.2	12.8	0.007	IO	8
Current Types															
DAF91/ ZD17	(SD)	1.4*	0.05	90	90	0	2.7	0.63	0.5	0.72	2.2	2.4	0.2	B7G	5
DAF96	(SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.06	-	0.17	1.8	2.7	0.3	B7G	5
DF91/ W17	(VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	4.5	7.5	0.006	B7G	2
DF96		1.4*	0.025	85	64.0	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
6BJ6	(VM)	6.3	0.15	250	100	-1.0	9.2	3.3	1.3	3.8	4.5	5.5	0.0035	B7G	32
EBF80/ WD709	(VM,DD)	6.3	0.3	250	85	-2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
EBF89	(VM,DD)	6.3	0.3	250	100	-2.0	9.0	3.0	1.0	3.8	5.0	5.0	0.002	B9A	12
EF22/ W143	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.2	2.2	5.5	6.4	0.002	B8B	61
EF39/ W147	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.25	2.2	5.5	7.2	0.003	IO	8
EF41/ W150	(VM)	6.3	0.2	250	97	-2.5	6.0	1.7	1.0	2.2	5.0	8.0	0.002	B8A	18
EF42/ Z150		6.3	0.33	250	250	-2.0	10.0	2.3	0.44	9.5	9.5	4.5	0.005	B8A	8
EF80/ Z152		6.3	0.3	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF80/ Z719		6.3	0.3	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF85/ W719	(VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86/ Z729		6.3	0.2	250	140	-2.0	3.0	0.6	2.5	2.0	4.0	5.5	0.025	B9A	23
EF89	(VM)	6.3	0.2	250	100	-2.0	9.0	3.0	1.0	3.6	5.5	5.1	0.002	B9A	36
EF91/ Z77		6.3	0.3	250	250	-2.0	10.0	2.5	1.0	7.6	7.4	3.0	0.009	B7G	21
EF95		6.3	0.175	180	120	-2.0	7.7	2.4	0.69	5.1	4.0	2.8	0.02	B7G	14
EF183	(VM)	6.3	0.3	200	90	-2.0	12.0	4.5	500 kΩ	12.5	9.5	3.0	<0.0055	B9A	10
EF184		6.3	0.3	200	200	-2.5	10.0	4.1	380 kΩ	15.0	10	3.0	<0.005	B9A	10
EH90		6.3	0.3	100	30	-1.0	0.75	1.1	0.9	1.2	5.5	7.5	<0.07	B7G	85
W77 / 9D6	(VM)	6.3	0.2	250	200	-2.5	8.0	2.1	0.5	2.5	4.6	6.5	0.009	B7G	21
W148/ 7H7	(VM)	6.3	0.3	250	150	-2.4	10.0	3.2	0.8	4.2	8.0	7.0	0.007	B8B	3

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI *(Continued)*															
Current Types (Continued)															
W149/ 7B7	(VM)	6.3	0.15	250	100	-3.0	8.5	1.75	0.75	1.7	5.0	6.0	0.007	B8B	3
W727 /6BA6	(VM)	6.3	0.3	250	100	-1.0	11.0	4.2	1.5	4.4	5.5	5.0	0.0035	B7G	16
W729	(VM)	6.3	0.3	170	170	0	11.5	3.8	1.0	3.5	7.5	3.3	0.007	B9A	10
W739	(VM)	6.3	0.2	175	100	-1.3	12.0	3.5	-	4.4	5.0	4.3	0.0017	B9A	10
Z319/ 6351	(SE)	6.3	0.3	350	250*	-	15.5	1.2	0.5	19.0	8.0	3.0	0.003	B9A	46
Z749		6.3	0.3	170	170	-1.9	10.0	2.6	-	9.2	8.3	3.3	0.0065	B9A	10
Z329		7.3	0.3	170	170	-1.9	10.0	2.6	-	8.8	9.0	4.4	0.0073	B9A	10
W107	(VM)	12.6	0.1	200	200	-2.5	8.0	2.0	0.5	2.5	4.2	7.0	0.006	B7G	22
UAF42/ WD142	(VM,SD)	12.6	0.1	200	85	-2.0	5.0	1.5	1.0	2.0	4.5	5.1	0.002	B8A	12
UF41/ W142	(VM)	12.6	0.1	200	116	-3.0	7.2	2.8	1.0	2.3	5.0	7.0	0.002	B8A	24
UF89	(VM)	12.6	0.1	170	110	-2.0	12.0	3.9	0.53	3.8	5.5	5.1	0.002	B9A	36
W118	(VM)	13.0	0.1	175	100	-2.5	7.0	2.0	1.0	2.3	5.1	6.8	0.0035	B8A	8
W119	(VM)	13.0	0.1	175	100	-1.3	12.0	3.5	-	4.4	5.0	4.3	0.0017	B9A	10
W145	(VM)	13.0	0.1	175	100	-2.5	7.0	2.0	-	2.3	5.1	6.8	0.0035	B8A	8
PCL84	(TP)	15.0	0.3	220	220	-3.3	18.0	3.2	0.15	9.5	9.0	4.5	0.1	B9A	53
UBF80	(VM,DDP)	17.0	0.1	170	85	-2.0	5.0	1.75	0.9	2.2	4.2	4.9	0.0025	B9A	12
UBF89	(VM,DDP)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.0	5.2	<0.0025	B9A	12
UF80		19.0	0.1	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	≤0.01	<0.0007	B9A	10
UF42/ Z142		21.0	0.1	170	170	-2.0	10.6	2.8	0.2	8.5	9.5	4.5	0.005	B8A	8
Z145		22.0	0.1	200	200	-1.8	10.0	2.6	-	9.0	9.0	4.6	0.0065	B8A	17

* Screen and secondary-cathode voltage

MAZDA (EXPORT EDISWAN)

Obsolete Types

1F2 } 1L4 }		1.4*	0.05	90	67.5	0	2.9	1.2	0.6	0.92	3.6	7.5	0.008	B7G	2
SP141		1.4*	0.05	83	83	0	1.3	0.5	0.6	0.75	7.5	10.0	0.006	MO	4
S215A		2.0*	0.15	150	60	0	2.0	0.3	1.3	1.1	8.5	12.5	0.002	B4	2
S215B		2.0*	0.15	150	60	-1.0	1.5	0.3	0.9	1.2	10.5	10.5	0.002	B4	2
S215VM	(VM)	2.0*	0.15	150	60	-1.4	1.0	0.15	1.4	0.8	10.0	8.5	0.002	B4	2
SG215		2.0*	0.15	150	60	-1.5	1.5	0.25	1.5	0.85	8.5	11.0	0.003	B4	2
SP210		2.0*	0.1	120	120	-1.0	1.1	0.33	2.0	1.2	10.0	11.0	0.005	B7	4
SP215		2.0*	0.15	150	80	-1.5	2.1	0.7	0.8	1.6	10.0	8.5	0.007	B7	4
SP22		2.0*	0.1	120	120	-1.0	1.1	0.38	1.35	1.2	7.75	12.5	0.0055	MO	1
VP22	(VM)	2.0*	0.1	120	60	-1.5	1.2	0.32	1.3	0.8	7.0	12.5	0.0045	MO	1
VP23	(VM)	2.0*	0.05	120	60	-1.5	1.45	0.5	1.45	1.08	8.0	11.0	0.006	MO	1
VP210	(VM)	2.0*	0.1	120	60	-1.5	1.1	0.38	1.45	0.82	8.75	11.0	0.004	B7	4
VP215	(VM)	2.0*	0.15	120	60	-1.5	1.1	0.38	0.9	0.82	10.0	8.5	0.007	B7	4
AC/ SG		4.0	1.0	200	60	-1.5	4.5	0.8	0.9	1.9	10.0	10.0	0.001	B5	2
AC/ SG/ VM	(VM)	4.0	1.0	200	60	-2.0	5.8	0.9	0.72	1.8	10.0	10.0	0.001	B5	2
AC/ SP1		4.0	1.0	200	200	-3.0	4.9	4.1	0.12	2.65	13.0	8.75	0.0035	B7	5
AC/ S2		4.0	1.0	200	80	-1.5	7.0	0.8	0.6	4.3	12.0	10.0	0.001	B5	2
AC/ S1VM	(VM)	4.0	1.0	200	75	-1.5	5.6	1.5	0.55	1.1	6.5	11.5	0.001	B5	2
AC/S2Pen		4.0	1.0	250	100	-1.5	8.0	2.7	0.7	4.6	13.5	8.75	0.009	B7	5
AC/ SP3		4.0	1.0	250	100	-1.7	7.9	2.5	0.55	7.0	14.5	11.0	0.005	B7	6
AC/ VP1	(VM)	4.0	0.65	250	200	-2.8	7.4	1.85	1.0	2.0	9.5	8.0	0.003	B7	5
AC/VP2	(VM)	4.0	0.65	250	200	-2.8	7.4	1.85	1.0	2.0	7.0	9.5	0.0025	B7	6
V453		4.0	0.65	250	100	-1.75	4.5	0.8	-	2.0	6.75	11.6	0.004	MO	11
VP41	(VM)	4.0	0.65	250	200	-2.7	7.7	2.0	1.3	2.0	6.5	11.5	0.0025	MO	11
6F11		6.3	0.2	250	100	-1.8	4.4	1.35	2.8	2.2	5.3	6.7	0.004	B8A	8
SP1320		13.0	0.2	250	100	-1.5	4.4	0.9	-	2.05	10.0	8.0	0.005	B7	5
VP133	(VM)	13.0	0.2	150	150	-2.7	8.0	2.2	0.7	2.1	7.0	11.5	0.0025	MO	11
VP1320	(VM)	13.0	0.2	250	100	-1.7	5.0	1.1	2.0	2.0	9.75	8.5	0.005	B7	5
VP1321	(VM)	13.0	0.2	250	200	-2.8	7.4	1.85	1.0	2.0	9.75	8.5	0.005	B7	5
VP1322	(VM)	13.0	0.2	250	200	-2.8	7.4	1.85	1.0	2.0	7.0	9.5	0.0025	B7	6
SP181		18.0	0.2	200	200	-1.5	10.9	2.7	0.7	8.5	10.75	5.25	0.005	MO	11
10F3		22.0	0.1	200	200	-2.35	6.0	1.6	-	6.5	9.0	4.6	0.0065	B8A	8
SP2220		22.0	0.2	250	200	-3.0	4.9	4.1	0.12	2.65	13.0	8.75	0.0035	B7	5

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*															
Replacement Types															
1F1	(VM)	1.4*	0.025	85	64	0	1.65	0.55	1.0	0.85	3.3	7.8	0.01	B7G	64
1F3, 1T4	(VM)	1.4*	0.05	90	45	0	1.8	0.65	0.8	0.75	3.6	7.5	0.01	B7G	2
1FD9, 1S5	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	3.3	0.4	B7G	5
1FD1	(SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.055	-	0.17	1.8	2.7	0.3	B7G	65
DAF91	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	2.8	0.4	B7G	5
DAF96	(SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.055	-	0.17	1.8	2.7	0.3	B7G	65
DF91	(VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	3.6	7.5	0.01	B7G	2
DF96	(VM)	1.4*	0.025	85	64	0	1.65	0.55	1.0	0.85	3.3	7.8	0.01	B7G	64
30F27	(VM)	3.7	0.3	170	140	-1.25	13.5	1.7	-	15.0	6.3	1.8	0.027	B9A	61
SP41		4.0	0.95	200	200	-1.5	10.9	2.7	0.7	8.5	10.75	5.25	0.005	MO	11
SP42		4.0	0.95	200	115	-1.25	20.0	5.0	-	8.5	10.0	7.0	0.0055	MO	11
6F1		6.3	0.35	200	200	-1.8	10.0	2.6	0.9	9.0	9.0	4.6	0.0065	B8A	17
6F12		6.3	0.3	250	250	-2.0	10.0	2.5	0.9	7.5	7.6	3.2	0.0045	B7G	21
6F13		6.3	0.35	200	200	-1.8	10.0	2.6	0.9	9.0	9.0	4.6	0.0065	B8A	8
6F14		6.3	0.35	135	135	-1.3	27.0	6.5	-	10.6	8.8	4.6	0.007	B8A	8
6F15	(VM)	6.3	0.2	250	100	-2.5	7.0	2.0	1.7	2.3	5.1	6.8	0.0035	B8A	8
6F16	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	18
6F18	(VM)	6.3	0.2	175	100	-1.3	12.0	3.5	-	4.4	5.0	4.3	0.0017	B9A	10
6F19	(VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
6F21	(VM)	6.3	0.2	250	200	-2.5	7.8	2.0	1.2	2.5	4.7	7.0	0.008	B7G	21
6F23		6.3	0.3	170	170	-1.9	10.0	2.6	-	9.2	8.3	3.3	0.0065	B9A	10
6F24		6.3	0.3	170	170	-1.9	10.0	2.7	-	15.0	8.8	2.6	0.006	B9A	10
6F25	(VM)	6.3	0.3	170	90	-1.5	11.5	2.8	-	12.5	8.5	2.7	0.006	B9A	10
EBF80	(VM,DD)	6.3	0.3	250	85	-2.0	5.0	1.75	1.5	1.5	2.2	4.2	0.0025	B9A	12
EF41	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	18
EF91		6.3	0.3	250	250	-2.0	10.0	2.5	1.0	7.5	7.5	3.2	0.01	B7G	21
SP61		6.3	0.6	Other data as Type SP41											
30F5		7.3	0.3	170	170	-1.9	10.0	2.6	-	8.8	9.0	4.4	0.0073	B9A	10
30FL1	(T,BT)	9.4	0.3	170	170	-2.1	10.0	2.5	-	7.5	7.9	3.2	0.03	B9A	49
20F2		11.0	0.2	135	135	-1.3	27.0	6.5	-	10.6	8.8	4.6	0.007	B8A	8
UF89	(VM)	12.6	0.1	170	110	-2.0	12.0	3.9	0.5	3.8	5.5	5.1	0.002	B9A	36
10F9	(VM)	13.0	0.1	175	100	-2.5	7.0	2.0	1.0	2.3	5.1	6.8	0.0035	B8A	8
10FD12	(VM,DD)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.0	5.2	0.0025	B9A	12
UBF89	(VM,DD)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.0	5.2	0.0025	B9A	12
10F1		22.0	0.1	200	200	-1.8	10.0	2.6	0.9	9.0	9.0	4.6	0.0065	B8A	17
Current Types															
6F22		6.3	0.2	250	140	-2.0	3.0	0.55	2.0	1.85	4.0	5.5	0.025	B9A	23
6F26	(VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
6F28		6.3	0.3	180	180	-2.9	10.0	2.5	0.31	12.5	8.1	2.6	0.03	B9A	80
6F29	(VM)	6.3	0.3	200	90	-2.0	12.0	4.5	0.5	12.5	9.5	3.0	0.0055	B9A	10
6F30		6.3	0.3	170	170	-2.0	10.0	4.1	0.33	15.6	10.0	3.0	0.0055	B9A	10
6FD12	(VM,DD)	6.3	0.3	250	100	-2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.0025	B9A	12
EBF89	(VM,DD)	6.3	0.3	250	100	-2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.0025	B9A	12
ECH84	(TH)	6.3	0.3	135	14	0	1.7	0.9	-	2.2	-	-	0.009	B9A	77
EF80		6.3	0.3	170	170	-2.0	10.0	2.5	0.5	7.4	7.5	3.3	0.007	B9A	10
EF85	(VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86		6.3	0.2	250	140	-2.0	3.0	0.6	2.5	2.0	3.8	5.4	0.025	B9A	23
EF89		6.3	0.2	250	100	-2.0	9.0	3.0	1.0	3.5	5.5	5.1	0.002	B9A	36
EF183	(VM)	6.3	0.3	200	90	-2.0	12.0	4.5	0.5	12.5	9.5	3.0	0.0055	B9A	10
EF184		6.3	0.3	170	170	-2.0	10.0	4.1	0.33	15.6	10.0	3.0	0.0055	B9A	10
EH90	(H)	6.3	0.3	100	30	0†	0.8	4.0	0.4	g_3-a 1.55	g_1 5.5	7.5	g_1 0.07	B7G	29
						-1.0‡	0.75	1.1	0.9	g_1-a 1.2	g_3 7.0	-	g_3 0.36		
S6F12 (SQ)		6.3	0.3	250	250	-2.0	10.0	2.5	0.9	7.5	7.6	3.2	0.0045	B7G	21
30FL14	(TP)	7.4	0.3	160	160	-1.7	12.0	4.0	0.25	14.5	6.4	2.7	0.008	B9A	78
PCF808	(TP)	7.4	0.3	160	160	-1.7	12.0	4.0	0.25	14.5	6.4	2.7	0.008	B9A	78
PCF802	(TP)	9.0	0.3	100	100	-1.0	6.0	1.7	0.4	5.5	5.4	-	0.06	B9A	25
30FL12	(T,BT)	10.0	0.3	180	180	-2.9	10.0	2.5	0.31	12.5	8.1	2.6	0.03	B9A	79
10F18	(VM)	13.0	0.1	175	100	-1.3	12.0	3.5	-	4.4	5.0	4.3	0.0017	B9A	10

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*															
Current Types (Continued)															
PCL84	(TP)	15.0	0.3	220	220	-3.4	18.0	3.0	0.15	10.0	8.7	4.2	0.1	B9A	53
PFL200	(DP)	16.5	0.3	150	150	-2.3	10.0	3.0	0.16	8.5	10.0	11.0	0.14	B10B	1
				170	170	-2.6	30.0	6.5	0.04	21.0	12.0	7.0	0.095		
				† Vg_3 = -1.0V											
				‡ Vg_3 = 0											
M.O. VALVE CO.															
Current Types															
A3064 / CV4014		6.3	0.3	300	300	0	11.0	3.4	-	8.43	7.6	<0.01	3.25	B7G	76
E180F		6.3	0.3	210	175	-50.0	11.5	2.9	0.09	15.9	11.1	<0.1	7.5	B9A	45
E280F		6.3	0.315	220	180	-50.0	15.0	4.5	0.12	23.0	15.5	<0.050	9.3	B9A	45
E282F		6.3	0.350	200	150	-50.0	35.0	11.0	-	26.0	16.0	<0.05	10.0	B9A	45
E810F		6.3	0.340	120	150	-1.9	35.0	5.0	0.042	50.0	14.5	<0.04	3.5	B9A	86
EF86/ Z729		6.3	0.2	250	140	-2.0	3.0	0.6	2.5	1.8	4.0	5.5	0.025	B9A	23
EF91/ Z77		6.3	0.3	250	250	-2.0	10.0	2.5	7.5	7.4	7.4	3.0	0.009	B7G	21
Z319	(SE)	6.3	0.3	350	250*	-1.7	15.0	1.2	0.5	19.0	8.0	3.0	0.003	B9A	46
Z759		6.3	0.6	Other data, except base connections, as Type Z359										B9A	48
Z359		12.6	0.3	250	250	-2.0	20.0	5.25	0.05	15.0	13.0	2.5	0.007	B9A	47
MULLARD															
Obsolete Types															
DF70		0.625*	0.025	30	30	0	0.375	0.125	0.5	0.22	1.6	2.4	0.5	B8D‡	6
DAF70	(SD)	1.25*	0.025	67.5	67.5	0	1.0	0.25	0.4	0.44	1.8	3.0	0.15	B8D‡	1
DF73	(VM)	1.25*	0.025	67.5	67.5	0	1.7	0.5	0.8	0.8	2.9	5.0	0.015	B8D‡	2
DF72		1.25*	0.025	67.5	67.5	0	1.7	0.5	0.75	1.0	3.2	5.1	0.01	B8D‡	2
1N5	(VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.0	10.0	0.007	IO	77
DF1	(VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	-	-	-	Ct8	26
DF33	(VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.8	9.5	0.007	IO	77
KF35	(VM)	2.0*	0.05	120	60	-1.5	1.45	0.5	1.5	1.08	8.0	10.0	0.01	IO	85
PM12M	(VM)	2.0*	0.18	150	90	0	2.5	0.5	-	1.4	-	-	-	B4	2
SP2		2.0*	0.18	135	135	0	3.0	1.0	0.7	1.8	11.0	6.0	0.01	B7	4
VP2	(VM)	2.0*	0.18	135	135	0	3.0	1.25	0.04	1.5	10.7	6.3	0.007	B7	4
VP2B	(VM,H_z)	2.0*	0.135	135	60	-1.5	2.0	0.95	1.3	1.4	7.9	16.3	0.002	B7	28
SP4		4.0	1.0	200	100	-2.0	3.0	1.1	2.2	2.3	-	-	-	B7	5
SP4B		4.0	0.65	250	250	-2.4	4.0	1.5	2.0	3.4	6.9	8.1	0.003	B7	6
TSP4		4.0	1.3	200	200	-2.5	8.0	1.5	-	4.7	9.6	7.5	0.01	B7	6
VP4	(VM)	4.0	1.0	200	100	-2.0	4.5	1.9	1.0	2.3	12.4	10.0	0.005	B5	2
														B7	6
VP4A	(VM)	4.0	1.2	200	100	-2.0	4.25	1.8	1.4	2.5	12.5	10.2	0.006	B5	2
														B7	6
6J7		6.3	0.3	250	100	-3.0	2.0	0.5	1.5	1.25	4.6	12.0	0.007	IO	8
6K7	(VM)	6.3	0.3	250	125	-3.0	10.5	2.6	0.6	1.65	4.6	12.0	0.005	IO	8
6SK7	(VM)	6.3	0.3	250	100	-3.0	9.2	2.6	0.8	2.0	6.5	7.5	0.005	IO	10
78	(VM)	6.3	0.3	Other data as Type 6K7										UX6	2
EAF41	(VM,SD)	6.3	0.2	250	110	-2.0	5.0	1.5	1.4	2.0	4.0	6.5	0.002	B8A	11
EF8 / EF38	(VM)	6.3	0.2	250	250	-2.5	8.0	0.2	0.45	1.8	4.9	7.8	0.007	Ct8	11
														IO	66
EF36		6.3	0.2	250	100	-2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
EF37		6.3	0.2	250	100	-2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
EF54		6.3	0.3	250	250	-1.7	10.0	1.45	0.5	7.7	6.2	4.9	0.02	B9G	2
EF70		6.3	0.2	100	100	-2.0	3.0	2.25	0.1	2.5	4.5	4.7	0.025	B8D‡	3
12J7		12.6	0.15	Other data as Type 6J7											
12K7	(VM)	12.6	0.15	Other data as Type 6K7											
12SK7	(VM)	12.6	0.15	Other data as Type 6SK7											

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*															
Obsolete Types (Continued)															
UAF41	(VM,SD)	12.6	0.1	200	85	-2.0	5.0	1.5	1.0	2.0	4.5	5.0	0.002	B8A	11
SP13		13.0	0.2	200	100	-2.0	3.3	1.2	1.3	2.2	7.1	7.7	0.003	Ct8	15
SP13C		13.0	0.2	200	200	-2.2	2.5	0.9	2.5	2.8	6.9	8.1	0.003	B7	6
VP13A	(VM)	13.0	0.2	200	100	-2.0	4.0	1.4	1.0	2.2	-	-	-	Ct8	15
VP13C	(VM)	13.0	0.2	200	200	-2.0	9.0	3.6	-	2.2	8.0	6.1	0.0023	B7	6
Replacement Types															
DF64		0.62*	0.01	15	15	-0.75	0.05	0.017	1.2	0.09	1.8	2.0	0.2	B5A	3
DF66		0.625*	0.015	22.5	22.5	-1.05	0.05	0.015	2.0	0.1	1.6	2.2	0.15	B5A	1
DF61		1.25*	0.025	67.5	67.5	0	1.7	0.45	1.6	0.95	3.1	3.6	0.01	B5A	3
DF62		1.25*	0.1	45	45	0	3.0	0.8	0.5	2.0	4.0	4.0	0.01	B5A	2
DAF91	(SD)	1.4*	0.05	90	90	0	2.7	0.63	0.5	0.72	2.0	2.8	0.4	B7G	5
DAF96	(SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.055	-	0.17	1.8	2.7	0.3	B7G	5
DF91	(VM)	1.4*	0.05	90	67.5	0	3.5	1.4	0.5	0.9	3.6	7.5	0.01	B7G	2
DF92		1.4*	0.05	90	67.5	0	3.7	1.4	0.5	1.0	3.6	7.5	0.01	B7G	2
DF96		1.4*	0.025	85	64	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
DF97		1.4*	0.025	85	57	0	1.5	0.59	0.52	0.90	3.7	7.5	0.01	B7G	59
VP4B	(VM)	4.0	0.65	250	250	-3.0	11.5	4.25	-	2.0	8.0	5.4	0.002	B7	6
6AS6 / M8196(SQ)		6.3	0.175	120	120	-2.0	5.1	3.5	0.15	3.2	4.2	3.2	<0.02	B7G	32
EF734 / 6205 (SQ)		6.3	0.15	100	100	-1.5	7.5	2.4	>0.175	5.0	4.2	3.4	<0.015	B8D/ F‡	17
EAF42	(VM,SD)	6.3	0.2	250	85	-2.0	5.0	1.5	1.4	2.0	4.5	5.1	0.002	B8A	12
EBF80	(VM,DD)	6.3	0.3	250	85	-2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
EBF83	(VM,DD)	6.3	0.3	12.6	12.6	††	0.45	0.14	1.0	1.0	5.0	5.2	<0.0025	B9A	12
EF9	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.25	2.2	5.5	7.2	0.003	Ct8	15
EF22	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.2	2.0	5.5	6.4	0.002	B8B	3
EF37A		6.3	0.2	250	100	-2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
EF39	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.25	2.2	5.5	7.2	0.003	IO	8
EF40		6.3	0.2	250	140	-2.0	3.0	0.55	2.5	1.85	4.0	5.5	0.025	B8A	15
EF41	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
EF42		6.3	0.33	250	250	-2.0	10.0	2.3	0.44	9.5	9.5	4.5	0.005	B8A	8
EF50		6.3	0.3	250	250	-2.0	10.0	3.0	1.0	6.5	8.3	5.2	0.007	B9G	1
EF55		6.3	1.0	250	250	-4.5	40.0	5.5	0.055	12.5	15.0	12.0	0.15	B9G	1
EF71	(VM)	6.3	0.15	100	100	-1.2	7.2	2.2	0.26	4.5	4.5	4.0	0.015	B8D‡	4
EF72		6.3	0.15	100	100	-1.4	7.0	2.2	0.25	5.0	4.1	2.0	0.02	B8D‡	4
EF73		6.3	0.2	100	100	-2.0	7.5	2.5	0.25	5.5	5.0	3.0	0.2	B8D‡	5
EF74		6.3	0.2	100	100	-1.4	7.0	2.4	0.2	3.1	3.6	4.2	<0.3	B8D‡	5
EF83	(VM,P)	6.3	0.2	250	50	-1.6	4.0	1.15	1.25	1.6	4.0	5.0	0.05	B9A	23
EF91 / M8083 (SQ)		6.3	0.3	250	250	-2.0	10.0	2.5	1.0	7.6	7.0	2.0	0.008	B7G	21
EF92 / M8161 (SQ)	(VM)	6.3	0.2	250	150	-0.65	8.0	2.0	0.5	2.5	4.5	7.0	0.004	B7G	21
EF93 / M8101 (SQ)	(VM)	6.3	0.3	250	100	-1.0	11.0	4.2	1.5	4.4	5.5	5.0	0.0035	B7G	16
EF95 / M8100 (SQ)		6.3	0.175	180	120	-2.0	7.7	2.4	0.69	5.1	4.0	2.8	0.02	B7G	14
EF97	(VM)	6.3	0.3	12.6	6.3	-	3.0	1.1	0.15	1.9	6.5	4.0	0.015	B7G	68
EF98		6.3	0.3	12.6	6.3	†	2.0	0.7	0.2	2.0	6.7	4.0	0.015	B7G	68
EF730 / 5636 (SQ)		6.3	0.15	100	100	-1.4	5.3	4.1	0.11	3.2	4.0	3.4	<0.02	B8D‡	8
EF731 / 5899 (SQ)	(VM)	6.3	0.15	100	100	-1.1	7.2	2.2	0.26	4.5	4.3	3.4	<0.015	B8D‡	14
EF732 / 5840 (SQ)		6.3	0.15	100	100	-1.5	7.5	2.4	0.26	5.0	4.2	3.4	<0.015	B8D‡	14
EF812 / 6F23		6.3	0.3	170	170	-1.9	10.0	2.6	-	9.2	8.3	3.3	0.0065	B9A	10
6AS6 / M8196 (SQ)		6.3	0.175	120	120	-2.0	5.1	3.5	0.15	3.2	4.2	3.2	<0.02	B7G	32
PF818 / 30F5		7.3	0.3	170	170	-1.9	10.0	2.6	-	8.8	-	-	-	B9A	10
PCE800 / 30FLI	(T,BT)	9.4	0.3	170	170	-2.1	10.0	2.5	-	8.0	7.8	2.4	0.033	B9A	49
HF93	(VM)	12.6	0.15	Other data as Type EF93											
UAF42	(VM,SD)	12.6	0.1	200	85	-2.0	5.0	1.5	1.0	2.0	4.5	5.1	0.002	B8A	12

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*															
Replacement Types (Continued)															
UF41	(VM)	12.6	0.1	170	100	-2.5	6.0	1.75	1.0	2.2	5.0	7.0	0.002	B8A	7
UBF80	(VM,DD)	17.0	0.1	170	85	-2.0	5.0	1.75	0.9	2.2	4.2	4.9	0.0025	B9A	12
UF80		19.0	0.1	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	<0.01	<0.007	B9A	10
UF85		19.0	0.1	200	116	-2.3	11.4	3.1	0.35	6.1	6.9	3.2	0.007	B9A	10
UF42		21.0	0.1	170	170	-2.0	10.0	2.8	0.2	8.5	9.5	4.5	0.005	B8A	8
Current Types															
E80CF (SQ)	(TP)	6.3	0.33	170	170	-2.0	10.0	2.8	0.4	6.2	5.6	3.4	0.025	B9A	25
E180F (SQ)		6.3	0.3	190	160	-1.0	13.0	3.3	0.035	16.5	7.9	2.9	0.02	B9A	45
EBF89	(VM,DD)	6.3	0.3	250	100	-2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.002	B9A	12
ECH84	(TH)	6.3	0.3	135	14	0	1.7	0.9	-	2.2	-	-	<0.009	B9A	77
EF80		6.3	0.3	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
EF85	(VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
EF86 M8195 (SQ)		6.3	0.2	250	140	-2.0	3.0	0.6	2.5	2.0	3.8	5.1	0.005	B9A	23
EF89	(VM)	6.3	0.2	250	100	-2.0	9.0	3.0	1.0	3.6	5.5	5.1	0.002	B9A	36
EF183	(VM)	6.3	0.3	200	90	-2.0	12.0	4.5	0.5	12.5	9.5	3.0	<0.0055	B9A	10
EF184		6.3	0.3	170	170	-2.0	10.0	4.1	0.33	15.6	10.0	3.0	<0.0055	B9A	10
EH90	(H)	6.3	0.3	100	30	-1.0	0.75	1.1	0.9	1.2	5.5	7.5	<0.07	B7G	29
PCF801	(T,VM)	8.5	0.3	173	119	-1.4	10.0	3.0	>0.35	11.0	6.2	3.7	0.009	B9A	A
PCF802	(TP)	9.0	0.3	100	100	-1.0	6.0	1.7	0.4	5.5	5.4	-	0.06	B9A	25
UF86		12.6	0.1	Other data as Type EF86											
UF89	(VM)	12.6	0.1	170	110	-2.0	12.0	3.9	0.525	3.8	5.5	5.1	0.002	B9A	36
PFL200	(DP)	16.5	0.3	150	150	-2.3	10.0	3.0	0.16	8.5	10.0	11.0	0.14	B10B	1
UBF89	(VM,DD)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.0	5.2	<0.0025	B9A	12

*Not Screened

† Grid current biasing Rg_1 = 10MΩ †† Grid current biasing Rg_1 = 2.2MΩ ‡ Flying Leads

S.T.C.

Obsolete Types

SP41	4.0	0.95	200	200	-1.5	10.9	2.7	0.7	8.5	10.75	5.25	0.005	MO	11
V453	4.0	0.65	250	100	-1.75	4.5	0.8	-	2.0	6.75	11.6	0.004	MO	11
Replacement Type														
6F32	6.3	0.63	200	200	-4.5	5.1	3.45	-	3.0	10.5	5.7	0.0005	MO	11
Current Types														
5A/ 162D	5.5	0.26	40	40	-1.5	3.0	0.77	0.2	4.5	8.0	5.5	0.02	IO	8
5A/ 152M/ G	6.3	0.46	250	150	-2.1	10.0	2.0	-	7.5	10.0	5.0	0.018	B8B	3
5A/ 163K	6.3	0.45	200	200	-1.5	15.0	5.0	-	15.0	13.0	3.6	0.016	B9A	60
5A/ 170K	6.3	0.3	180	150	-1.0	13.0	3.0	-	16.5	7.9	2.9	0.03	B9A	45
5A/ 180M	6.3	0.45	180	150	-1.0	26.0	6.0	-	32.0	16.0	5.0	0.05	B8B	19
5B/ 110M	6.3	0.8	250	150	-6.0	38.0	8.0	-	6.5	11.0	6.0	0.035	B8B	3
6F17	6.3	0.3	200	250	-6.25	64.0	-	-	8.3	6.6	5.9	0.03	B7G	82
6F33	6.3	0.35	200	200	-4.0	5.75	3.1	-	3.55	7.3	4.5	0.01	B7G	21
S6F17 (SQ)	6.3	0.3	200	200	-11.0	17.0	3.0	-	4.0	6.2	5.2	0.03	B7G	82
S6F17F (SQ)	6.3	0.3	200	250	-6.25	64.0	-	-	8.3	6.2	5.2	0.03	B7G/ F	82
S6F33 (SQ)	6.3	0.35	200	200	-3.3	7.1	4.35	0.1	4.05	7.55	4.55	0.01	B7G	21
5A/ 102D	7.5	0.85	180	150	-18.0	43.0	7.0	-	2.5	8.5	12.8	1.1	IO	8

TUNGSRAM

Obsolete Types

HP4101	4.0	1.0	200	100	-2.0	3.5	0.6	2.0	3.5	10.0	12.0	0.002	B5 B7	2 5

(Continued)

Type		Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM *(Continued)*															
Obsolete Types (Continued)															
HP4106	(VM)	4.0	1.0	200	100	-2.0	5.0	1.25	1.2	3.5	-	-	0.002	B5 B7	2 5
6C6		6.3	0.3	250	100	-3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	UX6	2
6D6	(VM)	6.3	0.3	250	100	-3.0	8.2	2.0	0.8	1.6	4.7	6.5	0.007	UX6	2
EF9	(VM)	6.3	0.2	250	250	-2.5	6.0	1.7	1.5	2.2	5.0	7.0	0.003	Ct8	15
Replacement Types															
VP4B	(VM)	4.0	0.65	250	250	-1.0	10.0	2.5	1.0	4.0	6.4	7.6	0.003	B7	6
6B7 6B8	(DD)	6.3	0.3	250	125	-3.0	10.0	2.3	0.6	1.33	3.5	9.5	0.007	UX7 IO	2 15
VP13K	(VM)	13.0	0.2	200	100	-3.0	8.0	2.6	0.9	2.0	6.4	7.6	0.003	B7	6
Current Types															
1AH5	(SD)	1.4*	0.025	67.5	67.5	-1.5	0.17	0.055	-	0.17	1.8	2.7	0.3	B7G	5
1AJ4		1.4*	0.025	85	64	0	1.65	0.55	1.0	0.75	3.3	7.8	0.01	B7G	2
1L4		1.4*	0.05	90	67.5	0	3.7	1.4	0.5	1.0	3.6	7.5	0.01	B7G	2
1N5GT	(VM)	1.4*	0.05	90	90	0	1.2	0.3	1.5	0.75	3.8	9.5	0.007	IO	77
1S5	(SD)	1.4*	0.05	67.5	67.5	0	1.6	0.4	0.6	0.63	2.2	2.4	0.2	B7G	5
1T4	(VM)	1.4*	0.05	90	67.5	0	3.5	1.5	0.5	0.9	3.6	7.5	0.01	B7G	2
6AC7		6.3	0.45	300	150	-2.0	10.0	2.5	1.0	9.0	11.0	5.0	0.015	IO	10
6AK5		6.3	0.175	180	120	-2.0	7.7	2.4	0.69	5.1	4.0	2.8	0.02	B7G	14
6AM6 EF91		6.3	0.3	250	250	-2.0	10.0	2.1	1.0	7.5	3.25	7.6	0.0054	B7G	21
6AU6		6.3	0.3	250	150	-1.0	10.8	4.3	1.0	5.2	5.5	5.0	0.0035	B7G	16
6BA6		6.3	0.3	250	100	-1.0	11.0	4.2	1.0	4.4	5.5	5.0	0.0035	B7G	16
6BX6		6.3	0.3	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	3.3	0.007	B9A	10
6BY7	(VM)	6.3	0.3	250	100	-2.0	10.0	2.5	0.5	6.0	7.2	3.7	0.007	B9A	10
6CJ5	(VM)	6.3	0.2	250	100	-2.5	6.0	1.7	1.0	2.2	4.7	8.0	0.002	B8A	7
6CT7	(VM,SD)	6.3	0.2	250	85	-2.0	5.0	1.5	1.4	2.0	4.5	5.1	0.002	B8A	12
6CQ6	(VM)	6.3	0.2	250	150	-0.65	8.0	2.0	0.5	2.5	4.5	7.0	0.004	B7G	21
6DC8 / EBF89	(VM,DD)	6.3	0.3	250	100	-2.0	9.0	2.7	1.0	3.8	5.0	5.2	0.002	B9A	12
6EH7/ EF183	(VM)	6.3	0.3	200	90	-2.0	12.0	4.5	0.5	13.0	9.0	3.0	<0.005	B9A	10
6EJ7/ EF184		6.3	0.3	170	170	-2.0	10.0	4.1	0.33	15.6	10.0	3.0	<0.005	B9A	10
6J7		6.3	0.3	250	100	-3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	IO	8
6K7	(VM)	6.3	0.3	250	125	-3.0	10.5	2.6	0.6	1.65	4.6	12.0	0.005	IO	8
6N8	(VM,DD)	6.3	0.3	250	85	-2.0	5.0	1.75	1.4	2.2	4.2	4.9	0.0025	B9A	12
6SJ7		6.3	0.3	250	100	-3.0	3.0	0.8	1.0	1.65	6.0	7.0	0.005	IO	10
6SK7	(VM)	6.3	0.3	250	100	-3.0	9.2	2.6	0.8	2.0	6.5	7.5	0.005	IO	10
77		6.3	0.3	250	100	-3.0	2.3	0.5	1.0	1.25	4.7	11.0	0.007	UX6	2
78	(VM)	6.3	0.3	250	125	-3.0	10.5	2.6	0.6	1.65	4.5	11.0	0.007	UX6	2
6267		6.3	0.2	250	140	-2.0	3.0	0.6	2.5	1.8	4.0	5.5	0.025	B9A	23
EBF83/ 6DR8	(DD)	6.3	0.3	12.6	12.6	††	0.45	0.14	1.0	1.0	5.0	5.2	<0.0025	B9A	12
EF37A		6.3	0.2	250	100	-2.0	3.0	0.8	2.5	1.8	5.5	8.5	0.02	IO	8
EF39	(VM)	6.3	0.2	250	250	-2.5	6.0	1.7	1.5	2.2	5.0	7.0	0.003	IO	8
EF42		6.3	0.33	250	250	-2.0	10.0	2.3	0.44	9.5	9.5	4.5	0.005	B8A	8
EF50		6.3	0.3	250	250	-2.0	10.0	3.0	1.0	6.5	8.3	5.2	0.007	B9G	1
EF83	(VM)	6.3	0.2	250	50	-1.6	4.0	1.15	1.25	1.6	4.0	<0.005	5.0	B9A	23
EF89	(VM)	6.3	0.2	250	100	-2.0	9.0	3.0	1.0	3.6	5.5	5.1	0.002	B9A	36
EF98		6.3	0.3	12.6	12.6	-1.0†	4.8	2.2	0.05	3.0	-	-	-	B7G	68
12AC5	(VM)	12.6	0.1	170	100	-2.5	6.0	1.75	1.0	2.2	5.0	7.0	0.002	B8A	7
12BA6		12.6	0.15	Other data as Type 6BA6											
12J7		12.6	0.15	250	100	-3.0	2.0	0.5	1.0	1.23	7.0	12.0	0.005	IO	8
12K7	(VM)	12.6	0.15	250	125	-3.0	10.5	2.6	0.6	1.65	4.5	11.0	0.007	IO	8
12S7	(VM,SD)	12.6	0.1	200	85	-2.0	5.0	1.5	1.0	2.0	4.5	5.1	0.002	B8A	12
12SJ7		12.6	0.15	Other data as Type 6SJ7											
12SK7		12.6	0.15	Other data as Type 6SK7											
UF86		12.6	0.1	250	140	-2.0	3.0	0.6	2.5	2.0	3.8	5.4	0.025	B9A	23
UF89	(VM)	12.6	0.1	170	110	-2.0	12.0	3.9	0.525	3.85	5.5	5.1	0.002	B9A	36
UBF80	(VM,DD)	17.0	0.1	170	85	-2.0	5.0	1.75	0.9	2.2	4.2	4.9	0.0025	B9A	12
UF80		19.0	0.1	170	170	-2.0	10.0	2.5	0.4	7.4	7.5	<0.01	<0.0007	B9A	10
19FL8/ UBF89	(VM,DD)	19.0	0.1	200	100	-1.5	11.0	3.3	0.6	4.5	5.0	5.2	<0.0025	B9A	12

(Continued)

Type	Heater		Volts			Current (mA)		r_a (MΩ)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen			c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM														
Current Type														
UF85	19.0	0.1	200	116	-2.3	11.4	3.1	0.35	6.1	6.9	3.2	0.007	B9A	10

† Grid current biasing $Rg_1 = 10M\Omega$

†† Grid current biasing $Rg_1 = 2.2M\Omega$

OUTPUT VALVES 1

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
BRIMAR																
Obsolete Types																
1A5	(P)	1.4*	0.05	90	90	-4.5	4.0	0.8	300,000	0.85	-	25,000	0.115	7	IO	78
1C5	(P)	1.4	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.575	-	8,000	0.27	12	IO	78
1S4	(BT)	1.4*	0.1	90	67.5	-7.0	7.4	1.4	100,000	1.575	-	8,000	0.27	12	B7G	4
3D6	(BT)	1.4*	0.22†	135	90	-4.5	9.8	1.2	150,000	2.4	-	12,000	0.5	-	B8B	32
3Q4	(BT)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	6
3Q5	(BT)	1.4*	0.1†	90	90	-9.0	6.0	1.4	-	1.55	-	8,000	0.24	-	IO	87
2A3	(T)	2.5*	2.5	250	-	-45.0	60.0	-	800	5.2	750	2,500	3.5	5	UX4	1
45	(T)	2.5*	1.5	250	-	-50.0	36.0	-	1,600	2.2	1,500	3,900	1.6	-	UX4	1
47/47E		2.5*	1.75	250	250	-16.5	31.0	6.0	60,000	2.5	450	7,000	2.7	-	UX5	3
7A2	(P)	4.0	1.2	250	250	-16.5	34.0	6.5	80,000	2.35	410	7,000	3.5	10	B5 B7	7 24
7A3	(P)	4.0	2.0	250	250	-6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	B7	24
PA1	(T)	4.0	1.0	200	-	-10.0	40.0	-	2,000	5.0	250	4,000	1.8	10	B5	1
PenA1	(P)	4.0*	1.0	250	250	-16.5	32.0	6.5	60,000	3.0	450	8,000	2.7	6	B5	6
6B4	(T)	6.3*	1.0	250	-	-45.0	60.0	-	800	5.25	750	2,500	3.5	5	IO	81
6F6	(P)	6.3	0.7	285	285	-20.0	38.0	7.0	78,000	2.55	440	7,000	4.5	9	IO	36
6K6	(P)	6.3	0.4	315	285	-21.0	25.5	4.0	75,000	2.1	700	9,000	4.5	15	IO	36
6N7	(DT)	6.3	0.8	250	-	-5.0	3.0	-	23,000	1.6	1,000	30,000	0.2	-	IO	22
41/41E		6.3	0.4	250	250	-18.0	32.0	5.5	68,000	2.3	500	8,000	3.4	11	UX6	8
42	(P)	6.3	0.7	250	250	-16.5	34.0	6.5	80,000	2.5	410	7,000	3.2	8	UX6	8
12A6	(BT)	12.6	0.15	250	250	-12.5	30.0	3.5	70,000	3.0	350	7,500	3.4	7	IO	36
7D5	(P)	13.0	0.315	250	250	-16.5	34.0	6.5	80,000	2.5	410	7,000	3.2	8	B7	24
7D8	(P)	13.0	0.65	250	250	-6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	B7	24
18	(P)	14.0	0.3	285	285	-20.0	38.0	7.0	78,000	2.55	440	7,000	4.5	9	UX6	8
2151		14.0	0.3	250	250	-31.0	47.0	11.6	50,000	2.4	500	5,000	5.0	-	UX6	8
25A6	(P)	25.0	0.3	160	120	-18.0	33.0	6.5	42,000	2.4	440	5,000	2.2	10	IO	36
25L6	(BT)	25.0	0.3	200	110	-8.0	50.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
43	(P)	25.0	0.3	160	120	-18.0	33.0	6.5	42,000	2.4	440	5,000	2.2	10	UX6	8
35A5	(BT)	35.0	0.15	200	110	-8.0	41.0	2.0	40,000	5.9	185	4,500	3.3	10	B8B	10
7D3	(P)	40.0	0.2	160	120	-18.0	33.0	6.5	42,000	2.4	440	5,000	2.2	10	B7	24
7D6	(P)	40.0	0.2	250	250	-6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	B7	24
50A5	(BT)	50.0	0.15	200	110	-8.0	50.0	1.5	35,000	8.25	160	3,000	4.3	10	B8B	10
50L6	(BT)	50.0	0.15	200	110	-8.0	50.0	2.0	30,000	9.5	160	3,000	4.3	10	IO	36
Replacement Types																
3S4	(BT)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.58	-	8,000	0.27	12	B7G	6
3V4	(BT)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
DL92	(P)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.57	-	8,000	0.27	12	B7G	6
DL94	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
DL96/3C4	(P)	1.4*	0.05†	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
6AG6	(P)	6.3	1.2	250	250	-6.0	32.0	6.0	60,000	10.0	150	8,500	3.75	10	IO	36
6AK6	(P)	6.3	0.15	180	180	-9.0	15.0	2.5	200,000	2.3	520	10,000	1.1	10	B7G	16
6AM5 7D9	(P)	6.3	0.2	250	250	-13.5	16.0	2.4	150,000	2.6	680	16,000	1.4	10	B7G	25
6AQ5	(BT)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B7G	27

(Continued)

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
BRIMAR *(Continued)*																
Replacement Types (Continued)																
6CD6	(BT)	6.3	2.5	200	110	-14.0	80.0	5.3	-	-	180	1,500	4.7	13	IO	39
6L6/ 6L6GA	(BT)	6.3	0.9	350	250	-18.0	54.0	2.5	33,000	5.2	300	4,200	11.0	15	IO	36
6V6	(BT)	6.3	0.45	315	225	-13.0	34.0	2.2	77,000	3.75	360	8,500	5.5	12	IO	36
7C5	(BT)	6.3	0.45	315	225	-13.0	34.0	2.2	77,000	3.75	330	8,500	5.0	11.5	B8B	10
807	(BT)	6.3	0.9	500	200	-14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
ECL80/ 6AB8	(TP)	6.3	0.3	200	200	-8.0	17.5	3.3	150,000	3.3	-	11,000	1.4	10	B9A	13
ECL83	(TP)	6.3	0.6	200	200	-13.0	27.0	4.4	65,000	5.0	410	7,500	2.5	10.5	B9A	27
EL33	(P)	6.3	0.9	250	250	-6.0	36.0	4.0	50,000	9.0	150	7,000	4.0	10	IO	36
EL41	(P)	6.3	0.7	250	250	-7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	23
EL90	(P)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B7G	27
ELL80	(DP)	6.3	0.55	250	250	-9.0	24.0	4.5	80,000	6.0	160	10,000	3.0	10	B9A	68
F / 7001(SQ)	(BT)	6.3	0.45	120	120	-	35.0	4.0	15,000	4.8	250	2,500	1.0	9	B7G†	14
9BW6	(BT)	9.0	0.3	Other data as Type 6BW6												
12K5		12.6	0.45	12.6*	12.6	-2.0g_2	8.0	85.0*	800	7.0	-	800	0.035	10	B7G	69
PCL83	(TP)	12.6	0.3	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.2	10	B9A	27
PL83	(P)	15.0	0.3	170	170	-2.3	36.0	5.0	100,000	10.0	-	-	-	-	B9A	14
PL84	(P)	15.0	0.3	170	170	-12.5	70.0	5.0	23,000	10.0	170	2,400	5.6	10	B9A	16
PL82	(P)	16.5	0.3	170	170	-10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
19AQ5	(BT)	19.0	0.15	Other data as Type 6AQ5												
35L6	(BT)	35.0	0.15	200	110	-8.0	41.0	2.0	40,000	5.9	185	4,500	3.3	10	IO	36
UCL83	(TP)	38.0	0.1	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.2	10	B9A	27
UL41	(P)	45.0	0.1	200	200	-14.2	45.0	8.5	24,000	8.2	250	4,300	4.2	10	B8A	7
50CD6	(BT)	50.0	0.3	Other data as Type 6CD6												
Current Types																
5763 / 6062 (SQ)	(BT)	6.0	0.75	300	225	-7.4	40.0	2.4	65,000	6.3	175	8,500	4.15	7.6	B9A	11
6BW6 / 6061 (SQ)	(BT)	6.3	0.45	315	225	-13.0	34.0	2.2	77,000	3.75	360	8,500	5.5	12	B9A	19
6CH6 / 6132 (SQ)	(BT)	6.3	0.75	250	250	-4.5	40.0	6.0	50,000	11.0	100	6,000	3.0	8.5	B9A	19
6CL6	(P)	6.3	0.65	250	150	-3.0	30.0	7.0	150,000	11.0	-	7,500	2.8	8	B9A	84
6516	(P)	6.3	0.2	250	250	-	15.0	2.0	200,000	2.55	740	16,000	1.4	10	B7G	25
ECL82/ 6BM8	(TP)	6.3	0.78	200	200	-16.0	35.0	7.0	20,000	6.4	-	5,600	3.5	10	B9A	37
ECL86	(TP)	6.3	0.66	250	250	-7.0	36.0	6.0	48,000	10.0	170	5,900	4.3	10	B9A	76
EL34	(P)	6.3	1.5	250	250	-12.2	100.0	15.0	15,000	11.0	106	2,000	11.0	10	IO	133
EL84 / 6BQ5	(P)	6.3	0.76	250	250	-7.3	48.0	5.5	38,000	11.0	135	5,200	5.7	10	B9A	16
EL506	(P)	6.3	0.8	300	300	-10.0	60.0	8.0	25,000	10.2	-	3,000	10.0	13	B9D	2
EL821	(P)	6.3	0.75	250	250	-4.5	40.0	6.0	50,000	11.0	-	-	-	-	B9A	19
PCL86	(TP)	13.6	0.3	230	230	-5.7	41.0	10.5	45,000	10.5	125	5,100	4.1	10	B9A	76
PCL82	(TP)	16.0	0.3	200	200	-16.0	35.0	6.5	20,000	6.4	-	5,600	3.5	10	B9A	37
PCL85	(TP)	18.0	0.3	170	170	-15.0	41.0	2.7	25,000	7.5	-	4,000	3.4	-	B9A	66
UL84	(P)	45.0	0.1	160	170	-12.5	70.0	5.0	23,000	10.0	-	2,200	5.2	10	B9A	16
50C5	(BT)	50.0	0.15	110	110	-7.5	49.0	4.0	10,000	7.5	140	2,500	1.9	9	B7G	42
UCL82	(TP)	50.0	0.1	200	200	-16.0	35.0	7.0	20,000	6.4	380	5,600	3.5	10	B9A	37

* Space-charge grid † Flying leads

COSSOR

Obsolete Types

1C5	(P)	1.4*	0.1	90	90	-7.5	7.8	3.5	115,000	1.55	-	8,000	0.24	10	IO	78
2P	(T)	2.0	0.7	250	-	-22.0	40.0	-	1,150	7.0	-	3,000	2.0	5	B4	1
220OT	(BT)	2.0	0.2	150	150	-4.5	9.5	2.0	-	2.5	-	20,000	0.5	8	B5	6
PT10	(P)	4.0	2.0	250	250	-7.5	40.0	-	-	9.0	160	5,000	4.2	10	B7	24
6V6	(BT)	6.3	0.45	315	225	-13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	IO	36
142BT	(BT)	14.0	0.2	180	180	-8.5	29.0	3.0	58,000	3.7	265	5,500	2.0	8	IO	36
CL33/ 332Pen	(P)	33.0	0.2	200	200	-8.5	45.0	6.0	-	8.0	167	4,500	4.0	10	IO	36

(Continued)

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
COSSOR *(Continued)*																
Replacement Types																
DL92	(BT)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.58	-	8,000	0.27	12	B7G	6
DL94	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
DL96	(P)	1.4*	0.05	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
6C4	(T)	6.3	0.15	250	-	-8.5	10.5	-	7,700	2.2	-	-	-	-	B7G	15
7C5	(BT)	6.3	0.45	315	225	-13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	B8B	10
807	(BT)	6.3	0.9	300	250	-14.0	83.0	8.0	20,000	6.5	155	2,850	6.7	-	UX5	6
ECL80/ 6AB8	(TP)	6.3	0.3	170	170	-6.7	15.0	2.8	150,000	3.2	-	11,000	1.0	10	B9A	13
ECL82	(TP)	6.3	0.78	250	250	-22.5	28.0	5.5	25,000	5.0	680	9,000	3.4	10	B9A	37
ECL83	(TP)	6.3	0.6	200	200	-1.3	27.0	4.4	65,000	5.0	-	7,500	2.5	10.5	B9A	27
EL38	(P)	6.3	1.4	275	275	-9.0	91.0	11.0	-	14.0	-	-	-	-	IO	40
EL41 / 67PT	(P)	6.3	0.7	250	250	-7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	23
EL42	(P)	6.3	0.2	225	225	-10.0	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	23
EL81	(P)	6.3	1.05	250	250	-38.5	32.0	2.4	15,000	4.6	-	-	-	-	B9A	17
EL84 / 6BQ5	(P)	6.3	0.76	250	250	-7.3	48.0	5.5	38,000	11.3	135	5,200	5.7	10	B9A	16
EL86	(P)	6.3	0.76	170	170	-12.5	70.0	5.0	23,000	10.0	-	2,400	5.6	10	B9A	16
EL822	(P)	6.3	0.75	250	150	-2.5	40.0	5.0	100,000	13.0	-	-	-	-	B9A	19
PCL83	(TP)	12.6	0.3	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.2	10	B9A	27
PCL84	(TP)	15.0	0.3	220	220	-3.4	18.0	3.1	150,000	10.0	-	-	-	-	B9A	53
PL83	(P)	15.0	0.3	170	170	-2.3	36.0	5.0	100,000	10.0	-	-	-	-	B9A	14
PL84	(P)	15.0	0.3	250	250	-5.5	36.0	5.0	130,000	10.0	-	-	-	-	B9A	16
PCL82	(TP)	16.0	0.3	170	170	-11.5	41.0	7.5	16,000	7.5	-	3,900	3.3	10	B9A	37
PL82 / 16A5	(P)	16.5	0.3	170	170	-10.4	53.0	10.0	20,000	9.5	-	3,000	4.2	10	B9A	16
UL41/ 451PT	(P)	45.0	0.1	170	170	-10.4	53.0	10.0	20,000	9.5	140	3,000	4.2	10	B8A	23
UL84	(P)	45.0	0.1	170	170	-12.5	70.0	5.0	23,000	10.0	170	2,400	5.6	10	B9A	16
UCL82	(TP)	50.0	0.1	Other data as PCL82												
EMITRON																
Obsolete Types																
3A4	(BT)	1.4*	0.2†	150	90	-8.4	13.3	2.2	100,000	1.9	-	8,000	0.7	6	B7G	7
6L6G	(BT)	6.3	0.9	350	250	-18.0	54.0	2.5	33,000	5.2	300	4,200	10.8	15	IO	36
Current Types																
3S4	(BT)	1.4	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.58	-	8,000	0.27	12	B7G	6
6AM5	(P)	6.3	0.2	250	250	-13.5	16.0	2.4	130,000	2.6	730	16,000	1.4	10	B7G	25
6AQ5	(BT)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B7G	27
7C5	(BT)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B8B	10
807	(BT)	6.3	0.9	500	200	-14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
35A5	(BT)	35.0	0.15	200	110	-8.0	41.0	2.0	40,000	5.9	185	4,500	3.3	10	B8B	10
FERRANTI																
Obsolete Types																
1C5	(P)	1.4*	0.1	90	90	-7.5	7.8	3.5	115,000	1.55	-	8,000	0.24	10	IO	78
3D6	(BT)	1.4*	0.22†	135	90	-4.5	9.8	1.2	150,000	2.4	-	12,000	0.5	-	B8B	32
LP2	(T)	2.0*	0.3	150	-	-18.0	22.0	-	1,500	3.0	-	3,500	0.45	5	B4	1
PT2	(P)	2.0*	0.2	120	120	-4.5	5.3	1.1	-	2.6	-	20,000	0.35	-	B5	6
L4	(T)	4.0*	1.0	250	-	-16.0	20.0	-	3,300	3.2	800	10,000	0.5	4	B5	1
LP4	(T)	4.0*	1.0	250	-	-36.0	48.0	-	870	5.5	700	2,500	3.0	4	B4	1
PT4	(P)	4.0	2.0	250	250	-6.0	32.5	7.0	-	7.5	150	6,500	3.5	10	B7	24
PT4D	(DD, P)	4.0	2.0	250	250	-6.0	32.5	7.0	-	7.5	150	6,500	3.5	10	B7	9
42	(P)	6.3	0.7	250	250	-16.5	34.0	6.5	80,000	2.5	410	7,000	3.2	8	UX6	8
PTZ	(P)	10.0	0.2	250	250	-6.2	32.5	5.0	-	7.5	160	5,000	-	-	B7	15
PTA	(P)	13.0	0.3	250	250	-9.8	32.5	6.0	-	6.0	250	7,000	-	-	B7	24
PTSD	(DD, P)	26.0	0.3	250	200	-5.0	40.0	7.0	-	6.0	120	6,000	3.5	-	B7	9

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
FERRANTI *(Continued)*																
Replacement Types																
1A5	(P)	1.4*	0.05	90	90	-4.5	4.0	1.1	300,000	0.85	-	25,000	0.115	7	IO	78
1Q5	(BT)	1.4*	0.1	90	90	-4.5	9.5	1.3	75,000	2.2	-	8,000	0.27	6	IO	78
1S4	(BT)	1.4*	0.1	90	67.5	-7.0	7.4	1.4	100,000	1.575	-	8,000	0.27	12	B7G	4
3Q5	(BT)	1.4*	0.1†	90	90	-4.5	9.5	1.3	80,000	2.15	-	10,000	0.27	6	IO	87
3S4	(P)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.58	-	8,000	0.27	12	B7G	6
6AG7	(P)	6.3	0.65	300	150	-3.0	30.0	7.0	130,000	11.0	-	10,000	3.0	7	IO	11
6AQ5/EL90	(P)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B7G	27
6AM5/EL91	(P)	6.3	0.2	250	250	-13.5	16.0	2.4	250,000	2.6	750	6,000	2.0	10	B7G	25
6C4	(T)	6.3	0.15	250	-	-8.5	10.5	-	7,700	2.2	-	-	-	-	B7G	15
6G6	(P)	6.3	0.15	180	180	-9.0	15.0	2.5	175,000	2.3	540	10,000	1.1	10	IO	36
6F6	(P)	6.3	0.7	285	285	-22.0	38.0	12.0	78,000	2.55	440	7,000	4.5	9	IO	36
6K6	(P)	6.3	0.4	250	250	-18.0	32.0	5.5	68,000	2.3	470	7,600	3.4	10	IO	36
6L6	(BT)	6.3	0.9	300	200	-13.0	54.5	4.6	33,000	5.2	220	4,500	6.5	11	IO	36
6V6	(BT)	6.3	0.45	315	225	-13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	IO	36
6Y6	(BT)	6.3	1.25	200	135	-14.0	66.0	9.0	18,300	7.1	186	2,600	6.0	10	IO	36
7C5	(BT)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B8B	10
807	(BT)	6.3	0.9	500	200	-14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
EL41/6CK5	(P)	6.3	0.7	250	250	-7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	23
EL42	(P)	6.3	0.2	225	225	-12.5	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	23
12A6	(BT)	12.6	0.15	250	250	-12.5	30.0	3.5	70,000	3.0	375	7,500	2.4	-	IO	36
25L6	(BT)	25.0	0.3	200	110	-8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
35L6	(BT)	35.0	0.15	200	110	-8.0	44.0	7.0	40,000	5.9	185	4,500	3.3	10	IO	36
UL41	(P)	45.0	0.1	200	200	-14.2	45.0	8.5	24,000	8.2	-	4,300	4.2	10	B8A	23
50L6	(BT)	50.0	0.15	200	110	-8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
Current Types																
3V4/DL94	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
DL96/3C4	(P)	1.4*	0.05†	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
ECL80/6AB8	(TP)	6.3	0.3	200	200	-8.0	17.5	3.3	150,000	3.3	-	11,000	1.4	10	B9A	13
ECL82	(TP)	6.3	0.78	250	250	-22.5	28.0	5.7	25,000	5.0	680	9,000	3.4	10	B9A	37
ECL83	(TP)	6.3	0.6	200	200	-13.0	27.0	4.4	65,000	5.0	-	7,500	2.5	10.5	B9A	27
EL84/6BQ5	(P)	6.3	0.76	250	250	-7.3	48.0	5.5	38,000	11.0	135	5,200	5.7	10	B9A	16
EL85/6BN5	(P)	6.3	0.2	225	225	-10.8	26.0	4.1	90,000	3.2	360	9,000	2.8	12	B9A	26
PCL83	(TP)	12.6	0.3	200	200	-13.0	27.0	4.4	55,000	5.5	-	7,500	2.5	10	B9A	27
15A6	(P)	15.0	0.3	170	170	-2.3	36.0	5.0	100,000	10.0	-	-	-	-	B9A	14
PCL84	(TP)	15.0	0.3	200	200	-2.9	18.0	3.1	30,000	10.0	-	-	-	-	B9A	53
PL83	(P)	15.0	0.3	170	170	-2.3	36.0	5.0	100,000	10.0	-	-	-	-	B9A	14
PL84	(P)	15.0	0.3	170	170	-12.5	70.0	3.5	26,000	10.8	-	2,400	5.6	10	B9A	16
PCL82/16A8	(TP)	16.0	0.3	170	170	-11.5	41.0	7.5	16,000	7.5	-	-	-	-	B9A	37
PCL85	(TP)	18.0	0.3	170	170	-15.0	41.0	2.7	25,000	7.25	-	-	-	-	B9A	66
UCL83	(TP)	40.0	0.1	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.2	10	B9A	27
UL84	(P)	45.0	0.1	170	170	-12.5	70.0	5.0	23,000	10.0	-	2,400	5.6	10	B9A	16
UCL82	(TP)	50.0	0.1	200	200	-16.0	35.0	7.0	20,000	6.6	-	5,600	3.5	10	B9A	37
HIVAC																
Obsolete Types																
XFY10	(P)	1.25*	0.025	22.5	22.5	-1.25	0.5	0.2	-	0.35	-	50,000	0.003	-	B5A	1
XFY11	(P)	1.25*	0.025	22.5	22.5	0	0.3	0.009	-	0.42	-	200,000	0.0012	-	B5A	1
XFY12	(P)	1.25*	0.025	22.5	22.5	-0.5	0.25	0.08	-	0.37	-	175,000	0.00175	-	B5A	1
XFY21	(BT)	1.25*	0.0125	22.5	22.5	0	0.38	0.095	-	0.41	-	100,000	0.0018	-	B5A	1
XFY22	(BT)	1.25*	0.0125	22.5	22.5	-1.2	0.3	0.075	-	0.36	-	100,000	0.0023	-	B5A	1
XFY23	(BT)	1.25*	0.0175	22.5	22.5	-2.0	0.4	0.09	-	0.34	-	50,000	0.00375	-	B5A	1
XFY31	(BT)	1.25*	0.0125	22.5	22.5	0	0.38	0.095	-	0.41	-	100,000	0.0018	-	B5A	1
XFY32	(BT)	1.25*	0.0125	22.5	22.5	-1.5	0.375	0.09	-	0.32	-	75,000	0.0027	-	B5A	1
XFY33	(BT)	1.25*	0.0175	22.5	22.5	-2.0	0.4	0.09	-	0.34	-	50,000	0.00375	-	B5A	1

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
HIVAC *(Continued)*																
Replacement Types																
XFY15	(BT)	1.25*	0.02	67.5	67.5	-6.5	3.1	0.95	-	0.65	-	20,000	0.065	-	B5A	1
XFY35	(BT)	1.25*	0.025	22.5	22.5	-0.5	0.19	0.065	-	0.32	-	60,000	0.002	-	B5A	1
XFY41	(BT)	1.25*	0.01	30	30	-1.2	0.3	0.075	-	0.38	-	100,000	0.0033	-	B5A	1
XFY43	(BT)	1.25*	0.01	30	30	-3.5	0.5	0.12	-	0.36	-	50,000	0.0075	-	B5A	1
XFY51	(BT)	1.25*	0.01	22.5	22.5	0	0.32	0.09	-	0.32	-	80,000	0.0023	-	B5A	1
XFY53	(BT)	1.25*	0.01	15	15	-2.0	0.18	0.06	-	0.17	-	50,000	0.00125	-	B5A	1
XFY54	(BT)	1.25*	0.01	22.5	22.5	-2.0	0.34	0.08	-	0.28	-	30,000	0.00275	-	B5A	1
Current Types																
XFY14	(P)	1.25*	0.05	67.5	67.5	-6.5	3.1	0.95	-	0.65	-	-	0.07	-	B5A	1
XFY34	(BT)	1.25*	0.026	45	45	-4.0	1.5	0.36	-	0.6	-	25,000	0.03	-	B5A	1
MARCONI																
Obsolete Types																
N14	(P)	1.4*	0.1	90	90	-7.0	7.0	1.7	-	1.55	700	8,000	0.25	-	IO	78
N15	(P)	1.4*	0.1†	90	90	-7.0	7.0	1.7	-	1.55	-	8,000	0.25	12	IO	87
N16	(P)	1.4*	0.1†	90	90	-4.5	9.5	1.3	-	2.1	-	8,000	0.27	6	IO	87
KT21	(BT)	2.0*	0.3	150	120	-2.5	5.3	1.0	-	5.3	-	19,000	0.46	-	B5	6
KT24	(BT)	2.0*	0.2	150	150	-2.8	10.0	2.1	-	3.2	200	10,000	0.64	10	B5	6
DA30	(T)	4.0*	2.0	500	-	-144.0	60.0	-	-	3.85	-	6,000	11.0	5.5	B4	1
DN41	(P,DD)	4.0	2.3	250	200	-3.3	32.0	8.0	-	10.0	90	7,800	4.5	-	B7	9
KT42	(BT)	4.0	1.0	250	250	-16.5	34.0	5.5	-	2.5	420	7,000	3.25	-	B7	24
KT45	(BT)	4.0	2.0	‡	300	-15.0	85.0	6.3	-	6.3	160	2,200	7.25	9	B7	37
MKT4	(BT)	4.0	1.0	200	200	-10.5	32.0	4.0	-	3.0	365	8,000	2.5	10	B7	24
N43	(P)	4.0	2.0	250	250	-4.4	40.0	10.0	-	10.0	90	5,400	4.5	-	B7	15
PT25	(P)	4.0*	2.0	400	200	-22.0	62.5	10.6	-	4.0	330	6,000	10.0	-	B5	6
KT81	(BT)	6.3	0.95	250	250	-4.4	40.0	7.5	-	10.8	90	6,000	4.3	8	B8B	10
KT30	(BT)	13.0	0.3	250	250	-12.0	40.0	7.0	-	3.9	260	7,500	2.7	-	B7	24
KT35	(BT)	13.0	0.6†	200	200	-11.5	50.0	8.5	-	10.0	200	4,000	4.2	-	IO	73
KT31	(BT)	26.0	0.3	200	180	-4.0	40.0	10.6	-	10.0	80	5,500	2.5	-	B7	15
KT101	(BT)	80.0	0.1	175	175	-9.8	70.0	12.0	-	10.0	180	3,000	3.8	12	B8B	10
	(T)	80.0	0.1	175	-	-7.5	120.0	-	-	11.5	-	-	-	-	B8B	10
Replacement Types																
DL92/N17	(P)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	-	1.425	-	8,000	0.27	12	B7G	6
KT2	(BT)	2.0*	0.2	150	150	-4.5	7.5	1.7	-	2.5	-	17,000	0.5	-	B5	6
LP2	(T)	2.0*	0.2	100	-	-3.0	5.0	-	4,170	3.6	-	7,000	0.15	-	B4	1
P2	(T)	2.0*	0.2	100	-	-6.0	11.0	-	2,150	3.5	-	4,500	0.3	-	B4	1
KT41	(BT)	4.0	2.0	250	250	-4.4	40.0	8.5	-	10.5	90	6,000	4.2	8	B7	24
PX25	(T)	4.0*	2.0	400	-	-31.0	62.5	-	1,265	7.5	1,000	5,500	6.0	7	B4	1
KT63	(BT)	6.3	0.7	250	250	-16.5	34.0	5.5	-	2.5	420	7,000	4.8	-	IO	36
KT76	(BT)	15.0	0.16	175	175	-12.5	33.0	6.0	-	2.5	300	5,000	2.0	4.5	IO	36
KT32	(BT)	26.0	0.3	110	110	-7.0	50.0	4.0	-	9.0	95	1.300	2.3	11	IO	36
KT71	(BT)	48.0	0.16	175	175	-9.8	70.0	12.0	-	10.0	120	2,500	5.0	9	IO	36
Current Types																
DL94/N19	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	58
DL96	(P)	1.4*	0.05	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
N18/3Q4	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	6
KT44/45	(BT)	4.0	2.0	250	250	-25.0	85.0	20.0	-	6.3	-	2,200	7.5	9	B7	37
PX4	(T)	4.0*	1.0	300	-	-45.0	50.0	-	830	6.0	1,000	3,500	4.5	4	B4	1
EBL21/DN143	(P,DD)	6.3	0.8	250	250	-6.0	36.0	4.5	70,000	9.0	120	5,700	4.5	10	B8B	62
ECL80/LN152	(TP)	6.3	0.3	200	200	-8.0	17.5	3.3	150,000	3.3	-	11,000	1.4	10	B9A	13
ECL82	(TP)	6.3	0.78	250	250	-22.5	28.0	5.5	25,000	5.0	680	9,000	3.4	10	B9A	37
ECL83	(TP)	6.3	0.6	200	200	-1.3	27.0	4.4	65,000	5.0	-	75,000	2.5	10.5	B9A	27
ECL86	(TP)	6.3	0.7	250	250	-7.0	36.0	6.0	48,000	10.0	-	-	4.0	-	B9A	76
EL33/N147	(P)	6.3	0.9	250	250	-6.0	36.0	4.0	50,000	9.0	150	7,000	4.0	10	IO	36

(Continued)

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MARCONI *(Continued)*																
Current Types (Continued)																
EL41/N150	(P)	6.3	0.7	250	250	-7.0	36.0	5.2	40,000	10.0	-	7,000	4.2	10	B8A	23
EL42/N151	(P)	6.3	0.2	225	225	-11.0	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	23
EL81	(P)	6.3	1.05	250	250	-38.5	32.0	2.4	15,000	4.6	-	-	-	-	B9A	17
EL84/N709	(P)	6.3	0.76	250	250	-7.3	48.0	-	38,000	11.3	120	5,000	6.0	10	B9A	16
EL95	(P)	6.3	0.2	250	250	-9.0	24.0	4.5	80,000	5.0	320	10,000	3.0	12	B7G	67
KT61	(BT)	6.3	0.95	250	250	-4.4	40.0	7.5	-	10.5	90	6,000	4.3	8	IO	36
KT66	(BT)	6.3	1.27	250	250	-15.0	85.0	6.3	-	6.3	160	2,200	7.25	9	IO	36
N144	(P)	6.3	0.2	250	250	-13.8	16.0	2.4	130,000	2.6	680	16,000	1.4	10	B7G	63
N148/7C5	(BT)	6.3	0.45	250	250	-12.5	45.0	4.5	77,000	4.1	360	8,500	-	12	B8B	63
N155	(P)	6.3	0.2	225	225	-10.8	26.0	4.1	90,000	3.2	-	9,000	2.6	-	B9A	26
N727/6AQ5	(BT)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	240	5,000	4.5	8	B7G	27
HN309	(TP)	12.6	0.3	165	165	-9.0	30.0	6.5	45,000	4.7	220	6,000	-	10	B9A	27
N369	(BT)	12.6	0.3	170	180	-10.3	31.0	7.3	-	6.7	270	5,000	2.25	7	B9A	16
PCL83/LN309	(TP)	12.6	0.3	200	200	-13.0	27.0	4.4	45,000	5.5	220	6,000	2.5	10	B9A	27
KT33C	(BT)	13.0	0.6†	175	175	-7.0	44.0	8.0	-	10.0	190	3,000	4.0	-	IO	73
LN319	(T,BT)	13.0	0.3	170	180	-9.6	28.0	6.5	-	6.5	270	6,000	2.0	7	B9A	27
N37	(P)	13.0	0.3	165	165	-9.0	53.0	9.0	23,000	9.5	330	6,000	4.1	10	B7G	25
PCL86	(TP)	13.3	0.3	230	230	-5.7	39.0	6.5	45,000	10.5	125	5,100	4.1	10	B9A	76
PCL84	(TP)	15.0	0.3	220	220	-3.4	18.0	3.1	150,000	10.0	-	-	-	-	B9A	53
PL83/N309	(P)	15.0	0.3	200	200	-3.5	36.0	5.0	41,000	10.0	68	5,000	1.1	7.8	B9A	14
PL84	(P)	15.0	0.3	170	170	-12.5	70.0	3.5	26,000	11.0	-	-	-	-	B9A	16
PCL82	(TP)	16.0	0.3	200	200	-16.0	35.0	6.5	20,000	6.4	-	5,000	3.5	10	B9A	37
PFL200	(DP)	16.5	0.3	170	170	-2.6	30.0	6.5	40,000	21.0	-	-	-	-	B10B	1
PL82/N329	(P)	16.5	0.3	200	200	-14.2	45.0	8.5	20,000	7.6	180	3,000	4.2	10	B9A	16
PCL85	(TP)	18.0	0.3	170	170	-15.0	41.0	2.7	25,000	7.25	-	-	-	-	B9A	66
N108	(P)	40.0	0.1	165	165	-9.0	53.0	9.0	23,200	9.5	150	3,000	4.1	10	B7G	25
N118	(BT)	40.0	0.1	100	150	-6.3	29.0	5.8	-	7.5	180	5,400	2.6	10	B8A	7
N145	(P)	40.0	0.1	180	150	-6.3	29.0	5.8	-	7.5	180	5,800	2.6	10	B8A	7
UL41/N142	(P)	45.0	0.1	200	200	-14.2	45.0	8.5	20,000	8.2	140	3,000	4.2	10	B8A	23
UL84	(P)	45.0	0.1	170	170	-12.5	70.0	5.0	23,000	10.0	170	2,400	5.6	10	B9A	16
UCL82	(TP)	50.0	0.1	200	200	-16.0	35.0	7.0	20,000	6.6	-	5,600	3.5	10	B9A	37

‡ Maximum anode voltage, 8,000 peak

MAZDA (EXPORT EDISWAN)																
Obsolete Types																
Pen141	(P)	1.4*	0.1	90	90	-9.0	5.5	1.1	-	1.4	-	10,000	0.24	12	MO	3
P215	(T)	2.0*	0.15	150	-	-13.5	5.8	-	6,500	1.1	-	11,000	0.15	5	B4	1
P220	(T)	2.0*	0.2	150	-	-7.0	5.5	-	5,600	2.2	-	10,000	0.15	5	B4	1
P220A	(T)	2.0*	0.2	150	-	-14.0	15.0	-	2,400	2.7	-	4,100	0.35	5	B4	1
PA20	(T)	2.0*	2.0	300	-	-36.0	48.0	-	1,100	5.2	750	3,000	4.2	5	B4	1
Pen24	(P)	2.0*	0.3	120	120	-3.3	5.0	1.0	-	4.0	-	15,000	0.37	16	MO	3
Pen25	(P)	2.0*	0.15	120	120	-3.6	5.0	1.0	350,000	3.0	-	14,000	0.4	16	MO	3
Pen220	(P)	2.0*	0.2	150	150	-4.9	9.0	1.6	-	2.2	-	14,000	0.6	7	B5	6
Pen220A	(P)	2.0*	0.2	150	150	-9.0	18.0	3.6	270,000	2.2	-	6,000	1.1	7	B5	6
Pen231	(P)	2.0*	0.3	120	120	-2.5	5.0	1.0	500,000	3.6	-	19,000	0.37	14	B5	6
AC/P	(T)	4.0	1.0	200	-	-13.5	17.0	-	3,700	2.7	800	5,000	0.65	7	B5	1
ACP1	(T)	4.0	1.0	200	-	-28.0	24.0	-	2,200	2.3	1,500	5,000	1.0	5	B5	1
AC/Pen	(P)	4.0	1.0	250	250	-15.5	32.0	6.0	75,000	2.7	410	7,500	3.3	7	B7	24
AC/2Pen	(P)	4.0	1.75	250	250	-5.3	32.0	6.0	110,000	8.5	140	6,700	3.5	7	B7	24
AC/2 PenDD	(P,DD)	4.0	2.0	250	250	-5.3	32.0	6.0	110,000	8.5	140	6,700	3.5	7	B7	9
AC/4Pen	(BT)	4.0	1.75	250	250	-8.75	64.0	13.0	20,000	12.0	115	3,300	6.9	7	B7	24
AC/5Pen	(BT)	4.0	1.75	250	250	-8.5	40.0	7.5	-	9.4	180	5,200	4.85	7	B7	24
AC/5 PenDD	(BT,DD)	4.0	2.0	250	250	-8.5	40.0	7.5	-	9.4	180	5,200	4.85	7	B7	9

(Continued)

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*																
Obsolete Types (Continued)																
PP3/250	(T)	4.0*	1.0	300	-	-37.0	48.0	-	1,100	5.2	770	3,000	4.2	5	B4	1
PP5/400	(T)	4.0*	2.0	400	-	-32.0	62.5	-	1,100	8.0	510	2,700	5.9	5	B4	1
Pen44	(BT)	4.0	2.1	260	270	-11.1	70.0	12.0	-	10.6	135	3,000	8.0	7	MO	20
Pen44	(T)	4.0	2.1	275	-	-13.6	57.0	-	1,200	11.5	240	2,400	3.2	5	MO	20
Pen45 Pen45 AN (SQ)	(BT)	4.0	1.75	250	250	-8.5	40.0	8.0	40,000	8.8	180	5,000	4.5	7	MO	20
Pen45	(T)	4.0	1.75	250	-	-9.8	35.0	-	1,900	9.3	280	3,500	1.7	5	MO	20
Pen/45DD	(BT,DD)	4.0	2.0	250	250	-8.5	40.0	8.0	40,000	8.8	180	5,000	4.5	7	MO	15
6P1	(BT)	6.3	0.8	250	250	-8.5	40.0	7.5	40,000	8.8	180	5,000	4.2	7	IO	36
Pen1340	(P)	13.0	0.4	240	240	-8.6	41.0	8.0	80,000	6.4	175	5,500	3.5	7	B7	24
PenDD 1360	(P,DD)	13.0	0.6	250	250	-5.3	32.0	6.0	100,000	8.2	140	6,700	3.5	7	B7	9
Pen3520	(P)	35.0	0.2	200	200	-8.0	40.0	8.0	67,000	7.3	165	4,400	3.0	7	B7	24
PP3521	(T)	35.0	0.2	200	-	-25.0	70.0	-	950	6.3	360	2,000	2.3	5	B7	16
Pen383	(BT)	38.0	0.2	160	175	-10.0	64.0	13.0	-	10.5	130	2,600	3.75	7	MO	20
Pen384	(BT)	38.0	0.2	110	110	-7.0	40.0	2.9	-	7.8	160	2,200	1.9	10	MO	20
Pen3820	(BT)	38.0	0.2	160	175	-10.0	64.0	13.0	-	10.5	130	2,600	3.75	7	B7	24
PenDD 4020	(P,DD)	40.0	0.2	240	250	-7.5	43.0	8.5	-	7.8	150	4,800	3.9	7	B7	9
Pen453 DD	(BT,DD)	45.0	0.2	160	175	-10.0	64.0	13.0	-	10.5	130	2,600	3.75	7	MO	15
PenDD4021	(BT)	45.0	0.2	160	175	-10.0	64.0	13.0	-	10.5	130	2,600	3.75	7	B7	9
Replacement Types																
1P1		1.4*	0.05†	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
1P10 3S4	(P)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	-	1.57	-	8,000	0.27	12	B7G	6
1P11 3V4	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
DL92	(P)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.57	-	8,000	0.27	12	B7G	6
DL94	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
DL96	(P)	1.4*	0.05†	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
6P17	(P)	6.3	0.2	250	250	-13.5	16.0	2.4	-	2.6	740	16,000	1.4	10	B7G	77
6P25	(BT)	6.3	1.1	250	250	-8.5	40.0	8.0	40,000	8.8	180	5,000	4.5	7	IO	36
ECL80	(TP)	6.3	0.3	200	200	-8.0	17.5	3.3	150,000	3.3	-	11,000	1.4	10	B9A	13
EL95	(P)	6.3	0.2	250	250	-9.0	24.0	4.5	80,000	5.0	320	10,000	3.0	12	B7G	67
ELL80	(DP)	6.3	0.55	250	250	-9.0	24.0	4.5	80,000	6.0	160	10,000	3.0	10	B9A	68
30P12	(BT)	12.6	0.3	170	180	-10.3	31.0	7.3	-	6.7	270	5,000	2.25	7	B9A	16
PCL83	(TP)	12.6	0.3	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.2	10	B9A	27
30PL1	(T,BT)	13.0	0.3	170	180	-9.6	28.0	6.5	-	6.5	270	6,000	2.0	7	B9A	27
30P18	(P)	15.0	0.3	160	170	-12.5	70.0	5.0	23,000	10.0	-	2,200	5.2	10	B9A	16
PL83	(P)	15.0	0.3	170	170	-2.3	36.0	5.0	100,000	10.0	-	-	-	-	B9A	14
PL84	(P)	15.0	0.3	170	170	-12.5	70.0	5.0	23,000	10.0	170	2,200	5.2	10	B9A	16
30PL13	(T,BT)	16.0	0.3	170	170	-13.5	45.0	9.0	-	7.5	TV frame - output valve				B9A	37
30PL15	(T,BT)	16.0	0.3	170	170	-15.0	50.0	3.0	-	7.6	TV field output				B9A	66
30P16	(P)	16.5	0.3	170	170	-10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
PL82	(P)	16.5	0.3	170	170	-10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
20P3	(BT)	20.0	0.2	195	210	-11.5	51.0	12.7	-	7.4	180	3,700	4.5	7	IO	36
20P5	(BT)	20.0	0.2	180	150	-6.3	29.0	5.8	-	7.5	180	5,400	2.6	10	B8A	7
10P13	(BT)	40.0	0.1	180	150	-6.3	29.0	5.8	-	7.5	180	5,400	2.6	10	B8A	7
10P14	(BT)	40.0	0.1	195	210	-11.5	51.0	12.7	-	7.4	180	3,700	4.5	7	IO	36
UL41	(P)	45.0	0.1	170	170	-10.4	53.0	10.0	20,000	9.5	160	3,000	4.2	10	B8A	23
Current Types																
6P15	(P)	6.3	0.76	250	250	-7.3	48.0	5.5	38,000	11.3	135	4,000	5.4	10	B9A	16
6PL12	(T,BT)	6.3	0.78	250	250	-22.5	28.0	5.5	25,000	5.0	680	9,000	3.4	10	B9A	37
ECL82	(TP)	6.3	0.78	250	250	-22.5	28.0	5.5	25,000	5.0	680	9,000	3.4	10	B9A	37
ECL86	(TP)	6.3	0.66	250	250	-7.0	36.0	6.0	48,000	10.0	170	5,900	4.3	10	B9A	76
EL84	(P)	6.3	0.76	250	250	-7.3	48.0	5.5	38,000	11.3	135	4,000	5.4	10	B9A	16

(Continued)

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*																
Current Types (Continued)																
PCL86	(TP)	13.6	0.3	230	230	-5.7	41.0	10.5	45,000	10.5	125	5,100	4.1	10	B9A	76
30PL12	(T,BT)	16.0	0.3	200	200	-16.0	35.0	7.0	-	6.4	380	5,600	3.5	10	B9A	37
30P14	(T,BT)	16.0	0.3	170	170	-15.0	50 0	3.0	-	7.6	TV frame-output valve				B9A	37
PCL82	(TP)	16.0	0.3	200	200	-16.0	35.0	7.0	20,000	6.4	380	5,600	3.5	10	B9A	37
PCL85	(TP)	18.0	0.3	170	170	-15.0	41.0	2.7	25,000	7.5	TV field output			-	B9A	66
10P18	(P)	45.0	0.1	160	170	-12.5	70.0	5.0	23,000	10.0	-	2,200	5.2	10	B9A	16
UL84	(P)	45.0	0.1	160	170	-12.5	70.0	5.0	23,000	10.0	-	2,200	5.2	10	B9A	16
10PL12	(T,BT)	50.0	0.1	200	200	-16.0	35.0	7.0	-	6.4	380	5,600	3.5	10	B9A	37
UCL82	(TP)	50.0	0.1	200	200	-16.0	35.0	7.0	20,000	6.4	380	5,600	3.5	10	B9A	37
M.O. VALVE CO.																
Replacement Types																
PX4	(T)	4.0*	1.0	300	-	-50.0	50.0	-	830	6.0	1,000	3,500	4.5	4	B4	1
PX25	(T)	4.0*	2.0	500	-	-50.0	50.0	-	1,265	7.5	1,000	5,500	8.5	7	B4	1
A2134	(P)	6.3	0.635	165	165	-9.3	53.0	9.0	23,200	9.5	150	3,000	4.1	10	B7G	25
EL84/N709	(P)	6.3	0.76	250	250	-7.5	48.0	-	38,000	11.3	120	5,000	6.0	10	B9A	16
KT61	(BT)	6.3	0.95	250	250	-4.4	40.0	7.5	-	10.5	90	6,000	4.3	8	IO	36
KT33C	(BT)	13.0	0.6†	200	200	-13.3	60.0	10.0	-	10.0	190	3,000	5.0	8	IO	73
Current Types																
KT66	(BT)	6.3	1.27	250	250	-15.0	85.0	6.3	22,500	6.3	160	2,200	7.25	9	IO	36
KT88	(BT)	6.3	1.6	300	300	-20.0	130.0	13.5	-	12.0	11,150	3,500	-	7	IO	Special
N78	(P)	6.3	0.64	250	250	-5.5	36.0	5.0	40,000	10.0	120	7,000	4.0	10	B7G	25
MULLARD																
Obsolete Types																
DL66	(P)	1.25*	0.015	22.5	22.5	-1.4	0.3	0.075	300,000	0.35	-	75,000	0.0027	10	B5A	
DL71	(P)	1.25*	0.025	45	45	-1.25	0.6	0.15	350,000	0.55	-	100,000	0.0063	10	B8D†	6
DL72	(P)	1.25*	0.025	45	45	-4.5	1.25	0.4	170,000	0.55	2,700	30,000	0.02	10	B8D†	6
DL75	(P)	1.25*	0.025	90	90	-2.5	1.75	0.4	450,000	0.85	-	60,000	0.05	10	B8D†	6
1C5	(P)	1.4*	0.1	90	90	-7.5	7.8	3.5	115,000	1.55	-	8,000	0.24	10	IO	78
3Q5	(P)	1.4*	0.1†	110	110	-6.6	10.0	1.4	90,000	2.2	-	8,000	0.4	6	IO	87
DL2	(P)	1.4*	0.1	90	90	-7.5	7.5	1.6	115,000	1.55	-	8,000	0.24	10	Ct8	25
ACO42	(T)	2.0*	2.0	300	-	-38.0	50.0	-	1,200	5.0	760	2,300	3.5	5	B4	1
KL35	(P)	2.0*	0.15	135	135	-4.5	5.6	-	150,000	2.2	-	19,000	0.34	10	IO	78
PM2	(T)	2.0*	0.2	100	-	-	14.5	-	4,400	1.7	-	9,000	-	-	B4	1
PM2A	(T)	2.0*	0.2	135	-	-6.0	5.0	-	6,000	2.0	-	7,000	0.15	5	B4	1
PM22	(P)	2.0*	0.3	125	125	-9.0	10.0	4.0	62,500	1.3	-	8,000	-	-	B4	6
PM22A/5	(P)	2.0*	0.15	135	135	-4.5	5.6	-	150,000	2.2	-	19,000	0.34	10	B4	6
PM22D	(P)	2.0*	0.3	135	135	-2.4	5.0	0.8	-	3.0	-	24,000	0.3	10	B5	6
PM202	(T)	2.0*	0.2	150	-	-15.0	14.0	-	2,000	3.5	-	3,700	2.0	-	B4	1
ACO44	(T)	4.0*	1.0	300	-	-38.0	50.0	-	1,200	5.0	760	2,300	3.5	5	B4	1
DO24	(T)	4.0*	1.85	400	-	-40.0	63.0	-	1,000	7.5	630	3,200	7.1	4	B4	1
DO26	(T)	4.0*	2.0	400	-	-92.0	63.0	-	950	3.8	1,500	3,000	7.5	10	B4	1
DO30	(T)	4.0*	2.0	500	-	- 134.0	60.0	-	580	6.9	2,250	6,000	11.0	3	B4	1
Pen4VA	(P)	4.0	1.35	250	250	-20.0	36.0	3.0	40,000	2.8	500	6,000	3.8	10	B5	7
															B7	24
Pen428	(P)	4.0	2.1	250	250	-	72.0	-	-	-	150	3,200	8.0	10	B7	24
PenB4	(P)	4.0	2.1	250	275	13.8	72.0	7.0	22,000	8.5	175	3,500	8.8	10	B7	24
PM24A	(P)	4.0*	0.275	300	200	-22.5	20.0	3.5	-	2.0	-	10,000	2.5	10	B5	6
PM24M	(P)	4.0*	1.1	250	250	-17.0	30.0	5.6	43,000	3.0	540	7,000	2.8	-	B5	6
6L6	(BT)	6.3	0.9	350	250	-18.0	54.0	2.5	33,000	5.2	300	4,200	11.0	15	IO	36
6F6	(P)	6.3	0.7	285	285	-20.0	38.0	12.0	78,000	2.55	440	7,000	4.8	9	IO	36
6V6	(BT)	6.3	0.45	250	250	-12.5	45.0	4.5	50,000	4.1	250	8,500	4.5	8	IO	36
EBL1	(P,DD)	6.3	1.2	250	250	-6.0	36.0	5.0	55,000	9.5	146	7,000	4.3	10	Ct8	13
EBL31	(P,DD)	6.3	1.2	250	250	-6.0	36.0	5.0	55,000	9.5	146	7,000	4.3	10	IO	15
EC31	(T)	6.3	0.65	250	-	-16.0	20.0	-	3,000	3.2	800	10,000	0.5	5	IO	20

(Continued)

Type	Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MULLARD *(Continued)*															
Obsolete Types (Continued)															
EL2 (P)	6.3	0.2	250	250	-18.0	32.0	5.0	70,000	2.8	485	8,000	3.6	10	Ct8	33
EL3 (P)	6.3	0.9	250	250	-6.0	36.0	4.0	50,000	9.0	150	7,000	4.0	10	Ct8	12
EL3 (T)	6.3	0.9	250	-	-8.5	20.0	-	3,000	6.5	425	7,000	1.1	5	Ct8	12
EL6 / EL36 (P)	6.3	1.2	250	250	-7.0	72.0	8.0	20,000	14.5	90	3,500	8.0	10	Ct8 / IO	12 / 36
EL22 (P)	6.3	0.7	250	250	-7.0	44.0	5.2	45,000	9.5	140	5,750	5.2	10	B8B	10
EL31 (P)	6.3	1.4	275	275	-9.0	91.0	11.0	20,000	14.0	-	-	-	-	IO	40
EL32 (P)	6.3	0.2	250	250	-18.0	32.0	5.0	70,000	2.8	485	8,000	3.6	10	IO	9
EL35 (P)	6.3	1.35	250	250	-15.5	72.0	8.0	15,500	5.0	180	2,500	6.0	10	IO	36
EL50 (P)	6.3	1.35	250	275	-14.0	72.0	8.0	22,000	8.5	175	3,500	8.8	10	Ct8	21
Pen26 (P)	24.0	0.2	200	100	-19.0	40.0	5.0	-	3.1	420	5,000	3.0	10	Ct8	4
25A6 (P)	25.0	0.3	160	120	-18.0	33.0	12.0	42,000	2.4	440	5,000	2.2	10	IO	36
25L6 (P)	25.0	0.3	200	125	-8.7	46.0	2.2	28,000	8.0	180	3,000	3.8	10	IO	36
43 (P)	25.0	0.3	Other data as Type 25A6											UX6	8
CL4 (P)	33.0	0.2	200	200	-8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	Ct8	4
Pen36C (P)	33.0	0.2	200	200	-8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	B7	24
35L6 (P)	35.0	0.15	200	110	-8.0	41.0	2.0	40,000	5.9	185	4,500	3.3	10	IO	36
CL6 (P)	35.0	0.2	200	100	-9.5	45.0	5.5	19,000	8.0	190	4,500	4.0	10	Ct8	4
CBL1 (P,DD)	44.0	0.2	200	200	-8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	Ct8	13
CBL31 (P,DD)	44.0	0.2	200	200	-8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	IO	15
Pen40DD (P,DD)	44.0	0.2	200	200	-8.5	45.0	6.0	35,000	8.0	170	4,500	4.0	10	B7	22
50L6 (P)	50.0	0.15	200	125	-8.7	46.0	2.2	28,000	8.0	180	3,000	3.8	10	IO	36
Replacement Types															
DL64 (P)	1.25*	0.01	15	15	-1.5	0.16	0.04	400,000	0.18	-	100,000	0.00095	10	B5A	3
DL68 (P)	1.25*	0.025	22.5	22.5	-2.2	0.6	0.15	100,000	0.43	-	37,000	0.005	10	B5A	1
DL69 (P)	1.25*	0.025	90	90	-2.5	1.75	0.04	800,000	0.85	-	60,000	0.05	10	B5A†	5
DL70 (P)	1.25*	0.11	135	90	-7.5	7.5	1.5	150,000	1.9	-	16,000	0.5	10	B8D†	6
DL73 (P)	1.25*	0.2	100	100	-9.0	15.0	3.8	16,000	2.5	-	-	-	-	B8D†	6
DL620 (P)	1.25*	0.05	67.5	67.5	-6.5	3.1	0.95	110,000	0.65	-	15,000	0.085	10	B5A†	1
DL33 (P)	1.4*	0.1†	90	90	-4.5	9.5	1.3	90,000	2.2	-	8,000	0.27	6	IO	87
DL35 (P)	1.4*	0.1	90	90	-7.5	7.5	1.6	115,000	1.55	-	8,000	0.24	10	IO	78
DL92 (P)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.57	-	8,000	0.235	13	B7G	6
DL93 (P)	1.4*	0.2†	150	90	-8.4	13.3	2.2	100,000	1.9	-	8,000	0.7	6	B7G	7
DL94 (P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
DL96 (P)	1.4*	0.05	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
Pen4DD (P,DD)	4.0	2.25	250	250	-6.0	36.0	5.0	50,000	9.5	146	7,000	4.3	10	B7	22
PenA4 (P)	4.0*	1.95	250	250	-5.8	36.0	5.0	50,000	9.5	145	8,000	3.8	10	B7	24
42 (P)	6.3	0.7	Other data as Type 6F6											UX6	8
EBL21 (P,DD)	6.3	0.8	250	275	-6.2	44.0	5.8	50,000	9.5	125	5,700	5.5	10	B8B	6
EL33 (P)	6.3	0.9	250	250	-6.0	36.0	4.0	50,000	9.0	150	7,000	4.0	10	IO	36
EL33 (T)	6.3	0.9	250	-	-8.5	20.0	-	3,000	6.5	425	7,000	1.1	5	IO	36
EL37 (P)	6.3	1.4	250	250	-13.5	100.0	13.5	13,500	11.0	120	2,500	11.5	13.5	IO	36
EL41 (P)	6.3	0.7	250	250	-7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	23
EL41 (T)	6.3	0.7	250	-	-	33.0	-	-	-	250	3,500	1.55	8	B8A	23
EL42 (P)	6.3	0.2	225	225	-10.0	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	23
EL71 / 5902 (SQ) (P)	6.3	0.45	110	110	-8.3	30.0	2.0	15,000	4.2	270	3,000	1.0	10	B8D†	14
EL83 (P)	6.3	0.71	250	250	-5.5	36.0	5.0	130,000	10.0	-	-	-	-	B9A	14
EL95 (P)	6.3	0.2	250	250	-9.0	24.0	4.5	80,000	5.0	320	10,000	3.0	12	B7G	67
ELL80 (DP)	6.3	0.55	250	250	-4.6	24.0	4.5	80,000	6.0	160	10,000	3.0	10	B9A	68
PCL83 (TP)	12.6	0.3	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.5	10.5	B9A	27
PL801 / 30P12 (BT)	12.6	0.3	170	180	-10.3	31.0	7.3	-	-	-	5,000	2.25	-	B9A	16
PCL801 / 30LP1 (T,BT)	13.0	0.3	170	180	-9.0	32.0	6.5	-	7.2	270	6,000	2.0	5	B9A	27
PL83 (P)	15.0	0.3	170	170	-2.3	36.0	5.0	100,000	10.0	-	-	-	-	B9A	14
PL84 (P)	15.0	0.3	170	170	-12.5	70.0	3.5	26,000	11.0	-	-	-	-	B9A	16
PCL88 / 30PL14 (T,BT)	16.0	0.3	170	170	-15.0	50.0	3.0	-	7.3	-	-	-	-	B9A	37
PCL800 / 30PL13 (T,BT)	16.0	0.3	170	170	-13.5	45.0	8.7	-	7.5	-	-	-	-	B9A	37

(Continued)

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
MULLARD *(Continued)*																
Replacement Types (Continued)																
PL82	(P)	16.5	0.3	170	170	-10.4	53.0	10.0	20,000	9.0	165	3,000	4.2	10	B9A	16
PL33	(P)	19.0	0.3	225	225	-5.3	32.0	3.4	50,000	9.0	150	7,000	4.5	10		
	(T)	19.0	0.3	250	-	-8.5	20.0	-	3,000	6.5	425	7,000	1.1	5	IO	36
CL33	(P)	33.0	0.2	200	200	-8.5	45.0	6.0	35,000	8.0	167	4,500	4.0	10	IO	36
UCL83	(TP)	40.0	0.1	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.5	10.5	B9A	27
UL41	(P)	45.0	0.1	170	170	-10.4	53.0	10.0	20,000	9.5	160	3,000	4.2	10	B8A	23
UL46	(P)	45.0	0.1	170	170	-10.4	53.0	10.0	20,000	9.5	-	3,000	4.2	10	B8A	7
HL92	(P)	50.0	0.15	110	110	-7.5	94.0	4.0	10,000	7.5	-	2,500	1.9	9	B7G	42
UBL21	(P,DD)	55.0	0.1	200	200	-13.0	55.0	9.5	25,000	8.0	200	3,500	4.8	10	B8B	6
Current Types																
ECL80	(TP)	6.3	0.3	200	200	-8.0	17.5	3.3	150,000	3.3	-	11,000	1.4	10	B9A	13
ECL82	(TP)	6.3	0.78	250	250	-22.5	28.0	5.7	25,000	5.0	680	9,000	3.4	10	B9A	37
ECL83	(TP)	6.3	0.6	200	200	-13.0	27.0	4.4	53,000	5.5	-	75,000	2.5	10.5	B9A	27
ECL86	(TP)	6.3	0.70	250	250	-7.0	36.0	6.0	48,000	10.0	170	7,000	4.0	10	B9A	76
EL34	(P)	6.3	1.5	250	250	12.2	100.0	15.0	15,000	11.0	120	2,000	11.0	11	IO	133
EL84	(P)	6.3	0.76	250	250	-7.3	48.0	5.5	38,000	11.3	135	5,200	5.7	10	B9A	16
EL85	(P)	6.3	0.2	225	225	-10.8	26.0	4.1	90,000	3.2	360	9,000	2.6	10	B9A	26
EL86	(P)	6.3	0.76	170	170	-12.5	70.0	3.5	26,000	11.0	-	24,000	5.6	10	B9A	16
EL90	(P)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B7G	27
EL91 / M8082 (SQ)	(P)	6.3	0.2	250	250	-13.8	16.0	2.4	130,000	2.6	680	16,000	1.4	10	B7G	25
EL821	(P)	6.3	0.75	250	250	-4.5	40.0	6.0	50,000	11.0	-	-	-	-	B9A	19
EL822	(P)	6.3	0.75	250	150	-2.5	40.0	5.0	100,000	13.0	-	-	-	-	B9A	19
PCL86	(TP)	13.3	0.3	230	230	-5.7	41.0	10.5	45,000	10.5	125	5,100	4.1	10	B9A	76
PCL84	(TP)	15.0	0.3	220	220	-3.4	18.0	3.0	150,000	10.0	-	-	-	-	B9A	53
PCL82	(TP)	16.0	0.3	170	170	-11.5	41.0	9.0	16,000	7.5	-	3,900	3.3	10	B9A	37
PFL200	(DP)	16.5	0.3	170	170	-2.6	30.0	6.5	40,000	21.0	-	-	-	-	B10B	1
PCL85	(TP)	18.0	0.3	170	170	-15.0	41.0	2.7	25,000	7.25	-	-	-	-	B9A	66
UL84	(P)	45.0	0.1	170	170	-12.5	70.0	5.0	23,000	10.0	170	2,400	5.6	10	B9A	16
UCL82	(TP)	50.0	0.1	250	250	-22.5	28.0	5.5	25,000	5.0	-	9,000	3.4	10	B9A	37

† Flying Leads

S.T.C.

Replacement Type

Pen36	35.0	0.2	200	200	-8.5	45.0	6.0	35,000	7.0	167	4,500	5.0	10	B7	24
Current Types																
11A1	6.3	0.95	150	-	-23.0	100	-	375	12.0	-	-	Δ	-	B9A	62
11E14	6.3	1.2	250	250	-45.0	48.0	-	-	7.0	-	-	10.0	-	IO	38
12E1	6.3	1.6	150	150	-10.0	200	10.0	-	14.0	-	-	***	-	IO	38
12E1C	6.3	1.6	150	150	-10.0	200	10.0	-	14.0	-	-	***	-	IO	38
12E14	6.3	1.6	150	150	-10.0	200	10.0	-	14.0	-	-	***	-	IO	38
S11E12 (SQ)	6.3	1.6	150	150	-8.5	200	12.0	-	13.5	-	-	‡	-	IO	138
13E1	13.0	2.6	150	150	-14.0	500	-	130	35.0	-	-	ø	-	B7A	2
13E12	13.0	2.6	150	150	-33.0	500	-	110	25.0	-	-	ø	-	B7A	2

*** Maximum Values for use in stabilized h.t. supply circuits. $V_a = 800$, $Vg_2 = 300$, $I_k(max) = 300mA$, $P_a(max) = 35W$

ø Maximum Values for use in stabilized h.t. supply circuits. $V_a = 800$, $Vg_2 = 300$, $I_k(max) = 800mA$, $P_a(max) = 90W$

‡ Maximum Values for use in stabilized h.t. supply circuits. $V_a = 800$, $Vg_2 = 300$, $I_k(max) = 300mA$, $P_a(max) = 28W$

Δ Maximum Values for use in stabilized h.t. supply circuits. $V_a = 600$, - $I_k(max) = 120mA$, $P_a(max) = 15W$

Type		Heater		Volts			Current(mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
TUNGSRAM																
Obsolete Types																
PP2	(P)	2.0*	0.14	135	135	-5.0	7.0	1.0	-	-	-	19,000	0.44	-	B4 B5	7 6
PP215	(P)	2.0*	0.15	90	90	-4.5	8.0	1.2	-	-	-	14,000	0.2	-	B5	6
PP222	(P)	2.0*	0.22	150	150	-6.0	9.0	2.0	-	-	-	14,000	0.6	-	B4 B5	7 7
PP225	(P)	2.0*	0.265	135	135	-12.0	18.0	2.0	-	-	-	6,000	0.8	-	B5	6
SP220	(T)	2.0*	0.2	150	-	-12.0	14.0	-	2,200	3.0	-	6,700	0.36	-	B4	1
P12/250	(T)	4.0*	1.0	250	-	-33.0	48.0	-	830	6.0	700	2,400	2.75	-	B4	1
PP4	(P)	4.0	1.1	250	250	-15.0	36.0	6.0	-	-	400	7,500	3.1	-	B5	6
EBL1	(P,DD)	6.3	1.4	250	250	-6.0	36.0	4.0	-	9.5	150	7,000	3.6	-	Ct8	13
EL36	(P)	6.3	1.4	250	250	-7.0	72.0	8.5	-	15.0	85	3,500	8.2	-	IO	36
EL42	(P)	6.3	0.2	225	225	-10.0	26.0	4.1	90,000	3.2	360	9,000	2.5	10	B8A	23
PP2018	(P)	20.0	0.18	200	200	-18.0	20.0	5.0	-	2.5	720	8,800	1.4	-	B5	7
Replacement Types																
1S4	(BT)	1.4*	0.1	90	67.5	-7.0	7.4	1.4	100,000	1.58	-	8,000	0.27	12	B7G	4
LP220	(T)	2.0*	0.2	150	-	-4.5	5.0	-	3,900	3.5	-	7,500	0.2	-	B4	1
2A5	(P)	2.5	1.75	250	250	-16.5	34.0	6.5	100,000	2.2	-	7,000	3.0	-	UX6	8
APP4A	(P)	4.0	1.2	250	250	-16.5	36.0	6.0	-	-	400	7,000	3.5	-	B5 B7	7 24
APP4B	(P)	4.0	2.0	250	250	-5.0	36.0	4.0	-	-	140	7,000	3.6	-	B7	24
P27/500	(T)	4.0*	2.0	500	-	-31.0	62.5	-	1,050	8.5	500	5,000	5.0	-	B4	1
PP35	(P)	35.0	0.2	200	200	-6.5	45.0	5.0	-	8.5	170	4,400	3.2	-	B7	24
Current Types																
1C5GT	(P)	1.4*	0.1	90	90	-7.5	7.5	1.6	115,000	1.55	-	8,000	0.24	10	IO	78
3A4	(P)	1.4*	0.2†	150	90	-8.4	13.3	2.2	100,000	1.9	-	8,000	0.7	6	B7G	7
3C4	(P)	1.4*	0.05	85	85	-5.2	5.0	0.9	150,000	1.4	-	13,000	0.2	10	B7G	9
3Q4	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	6
3Q5GT	(P)	1.4*	0.1†	90	90	-4.5	9.5	1.3	90,000	2.2	-	8,000	0.27	6	IO	87
3S4	(P)	1.4*	0.1†	90	67.5	-7.0	7.4	1.4	100,000	1.57	-	8,000	0.27	12	B7G	6
3V4	(P)	1.4*	0.1†	90	90	-4.5	9.5	2.1	100,000	2.15	-	10,000	0.27	7	B7G	9
42	(P)	6.3	0.7	Other data as Type 6F6											UX6	8
807	(BT)	6.3	0.9	500	200	-14.5	50.0	1.6	39,000	5.7	280	6,000	11.5	12	UX5	6
6AB8	(TP)	6.3	0.3	200	200	-8.0	17.5	3.3	150,000	3.3	-	11,000	1.4	10	B9A	13
6AM5	(P)	6.3	0.2	250	250	-12.5	16.0	2.4	130,000	2.6	680	16,000	1.4	10	B7G	25
6AQ5	(P)	6.3	0.45	250	250	-12.5	45.0	4.5	52,000	4.1	250	5,000	4.5	8	B7G	27
6BQ5	(P)	6.3	0.76	250	250	-7.3	48.0	5.5	38,000	11.3	135	5,200	5.7	10	B9A	16
6C4	(T)	6.3	0.15	250	-	-8.5	10.5	-	7,700	2.2	-	-	-	-	B7G	15
6CK5	(P)	6.3	0.7	250	250	-7.0	36.0	5.2	40,000	10.0	170	7,000	4.2	10	B8A	23
	(T)	6.3	0.7	250	-	-	33.0	-	-	-	250	3,500	1.55	8		
6F6	(P)	6.3	0.7	285	285	-22.0	38.0	12.0	78,000	2.55	440	7,000	4.5	9	IO	36
6L6	(BT)	6.3	0.9	300	200	-13.0	54.5	4.6	33,000	5.2	220	4,500	6.5	11	IO	36
6M6		6.3	1.2	250	250	-6.0	36.0	4.0	-	9.5	150	7,000	4.4	-	IO	36
6V6	(BT)	6.3	0.45	315	225	-13.0	35.0	6.0	77,000	3.75	315	8,500	5.5	12	IO	36
EBL31	(P,DD)	6.3	1.2	250	250	-6.0	36.0	5.0	-	9.5	150	7,000	4.3	-	IO	15
ECL82	(TP)	6.3	0.78	170	170	-11.5	41.0	7.5	16,000	7.5	-	3,900	3.3	10	B9A	37
ECL83	(TP)	6.3	0.6	200	200	-13.0	27.0	4.4	65,000	5.5	-	7,500	-	10.5	B9A	27
ECL86/6GW8	(TP)	6.3	0.7	250	250	-7.0	36.0	6.0	48,000	10.0	-	8,000	-	-	B9A	76
EL32	(P)	6.3	0.2	250	250	-18.0	32.0	5.0	70,000	2.8	485	8,000	3.6	10	IO	9
EL33	(P)	6.3	1.2	250	250	-6.0	36.0	5.0	-	9.5	150	7,000	4.4	-	IO	36
EL34/6CA7	(P)	6.3	1.5	250	250	-12.2	100.0	15.0	15,000	11.0	106	2,000	11.0	10	IO	133
EL37	(P)	6.3	1.4	250	250	-13.5	100.0	13.5	13,500	11.0	120	2,500	10.5	10	IO	36
EL85	(P)	6.3	0.2	225	225	-10.8	26.0	4.1	90,000	3.2	360	9,000	2.6	10	B9A	26
EL86/6CW5	(P)	6.3	0.76	200	200	-12.0	64.0	3.5	26,000	11.0	215	2,500	5.3	10	B9A	16
EL95	(P)	6.3	0.2	250	250	-9.0	24.0	4.5	80,000	5.0	320	10,000	3.0	12	B7G	67
EL821/6CH6	(P)	6.3	0.75	250	250	-4.5	40.0	6.0	50,000	11.0	100	6,000	3.0	8.5	B9A	19
EL822/21V06	(P)	6.3	0.75	250	150	-2.5	40.0	5.0	90,000	13.0	-	-	-	-	B9A	19
PP60	(BT)	6.3	1.27	250	250	-15.0	85.0	6.3	-	6.3	160	2,200	7.25	9	IO	36
12A6	(BT)	12.6	0.15	250	250	-12.5	30.0	3.5	70,000	3.0	375	7,500	2.4	-	IO	36
PCL83	(TP)	12.6	0.3	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.2	10	B9A	27

(Continued)

Type	Heater		Volts			Current (mA)		r_a (Ω)	g_m (mA/V)	R_K (Ω)	R_L (Ω)	Power Output (W)	D (%)	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen							Type	Ref.
TUNGSRAM *(Continued)*															
Current Types (Continued)															
PCL86/14GW8 (TP)	13.3	0.3	230	230	-5.7	39.0	6.5	45,000	10.5	-	-	-	-	B9A	76
18 (P)	14.0	0.3	315	315	-22.0	42.0	8.0	75,000	2.65	-	7,000	5.0	-	UX6	8
15A6 (P)	15.0	0.3	170	170	-2.3	36.0	5.0	100,000	10.0	-	-	-	-	B9A	14
PCL84/15DQ8 (TP)	15.0	0.3	220	200	-3.5	18.0	3.1	140,000	10.0	-	3,000	-	-	B9A	53
PL84/15CW5 (P)	15.0	0.3	250	250	-5.5	36.0	5.0	13,000	10.0	-	-	-	-	B9A	16
16A8 (TP)	16.0	0.3	170	170	-11.5	41.0	7.5	16,000	7.5	-	3,900	3.3	10	B9A	37
16A5 (P)	16.5	0.3	170	170	-10.4	53.0	10.0	20,000	9.0	165	3,000	4.0	10	B9A	16
PFL200 (DP)	16.5	0.3	170	170	-2.6	30.0	6.5	40,000	21.0	-	-	-	-	B10B	1
PCL85/18GV8 (TP)	18.0	0.3	170	170	-15.0	41.0	2.7	25,000	7.5	-	4,000	3.4	-	B9A	66
PL33 (P)	19.0	0.3	250	250	-6.0	36.0	4.0	50,000	9.0	150	7,000	4.5	10	IO	36
PL33 (T)	19.0	0.3	250	-	-8.5	20.0	-	3,000	6.5	425	7,000	1.1	5	IO	36
25A6 (P)	25.0	0.3	160	120	-18.0	36.0	12.0	42,000	2.4	450	5,000	2.2	10	IO	36
25L6 (BT)	25.0	0.3	200	110	-8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
CL33 (P)	35.0	0.2	200	200	-7.5	45.0	5.0	-	8.0	170	4,300	3.2	-	IO	36
CBL31 (P,DD)	39.0	0.2	200	200	-8.0	45.0	6.0	-	8.5	170	4,400	3.2	-	IO	15
UCL83 (TP)	40.0	0.1	170	170	-9.5	30.0	5.0	53,000	5.5	-	5,500	2.2	10	B9A	27
45A5 (P)	45.0	0.1	170	170	-10.4	53.0	10.0	20,000	9.5	140	3,000	4.2	10	B8A	7
UL46 (P)	45.0	0.1	170	170	-10.4	53.0	10.0	20,000	9.5	-	3,000	4.2	10	B8A	7
UL84 (P)	45.0	0.1	165	165	-12.0	73.0	4.5	20,000	10.5	-	2,400	5.6	10	B9A	16
50C5 (BT)	50.0	0.15	110	110	-7.5	49.0	4.0	14,000	7.5	-	3,000	1.9	-	B7G	42
50L6 (BT)	50.0	0.15	200	110	-8.0	55.0	7.0	30,000	9.5	160	3,000	4.3	10	IO	36
UCL82 (TP)	50.0	0.1	200	100	-16.0	35.0	7.0	25,000	6.4	-	5,600	-	-	B9A	37

OUTPUT VALVES 2

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
BRIMAR																
Obsolete Types																
1S4 (BT)	1.4*	0.1				Data as Type 3S4									B7G	4
3Q4 (BT)	1.4*	0.1†				Data as Type 3V4									B7G	6
19 (DT)	2.0*	0.26	135	-	0	10-27	-		10,000	-	-	2.1	-	B	UX6	7
2A3 (T)	2.5*	2.5	300	-	-62.0	40.0-74	-	124.0	∞	-	3,000	15.0	2.5	AB_1	UX4	1
7A2 (P)	4.0	1.2				Data as Type 6F6									B5	7
6A3 (T)	6.3*	1.0				Data as Type 2A3									UX4	1
6B4 (T)	6.3*	1.0				Data as Type 2A3									IO	81
6F6 (P)	6.3	0.7	315	285	-	31.0	9.0	58.0	∞	320§	10,000	10.5	3.0	A_1	IO	36
6K6 (P)	6.3	0.4	285	285	-	27.5-31	4.5-6.5	51.0	∞	400§	12,000	9.8	4.0	A_1	IO	36
6N7 (DT)	6.3	0.8	300	-	0	35.0	-	82.0	1,032	-	8,000	10.0	8.0	B	IO	22
7C5 (BT)	6.3	0.45				Data as Type 6V6									B8B	10
41/41E (P)	6.3	0.4	285	285	-	27.5-31	4.5-6.5	51.0	-	400§	12,000	9.8	4.0	A_1	UX6	8
42 (P)	6.3	0.7				Data as Type 6F6									UX6	8
79 (DT)	6.3	0.6	250	-	-	10.6	-	-	-	-	14,000	8.0	-	B	UX6	6
7D5 (P)	13.0	0.315				Data as Type 6F6									B7	24
18 (P)	14.0	0.3				Data as Type 6F6									UX6	8
2151	14.0	0.3	250	250	-31.0	47.0	11.5	-	-	250§	7,000	12.0	-	A	UX6	8
Replacement Types																
3S4 (BT)	1.4*	0.1†	90	90	-16.5	2.0-8.4	0.35-2.7	32.5	-	-	10,000	-	6.0	AB_1	B7G	6
3V4 (BT)	1.4*	0.1†	90	90	-9.4	2.0-6.4	0.5-2.3	20.0	-	-	14,000	0.58	3.8	AB_1	B7G	9

(Continued)

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
BRIMAR *(Continued)*																
Replacement Types (Continued)																
DL92 (P)	1.4*	0.1†	90	90	-16.5	8.4	2.7	32	-	-	10,000	0.78	0.6	AB_1	B7G	6
DL94 (P)	1.4*	0.1†	90	90	-9.4	6.4	2.3	20	-	-	14,000	0.58	3.8	AB_1	B7G	9
DL96/3C4 (P)	1.4*	0.05†	81.5	81.	5-8.5	1.0-5.0	0.2-1.3	22.4	-	-	16,000	0.44	2.6	B	B7G	9
6AK6 (P)	6.3	0.15	180	180	-	14.5	3.8	18.0	6	260§	20,000	2.5	5.3	A_1	B7G	16
			275	225	-21.0	15.7	4.0	42.0	8	-	20,000	5.2	4.2	AB_1		
6AM5 (P)	6.3	0.2	250	250	-	13.0	4.1	30.0	8	600	24,000	4.0	3.2	A	B7G	25
6AQ5 (BT)	6.3	0.45	250	250	-15.0	35-40	2.5	30.0	8	-	10,000	10.0	3.0	AB_1	B7G	27
6CD6 (BT)	6.3	2.5	200	110	-14.0	80.0	5.8	28.0	6	90§	3,000	13.5	1.75	A_1	IO	39
6CD6 (T)			200	-	-33.5	70.0	-	62.0	8	240§	1,500	4.8	2.7	A_1		
6L6 (BT)	6.3	0.9	270	270	-	72.5	8.5	40.0	8	125§	5,000	18.5	4.0	A_1	IO	36
6L6GA (BT)			360	270	-	50.0	9.5	57.0	6	250§	9,000	24.0	4.0	AB_1		
6L6GA (T)	-	-	360	270	-22.5	69.0	8.0	45.0	-	-	6,600	26.5	1.8	AB_2		
			325	-	-	42.0	-	60.0	8	375§	8,000	6.0	0.6	A_1		
6V6 (BT)	6.3	0.45	285	285	-19.0	35-46	2.0-6.8	38.0	8	250§	8,000	14.0	3.5	AB_1	IO	36
ECL83 (TP)	6.3	0.6	200	200	-	29.0	8.5	33.0	-	220§	7,500	7.2	4.2	AB	B9A	27
EL33 (P)	6.3	0.9	250	250	-	28.5	4.6	18.0	6	140*	10,000	8.2	3.1	A	IO	36
EL41 (P)	6.3	0.7	300	300	-	36.0	9.5	24.0	-	140§	9,000	13.0	2.5	AB_1	B8A	23
EL90 (P)	6.3	0.45	250	250	-15.0	35.0	2.5	30.0	-	-	10,000	10.0	3.0	AB_1	B7G	27
ELL80 (DP)	6.3	0.55	250	250	-	26.0	8.0	22.6	-	180§	11,000	8.5	5.0	AB_1	B9A	68
807 (BT)	6.3	0.9	500	300	-	50-60	1.25-8.3	72.0	8	270§	9,000	32.5	2.7	A_1	UX5	6
			600	300	-29.5	40-75	0.75-8.8	59.0	8	-	10,000	47.5	2.2	A_1		
			600	300	-30.0	30-100	2.5-10.5	78.0	-	-	6,400	80.0	3.5	AB_2		
807 (T)			325	-	-	40-42	-	60.0	8	375§	8,000	6.0	0.6	A		
			400	-	-45.0	30-70	-	90.0	8	-	3,000	15.0	3.0	AB_1		
9BW6 (BT)	9.0	0.3	Data as Type 6BW6												B9A	19
PCL83 (TP)	12.6	0.3	200	200	-	29.0	8.5	33.0	-	220§	7,500	7.2	4.2	AB	B9A	14
PL82 (P)	16.5	0.1	170	170	-	49.0	16.5	26.0	8	200	4,000	9.0	4.0	AB_1	B9A	16
19AQ5 (BT)	19.0	0.15	Data as Type 6AQ5												B7G	27
UL41 (P)	45.0	0.1	200	200	-	45-53	9.0-19	35.0	8	130§	4,000	12.5	-	-	B8A	7
50CD6 (BT)	50.0	0.3	Data as Type 6CD6												IO	39
Current Types																
5763 (BT)	6.0	0.75	300	225	-	43.0	7.3	13.75	8	68§	11,500	7.5	4.2	A_1	B9A	11
			300	225	-	28.5	7.3	21.0	8	150§	13,500	8.8	4.4	AB_1		
			300	225	-12.5	70.0	9.0	71.0	-	-	4,500	25.0	9.6	AB_2		
6BW6 (BT)	6.3	0.45	250	250	-	49.0	6.8	26.0	8	120§	10,000	9.0	2.5	A_1	B9A	19
6BW6			285	285	-	39.3	5.0	45.0	8	260§	8,000	12.0	1.0	AB_1		
			315	285	-19.0	77.5	8.0	80.0	-	-	5,000	30.0	7.0	AB_2		
6BW6 (T)			285	-	-	41.4	-	38.0	8	240§	4,500	3.1	0.5	A_1		
6CH6 (BT)	6.3	0.75	250	250	-	40.0	8.8	9.0	8	50§	9,000	8.0	7.5	A_1	B9A	19
6CH6 (T)			250	-	-	46.0	-	9.0	8	50§	5,000	1.8	1.0	A_1		
13D3 (DT)	6.3	0.6†	250	-	-	21.6	-	45.3	-	-	20,000	6.7	11.5	B	B9A	1
ECL82 (TP) 6BM8	6.3	0.78	200	200	-	39.5	16.5	35.0	8	380	6,000	9.8	4.0	AB_1	B9A	37
ECL86 (TP)	6.3	0.66	250	250	-	35.5	8.9	15.5	-	180	8,200	10.0	5.0	AB	B9A	76
EL34 (P)	6.3	1.5	375	Rg_2 600Ω	-33.0	107.5	23.5	65.0	-	-	3,500	48.0	2.8	-	IO	133
EL34 (P)			400	Rg_2 800Ω	-36.0	110.5	23.0	70.0	-	-	3,500	54.0	1.6	-		
EL84/6BQ5 (P)	6.3	0.76	300	300	-	36.0	4.0	28.0	8	130§	8,000	17.0	10.0	AB_1	B9A	16
EL506 (P)	6.3	0.8	450	400	-21.0	72	15.0	42.0	-	-	6,600	45.0	1.5	AB_1	B9D	2
EL506 (P)			450	400	-	47	11.0	31.0	-	170§	9,000	28.0	2.0	AB_1		
EL821 (BT)	6.3	0.75	250	250	-	40.0	8.8	9.0	8	50§	9,000	8.0	7.5	A_1	B9A	19
EL821 (T)			250	-	-	46.0	-	9.0		50§	5,000	1.8	1.0	A_1		
PCL82 (TP)	16.0	0.3	Data as Type ECL82												B9A	37
UL84 (P)	45.0	0.1	200	200	-	60.0	15.0	41.0	-	300	3,500	15.0	3.5	AB	B9A	16
50C5 (BT)	50.0	0.15	110	110	-7.5	49.0	4.0	15.0	8	70§	4,000	3.75	7.0	A_1	B7G	42
50C5 (T)			110	-	-7.5	53.0	-	15.0	8	70§	2,000	0.75	2.1	A_1		

§ Common resistor

Type		Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
COSSOR																	
Obsolete Types																	
6V6	(BT)	6.3	0.45	285	285	-19.0	35.0	2.0	38.0	∞	500	8,000	14.0	3.5	AB_1	IO	36
Replacement Types																	
DL96	(P)	1.4*	0.05	81.5	81.5	-8.5	1.0	0.2	20.0	-	-	16,000	0.44	2.2	B	B7G	9
807	(BT)	6.3	0.9	400	300	-25.0	100-165	5-10	48.0	-	-	8,400	45.0	-	AB_1	UX5	6
				600	300	-30.0	66-150	5-10	58.0	-	-	12,000	65.0	-	AB_1		
EL84/ 6BQ5	(P)	6.3	0.76	300	300	-	46.0	11.0	28.0	-	130 §	8,000	17.0	4.0	AB	B9A	16
PCL82	(TP)	16.0	0.3	200	200	-	35.0	7.0	25.0	-	190	6,000	9.8	4.0	AB	B9A	37
UCL82	(TP)	50.0	0.1	200	200	-	35.0	7.0	25.0	-	190	6,000	9.8	4.0	AB	B9A	37

§ Common Resistor

EMITRON

Obsolete Type

6L6G	(BT)	6.3	0.9	270	270	-	67.0	5.5	40.0	∞	250	5,000	18.5	2.0	A	IO	36
				360	270	-	44.0	2.5	57.0	∞	500	9,000	24.5	4.0	AB_1		
				360	270	-22.5	44.0	2.5	72.0	-	-	3,800	47.0	2.0	AB_2		

Current Types

6AQ5	(BT)	6.3	0.45	250	250	-15.0	35.0	2.5	30.0	∞	-	10,000	10.0	3.0	AB_1	B7G	27
7C5	(BT)	6.3	0.45	285	285	-19.0	35.0	2.0	38.0	∞	-	8,000	14.0	3.5	AB_1	B8B	10

FERRANTI

Obsolete Types

QPT2	(DP)	2.0*	0.4	150	150	-9.0	3.3	0.9	-	∞	-	25,000	1.2	-	B_1	B7	11
LP4	(T)	4.0*	1.0	300	-	-50.0	50.0	-	110.0	∞	500	3,800	13.5	2.5	AB_1	B4	1
42	(P)	6.3	0.7	Data as Type 6F6												UX6	8

Replacement Types

6F6	(P)	6.3	0.7	375	250	-26.0	32.0	2.5	82.0	∞	-	10,000	18.5	3.5	AB_2	IO	36
				315	285	-	31.0	6.0	58.0	∞	320	10,000	10.5	3.0	A_1		
6K6	(P)	6.3	0.4	285	285	-	27.5	4.5	51.0	∞	400	12,000	9.8	4.0	A_1	IO	36
6L6	(BT)	6.3	0.9	270	270	-	67.5	5.5	40.0	∞	125	5,000	18.5	2.0	A_1	IO	36
				360	270	-	44.0	2.5	57.0	∞	250	9,000	24.0	4.0	AB_1		
				360	270	-22.5	44.0	2.5	72.0	-	-	3,800	47.0	2.0	AB_2		
6V6	(BT)	6.3	0.45	282	285	-19.0	35.0	2.0	38.0	∞	-	8,000	14.0	3.5	AB_1		
EL41/ 6CK5	(P)	6.3	0.7	300	300	-	36.0	9.5	24.0	-	140	9,000	13.0	2.5	AB_1	B8A	23
	(T)			300	-	-	33.0	-	9.4	-	150	10,000	4.0	1.0	AB_1		
EL42	(P)	6.3	0.2	250	250	-	21.5	6.7	35.0	-	310	15,000	7.0	5.5	AB_1	B8A	23
EL90/ 6AQ5	(P)	6.3	0.45	250	250	-	35.0	2.5	30.0	-	200	10,000	10.0	3.0	AB_1	B7G	27
EL91/ 6AM5	(P)	6.3	0.2	250	250	-	11.0	1.6	34.0	∞	600	24,000	4.0	3.2	AB_1	B7G	25
UL41	(P)	45.0	0.1	170	170	-	49.0	16.5	26.0	-	100	4,000	9.0	4.0	AB_1	B8A	23

Current Types

3S4/DL92	(P)	1.4*	0.1†	90	90	-16.5	8.4	2.7	32.0	-	-	10,000	0.78	6.0	AB_1	B7G	6
3V4/DL94	(P)	1.4*	0.1†	90	90	-9.4	6.4	2.3	20.0	-	-	14,000	0.58	3.8	AB_1	B7G	9
DL96/3C4	(P)	1.4*	0.05	81.5	81.5	-8.5	4.5	1.1	20.0	-	-	16,000	0.44	2.2	B	B7G	9
				90	90	-	4.25	1.25	20.0	-	560	20,000	0.42	4.0	AB_1		
EL84 6BQ5	(P)	6.3	0.76	300	300	-	46.0	11.0	28.0	-	130	8,000	17.0	4.0	AB_1	B9A	16
	(T)			-	-	-	36.0	-	28.0	-	270	10,000	5.3	2.5	AB_1		
PCL83	(TP)	12.6	0.3	200	200	-	29.0	8.5	23.5	-	220	7,500	2.5	10.0	AB	B9A	27

(Continued)

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
FERRANTI *(Continued)*																
Current Types (Continued)																
PL84 (P)	15.0	0.3	170	170	-	57.0	20.0	13.1	-	120	3,500	13.0	4.5	AB	B9A	16
PL82/16A5 (P)	16.5	0.3	170	170	-	49.0	16.5	26.0	-	100	4,000	9.0	4.0	AB_1	B9A	16
PL81/21A6 (P)	21.5	0.3	200	200	-31.5	87.0	12.5	31.0	-	-	2,500	20.0	5.5	B	B9A	17
UL84 (P)	45.0	0.1	170	170	-17.0	57.5	20.5	18.5	-	120	3,500	13.0	4.5	AB_1	B9A	16
MARCONI																
Obsolete Types																
N14 (P)	1.4*	0.1	90	90	-11.0	6.0	2.4	17.0	∞	2,200	16,000	0.56	6.0	AB_1	IO	78
N15 (P)	1.4*	0.1†	90	90	-11.0	6.0	2.3	17.0	∞	2,200	16,000	0.56	6.0	B_1	IO	87
QP21 (DP)	2.0*	0.4	150	120	-4.5	5.6	1.4	-	∞	-	25,000	0.5	-	B_1	B7	11
KT81 (BT)	6.3	0.95	275	275	-8.7	38.0	10.0	17.5	∞	80	10,000	11.5	6.5	AB_1	B8B	10
KT81 (T)			350	-	-	36.5	-	23.0	∞	150	6,000	6.0	2.0	AB_1		
DA41 (T)	7.5	3.1ψ	1,000	-	0	140.0	-	220.0	-	-	7,000	175.0	5.0	B	UX4	20
KT35 (BT)	13.0	0.6†	200	200	-14.7	58.5	15.0	14.7	∞	100	4,000	14.0	5.6	AB_1	IO	73
KT101 (BT)	80.0	0.1	175	175	-10.5	59.0	11.0	28.0	∞	140	2,500	11.5	4.5	AB_1	B8B	10
Replacement Types																
PX25 (T)	4.0*	2.0	500	-	-50.0	50.0	-	102.0	∞	1,000	10,000	20.0	2.0	A	B4	1
			500	-	-54.0	82.5	-	108.0	∞	-	3,400	26.0	4.0	AB_1		
KT63 (BT)	6.3	0.7	250	250	-20.0	32.0	7.0	39.0	∞	250	12,000	6.0	4.0	AB_1	IO	36
KT76 (BT)	15.0	0.16	175	175	-18.0	25.0	7.5	41.0	∞	350	8,000	4.8	3.0	AB_1	IO	36
KT32 (BT)	26.0	0.3	135	135	-10.0	50.0	4.0	19.7	∞	200	2,500	7.5	5.0	AB_1	IO	36
KT71 (BT)	48.0	0.16	175	175	-10.2	72.5	15.0	28.0	∞	140	2,500	11.5	4.5	AB_1	IO	36
Current Types																
PX4 (T)	4.0*	1.0	300	-	-15.0	45.0	-	110.0	∞	1,000	4,000	13.5	2.5	AB_1	B4	1
EL84/N709 (P)	6.3	0.76	250	250	-	31.0	3.5	22.5	-	260	8,000	11.0	3.0	AB_1	B9A	16
EL95 (P)	6.3	0.2	250	250	-	26.0	7.5	13.0	-	360	10,000	7.0	5.0	AB	B7G	67
			250	250	-9.0	24.0	7.5	13.0	-	-	10,000	6.5	3.5	B		
KT61 (BT)	6.3	0.95	275	275	-6.7	36.0	6.0	16.0	∞	80	10,000	11.5	6.5	AB_1	IO	36
			400	400	-35.0	62.5	*	80.0	∞	560	7,000	32.0	2.0	UL. AB_1		
KT66 (BT)	6.3	1.27	500	500	-60.0	80.0	*	130.0	∞	-	8,000	50.0	2.0	UL. AB_1	IO	36
KT66 (T)			400	-	-38.0	62.5	-	80.0	∞	600	4,000	14.5	3.5	AB_1		
N78 (P)	6.3	0.64	250	250	-5.0	35.0	5.5	11.2	-	120	9,000	9.0	4.6	AB_1	B7G	25
N78 (T)			350	-	-9.5	28.5	-	21.0	-	330	8,000	6.3	1.6	AB_1		
N727/6AQ5 (BT)	6.3	0.45	250	250	-15.0	35.0	2.5	30.0	-	-	10,000	10.0	3.0	AB_1	B7G	27
HN309 (TP)	12.6	0.3	165	165	-	28.0	6.0	28.0	-	220	6,000	5.2	2.3	AB_1	B9A	27
PCL83/LN309 (TP)	12.6	0.3	165	165	-11.5	23.0	3.0	28.0	-	440	6,000	5.2	2.3	AB_1	B9A	27
KT33C (BT)	13.0	0.6	200	200	-19.1	56.5	9.0	44.0	∞	240	4,000	15.5	7.5	AB_1	IO	73
PL84 (P)	15.0	0.3	170	170	-	57.0	20.0	13.1	-	120	3,500	13.0	4.5	AB	B9A	16
PCL82 (TP)	16.0	0.3	200	200	-	35.0	7.0	25.0	-	190	6,000	9.8	4.0	AB	B9A	37
PL82/N329 (P)	16.5	0.3	170	170	-	49.0	16.5	26.0	-	200	4,000	9.0	4.0	AB_1	B9A	16
N118 (BT)	40.0	0.1	180	185	-	30.0	13.0	22.0	∞	270	7,000	7.0	3.0	AB_1	B8A	7
N118 (T)			220	-	-	30.0	-	27.0	∞	470	4,500	3.4	3.0	A		
UL41/N142 (P)	45.0	0.1	170	170	-	49.0	16.5	26.0	-	100	4,000	9.0	4.0	AB_1	B8A	23
UL84 (P)	45.0	0.1	200	200	-	50.0	5.0	41.0	-	150‡	3,500	15.0	3.5	AB	B9A	16
UCL82 (TP)	50.0	0.1	200	200	-	35.0	7.0	25.0	-	190	6,000	9.8	4.0	AB	B9A	37
KT55 (BT)	52.0	0.3ψ	190	190	-25.0	112.5	22.5	28.8	-	185	2,000	25.0	2.0	AB_1	IO	36
KT55 (T)			200	-	-22.0	120.0	-	21.0	-	185	1,500	15.0	-	AB_1		

ψ Each valve of pair * Included with anode current ‡ Common resistor

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
MAZDA (EXPORT EDISWAN)																
Obsolete Types																
PD220 (DT)	2.0*	0.2	150	-	-1.15	0.4	-	58.0	3,300	-	11,500	2.85	5.0	B_2	B7	10
PD220A (DT)	2.0*	0.2	150	-	-6.0	1.25	-	74.0	7,000	-	10,000	2.9	5.0	B_2	B7	10
QP25 (DP)	2.0*	0.2	120	120	-9.75	2.3	0.43	19.5	∞	-	15,500	1.2	5.0	B_1	MO	9
QP230 (DP)	2.0*	0.3	120	120	-9.6	2.3	0.6	19.0	∞	-	17,000	0.85	5.0	B_1	B7	11
QP240 (DP)	2.0*	0.45	150	130.5	-11.5	2.0	0.45	23.0	∞	-	15,000	2.25	5.0	B_1	B9	4
PA40 (T)	4.0*	2.0	450	-	-96.5	107.0	-	192.0	∞	-	4,000	40.0	5.0	AB_1	B4	1
Pen44 (BT)	4.0	2.1	300	275	-12.2	77.0	25.0	23.0	∞	-	5,000	24.0	5.0	AB_1	MO	20
Pen45 (BT)	4.0*	1.75	250	250	-	41.5	12.5	19.0	∞	180	7,500	11.5	5.0	AB_1	MO	20
V503 (T)	4.0*	2.0	450	-	-96.5	107.0	-	192.0	∞	-	4,000	40.0	5.0	AB_1	B4	1
Replacement Types																
1P1	1.4*	0.05†	81.5	81.5	-8.5	1.0	0.18	22.0	∞	-	16,000	0.44	2.6	B	B7G	9
1P10 (P)	1.4*	0.1†	90	90	-16.5	8.4	2.7	32.0	-	-	10,000	0.78	6.0	AB_1	B7G	6
1P11 / 3V4 (P)	1.4*	0.1†	90	90	-9.4	6.4	2.3	20.0	-	-	14,000	0.58	3.8	AB_1	B7G	9
DL92 (P)	1.4*	0.1†	90	90	-16.5	8.4	2.7	32.0	-	-	10,000	0.78	6.0	AB_1	B7G	6
DL94 (P)	1.4*	0.1†	90	90	-9.4	6.4	2.3	20.0	-	-	14,000	0.58	3.8	AB_1	B7G	9
DL96 (P)	1.4*	0.05†	81.5	81.5	-8.5	1.0	0.18	22.0	∞	-	16,000	0.44	2.6	B	B7G	9
6P25 (BT)	6.3	1.1	250	250	-	41.5	12.5	19.0	∞	180	7,500	11.5	5.0	AB_1	IO	36
EL95 (P)	6.3	0.2	250	250	-	26.0	7.5	13.0	-	360	10,000	7.0	5.0	AB	B7G	67
ELL80 (DP)	6.3	0.55	250	250	-	26.0	8.0	22.6	-	180‡	11,000	8.5	5.0	AB_1	B9A	68
PCL83 (TP)	12.6	0.3	200	200	-	29.0	8.5	33.0	-	220‡	7,500	7.2	4.2	AB	B9A	27
30P16 (P)	16.5	0.3	170	170	-	49.0	16.5	26.0	∞	200	4,000	9.0	4.0	AB_1	B9A	16
PL82 (P)	16.5	0.3	170	170	-	49.0	16.5	26.0	∞	200	4,000	9.0	4.0	AB_1	B9A	16
20P3 (BT)	20.0	0.2	195	210	-	48.0	26.5	26.0	∞	180	6,000	10.7	4.0	AB_1	IO	36
			200	210	-	34.0	22.5	36.0	∞	330	7,000	10.0	3.0	AB_1		
20P3 (T)			250	-	-	45.0	-	36.0	∞	430	4,000	5.9	3.0	A		
10P13 (BT)	40.0	0.1	180	185	-	30.0	13.0	22.0	∞	270	7,000	7.0	3.0	AB_1	B8A	7
10P13 (T)			220	-	-	30.0	-	27.0	∞	470	4,500	3.4	3.0	A		
10P14 (BT)	40.0	0.1	195	210	-	48.0	26.5	26.0	∞	180	6,000	10.7	4.0	AB_1	IO	36
			200	210	-	34.0	22.5	36.0	∞	330	7,000	10.0	3.0	AB_1		
10P14 (T)			250	-	-	45.0	-	36.0	∞	430	4,000	5.9	3.0	-		
UL41 (P)	45.0	0.1	200	200	-	53.0	19.0	35.0	∞	130‡	4,000	12.5	4.0	-	B8A	23
Current Types																
6P15 (P)	6.3	0.76	250	250	-	37.5	7.5	22.5	∞	260	8,000	11.0	3.0	AB_1	B9A	16
6PL12 (TP)	6.3	0.78	200	200	-	39.5	16.5	35.0	-	380	6,000	9.0	4.0	AB_1	B9A	37
ECL82 (TP)	6.3	0.78	200	200	-	39.5	16.5	35.0	-	380	6,000	9.0	4.0	AB_1	B9A	37
ECL86 (TP)	6.3	0.66	250	250	-	35.5	8.9	15.5	-	180	8,200	10.0	5.0	AB	B9A	76
EL84 (P)	6.3	0.76	300	300	-	46.0	11.0	28.0	∞	270	8,000	17.0	4.0	AB	B9A	16
30PL12 (TP)	16.0	0.3	200	200	-	39.5	16.5	35.0	-	380	6,000	9.8	4.0	AB	B9A	37
PCL82 (TP)	16.0	0.3	200	200	-	39.5	16.5	35.0	-	380	6,000	9.8	4.0	AB	B9A	37
10P18 (P)	45.0	0.1	200	200	-	60.0	15.0	41.0	-	300	3,500	15.0	3.5	AB	B9A	16
UL84 (P)	45.0	0.1	200	200	-	60.0	15.0	41.0	-	300	3,500	15.0	3.5	AB	B9A	16

‡ Common resistor

M.O. VALVE CO.

Replacement Types

PX4 (T)	4.0	1.0	300	-	-50.0	50.0	-	110.0	∞	1,000	4,000	13.5	2.5	AB_1	B4	1
PX25 (T)	4.0	2.0	500	-	-50.0	50.0	-	102.0	∞	1,000	10,000	20.0	2.0	A	B4	1
			500	-	-54.0	82.5	-	108.0	∞	-	3,400	26.0	4.0	AB_1		
A2134 (P)	6.3	0.635	250	165	-	40.0	12.0	30.0	-	300	7,500	13.3	4.5	AB_1	B7G	25
A2134 (T)			165	-	-10.5	32.5	-	24.0	-	330	3,000	2.6	1.4	AB_1		
EL84/N709 (P)	6.3	0.76	250	250	-	31.0	3.5	22.5	-	260	8,000	11.0	3.0	AB_1	B9A	16
KT61 (BT)	6.3	0.95	275	275	-6.7	36.0	6.0	16.0	∞	80	10,000	11.5	6.5	AB_1	IO	36
N78 (P)	6.3	0.64	250	250	-5.0	35.0	5.5	11.2	-	120	9,000	9.0	4.6	AB_1	B7G	25
N78 (T)			350	-	-9.5	28.5	-	21.0	-	330	8,000	6.3	1.6	AB_1		

(Continued)

Type		Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
M.O. VALVE CO. *(Continued)*																	
Replacement Types (Continued)																	
DA41	(T)	7.5	3.1ψ	1,000	-	0	140.0	-	220.0	-	-	7,000	175.0	5.0	B	UX4	20
DA42	(T)	7.5	1.2ψ	1,250	-	- 4.0	120.0	-	200.0	-	-	13,000	200.0	6.0	B	4-pin	
KT33C	(BT)	13.0	0.6†	200	200	-19.1	56.5	9.0	44.0	∞	240	4,000	15.5	7.5	AB_1	IO	73
KT55	(BT)	52.0	0.3ψ	190	190	-25.0	112.5	22.5	28.8	-	185	2,000	25.0	-	AB_1	IO	36
	(T)			200	-	-22.0	120.0	-	21.0	-	185	1,500	15.0	-	AB_1		
Current Types																	
KT66	(BT)	6.3	1.27	400	400	-35.0	62.5	*	80.0	∞	560	7,000	32.0	2.0	UL. AB_1	IO	36
				500	500	-60.0	80.0	*	130.0	∞	-	8,000	50.0	2.0	UL. AB_1		
	(T)			400	-	-38.0	62.5	-	80.0	∞	600	4,000	14.5	3.5	AB_1		
KT77	(BT)	6.3	1.4ψ	600	600	-28.0	60 - 77	62.0	23.0	11.5	470	6,000	30.6	2.5	UL	IO	68
	(T)			430	-	-27.0	60 - 66	60.0	85.0	3.8	440	5,000	17.6	1.2	AB_1		
KT88	(BT)	6.3	1.6	425	425	-44.0	83.0	-	110.0	-	525	6,000	50.0	2.0	UL. AB_1	IO	36
				550	550	-80.0	150.0	-	160.0	-	-	4,500	100.0	3.6	UL. AB_1		
	(T)			425	-	-	90.0	-	100.0	-	525	4,000	27.0	1.3	A		
TT21		6.3	1.6ψ	1,250	300	-45.0	28 - 130	71.0	12.0	11.0	-	15,000	200.0	7.0	AB_1	IO	129
TT22		12.6	0.8ψ	1,250	300	-45.0	28 - 130	71.0	12.0	11.0	-	15,000	200.0	7.0	AB_1	IO	129

ψ Per valve of pair * Included under anode current

MULLARD

Obsolete Types

DL75	(P)	1.25*	0.025	90	90	-	1.5	0.33	-	-	2,200	100,000	0.1	4.5	AB	B8D†	6
PM2B	(DT)	2.0*	0.2	120	-	0	20.0	-	40.0	4,000	-	14,000	1.25	-	B_2	B7	10
QP22B	(DP)	2.0*	0.3	120	120	-10.7	3.3	0.45	23.0	∞	-	14,700	1.0	-	B_1	B7	11
KLL32	(DP)	2.0*	0.3	135	135	-11.3	16.9	5.7	12.0	∞	-	16,000	1.2	2.8	AB_1	IO	97
DO30	(T)	4.0*	2.0	500	-	-145.0	50.0	-	285.0	∞	-	3,400	45.0	3.0	AB_1	B4	1
Pen428	(P)	4.0	2.1	375	275	-23.5	62.0	9.0	45.0	∞	165	6,500	28.0	3.0	AB_1	B7	24
6F6	(P)	6.3	0.7	285	285	-20.0	38.0	7.0	58.0	-	640	10,000	14.8	9.0	A	IO	36
6V6	(BT)	6.3	0.45	285	285	-	35.0	2.0	45.0	-	520	8,000	14.0	3.5	AB	IO	36
6L6	(BT)	6.3	0.9	360	270	-22.5	44.0	2.5	72.0	-	-	3,800	24.0	4.0	AB_1	IO	36
EL6	(P)	6.3	1.2	250	250	-	53.0	8.5	20.0	∞	90	5,000	14.5	2.2	AB_1	Ct8	12
EL22	(P)	6.3	0.7	300	300	-	43.0	7.8	26.0	∞	140	8,000	15.4	5.0	A	B8B	10
EL31	(P)	6.3	1.4	800	400	-26.0	30.0	3.1	51.0	-	-	10,000	102.0	5.0	AB_1	IO	40
				400	400	-23.0	40.0	5.2	44.0	-	145	4,000	55.0	3.2	AB_1		
EL32	(P)	6.3	0.2	250	250	-	32.0	8.0	42.0	∞	310	8,000	7.0	1.5	A	IO	9
EL35	(P)	6.3	1.35	300	270	-	53.0	17.5	65.0	∞	250	7,000	21.0	3.0	AB_1	IO	36
EL50	(P)	6.3	1.35	375	275	-	62.0	9.0	45.0	∞	165	6,500	28.5	2.25	AB_1	Ct8	21
CL6	(P)	35.0	0.2	250	125	-	42.5	12.5	38.0	∞	180	7,000	13.5	6.3	AB_1	Ct8	4
Replacement Types																	
DL92	(P)	1.4*	0.1†	90	90	-16.5	8.4	2.7	32.0	-	-	10,000	0.78	6.0	AB_1	B7G	6
DL96	(P)	1.4*	0.05	81.5	81.5	-8.5	5.0	1.3	22.5	-	-	16,000	0.44	2.6	B	B7G	9
EBL21	(P)	6.3	0.8	300	300	-	36.0	6.5	20.0	∞	130	9,000	13.2	1.8	AB_1	B8B	6
EL33	(P)	6.3	0.9	250	250	-	28.5	4.6	18.0	∞	140	10,000	8.2	3.1	A	IO	36
EL37	(P)	6.3	1.4	325	325	-	90.0	30.0	61.0	∞	130	4,000	35.0	4.4	AB_1	IO	36
	(P)			400	400	-36.0	138.0	36.0	70.0	∞	-	3,250	69.0	2.5	AB_1		
	(T)			400	-	-	80.0	-	77.0	∞	245	4,000	20.6	4.3	A		
EL41	(P)	6.3	0.7	300	300	-	36.0	9.5	24.0	-	140	9,000	13.0	2.5	AB_1	B8A	23
	(T)			300	-	-	33.0	-	9.4	-	150	10,000	4.0	1.0	A		
EL42	(P)	6.3	0.2	250	250	-	21.5	6.7	35.0	-	310	15,000	7.0	5.5	AB_1	B8A	23
EL95	(P)	6.3	0.2	250	250	-	26.0	7.5	13.0	-	360	10,000	7.0	5.0	AB	B7G	67
				250	250	-9.0	24.0	7.5	13.0	-	-	10,000	6.5	3.5	B		
ELL80	(DP)	6.3	0.55	250	250	-9.1	26.0	8.0	22.6	-	180	11,000	8.5	5.0	AB_1	B9A	68
PCL83	(TP)	12.6	0.3	200	200	-	29.0	8.5	33.0	-	220	7,500	7.2	4.2	AB	B9A	27
PL82	(P)	16.5	0.3	170	170	-	49.0	16.5	26.0	-	100	4,000	9.0	4.0	AB_1	B9A	16
PL33	(P)	19.0	0.3	250	250	-	28.5	4.8	18.0	∞	140	10,000	8.2	3.1	A	IO	36
UL41	(P)	45.0	0.1	170	170	-	49.0	16.5	26.0	-	200	4,000	9.0	4.0	AB_1	B8A	23

Type		Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
MULLARD *(Continued)*																	
Current Types																	
ECL82	(TP)	6.3	0.78	250	250	-	27.5	9.2	53.7	-	390	10,000	9.0	5.0	AB	B9A	37
ECL83	(TP)	6.3	0.6	200	200	-	29.0	8.5	33.0	-	220‡	7,500	7.2	4.2	AB	B9A	27
ECL86	(TP)	6.3	0.66	300	300	-	37.0	10.6	23.8	-	260	9,100	13.6	4.0	-	B9A	76
EL34	(P)	6.3	1.5	375	Rg_2 600Ω‡	-33.0	107.5	23.5	65.0	-	-	3,500	48.0	2.8	-	IO	133
	(P)			400	Rg_2 800Ω‡	-36.0	110.5	23.0	70.0	-	-	3,500	54.0	1.6	-		
	(P)†			800	400	-39.0	91.0	19.0	66.0	-	-	11,000	100.0	5.0	-		
	(P)			375	Rg_2 470Ω‡	-	94.0	19.5	56.0	-	260	3,500	35.0	1.7	-		
	(P)			450	Rg_2 1kΩ‡	-	71.5	22.0	75.0	-	465	6,500	40.0	5.1	-		
	(P)			430	Rg_2 1kΩ‡	-	70.0	14.0	70.0	-	470	6,000	34.0	2.5	UL. AB_1		
	(T)			430	-	-	70.0	-	70.0	-	440	5,000	19.0	1.8	-		
EL84	(P)	6.3	0.76	300	300	-	46.0	11.0	28.0	-	270	8,000	17.0	4.0	AB	B9A	16
EL85	(P)	6.3	0.2	250	250	-	22.1	7.1	34.5	-	310	12,000	6.8	5.4	AB	B9A	26
EL90	(P)	6.3	0.45	250	250	-15.0	35.0	2.5	30.0	-	-	10,000	10.0	3.0	AB_1	B7G	27
EL91	(P)	6.3	0.2	250	250	-	12.8	4.1	34.0	∞	600	24,000	4.0	3.2	AB	B7G	25
PCL82	(TP)	16.0	0.3	200	200	-	39.5	16.5	35.4	-	390	6,000	9.8	4.0	AB	B9A	37
UL84	(P)	45.0	0.1	200	200	-	50.0	5.0	41.0	-	150‡	3,500	15.0	3.5	AB	B9A	16
UCL82	(TP)	50.0	0.1	200	200	-	39.5	16.5	35.4	-	390	6,000	9.8	4.0	AB	B9A	37

† Fixed bias and separate screen grid supply ‡ Common resistor

S.T.C.

Current Types

5B/254M, 5B/255M	(T)	6.3	0.9ψ	400	-	-45.0	140.0	-	90.0	-	-	3,000	15.0	3.0	AB_1	B8B	66, 65
828	(P)	10.0	3.25ψ	1,700	750	-120.0	248.0	43.0	240.0	-	-	16,200	300.0	1.0	AB_1	UX5	8
				1,250	750	-120.0	150.0	-	-	-	-	12,500	200.0	<1.0			

ψ Each value

TUNGSRAM

Replacement Type

EL42	(P)	6.3	0.2	250	250	-21.5	6.7	-	35.0	-	310	15,000	7.0	5.5	AB_1	B8A	23

Current Types

3C4	(P)	1.4*	0.05†	81.5	81.5	-8.5	1.0	0.2	20.0	-	-	16,000	0.44	2.2	B	B7G	9
3S4	(P)	1.4*	0.1†	90	90	-16.5	8.4	2.7	32.0	-	-	10,000	0.78	6.0	AB_1	B7G	6
807	(BT)	6.3	0.9	400	300	-25.0	45-120	1-9	78.0	-	-	3,200	55.0	-	AB_2	UX5	6
				500	300	-29.0	36-120	1-8	86.0	-	-	4,240	75.0	-	AB_2		
				600	300	-30.0	30-100	1-6	78.0	-	-	6,400	80.0	-	AB_2		
	(T)			750	300	-32.0	26-120	1-8	92.0	-	-	6,950	15.0	3.0	AB_1		
				400	-	-45.0	30-70	-	90.0	-	-	3,000	15.0	3.0	AB_1		
6AM5	(P)	6.3	0.2	250	250	-	12.8	4.1	34.0	∞	600	24,000	4.0	3.2	A	B7G	25
6AQ5	(BT)	6.3	0.45	250	250	-15.0	35.0	2.5	30.0	∞	-	10,000	10.0	3.0	AB_1	B7G	27
6BQ5	(P)	6.3	0.76	300	300	-	46.0	11.0	28.0	-	130	8,000	17.0	4.0	AB	B9A	16
6CK5	(P)	6.3	0.7	300	300	-	36.0	9.5	24.0	-	140	9,000	13.0	2.5	AB_1	B8A	23
	(T)			300	-	-	33.0	-	9.4	-	150	10,000	4.0	1.0	A		
6F6	(P)	6.3	0.7	315	285	-24.0	31.0	6.0	48.0	∞	-	10,000	11.0	4.0	A	IO	36
				315	285	-	31.0	6.0	58.0	∞	640	10,000	10.5	3.0	A		
6L6	(BT)	6.3	0.9	270	270	-	67.0	5.5	40.0	∞	250	5,000	18.5	2.0	A	IO	36
				360	270	-	44.0	2.5	57.0	∞	500	9,000	24.0	4.0	AB_1		
				360	270	-22.5	44.0	2.5	72.0	-	-	3,800	47.0	2.0	AB_2		
6V6	(BT)	6.3	0.45	285	285	-19.0	35.0	2.0	38.0	∞	500	8,000	14.0	3.5	AB_1	IO	36
ECL83	(TP)	6.3	0.6	200	200	-	29.0	8.5	33.0	-	220‡	7,500	7.2	4.2	AB	B9A	27
EL32	(P)	6.3	0.2	250	250	-	32.0	8.0	42.0	∞	310	8,000	7.0	1.5	A	IO	9
EL33	(P)	6.3	1.2	250	250	-	28.5	4.8	18.0	∞	140	10,000	8.2	3.1	A	IO	36
EL34/6CA7	(P)	6.3	1.4	375	Rg_2 600Ω‡	-33.0	107.5	23.5	65.0	-	-	3,500	48.0	2.8	-	IO	133

(Continued)

Type	Heater		Volts			Current (mA) (per valve)		Input Volts (peak) g—g	R_{IN} (Ω)	R_K (per valve) (Ω)	R_L a—a (Ω)	Power Output (W)	D (%)	Class	Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen								Type	Ref.
TUNGSRAM *(Continued)*																
Current Types (Continued)																
EL37 (P)	6.3	1.4	325	325	-	90.0	30.0	61.0	∞	130	4,000	35.0	4.4	AB_1	IO	36
EL37 (P)			400	400	-36.0	138.0	36.0	70.0	∞	-	3,250	69.0	2.5	AB_1		
EL37 (T)			400	-	-	80.0	-	77.0	∞	245	4,000	20.6	4.3	A		
EL85 (P)	6.3	0.2	250	250	-22.1	7.1	34.5	-	-	310	12,000	6.8	5.4	AB	B9A	26
EL86/6CW5(P)	6.3	0.76	250	200	-	50.0	2.0	26.0	-	300	5,500	18.5	4.5	AB	B9A	16
EL95 (P)	6.3	0.2	250	250	-	26.0	7.5	13.0	-	360	10,000	7.0	5.0	AB	B7G	67
EL95 (P)			250	250	-9.0	24.0	7.5	13.0	-	-	10,000	6.5	3.5	B		
PP60 (BT)	6.3	1.27	390	275	-	62.5	9.0	70.0	∞	500	8,000	30.0	6.0	AB_1		
PP60 (BT)			480	385	-40.0	87.5	9.5	80.0	∞	-	6,000	50.0	5.0	AB_1	IO	36
PP60 (T)			400	-	-38.0	62.5	-	80.0	∞	600	4,000	14.5	3.5	AB_1		
PCL83 (TP)	12.6	0.3	200	200	-	29.0	8.5	23.5	-	220	7,500	2.5	10.0	AB	B9A	27
PL84 (P)	15.0	0.3	170	170	-	57.0	20.0	13.1	-	120	3,500	13.0	4.5	AB	B9A	16
15CW5																
16A5 (P)	16.5	0.3	170	170	-	49.0	16.5	26.0	-	100	4,000	9.0	4.0	AB_1	B9A	16
PL33 (P)	19.0	0.3	250	250	-	28.5	4.8	18.0	∞	140	10,000	8.2	3.1	A	IO	36
45A5 (P)	45.0	0.1	170	170	-	49.0	16.5	26.0	-	100	4,000	9.0	4.0	AB_1	B8A	7
UL84 (P)	45.0	0.1	170	170	-17.0	57.5	20.5	18.5	-	120	3,500	13.0	4.5	AB_1	B9A	16
/45B5																

OUTPUT VALVES 3

Type	Heater		Anode Supply Volts	Screen Volts	Typical R_K (Ω)	Positive Surge Anode Volts (max.)	Negative Surge Grid Volts (max.)	Max. Diss. (W)		Typical Current (mA)		Base	
	Volts	Amps						Anode	Screen	Anode	Screen	Type	Ref.
BRIMAR													
Obsolete Type													
19BG6 (BT)	19.0	0.3	Other data as Type 6BG6										
Replacement Types													
6BG6 (BT)	6.3	0.9	700	350	100	6,000	-400	20	3.2	70.0	6.0	IO	39
6CD6 (BT)	6.3	2.5	700	175	-	6,600	-200	15	3.0	100.0	6.0	IO	39
PL81/21A6	21.5	0.3	170	170	-	7,000	-	8	4.5	45.0	3.0	B9A	17
50CD6 (BT)	50.0	0.3	Other data as Type 6CD6										
Current Types													
PL36	25.0	0.3	230	200	-	7,000	1,500	11*	5.0†	100.0 §	16.0 §	IO	129
PL302	25.0	0.3	230	200	-	7,000	-	11*	5.0†	100.0 §	15.0 §	IO	129
PL500	27.0	0.3	230	200	-	7,000	-	12*	5.0‡	100.0 §	10.0 §	B9D	1

* With screen dissipation less than 4W
† With anode dissipation less than 7W
‡ With anode dissipation less than 8W
§ For line scan operation

COSSOR													
Obsolete Types													
41MPT	4.0	1.0	-	200	-	4,000	-	-	-	22.0	-	B7	5
42MPT	4.0	2.0	-	250	-	4,000	-	-	-	36.0	-	B7	5
61BT	6.3	0.7	200	200	470	5,000	-	8	1.75	40.0	3.5	IO	38
62BT	6.3	1.27	180	180	160	8,000	-	25	5.5	120.0	9.5	IO	38
185BTA (BT)	18.0	0.45	180	180	140	10,000	-	25	5.5	120.0	10.0	IO	38
Replacement Types													
EL38	6.3	1.4	300	250	120	8,000	-	25	8.0	64.0	18.0	IO	40
EL81	6.3	1.05	250	250	-	7,000	-	8	4.5	32.0	2.4	B9A	17

(Continued)

Type		Heater		Anode Supply Volts	Screen Volts	Typical R_K (Ω)	Positive Surge Anode Volts (max.)	Negative Surge Grid Volts (max.)	Max. Diss. (W)		Typical Current (mA)		Base	
		Volts	Amps						Anode	Screen	Anode	Screen	Type	Ref.
COSSOR *(Continued)*														
Replacement Types (Continued)														
185BT		18.0	0.45	180	180	160	8,000	-	25.0	5.5	120.0	9.5	IO	38
PL81/21A6		21.5	0.3	170	170	-	7,000	-	8.0	4.5	45.0	3.0	B9A	17
PL36		25.0	0.3	170	170	-	7,000	1,500	8.0	5.0	100.0	8.0	IO	129
PL38		30.0	0.3	200	200	-	8,000	-	25.0	8.0	75.0	9.0	IO	40
EMITRON														
Replacement Types														
185BT	(BT)	18.0	0.45	180	180	140	8,000	-	25.0	5.5	120.0	10.0	IO	38
185BTA	(BT)	18.0	0.45	180	180	140	10,000	-	25.0	5.5	120.0	10.0	IO	38
FERRANTI														
Replacement Types														
EL81		6.3	1.05	250	250	-	7,000	-	8.0	4.5	32.0	2.4	B9A	17
PL38		30.0	0.3	200	200	-	8,000	-	25.0	8.0	75.0	9.0	IO	40
Current Types														
PL81		21.5	0.3	170	170	-	6,000	1,000	7.0	4.5	45.0	3.0	B9A	17
PL820		21.5	0.3	170	170	-	7,000	-	8.0	4.5	45.0	3.0	B9A	17
21A6		21.5	0.3	170	170	-	7,000	-	8.0	4.5	45.0	3.0	B9A	17
PL36		25.0	0.3	170	170	-	7,000	1,500	12.0	5.0	100.0	7.0	IO	129
MARCONI														
Obsolete Type														
KT44/45		4.0	2.0	-	300	-	8,000	-	21.5	-	-	-	B7	37
Current Types														
EL81		6.3	1.05	250	250	-	7,000	-	8.0	4.5	32.0	2.4	B9A	17
N339		20.0	0.3	190	150	-	7,500	-	12.0	4.5	50.0	-	B9A	17
PL81/N152		21.5	0.3	170	170	-	7,000	-	8.0	4.5	45.0	3.0	B9A	17
N308	(BT)	25.0	0.3	400	250	-	6,500	-	10.0	4.0	-	-	IO	129
N389	(BT)	25.0	0.3	400	250	-	7,000	-	10.0	5.0	-	-	IO	129
PL36		25.0	0.3	170	170	-	7,000	1,500	8.0	5.0	100.0	8.0	IO	129
KT36		26.0	0.3	250	200	-	4,000	-	10.0	3.0	-	-	IO	38
PL500		27.0	0.3	75	-10	-	7,000	-	12.0	5.0	440.0	30.0	B9D	1
MAZDA (EXPORT EDISWAN)														
Obsolete Types														
AC/6Pen	(BT)	4.0	1.75	310	210	90	3,000	-	20.0	3.0	63.0	14.0	B7	36
Pen46	(BT)	4.0	1.75	315	230	100	3,000	-	20.0	3.4	63.0	14.0	MO	14
Replacement Types														
6P28	(BT)	6.3	1.1	350	250	100	5,000	-	15.0	4.5	27.0	16.0	IO	38
PL81		21.5	0.3	170	170	-	7,000	-	8.0	4.5	45.0	3.0	B9A	17
30P4	(BT)	25.0	0.3	230	200	-	6,500	-	10.0	4.0	100.0 §	15.0 §	IO	129
20P1△	(BT)	38.0	0.2	400	250	-	6,000	1,500	15.0	5.0	-	-	IO	38
20P4		38.0	0.2	400	250	-	6,000	-	10.0	4.0	-	-	IO	38
Current Types														
30P19	(BT)	25.0	0.3	230	200	-	7,000	-	11.0 *	5.0 †	100.0 §	15.0 §	IO	129
PL36		25.0	0.3	230	200	-	7,000	1,500	11.0 *	5.0 †	100.0 §	16.0 §	IO	129

(Continued)

Type	Heater		Anode Supply	Screen Volts	Typical R_K (Ω)	Positive Surge Anode Volts (max.)	Negative Surge Grid Volts (max.)	Max. Diss. (W)		Typical Current (mA)		Base	
	Volts	Amps	Volts					Anode	Screen	Anode	Screen	Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*													
Current Types													
PL302	25.0	0.3	230	200	-	7,000	-	11.0 *	5.0†	100.0 §	15.0 §	IO	129
PL500	27.0	0.3	230	200	-	7,000	-	12.0 *	5.0‡	100.0 §	10.0 §	B9D	1
MULLARD													
Obsolete Type													
EL820	6.3	1.05	250	250	-	7,000	-	8.0	4.5	32.0	2.4	B9A	17
Replacement Types													
EL38	6.3	1.4	300	300	120	8,000	-	25.0	8.0	64.0	18.0	IO	40
EL36	6.3	1.25	100	100	-	7,000	1,500	12.0	5.0	100.0	7.0	IO	129
EL81	6.3	1.05	250	250	-	7,000	-	8.0	4.5	32.0	2.4	B9A	17
PL820	21.5	0.3	170	170	-	7,000	-	8.0	4.5	45.0	3.0	B9A	17
PL302/30 P19(BT)	25.0	0.3	400	250	-	7,000	-	10.0	5.0	-	-	IO	129
PL38	30.0	0.3	200	200	-	8,000	-	25.0	8.0	75.0	9.0	IO	40
CL30/20P4 (BT)	38.0	0.2	400	250	-	6,000	-	10.0	4.0	-	-	IO	38
UL44	45.0	0.1	175	175	-	3,500	-	5.0	3.0	30.0	4.7	B8A	16
Current Types													
PL81	21.5	0.3	170	170	-	6,000	-	8.0	4.5	45.0	3.0	B9A	17
PL36	25.0	0.3	170	170	-	7,000	1,000	10.0	5.0	100.0	8.0	IO	129
PL500 (P)	27.0	0.3	75	200	-	7,000	-	12.0	5.0	440.0	30.0	B9D	1
TUNGSRAM													
Current Types													
6CJ6	6.3	1.05	250	250	-	7,000	-	8.0	4.5	32.0	2.4	B9A	17
EL36/6CM5	6.3	1.25	100	100	-	7,000	1,500	12.0	5.0	100.0	7.0	IO	36
EL38	6.3	1.4	300	250	120	8,000	-	25.0	8.0	64.0	18.0	IO	40
21A6	21.5	0.3	170	170	-	7,000	-	8.0	4.5	45.0	3.0	B9A	17
PL36	25.0	0.3	170	170	-	7,000	1,500	8.0	5.0	100.0	8.0	IO	29
PL500/27GB5	27.0	0.3	200	150	-	7,000	-	12.0	4.0	230.0	-	B9D	1
PL38	30.0	0.3	200	200	-	8,000	-	25.0	8.0	75.0	9.0	IO	40
UL44	45.0	0.1	175	175	-	3,500	-	5.0	3.0	30.0	4.7	B8A	17

Δ For use under self-oscillating conditions
* With screen dissipation less than 4 W
† With anode dissipation less than 7 W
‡ With anode dissipation less than 8 W
§ For line scan operation

AMPLIFIER TRIODES

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR													
Obsolete Types													
1H5		1.4*	0.05	90	0	0.15	240,000	0.274	1.1	4.6	1.0	IO	91
30		2.0*	0.06	135	-9.0	3.0	10,300	0.9	3.0	2.0	6.0	UX4	1
27		2.5	1.75	250	-21.0	5.2	9,000	1.0	-	-	-	UX5	1
11A2	(DD)	4.0	1.0	200	-2.0	3.0	18,000	2.8	7.0	7.0	5.0	B7	7
6C5		6.3	0.3	250	-8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6J6	(DT)	6.3	0.45	100	R_k=50Ω	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
6N7	(DT)	6.3	0.8	250	-5.0	3.0	23,000	1.6	-	-	-	IO	22
6R7	(DD)	6.3	0.3	250	-9.0	9.5	8,500	1.9	2.6	5.2	2.4	IO	29
6SC7		6.3	0.3	250	-2.0	2.0	53,000	1.325	2.0	3.0	2.0	IO	25
6T8	(TD)	6.3	0.45	250	-3.0	1.0	58,000	1.2	1.6	1.0	2.2	B9A	2
7B6	(DD)	6.3	0.3	250	-2.0	0.9	91,000	1.1	3.0	2.4	1.6	B8B	2
7K7	(DD)	6.3	0.3	250	-2.0	2.3	44,000	1.6	2.6	3.1	2.7	B8B	21
13D2 (SQ)	(DT)	6.3	0.6	250	-8.0	9.0	7,700	2.6	2.6	0.8	4.1	IO	26
37		6.3	0.3	250	-18.0	7.5	8,400	1.1	-	-	-	UX5	1
75	(DD)	6.3	0.3	250	-2.0	0.9	91,000	1.1	4.2	3.4	1.8	UX6	4
76		6.3	0.3	250	-13.5	5.0	9,500	1.45	3.4	5.5	2.2	UX5	1
85	(DD)	6.3	0.3	250	-20.0	8.0	7,500	1.1	-	-	-	UX6	4
12Q7	(DD)	12.6	0.15			Other data as Type 6Q7							
12SL7	(DT)	12.6	0.15			Other data as Type 6SL7							
14B6	(DD)	12.6	0.15			Other data as Type 7B6							
4D1		13.0	0.2	250	-3.0	10.0	10,000	4.0	-	-	-	B7	23
11D3	(DD)	13.0	0.2	250	-2.0	0.4	90,000	1.1	2.0	4.0	2.0	B7	7
11D5	(DD)	13.0	0.15	250	-3.0	3.8	26,700	1.5	-	-	-	B7	7
19T8	(TD)	19.0	0.15			Other data as Type 6T8							
HABC80	(TD)	19.0	0.15			Other data as Type EABC80							
13D1(25SN7) (SQ)	(DT)	25.0	0.15			Other data as Type 6SN7							
Replacement Types													
6AV6	(DD)	6.3	0.3	250	-2.0	1.2	62,500	1.6	2.3	1.1	2.1	B7G	19
6J5		6.3	0.3	250	-8.0	9.0	7,700	2.6	4.2	5.0	5.0	IO	20
6Q7	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	2.0	5.0	1.6	IO	29
6SL7	(DT)	6.3	0.3	250	-2.0	2.3	44,000	1.6	2.15	0.9	3.5	IO	26
6SN7	(DT)	6.3	0.6	250	-8.0	9.0	7,700	2.6	2.6	0.8	4.1	IO	26
7C6	(DD)	6.3	0.15	250	-1.0	1.3	100,000	1.0	2.4	2.4	1.6	B8B	2
5963 (SQ)	(DT)	6.3	0.3†	67.5	0	8.5	6,600	3.2	1.9	0.5	1.5	B9A	1
5965 (SQ)	(DT)	6.3	0.45	150	R_k=220Ω	8.2	7,250	6.5	3.8	a.t. 0.5 / a.t. 0.38	3.0	B9A	1
EBC41	(DD)	6.3	0.23	250	-3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
EBC81	(DD)	6.3	0.2	100	-0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
ECC84/6CW7	(DT)	6.3	0.335	90	-1.5	12.0	4,000	6.0	2.3	0.5	2.3	B9A	28
ECF80	(TP)	6.3	0.3	100	-2.0	14.0	4,000	5.0	2.5	1.8	1.5	B9A	25
ECF804	(TP)	6.3	0.45	150	-1.5	13.5	5,300	7.2	2.5	1.5	1.8	B9A	25
ECL80/6AB8	(TP)	6.3	0.3	100	-2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
ECL83	(TP)	6.3	0.6	200	-1.5	2.4	34.000	2.5	2.3	0.32	1.6	B9A	27
PCC84/7AN7	(DT)	7.0	0.3			Other data as Type ECC84							
PCC85	(DT)	9.0	0.3	200	-2.1	10.0	8,300	5.8	3.0	1.2	1.5	B9A	39
12AV6	(DD)	12.6	0.15	250	-2.0	1.2	62,500	1.6	2.3	1.1	2.1	B7G	19
12AE6	(DD)	12.6	0.15	12.6	0	0.75	15,000	1.0	1.8	1.1	2.0	B7G	19
PCL83	(TP)	12.6	0.3	250	-8.5	10.5	7,700	2.2	2.0	0.35	1.6	B9A	27
UBC81	(DD)	13.0	0.1	100	-0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
UBC41	(DD)	14.0	0.1	170	-1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
UCL83	(TP)	38.0	0.1	200	-1.5	2.4	34,000	2.5	2.3	0.32	1.6	B9A	27
Current Types													
PC86		3.8	0.3	175	-1.5	12.0	4,850	14.0	3.6	0.2	2.0	B9A	74
PC88		3.8	0.3	160	-1.25	12.5	4,800	13.5	3.8	0.055	1.2	B9A	75
PC97		4.5	0.3	135	-1.0	11.0	5,000	13.0	3.2	0.21	0.48	B7G	79
6AF4A		6.3	0.225	80	-2.4	16.0	2,270	6.6	2.2	0.45	1.9	B7G	60
6AM4		6.3	0.225	200	-1.0	10.0	8,700	9.8	4.4	0.16	2.4	B9A	38
6AT6	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
6BQ7A	(DT)	6.3	0.4	150	-2.0	9.0	6,100	6.4	2.85	0.15	1.15	B9A	39

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
BRIMAR *(Continued)*													
Current Types (Continued)													
6BR8	(TP)	6.3	0.45	150	-1.0	18.0	5,000	8.5	2.5	0.4	1.8	B9A	67
6C4		6.3	0.15	250	-8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
12AT7 / 6060 (SQ)	(DT)	6.3	0.3†	250	-2.0	10.0	10,000	5.5	2.5	0.4	1.5	B9A	1
12AU7 / 6067 (SQ)	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
12AX7 / 6057 (SQ)	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
12BH7	(DT)	6.3	0.6†	250	-10.5	11.5	5,500	3.1	3.0	0.8	2.4	B9A	1
13D3 / 6158 (SQ)	(DT)	6.3	0.6†	250	-4.6	6.0	14,000	2.3	2.3	0.9	2.1	B9A	1
13D8	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
6080	(DT)	6.3	2.5	100	-30.0	100.0	300	6.5	5.5	2.5	8.6	IO	145
6100 (SQ)		6.3	0.15	250	-8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
E88CC(SQ)	(DT)	6.3	0.3	90	-1.2	15.0	2,650	12.5	3.3	0.18	1.4	B9A	39
EABC80/ 6AK8	(TD)	6.3	0.45	250	-3.0	1.0	58,000	1.2	1.9	1.6	2.2	B9A	2
EC86		6.3	0.175	175	-1.5	12.0	4,850	14.0	3.6	0.2	2.0	B9A	74
EC88		6.3	0.165	160	-1.25	12.5	4,800	13.5	3.8	0.055	1.2	B9A	75
EC90		6.3	0.15	250	-8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
EC97		6.3	0.215	135	-1.0	11.0	5,000	13.0	3.2	0.21	0.48	B7G	79
ECC81	(DT)	6.3	0.3†	250	-2.0	10.0	10,000	5.5	2.5	0.4	1.5	B9A	1
ECC82	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
ECC83	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.3	1.7	B9A	1
ECC85	(DT)	6.3	0.435	250	-2.0	10.0	9,700	6.0	3.0	0.18	1.5	B9A	39
ECC88	(DT)	6.3	0.365	90	-1.3	15.0	2,600	12.5	3.3	0.18	1.4	B9A	39
ECC189	(DT)	6.3	0.365	90	-1.2	15.0	2,900	12.3	3.5,6.0	2.4,0.17	1.9,1.9	B9A	39
ECC804	(DT)	6.3	0.3	200	-7.7	10.0	5,300	3.4	2.5	2.1	2.5	B9A	39
ECC807	(DT)	6.3	0.3	250	-1.5	1.3	62,500	2.4	2.0	1.35	2.3	B9A	86
ECL82/6BM8	(TP)	6.3	0.78	100	0	3.5	27,000	2.5	2.7	4.0	4.0	B9A	37
ECL86	(TP)	6.3	0.66	250	-1.9	1.2	62,000	1.6	2.3	2.5	1.4	B9A	76
PCF808	(TP)	7.4	0.3	100	-3.0	14.0	3,100	5.5	2.4	1.6	2.1	B9A	78
PCC89	(DT)	7.5	0.3	90	-1.2	15.0	2,900	12.3	3.8,6.3	2.5,0.2	1.9,4.1	B9A	28
PCC88	(DT)	7.6	0.3	90	-1.3	15.0	2,650	12.5	3.3,6.0	1.8,0.18	1.4,1.4	B9A	39
PC189	(DT)	7.6	0.3	90	-1.4	15.0	2,500	12.5	3.5,6.0	1.7,0.18	1.9,1.9	B9A	39
PCF80	(TP)	9.0	0.3	100	-2.0	14.0	4,000	5.0	2.5	1.8	1.5	B9A	25
PCF802	(TP)	9.0	0.3	200	-2.0	3.5	20,000	3.5	2.4	-	1.5	B9A	25
PCE82	(T,BT)	10.0	0.3	150	-4.9	10.0	4,900	3.7	2.2	1.9	2.4	B9A	49
12AT6	(DD)	12.6	0.15	250	-3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
PCL86	(TP)	13.6	0.3	230	-1.7	1.2	62,000	1.6	2.3	2.5	1.4	B9A	76
PCL84	(TP)	15.0	0.3	200	-1.7	3.0	16,200	4.0	4.0	2.5	2.7	B9A	53
PCL82	(TP)	16.0	0.3			Other data as Type ECL82							
PCL85	(TP)	18.0	0.3	100	-0.85	10.0	11,000	5.5	3.0	2.5	1.9	B9A	66
UCC85	(DT)	26.0	0.1	200	-2.1	10.0	8,300	5.8	3.0	1.2	1.5	B9A	39
UABC80	(TD)	28.0	0.1	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
UCL82	(TP)	60.0	0.1	100	0	3.5	28,000	2.5	3.0	4.3	4.5	B9A	37
COSSOR													
Obsolete Types													
6C5		6.3	0.3	250	-8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6J5		6.3	0.3	250	-8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6Q7	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	5.0	3.8	1.4	IO	29
6SL7	(DT)	6.3	0.3	250	-2.0	2.3	44,000	1.6	2.15	0.9	3.5	IO	26
6SN7	(DT)	6.3	0.6	250	-8.0	9.0	7,700	2.6	2.8	0.8	3.8	IO	26

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
COSSOR *(Continued)*													
Replacement Types													
PC86	(T)	3.8	0.3	175	-1.5	12.0	4,850	14.0	3.6	0.2	2.0	B9A	74
PC88	(T)	3.8	0.3	160	-1.25	12.5	4,800	13.5	3.8	0.055	1.7	B9A	75
PC97	(T)	4.5	0.3	135	-1.0	11.0	5,000	13.0	3.2	0.25	0.5	B7G	79
6BQ7A	(DT)	6.3	0.4	150	-2.0	9.0	6,100	6.4	2.6	0.12	1.2	B9A	39
6C4		6.3	0.15	250	-8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
7C6	(DD)	6.3	0.15	250	-1.0	1.3	100,000	1.0	2.4	3.0	1.4	B8B	2
12BH7	(DT)	6.3	0.6†	250	-10.5	11.5	5,500	3.1	3.0	0.8	2.4	B9A	1
EABC80/6AK8	(TD)	6.3	0.45	100	-1.0	0.8	54,000	1.45	1.9	1.4	2.0	B9A	2
EBC41/62DDT	(DD)	6.3	0.23	250	-3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
ECC81	(DT)	6.3	0.3†	170	-1.5	7.0	12,000	4.8	2.2	0.4	1.5	B9A	1
ECC82	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5', 0.35''	1.5	B9A	1
ECC83	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
ECC84	(DT)	6.3	0.34	90	-1.5	12.0	4,000	6.0	2.1,2.3	0.16,0.45	1.1,2.3	B9A	28
ECC85/6AQ8	(DT)	6.3	0.435	230	-2.0	10.0	9,700	6.0	3.0	0.18	1.5	B9A	39
ECC91	(DT)	6.3	0.45	100	-0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
ECL80/6AB8	(TP)	6.3	0.3	100	-2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
OM4	(DD)	6.3	0.2	250	-5.0	5.5	15,000	2.2	2.5	3.6	1.4	IO	29
PCC84/7AN7	(DT)	7.0	0.3	90	-1.5	12.0	-	6.0	2.3	0.45	1.1',2.3''	B9A	28
PCC89	(DT)	7.2	0.3	90	-1.2	15.0	3,000	12.0	4.0,6.8	0.4,0.2	1.7,3.1	B9A	28
PCC85	(DT)	9.0	0.3	200	-2.1	10.0	8,300	5.8	0.003	0.18	1.5	B9A	39
PABC80	(DD)	9.5	0.3	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
PCL83	(TP)	12.6	0.3	250	-8.5	10.5	7,700	2.2	2.0	0.35	1.6	B9A	27
PCL84	(TP)	15.0	0.3	200	-1.7	3.0	16,200	4.0	4.0	2.5	2.7	B9A	53
PCL82	(TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
UCC84	(DT)	21.0	0.3		Other data as Type PCC84							B9A	28
UCC85	(DT)	26.0	0.1		Other data as Type PCC85							B9A	39
UCL83	(TP)	40.0	0.1	200	-1.5	2.4	34,000	2.5	-	-	-	B9A	27
UCL82	(TP)	50.0	0.1	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
PCL85	(TP)	18.0	0.3	100	0	10.0	9,000	5.5	-	-	-	B9A	66
EMITRON													
Current Types													
6AT6	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
7C6	(DD)	6.3	0.15	250	-1.0	1.3	100,000	1.0	2.4	2.1	1.5	B8B	2
FERRANTI													
Obsolete Types													
H2D		2.0*	0.1	100	0	3.5	15,000	1.3	-	-	-	B5	5
HL2		2.0*	0.1	120	-3.0	4.5	10,000	1.4	-	-	-	B4	1
HP2	(DT)	2.0*	0.4	120	0	4.0	8,000	-	-	-	-	B7	11
L2		2.0*	0.1	120	-6.0	7.5	7,000	1.6	-	-	-	B4	1
D4		4.0	1.0	200	-3.0	4.0	12,500	3.3	8.8	10.0	2.4	B5	1
H4D	(DD)	4.0	1.0	200	-2.5	5.5	14,500	2.7	3.5	5.5	2.0	B7	7
76		6.3	0.3	250	-13.5	5.0	9,500	1.45	3.4	5.5	2.2	UX5	1
12SR7	(DD)	12.6	0.15	250	-9.0	9.5	8,500	1.9	3.6	2.8	2.4	IO	31
DA		13.0	0.2	200	-2.6	3.7	20,000	2.2	7.1	6.7	3.5	B7	23
HAD	(DD)	13.0	0.2	200	-2.0	4.5	18,000	2.9	-	-	-	B7	7
Replacement Types													
1G6	(DT)	1.4*	0.1	90	0	1.0	45,000	0.68	-	-	-	IO	96
1H5	(SD)	1.4*	0.05	90	0	0.15	240,000	0.28	1.1	4.6	1.0	IO	91
6A6 6N7	(DT)	6.3	0.8	250	-5.0	3.0	22,600	1.55	-	-	-	UX7 IO	5 22

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
FERRANTI *(Continued)*													
Replacement Types (Continued)													
6C5		6.3	0.3	250	-8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6F8	(DT)	6.3	0.6	250	-8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	28
6J5		6.3	0.3	250	-8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6J6	(DT)	6.3	0.45	100	-0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
6Q7	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	3.2	5.0	1.5	IO	29
6R7	(DD)	6.3	0.3	250	-9.0	9.5	8,500	1.9	2.6	5.2	2.4	IO	29
6SC7		6.3	0.3	250	-2.0	2.0	53,000	1.325	2.0	3.0	2.0	IO	25
6SQ7	(DD)	6.3	0.3	250	-2.0	0.9	91,000	1.1	4.2	3.4	1.8	IO	31
6SL7	(DT)	6.3	0.3	250	-2.0	2.3	44,000	1.6	2.15	0.9	3.5	IO	26
7C6	(DD)	6.3	0.15	250	-1.0	1.3	100,000	1.0	2.4	2.4	1.6	B8B	2
7K7	(DD)	6.3	0.3	250	-2.0	2.3	44,000	1.6	2.6	3.1	2.7	B8B	21
EBC41	(DD)	6.3	0.23	250	-3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
EC90		6.3	0.15	250	-8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
ECC91	(DT)	6.3	0.45	100	-0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
12J5		12.6	0.15	Other data as Type 6J5									
12Q7	(DD)	12.6	0.15	Other data as Type 6Q7									
12SQ7	(DD)	12.6	0.15	Other data as Type 6SQ7									
12SC7	(DT)	12.6	0.15	250	-2.0	2.0	53,000	1.3	2.2	3.0	2.0	IO	25
12SL7	(DT)	12.6	0.15	Other data as Type 6SL7									
UBC41	(DD)	14.0	0.1	170	-1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
Current Types													
6SN7	(DT)	6.3	0.6	250	-8.0	9.0	7,700	2.6	2.6	0.8	4.1	IO	26
12AT7/ ECC81	(DT)	6.3	0.3†	170	-1.5	7.0	12,000	4.8	2.2	0.4	1.5	B9A	1
12AU7/ ECC82	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.8	0.37	1.5	B9A	1
12AX7/ ECC83	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.33	1.7	B9A	1
EABC80/ 6AK8	(TD)	6.3	0.45	100	-1.0	0.8	54,000	1.45	1.9	1.4	2.0	B9A	2
EC91		6.3	0.3	250	-1.5	10.0	12,000	8.5	5.3	0.2	3.8	B7G	24
ECC84	(DT)	6.3	0.34	90	-1.5	12.0	4,000	6.0	2.1,2.3	0.16,0.45	1.1,2.3	B9A	28
ECC85	(DT)	6.3	0.435	250	-2.0	10.0	97,000	6.0	3.0	0.18	1.5	B9A	39
PCC84/7AN7	(DT)	7.0	0.3	90	-1.5	12.0	4,000	6.0	2.3	0.5	2.3	B9A	28
PCC89	(DT)	7.2	0.3	90	-1.2	15.0	3,000	12.0	4.0,6.8	0.4,0.2	1.7,3.1	B9A	28
PABC80	(DD)	9.5	0.3	Other data as Type UABC80									
PCC85/9AQ8	(DT)	9.5	0.3	170	-1.5	10.0	8,000	6.2	0.003	0.18	1.5	B9A	39
UCC84	(DT)	21.0	0.1	90	-1.5	12.0	4,000	6.0	2.3	0.45	2.37,1.1	B9A	28
UCC85	(DT)	26.0	0.1	200	-2.1	10.0	-	5.8	0.003	0.18	1.5	B9A	39
UABC80	(DT)	28.0	0.1	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
HIVAC													
Obsolete Type													
XR8		6.3	0.15	100	-2.5	8.0	4,750	4.2	-	-	-	B8D	8
Replacement Types													
XFR3		1.25*	0.12	135	-5.0	4.0	-	1.65	1.35	3.25	1.3	B5A	5
XR9		6.3	300	100	-1.85	8.5	-	5.0	-	-	-	B8D	12
MARCONI													
Obsolete Types													
HD14	(SD)	1.4*	0.05	90	0	0.14	240,000	0.28	0.48	3.5	1.1	IO	91
HD22	(DD)	2.0*	0.2	150	-3.0	1.2	18,000	1.5	1.8	15.0	3.6	B5	5
HD23	(DD)	2.0*	0.15	150	-2.0	1.0	28,600	1.4	2.75	10.0	2.5	B5	5
HD24	(DD)	2.0*	0.1	100	0	0.4	28,600	1.4	2.75	10.0	2.5	B5	5

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI *(Continued)*													
Obsolete Types (Continued)													
L21		2.0*	0.1	150	-6.0	2.2	8,900	1.8	4.4	3.4	5.9	B4	1
DH42	(DD)	4.0	0.6	250	-3.0	1.1	58,000	1.2	2.5	4.8	2.0	B7	7
H42		4.0	0.6	250	-2.0	1.0	66,000	1.5	2.6	5.3	3.0	B7	23
MH40		4.0	1.0	200	-3.0	2.7	18,750	2.4	6.0	4.0	7.3	B5	1
MH4Met		4.0	1.0	200	-3.0	4.7	11,100	3.6	7.0	6.5	5.7	B5	1
MH41		4.0	1.0	200	-1.5	5.2	13,300	6.0	8.5	4.1	3.2	B5	1
MHD4Met	(DD)	4.0	1.0	200	-4.0	4.0	18,200	2.2	2.42	4.6	3.76	B7	7
MHL4Met		4.0	1.0	200	-5.0	9.0	8,000	2.5	5.4	4.5	3.9	B5	1
ML4		4.0	1.0	250	-16.0	14.0	2,860	4.2	7.2	4.5	6.3	B5	1
DH81	(DD)	6.3	0.3	250	-0.68	1.0	58,000	1.2	2.4	1.4	1.7	B8B	12
DL82	(DD,VM)	6.3	0.3	250	-3.0	5.0	17,000	1.4	2.0	1.5	2.0	B8B	12
DH30	(DD)	13.0	0.3	200	-2.0	2.8	18,000	4.5	4.8	2.4	2.86	B7	7
H30		13.0	0.3	250	-1.7	5.5	13,300	6.0	5.0	2.7	3.5	B7	23
L30		13.0	0.3	200	-8.0	25.0	2,860	4.2	5.0	2.7	3.5	B7	16
DH101	(DD)	19.0	0.1	250	-3.0	1.0	58,000	1.2	2.4	1.4	1.7	B8B	12
Replacement Types													
HL2		2.0*	0.1	150	0	1.75	18,000	1.5	8.0	9.0	4.0	B4	1
DL63	(DD)	6.3	0.3	250	-3.0	-	22,500	1.6	1.5	3.5	2.3	IO	29
H63		6.3	0.3	250	-2.0	1.0	66,000	1.5	2.3	3.7	2.5	IO	18
DH76	(DD)	13.0	0.16	175	-1.3	0.4	58,000	1.2	1.5	5.0	1.5	IO	29
Current Types													
PC86(UHF)	(T)	3.8	0.3	175	-1.5	12.0	4.85	14.0	3.6	0.2	2.0	B9A	74
PC88**	(T)	3.8	0.3	160	-1.25	12.5	4.8kΩ	13.5	3.8	0.055	1.7	B9A	75
PC900	(T)	3.9	0.3	135	-1.0	11.5	5.0kΩ	14.5	3.3	0.08	0.35	B7G	83
PC97 (RF)	(T)	4.5	0.3	135	-1.0	11.0	5.0	13.0	3.2	0.25	0.5	B7G	79
B65	(DT)	6.3	0.6	250	-8.0	9.0	7,700	2.6	2.95	0.77	4.15	IO	26
B729	(DT)	6.3	0.3	200	-7.7	10.0	5,300	3.4	2.5	2.1	2.5	B9A	39
DH63	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	2.5	7.0	1.6	IO	29
DH77/6AT6	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	2.0	1.1	1.9	B7G	19
DH149/7C6	(DD)	6.3	0.15	250	-1.0	1.3	100,000	1.0	2.4	3.0	1.4	B8B	2
EABC80/DH719	(TD)	6.3	0.45	250	-3.0	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
EBC33/DH147	(DD)	6.3	0.2	250	-5.5	5.0	15,000	2.0	-	-	-	IO	29
EBC41/DH150	(DD)	6.3	0.23	250	-3.0	1.0	54,000	1.3	-	-	-	B8A	9
ECC81/B309	(DT)	6.3	0.3†	250	-2.0	10.0	11,000	5.5	2.5	0.4	1.6	B9A	1
ECC82/B329	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
ECC83/B339	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
ECC84	(DT)	6.3	0.33	90	-1.5	12.0	4,000	6.0	2.1, 2.3	0.16, 0.45	1.1, 2.3	B9A	28
ECC85/B719	(DT)	6.3	0.435	250	-2.3	10.0	9,600	5.9	3.0	0.18	1.5	B9A	39
ECC88	(DT)	6.3	0.33	90	-1.2	15.0	2,650	12.5	3.3	1.8	1.4	B9A	39
ECL80/LN152	(TP)	6.3	0.3	100	-2.3	4.0	19,000	1.4	2.0	0.3	0.9	B9A	13
ECL82	(TP)	6.3	0.78	100	0	3.5	27,000	2.5	2.7	4.0	4.0	B9A	37
ECL83	(TP)	6.3	0.6	200	-1.5	2.5	34,000	2.5	2.3	0.32	1.6	B9A	27
EF86/Z729		6.3	0.2	250	-2.0	3.0	16,000	2.0	-	-	-	B9A	23
L63		6.3	0.3	250	-8.0	9.0	7,700	2.6	3.8	3.2	4.1	IO	20
L77		6.3	0.15	250	-8.5	10.5	7,700	2.2	1.8	1.3	1.6	B7G	15
Z749	(P)	6.3	0.3	170	-1.9	12.6	4,800	11.6	-	-	-	B9A	10
B349	(DT)	7.0	0.3	90	-1.2	15.0	3,100	9.0	3.1	-	-	B9A	28
PCC84/B319	(DT)	7.0	0.3	90	-1.5	12.0	4,000	6.0	2.3	0.45	-	B9A	28
PCC89	(DT)	7.2	0.3	90	-1.2	15.0	3,000	12.0	4.0, 6.8	0.4, 0.2	1.7, 3.1	B9A	28
Z329	(P)	7.3	0.3	170	-1.9	12.6	-	11.0	-	-	-	B9A	10
PCC189	(DT,VM)	7.6	0.3	90	-1.4	15.0	2.5kΩ	12.5	3.5, 6.0	1.7, 0.18	1.9, 1.9	B9A	39
PCC85	(DT)	9.5	0.3	170	-1.5	10.0	8,000	6.2	0.003	0.18	1.5	B9A	39
12AT6	(DD)	12.6	0.15	100	-3.0	0.8	54,000	1.3	2.3	1.1	2.1	B7G	19
B36	(DT)	12.6	0.3	250	-8.0	9.0	7,700	2.6	3.7	1.2	4.5	IO	26
PCL83/LN309	(TP)	12.6	0.3	250	-8.5	10.5	-	2.2	-	-	-	B9A	27

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MARCONI *(Continued)*													
Current Types (Continued)													
LN319	(T, BT)	13.0	0.3	200	-7.7	10.0	5,300	3.4	2.6	2.0	2.4	B9A	27
PCL86	(TP)	13.3	0.3	230	-1.7	1.2	-	1.6	2.3	2.5	1.4	B9A	76
UBC41/DH142	(DD)	14.0	0.1	170	-1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
DL145	(DD)	15.0	0.1	150	-2.25	1.25	47,000	3.4	3.6	3.7	1.5	B8A	9
PCL84	(TP)	15.0	0.3	200	-1.7	3.0	16,200	4.0	4.0	2.5	2.7	B9A	53
PCL82	(TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
PCL85	(TP)	18.0	0.3	100	0	10.0	9,000	5.5	2.8	0.35	1.9	B9A	66
DH107	(DD)	19.0	0.1	250	-3.0	1.0	58,000	1.2	2.0	1.1	1.9	B7G	19
UCC85	(TD)	26.0	0.1	200	-2.1	10.0	8,300	5.8	0.003	0.008	0.008	B9A	39
UABC80	(DT)	28.0	0.1	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
UCL83	(TP)	38.0	0.1	170	-9.5	30.0	5,500	5.5	2.3	0.32	1.6	B9A	27
UCL82	(TP)	50.0	0.1	100	0	3.5	28,000	2.5	2.7	4.3	4.2	B9A	37

** U.h.f.

MAZDA (EXPORT EDISWAN)

Obsolete Types

H141D	(SD)	1.4*	0.05	90	-0.6	0.1	260,000	0.25	1.8	6.0	2.3	MO	6
HL2		2.0*	0.1	150	-2.0	2.0	24,000	1.35	3.0	5.25	4.5	B4	1
HL21DD	(DD)	2.0*	0.15	150	-2.0	2.0	25,000	1.3	2.5	7.0	3.5	B5	5
HL22		2.0*	0.1	150	-2.0	2.0	25,000	1.3	2.75	5.0	4.5	MO	2
HL22DD	(DD)	2.0*	0.1	150	-2.0	2.0	25,000	1.3	2.25	6.75	3.25	MO	7
HL23		2.0*	0.05	150	-2.4	1.5	27,000	1.2	2.75	5.25	5.0	MO	2
HL23DD	(DD)	2.0*	0.05	150	-2.8	1.5	24,000	1.05	2.0	6.0	3.5	MO	7
L2		2.0*	0.1	150	-3.8	4.0	12,500	1.5	3.75	5.25	4.75	B4	1
L21DD	(DD)	2.0*	0.1	150	-4.2	4.0	12,000	1.55	2.25	6.75	3.25	B5	5
L22DD	(DD)	2.0*	0.1	150	-4.2	4.0	12,000	1.55	2.25	6.75	3.25	MO	7
AC/2HL		4.0	1.0	200	-1.75	4.9	15,000	5.0	9.0	6.0	6.5	B5	1
AC/ HL		4.0	1.0	200	-3.5	5.0	12,500	2.8	8.0	11.5	3.25	B5	1
AC/HLDD	(DD)	4.0	1.0	200	-3.0	4.3	14,500	2.5	5.0	9.75	2.0	B7	7
AC/HL / DDD	(TD)	4.0	1.0	200	-3.0	4.9	13,500	2.6	3.75	9.5	2.0	B9	5
AC/P4		4.0	1.0	700	For electrostatic scanning				8.4	4.4	5.7	B5	9
HL41		4.0	0.65	250	-4.5	7.0	11,500	3.1	5.25	4.5	5.25	MO	16
HL41DD	(DD)	4.0	0.65	250	-5.2	6.0	13,500	2.2	3.5	4.5	3.5	MO	10
HL42DD	(DD, VM)	4.0	0.65	65	-1.25	2.8	12,500	1.85	3.5	4.5	3.5	MO	10
P41		4.0	0.95	250	-11.8	16.0	3,700	4.5	7.0	4.75	3.5	MO	16
V312		4.0	0.65	250	-4.8	6.0	13,000	2.3	4.5	4.5	2.2	B5	13
6F11	(P)	6.3	0.2	100	-1.8	5.75	9,000	2.85	-	-	-	B8A	8
6L1	(DT)	6.3	0.4	250	-11.5	10.0	6,200	2.8	2.8	2.3	2.7	B8A	13
P61		6.3	0.6	250	-11.8	16.0	3,700	4.5	7.0	4.75	3.5	MO	16
HL133		13.0	0.2	200	-3.3	6.0	12,500	2.9	4.0	5.0	4.75	MO	19
HL133DD	(DD)	13.0	0.2	250	-5.4	6.0	14,000	2.3	3.5	4.5	3.5	MO	10
HL1320		13.0	0.2	200	-3.3	6.0	10,000	3.0	5.0	5.25	2.5	B7	23
HLDD1320	(DD)	13.0	0.2	200	-3.0	4.3	16,000	1.9	4.25	10.5	2.0	B7	7
10L1		19.0	0.1	250	-1.5	10.0	10,500	8.5	5.1	0.1	3.6	B7G	24

Replacement Types

6F1	(P)	6.3	0.35	200	-1.8	12.6	5,300	11.3	-	-	-	B8A	17
6F12	(P)	6.3	0.3	250	-2.0	12.6	8,000	9.4	-	-	-	B7G	21
6F13	(P)	6.3	0.35	200	-1.8	12.6	5,300	11.3	-	-	-	B8A	8
6F23	(P)	6.3	0.3	170	-1.9	12.6	4,800	11.6	-	-	-	B9A	10
6F24	(P)	6.3	0.3	170	-1.9	12.7	3,400	19.0	-	-	-	B9A	10
6L18		6.3	0.3	250	-13.3	12.0	3,000	4.8	4.6	5.8	2.2	B8A	6
6L19	(DT)	6.3	0.4	250	-3.1	4.0	20,000	2.75	2.9	2.5	2.5	B8A	13
6L34		6.3	0.3	250	-1.5	10.0	10,500	8.5	5.1	0.1	3.6	B7G	24
6LD3	(DD)	6.3	0.23	100	-0.7	0.8	54,000	1.4	3.0	1.9	1.3	B8A	9
6LD20	(DD)	6.3	0.25	250	-5.9	5.0	13,500	2.3	3.6	3.7	1.5	B8A	9
EBC41	(DD)	6.3	0.23	100	-0.7	0.8	54,000	1.4	3.0	1.9	1.3	B8A	9
EBC90	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
EC91		6.3	0.3	250	-1.5	10.0	10,500	8.5	5.1	0.1	3.6	B7G	24

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*													
Replacement Types (Continued)													
EC92		6.3	0.15	250	-2.0	10.0	11,000	5.5	2.6	0.24	1.6	B7G	66
ECC84	(DT)	6.3	0.33	90	-1.5	12.0	4,000	6.0	2.3	0.5	1.1	B9A	28
ECL80	(TP)	6.3	0.3	100	-2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
30L1	(DT)	7.0	0.3	90	-1.5	12.0	4,000	6.0	2.3	0.5	1.1	B9A	28
30L15	(DT)	7.0	0.3	90	-1.2	15.0	3,100	9.0	3.1	-	-	B9A	28
PCC84	(DT)	7.0	0.3	90	-1.5	12.0	4,000	6.0	2.3	0.5	1.1	B9A	28
30F5	(P)	7.3	0.3	170	-1.85	12.6	-	11.0	-	-	-	B9A	10
30FL1	(T,BT)	9.4	0.3	200	-7.7	10.0	5,300	3.4	3.6	2.6	2.7	B9A	49
20L1	(DT)	12.6	0.2	250	-11.5	10.0	6,200	2.8	2.8	2.3	2.7	B8A	13
PCL83	(TP)	12.6	0.3	250	-8.5	10.5	7,700	2.2	2.0	0.35	1.6	B9A	27
10LD3	(DD)	13.0	0.1	100	-0.7	0.8	54,000	1.4	3.0	1.9	1.3	B8A	9
10LD13	(DD)	13.0	0.1	100	-0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
30PL1	(T,BT)	13.0	0.3	200	-7.7	10.0	5,300	3.4	2.6	2.0	2.4	B9A	27
UBC81	(DD)	13.0	0.1	100	-0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
UBC41	(DD)	14.0	0.1	100	-0.7	0.8	54,000	1.4	2.6	2.9	1.9	B8A	9
10LD11	(DD)	15.0	0.1	250	-5.9	5.0	13,500	2.3	3.6	3.7	1.5	B8A	9
30PL13	(T,BT)	16.0	0.3	200	-7.7	10.0	5,300	3.4	2.1	1.9	2.3	B9A	37
30PL15	(T,BT)	16.0	0.3	100	-2.1	10.0	4,200	4.3	2.0	1.8	2.3	B9A	66
10F1	(P)	22.0	0.1	200	-1.8	12.6	5,300	11.3	-	-	-	B8A	17
Current Types													
PC86		3.8	0.3	175	-1.5	12.0	4,850	14.0	3.6	0.2	2.0	B9A	74
PC88		3.8	0.3	160	-1.25	12.5	4,800	13.5	3.8	0.055	1.2	B9A	75
PC97		4.5	0.3	135	-1.0	11.0	5,000	13.0	3.2	0.21	0.48	B7G	79
6/30L2	(DT)	6.3	0.3	200	-7.7	10.0	5,300	3.4	2.5	2.1	2.5	B9A	39
6L12	(DT)	6.3	0.435	250	-2.3	10.0	9,700	5.9	3.0	1.2	1.5	B9A	39
6L13	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
6LD12	(TD)	6.3	0.45	250	-3.0	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
6LD13	(DD)	6.3	0.2	100	-0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
6PL12	(T,BT)	6.3	0.78	100	0	3.5	28,000	2.5	3.0	4.3	4.2	B9A	37
EABC80	(TD)	6.3	0.45	250	-3.0	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
EBC81	(DD)	6.3	0.2	100	-0.7	0.8	54,000	1.4	2.6	2.9	1.9	B9A	54
ECC81	(DT)	6.3	0.3†	250	-2.0	10.0	10,000	5.5	2.5	0.4	1.5	B9A	1
ECC82	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
ECC83	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.3	1.7	B9A	1
ECC85	(DT)	6.3	0.435	250	-2.3	10.0	9,700	5.9	3.0	0.18	1.5	B9A	39
ECC804	(DT)	6.3	0.3	200	-7.7	10.0	5,300	3.4	2.5	2.1	2.5	B9A	39
ECL82	(TP)	6.3	0.78	100	0	3.5	28,000	2.5	3.0	4.3	4.2	B9A	37
ECL86	(TP)	6.3	0.66	250	-1.9	1.2	62,000	1.6	2.3	2.5	1.4	B9A	76
PCC806	(DT)	7.2	0.3	75	-0.75	15.0	2,400	16.5	4.1,6.3	1.8,0.17	1.6,3.3	B9A	87
30L17	(DT)	7.2	0.3	75	-0.75	15.0	2,400	16.5	4.1,6.3	1.8,0.17	1.6,3.3	B9A	87
30FL14	(TP)	7.4	0.3	100	-3.0	14.0	3,100	5.5	2.4	1.6	2.1	B9A	78
PCF808	(TP)	7.4	0.3	100	-3.0	14.0	3,100	5.5	2.4	1.6	2.1	B9A	78
PCC89	(DT)	7.5	0.3	90	-1.2	15.0	2,900	12.3	3.8,6.3	2.5,0.2	1.9,4.1	B9A	28
PCC189	(DT)	7.6	0.3	90	-1.4	15.0	2,500	12.5	3.5,6.0	1.7,0.18	1.9,1.9	B9A	39
PCF802	(TP)	9.0	0.3	200	-2.0	3.5	20,000	3.5	2.4	-	1.5	B9A	25
30FL12	(T,BT)	10.0	0.3	150	-4.9	10.0	4,900	3.7	2.2	1.9	2.4	B9A	49
PCL86	(TP)	13.6	0.3	230	-1.7	1.2	62,000	1.6	2.3	2.5	1.4	B9A	76
PCL84	(TP)	15.0	0.3	200	-1.7	3.0	16,200	4.0	3.8	2.3	2.7	B9A	53
30PL12	(T,BT)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
30PL14	(T,BT)	16.0	0.3	200	-7.7	10.0	5,300	3.4	2.1	1.9	2.3	B9A	37
PCL82	(TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
PCL85	(TP)	18.0	0.3	100	-0.85	5.0	11,000	5.5	3.0	2.5	1.9	B9A	66
10L14	(DT)	26.0	0.1	200	-2.1	10.0	8,300	5.8	3.0	1.2	1.5	B9A	39
UCC85	(DT)	26.0	0.1	200	-2.1	10.0	8,300	5.8	3.0	1.2	1.5	B9A	39
10LD12	(TD)	28.0	0.1	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
UABC80	(TD)	28.0	0.1	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
10PL12	(T,BT)	50.0	0.1	100	0	3.5	28,000	2.5	3.0	4.3	4.5	B9A	37
UCL82	(TP)	50.0	0.1	100	0	3.5	28 000	2.5	3.0	4.3	4.5	B9A	37

Type	Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
	Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
M.O. VALVE CO.												
Replacement Types												
ECC81 / B309 (DT)	6.3	0.3†	250	-2.0	10.0	10,000	5.5	2.5	0.4	1.6	B9A	1
ECC82 / B329 (DT) /12AU7	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
ECC83 / B339 (DT) /12AX7	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
EF86 / Z729	6.3	0.2	250	-5.0	4.0	16,000	2.0	-	-	-	B9A	23
L63	6.3	0.3	250	-8.0	9.0	7,700	2.6	3.8	3.2	4.1	IO	20
Current Types												
A1714**	6.3	0.5	250	-	10.0	-	8.5	3.0	1.3	0.9	B7G	81
A2521***	6.3	0.3	250	-	16.0	-	15.0	3.5	0.06	1.6	B9A	70
A2599**	6.3	0.3	250	-	16.0	-	15.0	3.5	0.7	1.1	B9A	71
A2688**	6.3	0.37	200	-	16.0	-	15.0	2.7	0.2	1.1	B7G†	24
R5559‡	6.3	0.3	250	-	25.0	-	25.0	12.0	5.0	2.0	B9A	-
5842 / 417A**	6.3	0.3	180	-	25.0	-	25.0	6.5	0.35	1.8	B9A	-

** V.h.f. *** U.h.f ‡ Video † Flying leads

MULLARD

Obsolete Types

1H5	(SD)	1.4*	0.05	90	0	0.15	240,000	0.275	1.1	4.6	1.0	IO	91
DAC1	(SD)	1.4*	0.05	90	0	0.14	240,000	0.275	-	-	-	Ct8	32
DA1		2.0*	0.05	40	-0.25	0.25	80,000	0.4	3.8	5.4	1.6	Sm4	1
DA2		2.0*	0.05	40	-2.15	1.25	13,600	0.5	3.4	5.4	1.4	Sm4	1
DA3		2.0*	0.055	40	-2.8	1.8	7,600	0.62	-	-	-	Sm4	1
KBC32	(DD)	2.0*	0.05	100	0	2.4	21,000	1.2	1.9	7.0	3.1	IO	88
PM1HF		2.0*	0.1	100	0	2.3	22,500	0.8	-	-	-	B7	1
PM1LF		2.0*	0.1	100	0	5.8	12,000	0.9	-	-	-	B4	1
PM2HL		2.0*	0.1	135	-1.5	2.2	21,500	1.4	3.6	5.0	3.2	B4	1
TDD2A	(DD)	2.0*	0.12	135	-1.5	1.95	25,000	1.2	2.5	7.6	3.7	B5	5
164V		4.0	0.65	200	-9.0	12.0	4,700	3.4	8.6	8.4	3.2	B5	1
354V		4.0	0.65	250	-4.5	6.5	11,500	3.5	5.3	4.2	3.3	B5	1
904V		4.0	0.65	200	-2.0	2.0	36,000	2.0	8.8	7.8	3.4	B5	1
TDD4	(DD)	4.0	0.65	250	-7.0	4.0	13,500	2.0	3.5	2.9	-	B7	7
TT4		4.0	1.0	250	-16.0	20.0	3,300	3.2	3.7	7.0	3.4	B5	1
TT4A		4.0	1.0	250	-9.0	20.0	4,400	4.1	-	-	-	B5	1
6J5		6.3	0.3	250	-8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6Q7	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	5.0	3.8	1.4	IO	29
6SN7		6.3	0.6	250	-8.0	9.0	7,700	2.6	2.8	0.8	3.8	IO	26
75	(DD)	6.3	0.3	250	-2.0	0.9	91,000	1.1	4.2	3.4	1.8	UX6	4
6C5		6.3	0.3	250	-8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
EBC3	(DD)	6.3	0.2	250	-5.5	5.0	15,000	2.0	-	-	-	Ct8	7
EC31		6.3	0.65	250	-16.0	20.0	3,300	3.2	-	-	-	IO	20
EC52		6.3	0.43	250	-2.6	10.0	9,200	6.5	5.2	1.3	3.1	B9G	3
EC53		6.3	0.25	200	-3.3	7.5	11,400	2.9	1.3	0.13	1.3	B3G	1
ECC31	(DT)	6.3	0.95	250	-4.6	6.0	14,000	2.3	4.0	1.9	3.4	IO	22
EF37	(P)	6.3	0.2	150	-3.0	6.0	10,000	2.8	-	-	-	IO	8
12Q7	(DD)	12.6	0.15			Other data as Type 6Q7							
12SN7	(DT)	12.6	0.3			Other data as Type 6SN7							
HL13 } HL13C }		13.0	0.2	200	-3.7	5.0	12,000	3.3	3.9	4.6	3.1	{ Ct8 B7	{ 3 23
TDD13C	(DD)	13.0	0.2	200	-5.0	4.0	13,500	2.0	3.5	2.9	-	B7	7
Replacement Types													
DAC32	(SD)	1.4*	0.05	90	0	0.15	240,000	0.275	1.3	6.0	1.0	IO	91
DCC90	(DT)	1.4*	0.22†	90	-2.5	3.7	8,300	1.8	0.9	1.0	3.2	B7G	8
PC95		3.6	0.3	200	-1.2	10.0	8,000	10.5	3.1	0.24	0.38	B7G	-

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*													
Replacement Types (Continued)													
PC97**	(T)	4.5	0.3	135	-1.0	11.0	5,000	13.0	3.2	0.25	0.5	B7G	79
EAC91 / M8097 (SQ)	(SD)	6.3	0.3	200	-3.2	7.5	12,800	2.8	1.7	0.4	1.6	B7G	23
EBC33	(DD)	6.3	0.2	250	-5.5	5.0	15,000	2.0	-	-	-	IO	29
EBC41	(DD)	6.3	0.23	250	-3.0	1.0	58,000	1.2	2.75	1.5	1.3	B8A	9
EBC81	(DD)	6.3	0.23	250	-3.0	1.0	58,000	1.2	2.3	2.3	1.2	B9A	54
EBC90	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
EBC91	(DD)	6.3	0.3	250	-2.0	1.2	62,500	1.6	-	-	-	B7G	19
EC71 / 5718 (SQ)	(DT)	6.3	0.15	100	-1.25	8.5	4,700	5.8	2.2	0.7	1.45	B8D†	16
EC86 / E86C (SQ)	(T)	6.3	0.165	175	-1.5	12.0	5,000	14.0	4.2	0.25	3.1	B9A	75
EC88 / E88C (SQ)	(T)	6.3	0.155	160	-1.25	12.5	4,800	13.5	3.8	0.055	1.7	B9A	75
EC90 / M8080(SQ)	(T)	6.3	0.15	250	-8.5	10.5	7,700	2.2	1.5	1.2	1.4	B7G	15
EC91 / M8099 (SQ)		6.3	0.3	250	-1.5	10.0	12,000	8.5	5.3	0.2	3.8	B7G	24
EC92		6.3	0.15	250	-2.0	10.0	11,000	5.5	2.6	0.24	1.6	B7G	66
EC98 / M8248	(T)	6.3	0.04	150	-13.5	13.5	3,700	13.5	-	0.08	2.8	B7G	84
ECC32	(DT)	6.3	0.95	250	-4.6	6.0	14,000	2.3	4.3	2.0	4.3	IO	26
ECC33	(DT)	6.3	0.4	250	-4.0	9.0	9,700	3.6	3.5	1.5,1.2	2.5	IO	26
ECC34	(DT)	6.3	0.95	250	-16.0	10.0	5,200	2.2	3.5	1.8	4.0	IO	26
ECC35	(DT)	6.3	0.4	250	-2.5	2.3	34,000	2.0	3.0	1.0,1.3	2.5,3.0	IO	26
ECC40	(DT)	6.3	0.6	250	-5.2	6.0	11,000	2.7	3.0,2.6	1.15	2.6,2.7	B8A	13
ECC70 / 6021 (SQ)	(DT)	6.3	0.3	100	-1.0	6.5	6,500	5.4	2.4	0.3	1.5	B8D†	15
ECC84	(DT)	6.3	0.34	90	-1.5	12.0	4,000	6.0	2.1,2.3	0.16,0.45	1.1,2.3	B9A	28
ECC804/ 6/30L2	(DT)	6.3	0.3	200	-7.7	10.0	5,300	3.4	2.5	2.1	2.5	B9A	39
EF37A	(P)	6.3	0.2	150	-3.0	6.0	10,000	2.8	-	-	-	IO	8
PCC84	(DT)	7.0	0.3	90	-1.5	12.0	4,000	6.0	2.1,2.3	0.16,0.45	1.2,2.3	B9A	28
PCC88	(DT)	7.0	0.3	90	-1.2	15.0	2,650	12.5	3.3	1.8	1.4	B9A	39
PCC805/ 30L15**	(DT)	7.0	0.3	90	-1.2	15.0	3,100	9.0	3.0	1.7	1.5	B9A	28
PCC85	(DT)	9.0	0.3	Other data as Type UCC85									
PCF802*	(TP)	9.0	0.3	200	-2.0	3.5	20,000	3.5	2.4	-	1.5	B9A	25
PCE800 / 30FL1	(T,BT)	9.4	0.3	200	-7.7	10.0	5,300	3.4	1.85	2.1	2.3	B9A	49
PABC80	(DD)	9.5	0.3	Other data as Type UABC80									
UC92		9.5	0.1	170	-1.0	8.5	11,000	5.9	2.6	0.24	1.6	B7G	66
HBC90	(DD)	12.6	0.15	Other data as Type EBC90									
HBC91	(DD)	12.6	0.15	250	-2.0	1.2	62,500	1.6	-	-	-	B7G	19
PCL83	(TP)	12.6	0.3	250	-8.5	10.5	7,700	2.2	2.0	0.35	1.6	B9A	27
PCL801 / 30PL1	(T,BT)	13.0	0.3	200	-7.7	10.0	5,300	3.4	2.6	2.0	2.4	B9A	27
UBC41	(DD)	14.0	0.1	170	-1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
UBC81	(DD)	14.0	0.1	170	-1.6	1.5	42,000	1.65	2.3	2.3	1.2	B9A	54
PCL88 / 30PL14	(T,BT)	16.0	0.3	100	-2.1	10.0	4,200	4.3	2.1	1.8	2.3	B9A	37
PCL800 / 30PL13	(T,BT)	16.0	0.3	100	-2.1	10.0	4,200	4.3	2.1	1.9	2.3	B9A	37
UCC84	(DT)	21.0	0.1	Other data as Type PCC84									
UCL83	(TP)	40.0	0.1	200	-1.5	2.4	34,000	2.5	2.3	0.32	1.6	B9A	27
Current Types													
PC86‡ Δ	(T)	3.8	0.3	175	-1.5	12.0	4,850	14.0	3.6	0.2	2.0	B9A	74
PC88‡	(T)	3.8	0.3	160	-1.25	12.5	4,800	13.5	3.8	0.055	1.7	B9A	75
PC900**	(T)	4.0	0.3	200	-0.5	17.0	5,000	14.5	3.3	0.08	0.35	B7G	83
PC97**	(T)	4.5	0.3	135	-1.0	11.0	5,000	13.0	3.2	0.25	0.5	B7G	79
E80CF (SQ)	(TP)	6.3	0.33	100	-1.2	14.0	3,600	5.0	2.5	1.5	1.5	B9A	25

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
MULLARD *(Continued)*													
Current Types (Continued)													
E88CC (SQ)	(DT)	6.3	0.3	90	-1.0	15.0	-	12.5	3.3	1.18	1.4	B9A	39
E90CC	(DT)	6.3	0.4	100	-2.1	8.5	4,500	6.0	3.4	0.35,0.4	3.2,3.5	B7G	17
EABC80	(TD)	6.3	0.45	250	-3.0	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
ECL86	(TP)	6.3	0.66	250	-1.9	1.2	62,000	1.6	2.3	2.5	1.4	B9A	76
ECC81 / M8162 (SQ)	(DT)	6.3	0.3†	170	-1.0	8.5	11,000	5.9	2.3	0.2	1.6	B9A	1
ECC82 / M8136 (SQ)	(DT)	6.3	0.3†	250	-8.5	10.5	7,700	2.2	1.6	0.5	1.5	B9A	1
ECC83 / M8137 (SQ)	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.46	1.7	B9A	1
ECC85	(DT)	6.3	0.435	250	-2.3	10.0	9,700	5.9	3.0	0.18	1.5	B9A	39
ECC88	(DT)	6.3	0.33	90	-1.2	15.0	2,650	12.5	3.3	1.8	1.4	B9A	39
ECC91 / M8081 (SQ)	(DT)	6.3	0.45	100	-0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
ECH84	(TH)	6.3	0.3	50	0	3.0	13,500	3.7	3.0	-	1.1	B9A	77
ECL80	(TP)	6.3	0.3	100	-2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
ECL82	(TP)	6.3	0.78	100	0	3.5	28,000	2.5	2.7	4.3	4.2	B9A	37
ECL83	(TP)	6.3	0.6	200	-1.5	2.5	34,000	2.5	3.8,6.3	0.32	1.6	B9A	27
PCC89	(DT)	7.2	0.3	90	-1.2	15.0	2,900	12.3	3.5,6.0	2.5,0.2	1.9,4.1	B9A	28
PCC189‡	(VM,DT)	7.6	0.3	90	-1.4	15.0	2,500	12.5	3.5,6.0	1.7,0.18	1.9,1.9	B9A	39
PCL86	(TP)	13.3	0.3	230	-1.7	1.2	62,000	1.6	2.3	2.5	1.4	B9A	76
PCL84	(TP)	15.0	0.3	200	-1.7	3.0	16,200	4.0	4.0	2.5	2.7	B9A	53
PCL82	(TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
PCL85	(TP)	18.0	0.3	100	0	10.0	9,000	5.5	2.8	0.35	1.9	B9A	66
UCC85	(DT)	26.0	0.1	200	-2.1	10.0	8,300	5.8	0.003	0.18	1.5	B9A	39
UABC80	(DT)	28.0	0.1	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
UCL82	(TP)	50.0	0.1	100	0	3.5	28,000	2.5	2.7	4.3	4.2	B9A	37
		2.0*	0.05	150	-2.4	1.5	27,000	1.2	2.75	5.25	5.0	MO	2
HL41		4.0	0.65	250	-4.5	7.0	11,500	3.1	5.25	4.5	5.25	MO	16
V312		4.0	0.65	250	-4.8	6.0	13,000	2.3	4.5	4.5	2.2	B5	13
Current Type													
3A/167M		6.3	0.45	150	-1.5	40.0	1,000	47.0	11.0	2.5	4.0	B8B	56
TUNGSRAM													
Obsolete Types													
LD210		2.0*	0.1	150	-4.5	3.0	14,000	1.3	-	-	4.0	B4	1
2A6	(DD)	2.5	0.8	250	-1.35	0.4	91,000	1.1	1.7	3.8	1.7	UX6	4
HL4g		4.0	0.65	250	-4.5	5.0	11,000	3.5	4.9	4.5	1.7	B7	6
6C5		6.3	0.3	250	-8.0	8.0	10,000	2.0	4.4	12.0	2.2	IO	20
6R7	(DD)	6.3	0.3	250	-9.0	9.5	8,500	1.9	4.8	3.8	2.4	IO	29
EBC3	(DD)	6.3	0.2	250	-5.5	5.0	15,000	2.5	4.0	3.1	1.6	Ct8	7
25SN7		25.0	0.15	Other data as Type 6SN7									
Replacement Types													
HL4+		4.0	0.65	250	-4.5	5.0	11,000	3.5	4.9	4.5	3.5	B5	1
DDT4	(DD)	4.0	0.65	250	-5.0	4.0	11,000	3.6	4.3	3.1	1.7	B7	7
Current Types													
PC95/4ER5		3.6	0.3	200	-1.2	10.0	-	10.5	4.4	0.2	0.38	B7G	79
PC86/4CM4		3.8	0.3	175	-1.5	12.0	4,850	14.0	3.6	0.0002	2.0	B9A	74
PC88/4DL4		3.8	0.3	160	-1.25	12.5	4,800	13.5	3.8	0.0055	1.7	B9A	75

** R.F. triode † Flying leads Δ U.h.f. * Reactance value ‡ Frame grid

(Continued)

Type		Heater		Volts		Anode Current (mA)	r_a (Ω)	g_m (mA/V)	Capacitances (pF)			Base	
		Volts	Amps	Anode	Grid				c_{gk}	c_{ak}	c_{ga}	Type	Ref.
TUNGSRAM *(Continued)*													
Current Types (Continued)													
PC97/4FY5		4.5	0.3	135	-1.0	11.0	5,000	13.0	5.0	0.25	0.50	B7G	79
75 } 6SQ7 }	(DD)	6.3	0.3	250	-2.0	0.9	91,000	1.1	4.2	3.4	1.8	{ UX6 IO	4 31
6AB8	(TP)	6.3	0.3	100	-2.3	4.0	12,500	1.4	2.0	0.3	0.9	B9A	13
6AK8	(TD)	6.3	0.45	250	-3.0	1.0	50,000	1.4	1.9	1.6	2.2	B9A	2
6AT6		6.3	0.3	250	-3.0	1.0	58,000	1.2	2.3	1.1	2.1	B7G	19
6AV6		6.3	0.3	250	-2.0	1.2	62,500	1.6	-	-	-	B7G	19
6CV7	(DD)	6.3	0.23	250	-3.0	1.0	54,000	1.3	2.75	1.5	1.3	B8A	9
6J5		6.3	0.3	250	-8.0	9.0	7,700	2.6	3.4	3.6	3.4	IO	20
6J6	(DT)	6.3	0.45	100	-0.85	8.5	7,100	5.3	2.2	0.4	1.6	B7G	17
6Q7	(DD)	6.3	0.3	250	-3.0	1.0	58,000	1.2	3.2	5.0	1.5	IO	29
6SL7GT	(DT)	6.3	0.3	250	-2.0	2.3	44,000	2.0	3.0	1.0,1.3	2.5,3.0	IO	26
6SN7	(DT)	6.3	0.6	250	-8.0	9.0	7,700	2.6	2.8	0.8	3.8	IO	26
12AT7	(DT)	6.3	0.3†	170	-1.5	8.5	12,000	5.5	2.2	0.4,0.5	1.5	B9A	1
12AU7	(DT)	6.3	0.3†	250	-8.3	10.5	7,700	2.7	1.6	0.5	1.5	B9A	1
12AX7	(DT)	6.3	0.3†	250	-2.0	1.2	62,500	1.6	1.6	0.466	1.5	B9A	1
E88CC	(DT)	6.3	0.3	90	-1.0	15.0	-	12.5	3.3	1.18	1.4	B9A	39
EAC91	(DT)	6.3	0.3	200	-2.8	7.5	12,800	2.8	1.7	0.4	1.6	B7G	23
EBC33	(DT)	6.3	0.3	250	-5.5	5.0	15,000	2.5	4.0	3.1	3.1	IO	29
EBC81	(DD)	6.3	0.23	250	-3.0	1.0	58,000	1.2	-	-	-	B9A	54
EC91/6AQ4		6.3	0.3	250	-1.5	10.0	12,000	8.5	5.3	0.2	3.8	B7G	24
EC92		6.3	0.15	250	-2.0	10.0	11,000	5.5	2.6	0.24	1.6	B7G	66
ECC32	(DT)	6.3	0.95	250	-4.6	6.0	14,000	2.3	4.3	2.0	4.3	IO	26
ECC33	(DT)	6.3	0.4	250	-4.0	9.0	9,700	3.6	3.5	1.5,1.2	2.5	IO	26
ECC35	(DT)	6.3	0.4	250	-2.5	2.3	34,000	2.0	3.0	1.0,1.3	2.5,3.0	IO	26
ECC40	(DT)	6.3	0.6	250	-5.2	6.0	11,000	2.7	3.0,2.6	1.15	2.6,2.7	B8A	13
ECC85/6AQ8	(DT)	6.3	0.435	250	-2.0	10.0	9,700	5.9	3.0	0.18	1.5	B9A	39
ECC88/6DJ8	(DT)	6.3	0.33	90	-1.2	15.0	2,650	12.5	3.3	1.8	1.4	B9A	39
ECC84	(DT)	6.3	0.335	90	-1.5	12.0	4,000	6.0	2.3	0.5	2.3	B9A	28
ECL82/6BM8	(TP)	6.3	0.78	100	0	3.5	28,000	2.5	2.7	4.3	4.2	B9A	37
ECL83	(TP)	6.3	0.6	200	-1.5	2.5	34,000	2.5	2.3	0.32	1.6	B9A	27
ECL86/6GW8	(TP)	6.3	0.66	250	-1.9	1.2	62,000	1.6	2.3	2.5	1.4	B9A	73
EF37A	(P)	6.3	0.2	150	-3.0	6.0	10,000	2.8	-	-	-	IO	8
PCC88	(DT)	7.0	0.3	90	-1.2	15.0	2,650	12.5	-	-	-	B9A	39
7AN7	(DT)	7.0	0.3	90	-1.5	12.0	4,000	6.0	2.3	0.45	2.3,1.1	B9A	28
7FC7	(DT)	7.2	0.3	90	-1.2	15.0	3,000	12.0	4.0,6.8	0.4,0.2	1.7,3.1	B9A	28
PCC85/9AQ8	(DT)	9.0	0.3	200	-2.1	10.0	8,300	5.8	3.0	0.18	1.5	B9A	39
PABC80 9AK8	(DD)	9.5	0.3	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
12AT6		12.6	0.15		Other data as Type 6AT6								
12AV6		12.6	0.15		Other data as Type 6AV6								
12J5		12.6	0.15		Other data as Type 6J5								
PCL83	(TP)	12.6	0.3	250	-8.5	10.5	7,700	2.2	2.0	0.35	1.6	B9A	27
12Q7GT	(DD)	12.6	0.3	250	-3.0	1.0	58,000	1.2	2.0	5.0	1.6	IO	29
12SN7	(DT)	12.6	0.3		Other data as Type 6SN7								
12SQ7	(DD)	12.6	0.15		Other data as Type 6SQ7								
PCL86/14GW8	(TP)	13.3	0.3	230	-1.7	1.2	62,000	1.6	2.3	2.5	1.4	B9A	73
14L7	(DD)	14.0	0.1	170	-1.6	1.5	42,000	1.65	2.75	1.5	1.3	B8A	9
UBC81	(DD)	14.0	0.1	170	-1.6	1.5	42,000	1.65	-	-	-	B9A	54
PCL84/15DQ8	(TP)	15.0	0.3	200	-1.7	3.0	16,200	4.0	4.0	2.5	2.7	B9A	53
PCL82/16A8	(TP)	16.0	0.3	100	0	3.5	28,000	2.5	2.7	4.0	4.0	B9A	37
PCL85/18GV8	(TP)	18.0	0.3	100	-0.85	5.0	11,000	5.5	2.8	0.35	1.9	B9A	66
UCC84	(DT)	21.0	0.1	90	-1.5	12.0	4,000	6.0	2.3	0.45	2.37,1.1	B9A	28
UCC85	(DT)	26.0	0.1	200	-2.1	10.0	8,300	5.8	0.003	0.008	0.008	B9A	39
UABC80	(TD)	28.0	0.1	200	-2.3	1.0	50,000	1.4	1.9	1.4	2.0	B9A	2
UCL83	(TP)	40.0	0.1	200	-1.5	2.4	34,000	2.5	2.3	0.32	1.6	B9A	27
UCL82/50BM8	(TP)	50.0	0.1	100	0	3.5	28,000	2.5	2.7	4.3	4.2	B9A	37

SMALL TRANSMITTING VALVES

Type		Heater		Volts			Current (mA)			Drive	Max. Diss.	R.F. Output	Frequency (Mc/s)		Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen	Grid	(W)	(W)	(W)	Full Rating	Reduced Rating	Type	Ref.
BRIMAR																
Obsolete Types																
6J6	(DT)	6.3	0.45	150	-	-10	30.0	-	-	0.35	3.0	3.5	80	250	B7G	17
Replacement Types																
807	(BT)	6.3	0.9	600	250	-45	100.0	7.0	3.5	0.2	25.0	40.0	60	120	UX5	6
Current Types																
5763 6062 (SQ)	(BT)	6.0	0.75	300	250	-60	50.0	5.0	3.0	0.35	12.0	8.0	50	175	B9A	11
6C4	(T)	6.3	0.15	300	-	-27	25.0	-	7.0	0.35	3.5	5.5	70	150	B7G	15
6146	(BT)	6.3	1.25	600	150	-58	112.0	9.0	2.8	0.2	20.0	52.0	60	175	IO	134
6870 (SQ)	(P)	6.3	0.6†	250	250	-30	28.5	8.0	1.4	7.15	6.3	3.2	75	150	B9A	44
7558	(P)	6.3	0.8	250	200	-	60.0	3.7	1.5	1.0	10.0	6.5	175	-	B9A	88
EC90	(T)	6.3	0.15	300	-	-27	17.1	-	2.9	-	3.5	3.3	100	150	B7G	15
EMITRON																
Current Type																
807	(BT)	6.3	0.9	600	250	-45	100.0	7.0	3.5	0.2	25.0	40.0	60.0	125	UX5	6
ENGLISH ELECTRIC																
Current Types																
3C24	(T)	6.3	3.0	1,000	-	-70	72	-	9.0	1.3	25.0	47	60	100	UX4	9
4D32	(BT)	6.3	3.75	750	300	-100	250	34.0	12.0	1.5	50.0	140	60	-	B7A	6
829B	(DBT)	6.3	2.25†	500	200	-45	230	3.0	15.0	0.9	40.0	83	200	250	B7A	1
832A	(DBT)	6.3	1.6†	500	200	-65	72	14.0	2.6	0.18	15.0	26	200	-	B7A	1
C178A/ 5894	(DBT)	6.3	1.8†	600	250	-80	200	18.0	7.0	3.0	40.0	90	250	500	B7A	1
C1134	(DBT)	6.3	1.3†	600	250	-60	100	8.0	1.4	1.5	20.0	48	150	600	B7A	1
M.O. VALVE CO.																
Replacement Type																
DET18	(T)	5.0	4.0	1,000	-	-87.5	100	-	35.0	6.0	35.0	70.0	100	150	UX4	20
Current Types																
A2244	(T)	6.3	0.4	350	-	-	510	-	5.0	-	10.0	1.0Δ	3,000	-	Coaxial	
DET22	(T)	6.3	0.4	350	-	-	40	-	-	-	10.0	3.0	600	4,000	Coaxial	
DET24	(T)	6.3	1.0	400	-	-	120	-	-	-	20.0	14.0	500	2,600	Coaxial	
DET29	(T)	6.3	0.5	450	-	-	40	-	6.0	0.5	10.0	3.0	3	1.2	Coaxial	
TT15	(DBT)	6.3	1.6	300	175	-50	120	14	2.5	0.3	15.0	24.0	160	250	B9G	5
TT20/ QQV03-20A	(DT)	6.3	1.3	500	250	-80	80	8	2.0	3.0	13.0	31.0	200	400	B7A	1
TT21	(BT)	6.3	1.6	1,250	300	-115	175	20	6.0	1.9	45.0	102.0	30	-	IO	129
DET28	(T)	7.7*	1.15	600	-	-60	100	-	6.0	1.0	25.0	35.0	20	-	B9G	12
TT22	(BT)	12.6	0.8	1,250	300	-115	175	20	6.0	1.9	45.0	102.0	30	-	IO	129

(continued)

Type	Heater		Volts			Current (mA)			Drive (W)	Max. Diss. (W)	R.F. Output (W)	Frequency (Mc/s)		Base	
	Volts	Amps	Anode	Screen	Grid	Anode	Screen	Grid				Full Rating	Reduced Rating	Type	Ref.
M.O. VALVE CO. *(Continued)*															
Current Types (Continued)															
TT23/QQV02-6	(DT) 12.6 / 6.3	0.3 / 0.6	250	200	-50	90	-	6.0	0.2	3.0	5.8	500	-	B9A	29
TT24/QQV03-10	(DT) 12.6 / 6.3	0.42 / 0.83	300	200	-150	60	-	6.0	0.4	10.0	16.0	225	-	B9A	29
TT25/QQV06-40A	(DT) 12.6 / 6.3	0.9 / 1.8	600	300	-100	60	-	10.0	0.2	40.0	56.0	500	-	B7A	1
						φ2,300 Mc/s Δ 1,600 Mc/s									
MULLARD															
Obsolete Types															
MZ05-20	(T)	6.0	1.0	600	-	-107	80	-	11.0	2.0	20.0	33.5	2	30	B4 1
TZ05-20	(T)	6.0	1.1	600	-	-60	85	-	20.0	2.7	20.0	36.0	2	30	B4 1
EC52	(T)	6.3	0.43	250	-	-2.6	10	-	-	-	7.0	-	300	400	B9G 3
EC53	(T)	6.3	0.25	250	-	-	12.5	-	3.6	-	2.5	0.5	285	400	B3G 1
EC56	(T)	6.3	0.65	220	-	-	30	-	-	-	10.0	0.5	4,000	-	Disc seal
EC57	(T)	6.3	0.65	220	-	-	60	-	-	-	10.0	1.8	4,000	-	Disc seal
PV06-25	(P)	6.3	1.3	600	300	-75	109	11.5	2.0	0.2	25.0	45.0	20	60	B7 39
QQV04-20	(DBT)	6.3	1.6†	400	145	-45	150	17.0	4.5	0.23	20.0	44.0	125	200	IO .114
TD05-12	(T)	6.3	0.75	150	-	-	10	-	1.5	1.5	0.02	12.0	1,300	-	- -
TY1-50	(T)	7.5	3.25	1,250	-	-225	90	-	15.0	4.5	50.0	75.0	20	330	B4 16
PV1-35	(P)	12.0	0.9	1,000	300	-170	97	10.0	5.0	1.0	35.0	73.0	20	60	B7 39
Replacement Types															
DL93	(P)	1.4*	0.2	150	135	-	18.3	6.5	0.13	-	2.0	1.2	50	-	B7G 7
EC70	(T)	6.3	0.15	175	-	-	20	-	2.0	-	3.0	0.75	500	-	B8D 8
QQV07-40	(DBT)	6.3	2.5†	750	200	-55	160	30.0	12.0	0.8	40.0	87.0	100	250	B7A 1
QQZ04-15	(DBT)	6.3*	0.68	400	200	-80	60	8.0	3.0	-	12.0	14.5	186	-	B8B 50
QV04-7 / M8157(SQ)	(BT)	6.3	0.6	300	250	-50	44	6.0	0.4	-	7.5	7.7	60	150	B9G 6
QV05-25	(BT)	6.3	0.9	600	250	-45	100	7.0	3.5	0.2	25.0	40.0	60	75	UX5 6
Current Types															
YL1130	(DBT)	1.1*	3.1	275	175	-25	80	14.0	2.6	0.4	8.0	15.0	200	500	B9A 83
YL1190	(DBT)	1.1*	3.8	260	175	-22.5	140	20.0	6.0	2.5	14.0	20.5	200	500	B9D 3
YL1240	(DBT)	1.1*	0.88	300	150	-35	40	3.5	0.85	-	5.0	8.0	175	-	B9A 81
DC70	(T)	1.25*	0.2	150	-	-	18.7	-	1.3	-	2.4	0.55	500	-	B8D 7
DL70	(P)	1.25*	0.11	150	110	-22	10.5	2.5	0.06	-	1.0	0.45	200	-	B8D 6
DL73	(P)	1.25*	0.2	150	75	-20	18.6	5.6	0.8	-	2.0	1.2	200	-	B8D 6
YL1020 / QQZ03-20	(DBT)	1.6*	4.25	600	250	-60	100	6.0	2.0	1.5	20.0	45.0	200	500	B7A 5
YL1080	(DBT)	1.6*	2.5	300	170	-40	75	2.4	1.8	1.0	10.0	14.5	200	-	B9A 82
YL1030 / QQZ06-40	(DBT)	2.1*	4.5	600	250	-80	200	18.0	7.0	4.0	40.0	85.0	200	500	B7A 5
QV03-12 / M8096 (SQ)	(P)	6.0	0.75	300	250	-60	50	5.0	3.0	0.4	12.0	8.0	30	175	B9A 11
EC157	(T)	6.3	0.375	200	-	-	60	-	-	-	12.5	1.8	4,000	-	Disc Seal
EC158	(T)	6.3	0.9	200	-	-	140	-	-	-	30.0	5.3	4,200	-	Disc Seal
ECC91(SQ) / M8081	(DT)	6.3	0.45	150	-	-10	30	-	16.0	0.35	3.0	3.5	80	250	B7G 17
EL85	(P)	6.3	0.2	300	175	-30	20.2	3.9	0.9	-	6.0	3.1	120	-	B9A 26
QQV5-P10	(DBT)	6.3	2.4†	5,000	850	-200	10	2.0	1.0	-	15.0	-	-	-	B7A 1
QQV02-6	(DBT)	6.3	0.8†	180	180	-2.5	55	11.0	2.0	1.6	6.0	6.0	490	-	B9A 29
QQV03-10	(DBT)	6.3	0.83†	300	175	-40	76	3.0	3.0	0.5	10.0	14.0	225	-	B9A 29
QQV03-20A	(DBT)	6.3	1.3†	600	250	-60	100	8.0	1.4	1.5	20.0	48.0	200	600	B7A 1
QQV03-25	(DBT)	6.3	1.3†	700	250	-65	120	9.0	2.0	2.0	25.0	67.0	180	600	B7A 4
QQV04-16	(DBT)	6.3	0.6†	250	170	-15	80	15.0	1.5	1.4	16.0	8.0	960	-	B8B 13
QQV06-40A	(DBT)	6.3	1.8†	600	250	-80	200	18.0	7.0	3.0	40.0	90.0	275	486	B7A 1

(Continued)

Type		Heater		Volts			Current (mA)			Drive	Max. Diss.	R.F. Output	Frequency (Mc/s)		Base	
		Volts	Amps	Anode	Screen	Grid	Anode	Screen	Grid	(W)	(W)	(W)	Full Rating	Reduced Rating	Type	Ref.
MULLARD *(Continued)*																
Current Types (Continued)																
QQV07-50	(DBT)	6.3	1.8†	400	250	-50	230	10.0	6.0	12.0	50.0	52.0	180	500	B7A	4
QV04-7R	(BT)	6.3	0.6	300	150	-30	44	4.5	1.9	-	7.5	7.0	60	150	B9G	6
QV06-20		6.3	1.25	600	150	-58	112	10.0	5.0	-	20.0	52.0	60	175	IO	134
TD03-5		6.3	0.4	250	-	-2	10	-	-	0.6	5.0	-	2,000	-	Coaxial	
TD03-10	(T)	6.3	0.4	250	-	-3.5	20	-	-	10.0	10.0	3.0	1,000	3,000	Coaxial	
TD03-10F	(T)	6.3	0.4	250	-	-3.5	20	-	-	-	10.0	3.0	1,000	3,000	Coaxial	
TD04-20		6.3	1.0	400	-	-	50	-	-	2.0	20.0	13.0	1,000	2,000	Coaxial	
S.T.C.																
Obsolete Types																
3A/154M	(T)	6.3	0.43	250	-	-2	12	-	-	-	-	-	-	-	B8B	15
55A/165M	(DP)	12.6	1.0	500	200	-80	125	20.0	1.0	-	16.0	47.5	30	60	B8B	38
Replacement Types																
3A/146J	(T)	4.0	0.65	350	-	-	-	-	-	-	2.0	-	350	450	-	-
3A/147J	(T)	4.0	0.7	350	-	-	28	-	-	-	6.0	1.5	750	850	-	-
4300A	(T)	5.0	1.2	400	-	-89	50	-	-	-	40.0	-	-	-	UX4	1
4033L	(T)	6.0	1.4	600	-	-65	125	-	30.0	-	25.0	53.0	45	-	B5	1
4061A	(P)	6.3	0.8	500	200	-90	55	35.0	6.0	0.8	10.0	24.0	30	-	UX7	-
4074A	(DT)	6.3	0.8	300	-	-50	90	-	17.0	1.0	10.0	15.0	100	300	UX7	12
3A/148J	(T)	6.3	0.4	350	-	-	-	-	-	-	2.0	-	600	-	-	-
4043C	(T)	7.5	1.2	600	-	-170	130	-	-	-	35.0	52.0	2	10	UX4	1
Current Types																
2P20		2.5*	0.46†	150	150	-10	28	2.0	-	-	5.0	2.4	100	-	B9A	63
2P21		2.5*	0.46†	150	150	-10	28	2.0	-	-	5.0	2.9	200	-	B9A	89
3B/240M	(T)	6.3	1.1	300	-	-10	90	-	35.0	2.5	15.0	16.0	200	-	B8B	54
5B/254M	(BT)	6.3	0.9	600	250	-45	100	8.0	4.0	0.3	25.0	40.0	60	-	B8B	66
5B/255M	(BT)	6.3	0.9	600	250	-45	100	8.0	4.0	0.3	25.0	40.0	60	-	B8B	65
11E13		6.3	0.83†	300	175	-40	76	3.0	3.0	0.5	10.0	14.0	225	-	B9A	29
33A/158M	(DT)	6.3	0.8	300	-	-50	90	-	17.0	1.0	12.0	15.5	100	-	B8B	14
33B/152M	(DT)	6.3	0.92	275	-	-8.5	100	-	13.0	2.0	16.0	13.5	300	420	B9G	10
44A/160M	(DBT)	6.3	1.6	350	200	-48	45	5.0	1.5	0.3	15.0	20.0	150	200	B9G	5
304CB	(T)	7.5	3.2	1,000	-	-170	100	-	22.0	6.0	50.0	70.0	100	300	B4	16
5B/257M	(BT)	12.0	0.47	600	250	-45	100	8.0	4.0	0.3	25.0	40.0	60	-	B8B	65
3B/241M	(T)	19.0	0.37	300	-	-10	90	-	35.0	2.5	15.0	16.0	200	-	B8B	54
5B/256M	(BT)	19.0	0.3	600	250	-45	100	7.0	3.5	0.2	25.0	40.0	60	-	B8B	65
TUNGSRAM																
Current Types																
3A4	(P)	1.4*	0.2	150	135	-	18.3	6.5	0.13	-	2.0	1.2	50	-	B7G	7
807	(BT)	6.3	0.9	600	275	-90	100.0	6.5	4.0	0.4	25.0	42.5	60	125	UX5	6
6J6	(DT)	6.3	0.45	150	-	-10	30.0	-	16.0	0.35	3.0	3.5	80	250	B7G	17
EL85/6BN5		6.3	0.2	300	175	-30	20.2	3.9	0.9	-	6.0	3.1	120	-	B9A	26

TELEVISION CATHODE-RAY TUBES

Type	Heater		kV (max.)		Final Anode Max. μA*	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E T,RG	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
BRIMAR														
Obsolete Types														
C9A	2.0	1.4	6	-	-	-30	-	-	5	5	9	-	MO	24
C9B	2.0	2.5	8	-	-	-40 to -100	-	150	9	7	9	A	IO	112
C15B	2.0	2.5	14	-	-	-60 to -140	-	-	9	7	15	A	IO	112
C12E	6.3	0.6	8	-	-	-50	-	100	10	7	12	-	IO	112
C17JM	6.3	0.6	17.5	0.41	-	-33 to -77	70	150	9	6	17††	A, M, E, R, IT	B12A	11

(Continued)

Type	Heater		kV (max.)		Final Anode Max. μA*	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E T.RG	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
BRIMAR *(Continued)*														
Replacement Types														
C12A	2.0	1.4	6	-	-	-35	-	-	5	5	12	-	MO	24
C12B	2.0	2.5	12	-	-	-60 to -140	-	150	9	7	12	A, F	IO	112
C12D	2.0	2.5	7	-	-	-40 to -100	-	150	9	7	12	F	IO	112
C17AF	4.0	0.3	17.6	0.75	-	-38 to -78	110	180	5	4	17††	A, M, R, E	B8H	2
C19AH	4.0	0.3	16.5	0.7	-	-38 to -78	114	200	5	4	19††	A, M, R, E	B8H	2
C21AF	4.0	0.3	17.6	0.75	-	-38 to -78	110	180	5	4	21††	A, M, R, E	B8H	2
C23AG	4.0	0.3	17.6	0.75	-	-38 to -78	110	180	5	4	23††	A, M, R, E	B8H	2
AW47-90	6.3	0.3	17	0.5	-	-38 to -94	110	200	7	3	19††	A, M, R, E	B8H	1
C12FM	6.3	0.3	9	0.35	-	-40	63	150	7	5	12	IT, M	B12A	1
C14BM	6.3	0.6	14	-	-	-50 to -100	70	150	9	7	14††	A, M, R	B12A	5
C14LM	6.3	0.3	18	0.5	-	-33 to -77	70	180	7	5	14††	A, M, R, E	B12A	11
C14PM	6.3	0.3	18	0.5	-	-33 to -77	70	180	9	6	14††	IT, E, A, M, R	B12A	11
C17AA	6.3	0.3	17.6	0.5	-	-30 to -72	110	180	6	4	17††	IT, A, M, R, E	B8H	2
C17BM	6.3	0.6	17.5	-	-	-50 to -100	70	150	9	7	17††	A, M, R	B12A	5
C17LM	6.3	0.3	18	0.5	-	-33 to -77	70	180	7	5	17††	E, A, M, R	B12A	11
C17PM	6.3	0.3	18	0.5	-	-33 to -77	70	180	9	6	17††	E, IT, A, M, R	B12A	11
C17SM	6.3	0.3	18	0.5	-	-33 to -77	90	180	9	6	17††	E, A, M, R	B12A	11
C19AK	6.3	0.3	16	0.5	-	-38 to -94	110	200	6	4	19††	A, M, R, E	B8H	1
C21AA	6.3	0.3	16	0.5	-	-30 to -72	110	200	6	4	21††	A, M, R, E	B8H	1
C21HM	6.3	0.6	18	0.5	-	-33 to -77	70	180	9	6	21††	A, M, R, IT	B12A	9
C21KM	6.3	0.3	18	0.5‡	-	-40 to -80	90	200	7	5	21††	IT, A, M, R	B12A	10
C21NM	6.3	0.3	18	0.5	-	-53 to 105	70	180	7	7	21††	A, M, R, IT	B12A	10
C21SM	6.3	0.3	18	0.5	-	-33 to -77	90	180	7	5	21††	E, A, M, R	B12A	11
C23AK	6.3	0.3	16	0.5	-	-38 to -94	110	200	6	4	23††	A, M, R, E	B8H	1
C23AKT	6.3	0.3	16	0.5	-	-38 to -94	110	200	6	4	23††	A, M, R, E, T	B8H	1
C24KM	6.3	0.6	18	0.5	-	-33 to -77	70	180	9	6	24††	IT, A, M, R	B12A	10
C14FM	12.6	0.3	14	0.41	-	-33 to -77	70	150	6	5	14††	A, M, R, IT	B12A	9
C21TM	12.6	0.3	20	0.5	-	-30 to -72	90	180	8.5	6.5	21††	IT, A, M, R	B12A	9
C17FM	12.6	0.3	17.5	0.41	-	-33 to -77	70	150	6	5	17††	A, M, R, IT	B12A	9
Current Types														
A47-13W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E, T	B8H	
A47-17W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E, RG	B8H	
A59-12W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E, RG	B8H	
A59-13W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E, T	B8H	
AW47-91	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E	B8H	
CATHODEON														
Obsolete Types														
C17/1	6.3	0.3	16	0.41	100	-44 to -99	70	150	6	4	17	IT, M, R	B12A	1
C27/1A	6.3	0.3	20	0.41	200	-44 to -99	90	150	6	4	27	IT, A, M, R	B12A	1
C27/5A	6.3	0.6	18	0.45	200	-40 to -80	90	150	8	6	27	IT, A, M, R, E	B12A	2
Replacement Types														
C12/1	6.3	0.3	10	0.41	100	-44 to -99	50	150	6	4	12	IT, M	B12A	1
C14/3A	6.3	0.3	14	0.45	100	-40 to -80	70	150	8	6	14	IT, A, M, R, E	B12A	2
C17/1A	6.3	0.3	16	0.41	100	-44 to -99	70	150	6	4	17	IT, A, M, R	B12A	1
C17/4A	6.3	0.3	16	0.41	100	-44 to -99	90	150	6	4	17	IT, A, M, R	B12A	1
C17/5A	6.3	0.3	16	0.45	200	-40 to -80	90	150	8	6	17	IT, A, M, R, E	B12A	2
C17/7A	6.3	0.3	16	0.45	200	-30 to -72	110	150	8	6	17	A, M, R, E	B8H	2
C19/7A	6.3	0.3	16	0.5	300	-30 to -72	110	150	8	6	19	A, M, R, E	B8H	2
C19/10A	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
C19/10AP	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
C21/1A	6.3	0.3	18	0.41	200	-44 to -99	90	150	6	4	21	IT, A, M, R	B12A	1
C21/7A	6.3	0.3	18	0.5	200	-30 to -72	110	150	8	6	21	A, M, R, E	B8H	1
C23/7A	6.3	0.3	18	0.5	300	-30 to -72	110	150	8	6	23	A, M, R, E	B8H	1
C23/10A	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	23	A, M, R, E	B8H	1
C36/24	6.3	0.3	14	0.41	100	-44 to -99	70	150	6	4	14	IT, M, R	B12A	1

Type	Heater		kV (max.)		Final Anode Max. μA*	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E T,RG	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
CATHODEON *(Continued)*														
Current Types														
A47/14W	6.3	0.3	20	0.55	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8A	1
A59/15W	6.3	0.3	20	0.55	300	-40 to -77	110	250	6	4	23	A, M, R, E	B	1
C19/10AR	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
C23/10AR	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	23	A, M, R, E	B8H	1
COSSOR														
Obsolete Types														
121K	6.3	0.3	9	-	100	-50 max	52	150	10	5	12	IT	B12A	1
141K	6.3	0.3	14	-	150	-40	70	150	6.5	5.5	14†	IT, R	B12A	1
171K	6.3	0.3	14	-	150	-40	70	150	6.5	5.5	17††	IT, R	B12A	1
172K	6.3	0.3	16	-	150	-60	70	150	8	6	17††	IT, R	B12A	10
Replacement Types														
MW31-74	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	12	IT, M	B12A	1
MW36-44	6.3	0.3	14	0.41‡	100	-33 to -72	65	200	7	5	14††	IT, M, R	B12A	10
AW43-80	6.3	0.3	16	0.5	100	-40 to -80	85	200	7	4	17††	IT, A, M, R, E	B12A	17
AW43-88	6.3	0.3	16	0.65	-	-38 to -94	110	200	6	4	17††	A, M, R, E	B8H	1
AW47-90	6.3	0.3	18	0.5	300	-38 to -94	110	250	6	4	19	A, M, R, E	B8H	1
AW47-91	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
AW53-88	6.3	0.3	16	0.65	-	-38 to -94	110	200	7	5	21††	A, M, R, E	B8H	1
AW59-90	6.3	0.3	18	0.5	300	-38 to -94	110	250	6	4	23	A, M, R, E	B8H	1
AW59-91	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	23	A, M, R, E	B8H	1
MW43-69	6.3	0.3	16	0.41‡	150	-40 to -86	65	100	8	6	17††	IT, A, M, R	B12A	10
MW53-80	6.3	0.3	18	0.5‡	-	-40 to -80	85	200	7	5	21††	IT, A, M, R	B12A	10
EMISCOPE														
Obsolete Types														
3/1	4.0	1.3	2.7	-	-	-25	-	-	10	7.5	5	-		Special
3/2	4.0	1.3	2.7	-	-	-30	-	-	9	7.5	7	-		Special
3/3	4.0	1.3	3.5	-	-	-32	-	-	9	7.5	9	-		Special
3 4	4.0	1.3	4	-	-	-32	-	-	9	7.5	10	A		Special
3/5	4.0	1.3	4	-	-	-34	-	-	9	7.5	14			Special
3/6A	4.0	1.3	4	-	-	-34	-	-	9	7.5	15	A		Special
6/5	4.0	1.3	5	0.9	-	-20	-	-	9	-	9	-		Special
6/6	4.0	1.3	5	0.9	-	-20	-	-	9	-	12	-		Special
6/7	4.0	1.3	7	1.1	-	-25	-	-	10	7.5	12	-		Special
TA10	4.0	1.0	7	0.25	-	-34	-	-	12	6	10	A	B7B	1
3/32	8.0	0.3	9	-	-	-20	-	-	10	6	15	A	B7B	2
4/13	8.0	0.3	15	0.4	300	-40	70	200	15	6	21	A	B7B	1
5/2	8.0	0.3	17	0.6	-	-33 to -77	70	200	15	6	14	A, R	B7B	3
5/3	8.0	0.3	17	0.6	-	-33 to -77	70	200	15	6	17	A, R	B7B	3
3/16	8.5	0.3	7	-	-	-34	-	-	10	6	10	A	B7B	2
3 18	8.5	0.3	7	-	300	-34	50	200	10	6	12	A	B7B	2
3/31	8.5	0.3	9	-	150	-20	50	200	10	6	12	A	B7B	2
4/14T	8.5	0.3	17	0.4	400	-50	70	200	15	6	14	A, R	B7B	1
4/15T	8.5	0.3	17	0.4	400	-50	70	200	15	6	17	A, R	B7B	1
3/20	11.5	0.3	5.5	-	-	-35	-	-	10	6	10	-	B4E	1
Replacement Types														
AW36/20	6.3	0.3	14	0.41	100	-40 to -80	65	200	> 8	> 6	14††	IT, A, M, R, E	B12A	17
MW36/44	6.3	0.3	14	0.41‡	100	-33 to -72	65	200	7	5	14††	IT, M, R	B12A	10
5/2T	8.5	0.3	17	0.6	-	-60	70	200	15	6	14	A, R, M, E	B7B	3
5/3T	8.5	0.3	17	0.6	-	-60	70	200	15	6	17	A, R, M, E	B7B	3
7204A	12.6	0.3	14	0.4	100	-51	70	180	8.5	6.5	14††	IT, A, R,	B12A	1

(Continued)

Type	Heater		kV (max.)		Final Anode Max. μA*	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E T, RG	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
EMISCOPE *(Continued)*														
Replacement Types (Continued)														
7205A	12.6	0.3	14	0.4	100	-51	90	180	7.5	6.5	14††	IT, A, M, R, E	B12A	2
7404A	12.6	0.3	16	0.4	100	-51	70	180	8.5	6.5	17††	IT, A, R	B12A	1
Current Types														
TA15	4.0	1.0	7	0.25	-	-34	-	-	12	6	15	A	B7B	1
AW43/80	6.3	0.3	16	0.5	100	-40 to -80	85	200	7	4	17††	IT, A, M, R, E	B12A	17
AW43/88	6.3	0.3	16	0.5	-	-38 to -94	110	200	6	4	17††	A, M, R, E	B8H	1
AW47/90	6.3	0.3	16	0.4	-	-38 to -94	110	200	6	4	19††	A, M, R, E	B8H	1
AW47/91	6.3	0.3	18	0.4	-	-40 to -77	110	200	6	4	19††	A, M, R, E	B8H	1
AW53/88	6.3	0.3	16	0.4	-	-38 to -94	110	200	6	4	21††	A, M, R, E	B8H	1
AW59/90	6.3	0.3	16	0.4	-	-38 to -94	110	200	6	4	23††	A, M, R, E	B8H	1
AW59/91	6.3	0.3	18	0.4	-	-40 to -77	110	200	6	4	23††	A, M, R, E	B8H	1
MW43/69	6.3	0.3	16	0.41‡	100	-40 to -66	65	100	>8	>6	17††	IT, A, M, R	B12A	10
MW53/80	6.3	0.3	18	0.5‡	-	-40 to -80	85	200	7	5	21††	IT, A, M, R	B12A	10
SE14/70	6.3	0.3	18	0.5	250	-90	70	180	9	6	14††	IT, A, M, R, E	B12A	11
SE17/70	6.3	0.3	18	0.5	250	-90	70	180	9	6	17††	IT, A, M, R, E	B12A	11
4/14TG	8.0	0.3	17	0.4	400	-50	70	200	15	6	14	A, R, M	B7B	1
4/15TG	8.0	0.3	17	0.4	400	-50	70	200	15	6	17	A, R, M	B7B	1
7405A	12.6	0.3	16	0.4	100	-51	110	180	6	4.5	17††	A, M, R, E	B8H	1
7406A	12.6	0.3	16	0.5	100	-51	110	180	8	4.5	17††	A, M, R, E	B8H	2
7502A	12.6	0.3	20	0.4	100	-51	90	180	8.5	6.5	21††	IT, A, M, R	B12A	1
					Max. third anode volts ± 700V									
7503A	12.6	0.3	16	0.4	100	-51	110	180	6	4.5	21††	A, M, R, E	B8H	1
7504A	12.6	0.3	18	0.5	100	-51	110	180	8	4.5	21††	A, M, R, E	B8H	2
7601A	12.6	0.3	17	0.5	100	-55	110	180	6.5	4.5	19††	A, M, R, E	B8H	1
7701A	12.6	0.3	17	0.5	100	-55	110	180	6.5	4.5	23††	A, M, R, E	B8H	1
EMITRON														
Obsolete Types														
12XP4	6.3	0.3	9	0.41	150	-60	60	150	6	5	12	IT, M	B12A	9
12XP4A	6.3	0.3	9	0.41	50	-60	60	200	6	5	12	IT, M	B12A	9
14LP4	6.3	0.3	14	0.41	150	-60	70	200	6.5	5.5	14††	IT, M, R	B12A	9
14KP4A	6.3	0.3	14	0.41	150	-60	70	150	6.5	5.5	14††	IT, M, R	B12A	9
15EP4	6.3	0.3	10	0.41	150	-60	52	150	6.5	5.5	15	IT, M	B12A	9
17ASP4	6.3	0.3	14	0.41	150	-60	70	150	6.5	5.5	17††	IT, M, R	B12A	9
17AXP4	6.3	0.3	14	0.41	150	-60	70	200	6.5	5.5	17††	IT, M, R	B12A	9
85K	6.3	0.55	10	-	100	-50	52	50	9	9	15	IT	B4E	1
108K	6.3	0.55	9	-	100	-50	50	200	9	9	10	IT	B4E	1
ENGLISH ELECTRIC														
Obsolete Types														
T900	6.3	0.6	14	0.41	-	-33 to -77	53	125	6.5	5	16	IT	B12A	4
T901A	6.3	0.3	14	0.41	-	-33 to -77	70	200	6	5	16	IT	B12A	4
T908	6.3	0.3	16	0.41	-	-33 to -77	70	200	6	5	17††	IT, M, R	B12A	1
T909A	6.3	0.3	16	0.41	-	-33 to -77	70	200	9	15	21	IT	B12A	4
T914	6.3	0.3	16	0.41	-	-33 to -77	70	200	6	5	17††	IT, M, R	B12A	9
T915	6.3	0.3	16	0.41	-	-33 to -77	70	200	9	15	21	IT	B12A	4
FERRANTI														
Obsolete Types														
T12/91	2.0	1.5	9	-	200	-70	50	100	5	6.2	12	F	IO	112
T12/92	2.0	1.5	9	-	200	-70	50	100	5	6.2	12	F, M	IO	112
T9/2	4.0	1.0	6	-	200	-50	48	50	10	10	9	-	IO	112

(Continued)

Type	Heater		kV (max.)		Final Anode Max. μA*	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E T,RG	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
FERRANTI *(Continued)*														
Obsolete Types (Continued)														
T9/3	4.0	1.0	7	-	200	-60	48	50	10	10	9	-	IO	112
T9/5	4.0	1.0	7	-	200	-60	48	50	10	10	9	M	IO	112
T12/2	4.0	1.0	7	-	200	-55	48	50	10	10	12	-	IO	112
T12/3	4.0	1.0	7	-	200	-50	48	50	10	10	12	-	IO	112
T12/44	4.0	0.95	8	-	200	-50	50	100	10	10	12	F	IO	112
T12/54	4.0	0.95	8	-	200	-50	50	100	10	10	12	F, M	IO	112
T12/404	4.0	0.95	9	-	200	-55	50	100	5	6	12	A,F	IO	112
T12/449	4.0	0.95	9	-	200	-55	50	100	5	6	12	F	IO	112
T12/504	4.0	0.95	9	-	200	-55	50	100	5	6	12	A,F,M	IO	112
TR14/1	4.0	0.95	12	-	150	-55	65	100	8	7	14††	A,F	IO	112
TR14/2	4.0	0.95	12	-	150	-50	65	100	8	7	14††	A, F, M, R	IO	112
TR17/1	4.0	0.95	15	-	150	-70	65	100	5	6.3	17††	A, R, F	IO	112
TR17/2	4.0	0.95	15	-	150	-70	65	100	5	6.3	17††	A, M, R, F	IO	112
MW36-24	6.3	0.3	14	0.41	100	-33 to -72	65	200	6	4	14††	IT, M, R	B12A	1
MW43-64	6.3	0.3	14	0.41	100	-43 to -77	65	200	<8	<6	17††	IT, R, M	B12A	10
T12/46	6.3	0.6	8	-	200	-50	48	100	10	10	12	F	IO	112
T12/56	6.3	0.6	8	-	200	-50	48	100	10	10	12	F, M	IO	112
T12/100	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	12	IT, M	B12A	1
TR14/4	6.3	0.3	14	-	150	-50	65	150	5	6	14††	A, F, M, R	IO	112
TR14/15	6.3	0.3	15	0.25	200	-50	65	200	4	7	14††	A, F, M, R	B12A	9
TR14/21	6.3	0.3	15	0.25	100	-50	65	200	<8	<6	14††	IT, M, R	B12A	1
TR14/22	6.3	0.3	15	0.25	100	-50	65	200	<8	<6	14††	A, IT, M, R	B12A	1
TR17/8	6.3	0.3	16	0.25	200	-50	65	150	4	7	17††	A, F, M, R	B12A	9
TR17/10	6.3	0.3	16	0.25	200	-50	65	150	4	7	17††	A, F, M, R	B12A	9
TR17/21	6.3	0.3	16	0.25	100	-40 to -86	65	200	8	6	17††	IT, M, R	B12A	1
TR17/22	6.3	0.3	16	0.25	100	-40 to -86	65	200	8	6	17††	A, IT, M, R	B12A	1
TR21/21	6.3	0.3	18	0.42	100	-60	85	200	8	6	21††	IT, M, R	B12A	1
TR21/22	6.3	0.3	18	0.42	100	-60	85	200	8	6	21††	IT, M, R	B12A	1
T12/71U	8.0	0.3	10	-	200	-60	50	200	10	10	12	F	IO	112
T12/81U	8.0	0.3	10	-	200	-60	50	200	10	10	12	A, F	IO	112
T12/82U	8.0	0.3	10	-	200	-60	50	200	10	10	12	A, F, M	IO	112
Replacement Types														
T12/549	4.0	0.95	9	-	200	-55	50	100	5	6	12	F, M	IO	112
MW31-74	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	12	IT, M	B12A	1
T12/72U	6.3	0.3	10	-	200	-60	50	200	10	10	12	F, M	IO	112
TR14/8	6.3	0.3	14	-	150	-50	65	200	5	6	14††	A, F, M, R	B12A	1
TR14/13	6.3	0.3	15	0.25	200	-50	65	200	4	7	14††	A, F, M, R	B12A	9
MAZDA (EXPORT EDISWAN)														
Obsolete Types														
CRM71	2.0	1.3	4.0	-	-	-35	54	-	5	5	7	-	MO	24
CRM91	2.0	1.3	6.0	-	-	-54	64	-	5	5	9	-	MO	24
CRM92	2.0	1.3	7	-	-	-56	57	-	5.2	5.4	9	-	MO	24
CRM92A	2.0	1.3	7	-	-	-56	57	-	5.2	5.4	9	-	MO	24
CRM121	2.0	1.3	7	-	-	-56	57	-	5.2	5.4	12	-	MO	24
CRM121A	2.0	1.3	7.5	-	-	-60	57	-	5.2	5.4	12	-	MO	24
CRM152A	2.0	1.3	13.0	-	-	-101	67	-	5.2	5.4	15	A	B12A	5
CME2307	6.3	0.3	17	0.5	-	-38 to -94	110	200	7	3	23††	A, M, R, E, T	B8H	1
Replacement Types														
CRM121B	2.0	1.3	10	-	-	-79	57	-	5.2	5.4	12	-	MO	24
CRM123	2.0	1.3	10	-	-	-79	57	-	5.2	5.4	12	A	MO	24
CRM151	2.0	1.3	13	-	-	-101	51	-	5.2	5.4	15	A	MO	24
CRM152B	2.0	1.3	13	-	-	-101	67	-	5.2	5.4	15	A	B12A	5
AW47-90	6.3	0.3	17	0.5	-	-38 to -94	110	200	7	3	19††	A, M, R, E	B8H	1
AW59-90	6.3	0.3	17	0.5	-	-38 to -94	110	200	7	3	23††	A, M, R, E	B8H	1
CME1902	6.3	0.3	17	0.5	-	-38 to -94	110	200	7	3	19††	A, M, R, E	B8H	1

(Continued)

Type	Heater		kV (max.)		Final Anode Max. μA*	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E T,RG	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*														
Replacement Types (Continued)														
CME2302	6.3	0.3	17	0.5	-	-38 to -94	110	200	7	3	23††	A, M, R, E	B8H	1
CRM122	7.3	0.3	7.5	-	-	-60	57	200	5.2	5.4	12	-	MO	24
CME141	12.6	0.3	14§	0.4	-	-51	70	180	8.5	6.5	14††	IT, A, M, R, E	B12A	2
CME1402	12.6	0.3	14§	0.4	-	-51	90	180	7.5	6.5	14††	IT, A, M, R, E	B12A	2
CME1702	12.6	0.3	16§	0.4	-	-51	90	180	9	6.5	17††	A, M, R, E	B12A	2
CME1703	12.6	0.3	16§	0.4	-	-51	110	180	6	4.5	17††	A, M, R, E	B8H	1
CME1705	12.6	0.3	16	0.5	-	-51	110	180	8	4.5	17††	A, M, R, E	B8H	2
CME1901	12.6	0.3	17§	0.5	-	-55	114	180	6.5	4.5	19††	A, M, R, E	B8H	1
CME2101	12.6	0.3	16§	0.4	-	-51	110	180	6	4.5	21††	A, M, R, E	B8H	1
CME2104	12.6	0.3	18	0.5	-	-51	110	180	8	4.5	21††	A, M, R, E	B8H	2
CME2301	12.6	0.3	17§	0.5	-	-55	110	180	6.5	4.5	23††	A, M, R, E	B8H	1
CRM93	12.6	0.3	9	0.4	-	-51	57	180	8.5	6.5	9	IT, A	B12A	1
CRM124	12.6	0.3	10	0.4	-	-51	57	180	8.5	6.5	12	IT, A, M	B12A	1
CRM141	12.6	0.3	14	0.4	-	-51	67	180	8.5	6.5	13.5	IT, A	B12A	1
CRM142	12.6	0.3	14	0.4	-	-51	67	180	8.5	6.5	13.5	IT, A	B12A	1
CRM143	12.6	0.3	14	0.4	-	-51	70	180	8.5	6.5	14††	IT, A, R	B12A	1
CRM144	12.6	0.3	14	0.4	-	-51	70	180	8.5	6.5	14††	IT, A, M, R	B12A	1
CRM153	12.6	0.3	15	0.4	-	-51	67	-	8.5	6.5	15	IT, A, M	B12A	1
CRM171	12.6	0.3	16	0.4	-	-51	70	180	8.5	6.5	17††	IT, A, R	B12A	1
CRM172	12.6	0.3	16	0.4	-	-51	70	180	8.5	6.5	17††	IT, A, M, R	B12A	1
CRM173	12.6	0.3	16	0.4	-	-51	90	180	7.5	6.5	17††	IT, A, M, R	B12A	1
CRM211	12.6	0.3	16	0.4	-	-51	70	180	8.5	6.5	21††	IT, A, M, R	B12A	1
CRM212	12.6	0.3	20	0.4	-	-51	90	180	8.5	6.5	21††	IT, A, M, R	B12A	1
Current Types					-	Max. third anode voltage ± 700V								
A47-13W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E,T	B8H	1
A47-14W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E	B8H	1
A47-17W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E,RG	B8H	1
A59-12W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A,M, R, E,RG	B8H	1
A59-13W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E, T	B8H	1
A59-15W	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E	B8H	1
AW47-91	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E	B8H	1
AW59-91	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E	B8H	1
CME1101	6.3	0.3	15	0.55	-	-38 to -94	110	200	6	5	11††	A, M, R, E,RG	B8H	1
CME1601	6.3	0.3	17	0.55	-	-40 to -77	110	250	7	3	16††	A, M, R, E	B8H	1
CME1903	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E	B8H	1
CME1905	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E,RG	B8H	1
CME1906	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E, T	B8H	1
CME1908	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	19††	A, M, R, E	B8H	1
CME2303	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E	B8H	1
CME2305	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E,RG	B8H	1
CME2306	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E, T	B8H	1
CME2308	6.3	0.3	18	0.55	-	-40 to -77	110	250	7	3	23††	A, M, R, E	B8H	1
MULLARD														
Obsolete Types														
AW36-21	6.3	0.3	12	0.30	100	-40 to -80	65	200	>8	>6	14††	IT, M, R, E	B12A	17
MW22-7	6.3	0.6	7	0.30	100	-40	51	150	10	5	9	-	B8B	53
MW22-14	6.3	0.3	7	0.3	100	-40 to -99	51	150	>10	>5	9	M	B8B	53
MW22-14C	6.3	0.3	7	0.3	100	-44 to -99	51	150	>10	>5	9	-	B8B	53
MW22-17	6.3	0.3	9	0.41	100	-44 to -99	51	200	6	4	9	-	B12A	1
MW22-18	6.3	0.3	9	0.41	100	-44 to -99	51	200	6	4	9	M	B12A	1
MW31-7	6.3	0.6	7	0.3	100	-40	50.5	150	10	5	12	-	B8B	53
MW31-14	6.3	0.3	9	0.3	100	-44 to -99	50.5	150	>10	>5	12	-	B8B	53
MW31-14C	6.3	0.3	9	0.3	100	-44 to -99	50.5	150	>10	>5	12	M	B8B	53
MW31-16	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	12	IT, M	B12A	1
MW31-17	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	12	-	B12A	1
MW31-18	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	12	M	B12A	1
MW31-20	6.3	0.3	11	0.35	100	-44 to -99	50.5	150	>10	>10	12	A	B8B	53

(Continued)

Type	Heater		kV (max.)		Final Anode Max. μA*	Grid Volts (cut-off)	Defl. Angle (deg.)	Volts h-k (max.)	Capacitances (pF to earth)		Screen Diam. (in)	Remarks† IT, A, F, M, R, E T,RG	Base	
	Volts	Amps	Final Anode	First Anode					g	k			Type	Ref.
MULLARD *(Continued)*														
Obsolete Types (Continued)														
MW31-21	6.3	0.3	11	0.35	100	-44 to -99	50.5	150	>10	>10	12	A, M	B8B	53
MW31-22	6.3	0.3	11	0.35	100	-44 to -99	50.5	150	>10	>10	12	A	B12A	1
MW31-23	6.3	0.3	11	0.35	100	-44 to -99	50.5	150	>10	>10	12	A, M	B12A	1
MW36-22	6.3	0.3	14	0.41	100	-33 to -72	65	200	6	4	14††	IT, R, M	B12A	1
MW36-24	6.3	0.3	14	0.41	100	-33 to -72	65	200	6	4	14††	IT, M, R	B12A	1
MW43-64	6.3	0.3	14	0.41‡	100	-40 to -86	65	200	>8	>6	17††	IT, R, M	B12A	10
Replacement Types														
A47-13W	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
AW36-20	6.3	0.3	14	0.41	100	-40 to -80	65	200	>8	>6	14††	IT, A, M, R, E	B12A	17
AW36-80	6.3	0.3	14	0.5	100	-40 to -80	85	200	7	4	14††	IT, A, M, R, E	B12A	17
AW43-80	6.3	0.3	16	0.5	100	-40 to -80	85	200	7	4	17††	IT, A, M, R, E	B12A	17
AW43-88	6.3	0.3	16	0.5	-	-38 to -94	110	200	6	4	17††	A, M, R, E	B8H	1
AW43-89	6.3	0.3	16	0.7	-	-35 to -75	110	200	7	5	17††	A, M, R, E	B8H	2
AW47-90	6.3	0.3	18	0.5	300	-38 to -94	110	250	6	4	19	A, M, R, E	B8H	1
AW53-80	6.3	0.3	16	0.5	100	-40 to -80	85	200	7	4	21††	IT, A, M, R, E	B12A	17
AW53-88	6.3	0.3	16	0.5	-	-38 to -94	110	200	6	4	21††	A, M, R, E	B8H	1
AW53-89	6.3	0.3	16	0.7	-	-35 to -75	110	200	6	4	21††	A, M, R, E	B8H	2
AW59-90	6.3	0.3	18	0.5	300	-38 to -94	110	250	6	4	23	A, M, R, E	B8H	1
MW6-2	6.3	0.3	25	-	150	-40 to -90	30.5	125	6	6	2.5	A, M	side contact	
MW22-16	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	9	IT, M	B12A	1
MW31-74	6.3	0.3	9	0.41	100	-44 to -99	50.5	200	6	4	12	IT, M	B12A	1
MW36-44	6.3	0.3	14	0.41‡	100	-33 to -72	65	200	7	5	14††	IT, M, R	B12A	10
MW41-1	6.3	0.3	14	0.41	100	-39 to -86	56	200	6	4	16	IT, F	B12A	1
MW43-43	6.3	0.3	14	0.41	100	-43 to -77	66	200	>8	>6	17††	IT, R	B12A	10
MW43-69	6.3	0.3	16	0.41‡	100	-40 to -86	65	200	< 8	< 6	17††	IT, A, M R	B12A	10
MW43-80	6.3	0.3	16	0.41	100	-40 to -86	85	200	< 8	< 5	17††	IT, A, M, R	B12A	10
MW53-20	6.3	0.3	18	0.5‡	-	-40 to -80	65	200	>7	>5	21††	IT, A, M, R	B12A	10
MW53-80	6.3	0.3	18	0.5‡	-	-40 to -80	85	200	7	5	21††	IT, A, M, R	B12A	10
AW21-11	11.5	0.06	16	0.8	100	-32 to -69	90	130	< 9	< 5	8.5	A, M, R, E	B8H	1
Current Types														
A47-11W	6.3	0.3	18	0.7	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
A47-18W	6.3	0.3	18	0.7	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
A59-11W	6.3	0.3	18	0.7	300	-40 to -77	110	250	6	4	23	A, M, R, E	B8H	1
AW47-91	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	19	A, M, R, E	B8H	1
AW59-91	6.3	0.3	18	0.55	300	-40 to -77	110	250	6	4	23	A, M, R, E	B8H	1

† IT = ion trap; A= aluminizing; E= electrostatic focusing; F = flat screen; M= external conducting coating; R = rectangular screen; T= twin panel; RG= rimguard protected tube

* For highlights †† Diagonal ‡ Second anode 0V S = Square screen. V_{a2} = +200V (focus)

CATHODE-RAY TUNING INDICATORS

Type	Heater		Target Volts	Target Current (mA)	Grid Voltage Change	Base	
	Volts	Amps				Type	Ref.
BRIMAR							
Obsolete Types							
EM85	6.3	0.3	250	2.1	18	B9A	56
EM71	6.3	0.3	250	2.5	20	B8B	57
12U5	12.6	0.15	Other data as type 6U5G				
1629	12.6	0.15	250	4.0	8	IO	46

(Continued)

Type	Heater		Target Volts	Target Current (mA)	Grid Voltage Change	Base	
	Volts	Amps				Type	Ref.
BRIMAR *(Continued)*							
Replacement Types							
DM70	1.4	0.025	85	0.17	10	B8D	9
PM84	4.2	0.3	170	0.6 to 1.05	0 to -15	B9A	56
6U5/6G5	6.3	0.3	250	4.0	22	UX6	11
6U5G	6.3	0.3	250	4.0	22	IO	46
EM81	6.3	0.3	250	2.0 to 2.3	-1.0 to -10	B9A	41
EM840	6.3	0.25	250	1.1 to 1.6	21	B9A	56
Current Types							
EM84	6.3	0.21	250	1.0 to 1.8	0 to -22	B9A	56
EM87	6.3	0.3	250	1.0 to 1.8	0 to -10	B9A	56
COSSOR							
Obsolete Types							
63ME	6.3	0.3	250	4.5	22	IO	46
65ME	6.3	0.3	250	2 to 2.3	15	B9A	41
64ME (Dual Sensitivity)	6.3	0.2	250	0.75	2.5 and 16	IO	48
Replacement Types							
EM81	6.3	0.3	250	2 to 2.3	9.5	B9A	41
EM84 (Dual sensitivity)	6.3	0.27	250	1.6	22	B9A	56
EM87 (Dual sensitivity)	6.3	0.3	250	2.0	15	B9A	56
FERRANTI							
Obsolete Types							
FT4	4.0	0.5	200-250	0.50	6	IO	46
VFT4	4.0	0.5	200-250	0.5	20	IO	46
Replacement Types							
EM80/6BR5	6.3	0.3	250	2.3	13	B9A	41
VFT6	6.3	0.3	200	4.5	22	IO	46
1629	12.6	0.15	250	2.0	7.5	IO	46
Current Types							
DM70/1M3	1.4*	0.025	85 60	0.17 0.1	10 7	B8D	9
EM81	6.3	0.3	250	2.3	9.5	B9A	41
MARCONI							
Obsolete Type							
EM80	6.3	0.3	250	2.0	13	B9A	41
Replacement Type							
Y61	6.3	0.3	180 to 250	4.5	22	IO	46

(Continued)

Type	Heater		Target Volts	Target Current (mA)	Grid Voltage Change	Base	
	Volts	Amps				Type	Ref.
MARCONI *(Continued)*							
Current Types							
DM70 / DM71 / Y25	1.4*	0.025	85 / 60	0.17 / 0.1	10 / 7	B8D	9
EM34	6.3	0.2	250	0.75	5 and 16	IO	48
EM81	6.3	0.3	250	2 to 2.3	9.5	B9A	41
EM84	6.3	0.27	250	1.6	22	B9A	55
EM87	6.3	0.3	250	1.8	-10	B9A	55
UM80	19.0	0.1	200	7.0	13	B9A	41
MAZDA (EXPORT EDISWAN)							
Obsolete Types							
AC/ME	4.0	0.5	250	1.5	22	B7	19
ME41	4.0	0.5	250	1.16	22.5	MO	21
6M2 (Dual sensitivity)	6.3	0.2	250	0.46	4 and 20	IO	135
ME91	9.0	0.2	175	2.7	19	MO	21
ME920	9.0	0.2	175	2.6	19	B7	19
10M2 (Dual sensitivity)	12.6	0.1	200	0.4	3 and 20	IO	136
10M1	18.0	0.1	250	1.16	22.5	IO	46
Replacement Types							
6M1	6.3	0.3	250	1.16	22.5	IO	46
EM81	6.3	0.3	250	2.0 to 2.3	-1.0 to -10	B9A	41
Current Types							
1M1	1.4*	0.025	90 / 60	0.25 / 0.12	13.5 / 8	B8D	9
DM71	1.4*	0.025	90 / 60	0.25 / 0.12	13.5 / 8	B8D	9
EM84	6.3	0.21	250	1.0 to 1.8	0 to -22	B9A	56
EM87	6.3	0.3	250	1.0 to 1.8	0 to -10	B9A	56
MULLARD							
Obsolete Types							
TV4	4.0	0.3	250	0.13	5	Ct8	9
EM1	6.3	0.2	250	0.13	5	Ct8	9
EM3	6.3	0.2	250	0.3	21	Ct8	9
EM4 (Dual sensitivity)	6.3	0.2	250	0.75	5 and 16	Ct8	20
EM80	6.3	0.3	250	2.3	13	B9A	41
UM34 (Dual sensitivity)	12.6	0.1	250	0.75	5 and 16	IO	48
Replacement Types							
DM70	1.4*	0.025	85 / 60	0.17 / 0.1	10 / 7	B8D	9
EM34 (Dual sensitivity)	6.3	0.2	250	0.75	5 and 16	IO	48
EM81	6.3	0.3	250	2.3	9.5	B9A	41
UM4	12.6	0.1	200	1.4	4.2 and 12.5	IO	136
UM80	19.0	0.1	200	7.0	13	B9A	41
Current Types							
EM84 (Dual sensitivity)	6.3	0.21	250	1.8	22	B9A	56
EM87 (Dual sensitivity)	6.3	0.3	250	2.8	15	B9A	56

Cathode Ray Tuning Indicators

Type	Heater		Target Volts	Target Current (mA)	Grid Voltage Change	Base	
	Volts	Amps				Type	Ref.
TUNGSRAM							
Replacement Type							
EM34	6.3	0.2	250	0.75	5 and 16	IO	48
Current Types							
DM70	1.4*	0.025	85 60	0.17 0.1	10 7	B8D	9
6FG6	6.3	0.27	250	1.6	22	B9A	55
6U5G	6.3	0.3	250	0.4	22	IO	46
EM80	6.3	0.3	250	2.3	13	B9A	41
EM81	6.3	0.3	250	2.3	9.5	B9A	41
EM87	6.3	0.3	250	1.8	22	B9A	56

THYRATRONS

Type	Heater		Max. Anode Volts	Max. Peak Current (mA)	Control Ratio	Valve Voltage Drop	Max. Frequency (c/s)	Base	
	Volts	Amps						Type	Ref.
BRIMAR									
Current Type									
2D21	6.3	0.6	650	500	250	8	-	B7G	15
ENGLISH ELECTRIC									
Current Types									
AFX203	2.5*	5.0	170	7,700	-	11	-	UX4	20
6D4	6.3	0.25	350	110	-	18	-	B7G	72
AFX234	6.3	0.49	350	1,200	-	16	-	B7G	72
FERRANTI									
Replacement Type									
GK3	Cold cathode		140	20	-	73	-	B4	18
Current Types									
EN30	Cold cathode		380	250A	-	20	-	IO	124
GK10	Cold cathode		150	30	-	70	-	B7G	56
GK20	Cold cathode		230	30	-	130	-	B7G	56
GK32	Cold cathode		140	20	-	80	-	caps	
GK33	Cold cathode		140	20	-	80	-	wires	
GK40	Cold cathode		150	20	-	73	-	caps	
GK41	Cold cathode		150	20	-	73	-	wires	
GN10	Cold cathode		550	250A	-	20	-	IO	123
GN20	Cold cathode		420	250A	-	20	-	IO	123
3C23	2.5	7.0	1,250	6,000	-	16	-	UX4	20
GL1	2.5	7.0	1,250	6,000	-	16	-	IO	125

Type	Heater		Max. Anode Volts	Max. Peak Current (mA)	Control Ratio	Valve Voltage Drop	Max. Frequency (c/s)	Base	
	Volts	Amps						Type	Ref.
HIVAC									
Obsolete Types									
XC13	Cold cathode		200	7.5	-	70	-		Wires
XC22	Cold cathode		210	0.5	-	70	-		Wires
XC24	Twin trigger version of XC18								
Replacement Types									
XFG1	1.25	0.05	45	-	-	-	-		Wires
XG2	6.3	0.15	560	100	200	10	200	B8D	10
Current Types									
XC18	Cold cathode		200	1	-	73	-		Wires
XC23	Cold cathode		200	15	-	68	-		Wires
XC31	Cold cathode		300	2	-	118	-		Wires
MAZDA (EXPORT EDISWAN)									
Obsolete Type									
T31	4.0	1.5	400	500	20	40	20,000	B5	9
Replacement Types									
T41	4.0	1.5	400	500	20	40	20,000	MO	16
6K25	6.3	0.95	400	500	20	40	20,000	IO	20
M.O. VALVE CO.									
Current Types									
GT1C	4.0	1.35	500	1,000	-	-	8,000	B5	1
GT3	6.3	0.85	500	300	-	-	-	IO	115
MULLARD									
Obsolete Types									
Z804U	Cold cathode		400	125	-	112	-	B9A	59
Z800U	Cold cathode		275	10	-	100	-	B9A	58
Z801U	Cold cathode		170	10	-	105	-	B9A	57
Replacement Types									
Z300T /1267	Cold cathode		225	100	-	70	-	IO	108
AN1	4.0	1.45	650	2,000	28	9	-	B5	1
EN31	6.3	1.3	1,000	750	-	33	150,000	IO	112
EN70	6.3	0.15	500	100	-	11	-	B8D	10
EN93	6.3	0.25	350	110	-	18	-	B7G	72
Current Types									
EN32	6.3	0.95	650	2,000	275	10	-	IO	126
EN91	6.3	0.6	650	500	250	8	500	B7G	51
EN92	6.3	0.15	350	100	-	10	-	B7G	46
M8204 (SQ)	6.3	0.66	500	100	-	-	50	B7G	46
Z700U	Cold cathode		310	16	-	116	-		Wires
Z700W	Cold cathode		310	16	-	116	-		Wires
Z701U	Cold cathode		165	12	-	62	-	B8D	-
Z803U	Cold cathode		290	50	-	105	-	B9A	51
Z900T	Cold cathode		200	100	-	62	-	B7G	71

Thyratrons

Type	Heater		Max. Anode Volts	Max. Peak Current (mA)	Control Ratio	Valve Voltage Drop	Max. Frequency (c/s)	Base	
	Volts	Amps						Type	Ref.
S.T.C.									
Replacement Types									
20A2	6.3	1.0	650	1,250	300	9	-	IO	118
20A3	6.3	0.6	650	500	250	8	-	B7G	46
4313C	Cold cathode		150	30	-	75	-	UX4	22
G1/236G	Cold cathode		235	1.5	-	70	-	Wires	
Current Types									
2D21	6.3	0.6	650	500	250	8	-	B7G	51
3D22	6.3	2.6	650	8,000	150	10	-	B7G	73
21A1	6.3	0.95	600	1,250	300	9	-	IO	126
G150/2D	Cold cathode		150	50	-	60	-	IO	141
G240/2D	Cold cathode		240	50	-	90	-	IO	141
G1/237G	Cold cathode		200	1.5	-	70	-	Wires	
G1/371K	Cold cathode		360	15	-	180	-	B7G	-

EFFICIENCY DIODES

Type	Heater		Peak Inverse Volts*	Peak Anode Current (mA)	Max. Rect. Current (mA)	Peak Cathode Potential		Capacitance (pF) h–k	Base	
	Volts	Amps				h(–) to k*	h(+) to k		Type	Ref.
BRIMAR										
Obsolete Type										
25U4GT	25.0	0.3	3,850	660	138	3,850	385	6.5	IO	109
Replacement Types										
6U4	6.3	1.2	3,850	660	138	3,850	110	8.5	IO	109
EY83	6.3	1.0	5,000	500	175	5,000	-	2.1	B9A	34
PY81 / 17Z3	17.0	0.3	4,500	450	150	4,500	3,000	3.6	B9A	34
PY83	20.0	0.3	Other data as Type EY83							
Current Types										
PY800	19.0	0.3	5,250	350	150	5,750	3,000	-	B9A	34
PY801	19.0	0.3	5,500	450	175	5,500	-	2.0	B9A	34
PY88	30.0	0.3	6,600	550	220	6,600	-	2.0	B9A	34
COSSOR										
Replacement Type										
PY81	17.0	0.3	4,500	450	150	4,500	3,000	3.6	B9A	34
EMITRON										
Obsolete Type										
PY80 / 19X3	19.0	0.3	4,000	400	180	650	-	-	B9A	18
FERRANTI										
Replacement Type										
PY80 / 19X3	19.0	0.3	4,000	400	180	650	-	-	B9A	18

(Continued)

Type	Heater		Peak Inverse Volts*	Peak Anode Current (mA)	Max. Rect. Current (mA)	Peak Cathode Potential		Capacitance (pF) h–k	Base	
	Volts	Amps				h(–) to k*	h(+) to k		Type	Ref.
FERRANTI *(Continued)*										
Current Types										
PY81	17.0	0.3	4,500	450	150	4,500	3,000	3.6	B9A	34
PY800	19.0	0.3	5,250	350	150	5,750	-	1.9	B9A	34
PY83	20.0	0.3	5,000	500	175	5,600	-	9.2	B9A	34
PY88	30.0	0.3	6,000	550	220	6,600	-	2.0	B9A	34
MARCONI										
Obsolete Type										
U152	19.0	0.3	4,000	400	180	650	160	-	B9A	18
Current Types										
PY81 / U153	17.0	0.3	4,750	450	150	4,500	3,000	3.6	B9A	34
PY80 / U309	19.0	0.3	4,000	1,000	180	700	-	-	B9A	18
PY800 Booster (D)	19.0	0.3	5,250	350	150	5,750	-	1.9	B9A	34
U339	19.0	0.3	5,000	600	120	5,000	-	-	IO	128
U349	19.0	0.3	5,000	450	150	5,500	-	7.9	B9A	34
U329	25.0	0.3	7,500	720	120	7,500	-	3.2	B9A	34
P788 Booster (D)	30.0	0.3	6,600	530	220	6,600	-	2.0	B9A	34
MAZDA (EXPORT EDISWAN)										
Obsolete Type										
U403	40.0	0.2	1,500	-	-	-	-	11.0	MO	18
Replacement Types										
PY81	17.0	0.3	4,750	450	150	4,750	3,000	3.6	B9A	34
U191	19.0	0.3	5,000	600	120	5,000	-	-	IO	128
PY83	20.0	0.3	5,000	500	175	5,000	-	2.1	B9A	34
U251	25.0	0.3	7,000	720	120	7,500	-	3.2	B9A	34
U281	28.0	0.2	3,000	600	120	1,000	-	12.5	IO	55
U282	28.0	0.2	4,500	600	120	1,000	-	12.5	IO	121
U301	28.0	0.2	4,500	600	120	4,500	-	-	IO	128
U801	80.0	0.2	1,500	-	-	-	-	14.0	IO	117
Current Types										
PY800	19.0	0.3	5,250	350	150	5,750	3,000	-	B9A	34
PY801	19.0	0.3	5,500	450	175	5,500	-	2.0	B9A	34
U193	19.0	0.3	5,500	450	175	5,500	-	2.0	B9A	34
PY88	30.0	0.3	6,600	550	220	6,600	-	2.0	B9A	34
M.O. VALVE CO.										
Replacement Type										
U329	25.0	0.3	7,000	720	120	7,500	-	3.2	B9A	34
Current Type										
U339	19.0	0.3	4,500	-	150	-	-	-	IO	128

Effeciency Diodes

Type	Heater		Peak Inverse Volts*	Peak Anode Current (mA)	Max. Rect. Current (mA)	Peak Cathode Potential		Capacitance (pF) h–k	Base	
	Volts	Amps				h(–) to k*	h(+) to k		Type	Ref.
MULLARD										
Replacement Types										
EY81	6.3	0.8	4,500	450	150	4,500	–	–	B9A	34
PY31	17.0	0.3	1,500	–	125	300	–	–	IO	55
PY81	17.0	0.3	4,750	450	150	4,750	–	2.8	B9A	34
PY80	19.0	0.3	4,000	400	180	650	–	–	B9A	18
PY301 / U191	19.0	0.3	4,500	450	150	4,500	–	–	IO	128
CY30 / U301	28.0	0.2	4,500	450	150	4,500	–	–	IO	128
PZ30	52.0	0.3	1,500**	–	200	650	–	–	IO	52
Current Types										
PY800	19.0	0.3	5,250	350	150	5,750	–	–	B9A	34
PY88	30.0	0.3	6,600	550	220	6,600	–	2.0	B9A	34
TUNGSRAM										
Current Types										
17Z3	17.0	0.3	4,500	450	150	4,500	–	3.6	B9A	34
PY31	17.0	0.3	1,500	–	125	300	–	–	IO	55
PY80 / 19X3	19.0	0.3	4,000	400	180	650	–	–	B9A	18
PY800	19.0	0.3	5,250	350	150	5,750	–	1.9	B9A	34
PY88 / 30AE3	30.0	0.3	6,600	550	220	6,600	–	2.0	B9A	34
WESTINGHOUSE										
Current Types										
14D19	–	–	320	unlimited	–	–	–	–	Metal rectifier	
14D24	–	–	400							
14D28	–	–	480							
14D36	–	–	640							
14D134	–	–	1,260							
14D148	–	–	560							

**Anode connected to Pin 5

*For 10 μ sec pulse duration

THERMIONIC DIODES

Type	Heater		Max. Input Volts (r.m.s.)	Max. Rect. Current (mA)	No. of Diodes	Capacitances (pF)			Base	
	Volts	Amps				a'-k	a"-k	a'-a"	Type	Ref.
BRIMAR										
Obsolete Types										
6H6	6.3	0.3	150	8.0	2	3.0	4.0	0.1	IO	53
10D1	13.0	0.2	50	8.0	2	5.0	5.0	0.6	B5	3
Current Types										
6AL5, 5726 (SQ), 6058 (SQ)	6.3	0.3	150	9.0	2	3.2	3.2	0.026	B7G	18
EB91	6.3	0.3	150	9.0	2	3.2	3.2	<0.026	B7G	18

Type	Heater		Max. Input Volts (r.m.s.)	Max. Rect. Current (mA)	No. of Diodes	Capacitances (pF)			Base	
	Volts	Amps				a'-k	a"-k	a'-a"	Type	Ref.
COSSOR										
Obsolete Type										
SD6	6.3	0.15	150	10.0	1	1.45	-	-	B7G	39
Replacement Type										
EB91	6.3	0.3	150	9.0	2	3.2	3.2	0.026	B7G	18
EMITRON										
Current Type										
6AL5	6.3	0.3	150	9.0	2	3.0	3.0	0.026	B7G	18
FERRANTI										
Obsolete Type										
SD } ZD }	7.0	0.2	50	1.0	1	-	-	-	B5	8
Replacement Types										
6H6	6.3	0.3	150	8.0	2	3.0	4.0	0.1	IO	53
EB41	6.3	0.3	150	9.0	2	<0.01	<0.01	<0.03	B8A	10
Current Types										
6AL5 / EB91	6.3	0.3	150	9.0	2	3.2	3.2	0.025	B7G	18
DD6	6.3	0.3	150	9.0	2	3.0	3.1	0.026	B7G	18
MARCONI										
Obsolete Types										
D41	4.0	0.3	-	-	2	3.5	2.5	0.5	B5	3
D42	4.0	0.6	75	15.0	1	4.0	-	-	B4	8
D43	4.0	0.6	75	15.0	1	4.0	-	-	B4	1
D152	6.3	0.3	150	9.0	2	3.0	3.0	0.03	B7G	18
Replacement Type										
D63	6.3	0.3	100	2.0	2	6.0	7.0	0.18	IO	53
Current Type										
EB91 / D77	6.3	0.3	120	5.0	2	3.5	3.5	0.025	B7G	18
MAZDA (EXPORT EDISWAN)										
Obsolete Types										
1D13	1.4	0.15	130	0.5	1	0.6	-	-	B7G	13
DD207	2.0*	0.075	-	-	2	4.0	3.25	0.8	B4	5
AC / DD	4.0	1.0	-	-	2	5.0	5.0	1.2	B5	3

(Continued)

Thermionic Diodes

Type	Heater		Max. Input Volts (r.m.s.)	Max. Rect. Current (mA)	No. of Diodes	Capacitances (pF)			Base	
	Volts	Amps				a'-k	a"-k	a'-a"	Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*										
Obsolete Types (Continued)										
D1	4.0	0.2	125	5.0	1	2.1	-	-	B3G	1
DD41	4.0	0.5	175	5.0	2	4.0	4.25	0.06	MO	13
V914	4.0	0.3	-	0.5	2	3.5	3.0	0.25	B5	3
DD620	6.0	0.2	-	0.5	2	3.5	3.0	0.25	B5	3
6D3*	6.3	0.3	-	5.0	1	-	-	-	B7G	50
DD101	10.0	0.2	175	5.0	2	5.0	4.6	0.06	MO	13
Replacement Types										
6D1	6.3	0.15	125	5.0	1	2.1	-	-	B3G	1
20D1	9.5	0.2	175	9.0	2	3.4	3.4	0.018	B7G	18
10D2	19.0	0.1	175	9.0	2	3.4	3.4	0.018	B7G	18
Current Types										
6D2	6.3	0.3	175	9.0	2	3.4	3.4	0.018	B7G	18
EB91	6.3	0.3	150	9.0	2	3.2	3.2	<0.026	B7G	18
				*Slow-heating cathode						
M.O. VALVE CO.										
Current Types										
A2087*	4.4	0.64	200	20.0	-	-	-	-	B7G	80
CV2341*	5.0	4.0	400	200.0	-	-	-	-	Coaxial	
CV2398*	6.0	1.15	200	85.0	-	-	-	-	B9A	69
D77 / EB91	6.3	0.3	120	5.0	2	2.2	2.2	0.025	B7G	18
				*Noise generators						
MULLARD										
Obsolete Types										
2D2	2.0	0.09	90	0.5	2	2.8	2.8	<0.5	B5	3
2D4A	4.0	0.65	200	0.8	2	4.5	4.5	<0.5	B5	3
2D4B	4.0	0.35	200	0.8	2	3.8	3.9	<0.07	B7	21
T4D	4.0	0.2	50	5.0	1	2.1	-	-	B3G	1
EAB1	6.3	0.2	200	0.8	3	1.5	1.35	<0.65	Ct8	17
EB4	6.3	0.2	200	0.8	2	1.2	1.2	<0.2	Ct8	10
2D13C	13.0	0.2	200	0.8	2	4.5	4.5	<0.3	B5	3
Replacement Types										
DA90	1.4	0.15	117	0.5	1	0.4	-	-	B7G	13
6AL5 / M8212	6.3	0.3	117	9.0	2	3.1	3.1	50.026	B7G	18
EA50	6.3	0.15	50	5.0	1	2.1	-	-	B3G	1
EA76	6.3	0.15	150	9.0	1	2.5	-	-	B5B	1
EB34	6.3	0.2	200	0.8	2	4.5	4.5	0.5	IO	53
EB41	6.3	0.3	150	9.0	2	<0.01	<0.01	<0.03	B8A	10
UB41	19.0	0.1	150	9.0	2	<0.01	<0.01	<0.03	B8A	10
Current Types										
EB91 / M8079 (SQ)	6.3	0.3	150	9.0	2	3.0	3.0	<0.025	B7G	18

Type	Heater		Max. Input Volts (r.m.s.)	Max. Rect. Current (mA)	No. of Diodes	Capacitances (pF)			Base	
	Volts	Amps				a'-k	a"-k	a'-a"	Type	Ref.
TUNGSRAM										
Obsolete Types										
6H6	6.3	0.3	150	3.0	2	3.0	4.0	0.1	IO	53
EAB1	6.3	0.2	200	0.8	3	2.25	1.0	0.4	Ct8	17
EB4	6.3	0.2	100	0.8	2	1.2	1.2	0.2	Ct8	10
DD818	8.0	0.18	100	1.5	2	-	-	-	B5	4
Current Types										
6AL5	6.3	0.3	150	9.0	2	3.2	3.2	0.026	B7G	18
EB34	6.3	0.2	200	0.8	2	4.5	4.5	0.5	IO	53

VALVE VOLTAGE STABILISERS

Type	Mean Stab. Volts	Striking Volts	Tube Current (mA)		Regulation (volts)	Base	
			Min.	Max.		Type	Ref.
BRIMAR							
Replacement Types							
VR75/30	75	100	5	40	6.5	IO	74
VR105/30	105	135	5	40	4.0	IO	74
VR150/30	150	180	5	40	5.5	IO	74
6BK4 E.h.t. Voltage Regulator, V_h = 6.3 I_h = 0.2A V_a max. = 25kV I_a max. = 1.5mA						IO	130
Current Types							
OB2	108	133	5	30	4.0	B7G	28
OA2	150	185	5	30	6.0	B7G	28
COSSOR							
Replacement Types							
85A2	85	115	1	10	3.0	B7G	28
S130	120	180	6	75	5.0	B4	12
S130P	120	135§	5	75	7.5	B4	15
150C4	150	165	5	30	6.0	B7G	28
150B3	153	170	2	20	5.0	B7G	40
EMITRON							
Obsolete Types							
S130	120	180	6	75	5.0	B4	12
S130P	120	135§	5	75	7.5	B4	15
ENGLISH ELECTRIC							
Obsolete Types							
QS83/3	83	115	1	8	1.5	B7G	28
QS1201 (SQ)	75	110	2	15	4.5	B7G/F	28
QS1204	108	133	5	25	3.0	B7G	28
STV280/40*	280	420	5	35	4.0**	B5	15
STV280/80*	280	420	10	70	4.0**	B5	15

(Continued)

Type	Mean Stab. Volts	Striking Volts	Tube Current (mA)		Regulation (volts)	Base	
			Min.	Max.		Type	Ref.
ENGLISH ELECTRIC *(Continued)*							
Current Types							
OA2(QS1207)	150	185	5	30	6.0	B7G	28
OA2WA(QS1210) (SQ)	150	165	5	30	5.0	B7G	28
OA3 (QS1205)	75	105	5	40	6.5	IO	74
OB2(QS1208)	108	133	5	30	3.5	B7G	28
OB2WA(QS1211) (SQ)	108	133	5	30	3.0	B7G	28
OC2	75	115	5	30	4.5	B7G	28
OC3(QS1206)	108	133	5	40	4.0	IO	74
OD3(QS150/40)	150	180	5	40	5.5	IO	74
QS75/20	75	110	2	20	6.0	B7G	70
QS75/60	75	117	5	60	5.0	B8B	64
QS92/10	92	140	1	10	5.0	B4	19
QS95/10	95	110	2	10	5.0	B7G	40
QS108/45	108	120	5	45	5.0	B8B	55
QS150/15	150	170	2	15	5.0	B7G	40
QS150/45	150	170	5	45	5.0	B8B	55
QS1200	150	180	5	15	5.0	B7G	55
QS1202 (SQ)	108	133	2	15	3.0	B7G/F	28
QS1203 (SQ)	150	180	2	15	4.5	B7G/F	28
QS1209/5651	85	115	1	10	4.0	B7G	28
QS1212 (SQ)	85	115	1	10	5.0	B7G	28
QS1213 (SQ)	85	115	1	10	4.0	B7G/F	28
QS1215	90	115	1	40	8.0	B7G	28
			** Per gap				
FERRANTI							
Current Types							
KD21	75	105	5	40	4.5	IO	74
KD24	105	135	5	40	4.0	IO	74
KD25	150	180	5	40	5.5	IO	74
KD60	62	80	0.1	2.5	0.4	Caps	
KD61	62	80	0.1	2.5	0.4	Wires	
KD63	62	100	0.2	2.5	0.5	Wires	
M.O. VALVE CO.							
Obsolete Types							
QS105/45	105	130†	5	45	5.0	B8B	55
S130P	120	135§	5	75	7.5	B4	15
ST11	100	140	1	8	5.0	B4	12
Replacement Types							
QS70/20	70	95	2	20	6.0	B7G	53
QS75/40	75	105	5	40	6.5	IO	74
QS83/3	83	130	1	5	-	B7G	52
QS95/10	95	110	2	10	5.0	B7G	40
QS108/45	108	120†	5	45	5.0	B8B	55
QS150/15	150	177	2	15	5.0	B7G	40
QS150/40	150	180	5	40	5.5	IO	74
QS150/45	150	170††	5	45	5.0	B8B	55
STV280/40*	280	420	5	35	-	B5	15
STV280/80*	280	420	10	70	-	B5	15
QS/75/60	75	117	5	60	5.0	B8B	64
QS92/10	92	140	1	10	5.0	B4	19
QS1200	150	180	5	15	5.0	B7G	55
QS1202	108	133	2	15	3.0	B7G/F	28
QS1203	150	180	5	15	5.0	B7G/F	28

(Continued)

Type	Mean Stab. Volts	Striking Volts	Tube Current (mA)		Regulation (volts)	Base	
			Min.	Max.		Type	Ref.
M.O. VALVE CO. *(Continued)*							
Replacement Types (Continued)							
QS1205	75	105	5	40	6.5	IO	
QS1206	108	133	5	40	4.0	IO	
QS1207	150	185	5	30	6.0	B7G	28
QS1208	108	133	5	30	3.5	B7G	28
QS1209	83	125	1	5	1.0	B7G	28
QS1210	150	165	5	30	5.0	B7G	28
QS1211	108	133	5	30	3.0	B7G	28
QS1212	85	115	1	10	4.0	B7G	28
QS1213	85	115	1	10	4.0	B7G/F	28
QS1215	90	115	1	40	10.0	B7G	28
MULLARD							
Replacement Types							
75B1	75	110	2	22	6.0	B7G	40
85A1§§	85	125	1	8	-	B8B	41
95A1	95	110	2	10	5.0	B7G	40
4687	100	130	10	40	6.0	Ct8	22
4687A	100	130	10	40	6.0	B4	12
7475	100	140	1	8	2.0	B4	12
13201A	100	135	15	200	5.0	B4	12
150C2	150	185	5	30	6.0	B7G	28
150B3	153	170	2	20	5.0	B7G	40
Current Types							
75C1 M8225 (SQ)	78	115	2	60	<5.0	B7G	55
83A1§§	83	130	3.5	6.0	<1.1	B7G	55
85A2§§ M8098§§(SQ) M8142§§(SQ)	85	115	1	10	3.0	B7G	28
M8190§§(SQ) (85A3)	86	125	0.5	3.5	3.0	Wires	
90C1 M8206 (SQ)	90	115	1	40	14.0	B7G	28
5644	90	125	5	25	5.0	B8D	12
108C1 M8224 (SQ)	108	133	5	30	3.5	B7G	28
150C4 M8223 (SQ)	150	165	5	30	6.0	B7G	28
150B2 M8163 (SQ) M8208 (SQ)	150	180	5	15	5.0	B7G	55
S.T.C.							
Current Types							
G50/2G	50	90	0.3	3	3.5	Wires	
G55/1K	55	90	2	30	5.0	B7G	28
G75/3G	75	115	5	60	6.5	B8B	58
VR75/30	75	105	5	40	6.5	IO	74
OB2	108	127	5	30	3.5	B7G	28
VR105/30	108	127	5	40	4.0	IO	74
G180/2G	150	180	5	45	5.0	B8B	59
G180/2M	150	180	5	45	5.0	B8B	59
OA2	150	180	5	30	6.0	B7G	28
VR150/30	150	180	5	40	5.5	IO	74
G400/1K	306	400	2	4	3.0	B7G	62
G400/2G	306	400	2	4	3.0	B7G	62

Valve Voltage Stabilisers

Type	Mean Stab. Volts	Striking Volts	Tube Current (mA) Min.	Tube Current (mA) Max.	Regulation (volts)	Base Type	Base Ref.
TUNGSRAM							
Current Types							
VR105/30	105	135	5	40	4.0	IO	74
VR150/30	150	180	5	40	5.5	IO	74

§ With primer taken to 190V through 50kΩ
† With primer taken to 150V through 40kΩ
†† With primer taken to 200V through 80kΩ
* Multi-gap types
§§ Voltage reference tubes

BARRETTERS

Type	Stabilized Current (A)	Voltage Drop	Base Type	Base Ref.
BRIMAR				
Replacement Type				
D15	0.15	90-140	IO	75
HIVAC				
Obsolete Type				
XB2	0.305	7.4-12.4	B7G	57
Current Types				
XB1	0.3	9-16	B7G	57

Type	Stabilized Current (A)	Voltage Drop	Base Type	Base Ref.
MARCONI				
Current Types				
161	0.16	100-180	Edison Screw	
202	0.2	120-200	Edison Screw	
301	0.3	138-221	Edison Screw	
302	0.3	112-195	Edison Screw	
303	0.3	86-129	Edison Screw	
304	0.3	95-165	Edison Screw	
305	0.3	40-90	Edison Screw	
306	0.3	40-90	IO	75

VALVE RECTIFIERS

Type	Heater Volts	Heater Amps	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base Type	Base Ref.
BRIMAR									
Obsolete Types									
R1	4.0	1.0	F.W.	250-0-250	60	8	100	B4	14
80	5.0*	2.0	F.W.	350-0-350	125	32	30	UX4	3
83	5.0*	3.0	F.W.	450-0-450	225	-	50	UX4	3
5Z3	5.0*	3.0	F.W.	450-0-450	225	32	75	UX4	3
80s	5.0	2.0	F.W.	350-0-350	125	32	30	UX4	21
7Z4	6.3	0.9	F.W.	325-0-325	100	32	75	B8B	1
1D6	25.0	0.3	H.W.	250	100	16	50	UX6	14
25RE,25Y5	25.0	0.3	F.W.	350-0-350	85	-	-	UX6	9
25Z4	25.0	0.3	H.W.	250	100	40	100	IO	111
35RE	35.0	0.3	F.W.	250-0-250	100	-	-	UX6	9
35Z3	35.0	0.15	H.W.	250	100	40	100	B8B	16
1D5	40.0	0.2	H.W.	250	100	16	50	B5	8
R14	52.0	0.3	2 × H.W.	240	400	50	50	IO	52
Replacement Types									
0Z4	-	-	F.W.	300-0-300	75	-	-	IO	57

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
BRIMAR *(Continued)*									
Replacement Types (Continued)									
R2	4.0	2.5	F.W.	350-0-350	120	16	30	B4	14
R3	4.0	2.5	F.W.	500-0-500	120	16	150	B4	14
83V	5.0	2.0	F.W.	375-0-375	175	32	100	UX4	22
5Y3	5.0	2.0	F.W.	350-0-350	125	32	30	IO	60
6X5	6.3	0.6	F.W.	325-0-325	70	32	150	IO	54
7Y4	6.3	0.5	F.W.	325-0-325	70	40	525	B8B	1
EZ35	6.3	0.6	F.W.	325-0-325	70	16	350	IO	54
EZ40	6.3	0.6	F.W.	350-0-350	90	50	300	B8A	14
R17	6.3	0.8	H.W.	500	75	32	50	B9A	30
R18	6.3	1.1	H.W.	625	125	8	160	B9A	30
PY82	19.0	0.3	H.W.	250	180	60	100	B9A	18
PY32	29.0	0.3	H.W.	250	325	100	35	IO	111
PY33	29.0	0.3	H.W.	250	325	200	25	IO	111
UY41	31.0	0.1	H.W.	250	100	50	210	B8A	1
35W4	35.0	0.15	H.W.	117	100	40	57	B7G	33
35Z4	35.0	0.15	H.W.	250	100	40	100	IO	55
HY90	35.0	0.15	H.W.	250	110	100	100	B7G	33
Current Types									
GZ34	5.0	1.9	F.W.	550-0-550	160	60	175	IO	62
5R4	5.0*	2.0	F.W.	750-0-750	250	4	250	IO	60
5U4	5.0*	3.0	F.W.	450-0-450	225	32	75	IO	60
5V4	5.0	2.0	F.W.	375-0-375	175	32	100	IO	62
5Z4	5.0	2.0	F.W.	350-0-350	125	32	30	IO	62
6X4 6063 (SQ)	6.3	0.6	F.W.	325-0-325	70	40	525	B7G	31
EZ80 / 6V4	6.3	0.6	F.W.	350-0-350	90	50	300	B9A	31
EZ81	6.3	1.0	F.W.	350-0-350	150	50	230	B9A	31
EZ90	6.3	0.6	F.W.	325-0-325	70	16	525	B7G	31
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
COSSOR									
Replacement Types									
27SU	3.2*	0.9†	H.W.	250	250	60	15	IO	106
431U	4.0	2.5	F.W.	500-0-500	150	16	75	B4	5
451U	4.0*	3.5	F.W.	500-0-500	250	16	75	B4	5
5U4	5.0*	3.0	F.W.	450-0-450	225	32	75	IO	60
5Z4	5.0	2.0	F.W.	350-0-350	125	32	50	IO	62
52KU	5.0	2.0	F.W.	500-0-500	150	16	75	IO	62
53KU	5.0	2.8	F.W.	500-0-500	250	16	75	IO	62
54KU	5.0	2.0	F.W.	350-0-350 300-0-300	250 300	32	100	IO	62
6X5	6.3	0.6	F.W.	325-0-325	70	8	50	IO	54
7Y4	6.3	0.5	F.W.	325-0-325	70	8	150	B8B	1
EZ40 / 66KU	6.3	0.6	F.W.	350-0-350	90	50	300	B8A	14
EZ80/6V4	6.3	0.6	F.W.	350-0-350	90	50	300	B9A	31
EZ81	6.3	1.0	F.W.	350-0-350	150	50	240	B9A	31
PY82 / 19Y3	19.0	0.3	H.W.	250	180	60	100	B9A	18
PY32	29.0	0.3	H.W.	250	275	100	56	IO	111
UY41 / 311SU	31.0	0.1	H.W.	250	90	50	160	B8A	5
35Z3	35.0	0.15	H.W.	250	100	16	100	B8B	16
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
EMITRON									
Obsolete Type									
35Z3	35.0	0.15	H.W.	250	100	40	100	B8B	16

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
EMITRON *(Continued)*									
Replacement Types									
52KU	5.0	2.0	F.W.	500-0-500	150	16	75	IO	62
53KU	5.0	2.8	F.W.	500-0-500	250	16	75	IO	62
6X4	6.3	0.6	F.W.	325-0-325	70	10	520	B7G	31
7Y4	6.3	0.5	F.W.	325-0-325	70	40	150	B8B	1
27SU	13.2	0.9†	H.W.	250	250	64	15	IO	106
FERRANTI									
Obsolete Types									
R4	4.0*	2.5	F.W.	350-0-350	120	32	120	B4	5
R4A	4.0*	2.5	F.W.	500-0-500	120	32	100	B4	5
R52	5.0	2.0	F.W.	350-0-350	125	32	50	IO	62
7Z4	6.3	0.9	F.W.	325-0-325	100	32	75	B8B	1
R13A	13.0	0.3	H.W.	250-0-250	70	8	100	IO	54
RA	13.0	0.3	F.W.	250-0-250	50	8	100	B5	8
RZ	20.0	0.2	H.W.	250	75	16	100	B5	8
Replacement Types									
OZ4	-	-	F.W.	300-0-300	75	-	-	IO	57
R42	4.0	2.5	F.W.	350-0-350	120	16	100	B4	14
R43	4.0*	2.5	F.W.	500-0-500	120	16	100	B4	5
80	5.0*	2.0	F.W.	350-0-350	125	16	50	UX4	3
5U4	5.0*	3.0	F.W.	450-0-450	225	32	75	IO	60
5V4	5.0	2.0	F.W.	375-0-375	175	32	100	IO	62
5Y3	5.0*	2.0	F.W.	350-0-350	125	32	50	IO	60
5Z4	5.0	2.0	F.W.	350-0-350	125	32	50	IO	62
6X5	6.3	0.6	F.W.	325-0-325	70	8	150	IO	54
7Y4	6.3	0.5	F.W.	325-0-325	70	32	150	B8B	1
EY91	6.3	0.42	H.W.	250	75	32	100	B7G	50
EZ40	6.3	0.6	F.W.	350-0-350	90	50	300	B8A	14
EZ90 / 6X4	6.3	0.6	F.W.	325-0-325	70	8	150	B7G	31
PY32	29.0	0.3	H.W.	200	325	100	23	IO	111
UY41	31.0	0.1	H.W.	250	100	50	210	B8A	1
35Z4	35.0	0.15	H.W.	250	100	40	100	IO	55
35Z5	35.0	0.15	H.W.	240	100	40	100	IO	51
PZ30	52.0	0.3	2 × H.W.	240	200	50	50	IO	52
Current Types									
HR6	4.0	1.25	H.W.	5,000	60	2	8,000	IO	22
5R4	5.0*	2.0	F.W.	750-0-750	250	4	250	IO	60
				1,000-0-1,000	150	4	575		
GZ32	5.0	2.3	F.W.	500-0-500	125	60	150	IO	62
EZ80 / 6V4	6.3	0.6	F.W.	350-0-350	90	50	300	B9A	31
PY82 / 19Y3	19.0	0.3	H.W.	250	180	60	45	B9A	18
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
MARCONI									
Obsolete Types									
GU1	4.0*	3.0	H.W., M.V.	1,000	250	-	-	B4	4
GU5	4.0*	3.0	H.W., M.V.	1,500	250	-	-	B4	6
GU50	4.0*	3.0	H.W., M.V.	1,750	250	4	-	B4	6
U12	4.0*	2.5	F.W.	350-0-350	120	-	-	B4	5
U14	4.0	2.5	F.W.	500-0-500	120	-	-	B4	5
U84	4.0*	1.0	F.W.	250-0-250	75	16	100	B8B	24
U81	6.3	1.6	F.W.	500-0-500	150	16	100	B8B	24
U82	6.3	0.6	F.W.	325-0-325	75	4	150	B8B	1
U154	9.0	0.3	H.W.	250	180	60	100	B9A	18
U30	26.0	0.3	F.W.	250-0-250	120	-	-	B7	12

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
MARCONI *(Continued)*									
Obsolete Types (Continued)									
PY32	29.0	0.3	H.W.	250	300	100	56	IO	111
U107	40.0	0.1	H.W.	250	90	12	200	B7G	13
U101	50.0	0.1	H.W.	250	100	32	100	B8B	25
Replacement Types									
MU14	4.0	2.5	F.W.	500-0-500	120	32	100	B4	5
U10	4.0*	1.0	F.W.	250-0-250	60	-	-	B4	5
U14	4.0*	2.0	F.W.	500-0-500	120	32	100	B4	5
U18/20	4.0*	3.0	F.W.	500-0-500	250	16	180	B4	5
GZ30	5.0	2.0	F.W.	350-0-350	125	50	380	IO	62
U76	30.0	0.16	H.W.	250	100	32	100	IO	55
Current Types									
AZ31/U143	4.0*	1.1	F.W.	300-0-300	100	16	100	IO	60
GZ34	5.0	1.9	F.W.	550-0-550	160	60	175	IO	62
U50	5.0*	2.0	F.W.	350-0-350	125	32	100	IO	60
U52	5.0*	3.0	F.W.	450-0-450	225	16	180	IO	60
U54	5.0	2.8	F.W.	500-0-500	250	16	75	IO	62
EZ35/U147	6.3	0.6	F.W.	325-0-325	70	16	350	IO	54
EZ40/U150	6.3	0.6	F.W.	350-0-350	90	50	300	B8A	20
EZ80	6.3	0.6	F.W.	350-0-350	90	50	300	B9A	31
EZ81/U709	6.3	1.0	F.W.	350-0-350	150	-	270	B9A	31
U70	6.3	0.6	F.W.	325-0-325	70	16	350	IO	54
U78/6X4	6.3	0.6	F.W.	325-0-325	70	8	435	B7G	31
U149/7Y4	6.3	0.5	F.W.	325-0-325	70	40	-	B8B	1
U718	6.3	0.58	F.W.	350-0-350	90	50	300	B8A	14
PY82/U319	19.0	0.3	H.W.	250	21	-	55	B9A	18
U31	26.0	0.3	H.W.	250	120	32	100	IO	55
PY33	29.0	0.3	H.W.	250	325	100	23	IO	111
UY41/U142	31.0	0.1	H.W.	250	100	50	210	B8A	22
35W4	35.0	0.15	H.W.	250	100	40	120	B7G	33
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
U118	40.0	0.1	H.W.	250	90	50	180	B8A	1
U145	40.0	0.1	H.W.	250	90	16	50	B8A	5
MAZDA (EXPORT EDISWAN)									
Obsolete Types									
UD41	4.0	1.15	V.D.	550	35	2	-	B7	33
UU4	4.0	2.2	F.W.	400-0-400	120	16	-	B4	14
UU6	4.0	1.4	F.W.	350-0-350	120	16	-	MO	8
UU7	4.0	2.3	F.W.	350-0-350	180	16	-	MO	8
UU10	4.0	2.3	F.W.	500-0-500	180	8	-	B4	14
U201	20.0	0.2	H.W.	250	90	16	47	IO	55
U403	40.0	0.2	H.W.	250	120	16	47	MO	18
U4020	40.0	0.2	H.W.	250	120	16	47	B5	8
Replacement Types									
UU5	4.0	2.3	F.W.	500-0-500	120	8	-	B4	14
UU8	4.0	2.8	F.W.	350-0-350	250	16	-	MO	8
EZ40	6.3	0.6	F.W.	350-0-350	90	50	300	B8A	14
UU9	6.3	0.58	F.W.	350-0-350	90	50	300	B8A	14
PY82	19.0	0.3	H.W.	250	180	60	100	B9A	18
U192	19.0	0.3	H.W.	250	180	60	100	B9A	18
U281	28.0	0.2	H.W.	250	120	16	47	IO	55
PY32	29.0	0.3	H.W.	250	300	100	35	IO	111
U291	29.0	0.3	H.W.	250	300	100	35	IO	111
PY33	29.0	0.3	H.W.	250	325	200	25	IO	111
UY41	31.0	0.1	H.W.	250	100	50	210	B8A	1

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
MAZDA (EXPORT EDISWAN) *(Continued)*									
Replacement Types (Continued)									
U404	40.0	0.1	H.W.	250	90	50	180	B8A	1
U801	80.0	0.2	H.W.	250	300	80	47†	IO	117
Current Types									
EZ80	6.3	0.6	F.W.	350-0-350	90	50	300	B9A	31
EZ81	6.3	1.0	F.W.	350-0-350	150	50	230	B9A	31
UU12	6.3	1.0	F.W.	350-0-350	150	50	240	B9A	31
U381	38.0	0.1	H.W.	250	110	100	100	B9A	18
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
			† Each anode						
M.O. VALVE CO.									
Replacement Types									
U18/20	4.0*	2.8	F.W.	500-0-500	275	16	180	B4	5
U50	5.0*	2.0	F.W.	350-0-350	120	32	100	IO	60
U52	5.0*	2.25	F.W.	500-0-500	250	16	180	IO	60
EZ90/U78	6.3	0.6	F.W.	325-0-325	70	16	435	B7G	31
Current Types									
GU12	2.5	5.6	H.W., M.V.	3,500	250	-	-	UX4	8
GXU1	2.5	5.0	H.W., Xenon	3,500	250	-	-	UX4	8
GXU5	2.5	30.0	H.W., Xenon	3,500	3,000	-	-	Special	
GU50	4.0*	3.0	H.W., M.V.	1,750	250	4	-	B4	6
GXU50	4.0	3.0	H.W., Xenon	1,800	250	-	-	B4	5
U19	4.0	3.3	H.W.	2,500	250	4	600	B4	6
GXU2	5.0	7.0	H.W., Xenon	4,500	1,250	-	-	B4F	1
GXU52	5.0	2.3	F.W., Xenon	450	250	-	-	B8B	-
A2272	6.3	1.6	H.W.	5,000	100	-	4,000	B8B	-
CV4044	6.3	1.15	H.W.	625	125	-	-	B9A	30
MULLARD									
Obsolete Types									
AX50	4.0*	3.75	F.W.	500-0-500	250	16	100	B4	5
DW2	4.0*	1.0	F.W.	250-0-250	60	16	-	B4	5
5U4	5.0*	3.0	F.W.	450-0-450	225	10	170	IO	60
5V4	5.0	2.0	F.W.	375-0-375	175	40	100	IO	62
5Y3	5.0*	2.0	F.W.	350-0-350	125	10	50	IO	60
5Z4	5.0	2.0	F.W.	350-0-350	125	50	380	IO	62
6X5	6.3	0.6	F.W.	325-0-325	70	32	150	IO	54
EY70	6.3	0.45	H.W.	235	45	20	270	B8D	11
CY31	20.0	0.2	H.W.	250	120	32	125	IO	55
25Z4	25.0	0.3	H.W.	250	100	-	-	IO	111
CY32	30.0	0.2	2 × H.W.	250	120	32	125	IO	53
UR3C	30.0	0.2	2 × H.W.	250	120	32	125	B7	29
35Z5	35.0	0.15	H.W.	235	100	40	100	IO	51
UY21	50.0	0.1	H.W.	250	140	60	175	B8B	4
UY31	50.0	0.1	H.W.	250	125	60	175	IO	55
Replacement Types									
AZ31	4.0*	1.1	F.W.	500-0-500	60	60	-	IO	60
AZ41	4.0*	0.72	F.W.	300-0-300	70	50	100	B8A	26
DW4-350	4.0*	2.0	F.W.	350-0-350	120	16	0	B4	5
DW4-500	4.0*	2.0	F.W.	500-0-500	120	16	200	B4	5
FW4-500	4.0*	3.0	F.W.	500-0-500	250	16	200	B4	5

(Continued)

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
MULLARD *(Continued)*									
Replacement Types (Continued)									
FW4-800	4.0*	3.0	F.W.	850-0-850	125	4	150	B4	5
IW4-350	4.0	2.0	F.W.	350-0-350	120	12	-	B4	14
IW4-500	4.0	2.5	F.W.	500-0-500	120	16	150	B4	14
80	5.0*	2.0	F.W.	350-0-350	125	-	50	UX4	3
GZ30	5.0	2.0	F.W.	350-0-350	125	50	380	IO	62
GZ33	5.0	2.8	F.W.	500-0-500	250	60	250	IO	62
GZ37	5.0	2.8	F.W.	500-0-500	250	-	-	IO	62
EY81	6.3	0.8	H.W.	4,500 PIV	150	4	-	B9A	34
EY84	6.3	1.0	H.W.	625	125	24	250	B9A	30
EY91	6.3	0.42	H.W.	250	75	32	100	B7G	50
EZ41	6.3	0.4	F.W.	250-0-250	60	50	325	B8A	14
EZ35	6.3	0.6	F.W.	325-0-325	70	16	350	IO	54
EZ40	6.3	0.6	F.W.	350-0-350	90	50	300	B8A	14
EZ90	6.3	0.6	F.W.	325-0-325	70	16	520	B7G	31
PY31	17.0	0.3	H.W.	250	125	60	175	IO	55
PY82	19.0	0.3	H.W.	200	180	60	30	B9A	18
UR1C	20.0	0.2	H.W.	250	120	32	125	B5	8
PY32	29.0	0.3	H.W.	200	325	100	23	IO	111
PY33	29.0	0.3	H.W.	200	325	200	15	IO	111
UY41	31.0	0.1	H.W.	250	100	50	210	B8A	1
HY90	35.0	0.15	H.W.	117	100	40	120	B7G	33
UY1N	50.0	0.1	H.W.	250	140	60	175	IO	122
PZ30	52.0	0.3	2 × H.W.	240	200	50	50	IO	52
Current Types									
RG3-250	2.5*	5.0	H.W.	3,500	250	2	-	Edison Screw	
RG3-250A	2.5*	5.0	H.W.	3,500	250	2	-	B4D	1
RR3-250	2.5*	5.0	H.W.	1,700	500	-	-	B4D	1
RG3-1250	4.0*	7.0	H.W.	8,000PIV	1,250	-	-	Edison Screw	
RG1-240A	4.0*	2.7	H.W.	2,220	250	5	-	B4	6
GZ32	5.0	2.3	F.W.	500-0-500	125	60	150	IO	62
GZ34	5.0	1.9	F.W.	550-0-550	160	60	175	IO	62
EZ80	6.3	0.6	F.W.	350-0-350	90	50	300	B9A	31
EZ81	6.3	1.0	F.W.	350-0-350	150	50	230	B9A	31
M8091 (SQ)	6.3	1.15	H.W.	625	125	24	250	B9A	30
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
S.T.C.									
Replacement Types									
19H1	4.0*	2.0	H.W.	5,300	75	0.5	2,500	B4	6
4274A (DD)	5.0*	2.0	F.W.	1,000	175	4	230	UX4	3
Current Types									
ESU76 (DD)	2.0*	7.5	H.W., M.V.	10,000 PIV	250	-	-	Edison Screw	
3B28	2.5*	5.0	H.W., Xenon	10,000 PIV	250	-	-	UX4	9
866A	2.5*	5.0	H.W., M.V.	10,000 PIV	250	-	-	UX4	9
ESU103	2.5*	5.0	H.W., Xenon	5,000 PIV	500	-	-	UX4	9
ESU866	2.5*	5.0	H.W., M.V.	10,000 PIV	250	-	-	UX4	9
ESU866ES	2.5*	5.0	H.W., M.V.	10,000 PIV	250	-	-	Edison Screw	
19H5	4.0*	4.0	H.W.	6,500	125	2	1,600	Goliath Screw	
ESU77	4.0*	12.0	H.W.	40,000 PIV	350	-	-	Goliath Edison Screw	
ESU101	4.0*	2.7	H.W., M.V.	10,000 PIV	250	-	-	B4	6
ESU112	4.0*	12.0	H.W.	40,000 PIV	350	-	-	B4F	1
ESU115	4.0*	2.7	H.W., M.V.	6,500 PIV	250	-	-	B4	6
705A	5.0*	5.0	H.W.	30,000 PIV	200	-	-	B4A	1

Type	Heater		Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Max. Reservoir Capacitance (μF)	Min. Series Resistance (Ω)	Base	
	Volts	Amps						Type	Ref.
TUNGSRAM									
Obsolete Types									
RG250/3000	2.5*	5.0	H.W.	3,000	250	-	-	UX4	6
RG250/1000	4.0*	3.0	H.W.	1,000	250	4	-	B4	6
RV120/350	4.0*	2.0	F.W.	350-0-350	120	-	-	B4	5
5X4	5.0*	3.0	F.W.	500-0-500	250	-	-	IO	61
5Z3	5.0*	3.0	F.W.	450-0-450	225	-	75	UX4	3
6Z4 / 84	6.3	0.5	F.W.	350-0-350	60	-	-	UX5	5
EZ3	6.3	0.65	F.W.	400-0-400	100	-	-	Ct8	14
EZ4	6.3	0.9	F.W.	400-0-400	175	-	-	Ct8	14
25Y5	25.0	0.3	2 × H.W.	235	75	-	-	UX6	9
Replacement Type									
V30	30.0	0.2	H.W.	275	120	-	50	B5	1
Current Types									
APV4	4.0*	2.0	F.W	400-0-400	120	-	-	B4	14
AZ31	4.0	1.1	F.W.	300-0-300	100	60	-	IO	60
RV200/600	4.0*	2.8	F.W.	600-0-600	200	-	-	B4	5
RV120/500	4.0*	2.0	F.W.	500-0-500	120	-	-	B4	5
80	5.0*	2.0	F.W.	350-0-350	125	-	50	UX4	3
5U4	5.0*	3.0	F.W.	450-0-450	225	-	75	IO	60
5V4G	5.0	2.0	F.W.	375-0-375	175	-	100	IO	62
5Y3	5.0*	2.0	F.W.	350-0-350	125	-	-	IO	60
5Z4	5.0	2.0	F.W.	350-0-350	125	-	50	IO	62
GZ32	5.0	2.3	F.W.	500-0-500	125	60	150	IO	62
GZ33	5.0	2.8	F.W.	500-0-500	250	16	75	IO	62
GZ34	5.0	1.9	F.W.	550-0-550	160	60	175	IO	62
GZ37	5.0	2.8	F.W.	500-0-500	250	-	-	IC	62
6BT4	6.3	0.6	F.W.	350-0-350	90	50	300	B8A	14
6V4	6.3	0.6	F.W.	350-0-350	90	50	300	B9A	31
6X4	6.3	0.6	F.W.	325-0-325	70	-	150	B7G	31
6X5	6.3	0.6	F.W.	325-0-325	70	4	150	IO	54
				For pulsed input PIV max = 22kV					
EY81	6.3	0.8	H.W.	4,500 PIV	150	4	-	B9A	34
EY84	6.3	1.0	H.W.	625	125	24	250	B9A	30
EZ41	6.3	0.4	F.W.	250-0-250	60	50	325	B8A	14
EZ81	6.3	1.0	F.W.	350-0-350	150	50	240	B9A	31
EZ35	6.3	0.6	F.W.	325-0-325	70	16	350	IO	54
PY31	17.0	0.3	H.W.	250	125	60	175	IO	55
			PIV = 4.5kV max. $I_{a\,(pk)}$ = 450mA max. V_{hk} = 4.5kV max.						
19X3	19.0	0.3	PIV = 4.0kV max. $I_{a\,(pk)}$ = 180mA max. $V_{hk\,(pk)}$ = 650V max.					B9A	18
19Y3	19.0	0.3	H.W.	250	180	60	100	B9A	18
CY1	20.0	0.2	H.W.	250	75	32	125	Ct8	5
CY31	20.0	0.2	H.W.	250	120	32	125	IO	55
V20	20.0	0.2	H.W.	250	120	32	125	B5	8
25Z4	25.0	0.3	H.W.	250	100	16	100	IO	55
25Z5 / 25Z6	25.0	0.3	2 × H.W.	235	150	16	100	UX6 / IO	9 / 111
PY33	29.0	0.3	H.W.	200	325	200	15	IO	111
31A3	31.0	0.1	H.W.	250	100	50	210	B8A	1
35W4	35.0	0.15	H.W.	117	100	-	15	B7G	33
35Z4	35.0	0.15	H.W.	235	100	-	100	IO	55
35Z5	35.0	0.15	H.W.	235	100	40	100	IO	51
UY85	38.0	0.1	H.W.	250	110	100	100	B9A	18
PZ30	52.0	0.3	2 × H.W.	240	200	50	50	IO	52

E.H.T RECTIFIERS

Type	Heater		Peak Inverse Volts	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Effective Series R (Ω)	Recommended Reservoir Capacitance (μF)	D.C. Output Voltage	Capacitance a-k (pF)	Base	
	Volts	Amps								Type	Ref.
BRIMAR											
Obsolete Types											
R16 / 1T2	1.4	0.14	15,000	-	2.0	-	-	-	0.65	Wires	
R10	4.0	0.5	12,500	3,500	5.0	62,000	0.25	-	-	B7G	22
R11	4.0	1.1	-	5,000	5.0	4,000	1.0	-	-	B4	6
Replacement Types											
R19 / 1X2B	1.25	0.2	25,000	-	2.0	-	-	-	1.0	B9A	32
EY51	6.3	0.09	17,000	-	0.35	-	0.005	-	0.8	Wires	
R12	6.3	0.09	17,000	-	0.1	10,000	0.1	-	-	Wires	
Current Types											
DY86	1.4	0.55	22,000	-	0.5	-	0.002	-	1.7	B9A	50
DY87*	1.4	0.55	22,000	-	0.5	-	0.002	-	1.55	B9A	50
R20	2.0	0.35	22,000	-	0.8	-	0.002	-	1.7	B9A	50
EY86	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50
EY87*	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50

*For use under conditions of high humidity and low atmospheric pressure

COSSOR											
Obsolete Types											
SU25	2.0	0.5	25,000	-	1.0	-	0.1	-	-	IO	102
SU2150	2.0	1.15	-	8,000	2.0	100,000	0.25	-	-	B4	6
SU2150A	2.0	1.5	-	5,000	10.0	10,000	0.25	-	-	B4	17
6W2	6.3	0.08	25,000	-	0.5	-	0.005	-	0.7	Wires	
Replacement Types											
DY86	1.4	0.55	22,000	-	0.8	-	0.002	-	1.7	B9A	50
SU42	4.0	1.25	-	6,000 5,000	40.0 50.0	5,000 4,000	1.0 1.0	- -	-	IO	103
EY51 (SU61)	6.3	0.09	15,000 15,000	-	0.1 0.5	100,000 100,000	0.001 0.1	- -	-	Wires	
EY86	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50

EMITRON											
Obsolete Types											
SU25	2.0	0.5	25,000	-	1.0	100,000	0.1	-	-	IO	102
SU2150A	2.0	1.5	-	5,000	10.0	10,000	0.25	-	-	B4	17
SU45	4.0	0.5	-	2,500	30.0	5,400	1.1	-	-	B7G	22
6W2	6.3	0.08	25,000	-	0.5 30.0	- 100,000	0.005 0.1	- -	0.7	Wires	

FERRANTI											
Replacement Types											
HR1	0.65*	0.055	12,500	5,000	0.05	2MΩ	0.002	-	0.7	B7G	1
HR9	4.0	1.3	14,000	15,000	8.0	100,000	0.1	-	-	IO	131
6W2	6.3	0.08	25,000	-	0.5	-	0.005	-	0.7	Wires	
Current Types											
DY86	1.4	0.55	22,000	-	0.8	-	0.002	-	1.7	B9A	50
HR12	2.5*	5.0	35,000	-	25.0	27,000	0.1	-	-	UX4	18
HR2	4.0	0.5	13,000	5,000	5.0	50,000	0.25	5,500	-	B7G	22

(Continued)

EHT Rectifiers

Type	Heater		Peak Inverse Volts	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Effective Series R (Ω)	Recommended Reservoir Capacitance (μF)	D.C. Output Voltage	Capacitance a-k (pF)	Base	
	Volts	Amps								Type	Ref.
FERRANTI *(Continued)*											
Current Types (Continued)											
HR3	4.0	0.5	11,500	5,000	15.0	30,000	1.0	-	-	B7G	22
HR8	4.0	1.25	16,500	6,000	40.0	5,000	1.0	-	-	IO	103
				5,000	50.0	4,000	1.0				
HR11	4.0*	1.9	35,000	14,500	3.0	-	-	-	-	IO	120
EY51 / 6X2	6.3	0.09	17,000	-	0.35	-	0.005	-	0.8		Wires
Sine-wave operation(10-500 kc/s)			17,000	-	0.5	-	0.01	-	-		
EY86 / 6S2	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50
MARCONI											
Obsolete Types											
U16	2.0*	1.0	-	5,000	2.0	-	0.25	-	-	B4	6
U17	4.0*	1.0	-	2,500	30.0	2,000	1.0	-	-	B4	6
U151	6.3	0.09	17,000	-	0.35	-	0.005	-	0.8		Wires
Sine-wave operation			17,000	-	0.5	-	0.01	-	0.8		
Replacement Types											
U35	1.4	0.12	-	3,500	2.0	-	0.001	-	-	IO	120
U33	2.0*	0.15	-	6,300	3.0	100,000	0.25	-	-	B4	6
Current Types											
DY86 (H W)	1.4	0.55	22kV	-	0.4	-	0.002	-	-	B9A	85
U37	1.4	0.14	15,000	-	2.0	-	0.001	7,500	0.65		Wires
U47	2.0	0.2	19,000	-	0.2	-	0.00025 to 0.001	16,000 to 9,500	0.6		Wires
Sine-wave operation			19,000	-	0.5	-			0.6		
U49	2.0	0.35	23,500	-	0.2	-	0.00025 to 0.001	-	0.9	B9A	50
EY51 / U43	6.3	0.09	17,000	-	0.35	100,000	0.005	-	0.8		Wires
Sine-wave operation			17,000	-	0.5	-	0.01	-	0.8		
EY86	6.3	0.09	22,000	-	0.8	-	0.002	-	6.7	B9A	50
U45	6.3	0.12	18,000	-	0.35	100,000	0.005	-	0.8		Wires
MAZDA (EXPORT EDISWAN)											
Obsolete Types											
MU2 (HW, MV)	2.0*	3.1	-	4,500	5.0	10,000	-	-	-	B4	6
U21	2.0	1.85	-	4,500	5.0	-	-	-	-	B4	6
U22	2.0	2.0	-	5,200	1.0	50,000	0.1	-	-	MO	17
U24	2.0	0.15	20,000	-	0.1	-	0.00025 to 0.001	15,000 to 9,500	1.3	IO	102
Sine-wave operation			20,000	-	0.5	-			1.3		
Replacement Types											
U25	2.0	0.2	19,000	-	0.2	-	0.00025 to 0.001	16,000 to 9,500	0.6		Wires
			19,000†	-	0.5	-			0.6		
EY51	6.3	0.09	17,000	-	0.35	-	0.005	-	0.8		Wires
Current Types											
DY86	1.4	0.55	22,000	-	0.5	-	0.002	-	1.55	B9A	50
DY87**	1.4	0.55	22,000	-	0.5	-	0.002	-	1.55	B9A	50
U26	2.0	0.35	23,500	-	0.2	-	0.00025 to 0.001	-	1.3	B9A	50
EY86	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50
EY87**	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50

**For use under conditions of high humidity and low atmospheric pressure

†At < 250 kc/s

Type	Heater		Peak Inverse Volts	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Effective Series R (Ω)	Recommended Reservoir Capacitance (μF)	D.C. Output Voltage	Capacitance a-k (pF)	Base	
	Volts	Amps								Type	Ref.
M.O. VALVE CO.											
Replacement Types											
U41	1.25	9.2	-	12,300	2.0	300,000	-	-	-	IO	58
U27	4.0	1.0	-	5,000	50.0	4,000	-	-	-	B4	6
U60	6.3	0.265	-	10,000	4.0	-	-	-	-	IO	139
Current Types											
Q / U37	1.4	0.14	15,000	5,300	0.1	-	0.001	7,500	0.65	Wires	
U37	1.4	0.14	15,000	-	2.0	-	0.001	7,500	0.45	Wires	
QU452	2.0	0.8	17,500	5,300	0.5	-	-	-	-	Wires	
CU4071	4.0	1.5	-	6,000	50.0	-	-	-	-	IO	103
U45	6.3	0.12	18,000	-	0.35	100,000	0.005	-	0.8	Wires	
QU456	6.3	0.225	17,500	5,300	0.5	-	-	-	-	Wires	
MULLARD											
Obsolete Types											
DY70	1.25*	0.14	-	2,900	1.8	150,000	0.1	-	-	Wires	
HVR1	2.0	0.29	-	6,000	5.0	-	-	-	-	B4	6
HVR2A	2.0	1.5	-	6,000	3.0	-	0.2	-	-	B4	6
HVR2	4.0	0.65	-	6,000	3.0	-	0.2	-	-	B4	17
Replacement Types											
KY50	2.0	0.2	19,000	-	-	-	-	-	-	Wires	
KY80	2.0	0.35	23,500	-	-	-	-	-	-	B9A	50
EY86 Pulsed input	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50
TY86F Pulsed input	7.4	0.077	Other data as EY86								
Current Types											
DY86 / DY87	1.4	0.55	22,000	-	0.5	-	0.002	-	1.55	B9A	50
EY51 Pulsed input	6.3	0.09	17,000	-	0.35	-	0.005	-	0.08	Wires	
Sine-wave operation (10-500 kc/s)			17,000	-	0.5	-	0.001	-	0.8		
EY87	6.3	0.09	22,000	-	0.8	-	-	-	1.55	B9A	50
S.T.C											
Current Types											
19H4	2.5	1.7	20,000	7,000	30.0	18,000	0.5	-	-	IO	58
19G3	4.0	1.4	7,000	2,200	50.0	1,900	5.0	-	-	IO	119
19G6	4.0	0.5	6,000	2,500	30.0	5,400	1.0	-	-	B7G	78
S19G6 (SQ)	4.0	0.5	6,000	2,000	30.0	4,500	1.1	-	-	B7G	78
S19G6F (SQ)	4.0	0.5	6,000	2,000	30.0	4,500	1.1	-	-	B7G / F	78
K3 / 45	-	-	3,060	1,080	1.0	-	0.1	1,140	-	Metal rectifier	
K3 / 50	-	-	3,400	1,200	1.0	-	0.1	1,260	-	Metal rectifier	
K3 / 60	-	-	4,080	1,420	1.0	-	0.05	1,500	-	Metal rectifier	
K3 / 70	-	-	4,760	1,680	1.0	-	0.05	1,780	-	Metal rectifier	
K3 / 80	-	-	5,450	1,920	1.0	-	0.05	2,030	-	Metal rectifier	
K3 / 90	-	-	6,120	2,160	1.0	-	0.05	2,280	-	Metal rectifier	
K3 / 100	-	-	6,800	2,400	1.0	-	0.05	2,550	-	Metal rectifier	
K3 / 120	-	-	8,150	2,880	1.0	-	0.025	3,080	-	Metal rectifier	
K3 / 140	-	-	9,500	3,360	1.0	-	0.025	3,600	-	Metal rectifier	
K3 / 160	-	-	10,850	3,840	1.0	-	0.025	4,100	-	Metal rectifier	
K3 / 180	-	-	12,250	4,320	1.0	-	0.025	4,660	-	Metal rectifier	
K3 / 200	-	-	13,600	4,800	1.0	-	0.01	5,150	-	Metal rectifier	
K8 / 45	-	-	3,060	1,080	5.0	-	1.0	1,280	-	Metal rectifier	
K8 / 50	-	-	3,400	1,200	5.0	-	1.0	1,420	-	Metal rectifier	
K8 / 60	-	-	4,080	1,420	5.0	-	1.0	1,680	-	Metal rectifier	

(Continued)

EHT Rectifiers

Type	Heater		Peak Inverse Volts	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Effective Series R (Ω)	Recommended Reservoir Capacitance (μF)	D.C. Output Voltage	Capacitance a-k (pF)	Base	
	Volts	Amps								Type	Ref.
S.T.C. *(Continued)*											
Current Types (Continued)											
K8/70	-	-	4,760	1,680	5.0	-	0.5	1,980	-	Metal rectifier	
K8/80	-	-	5,450	1,920	5.0	-	0.5	2,270	-	Metal rectifier	
K8/90	-	-	6,120	2,160	5.0	-	0.5	2,550	-	Metal rectifier	
K8/100	-	-	6,800	2,400	5.0	-	0.5	2,860	-	Metal rectifier	
K8/120	-	-	8,150	2,880	5.0	-	0.5	3,400	-	Metal rectifier	
K8/140	-	-	9,500	3,360	5.0	-	0.5	4,000	-	Metal rectifier	
K8/160	-	-	10,850	3,840	5.0	-	0.25	4,560	-	Metal rectifier	
K8/180	-	-	12,250	4,320	5.0	-	0.25	5,130	-	Metal rectifier	
K8/200	-	-	13,600	4,800	5.0	-	0.25	5,720	-	Metal rectifier	
MN as type K but different encapsulation, plus the following:						-			-		
MN388/60	-	-	3,060	1,080	10.0	-	2.0	1,315	-	Metal rectifier	
MN388/70	-	-	3,570	1,260	10.0	-	1.0	1,500	-	Metal rectifier	
MN388/80	-	-	4,080	1,440	10.0	-	1.0	1,740	-	Metal rectifier	
MN388/90	-	-	4,590	1,620	10.0	-	1.0	1,970	-	Metal rectifier	
MN388/100	-	-	5,100	1,800	10.0	-	1.0	2,210	-	Metal rectifier	
MN388/120	-	-	6,180	2,160	10.0	-	1.0	2,600	-	Metal rectifier	
MN388/140	-	-	7,140	2,520	10.0	-	1.0	2,980	-	Metal rectifier	
MN388/160	-	-	8,160	2,880	10.0	-	0.5	3,400	-	Metal rectifier	
MN388/180	-	-	9,180	3,240	10.0	-	0.5	3,800	-	Metal rectifier	
MN388/200	-	-	10,200	3,600	10.0	-	0.5	4,230	-	Metal rectifier	
N Types as MN types but different encapsulation.						-					
TUNGSRAM											
Current Types											
DY87	1.4	0.55	22,000	-	0.5	-	0.002	-	1.55	B9A	50
6X2	6.3	0.09	17,000	-	0.35	-	0.005	-	0.8	Wires	
Sine-wave operation (10-500 kc/s)			17,000	-	0.5	-	0.01	-	0.8	Wires	
EY86	6.3	0.09	22,000	-	0.8	-	0.002	-	1.7	B9A	50
WESTINGHOUSE											
Current Types											
39E10 Sine-wave operation			850	-	0.1	-	0.025	310	-	Metal rectifiers	
and intermediate types to											
39E60 Sine-wave operation			5,100	-	0.1	-	0.005	1,900	-		
36EHT20 Sine-wave operation			1,700	-	2.0	-	0.5	600	-		
and intermediate types to											
36EHT240 Sine-wave operation			20,400	-	2.0	-	0.05	7,900	-		
39E20 and intermediate types to			1,450	-	0.1	-	-	1,310	-		
39E60			4,350	-	0.1	-	-	3,430	-		
36EHT20 and intermediate types to			1,450	-	0.1	-	-	1,310	-		
36EHT240			17,400	-	0.1	-	-	15,700	-		

METAL RECTIFIERS

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
INTERNATIONAL RECTIFIER CO.					
Current Types					
A4B1SDBHD	Bridge	125	250	50	*115
A7C1SDBHD	C.T.	125-0-125	250	50	115

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
INTERNATIONAL RECTIFIER CO. *(Continued)*					
Current Types (Continued)					
A7D1SDBHD	V.D.	125	62.5	50	230
A7H1SDBHD	H.W.	125	125	100	115
A8B1SDBHD	Bridge	250	250	100	230
A14C1SDBHD	C.T.	250-0-250	250	100	230
A14D1SDBHD	V.D.	250	62.5	100	460
A14H1SDBHD	H.W.	250	125	200	230
A30H1SDBHD	H.W.	1,000	125	-	-
B4B1SDBHD	Bridge	125	400	50	115
B7C1SDBHD	C.T.	125-0-125	400	50	115
B7D1SDBHD	V.D.	125	100	50	230
B7H1SDBHD	H.W.	125	200	100	115
B8B1SDBHD	Bridge	250	400	100	230
B14C1SDBHD	C.T.	250-0-250	400	100	230
B14D1SDBHD	V.D.	250	100	100	460
B14H1SDBHD	H.W.	250	200	200	230
SALFORD ELECTRICAL INSTRUMENTS					
Current Types					
46 H1 and intermediate types to 46 H33	H.W.	28	5	4.5	28
	H.W.	6,120	5	0.02	6,120
48 H1 and intermediate types to 48 H33	H.W.	28	12	10	28
	H.W.	6,120	12	0.05	6,120
B½	Bridge	18	500	250	18
B1	Bridge	18	1A	500	18
B1½	Bridge	18	1.5A	750	18
B2	Bridge	18	2A	1,000	18
B3	Bridge	18	3A	1,500	18
B4	Bridge	18	4A	2,000	18
B5	Bridge	18	5A	2,500	18
B6	Bridge	18	6.5A	2,500	18
B½/24	Bridge	36	500	150	36
B1/24	Bridge	36	1A	250	36
B1½/24	Bridge	36	1.5A	500	36
B2/24	Bridge	36	2A	500	36
B3/24	Bridge	36	3A	1,000	36
B4/24	Bridge	36	4A	1,000	36
B5/24	Bridge	36	5A	1,250	36
B6/24	Bridge	36	6.5A	1,500	36
B½V	Push Pull	9-0-9	500	250	18
B1V	Push Pull	9-0-9	1A	500	18
B1½V	Push Pull	9-0-9	1.5A	750	18
B2V	Push Pull	9-0-9	2A	1,000	18
B3V	Push Pull	9-0-9	3A	1,500	18
B4V	Push Pull	9-0-9	4A	1,750	18
B5V	Push Pull	9-0-9	5A	2,250	18
B6V	Push Pull	9-0-9	6.5A	3,000	18
M160*	Bridge	18	1.5A	750	18
M161*	Bridge	18	2A	1,000	18
M162*	Bridge	18	2.5A	1,250	18
M163*	Bridge	18	3A	1,500	18
M160V*	Push Pull	18-0-18	1.5A	500	36
M161V*	Push Pull	18-0-18	2A	500	36
M162V*	Push Pull	18-0-18	2.5A	750	36
M163V*	Push Pull	18-0-18	3A	750	36
M170*	H.W.	250	60	8	270
M170A*	H.W.	125	60	16	135
M171*	Bridge	125	120	12	135
M172*	H.W.	250	100	12	270

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
SALFORD ELECTRICAL INSTRUMENTS *(Continued)*					
Current Types (Continued)					
M172A*	H.W.	125	100	25	135
M173*	Bridge	125	200	24	135
M180*	Push Pull	9-0-9	1.5A	750	18
M181*	Push Pull	9-0-9	2A	1,000	18
M182*	Push Pull	9-0-9	2.5A	1,250	18
M183*	Push Pull	9-0-9	3A	1,500	18
M200*	Bridge	25	1.5A	500	25
M201*	Bridge	25	2A	750	25
M202*	Bridge	25	2.5A	1,000	25
M203*	Bridge	25	3A	1,250	25
M200V*	Push Pull	25-0-25	1.5A	250	50
M201V*	Push Pull	25-0-25	2A	500	50
M202 V*	Push Pull	25-0-25	2.5A	500	50
M203V*	Push Pull	25-0-25	3A	500	50
M210*	Push Pull	12-0-12	1.5A	500	25
M211*	Push Pull	12-0-12	2A	750	25
M212*	Push Pull	12-0-12	2.5A	1,000	25
M213*	Push Pull	12-0-12	3A	1,000	25
M240*	H.W.	250	120	16	270
M241*	H.W.	250	200	25	270
M250*	Bridge	250	120	8	270
M251*	Bridge	250	200	12	270
RR0	H.W.	125	30	16	140
RR1	H.W.	125	60	16	130
RR2	H.W.	125	100	32	135
RR3	H.W.	125	120	32	130
SEI 4	H.W.	250	275	32	275
SEI 5	H.W.	250	325	32	275
SEI 7	H.W.	250	300	100	290
SEI 9	H.W.	250	300	100	290
SEI 10	H.W.	250	280	100	290
SEI 11	H.W.	250	300	100	290
SEI 12	H.W.	250	300	100	290
SEI 60	H.W.	250	300	100	290
SEI 61	H.W.	250	300	100	290
Z11B1X	Bridge	27	150	-	21.5
Z11H9X	H.W.	125	90	20	130
Z11H17X	H.W.	250	90	20	290
Z12B1X	Bridge	27	360	-	21.5
Z12H9X	H.W.	125	225	48	130
Z12H17X	H.W.	250	225	48	290
Z13B1X	Bridge	27	720	-	21.5
Z13H9X	H.W.	125	450	100	290
Z13H17X	H.W.	250	450	100	290
Z21B1X	Bridge	27	240	-	21.5
Z21H9X	H.W.	125	150	32	130
Z21H17X	H.W.	250	125	32	290
Z22B1X	Bridge	27	520	-	21.5
Z22H17X	H.W.	250	300	64	290
ZC12H18X	H.W.	250	325	100	290
ZC13H17XE	H.W.	250	300	100	280

* Contact-cooled types

Note:- Rectified voltage may be considerably reduced by any series dropping resistance in the circuit

S.T.C.

Obsolete Types

DRM1B	H.W.	250	60	8	250
DRM2B	H.W.	250	100	16	250

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
S.T.C. *(Continued)*					
Obsolete Types (Continued)					
DRM3B	H.W.	250	120	16	260
RM0	H.W.	125	30	8	130
RM1	H.W.	125	60	16	130
RM2	H.W.	125	100	32	125
RM3	H.W.	125	120	16	100
Replacement Types					
B18-14-1RW	Bridge	220	60	4	250
B25-14-1RW	Bridge	220	100	4	250
B18-1-1RW	Bridge	18	60	-	14
B25-1-1W	Bridge	18	150	-	14
B45-1-1W	Bridge	18	600	-	14
V18-28-1RW	F.W.	220-0-220	60	4	224
V25-28-1RW	F.W.	250-0-250	100	4	224
V25-40-1W	F.W.	350-0-350	150	4	345
V25-56-1RW	F.W.	500-0-500	100	4	535
Current Types					
420SC-1B1	Bridge	20	80	-	16
420SC-1D1	V.D.	10	40	-	16
420SC-1H1	H.W.	10	40	-	8
420SC-1V1	F.W.	10-0-10	80	-	8
420SC-1VP1	F.W.	10-0-10	80	-	8
420SCF-1B1	Bridge	20	170	-	16
420SCF-1D1	V.D.	10	80	-	16
420SCF-1H1	H.W.	10	80	-	8
420SCF-1V1	F.W.	10-0-10	170	-	8
420SCF-1VP1	F.W.	10-0-10	170	-	8
420SD-1B1	Bridge	25	80	-	20
420SD-1D1	V.D.	12.5	40	-	20
420SD-1H1	H.W.	12.5	40	-	10
420SD-1V1	F.W.	12.5-0-12.5	80	-	10
420SD-1VP1	F.W.	12.5-0-12.5	80	-	10
420SDF-1B1	Bridge	2.5	170	-	20
420SDF-1D1	V.D.	12.5	80	-	20
420SDF-1H1	H.W.	12.5	80	-	10
420SDF-1V1	F.W.	12.5-0-12.5	170	-	10
420SDF-1VP1	F.W.	12.5-0-12.5	170	-	10
430SC-1B1	Bridge	20	250	-	16
430SC-1D1	V.D.	10	125	-	16
430SC-1H1	H.W.	10	125	-	8
430SC-1V1	F.W.	10-0-10	250	-	8
430SC-1VP1	F.W.	10-0-10	250	-	8
430SCF-1B1	Bridge	20	500	-	16
430SCF-1D1	V.D.	10	250	-	16
430SCF-1H1	H.W.	10	250	-	8
430SCF-1V1	F.W.	10-0-10	500	-	8
430SCF-1VP1	F.W.	10-0-10	500	-	8
430SD-1B1	Bridge	25	250	-	20
430SD-1D1	V.D.	12.5	125	-	20
430SD-1H1	H.W.	12.5	125	-	10
430SD-1V1	F.W.	12.5-0-12.5	250	-	10
430SD-1VP1	F.W.	12.5-0-12.5	250	-	10
430SDF-1B1	Bridge	25	500	-	20
430SDF-1D1	V.D.	12.5	250	-	20
430SDF-1H1	H.W.	12.5	250	-	10
430SDF-1V1	F.W.	12.5-0-12.5	500	-	10
430SDF-1VP1	F.W.	12.5-0-12.5	500	-	10
440SC-1B1	Bridge	20	500	-	16

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
S.T.C. *(Continued)*					
Current Types (Continued)					
440SC-1D1	V.D.	10	250	-	16
440SC-1H1	H.W.	10	250	-	8
440SC-1V1	F.W.	10-0-10	500	-	8
440SC-1VP1	F.W.	10-0-10	500	-	8
440SCF-1B1	Bridge	20	1A	-	16
440SCF-1D1	V.D.	10	500	-	16
440SCF-1H1	H.W.	10	500	-	8
440SCF-1V1	F.W.	10-0-10	1A	-	8
440SCF-1VP1	F.W.	10-0-10	1A	-	8
440SD-1B1	Bridge	25	500	-	20
440SD-1D1	V.D.	12.5	250	-	20
440SD-1H1	H.W.	12.5	250	-	10
440SD-1V1	F.W.	12.5-0-12.5	500	-	10
440SD-1VP1	F.W.	12.5-0-12.5	500	-	10
440SDF-1B1	Bridge	25	1A	-	20
440SDF-1D1	V.D.	12.5	500	-	20
440SDF-1H1	H.W.	12.5	500	-	10
440SDF-1V1	F.W.	12.5-0-12.5	1A	-	10
440SDF-1VP1	F.W.	12.5-0-12.5	1A	-	10
450SC-1B1	Bridge	20	1.25A	-	16
450SC-1H1	H.W.	10	625	-	8
450SC-1V1	F.W.	10-0-10	1.25A	-	8
450SC-1VP1	F.W.	10-0-10	1.25A	-	8
450SCF-1B1	Bridge	20	2.5A	-	16
450SCF-1H1	H.W.	10	1.25A	-	8
450SCF-1V1	F.W.	10-0-10	2.5A	-	8
450SCF-1VP1	F.W.	10-0-10	2.5A	-	8
450SD-1B1	Bridge	25	1.25A	-	20
450SD-1H1	H.W.	12.5	625	-	10
450SD-1V1	F.W.	12.5-0-12.5	1.25A	-	10
450SD-1VP1	F.W.	12.5-0-12.5	1.25A	-	10
450SDF-1B1	Bridge	25	2.5A	-	20
450SDF-1H1	H.W.	12.5	1.25A	-	10
450SDF-1V1	F.W.	12.5-0-12.5	2.5A	-	10
450SDF-1VP1	F.W.	12.5-0-12.5	2.5A	-	10
460SC-1B1	Bridge	20	2.1A	-	16
460SC-1H1	H.W.	10	1.05A	-	8
460SC-1V1	F.W.	10-0-10	2.1A	-	8
460SC-1VP1	F.W.	10-0-10	2.1A	-	8
460SCF-1B1	Bridge	20	4.5A	-	16
460SCF-1H1	H.W.	10	2.3A	-	8
460SCF-1V1	F.W.	10-0-10	4.5A	-	8
460SCF-1VP1	F.W.	10-0-10	4.5A	-	8
460SD-1B1	Bridge	25	2.1A	-	20
460SD-1H1	H.W.	12.5	1.05A	-	10
460SD-1V1	F.W.	12.5-0-12.5	2.1A	-	10
460SD-1VP1	F.W.	12.5-0-12.5	2.1A	-	10
460SDF-1B1	Bridge	25	4.5A	-	20
460SDF-1H1	H.W.	12.5	2.3A	-	10
460SDF-1V1	F.W.	12.5-0-12.5	4.5A	-	10
460SDF-1VP1	F.W.	12.5	4.5A	-	10
470SC-1B1	Bridge	20	5A	-	16
470SC-1H1	H.W.	10	2.5A	-	8
470SC-1V1	F.W.	10-0-10	5A	-	8
470SC-1VP1	F.W.	10-0-10	5A	-	8
470SCF-1B1	Bridge	20	10A	-	16
470SCF-1H1	H.W.	10	5A	-	8
470SCF-1V1	F.W.	10-0-10	10A	-	8
470SCF-1VP1	F.W.	10-0-10	10A	-	8
470SD-1B1	Bridge	25	5A	-	20
470SD-1H1	H.W.	12.5	2.5A	-	10
470SD-1V1	F.W.	12.5-0-12.5	5A	-	10

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
S.T.C. *(Continued)*					
Current Types (Continued)					
470SD-1VP1	F.W.	12.5-0-12.5	5A	-	10
470SDF-1B1	Bridge	25	10A	-	20
470SDF-1H1	H.W.	12.5	5A	-	10
470SDF-1V1	F.W.	12.5-0-12.5	10A	-	10
470SDF-1VP1	F.W.	12.5-0-12.5	10A	-	10
820SK-1H1	H.W.	7.5	60	-	6
820SKF-1H1	H.W.	7.5	125	-	6
820SL-1H1	H.W.	9	60	-	8
820SLF-1H1	H.W.	9	125	-	8
830SK-1H1	H.W.	7.5	185	-	6
830SKF-1H1	H.W.	7.5	350	-	6
830SL-1H1	H.W.	9	185	-	8
830SLF-1H1	H.W.	9	350	-	8
840SK-1H1	H.W.	7.5	330	-	6
840SKF-1H1	H.W.	7.5	650	-	6
840SL-1H1	H.W.	9	330	-	8
840SLF-1H1	H.W.	9	650	-	8
850SK-1H1	H.W.	7.5	900	-	6
850SKF-1H1	H.W.	7.5	2.5A	-	6
850SL-1H1	H.W.	9	900	-	8
850SLF-1H1	H.W.	9	2.5A	-	8
860SK-1H1	H.W.	7.5	1.35A	-	6
860SKF-1H1	H.W.	7.5	3.5A	-	6
860SL-1H1	H.W.	9	1.35A	-	8
860SLF-1H1	H.W.	9	3.5A	-	8
870SK-1H1	H.W.	7.5	3.3A	-	6
870SKF-1H1	H.W.	7.5	7.65A	-	6
870SL-1H1	H.W.	9	3.3A	-	8
870SLF-1H1	H.W.	9	7.65A	-	8
C2D*	V.D.	125	60	16	245
C2H*	H.W.	125	60	16	115
C2V*	F.W.	125-0-125	120	16	120
C3B*	Bridge	250	120	16	250
C3D*	V.D.	125	120	16	205
C3H*	H.W.	125	120	16	85
C3V*	F.W.	125-0-125	240	16	115
DSM0/1	H.W.	250	60	8	250
DSM2/3	H.W.	250	120	16	250
K 3/6	H.W.	144	1	1	148
K 3/8	H.W.	192	1	1	198
K 3/10	H.W.	240	1	0.5	248
K 3/15	H.W.	360	1	0.5	375
K 3/20	H.W.	480	1	0.25	500
K 3/25	H.W.	600	1	0.25	655
K 3/30	H.W.	720	1	0.1	755
K 3/35	H.W.	840	1	0.1	885
K 3/40	H.W.	960	1	0.1	1,000
K 8/6	H.W.	144	5	8	167
K 8/8	H.W.	192	5	8	225
K 8/10	H.W.	240	5	4	280
K 8/15	H.W.	360	5	4	425
K 8/20	H.W.	480	5	2	568
K 8/25	H.W.	600	5	2	710
K 8/30	H.W.	720	5	1	850
K 8/35	H.W.	840	5	1	990
K 8/40	H.W.	960	5	1	1,130
L 1/1B	Bridge	40	0.5	2	40
L 1/1D	V.D.	24	0.25	2	40
L 1/1H	H.W.	24	0.25	2	20
L 1/1V	F.W.	20-0-20	0.5	2	20
L 1 2B	Bridge	80	0.5	1	80
L 1/2D	V.D.	48	0.25	1	80

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
S.T.C. *(Continued)*					
Current Types (Continued)					
L 1/2H	H.W.	48	0.25	1	40
L 1/2V	F.W.	40-0-40	0.5	1	40
L 1/3B	Bridge	120	0.5	1	124
L 1/3D	V.D.	72	0.25	1	124
L 1/3H	H.W.	72	0.25	1	62
L 1/3V	F.W.	60-0-60	0.5	1	65
L 1/4B	Bridge	160	0.5	0.5	164
L 1/4D	V.D.	96	0.25	0.5	164
L 1/4H	H.W.	96	0.25	0.5	82
L 1/4V	F.W.	80-0-80	0.5	0.5	85
L 1/5B	Bridge	200	0.5	0.5	206
L 1/5D	V.D.	120	0.25	0.5	206
L 1/5H	H.W.	120	0.25	0.5	103
L 1/5V	F.W.	100-0-100	0	0.5	105
L 3/1B	Bridge	40	2	4	46
L 3/1D	V.D.	24	1	4	46
L 3/1H	H.W.	24	1	4	23
L 3/1V	H.W.	20-0-20	2	4	25
L 3/2B	Bridge	80	2	2	96
L 3/2D	V.D.	48	1	2	96
L 3/2H	H.W.	48	1	2	48
L 3/2V	F.W.	40-0-40	2	2	50
L 3/3B	Bridge	120	2	2	147
L 3/3D	V.D.	72	1	2	147
L 3/3H	H.W.	72	1	2	72
L 3/3V	F.W.	60-0-60	2	2	75
L 3/4B	Bridge	160	2	2	192
L 3/4D	V.D.	96	1	2	192
L 3/4H	H.W.	96	1	2	98
L 3/4V	F.W.	80-0-80	2	2	100
L 3/5B	Bridge	200	2	2	245
L 3 5D	V.D.	120	1	2	245
L 3/5H	H.W.	120	1	1	122
L 3/5V	F.W.	100-0-100	2	1	125
L 3/6D	V.D.	144	1	1	300
L 3/6H	H.W.	144	1	1	148
L 3/6V	F.W.	120-0-120	2	1	150
L 3/8D	V.D.	192	1	0.5	400
L 3/8H	H.W.	192	1	1	198
L 3/8V	F.W.	160-0-160	2	1	200
L 3/10D	V.D.	240	1	0.5	500
L 3/10H	H.W.	240	1	0.5	248
L 3/10V	F.W.	200-0-200	2	0.5	250
L 3/15H	H.W.	360	1	0.5	375
L 3/20H	H.W.	480	1	0.25	500
L 6/1B	Bridge	40	7	8	48
L 6/1D	V.D.	24	3.5	8	48
L 6/1H	H.W.	24	3.5	16	25
L 6/1V	F.W.	20-0-20	7	16	25
L 6/2B	Bridge	80	7	8	98
L 6/2D	V.D.	48	3.5	8	98
L 6/2H	H.W.	48	3.5	8	51
L 6/2V	F.W.	40-0-40	7	8	50
L 6/3B	Bridge	120	7	8	150
L 6/3D	V.D.	72	3.5	8	150
L 6/3H	H.W.	72	3.5	8	79
L 6/3V	F.W.	60-0-60	7	8	80
L 6/4B	Bridge	160	7	8	210
L 6/4D	V.D.	96	3.5	8	210
L 6/4H	H.W.	96	3.5	8	105
L 6/4V	F.W.	80-0-80	7	8	105
L 6/5B	Bridge	200	7	4	250

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
S.T.C. *(Continued)*					
Current Types (Continued)					
L 6 / 5D	V.D.	120	3.5	4	250
L 6 / 5H	H.W.	120	3.5	8	135
L 6 / 5V	F.W.	100-0-100	7	8	135
L 8 / 1B	Bridge	40	10	16	50
L 8 / 1D	V.D.	24	5	16	50
L 8 / 1H	H.W.	24	5	16	25
L 8 / 1V	F.W.	20-0-20	10	16	25
L 8 / 2B	Bridge	80	10	8	107
L 8 / 2D	V.D.	48	5	8	107
L 8 / 2H	H.W.	48	5	8	52
L 8 / 2V	F.W.	40-0-40	10	8	55
L 8 / 3B	Bridge	120	10	8	164
L 8 / 3D	V.D.	72	5	8	164
L 8 / 3H	H.W.	72	5	8	81
L 8 / 3V	F.W.	60-0-60	10	8	85
L 8 / 4B	Bridge	160	10	8	218
L 8 / 4D	V.D.	96	5	8	218
L 8 / 4H	H.W.	96	5	8	109
L 8 / 4V	F.W.	80-0-80	10	8	110
L 8 / 5B	Bridge	200	10	8	274
L 8 / 5D	V.D.	120	5	8	274
L 8 / 5H	H.W.	120	5	8	138
L 8 / 5V	F.W.	100-0-100	10	8	140
L 8 / 6D	V.D.	144	5	8	325
L 8 / 6H	H.W.	144	5	8	167
L 8 / 6V	F.W.	120-0-120	10	8	170
L 8 / 8D	V.D.	192	5	8	435
L 8 / 8H	H.W.	192	5	8	225
L 8 / 8V	F.W.	160-0-160	10	8	115
L 8 / 10D	V.D.	240	5	8	545
L 8 / 10H	H.W.	240	5	4	280
L 8 / 10V	F.W.	200-0-200	10	4	140
L 8 / 15H	H.W.	360	5	4	425
L 8 / 20H	H.W.	480	5	2	568
M1	H.W.	24	0.25	2	20
M3	H.W.	24	1	4	23
MN As "K" types but different encapsulation, plus the following:					
MN388 / 6	H.W.	108	10	16	137
MN388 / 8	H.W.	144	10	16	181
MN388 / 10	H.W.	180	10	8	226
MN388 / 15	H.W.	270	10	8	340
MN388 / 20	H.W.	360	10	4	448
MN388 / 25	H.W.	450	10	4	568
MN388 / 30	H.W.	540	10	2	662
MN388 / 35	H.W.	630	10	2	772
MN388 / 40	H.W.	720	10	2	885
MN388 / 45	H.W.	810	10	2	975
MN388 / 50	H.W.	900	10	2	1,100
MQ1 / 1	H.W.	24	0.25	2	20
MQ1 / 2	H.W.	48	0.25	1	40
MQ1 / 3	H.W.	72	0.25	1	62
MQ1 / 4	H.W.	96	0.25	0	82
MQ1 / 5	H.W.	120	0.25	0	103
MQ3 / 1	H.W.	24	1	4	23
MQ3 / 2	H.W.	48	1	2	48
MQ3 / 3	H.W.	72	1	2	72
MQ3 / 4	H.W.	96	1	2	98
MQ3 / 5	H.W.	120	1	2	122
MQ6 / 1	H.W.	24	3.5	8	25
MQ6 / 2	H.W.	48	3.5	8	51
MQ6 / 3	H.W.	72	3.5	8	79
MQ6 / 4	H.W.	96	3.5	8	105

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
S.T.C. *(Continued)*					
Current Types (Continued)					
MQ6 / 5	H.W.	120	3.5	4	135
MQ8 / 1	H.W.	24	5	16	25
MQ8 / 2	H.W.	48	5	8	52
MQ8 / 3	H.W.	72	5	8	81
MQ8 / 4	H.W.	96	5	8	109
MQ8 / 5	H.W.	120	5	8	138
N Types. As "MN" types but different encapsulation					
P Types. As "L" types but different encapsulation					
Q Types. As "MQ" types but different encapsulation					
R Types. As "L" types but different encapsulation					
RM 4	H.W.	250	250	100	285
SM0 / 1	H.W.	125	60	8	95
SM2 / 3	H.W.	125	120	8	65
SM5 / 5	H.W.	250	300	100	288
T Types. As "MQ" types but different encapsulation					

*Contact cooled selenium rectifiers of small volume

WESTINGHOUSE

Obsolete Types					
011L992 } 011L999 }	H.W.	3.0	225	1,000	2
Current Types					
4A88	V.D.	150	200‡	2 × 32	250
4C1017	C.T.	2.5-0-2.5	120‡	2,000	1.5
4D958	C.T.	2.5-0-2.5	100	2,000	1.5
5D1	H.W.	2	40	240	1.5
14A86	H.W.	240	200‡	64	280
14A97	F.W.	240	250‡	64	275
14A100	H.W.	250	200‡	64	290
14A124	F.W.	250	200‡	80	300
14A144	F.W.	350	200‡	64	500
14A163	V.D.	120	120‡	2 × 50	250
14A342	H.W.	250	300‡	100	290
14A975	H.W.	250	120‡	16	260
14A949	H.W.	250 a.c. / d.c.	200	100	280
14B35	H.W.	100	70‡	32	110
14B130	H.W.	240	200‡	64	265
14B261	H.W.	210	70‡	32	240
14B980	H.W.	240	70‡	50	275
14B986	H.W.	250	70‡	16	275
15B35	H.W.	240	45‡	32	270
15B39	C.T.	95-0-95	100‡	32	95
15C997	H.W.	125	35	36	150
15D19	H.W.	125	25	32	150
2 × 15D39	C.T.	120-0-120	45‡	32	140
16HT12 and intermediate types to 16HT258	H.W.	180 and multiples to 3,865	8	4 0.2	190 4,120
16MB1 and intermediate types to 16MB16	H.W.	15 and multiples to 240	8	32 2	15 240
36EHT10 and intermediate types to 36EHT240	H.W.	270 and multiples to 6,480	2	0.5 0.05	300 7,900
36MB1 and intermediate types to 36MB13	H.W.	30 and multiples to 390	2	4 0.33	30 390
39E10 and intermediate types to 39E60	H.W.	270 and multiples to 1,620	0.1	0.25 0.005	310 1,900

(Continued)

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
WESTINGHOUSE *(Continued)*					
Current Types (Continued)					
39K1 and intermediate types to	H.W.	30 and multiples to	0.1	0.2	30
39K13	H.W.	390	0.1	0.015	390
EC1†	H.W.	250	120§	32	280
EC1†	Bridge	250	120§	16	270
EC1†	C.T.	250-0-250	120§	16	270
EC2†	H.W.	250	60§	16	280
EC2†	V.D.	125	60§	16	260
EC3†	C.T.	250-0-250	180§	32	275
EC3†	H.W.	250	180§	50	280
EC3†	Bridge	250	180§	32	280
EC4†	H.W.	500	60§	8	560
EC4†	V.D.	250	60§	8	520
EC9†	H.W.	250	60§	16	280
EC10†	H.W.	150	60§	24	170
EC11†	H.W.	500	75§	8	550
EC11†	V.D.	250	75§	8	550
EC12†	H.W.	300	60§	8	320
EC12†	V.D.	150	60§	16	320
EC13†	H.W.	400	60§	8	440
EC15†	Bridge	30	120§	120	32
EC16†	Bridge	90	120§	64	100
EC18†	Bridge	60	120§	64	65
EC19†	Bridge	120	120§	32	130
EC19†	C.T.	120-0-120	120§	32	130
EC401	Bridge	240	240	-	160
EC402	H.W.	170	120	-	160
EC403	Bridge	240	320	-	160
FC31†	H.W.	250	300§	100	280
FC116†	H.W.	250	60§	16	280
FC117†	H.W.	125	120§	64	140
FC118†	H.W.	125	60§	32	140
FC124†	Bridge	250	120§	24	270
FC132†	C.T.	120-0-120	120	24	130
FC133†	C.T.	250-0-250	120§	16	270
FC141†	H.W.	250	20§	4	280
FC142†	Bridge	250	40§	4	260
FC150*	C.T.	120-0-120	40§	8	130
HO29PEO1B	Bridge	21.5	160	-	12
HO31PEO1B	Bridge	21.5	120	-	12
H129PEO1B	Bridge	30	160	-	20
H131PEO1B	Bridge	30	120	-	20
HT43	V.D.	275	120	2×16	600
HT44	V.D.	210	120	2×16	400
HT45	V.D.	170	120	2×16	300
HT46	H.W.	250	120	16	240
HT47	H.W.	250	60	16	260
HT48	H.W.	250	30	8	260
HT49	H.W.	108	20	8	120
HT50	F.W.	300-0-300	40	8	350
HT51	F.W.	350-0-350	100	16	400
HT52	F.W.	350-0-350	200	32	400
HT53	F.W.	500-0-500	200	32	600
HT54	H.W.	120ϕ	60	16	110
HT57	H.W.	240	300	100	270
HT59	H.W.	250	300	100	280
HT60	H.W.	250	300	64	270
HT61	H.W.	250	325	64	270
HT62	H.W.	250	300	64	270
HT63	H.W.	250	300	64	270
LT113	Bridge	21.5	1.5A	-	12

Type	Type of Rectification	Input Volts (R.M.S.)	Max. Rect. Current (mA)	Min. Reservoir Capacitance (μF)	Rectified Volts
WESTINGHOUSE *(Continued)*					
Current Types (Continued)					
LT116	Bridge	30	1.5A	-	20
LT119	Bridge	21.5	1.0A	-	12
LT120	Bridge	30	1.0A	-	20
LW7	H.W.	240	300	100	270
LW9	H.W.	250	300	100	280
LW13	H.W.	240	300	100	280
LW15	H.W.	250	200	100	280

‡ The current rating given is typical for average conditions of ventilation, but the actual rating in any particular application will depend on the cooling provided and may be above or below the figure quoted.

ø Maximum open circuit voltage. Potential divider (line cord) a.c. or d.c.

† Contact-cooled types.

* Case forms d.c. negative connection.

§ Max. output current for chassis temperature not greater than 55°C.

GERANIUM PNP TRANSISTORS

Type	Construction	P_o Max (mW)	Typical f_T { or * f_1 / Δfab } Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
BRIMAR												
Current Types												
AC113	AJ	200φ	1.5*	-26	-16	-3	50	90 at 1	7	9	L.F. amplifiers drivers or oscillators	15
AC115	AJ	200φ	1.5*	-26	-16	-3	50	15† at 1	7	9	L.F. low level amplifiers or oscillators	15
AC154	AJ	200φ	1.5*	-26	-16	-6	500	80* at 300	7	9	Class B push pull, A.F. output, switching or oscillators	15
AC155	AJ	200φ	1.5*	-26	-16	-3	50	43 at 1	7	9		15
AC156	AJ	200φ	1.5*	-26	-16	-3	50	90 at 3	7	9	As for AC113	15
AC165	AJ	200φ	1.5*	-32	-20	-3	50	90 at 1	7	9		15
AC166	AJ	200φ	1.5*	-32	-20	-6	500	80* at 300	7	9	As for AC154	15
AC167	AJ	§	1.5*	-32	-20	-6	500	80* at 300	7	9		15
AC169	AJ	-	-	-2	-2	-2	30	-	7	1	Low voltage bias stabilising circuits	15
AC177	AJ	§	1.5*	-32	-20	-6	500	80* at 300	7	9	As for AC154	15
ASY82	AJ	200φ	1.5*	-26	-16	-12	500	40†* at 125	100	26	Switching	15
ASY83	AJ	200φ	2.5*	-26	-16	-12	500	100†* at 125	100	26		15
ASY84	AJ	200φ	1.5*	-40	-20	-12	500	40†* at 125	100	40		15
ASY85	AJ	200φ	2.5*	-40	-20	-12	500	100†* at 125	100	40		15

φ T_{amb} = 45°C

† Minimum value

§ $\theta_{j\text{-can}}$ = 0.05°C mW

MAZDA (EXPORT EDISWAN)

Replacement Type												
AC114	AJ	110φ	-	-26	-16	-6	-	77 at 1	7	9	Class B push pull A.F. output	15
Current Types												
AC113	AJ	200φ	1.5*	-26	-16	-3	50	90 at 1	7	9	L.F. amplifiers drivers or oscillators	15
AC115	AJ	200φ	1.5*	-26	-16	-3	50	15† at 1	7	9	L.F. low level amplifiers, or oscillators	15
AC154	AJ	200φ	1.5*	-26	-16	-6	500	80* at 300	7	9	Class B push pull A.F. output, switching or oscillators	15
AC155	AJ	200φ	1.5*	-26	-16	-3	50	43 at 1	7	9		15
AC156	AJ	200φ	1.5*	-26	-16	-3	50	90 at 3	7	9	L.F. amplifiers drivers or oscillators	15
AC165	AJ	200φ	1.5*	-32	-20	-3	50	90 at 1	7	9		15
AC166	AJ	200φ	1.5*	-32	-20	-6	500	80* at 300	7	9	As for AC154	15
AC167	AJ	§	1.5*	-32	-20	-6	500	80* at 300	7	9		15
AC169	AJ	-	-	-2	-2	-2	30	-	7	1	Low voltage bias stabilising circuits	15
AC177	AJ	§	1.5*	-32	-20	-6	500	80* at 300	7	9	As for AC154	15
AD140	AJ	35ΨW		-55	-40	-10	3A	30† at 1A	100	0.5	Audio power output	1

† Minimum value

φ T_{amb} = 45°C

Ψ $T_{case} \leq$ 37.5°C

§ $\theta_{j\text{-can}}$ = 0.05°C /mW

Type	Construction	P_C Max (mW)	Typical f_T {or * f_1} {$\Delta f\alpha b$} Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
MULLARD												
Current Types												
AF124	AD	67	75*	-20	-	-	10	150 at 1	8	6	As for AF114	31
AF125	AD	67	75*	-20		-	10	150 at 1	8	6	As for AF115	31
AF126	AD	67	75*	-20		-	10	150 at 1	8	6	As for AF116	31
AF127	AD	67	75*	-20		-	10	150 at 1	8	6	As for AF117	31
AC107	AD	80	2	-15	-15	-	10	60 at 0.3	3	5	Low noise amplifiers	28
2N987	AD	86	100	-40	-40	-1.0	10	100 at 1	8	6	R.F. amplifiers	26
AFZ12	AD	83	180	-20	-	-	10	70* at 1	6	6	Low noise V.H.F. amplifier	26
ASZ23	AD	83	-	-	-	-	100	-	8	6	Sampling oscilloscopes, pulse generators	10
OC43	A	83	18*	-15	-15	-12	150	-	10	15	Switching	28
AF114	AD	83	75*	-20	-	-	10	150 at 1	8	6	R.F. amplifier A.M/F.M.	10
AF115	AD	83	75*	-20		-	10	150 at 1	8	6	Mixer oscillator A.M/F.M.	10
AF116	AD	83	75*	-20	-	-	10	150 at 1	8	6	I.F. amplifiers	10
AF116	AD	83	75*	-20	-	-	10	150 at 1	8	6	Mixer oscillator I.F. amplifiers 42dB at 0.45Mc/s	10
AFZ11	AD	83	140	-20	-	-	10	70 at 1	6	6	Low noise V.H.F. amplifiers	
ASZ21	AD	120	450*	-20	-	-	50	75* at 30	50	20	High speed switching	4
GET896	A	120	> 1.7	-20	-	-	100	40 at 1	10	6		2
GET897	A	120	> 1.7	-20	-	-	100	75 at 1	10	6	General purpose amplifiers	2
GET898	A	120	> 1.7	-20	-	-	100	120 at 1	10	6	oscillators	2
GET880	A	120	3.5	-20	-	-	100	75 at 1	5	6	Low noise amplifiers	2
GET881	A	120	6.5	-20	-	-12	500	135* at 25	5	6	Medium speed switching	2
GET887	A	120	6.5	-20	-	-	100	75 at 1	5	6	R.F. amplifiers	2
GET891	A	120	6.5	-25	-	-12	500	135* at 25	5	6	Medium speed switching	2
GET889	A	120	7.5	-20	-	-	100	75 at 1	5	6		2
GET888	A	120	10	-20	-	-	100	155 at 1	5	6	R.F. amplifiers	2
GET890	A	120	12	-20	-	-	100	155 at 1	5	6		2
GET882	A	120	12.3	-20	-	-12	500	170* at 25	5	6		2
GET892	A	120	12.3	-25	-	-12	500	170* at 25	5	6	Medium speed switching	2
GET885	A	120	20	-20	-	-12	500	220* at 25	5	6		2
GET895	A	120	20	-25	-	-12	500	220* at 25	5	6		2
ASY26	A	150	> 4*	-30	-	-	300	55* at 20	3	5	General purpose	2
ASY25	A	150	> 6*	-25	-	-	300	100* at 20	3	5		2
2N1303	AJ	150	4.5Δ	-30	-	-25	300	50* at 10	-	-		2
2N1305	AJ	150	8Δ	-30	-	-25	300	70* at 10	-	-	Medium speed logic and	2
2N1307	AJ	150	12Δ	-30	-	-25	300	100* at 10	-	-	general purpose	2
2N1309	AJ	150	20Δ	-30	-	-25	300	150* at 10	-	-		2
ACY40	AJ	160φ	0.6Δ	-32	-18	-	500	37* at 300	100	32		2
ACY22	AJ	160φ	0.8*	-20	-15	-	500	70* at 300	100	20		2
ACY39	AJ	160φ	1Δ	-110	-40	-	500	80* at 300	100	110		2
ACY41	AJ	160φ	1Δ	-32	-18	-	500	85* at 300	100	32		2
ACY17	AJ	160φ	1.1Δ	-70	-32	-	500	80* at 300	100	70	Tightly controlled gain	2
ACY18	AJ	160φ	1.1Δ	-50	-30	-	500	85* at 300	100	50		2
ACY20	AJ	160φ	1.1Δ	-40	-20	-	500	90* at 50	100	40		2
ACY21	AJ	160φ	1.3Δ	-40	-20	-	500	170* at 50	100	40		2
ACY19	AJ	160φ	1.5Δ	-50	-30	-	500	140* at 300	100	50		2
ASY67	AD		> 150*	-50	-	-	50	>50* at 10	50	50	Logic circuits	9
AF118	AD	375φ		-70	-70	-	30	180* at 10	6	6	Video amplifiers	9
AC128 / 2-AC128	AJ	700φ	-	-32	-32	-	1A	90* at 300	10	10	Class A and B output	7
AFY19	AD	800	350	-32	-32	-	150	80* at 80	-	-	Transmitter power amplifiers	3
OC30	A	4Wφ	0.009Δ	-32	-32	-	1,400	-	-	-	Power, output, switching	24
AUY10	AD	4.5WΨ_2	120*	-70	-60	-	700	-	-	-	High speed core driving, V.H.F. power	1
OC25	AJ	22.5WΨ_3	-	-40	-40	-	4A	50* at 1A	-	-	General purpose power	1
OC20	AJ	30WΨ_3	0.25Δ	-100	-75	-	8A	50* at 1A	-	-	High voltage high gain	1
AD140 / 2-AD140	A	35WΨ_1	-	-55	-55	-	3A	65* at 1A	-	-	Power amplifiers	1
ADZ11	AD	45WΨ_4	0.08Δ	-50	-40	-	15A	80* at 1A	8mA	50		8
ADZ12	AD	45WΨ_4	0.1Δ	-80	-60	-	15A	80* at 1A	8mA	80	General purpose	8
2N1100	AJ	50WΨ_2	0.01Δ	-100	-80	-	11A	20* at 12A	-	-		8

(Continued)

Type	Construction	P_c Max (mW)	Typical f_T { or * f_1 / Δ fab } Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.

MULLARD *(Continued)*

Current Types (Continued)

ADY26	AJ	75WΨ_3	-	-80	-60	-	25A	60* at 5A	4mA	80	General purpose power	8

ϕ $T_{amb} = 45^{\circ}C$
Ψ_1 $T_{case} \leq 37.5^{\circ}C$
Ψ_2 $T_{case} \leq 50^{\circ}C$
Ψ_3 $T_{case} \leq 45^{\circ}C$
Ψ_4 $T_{case} \leq 55^{\circ}C$

NEWMARKET

Current Types

NKT123	A	75	3 Δ †	-20	-	-6	500	50* † at 500	5	10		2
NKT126	A	75	3 Δ †	-20	-	-6	500	50* † at 25	5	10	R.F. switching	2
NKT129	A	75	3 Δ †	-20	-	-6	500	50* † at 1	5	10		2
164/25	A	75	6 Δ	-9	-	-12	25	50 at 1	5	10	R.F. I.F. amplifiers	2
NKT122	A	75	7 Δ †	-20	-	-6	500	50* † at 500	5	10		2
NKT125	A	75	7 Δ †	-20	-	-6	500	50* † at 25	5	10	R.F. switching	2
NKT128	A	75	7 Δ †	-20	-	-6	500	50* † at 1	5	10		2
163/25	A	75	8 Δ	-9	-	-12	25	80 at 1	5	10	R.F. I.F. amplifiers	2
NKT162	A	75	11 Δ	-9	-	-	25	100 at 1	5	10	R.F. mixers	2
NKT121	A	75	15 Δ †	-20	-	-6	500	50* † at 500	5	10		2
NKT124	A	75	15 Δ †	-20	-	-6	500	50* † at 25	5	10	R.F. switching	2
NKT127	A	75	15 Δ †	-20	-	-6	500	50* † at 1	5	10		2
NKT603	M	80	140 Δ	-40	-	2	30	30 at 10	8	10	R.F. switching	
NKT612	M	80	140 Δ	-40	-	1	10	40† at 1	8	10	V.H.F. amplifiers	
NKT613	M	80	140 Δ	-40	-	1	10	40 at 1	8	10	V.H.F. amplifiers	
NKT675	M	80	140 Δ	-20	-	-1	10	40† at 1	8	10	V.H.F. mixers	7
NKT676	M	80	140 Δ	-20	-	-1	10	40† at 1	8	10	V.H.F. I.F. amplifiers	7
NKT677	M	80	140 Δ	-20	-	-1	10	40† at 1	8	10	R.F. amplifiers	7
NKT143	A	125	3 Δ †	-15	-	-12	25	30† at 1	5	10		2
NKT142	A	125	8 Δ †	-15	-	-12	25	40† at 1	5	10	R.F. amplifiers	2
NKT141	A	125	15 Δ †	-15	-	-12	25	50† at 1	5	10		2
NKT211	J	200	1 Δ	-32	-	-10	500	50* † at 300	10	10	Large signal A.F. amplifiers	7
NKT212	J	200	1 Δ	-32	-	-10	125	50* † at 25	10	10	A.F. switching	7
NKT213	J	200	1 Δ	-32	-	-10	125	50† at 1	10	10		7
NKT214	J	200	1 Δ	-32	-	-10	125	30* † at 1	10	10	A.F. amplifiers	
NKT215	J	200	1 Δ	-32	-	-10	125	15 † at 1	10	10		7
NKT216	J	200	1 Δ	-60	-	-10	125	50 † at 1	10	10	Low noise preamplifiers	7
NKT217	J	200	1 Δ	-60	-	-10	125	50* † at 25	10	10	A.F. switching	7
NKT218	J	200	1 Δ	-60	-	-10	500	50* † at 300	10	10	Large signal A.F. amplifiers	7
NKT219	J	200	1	-32	-	-10	125	85 † at 1	10	10	A.F. amplifiers	7
NKT271	J	200	1 Δ	-15	-	-5	500	50* † at 200	10	10	A.F. power output	7
NKT272	J	200	1 Δ	-15	-	-5	125	35† at 1	10	10	A.F. drivers	7
NKT273	J	200	1 Δ	-15	-	-5	500	25* † at 200	10	10	A.F. power output	7
NKT274	J	200	1 Δ	-15	-	-5	125	85† at 1	10	10	A.F. drivers	7
NKT275	J	200	1 Δ	-15	-	-5	125	25† at 1	10	10	Low noise preamplifiers	7
NKT221	J	300	1 Δ	-30	-	-10	500	30* † at 500	10	10	Large signal A.F. amplifiers	2
NKT222	J	300	1 Δ	-30	-	-10	125	50* † at 25	10	10	A.F. switching	2
NKT223	J	300	1 Δ	-30	-	-10	125	50† at 1	10	10		2
NKT224	J	300	1 Δ	-30	-	-10	125	30† at 1	10	10	A.F. amplifiers	2
NKT225	J	300	1 Δ	-30	-	-10	125	15† at 1	10	10		2
NKT226	J	300	1 Δ	-30	-	-10	125	50† at 1	10	10	Low noise preamplifiers	2
NKT227	J	300	1 Δ	-60	-	-10	125	50* † at 25	10	10	A.F. switching	2
NKT228	J	300	1 Δ	-30	-	-10	500	30* † at 500	10	10	Large signal A.F. amplifiers	2
NKT261	J	300	1 Δ	-15	-	-5	500	50* † at 200	10	10	A.F. output	2
NKT262	J	300	1 Δ	-15	-	-5	125	35† at 1	10	10	A.F. driver	2
NKT263	J	300	1 Δ	-15	-	-5	500	25* † at 200	10	10	A.F. power output	2

(Continued)

Type	Construction	P_c Max (mW)	Typical f_T or * f_1 or Δ fab Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
NEWMARKET *(Continued)*												
Current Types (Continued)												
NKT264	J	300	1Δ	-15	-	-5	125	85*†	10	10	A.F. driver	2
NKT265	J	300	1Δ	-15	-	-5	125	25† at 1	10	10	Low noise preamplifiers	2
NKT301	J	750	1Δ	-60	-40	-15	2A	30*† at 2A	50	1.5	Intermediate power switching	6
NKT302	J	750	1Δ	-60	-40	-15	2A	50*† at 5	50	1.5		6
NKT303	J	750	1Δ	-60	-20	-15	2A	30*† at 2A	50	1.5		6
NKT304	J	750	1Δ	-60	-20	-15	2A	50*† at 5	50	1.5		6
NKT351	J	750	1Δ	-60	-	-5	2A	15*† at 1A	100	1.5	Intermediate power amplifiers	6
NKT352	J	750	1Δ	-15	-	-5	2A	20*† at 1A	100	1.5		6
NKT361	J	750	1Δ	-30	-	-5	2A	15*† at 1A	100	1.5		25
NKT362	J	750	1Δ	-15	-	-5	2A	20*† at 1A	100	1.5		25
NKT401	J	1.3W	0.6Δ	-80	-30	-20	8A	15*† at 6A	100	1.5	Power switching	1
NKT402	J	1.3W	0.6Δ	-80	-20	-20	8A	30*† at 6A	100	1.5		1
NKT403	J	1.3W	0.6Δ	-80	-30	-20	8A	50*† at 1A	100	1.5		1
NKT404	J	1.3W	0.6Δ	-60	-20	-20	8A	50*† at 1A	100	1.5		1
NKT405	J	1.3W	0.9Δ	-60	-	-20	8A	100*† at 1A	100	1.5		1
NKT451	J	1.3W	0.9Δ	-36	-	-10	3A	50*† at 1A	100	1.5	Power amplifiers	1
NKT452	J	1.3W	0.9Δ	-36	-	-10	8A	30*† at 1A	100	1.5		1
NKT453	J	1.3W	0.9Δ	-36	-	-10	8A	15*† at 1A	100	1.5		1

† Minimum value

SEMICONDUCTORS LTD

Current Types

MA393	μA	25φ	25†	-6	-	-	50	75* at 50	10	6	Fast switching	7
MA393A	μA	25φ	25†	-15	-	-	50	75* at 50	10	15		7
MA393B	μA	25φ	25†	-15	-	-	50	75* at 50	10	15		7
MAS21	μA	25φ	50†	-6	-	-6	25	50*† at 20	20	6		7
MAS22	μA	25φ	50†	-6	-	-6	25	25*† at 20	20	6		7
MAS20	μA	25φ	70†	-6	-	-6	25	260* at 20	20	6		7
MDS38	μAD	50	280†	-15	-8	-2	50	20*† at 10	5	15		4
MDS34	μAD	-	-	-20	-	-2	100	20*† at 10	3	20		7
MD501	μAD	60	-	-15	-	-2	50	70*† at 10	5	15		7
MDS36	μAD	60	100†	-20	-	-2	100	30*† at 10	5	20		4
MDS33	μAD	60	300†	-15	-10	-2	50	80* at 10	3	15		7
MDS39	μAD	60	300†	-15	-10	-2	50	30*† at 10	30	15		4
MDS37	μAD	150	-	-15	-	-1.5	-	20*† at 40	5	15		4
SA51	A	150	4†	-	-30	-5	50	10*† at 1	0.05	-	General purpose	7
SA52	A	150	4†	-30	-30	-30	50	20*† at 1	0.05	30		7
SA52A	A	150	4†	-30	-30	-30	50	45*† at 1	0.05	30		7
SA52B	A	150	4†	-30	-30	-30	50	20*† at 1	0.02	30		7
SA56	A	150	4†	-	-5	-5	50	10*† at 1	0.05	-		7
SSA43	A(Sy)	150	4†	-	-10	-20	50	10*† at 1	0.01	-	Switching	7
SSA46	A(Sy)	150	4†	-	-10	-20	50	7† at 1	0.02	-		7
SSA48	A(Sy)	150	4†	-	-10	-20	50	7† at 1	0.05	-		7
SA496	A	150	5†	-	-10	-10	50	6† at 15	0.1	10		7
SA50	A	150	10†	-	-20	-5	50	45*† at 1	0.05	-	General purpose	7
SA53	A	150	10†	-	-20	-5	50	20*† at 1	0.05	-		7
SA54	A	150	10†	-	-15	-5	50	20*† at 1	0.05	-		7
SA55	A	150	10†	-	-10	-5	50	25*† at 1	0.05	-		7
SAC40	A	150	10†	-	-15	-15	50	2.5† at 1	0.05	-	Choppers	7
SAC42	A	150	10†	-	-25	-25	50	2.5† at 1	0.05	-		7

† Minimum value
φ $T_{amb} = 45^{\circ}C$

Type	Construction	P_c Max (mW)	Typical f_T { or * f_1 / Δfab } Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
S.T.C.												
Current Types												
ACY34	A	200	0.2Δ†	-30	-10	-20	-	20† at 0.5	12	30	Audio oscillators and amplifiers	15
ACY35	A	200	0.3Δ	-30	-10	-20	-	30† at 3	12	30		15
ACY36	A	200	0.35Δ	-32	-16	-20	-	45† at 10	12	32		15
ASY50	A	200	0.5Δ†	-20	-10	-	-	15* † at 5	10	20	General purpose	15
ASY51	A	200	0.5Δ†	-60	-20	-40	-	54 at 1	-	-	High voltage switching	15
ASY71	A	200	0.5	-100	-35	-40	-	75 at 1	100	100		15
ACY27	A	200	1.1Δ	-40	-20	-30	-	40 at 1	12	40	Audio oscillators and amplifiers	15
ACY31	A	200	1.1Δ	-50	-30	-20	-	60 at 1	12	50	Multi-channel carrier systems	15
ACY28	A	200	1.2Δ	-40	-15	-30	-	66 at 1	12	40	Audio oscillator	15
ACY29	A	200	1.4Δ	-40	-20	-30	-	66 at 1	12	40	Low noise A.F. amplifiers	15
ACY30	A	200	1.8	-40	-20	-40	-	90 at 1	12	40	High gain amplifiers, oscillators	15
ASY56	A	200	2	-15	-10	-12	-	25* † at 10	10	15	Medium speed logic	15
ASY57	A	200	3.7	-15	-10	-12	-	30* † at 10	10	15	Medium speed logic	15
ASY49	A	200	5Δ	-100	-20	-40	-	80* at 10	6	100	High voltage switching and logic	15
ASY52	A	200	5Δ	-60	-20	-40	-	80* at 10	100	60		15
ASY54	A	200	6Δ	-30	-15	-30	-	40 at 1	10	30		15
ASY58	A	200	7	-15	-10	-12	-	40* † at 10	10	15	Medium speed logic	15
ASY55	A	200	11Δ	-20	-15	-15	-	60 at 1	20	10	High voltage switching and logic	15
ASY59	A	200	12	-15	-10	-12	-	60* † at 10	10	15	Medium speed switching	15
ASY63	A	200	-	-26	-25	-20	-	46 at 3	10	26		15
CTP 1500	A	75WΨ	-	-100	-80	-30	15A	50* at 5A	-	-	High current switching converters, power supplies	1
CTP 1504	A	75WΨ	-	-60	-50	-30	15A	50* at 5A	-	-		1
2N1163	A	90WΨ	-	-50	-35	-25	25A	40* at 25A	20mA	15	High current power supplies, converters >0.5W output	1
2N1165	A	90WΨ	-	-80	-60	-40	25A	40* at 25A	20mA	30		1
2N1167	A	90WΨ	-	-100	-75	-50	25A	40* at 25A	20mA	30		1
2N2062A	A	90WΨ	-	-20	-20	-10	5A	100* at 2A	2mA	20	Medium current amplifiers, switching	1
2N2064A	A	90WΨ	-	-40	-30	-20	5A	100* at 2A	2mA	40		1
2N2066A	A	90WΨ	-	-80	-60	-30	5A	100* at 2A	2mA	80		1

† Minimum value

TEXAS

Current Types

GM378	EM	75	400†	-20	-15	-0.3	50	20*† at 3	-	-	High frequency amplifiers	13
GM378A	EM	75	400†	-20	-15	-0.3	50	20*† at 3	-	-		14
2N2415	M	75	500†	-15	-10	-2.5	20	10*† at 2	-	-		13
GM290	EM	75	700	-20	-15	-0.3	50	20*† at 3	-	-		13
GM290A	EM	75	700	-20	-15	-0.3	50	20*† at 3	-	-		14
2N1303	A	150	3Δ†	-30	-25	-25	300	20*† at 10	-	-	General purpose and switching	2
2N1305	A	150	5Δ†	-30	-20	-25	300	40*† at 10	-	-		2
2N1307	A	150	10Δ†	-30	-15	-25	300	60*† at 10	-	-		2
2N1309	A	150	15Δ†	-30	-15	-25	300	80*† at 10	-	-		2
2N711B	M	150	150†	-18	-15	-2	100	30*† at 10	-	-	High speed switching	4
2G371	A	200	1†	-20	-20	-10	300	35† at 1	-	-	General purpose amplifiers	15
2G374	A	200	1†	-20	-20	-10	300	75† at 1	-	-		15
2G377	A	200	1†	-60	-60	-10	300	15*† at 250	-	-		15
2G301	A	200	3†	-20	-20	-10	300	30† at 1	-	-	General purpose and switching	15
2G303	A	200	3†	-30	-30	-10	300	30† at 1	-	-		15
2G308	A	200	3†	-20	-20	-10	300	50† at 1	-	-	Amplifiers	15
2G302	A	200	7†	-20	-20	-10	300	45† at 1	-	-	General purpose and switching	15
2G304	A	200	7†	-30	-30	-10	300	45† at 1	-	-		15
2G306	A	200	12†	-20	-20	-10	300	90† at 1	-	-		15
2G309	A	200	12†	-20	-20	-10	300	170† at 1	-	-	General purpose amplifiers	15
2G381	A	250	1†	-20	-20	-3	500	45*† at 300	-	-		15
2G382	A	250	1†	-30	-30	-10	500	45*† at 300	-	-		15
2G383	A	250	1†	-70	-60	-12	1A	40*† at 50	-	-	High voltage medium power	2
2G384	A	250	1†	-50	-40	-12	1A	55*† at 50	-	-		2
2G385	A	250	1†	-50	-40	-12	1A	100*† at 50	-	-		2
2G386	A	250	1†	-40	-40	-12	1A	55*† at 50	-	-		2

(Continued)

Type	Construction	P_c Max (mW)	Typical f_T or * f_1 / Δ fab Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
TEXAS *(Continued)*												
Current Types (Continued)												
2G387	A	250	1†	-40	-30	-12	1A	100*† at 50	-	-	High voltage medium power	2
2N705	M	300ϕ	300Δ	-15	-15	-3.5	50	25*† at 10	-	-	High speed switching	4
2N711	M	300ϕ	300Δ	-12	-12	-1	50	20*† at 10	-	-		4
2N711A	M	300ϕ	300Δ	-15	-15	-2	50	25*† at 10	-	-		4
2N511	A	80Wϕ	0.07Δ	-40	-40	-30	10A	10*† at 10A	-	-		19
2N511A	A	80Wϕ	0.07Δ	-60	-60	-30	10A	10*† at 10A	-	-		19
2N511B	A	80Wϕ	0.07Δ	-80	-80	-30	10A	10*† at 10A	-	-		19
2N512	A	80Wϕ	0.07Δ	-40	-40	-30	15A	10*† at 15A	-	-		19
2N512A	A	80Wϕ	0.07Δ	-60	-60	-30	15A	10*† at 15A	-	-		19
2N512B	A	80Wϕ	0.07Δ	-80	-80	-30	15A	10*† at 15A	-	-		19
2N513	A	80Wϕ	0.07Δ	-40	-40	-30	20A	10*† at 20A	-	-		19
2N513A	A	80Wϕ	0.07Δ	-60	-60	-30	20A	10*† at 20A	-	-		19
2N513B	A	80Wϕ	0.07Δ	-80	-80	-30	20A	10*† at 20	-	-		19
2N514	A	80Wϕ	0.07Δ	-40	-40	-30	25A	10*† at 25A	-	-	High power	19
2N514A	A	80Wϕ	0.07Δ	-60	-60	-30	25A	10*† at 25A	-	-		19
2N514B	A	80Wϕ	0.07Δ	-80	-80	-30	25A	10*† at 25A	-	-		19
2N456A	A	150Wϕ	0.43	-40	-40	-20	7A	30*† at 5A	-	-		1
2N457A	A	150Wϕ	0.43	-60	-60	-20	7A	30*† at 5A	-	-		1
2N458A	A	150Wϕ	0.43	-80	-80	-20	7A	30*† at 5A	-	-		1
2N1021	A	150Wϕ	0.43	-100	-100	-20	7A	30*† at 5A	-	-		1
2N1022	A	150Wϕ	0.43	-120	-120	-20	7A	30*† at 5A	-	-		1
2N1907	AD	150Wϕ	20†	-100	-100	-1.5	20A	10*† at 15A	-	-		1
2N1908	AD	150Wϕ	20†	-130	-130	-1.5	20A	10*† at 15A	-	-		1

† = Minimum value
ϕ T_{case} = 25°C

GERMANIUM NPN TRANSISTORS

Type	Construction	P_c Max. (mW)	Typical f_T or * f_1 / Δ fab Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
BRIMAR												
Current Types												
ASY86	AJ	200ϕ	2*	16	12	12	500	40*† at 125	100	16	Switching	15
ASY88	AJ	200ϕ	2*	26	16	12	500	40*† at 125	100	26	Switching	15
AC157	AJ	200ϕ	2.5*	26	16	6	500	40*† at 125	20	9	Class B push pull A.F. oscillators	15
ASY87	AJ	200ϕ	4*	16	12	12	500	100*† at 100	100	16	Switching	15
ASY89	AJ	200ϕ	4*	26	16	12	500	100*† at 125	100	26	Switching	15

ϕ T_{amb} = 45°C
† Minimum value

MAZDA (EXPORT EDISWAN)

Current Types

AC157	AJ	200ϕ	2.5*	26	16	6	500	80*at 125	20	9	Class B push pull	15
AC168	AJ	200ϕ	2.5*	32	20	6	500	80*at 125	20	9	A.F. output, general purpose switching or oscillators	15

ϕ T_{amb} = 45°C

Type	Construction	P_C Max (mW)	Typical f_T { or * f_1 / Δfab } Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{fe} at (mA) (or * h_{FE})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
MULLARD												
Current Types												
ASY28	A	125	>4*	30	-	-	100	55* at 20	3	5	General purpose	2
ASY29	A	125	> 6*	25	-	-	100	100* at 20	3	5	General purpose	2
OC141	A(SY)	125	> 9*	20	-	-	400	140* at 15	3	5	High speed switching	28
2N1302	A	150	4	25	-	-	300	105* at 1.0	6	25	Medium speed logic and general purpose	2
2N1304	A	150	6	25	-	-	300	120* at 1.0	6	25	Medium speed logic and general purpose	2
2N1306	A	150	9	25	-	-	300	135* at 1.0	6	25	Medium speed logic and general purpose	2
2N1308	A	150	16	25	-	-	300	170* at 1.0	6	25	Medium speed logic and general purpose	2
AC127		340	2	32	-	-	500	50* at 500	-	-	Class B output stages	7
NEWMARKET												
Current Types												
NKT713	J	150	2Δ	25	-	15	300	50*† at 50	50	25	A.F. (large signal) amplifiers	7
NKT773	J	150	-	15	-	5	300	50*† at 200	15	10	A.F. power output	7
NKT774	J	150	-	15	-	5	300	25*† at 200	15	10	A.F. power output	7
S.T.C.												
Current Types												
2N 1146	A	90WΨ	150 kc/s†	-40	-30	-30	15A	110* at 5A	-	-	High current switching converters, power supplies	1
2N 1146A	A	90WΨ	150 kc/s†	-60	-45	-30	15A	110* at 5A	-	-	High current switching converters, power supplies	1
2N 1146B	A	90WΨ	150 kc/s†	-80	-60	-30	15A	110* at 5A	-	-	High current switching converters, power supplies	1
2N 1146C	A	90WΨ	150 kc/s†	-100	-75	-30	15A	110* at 5A	-	-	High current switching converters, power supplies	1
CQT 1075	A	90WΨ	300 kc/s†	-190	-70	-140	25A	>40* at 10A	2mA	-	General purpose	1
CQT 1076	A	90WΨ	300 kc/s†	-115	-60	-115	25A	>50* at 10A	2mA	-	General purpose	1
CQT 1077	A	90WΨ	300 kc/s†	-100	-45	-100	15A	>30* at 10A	2mA	-	General purpose	1
TEXAS												
Current Types												
2N1302	A	150	3†Δ	25	25	25	300	20*† at 10	-	-	General purpose and switching	2
2N1304	A	150	5†Δ	25	20	25	300	40*† at 10	-	-	General purpose and switching	2
2N1306	A	150	10†Δ	25	15	25	300	60*† at 10	-	-	General purpose and switching	2
2N1308	A	150	15†Δ	25	15	25	300	80*† at 10	-	-	General purpose and switching	2

† Minimum value

† Minimum value
Ψ $T_{case} = 25^{\circ}$ C

† Minimum value

SILICON PNP TRANSISTORS

Type	Construction	P_c Max. (mW)	Typical f_T {or * f_1} {Δ $f\alpha b$} Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
FERRANTI												
Current Types												
ZT152	PE	300	30†	-20	-20	-15	-500	35 at 100	0.1	20	Bi-directional	4
ZT153	PE	300	30†	-35	-35	-25	-500	35 at 100	0.1	35		4
ZT154	PE	300	30†	-45	-45	-25	-500	50 at 100	0.1	45		4
ZT180	P	300	150	-25	-25	-4	500	35 † at 10	0.5	25	General purpose	4
ZT181	P	300	150	-45	-45	-4	500	35 † at 10	0.5	45		4
ZT182	P	300	150	-45	-35	-4	500	75 † at 10	0.5	45		4
ZT183	P	300	150	-45	-45	-4	500	35 † at 10	0.05	45		4
ZT184	P	300	150	-45	-45	-4	500	75 † at 10	0.05	45		4
ZT187	P	300	150	-25	-25	-4	500	75 † at 10	0.5	25		4
ZT280		SO-12C(TO-46) Version of ZT180										4
ZT281		SO-12C(TO-46) Version of ZT181										5
ZT282		SO-12C(TO-46) Version of ZT182										5
ZT283		SO-12C(TO-46) Version of ZT183										5
ZT284		SO-12C(TO-46) Version of ZT184										5
ZT287		SO-12C(TO-46) Version of ZT187										5
ZT210	PE	5W	-	-60	-40	-7	1A	30 † at 150	0.25	60	General purpose	5
ZT211	PE	5W	-	-90	-65	-7	1A	40 † at 150	0.02	60		2
												2

† Minimum value

HUGHES												
Current Types												
2H1254	DDM	300	45	-30	-30	-5	-	25 † at 10	0.2	30	High speed switching	4
2H1256	DDM	300	45	-40	-40	-5	-	25 † at 10	0.2	40		4
2H1259	DDM	300	50	-50	-50	-5	-	25 † at 10	0.2	50		4
HT100	DDM	300	50	-20	-20	-5	-	14 † at 10	0.2	20		4
2H1255	DDM	300	60	-30	-30	-5	-	40 † at 10	0.2	30		4
2H1257	DDM	300	60	-40	-40	-5	-	40 † at 10	0.2	40		4
2H1258	DDM	300	60	-30	-30	-5	-	75 † at 10	0.2	30		4
2N1254	DDM	400	45	-30	-30	-5	-	25 † at 10	0.2	30		4
2N1256	DDM	400	45	-40	-40	-5	-	25 † at 10	0.2	40		2
2N721	P	400	50†	-50	-35	-5	-	20 † at 150	1	30	General purpose	2
2N1259	DDM	400	50	-50	-50	-5	-	25 † at 10	0.2	50	High speed switching	4
2N722	P	400	60†	-50	-35	-5	-	30 † at 150	1	30	General purpose	2
2N1255	DDM	400	60	-30	-30	-5	-	40 † at 10	0.2	30	High speed switching	4
2N1257	DDM	400	60	-40	-40	-5	-	40 † at 10	0.2	40		2
2N1258	DDM	400	50	-30	-30	-5	-	75 † at 10	0.2	30		2
2N1991	P	600	40†	-30	-20	-5	-	15 † at 150	5	10	General purpose	2
2N1131	P	600	50†	-50	-35	-5	-	20 † at 150	1	30		2
2N1131A	P	600	50†	-60	-40	-5	-	20 † at 150	0.5	45		2
2N1132	P	600	60†	-50	-35	-5	-	30 † at 150	1	30		2
2N1132A	P	600	60†	-60	-40	-5	-	30 † at 150	0.5	45		2
2N2303	P	600	60†	-50	-35	-5	-	75 † at 150	1	30		2
2N1132B	P	700	60†	-70	-45	-6	-	30 † at 150	0.01	50		2
												2

† Minimum value

MULLARD												
Current Types												
BCY30	AJ	250	1.2	-64	-64	-45	50	25 * at 1.0	0.05	6	General purpose	2

(Continued)

Type	Construction	P_c Max. (mW)	Typical f_T (or * f_1) ($\Delta f\alpha$) Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
MULLARD *(Continued)*												
Current Types (Continued)												
BCY33	AJ	250	1.5	-32	-32	-16	50	25* at 1	0.05	6		2
BCY31	AJ	250	1.7	-64	-66	-45	50	35* at 1	0.05	6		2
BCY34	AJ	250	2.4	-32	-32	-16	50	35* at 1	0.05	6		2
BCY32	AJ	250	2.5	-64	-64	-32	50	35* at 1	0.05	6		2
BCY38	AJ	410	1.5*	-32	-32	-12	250	20 at 150	0.10	6	General purpose	2
BCY39	AJ	410	1.5*	-64	-64	-12	250	30 at 150	0.10	6		2
BCY54	AJ	410	2*	-50	-50	-12	250	40 at 150	0.10	6		2
OC207	AJ	410	2*	-50	-50	-	250	40 at 150	0.10	6		28
BCY40	AJ	410	2.5*	-32	-32	-12	250	67 at 150	0.10	6		2
S.G.S. FAIRCHILD												
Current Types												
V205	PE	300	160	15	10	3	-	55 at 10	0.02	10	High speed, low noise	4
V405A	PE	300	550	12	12	4	-	38 at 25	0.10	5	Fast switching	4
2N3304		300	600	-6	-6	-4	-	20† at 50	0.01	6	Medium speed saturated switching	4
BSX 35	PE	300	700	6	6	4	-	70 at 10	0.02	3	High speed logic switching	4
2N2695	PE	360	100	-25	-25	-4	-	30† at 50	0.025	12	Medium speed switching	5
2N2696	PE	360	100	-25	-25	-4	-	30† at 50	0.025	12		4
2N869		360	150	-25	-25**	-5	-	20† at 10	0.010	15	High speed switching	4
2N995	PE	360	150	-20	-15	-4	-	35† at 20	0.005	15	Low noise amplifiers	4
2N3073	PE	360	150	-60	-	-4	-	30† at 50	10	30	V.H.F. amplifiers	4
2N3121	PE	360	200	-45	-	-4	-	30† at 50	10	22		4
2N996	PE	360	230	-15	-12	-4	-	35† at 20	0.005	10	Low noise amplifiers	4
2N2894	PE	360	550	-12	-12	-4	-	40† at 30	-		R.F. amplifiers	4
2N3209	DPE	360	550	-20	-	4	-	30† at 30	80	10		4
BSX29	PE	360	700	12	12	4	-	70 at 30	0.08	6	High speed switching or amplifiers	4
2N3504	PE	400	250	45	45	5	-	270 at 10	0.01	30		4
2N3505	PE	400	250	60	60	5	-	270 at 10	0.01	50		4
V410	PE	700	170	20	20	4	500	130 at 50	0.10	10	High current switching	2
BFY64	PE	700	250	40	40	5	-	200 at 10	0.03	25		2
2N3502	PE	700	250	45	45	5	-	270 at 10	0.01	30		2
2N3503	PE	700	250	60	60	5	-	270 at 10	0.01	50		2
2N2927	PE	800	150	-25	-	-4	-	30† at 50	25	12	V.H.F. amplifiers and high current switching	2
2N3072	PE	800	150	-60	-	-4	-	30† at 50	10	30		2
2N3120	PE	800	200	-45	-	-4	-	30† at 50	10	22		2
TEXAS												
Current Types												
2S306	A	50	1.5†	-6	-6	-6	10	30† at 1	-	-		2
2S307	A	50	1.5†	-15	-15	-15	10	30† at 1	-	-	Chopper, offset voltage	2
2S326	A	50	1.5†	-6	-6	-6	10	30† at 1	-	-	< 1mV	15
2S327	A	50	1.5†	-15	-15	-15	10	30† at 1	-	-		15
2S301	A	300	0.25†	-80	-80	-30	100	10*† at 1	-	-		2
2S321	A	300	0.25†	-80	-80	-30	50	10*† at 1	-	-		15
2S302	A	300	0.35†	-40	-40	-20	100	15*† at 1	-	-		2
2S322	A	300	0.35†	-40	-40	-20	50	15*† at 1	-	-		15
2S305	A	300	0.45†	-125	-125	-50	100	10*† at 1	-	-	General purpose	2
2S325	A	300	0.45†	-125	-125	-50	50	10*† at 1	-	-		15
2S303	A	300	0.65†	-25	-25	-20	100	25*† at 1	-	-		2
2S323	A	300	0.65†	-25	-25	-20	50	25*† at 1	-	-		15

** V_{CER} , $R_{BE} \leq 10$

† Minimum value

(Continued)

Silicon PNP Transistors

Type	Construction	P_c Max. (mW)	Typical f_T or * f_1 or Δfab Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
TEXAS												
Current Types												
2S304	A	300	1†	-15	-15	-15	100	45*† at 1	-	-	General purpose	2
2S324	A	300	1†	-15	-15	-15	50	45*† at 1	-	-		15
2N726	PE	300	140†	-25	-20	-5	50	15† at 10	-	-	Fast switching <125ns (total) at 10mA	4
2N727	PE	300	140†	-25	-20	-5	50	30† at 10	-	-		4
2N2411	PE	300	140†	-25	-20	-5	100	20† at 10	-	-		4
2N2412	PE	300	140†	-25	-20	-5	100	40† at 10	-	-		4
2N2696	PE	360	100†	-25	-25	-5	500	30† at 50	-	-		4
2N1131	P	600	50†	-50	-35	-5	600	20† at 150	-	-	Complementary to 2N696	2
2N1132	P	600	60†	-50	-35	-5	600	30† at 150	-	-	Complementary to 2N697	2

† Minimum value

SILICON NPN TRANSISTORS

Type	Construction	P_c Max. (mW)	Typical f_T or * f_1 or Δfab Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
A.E.I.												
Current Types												
PEP5	PE	1W	500	25	15	5	200	5* at 10	0.5	25	High speed logic switches	2
PEP6	PE	1W	500	40	15	5	200	5* at 10	1.0	40		2
PEP7	PE	1W	500	25	15	5	200	5* at 10	0.05	25		2
PEP8	PE	1W	500	40	15	5	200	5* at 10	0.05	40		2
FERRANTI												
Current Types												
ZDT30 ‡	P	150	100	10	-	6	50	- -	0.01	10	Chopper applications in D.C. amplifiers. Offset voltage 50 μV max	16
ZDT31 ‡												16
ZT2708	PE	200	700†	35	20	3	50	30*† at 2	0.01	35	High gain, low capacitance, U.H.F.	16
2N2708	PE	200	700†	35	20	3	-	30*† at 2	0.01	35		16
ZT2857	PE	200	1,000†	30	15	2.5	-	50*† at 2	0.01	30	Low noise, U.H.F.	16
2N2857	PE	200	1,000†	30	15	2.5	-	50*† at 2	0.01	30		16
ZT40	S	300	70†	20	20	6	50	35* at 1	0.5	20	General purpose, amplifiers, switching	4
ZT41	S	300	70†	20	20	6	50	50* at 1	0.5	20		4
ZT42	S	300	70†	45	45	6	50	30* at 1	0.5	45		4
ZT43	S	300	70†	45	45	6	50	50* at 1	0.5	45		4
ZT44	S	300	70†	45	45	6	50	90* at 1	0.5	45		4
ZT202	S	300	70†	30	20	5	50	30* at 1	1.0	30	General purpose	2
ZT203	S	300	70†	30	20	5	50	50* at 1	1.0	30		2
ZT204	S	300	70†	30	20	5	50	100* at 1	1.0	30		2
ZT402	S	300	70†	30	20	5	50	30* at 1	1.0	30		4
ZT403	S	300	70†	30	20	5	50	50* at 1	1.0	30		4
ZT404	S	300	70†	30	20	5	50	100* at 1	1.0	30		4
ZDT40 §	P	300	120	45	35	4	500	75† at 10	0.5		D.C. amplifiers	29
ZDT41 §	P	300	120	60	45	5	500	75† at 10	0.05			29
ZDT42 §	P	300	120	60	60	5	500	60† at 10	0.01			29
ZDT44 §	P	300	120	60	60	5	500	60† at 10	0.01			29
ZDT45 §	P	300	120	100	70	5	500	60† at 10	0.01			29
ZT80	PE	300	120†	25	25	4	500	55* at 1	0.5	25	General purpose, low saturation voltage	4
ZT81	PE	300	120†	45	35	4	500	55* at 1	0.5	45		4
ZT82	PE	300	120†	45	35	4	500	90* at 1	0.5	45		4
ZT83	PE	300	120†	60	45	5	500	55* at 1	0.05	60		4

(Continued)

Type	Construction	P_o Max. (mW)	Typical f_T or * f_1 / Δf_{ab} Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
FERRANTI *(Continued)*												
Current Types (Continued)												
ZT84	PE	300	120†	60	45	5	500	90 * at 1	0.05	60	General purpose, low saturation voltage	4
ZT86	PE	300	120†	100	80	5	500	55 * at 1	0.05	100		4
ZT87	PE	300	120†	25	25	4	500	90 * at 1	0.5	25		4
ZT88	PE	300	120†	100	80	5	500	90 * at 1	0.05	100		4
ZT89	PE	300	120†	70	70	5	500	90 * at 1	0.5	70		4
ZT110	PE	SO-12C (TO-46) versions of ZT80 to ZT87										5
ZT111	PE											
ZT112	PE											
ZT113	PE											
ZT114	PE											
ZT115	PE											
ZT116	PE											
ZT117	PE											
ZT118	PE											
ZT119	PE											
ZDT10§	P	300	150	10	10	5	50	- -	0.01	10	Matched for chopper applications in D.C. amplifiers. Offset voltage 2mV max	17
ZDT11§	P	300	150	10	10	5	50	- -	0.01	10		17
ZDT20§	P	300	150	35	35	5	50	- -	0.01	35	Matched for use in D.C. amplifiers as long-tail pairs. D.C. gain ratio 150.9 to 1.0	17
ZDT21§	P	300	150	35	35	5	50	- -	0.01	35		17
ZT190	P	300	200	20	15	5	200	50† at 10	0.2	20	General purpose	4
ZT191	P	300	200	20	20	5	200	>35 at 10	0.05	20		4
ZT192	P	300	200	40	20	5	200	38† at 10	0.05	40		4
ZT193	P	300	200	40	20	5	200	75† at 10	0.05	40		4
ZT706	P	300	200†	25	20	3	-	20† at 10	0.5	25	High speed switching	4
2N706	P	300	200†	25	20	3	-	20† at 10	0.5	25		4
ZT706A	P	300	200†	25	20	5	-	20† at 10	0.5	25		4
2N706A	P	300	200†	25	20	5	-	20 at 10	0.5	25		4
ZT1708	PE	300	200†	25	20	3	200	20† at 10	0.025	25	High speed logic and core driving	5
ZT2205	PE	300	200†	25	20	3	200	20† at 10	0.025	25		4
2N2205	PE	300	200†	25	20	3	200	20† at 10	0.025	25		4
ZT2206	PE	300	200†	25	20	3	200	40† at 10	0.025	25		5
2N2206	PE	300	200†	25	20	3	200	40† at 10	0.025	25		5
ZT709	PE	300	600†	15	6	4	-	50 at 10	0.05	15		4
2N709	PE	300	600†	15	6	4	-	50 at 10	0.05	15		4
ZT2369A	PE	300	600†	40	15	6	-	40† at 10	0.5	40		4
ZT2475	PE	300	600†	15	6	4	-	50 at 10	0.05	15		4
2N2475	PE	300	600†	15	6	4	-	50 at 20	0.05	15		4
ZT20	S	350	70†	20	20	6	50	35 * at 1	0.5	20	General purpose, amplifiers, switching	2
ZT21	S	350	70†	20	20	6	50	50 * at 1	0.5	20		2
ZT22	S	350	70†	45	45	6	50	30 * at 1	0.5	45		2
ZT23	S	350	70†	45	45	6	50	50 * at 1	0.5	45		2
ZT24	S	350	70†	45	45	6	50	65 * at 1	0.5	45		2
ZT60	PE	350	120†	25	25	4	500	55 * at 1	0.5	25	General purpose, low saturation voltage	2
ZT61	PE	350	120†	45	35	4	500	55 * at 1	0.5	45		2
ZT62	PE	350	120†	45	35	4	500	90 * at 1	0.5	45		2
ZT63	PE	350	120†	60	45	5	500	55 * at 1	0.05	60		2
ZT64	PE	350	120†	60	45	5	500	90 * at 1	0.05	60		2
ZT66	PE	350	120†	100	80	5	500	55 * at 1	0.05	100		2
ZT708	PE	360	300†	40	20	5	-	30† at 10	0.025	40	Amplifiers, high speed switching	2
2N708	PE	360	300†	40	20	5	-	30† at 10	0.025	40		2
ZT696	PE	600	80	60	40	5	500	40 at 150	1.0	60	Switching, medium power amplification	2
2N696	PE	600	80	60	40	5	500	40 at 150	1.0	60		2
ZT697	PE	600	100	60	40	5	500	75 at 150	1.0	60		2
2N697	PE	600	100	60	40	5	500	75 at 150	1.0	60		2
ZT2476	PE	600	250†	60	20	5	-	20*† at 150	-	60	High speed switching	2
2N2476	PE	600	250†	60	20	5	-	40 at 150	0.2	60		2
ZT2477	PE	600	250†	60	20	5	-	40† at 150	0.2	60		2
2N2477	PE	600	250†	60	20	5	-	40† at 150	0.2	60		2
ZT68	PE	750	120†	100	80	5	500	25† at 100	0.05	100	General purpose, video drivers	2

(Continued)

Type	Construction	P_c Max. (mW)	Typical f_T (or * f_1) / Δf_{ab} Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
FERRANTI *(Continued)*												
Current Types (Continued)												
ZT2938	PE	1WΨ	500†	25	13	5	500	60 at 200	0.025	25		4
2N2938	PE	1WΨ	500†	25	13	5	500	60 at 200	0.025	25	High speed switching	4
ZT1613	PE	3WΨ	60†	75	50**	7	1A	40† at 150	0.01	75		2
2N1613	PE	3WΨ	60†	75	50**	7	1A	40† at 150	0.01	75	General use in high	2
ZT1711	PE	3WΨ	70†	75	50**	7	-	100† at 150	0.01	75	performance oscillators,	2
2N1711	PE	3WΨ	70†	75	50**	7	-	100† at 150	0.01	75	amplifiers and switching	2
ZT1700	DJ	5WΨ	1.2Δ†	60	40††	6	1A	20† at 100	75.0	60	circuits	2
2N1700	DJ	5WΨ	1.2Δ†	60	40††	6	1A	20† at 100	75.0	60		2
ZT1479	DJ	5WΨ	1.5Δ†	60	40††	12	1.5A	20† at 200	10.0	60	General purpose	2
2N1479	DJ	5WΨ	1.5Δ†	60	40††	12	1.5A	20† at 200	10.0	60		2
ZT1480	DJ	5WΨ	1.5Δ†	100	55††	12	1.5A	20† at 200	10.0	100		2
2N1480	DJ	5WΨ	1.5Δ†	100	55††	12	1.5A	20† at 200	10.0	100		2
ZT1481	DJ	5WΨ	1.5Δ†	60	40††	12	1.5A	35† at 200	10.0	60		2
2N1481	DJ	5WΨ	1.5Δ†	60	40††	12	1.5A	35† at 200	10.0	60		2
ZT1482	DJ	5WΨ	1.5Δ†	100	55††	12	1.5A	35† at 200	10.0	100		2
2N1482	DJ	5WΨ	1.5Δ†	100	55††	12	1.5A	35† at 200	10.0	100		2
ZT90	PE	5WΨ	60†	60	60	7	1A	100 at 200	0.1	60		2
ZT91	PE	5WΨ	60†	120	100	8	1A	40† at 200	1.0	120		2
ZT92	PE	5WΨ	60†	120	100	8	1A	65† at 200	1.0	120	Power amplifiers	2
ZT93	PE	5WΨ	60†	120	80	6	1A	65† at 200	1.0	120		2
ZT94	PE	5WΨ	60†	60	45	6	1A	50† at 200	1.0	60		2
ZT2102	PE	5WΨ	60†	120	65	6	1A	40† at 150	1.0	120		2
2N2102	PE	5WΨ	60†	120	65	6	1A	40† at 150	1.0	120	High performance amplifiers, oscillators, switching	2
ZT2270	PE	5WΨ	60†	60	60	7	1A	50† at 150	0.1	60		2
2N2270	PE	5WΨ	60†	60	45	7	1A	50† at 150	0.1	60	Low noise, medium power	2
ZT2631	P	8.75WΨ	200†	80	60	4	1.5A	R.F. Power output at 50 Mc/s = 7.5 watts min	0.1	80	Large signal high power A.M., F.M., C.W. applications	3
2N2631	P	8.75WΨ	200†	80	60	4	1.5A	= 7.5 watts min	0.1	80		3
ZT3375	PE	11.6WΨ	500†	65	40	4	1.5A	- -	-		V.H.F. power amplifiers	-
ZT2876 / 2N2876	P	7.5WΨ	200	80	60	4	2.5A	R.F. Power output at 50 Mc/s = 10.0 watts min	0.1	80	Large signal high power A.M., F.M., C.W. applications	26
ZT1701	DJ	25WΨ	1.0Δ†	60	40††	6	2.5A	20† at 300	100Ψ	60		6
2N1701	DJ	25WΨ	1.0Δ†	60	40††	6	2.5A	20† at 300	100Ψ	60	General purpose	6
ZT1483	DJ	25WΨ	1.25Δ†	60	40††	12	3A	20† at 750	15.0	60		6
2N1483	DJ	25WΨ	1.25Δ†	60	40††	12	3A	20† at 750	15.0	60		6
ZT1484	DJ	25WΨ	1.25Δ†	100	55††	12	3A	20† at 750	15.0	100		6
2N1484	DJ	25WΨ	1.25Δ†	100	55††	12	3A	20† at 750	15.0	100		6
ZT1485	DJ	25WΨ	1.25Δ†	60	40††	12	3A	35† at 750	15.0	60		6
2N1485	DJ	25WΨ	1.25Δ†	60	40††	12	3A	35† at 750	15.0	60		6
ZT1486	DJ	25WΨ	1.25Δ†	100	55††	12	3A	35† at 750	15.0	100		6
2N1486	DJ	25WΨ	1.25Δ†	100	55††	12	3A	35† at 750	15.0	100		6
ZT1487	DJ	75WΨ	1.0Δ†	60	40††	10	6A	15 at 1.5A	25.0	60		1
2N1487	DJ	75WΨ	1.0Δ†	60	40††	10	6A	15 at 1.5A	25.0	60		1
ZT1488	DJ	75WΨ	1.0Δ†	100	55††	10	6A	15 at 1.5A	25.0	100		1
2N1488	DJ	75WΨ	1.0Δ†	100	55††	10	6A	15 at 1.5A	25.0	100	High power switching.	1
ZT1489	DJ	75WΨ	1.0Δ†	60	40††	10	6A	25 at 1.5A	25.0	60	Pulse, audio, servo	1
2N1489	DJ	75WΨ	1.0Δ†	60	40††	10	6A	25 at 1.5A	25.0	60	amplifiers	1
ZT1490	DJ	75WΨ	1.0Δ†	100	55††	10	6A	25 at 1.5A	25.0	100		1
2N1490	DJ	75WΨ	1.0Δ†	100	55††	10	6A	25 at 1.5A	25.0	100		1
ZT1511	DJ	75WΨ	1.0Δ†	60	40††	10	6A	15 at 1.5A	25.0	60		8
2N1511	DJ	75WΨ	1.0Δ†	60	40††	10	6A	15 at 1.5A	25.0	60		8
ZT1512	DJ	75WΨ	1.0Δ†	100	55††	10	6A	15 at 1.5A	25.0	100		8
2N1512	DJ	75WΨ	1.0Δ†	100	55††	10	6A	15 at 1.5A	25.0	100		8
ZT1513	DJ	75WΨ	1.0Δ†	60	40††	10	6A	25 at 1.5A	25.0	60		8
2N1513	DJ	75WΨ	1.0Δ†	60	40††	10	6A	25 at 1.5A	25.0	60		8
ZT1514	DJ	75WΨ	1.0Δ†	100	55††	10	6A	25 at 1.5A	25.0	100		8
2N1514	DJ	75WΨ	1.0Δ†	100	55††	10	6A	25 at 1.5A	25.0	100		8
ZT1702	DJ	75WΨ	1.0Δ†	60	40††	6	5A	15† at 800	200Ψ	60		1
2N1702	DJ	75WΨ	1.0Δ†	60	40††	6	5A	15† at 800	200Ψ	60		1
ZT1703	DJ	75WΨ	1.0Δ†	60	40††	6	5A	15† at 800	200Ψ	60	General purpose	8
2N1703	DJ	75WΨ	1.0Δ†	60	40††	6	5A	15† at 800	200Ψ	60		8

(Continued)

Type	Construction	P_c Max. (mW)	Typical f_T or * f_1 / Δf_{ab} Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
FERRANTI *(Continued)*												
Current Types (Continued)												
ZT2015	DJ	150WΨ	0.025	100	50††	10	10A	15 † at 5A	50Ψ	100	Power switching. Pulse, audio, servo amplifiers	8
2N2015	DJ	150WΨ	0.025	100	50††	10	10A	15 † at 5A	50Ψ	100		8
ZT2016	DJ	150WΨ	0.025	130	65††	10	10A	15 † at 5A	50Ψ	130		8
2N2016	DJ	150WΨ	0.025	130	65††	10	10A	15 † at 5A	50Ψ	130		8

Ψ $T_{case} = 25°C$
† Minimum value
** V_{CER}, $R < 10\Omega$
†† V_{CEO} (sus)
‡ Double emitter
§ Double transistor

HUGHES

Current Types

2N706	P	300	250	25	20**	3	-	20†	0.5	25	High speed switching	4
2N706A	P	300	250	25	20**	5	-	20†	0.5	25		4
2N706B	P	300	250	25	20**	5	-	20†	0.5	25		4
2N707	P	300	-	56	28**	4	-	9†	5.0	56		4
2N753	P	300	250	25	20**	5	-	40†	0.5	25		4
2N708	P	360	350	40	20**	5	-	30†	0.025	40	General purpose	4
2N717	P	400	40†	60	40**	5	-	20† at 150	1.0	30		4
2N719	P	400	40†	120	80**	5	-	20† at 150	1.0	60		4
2N718	P	400	50†	60	40**	5	-	40† at 150	1.0	30		4
2N720	P	400	50†	120	80**	5	-	40† at 150	1.0	60		4
2N719A	P	500	40†	120	80**	7	-	20† at 150	0.01	75		4
2N720A	P	500	50†	120	100**	7	-	40† at 150	0.01	90		4
2N870	P	500	50†	100	80**	7	-	40† at 150	0.01	75		4
2N911	P	500	50†	100	80**	7	-	35† at 10	0.025	75		4
2N718A	P	500	60†	75	50**	7	-	40† at 150	0.1	60		4
2N871	P	500	60†	100	80**	7	-	100† at 150	0.01	75		4
2N910	P	500	60†	100	80**	7	-	75† at 10	0.025	75		4
2N956	P	500	70†	75	50**	7	-	100† at 150	0.1	60		4
2N696	P	600	40†	60	40**	5	-	20† at 150	1.0	30		2
2N697	P	600	50†	60	40**	5	-	40† at 150	1.0	30		2
2N699	P	600	50†	120	80**	5	-	40† at 150	1.0	60		2
2N1420	P	600	50†	60	30**	5	-	100† at 150	1.0	30		2
2N698	P	800	40†	120	80**	7	-	20† at 150	0.01	75		2
2N1975	P	800	40†	100	80**	7	-	15† at 10	0.025	75		2
2N1889	P	800	50†	100	80**	7	-	40† at 150	0.01	75		2
2N1893	P	800	50†	120	100**	7	-	40† at 150	0.01	90		2
2N1974	P	800	50†	100	80**	7	-	35† at 10	0.025	75		2
2N1613	P	800	60†	75	50**	7	-	40† at 150	0.1	60		2
2N1890	P	800	60†	100	80**	7	-	100† at 150	0.01	75		2
2N1973	P	800	60†	100	80**	7	-	75† at 10	0.025	75		2
2N1711	P	800	70†	75	50**	7	-	100† at 150	0.1	60		2

† Minimum value
** V_{CER}

JOSEPH LUCAS (ELECTRICAL) Ltd.

Current Types

DT1602	DJ	100	-	75	75	1	25	5† at 3	100	75	Driving and coupling in cold cathode counting circuits	2
DT1603	DJ	100	-	150	150	1	25	5† at 3	100	150		2
DT1612	DJ	100	-	75	75	1	25	20† at 3	100	75		2
DT1613	DJ	100	-	150	150	1	25	20† at 3	100	150		2

(Continued)

Type	Construction	P_c Max. (mW)	Typical f_T (or * f_1) (Δ fab) Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
JOSEPH LUCAS (ELECTRICAL) Ltd. *(Continued)*												
Current Types (Continued)												
DT1610	DJ	600	0.5Δ	25	15	4	250	80 at 200	8	25	General purpose	2
DT1003	DJ	600	1Δ	200	200	5	300	24 at 200	50	200	General purpose, high voltage	2
DT1510	DJ	800	1Δ	30	20	8	1A	25 at 300	4	30		2
DT1511	DJ	800	1Δ	60	40	8	1A	25 at 300	4	60		2
DT1512	DJ	800	1Δ	100	70	8	1A	25 at 300	4	100		2
DT1520	DJ	800	2Δ	30	20	8	1A	120 at 300	4	30		2
DT1521	DJ	800	2Δ	60	40	8	1A	120 at 300	4	60		2
DT1522	DJ	800	2Δ	100	70	8	1A	120 at 300	4	100		2
DT1110	DJ	1W	1.5Δ	30	30	10	1A	45 at 300	2	30		2
DT1111	DJ	1W	1.5Δ	60	60	10	1A	45 at 300	2	60		2
DT1112	DJ	1W	1.5Δ	100	100	10	1A	45 at 300	2	100		2
DT1120	DJ	1W	2.5Δ	30	30	10	1A	60 at 300	2	30		2
DT1121	DJ	1W	2.5Δ	60	60	10	1A	60 at 300	2	60	General purpose	2
DT1122	DJ	1W	2.5Δ	100	100	10	1A	60 at 300	2	100		2
DT3200	DJ	15W	0.5	45	30	8	5A	30 at 3A	25	45		6
DT3201	DJ	15W	0.5	80	60	8	5A	30 at 3A	25	80		6
DT4110	DJ	30W	0.5Δ	45	30	8	5A	35 at 1.5A	15	45		1
DT4111	DJ	30W	0.5Δ	80	60	8	5A	35 at 1.5A	15	80		1
DT4112	DJ	30W	0.5Δ	120	100	8	5A	35 at 1.5A	15	120		1
DT4120	DJ	30W	0.5Δ	45	30	8	5A	50 at 1.5	15	45		1
DT4121	DJ	30W	0.5Δ	80	60	8	5A	50 at 1.5	15	80		1
DT4122	DJ	30W	0.5Δ	120	100	8	5A	50 at 1.5	15	120		1
DT6103	DJ	50W	5	200	135	5	10A	17 at 5A	10mA	200		8
DT1604	DJ	50W	5	300	200	5	10A	17 at 5A	10mA	300		8
DT6105	DJ	50W	5	400	265	5	10A	17 at 5A	10mA	400	High voltage, high power	8
DT6106	DJ	50W	5	500	325	5	10A	17 at 5A	10mA	500		8
MULLARD												
Current Types												
BFY10	M	260φ	100*	45	-	5	50	40 at 10	2	20		2
BFY11	M	260φ	100*	45	-	5	50	80 at 10	2	20	R.F. amplifiers	2
BSY10	M	260φ	100*	60	-	5	50	65 at 10	2	20		2
BSY11	M	260φ	100*	45	-	5	50	90 at 10	2	20	Switching	2
BSY38	PE	300	350	20	-	5	100	45 at 10	-	-		4
BSY39	PE	300	350	20	-	5	100	80 at 10	-	-	High speed logic	4
2N706	PE	300	-	25	-	3	-	20 at 10	0.5	15		4
2N743	PE	300	-	20	-	-	200	40 at 10	1	20		4
2N744	PE	300	-	20	12	5	200	80 at 10	1	20	Very high speed saturated switching	4
2N929	PE	300	-	45	45	5	30	225 at 10	0.01	45		4
2N930	PE	300	80	45	45	5	30	400 at 10	0.01	45	Low noise amplifiers	4
2N919	PE	360	-	25	15	5	220	40 at 10	0.02	15		
2N920	PE	360	-	25	15	5	220	80 at 10	0.02	15	High speed saturated switching	4
2N708	PE	360	-	40	15	-	-	75 at 10	0.025	20	H.F. amplifiers	4
BFY51	PE	800	>50	60	30	6	1A	70 at 150	0.05	40		3
BFY52	PE	800	>50	40	20	6	1A	130 at 150	0.05	30	General purpose,	3
BFY50	PE	800	>60	80	35	6	1A	55 at 150	0.05	60	control, switching	3
2N2297	PE	800	>60	80	35	7	1A	80 at 150	-	-		2
BDY10	AD	130WΨ	2*	50	-	5	2A	30 at 2A	30mA§	50		1
BDY11	AD	130WΨ	2*	100	-	5	2A	30 at 2A	30mA§	100	High power	1

Ψ $T_{case} < 45^{o}C$

φ $T_{amb} = 45^{o}C$

§ $T_{junction} = 175^{o}C$

Type	Construction	P_c Max. (mW)	Typical f_T {or * f_1} {Δfa^b} Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
SEMICONDUCTORS LTD												
Current Types												
2N918	PE	200	600†	30	15	3	-	6*†at 4	0.01	30	R.F. amplifiers	4
2N929	PE	300	30†	45	45	5	-	40† at 10	-	-	Low noise amplifiers	4
2N930	PE	300	30†	45	45	5	-	100† at 10	-	-		4
ST54	PE	300	50†	20	20	5	-	35† at 10	0.05	20		4
2N706	PE	300	200†	25	-	3	-	20† at 10	0.05	25		4
BSY26	PE	300	200†	20	15	6	-	20† at 10	0.025	20	Fast logic	4
BSY27	PE	300	200†	20	15	6	-	40† at 10	0.025	20		4
ST51	PE	300	200†	25	15	6	100	40† at 10	0.05	25		4
STO1	PE	300	250†	35	14	5	-	35† at 10	0.05	35	General purpose	4
BSY28	PE	300	300†	15	12	3	-	20† at 10	0.05	15		4
BSY29	PE	300	300†	15	12	3	-	40† at 10	0.05	15		4
ST50	PE	300	300†	25	12	5	-	30† at 10	0.025	25	Fast logic	4
ST53	PE	300	300†	25	12	5	-	40† at 10	0.025	25		4
ST55	PE	300	300†	40	15	6	-	40† at 10	0.025	40		4
SPC40	PE	360	-	25	10	6	-	- -	0.05	25		4
SPC42	PE	360	-	25	10	6	-	- -	0.05	25		4
SPC50	PE	-	-	20	10	6	50	- -	-	-	Choppers	4
SPC51	PE	-	-	20	10	6	50	- -	-	-		4
SPC52	PE	-	-	20	10	6	50	- -	-	-		4
STO6	PE	360	100†	50	35	5	-	80† at 10	0.02	50	General purpose	4
2N708	PE	360	300†	40	20	5	-	30† at 10	0.025	40	Fast logic	4
2N914	PE	360	300†	40	20	5	-	30† at 10	0.025	40	Fast amplifiers	4
STO2	PE	360	300†	40	20	5	-	20† at 10	0.02	40		4
STO3	PE	360	300†	40	20	5	-	20† at 10	0.02	40	General purpose	4
STO4	PE	360	300†	40	20	5	-	40† at 10	0.02	40		4
STO5	PE	360	300†	40	20	5	-	100† at 10	0.02	40		4
ST60	PE	360	500†	40	15	5	-	30† at 10	0.05	40		4
ST61	PE	360	500†	40	15	5	-	20† at 10	0.05	40	Fast logic	4
ST62	PE	360	500†	40	15	5	-	40† at 10	0.05	40		4
ST80	PE	360	550†	40	15	5	200	25† at 10	-	-		4
ST70	PE	360	600†	30	15	3	-	6*†at 4	0.01	30	High frequency	4
ST160	PE	600	50†	40	20	5	-	30† at 150	0.05	40		2
ST161	PE	600	50†	40	20	5	-	20† at 150	0.05	40		2
ST162	PE	600	50†	40	20	5	-	40† at 150	0.05	40		2
ST163	PE	600	50†	40	20	5	-	20† at 150	0.05	40	High current switching	2
2N696	PE	600	60†	60	-	5	-	20† at 150	0.01	60		2
2N697	PE	600	60†	60	-	5	-	40† at 150	0.01	60		2
2N1420	PE	600	60†	60	-	5	-	100† at 150	0.01	60		2
ST150	PE	600	60†	60	-	5	-	20† at 150	0.01	60		2
ST151	PE	600	60†	60	25	5	-	20† at 150	0.01	60		2
ST152	PE	600	60†	60	20	5	-	20† at 150	0.01	60		2
ST153	PE	600	60†	60	15	5	-	20† at 150	0.01	60	Core drivers	2
ST154	PE	600	60†	40	30	5	-	20† at 150	0.01	40		2
ST155	PE	600	60†	40	25	5	-	20† at 150	0.01	40		2
ST156	PE	600	60†	40	20	5	-	20† at 150	0.01	40		2
ST157	PE	600	60†	40	15	5	-	20† at 150	0.01	40		2
ST180	PtD	600	200†	90	75	5	-	20† at 50	0.05	90		2
ST181	PtD	600	200†	90	75	5	-	40† at 50	0.05	90		2
ST182	PtD	600	200†	90	75	5	-	100† at 50	0.05	90	High current switching	2
ST185	PtD	600	200†	100	100	5	-	20† at 50	0.05	100		2
ST186	PtD	600	200†	100	100	5	-	40† at 50	0.05	100		2
ST187	PtD	600	200†	100	100	5	-	100† at 50	0.05	100		2

† Minimum value

S.G.S. FAIRCHILD

Current Types

2N917	P	200	800	30	15	3	-	20† at 3	0.001	15	Very high speed switching,	27

(Continued)

Type	Construction	P_c Max. (mW)	Typical f_T (or * f_1) / $\Delta f a_b$ Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
S.G.S. FAIRCHILD *(Continued)*												
Current Types (Continued)												
C112	DP	300	320	25	12	4	-	30 at 10	0.05	15		4
C111	P	300	350	25	12	4	-	80 at 10	0.05	15	Logic switches	4
C111E	PE	300	350	25	12	5	-	70 at 10	0.05	15		4
C444	DP	300	350	50	35	4	-	100 at 10	0.025	30		4
2N3337	P	300	500	40	40**	4	-	30† at 4	0.025	40		4
2N3338	P	300	500	40	40**	4	-	30† at 4	0.025	40	Small signal, tuned R.F. and I.F. amplifiers	4
2N3339	P	300	500	40	40**	4	-	30† at 4	0.025	40		4
BFY79	P	300	500	30	30	4	-	50 at 4	0.025	20	I.F. - A.G.C. amplifiers	4
P346A	PE	300	550	25	12	4	-	60 at 25	0.25	5		4
2N2475	P	300	600	15	6	4	-	30† at 20	0.05	5	Ultra fast switching	4
2N2616	PE	300	600†	30	15	3	-	20† at 3	0.001	15	V.H.F., U.H.F., oscillators	4
2N2729	PE	300	600	30	15	3	-	20† at 3	0.01	15	or amplifiers	4
2N709	D	300	800	15	6	4	-	20† at 10	0.05	5	Ultra fast switching	4
BSX27	PE	300	800	15	6	4	-	80 at 10	0.10	5	High speed saturated switching	4
FT709	PE	300	800	15	6	4	-	30† at 10	0.05	5		4
BFY78	PE	300	900	25	12	3	50	50 at 3	0.02	12	U.H.F. amplifiers and oscillators	4
BFY76	P	360	55	45	45	6	50	140 at 100μA	0.02	30	Low level, low noise amplifiers	4
BFY77	P	360	55	45	45	6	50	375 at 100μA	0.02	30		4
2N2483	P	360	60†	60	60	6	-	40† at 0.01	0.01	45		4
2N2484	P	360	60	60	60	6	-	100† at 10	0.01	45	Low noise amplifiers	4
2N3117	P	360	120	60	60	6	-	250† at 10	0.01	30		4
2N915	P	360	350	70	50	5	-	40† at 10	0.01	60	High frequency amplifiers, switching	4
2N2845	PE	360	350	60	30	5	-	20† at 500	0.2	30	High speed saturated logic	4
2N2847	PE	360	350	60	24	5	-	30† at 500	0.2	30	switches and memory driver	4
C63	PE	360	360	60	45	5	-	75 at 10	0.01	45		4
C64	PE	360	360	60	45	5	-	114 at 10	0.01	45		4
C65	PE	360	360	80	60	5	-	75 at 10	0.01	45	V.H.F. amplifiers and	4
C66	PE	360	360	80	60	5	-	114 at 10	0.01	45	oscillators	4
BFY74	P	360	360	60	45	5	-	75 at 10	0.01	45		4
BFY75	P	360	360	60	45	5	-	114 at 10	0.01	45		4
2N914	PE	360	370	40	20**	5	-	30† at 10	0.025	20	High speed saturated logic switches and memory drivers	4
2N916	P	360	400	45	25	5	-	50† at 10	0.01	30	High frequency amplifiers, oscillators	4
2N3301	PE	360	400	60	30	5	-	100† at 150	0.01	60		4
2N3302	PE	360	400	60	30	5	-	100† at 150	0.01	60		4
2N708	P	360	450	40	20**	5	-	30† at 10	0.025	20	High speed switching	4
2N2368	PE	360	550	40	15	5	-	20† at 10	0.004	20		4
BSX26	PE	360	550	40	15	4	-	60† at 30	0.50	20	High speed saturated switching	4
2N3013	PE	360	550	40	15	4	-	30† at 30	0.3	20	Memory applications to	12
2N3014	PE	360	550	40	20	5	-	30† at 30	0.3	20	500mA	12
2N2369	PE	360	650	40	15	4.5	-	40† at 10	0.4	20	High speed saturated switching, small signal R.F. circuits	4
BSX28	PE	360	650	30	12	4.5	-	70† at 30	0.40	20	High speed saturated switching	4
2N2369A	PE	360	675	40	15	4.5	-	40† at 10	0.4	20	High speed saturated switching, small signal R.F. circuits	4
FM870	P	375	80	100	80**	7	-	40† at 150	0.01	50		5
FM871	P	375	100	100	80**	7	-	100† at 150	0.01	50	High voltage amplifiers	5
2N718	P	400	80	60	40**	5	-	40† at 150	1	30	General purpose	4
C400	PE	400	80	60	30	4	-	70 at 50	0.10	40	Amplifiers, switching	4
2N912	P	500	60	100	80**	7	-	18† at 1	0.025	75	Small signal amplifiers	4
2N719A	P	500	70	120	80**	7	-	20† at 150	0.01	75	General purpose	4
2N911	P	500	70	100	80**	7	-	36† at 1	0.025	75	Small signal amplifiers	4
2N718A	P	500	80	75	50**	7	-	35† at 10	0.01	60		4
2N720A	P	500	80	120	100**	7	-	35† at 10	0.01	90	General purpose, amplifiers	4
2N870	P	500	80	100	80**	7	-	35† at 10	0.01	75	and high speed switching	4
2N910	P	500	80	100	80**	7	-	76† at 1	0.025	75	Small signal amplifiers	4
2N2645	P	500	86	75	50**	5	-	100† at 300	0.01	60	Low noise amplifiers	4
2N871	P	500	100	100	80**	7	-	100† at 150	0.01	50	Large signal amplifiers	4
2N956	P	500	100	75	50**	7	-	35† at 0.1	0.01	60	Very high gain	4
2N696	P	600	60	60	40**	5	-	20† at 150	1	60	General purpose	2

(Continued)

Type	Construction	P_c Max. (mW)	Typical f_T {or * f_1} {Δfab} Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.

S.G.S. FAIRCHILD *(Continued)*

Current Types (Continued)

2N697	P	600	80	60	40**	5	-	40 † at 150	1	30	General purpose	2
2N699	P	600	80	120	80**	5	-	40 † at 150	2	60	Video amplifiers	2
2N3303	PE	600	500	25	12	4	-	30 † at 300	100	25	High speed switching	-
BSX12	PE	600	650	25	12	4	1A	50 at 100	100	15	High speed switching	-
2N3137	PE	600	750	40	30	4	-	20 † at 50	50	40	Class C, R.F. power amplifiers	2
BFY63	PE	600	750	30	15	4	-	70 at 50	0.05	20	Class C, R.F. power amplifiers	2
2N497	P	800	50	60	60	8	-	12 † at 200	10	30	General purpose, fast switching	2
2N498	P	800	50	100	100	8	-	12 † at 200	10	30	General purpose, fast switching	2
2N656	P	800	70	60	60	8	-	30 † at 200	10	30	General purpose, fast switching	2
BFY57	PE	800	55	125	125	5	-	60 at 30	0.10	75	High voltage amplifiers	2
2N657	P	800	70	100	100	8	-	30 † at 200	10	30	General purpose, fast switching	2
2N698		800	70	120	80**	7	-	20 † at 150	0.005	75	Video amplifiers, oscillators	2
2N1893	P	800	70	120	100	7	-	35 † at 10	0.01	90	Video amplifiers, oscillators	2
2N1974	P	800	70	100	80**	7	-	36 † at 1	0.025	75	Small signal amplifiers	2
C420	P	800	70	60	28	7	-	75 at 50	0.02	30		2
C425	P	800	70	75	60	7	-	100 at 50	0.02	60		2
2N1613	P	800	80	75	50**	7	-	20 † at 0.1	10	60	Fast switching (logic and high current)	2
2N1973	P	800	80	100	80**	7	-	76 † at 1	0.025	75	Small signal amplifiers	2
2N2443	P	800	80	120	100	7	-	50 † at 50	0.010	90	General purpose	2
C426	PE	800	80	60	30	5	-	70 at 150	0.10	50		2
2N2049	P	800	86	75	50**	7	-	100 † at 150	0.010	60	High gain, low noise	2
BFY56	P	800	86	80	45	5	-	70 at 150	0.05	50	Amplifiers, switching	2
2N2297	PE	800	90	80	35	7	-	40 † at 150	0.010	60	General purpose	2
2N1711	P	800	100	75	50**	7	-	35 † at 0.1	0.010	60	High gain	2
2N3108	PE	800	100	100	60**	7	-	40 † at 150	-	100	Medium speed, saturated switching	2
2N3110	PE	800	100	80	40**	7	-	40 † at 150	-	80	Medium speed, saturated switching	2
2N3114	P	800	100	150	150**	5	-	15 † at 0.1	0.01	75	Video amplifiers	2
BSX30	PE	800	330	60	30	5	-	65 at 150	0.20	30	High speed saturated switching	2
2N2846	PE	800	350	60	30	5	-	30 † at 150	0.2	30	High speed switching, memory drivers	2
2N2848	PE	800	350	60	20	5	-	40 † at 150	0.2	30	High speed switching, memory drivers	2
BFY72	PE	800	350	50	28	5	-	100 at 150	0.02	40	High speed switching and amplifiers	2
2N3299	PE	800	400	60	30	5	-	40 † at 150	0.01	60	High speed switching	2
2N3300	PE	800	400	60	30	5	-	40 † at 150	0.01	60	High speed switching	2
2N2883	PE	800	500	40	20	4	-	20 † at 100	0.5	20	High frequency amplifiers, oscillators	2
2N2884	PE	800	500	40	20	4	-	20 † at 100	0.5	20	High frequency amplifiers, oscillators	2
2N699B	P	870	70	120	100**	7	-	35 † at 10	0.01	90	Video amplifiers, oscillators	2

† Minimum value

** V_{CER}, $R_{BE} \leq 10\Omega$

S.T.C.

Current Types

BFY 22 (yellow)	EP	50φ	20	5	5	3	50	60 at 0.2	15	2	Sub-miniature hearing aids, etc. Colour spot indicates emitter lead	-
BFY 23 (red)	EP	50φ	20	5	5	3	50	110 at 0.2	15	2	Sub-miniature hearing aids, etc. Colour spot indicates emitter lead	-
BFY 24 (blue)	EP	50φ	20	5	5	3	50	100 at 0.2	15	2	Sub-miniature hearing aids, etc. Colour spot indicates emitter lead	-
BFY 29 (orange)	EP	50φ	20	45	30	5	50	60 at 0.2	15	2	Sub-miniature hearing aids, etc. Colour spot indicates emitter lead	-
BFY 30 (white)	EP	50φ	20	45	30	5	50	110 at 0.2	15	2	Sub-miniature hearing aids, etc. Colour spot indicates emitter lead	-
2N 929	P	300	30*	45	45	5	30	60* † at 1.0	0.010	45	Low noise amplifiers	4
2N 930	P	300	30*	45	45	5	30	150* † at 1.0	0.010	45	Low noise amplifiers	4
2N 706	P	300	200*	25	20	3	50	20 at 10	0.5	15	High speed switching	4
2N 706A	P	300	200*	25	15	5	50	60 at 10	0.5	15	High speed switching	4

(Continued)

Type	Construction	P_c Max. (mW)	Typical f_T or * f_1 or Δfab Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
S.T.C.												
Current Types (Continued)												
2N 753	P	300	200*	25	15	5	50	120 at 10	0.5	15	High speed switching	4
BFY 18	P	300	200*	40	25	3	100	64 * at 10	0.01	9	Wide band video, R.F. amplifiers	4
BSY 26	EP	300	200*	20	15	6	100	32 at 10	10	9		4
BSY 27	EP	300	200*	20	15	6	100	55 at 10	10	9	High speed logic	4
2N 743	EP	300	300*	20	12	5	200	60 at 10	1	20		4
2N 744	EP	300	300*	20	12	5	200	120 at 10	1	20		4
BFY 19	P	300	300*	30	20	3	100	110 * at 10	0.025	9	Wide band video, R.F. amplifiers	4
BSY 28	EP	300	300*	15	12	3	100	34 at 10	10	9	High speed logic	4
BSY 29	EP	300	300*	15	12	3	100	54 at 10	10	9		4
BFY 26	P	360	200*	60	40	6	200	60 at 10	0.010	9	Wide band video, R.F. amplifiers	4
2N 708	RP	360	300*	40	15	5	100	120 at 10	0.025	20	High speed logic	4
2N 914	EP	360	300*	40	15	5	-	120 at 10	0.025	20		4
2N 2236	EP	600	50*	40	20	6	500	15 † at 100	0.050	9	Fast switching	2
BSY 24	EP	600	50*	40	20	6	500	30 * at 20	0.05	9	Core drivers, oscillators	2
2N2237	EP	600	100*	40	20	6	500	40 † at 100	0.050	9	Fast switching	2
BSY 25	EP	600	100*	40	20	6	500	60 * at 20	0.05	9	Core drivers, oscillators	2
BFY 17	P	600	200*	40	25	3	100	64 * at 10	0.01	9	D.C., V.H.F. amplifiers	2
BFY 20	P	600	200*	40	15	3	100	10 † at 0.1	0.010	-	Double transistor amplifiers	2
BFY 25	P	600	200*	60	40	6	200	60 at 10	0.010	9	D.C., V.H.F. amplifiers	2
2N 1893	P	800	50*	120	80	7	500	45*† at 5.0	0.010	90	General purpose	2
2N 1613	P	800	80	75	50	7	500	30*† at 1.0	0.010	60		2
2N 1711	P	800	100	75	50	7	500	115 * at 1.0	0.010	60		2
BSY 51	EP	800	100†	60	25	5	750	80 at 150	0.1	30		2
BSY 53	EP	800	100†	75	30	7	750	80 at 150	0.01	60		2
BSY 55	EP	800	100†	120	80	7	750	80 at 150	0.01	90		2
BSY 87	EP	800	100†	100	60	7	750	80 at 150	0.01	75		2
BSY 81	EP	800	100†	40	18	5	1A	80 at 150	0.1	30		2
BSY 83	EP	800	100†	80	35	7	1A	80 at 150	0.01	60	Fast switching, amplifiers,	2
BSY 85	EP	800	110†	120	64	7	1A	80 at 150	0.01	90	oscillators	2
BSY 52	EP	800	120†	60	25	5	750	200 at 150	0.1	30		2
BSY 88	EP	800	120†	100	60	7	750	200 at 150	0.01	75		2
BSY 82	EP	800	120†	40	18	5	1A	200 at 150	0.1	30		2
BSY 84	EP	800	120†	80	35	7	1A	200 at 150	0.01	60		2
BSY 86	EP	800	130†	120	64	7	1A	200 at 150	0.01	90		2
BSY 54	EP	800	150†	75	30	7	750	200 at 150	0.01	60		2
3TE 160	EP	3WΨ	200†	90	80	5	0.6A	>10 at 0.5A	10	-	Power amplifiers	2
3TE 150	EP	7.5WΨ	200†	90	80	5	0.6A	>10 at 0.5A	10	-		11
3TE 260	EP	3WΨ	250	80	80	4	600	>10 at 500	10	70	R.F. amplifiers	2
3TE 250	EP	7.5WΨ	250	80	80	4	600	10 at 500	10	70		11
3TE 350	EP	7.5WΨ	400	70	40	4	Min. power gain: 3dB at 400 Mc/s				Power amplifiers	11
3TE 450	EP	7.5WΨ	400	70	70	4	Min. power gain: 8dB at 400 Mc/s					Strip-line
2N 2234	EP	10WΨ	50*	40	20	6	500	10*† at 20	0.050	9		1
BUY 10	EP	10WΨ	50*	40	20	6	500	30 * at 20	0.05	9		1
2N 2235	EP	10WΨ	100*	40	20	6	500	20*† at 20	0.050	9	R.F. amplifiers	1
BUY 11	EP	10WΨ	100*	40	20	6	500	60 * at 20	0.05	9		1
BLY 15	EP	11WΨ	250†	64	64	3	1.5A	>10 at 1.0A	10	40		1
3TE 140	EP	20WΨ	260	90	80	4	1.5A	>20 at 500	10	80		30
BLY 12	EP	25WΨ	60*	60	30	4	1.5A	30 † at 2A	100	50		1
3TE 240	EP	25WΨ	270	80	80	4	3A	>10 at 1.5A	10	70		30
3TE 230	EP	48WΨ	270	80	80	4	4A	>10 at 1.5A	10	70	Power amplifiers	30
3TE 220	EP	60WΨ	200	80	80	4	5A	>10 at 4.5A	10	70		30
3TE 130	EP	60WΨ	260	90	80	4	5A	>20 at 1A	10	80		30
3TE 120	EP	120WΨ	260	90	80	4	12A	>10 at 10A	10	80		30

† Minimum value

ϕ $T_{amb} = 45^{\circ}C$

Ψ $T_{case} = 25^{\circ}C$

Type	Construction	P_c Max. (mW)	Typical f_T or * f_1 or Δfab Mc/s	Absolute Max. Ratings V_{CBO} (V)	V_{CEO} (V)	V_{EBO} (V)	I_C (mA)	Typical h_{FE} at (mA) (or * h_{fe})	Max I_{CBO} at V_{CB} (μA)	(V)	Application	Base Ref.
TEXAS												
Current Types												
2N918	PE	200	600†	30	15	3	50	20 † at 3	-	-	High frequency amplifiers	4
2N2865	PE	200	600†	25	13	3	50	20*† at 4	-	-		4
2N2432	PE	300	20†	30	30	15	100	50 † at 1	-	-	Choppers, offset voltage < 500 μV	4
2N929	P	300	30†	45	45	5	30	40 † at 0.01	-	-	Low level, low noise amplifiers	4
2N930	P	300	30†	45	45	5	30	100 † at 0.01	-	-		4
2S501	P	300	30†	25	25	5	30	40 † at 0.01	-	-		4
2S502	P	300	30†	25	25	5	30	100 † at 0.01	-	-		4
2S503	P	300	30†	25	25	5	30	180 † at 0.01	-	-		4
2N706	PE	300	200†	25	20	3	200	20 † at 10	-	-	Fast switching	4
2N706A	PE	300	250†	25	20	5	200	20 † at 10	-	-		4
2N743	PE	300	250†	20	12	5	200	20 † at 10	-	-		4
2N744	PE	300	250†	20	12	5	200	40 † at 10	-	-		4
2N753	PE	300	250†	25	20	5	200	40 † at 10	-	-		4
2S512	PE	300	250†	25	20	5	200	50 † at 10	-	-		4
2N916	PE	360	300†	45	25	5	100	50 † at 10	-	-	High frequency amplifiers	4
2N2368	PE	360	400†	40	15	4.5	500	20 † at 10	-	-	Fast switching	4
2N2369	PE	360	500†	40	15	4.5	500	40 † at 10	-	-		4
2N2369A	PE	360	500†	40	15	4.5	500	40 † at 10	-	-		4
2S731	P	400	30†	30	30	3	50	20*† at 5	-	-	High frequency amplifiers	4
2S732	P	400	30†	30	30	3	50	40*† at 5	-	-		4
2S733	P	400	30†	30	30	3	50	80*† at 5	-	-		4
2S102	P	400	150†	60	60	4.5	50	20*† at 5	-	-		4
2S103	P	400	150†	60	60	4.5	50	40*† at 5	-	-		4
2S104	P	400	150†	60	60	4.5	50	80*† at 5	-	-		4
2N2220	PE	500	250†	60	30	5	800	20 † at 150	-	-	High frequency, medium power	4
2N2221	PE	500	250†	60	30	5	800	40 † at 150	-	-		4
2N2222	PE	500	250†	60	30	5	800	100 † at 150	-	-		4
2N2539	PE	500	250†	60	30	5	800	50*† at 150	-	-		4
2N2540	PE	500	250†	60	30	5	800	100*† at 150	-	-		4
2N696	P	600	40†	60	40	5	500	20 † at 150	-	-	Medium power, high voltage	2
2N697	P	600	50†	60	40	5	500	40 † at 150	-	-		2
2N698	P	800	40†	120	80	7	500	20 † at 150	-	-		2
2N1507	P	800	50†	60	30	5	1A	100 † at 150	-	-		2
2N1889	P	800	50†	100	60	7	500	40 † at 150	-	-		2
2N1893	P	800	50†	120	80	7	590	40 † at 150	-	-		2
2N2192	PE	800	50†	60	40	5	1A	100 † at 150	-	-		2
2N2192A	PE	800	50†	60	40	5	1A	100 † at 150	-	-		2
2N2193	PE	800	50†	80	50	8	1A	40 † at 150	-	-		2
2N2193A	PE	800	50†	80	50	8	1A	40 † at 150	-	-		2
2N2194	PE	800	50†	60	40	5	1A	20 † at 150	-	-		2
2N2194A	PE	800	50†	60	40	5	1A	20 † at 150	-	-		2
2N2243	PE	800	50†	120	80	7	1A	20 † at 150	-	-		2
2N2243A	PE	800	50†	120	80	7	1A	40 † at 150	-	-		2
2N3036	PE	800	50†	120	80	7	1.2A	50 † at 150	-	-		2
2N1613	P	800	60†	75	50	7	500	40 † at 150	-	-		2
2N1890	P	800	60†	100	60	7	500	100 † at 150	-	-		2
2N1711	P	800	70†	75	50	7	1A	100 † at 150	-	-		2
2N2217	PE	800	250†	60	30	5	800	20 † at 150	-	-	High frequency, medium power	2
2N2218	PE	800	250†	60	30	5	800	40 † at 150	-	-		2
2N2219	PE	800	250†	60	30	5	800	100 † at 150	-	-		2
2N2537	PE	800	250†	60	30	5	800	50 † at 150	-	-		2
2N2538	PE	800	250†	60	30	5	800	100 † at 150	-	-		2
2S024	DM	100WΨ	10†	100	100	10	7.5A	20 † at 2A	-	-	High power	18
2S025	DM	100WΨ	10†	150	150	10	7.5A	20 † at 2A	-	-		18
2S026	DM	100WΨ	10†	200	200	10	7.5A	20 † at 2A	-	-		18

Ψ T_{case} = 25°C
† Minimum value

SEMICONDUCTOR SIGNAL DIODES

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
A.E.I.									
Current Types									
CG60H	Germanium point-contact	150	3	1	10	10	17	Detectors, modulators, frequency converters, pulse separators	A25
CG61H		100	3	1	10	10	13		A25
CG62H		100	3	1	20	10	13		A25
CG63H		100	3	1	40	10	13		A25
CG64H		45	3	1	200	10	13		A25
CG80H	Germanium gold-bonded	100	-	-	10	10	70	Rectification efficiency 50%	A25
CG81H		75	-	-	10	10	75	High speed switching	A25
CG82H		50	-	-	10	10	77		A25
CG83H		25	-	-	10	10	80		A25
CG84H		12	-	-	10	10	90		A25
CG85H		12	-	-	10	10	90		A25
CG90H		25	-	-	7	10	80		A25
CG91H		20	-	-	9	10	50		A25
CG92H		10	-	-	10	10	50	Very high speed switching	A25
CG94H		10	-	-	15	10	80		A25
BRIMAR									
Current Types									
BY124	Silicon junction	50	700	1.2	0.5	50	100	Low voltage rectifier circuits	C13
BY125		200	700	1.2	1	200	100	Rectifier circuits	C13
FERRANTI									
Obsolete Types									
DS1E	Silicon pnpn	†	-	-	1	10	2	Fast switching. High speed relays, pulse generators	C1
DS1F		†	-	-	1	10	10		C1
DS1G		†	-	-	1	10	25		C1
DS6A		80††	-	-	-	-	5		C2
DS6B		80††	-	-	-	-	25		C2
DS6C		80††	-	-	-	-	50		C2
DS8A		100††	-	-	-	-	5		C2
DS8B		100††	-	-	-	-	25		C2
DS8C		100††	-	-	-	-	50		C2
DS10A		120††	-	-	-	-	5		C2
DS10B		120††	-	-	-	-	25		C2
DS10C		120††	-	-	-	-	50		C2
ZS10C	Silicon junction	60	-	-	5	50	100	General purpose	C2
Replacement Types									
ZS7	Silicon junction	30	-	-	0.1	30	100	General purpose, magnetic amplifiers	C2
ZS8		30	-	-	0.005	30	100		C2
DS2	Silicon pnpn	†	-	-	1	10	15*	Fast switching. 'Off' current = 0.5μA at 80V	C3
DS3		†	-	-	1	10	20*		C3
Current Types									
ZS10A	Silicon junction	60	-	-	0.05	60	100	General purpose, low capacitance. Good frequency responce to 200 kc/s	C2
ZS10B		60	-	-	0.5	60	100		C2
ZS20A		120	-	-	0.05	120	100		C2
ZS20B		120	-	-	0.5	120	100		C2

(Continued)

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
FERRANTI *(Continued)*									
Current Types (Continued)									
ZS21	Silicon junction	200	-	-	0.5	200	100	General purpose, low capacitance. Good frequency responce to 200 kc/s	C2
ZS22		300	-	-	0.5	300	100		C2
ZS24		400	-	-	0.5	400	100		C2
ZS40	Silicon junction	25	-	-	0.5	25	25	High speed logic, rectifiers	C2
ZS41		50	-	-	0.5	50	25		C2
ZS42		100	-	-	0.5	100	25		C2
ZS50	Silicon junction	60	-	-	0.5	60	200	General purpose, low capacitance	C2
ZS51		120	-	-	0.5	120	200		C2
ZS52		200	-	-	0.5	200	200		C2
ZS53		300	-	-	0.5	300	200		C2
ZS90	Silicon junction	50	-	-	0.25	50	250	Special quality for magnetic amplifiers, demodulators	A1
ZS91		100	-	-	0.25	100	250		A1
ZS92		200	-	-	0.25	200	250		A1
ZS94		400	-	-	0.25	400	250		A1
ZS120	Silicon junction	50	-	-	5.0	50	250	General purpose	A1
ZS121		100	-	-	5.0	100	250		A1
ZS122		200	-	-	5.0	200	250		A1
ZS123		300	-	-	5.0	300	250		A1
ZS124		400	-	-	5.0	400	250		A1
ZS130	Silicon alloyed	50	-	-	0.1	50	250	High speed logic, core driving	A1
ZS131		50	-	-	0.1	50	250		A1
ZS132		100	-	-	0.5	100	250		A1
ZS133		70	-	-	0.1	70	250		A1
ZS140	Silicon planar-epitaxial	15	-	-	0.1	15	250	Very high speed switching	A1
ZS141		50	-	-	0.1	50	250		A1
ZS142		30	-	-	0.1	30	250		A1
ZS143		75	-	-	0.1	75	250		A1
ZS150	Silicon planar-epitaxial	50	-	-	0.001	50	250	High temperature operations	A1
ZS151		100	-	-	0.001	100	250		A1
ZS152		50	-	-	0.005	50	250		A1
ZS153		100	-	-	0.005	100	250		A1
ZS154		50	-	-	0.1	50	250		AI
ZS155		100	-	-	0.1	100	250		AI
ZW2	Silicon junction	10	-	-	0.5	10	100	Surge limiter	C2

† Trigger voltage 90 to 125V
†† Nominal trigger voltage (tolerance ± 10%)
* Sustaining current

HUGHES

Current Types

1N133		5	3	0.5	300	5	-		A1
HG5085		5	-	-	-	-	-		A1
HD1842		6	10	0.5	30	3	-		A1
HD1872	Germanium gold-bonded	6	10	0.46	30	3	-		A1
HD1812		10	10	0.5	20	-	-		A1
HD1871		10	-	-	20	5	-		A1
1N995		15	10	1	10	6	-		A1
HD1870		15	-	-	15	10	-		A1
HD5004	Silicon	15	2	1	1	1	12		A1
1N695	Germanium point-contact	20	-	-	2	10	100		A1
1N770	Germanium indium-bonded	20	15	0.5	15	10	40		A1

(Continued)

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
HUGHES *(Continued)*									
Current Types (Continued)									
HD1841	Germanium point-contact	20	–	–	20	10	–		A1
HD5000	Silicon alloyed	20	5	1	0.2	5	12		A1
HD5001		20	5	1	1	5	12		A1
1N283	Germanium point-contact	24	–	–	20	10	–		A1
HG5079	Germanium gold-bonded	25	10	0.46	40	12	50		A1
1N625	Silicon	30*	4	1.5	1	20	20		A1
1N835	Germanium	30	–	–	–	–	–		A1
1N3067	Silicon planar	30*	5	1	0.1	20	75		A1
1N3068		30*	5	1	0.1	20	75		A1
HD1811	Germanium point-contact	30	–	–	10	10	–		A1
HD1840		30	–	–	10	10	–		A1
HD4101	Germanium	30	10	1	20	10	30		A1
HG1090	Germanium point-contact	30	10	1	500	30	–		A1
HG5808	Germanium gold-bonded	30	100	1	500	30	–		A1
1N273	Germanium gold-bonded	32	100	1	20	20	80		A1
1N279		32	100	1	200	20	70		A1
1N456	Silicon diffused	35	40	1	0.025	25	90		A1
1N461		35	15	1	0.5	25	60		A1
1N482A	Silicon	36	–	–	0.025	30	200		A1
1N482B		36	–	–	0.025	30	200		A1
1N482		36	–	–	0.25	30	100		A1
1N251	Silicon	40**	5	1	0.2	10	75		A1
1N287	Germanium	40	20	1	1.5mA	50	–		A1
1N904	Silicon diffused	40	–	–	0.1	30	300		A1
1N907		40	–	–	0.1	30	300		A1
HG5007	Germanium gold-bonded	40	–	–	5	30	80		A1
HG5008		40	–	–	25	30	80		A1
HG5009		40	–	–	50	30	80		A1
1N139	Germanium gold-bonded	46	20	1	1.5mA	50	70		A1
1N54A	Germanium point-contact	50	5	1	7	10	50		A1
1N128		50	3	1	10	10	30		A1
1N903	Silicon diffused	50	–	–	0.1	40	300		A1
1N908		50	–	–	0.1	40	300		A1
1N626	Germanium point-contact	50*	4	1.5	1	20	20		A1
1N636		50	2.5	1	10	10	30		A1
HD1810		50	–	–	5	10	–		A1
HG5078	Germanium gold-bonded	50	10	0.46	50	25	60		A1
HS1004	Silicon alloyed	50	–	–	0.05	50	120		A1
HS1005		50	–	–	0.1	50	120		A1
HS1006		50	–	–	0.2	50	120		A1
HS1010		50	50	1	0.05	50	90		A1
HS1011		50	50	1	0.1	50	90		A1
HS1012		50	50	1	0.2	50	90		A1
HS1203	Silicon planar	50	30	1.5	0.1	50	60		A1
HS1206		50	15	1.5	0.1	50	40		A1
HS1209		50	5	1.5	0.1	50	30		A1
1N81A	Germanium point-contact	55	3	1	10	10	30		A1
1N278	Germanium gold-bonded	58	20	1	–	–	–		A1
1N34A	Germanium point-contact	60	5	1	30	10	50		A1
1N66		60	5	1	50	10	50		A1
1N90		60	5	1	500	50	30		A1
1N95		60	10	1	800	50	30		A1
1N96		60	20	1	500	50	30		A1
1N116		60	5	1	100	50	30		A1
1N117		60	10	1	100	50	30		A1
1N118		60	20	1	100	50	30		A1
1N119		60*	5	1	–	–	25		A1
1N120		60*	5	1	–	–	25		A1
1N126		60	5	1	850	50	30		A1
1N480		60*	5	1	–	50	35		A1
1N659	Silicon diffused	60*	6	1	5	60	100		A1

(Continued)

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
HUGHES *(Continued)*									
Current Types (Continued)									
HD2135A	Germanium point-contact	60	5	1	100	50	-		A1
1N192		70	5	1	250	50	30		A1
1N288	Germanium	70	40	1	350	50	-		A1
1N292		70	-	-	200	50	70		A1
1N457	Silicon diffused	70	20	1	0.025	60	75		A1
1N483	Silicon	70	-	-	0.25	60	70		A1
1N483A		70	-	-	0.025	60	200		A1
1N500	Germanium indium-bonded	70	100	1	40	60	80		A1
HG5002	Germanium gold-bonded	70	-	-	5	50	80		A1
HG5004		70	-	-	25	50	80		A1
HG5006		70	-	-	50	50	80		A1
1N69A	Germanium point-contact	75	5	1	30	10	40		A1
1N96A	Germanium gold-bonded	75	40	1	500	50	-		A1
1N118A		75	40	1	100	50	-		A1
1N126A	Germanium	75	5	1	50	10	30		A1
1N281	Germanium point-contact	75	-	-	30	10	75		A1
1N3064	Silicon planar	75	10	1	0.1	50	75		A1
HG1007	Germanium	75	20	1	-	-	45		A1
HG1008		75	20	1	-	-	45		A1
HG1009		75	10	1	-	-	45		A1
HG1010		75	10	1	-	-	45		A1
HG1011		75	5	1	-	-	45		A1
HG1012		75	5	1	-	-	45		A1
1N67A	Germanium point-contact	80	4	1	50	50	30		A1
1N89		80	3.5	1	100	50	30		A1
1N97		80	10	1	100	50	30		A1
1N98		80	20	1	100	50	30		A1
1N99		80	10	1	50	50	30		A1
1N100		80	20	1	50	50	30		A1
1N140	Germanium gold-bonded	80	40	1	300	50	85		A1
1N141		80	20	1	50	50	70		A1
1N198A	Germanium	80	4	1	50	50	30		A1
1N289		80	20	1	50	50	80		A1
1N462	Silicon diffused	80	5	1	0.5	60	50		A1
1N483B	Silicon	80	-	-	0.025	60	200		A1
HG5001	Germanium gold-bonded	90	-	-	5	50	80		A1
HG5003		90	-	-	25	50	80		A1
HG5005		90	-	-	50	50	80		A1
1N88	Germanium	90	5	1	75	100	-		A1
1N191	Germanium gold-bonded	90	5	1	-	-	50		-
1N98A	Germanium	100	40	1	100	50	-		A1
1N100A	gold-bonded	100	40	1	50	50	-		A1
1N198	Germanium	100	5	1	50	50	30		A1
1N198B	point-contact	100	4	1	50	50	30		A1
1N270	Germanium	100	-	-	100	50	-		A1
1N276	gold-bonded	100	40	1	20	10	60		A1
1N291	Germanium	100	40	1	100	100	-		A1
1N627	Silicon	100*	4	1.5	1	20	20		A1
1N662	Silicon diffused	100	10	1	1	50	40		A1
1N662A		100	-	-	-	-	-		A1
1N914	Silicon planar	100**	10	1	0.025	20	75		A1
1N914A		100	20	1	0.025	20	75		A1
1N916		100	10	1	0.025	20	75		A1
1N916A	Silicon planar	100	20	1	0.025	20	75		A1
HD4102	Silicon	100	10	1	0.1	50	-		A1

(Continued)

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
HUGHES *(Continued)*									
Current Types (Continued)									
HG1001	Germanium point-contact	100	20	1	-	-	45		A1
HG1002		100	20	1	-	-	45		A1
HG1003		100	10	1	-	-	45		A1
HG1004		100	10	1	-	-	45		A1
HG1005		100	5	1	-	-	45		A1
HG1006		100	5	1	-	-	45		A1
HG5020		100	-	-	30	100	-		A1
HS1202	Silicon planar	100	30	1.5	0.1	100	60		A1
HS1205		100	15	1.5	0.1	100	40		A1
HS1208		100	5	1.5	0.1	100	30		A1
1N142	Germanium gold-bonded	115	5	1	100	100	60		A1
1N143		115	40	1	100	100	85		A1
1N277		125	-	-	-	-	50		A1
1N484	Silicon	130	-	-	0.25	125	100		A1
1N484A		130	-	-	0.025	125	200		A1
1N484B		130	-	-	0.025	125	200		A1
1N458	Silicon diffused	150	7	1	0.025	125	55		A1
1N628	Silicon	150*	4	1.5	1	20	20		A1
HS1001	Silicon alloyed	150	-	-	0.05	150	100		A1
HS1002		150	-	-	0.1	150	100		A1
HS1003		150	-	-	0.2	150	100		A1
HS1007		150	50	1	0.05	150	90		A1
HS1008		150	50	1	0.1	150	90		A1
HS1009		150	50	1	0.2	150	90		A1
HS1201	Silicon planar	150	30	1.5	0.1	150	60		A1
HS1204		150	15	1.5	0.1	150	40		A1
HS1207		150	5	1.5	0.1	150	30		A1
1N464	Silicon diffused	175	3	1	0.5	125	40		A1
1N485	Silicon	180	-	-	0.25	175	100		A1
1N485A		180	-	-	0.025	175	200		A1
1N459	Silicon diffused	200	3	1	0.025	175	40		A1
1N485B	Silicon	200	-	-	0.025	175	200		A1
1N629		200*	4	1.5	1	20	20		A1
1N643	Silicon diffused	200	10	1	1	100	-		A1
HS1020	Silicon alloyed	200	-	-	0.02	200	165		A1
1N486	Silicon	225	-	-	0.25	225	100		A1
1N486A		225	-	-	0.05	225	200		A1
1N463	Silicon diffused	230	1	1	0.5	175	30		A1
1N487	Silicon	300	-	-	0.25	300	100		A1
1N487A		300	-	-	0.1	300	200		A1
HS3103	Silicon alloyed	300	-	-	0.2	300	165		A1
1N488	Silicon	380	-	-	0.25	380	100		A1
1N488A		380	-	-	0.1	380	200		A1
HS3104	Silicon alloyed	400	-	-	0.2	400	165		A1

* Breakdown voltage
**Maximum continuous working voltage

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
MAZDA (EXPORT EDISWAN)									
Current Types									
AA120	Germanium junction	1	8.5	0.32	Use only in forward direction		10	Transistor bias compensation	C4
BA116	Two silicon junction diodes in one case	50	10	1	1	20	10	T.V. AGC clamp, overload protection diode	C5
BY124	Silicon junction	50	700	1.2	0.5	50	100	Low voltage rectifier circuits	C13
MULLARD									
Current Types									
AA119	Germanium point-contact	45	0.1	0.23	350	45	35*	A.M. detector	A1
AA129	Germanium junction	-	5	0.175	-	-	20	Bias stabiliser	C5
AAY11	Germanium point-contact	90	10	1.5	250	90	35*	High speed switching	A2
AAY12	Germanium gold-bonded	100	2	0.4	30	100	115*	General purpose	AC
AAZ12	Germanium junction	30	0.8	0.2	60	30	135*	Low hole storage	C7
AAZ13	Germanium gold-bonded	8	1	0.27	150	8	30*	High speed switching	A2
AAZ15		75	0.1	0.15	25	75	140*	General purpose, switching	A2
AAZ17		50	0.1	0.15	150	50	110*	High speed switching	A2
BA100	Silicon	60	0.1	0.55	10	60	90*	General purpose	A2
BA114	Silicon junction	-	0.2	0.6	-	-	20	Bias stabiliser, Class B output	A1
BA115	Silicon gold-bonded	150	0.1	0.6	20ϕ	100	2*	Video noise limiter	A1
BAY38	Silicon epitaxial planar	50	-	-	0.05	50	115	High speed logic	A2
OA6	Germanium gold-bonded	60	2	0.4	9	50	115*	General purpose	C7
OA47		25	0.1	0.25	10	25	110*	High speed switching	A2
SX641	Silicon junction	60	-	-	5	60	290	Switching and low power rectifiers and second detector diodes up to 10 Mc/s	C2
SX642		120	-	-	5	120	270		C2
SX643		180	-	-	5	180	260		C2
SX644		300	-	-	15	300	190		C2
SX645		400	-	-	15	400	190		C2
SX780		25	-	-	50	25	50	High speed switching and detectors up to 100 Mc/s	C2
SX781		60	-	-	50	60	50		C2
SX782		120	-	-	50	120	50		C2

*Average value
ϕ T_{amb} = 70° C

SEMICONDUCTORS LTD

Current Types

SD01	Silicon planar epitaxial	60	-	-	0.15	40	-	Switching, high conductance	A1
SD02		40	-	-	0.15	30	-		A1
SD04		70	-	-	0.15	40	-		A1
SD10		30	-	-	0.1	20	-	Fast switching	A3
SD11		30	-	-	0.1	20	75		A3
SD12		30	-	-	0.1	20	75		A3
SD13		20	-	-	0.125	20	75		A3
SD14		40	-	-	0.1	10	75		A3
2052	Silicon planar epitaxial	50	-	-	1	50	250		A1
2102		100	-	-	1	100	250		A1
2152		150	-	-	1	150	250		A1
2202		200	-	-	1	200	250		A1
2252		250	-	-	1	250	250		A1
2201		200	-	-	1	200	100		A1

(Continued)

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
SEMICONDUCTORS LTD *(Continued)*									
Current Types (Continued)									
SD80	Silicon planar epitaxial	5	-	-	0.9	5	50		A1
SD81		50	-	-	0.01	50	50		A1
2302	Silicon mesa	300	-	-	1	300	250		A1
2402		400	-	-	1	400	250		A1
3121	Silicon planar epitaxial	120	-	-	0.1	120	100		A3
3201		200	-	-	0.1	200	100		A3
S.G.S. FAIRCHILD									
Current Types									
1N914	Silicon planar epitaxial	75	10	1	5	75	75	Ultra-fast switching t_{rr} = 4.0mμsec (max)	A
1N916		75	10	1	5	75	75		A
1N914A		75	20	1	5	75	75		A
1N916A		75	20	1	5	75	75		A
1N3062	Silicon planar epitaxial	50	20	1	0.1	50	75	Ultra-fast switching, computer logic	A
1N3063		50	10	0.85	0.1	50	75		A
1N3064		50	10	1	0.1	50	75		A
1N3065		50	20	1	0.1	50	75		A
1N3066		50	10	1	0.1	50	75		A
1N3067		20	5	1	0.1	20	50	General purpose switching	A
1N3068		20	5	1	0.1	20	75		A
1N3069		50	50	1	0.1	50	75		A
1N3070		175	100	1	0.1	175	100		A
1N3071		150	100	1	0.1	150	225		A
1N3595	Planar	125	200	1	0.001	125	150	Fast switching	A
1N3600		50	200	1	0.1	50	200	Ultra-fast switching	A
1N4244		10	20	1	0.1	10	50		A
BAY71	Planar	35	20	1	0.1	35	100	Fast switching	A
BAY72		100	100	1	0.1	100	300	High conductance	A
BAY73		100	200	1	0.005	100	200	Very low leakage	A
BAY74	Planar epitaxial	35	200	1	0.1	35	300	Very fast switching	A
BAY82	Planar	12	20	1	0.1	12	75	Computer logic $t_{rr} < 0.75$ nsec	A
EA403	Planar	35	10	1	0.1	20	75	General purpose, switching	A
EB383		50	50	1	0.1	50	100		A
EC401	Silicon planar epitaxial	100	50	1	0.01	75	200		A
EC402		50	50	1	0.01	50	200		A
FD100	Planar	50	10	1	0.1	50	75	Ultra-fast switching	A
FD200		150	100	1	0.1	150	100		A
FD300		125	200	1	0.001	125	150		A
FD600	Silicon planar epitaxial	50	200	1	0.1	50	200		A
FD700		20	50	1.1	0.05	15	50		A
FD777		8			0.1	8	50		A
FD1313		30	30	1	0.1	30	75		A
FD6001	Silicon planar epitaxial	25	200	0.93	0.1	25	200		A
FD6002		25	200	1	0.1	25	200		A
FD6003		25	100	1	0.1	25	200		A
FD6004		35	200	1	0.1	35	200		A
FD6005		35	200	1	0.05	35	200		A
FD6006		35	100	1	0.1	35	200		A
FD6007		35	100	1	0.05	35	200		A
FD6008		50	100	1	0.1	50	200		A
FD6009		50	100	1	0.05	50	200		A

Type	Construction	Peak Inverse Volts	Minimum Forward Current		Maximum Reverse Current		Max. Rect. Current (mA)	Application	Connections
			mA	at Volts	μA	at Volts			
F.C.									
Current Types									
BAY31	Silicon epitaxial planar	15	40	1	0.1	10	200	High speed switching	A1
BAY36		30	40	1	5	15	200		A1
BAY52		15	20	1	0.05	10	200		A1
DK13	Germanium gold-bonded	50	100	1	5	10	250	High speed switching	A1
DK14		80	100	1	15	25	250		A1
DK15		100	100	1	30	50	250		A1
DK19		25	30	0.65	40	10ø	110		A1
DK20		70	100	0.8	25	50	80		A1
DK21		8	10	0.6	25	3	30		A1
			φ T_{amb} = 60°C						
TEXAS									
Current Types									
1N914	Silicon diffused	75	10	1	0.025	20	75	Computer logic	A3
1N916		75	10	1	0.025	20	75		A3
1S44		40	6	1	0.05	10	75		A3
1S120	Silicon diffused	50	110	0.8	0.1	50	200	General purpose	A4
1S121		150	110	0.8	0.1	150	200		A4
1S130	Silicon diffused	50	-	-	1	50	200	General purpose	A4
1S131		100	-	-	1	100	200		A4
1S132		200	-	-	1	200	200		A4
1S134		400	-	-	1	400	200		A4
1S140	Silicon diffused	50	300	1	0.002	50	300	Very low leakage	A4
1S141		100	300	1	0.002	100	300		A4
1S142		200	300	1	0.002	200	300		A4
1S144		400	300	1	0.002	400	300		A4
1S920	Silicon diffused	50	75	1	0.01	50	200	General purpose	A3
1S921		100	75	1	0.01	100	200		A3
1S922		150	75	1	0.01	150	200		A3
1S923		200	75	1	0.01	200	200		A3
WESTINGHOUSE									
Current Types									
S05A06	Silicon diffused	50	250	1.15	1.5	50	250	General purpose sub-miniature	A1
51A06		100	250	1.15	1.5	100	250		A1
52A06		200	250	1.15	1.5	200	250		A1
53A06		300	250	1.15	1.5	300	250		A1
54A06		400	250	1.15	1.5	400	250		A1

SEMICONDUCTOR POWER RECTIFIER DIODES

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
A.E.I.								
Current Types								
GJ3M	Germanium junction	200	1A	0.72	1.0	1mA	200	S1
GJ4M		75	1A	0.72	1.0	1.3mA	75	S1
GJ5M		300	1A	0.72	1.0	800	300	S1
GJ6M		150	1A	0.72	1.0	800	150	S1
SJ053F	Silicon diffused	50	750	1	0.75	10	50	S1
SJ103F		100	750	1	0.75	10	100	A5
SJ203F		200	750	1	0.75	10	200	A5
SJ303F		300	750	1	0.75	10	300	A5
SJ403F		400	750	1	0.75	10	400	A5
SJ603F		600	750	1	0.75	10	600	A5
SJ803F		800	750	1	0.75	10	800	A5
SJ1003F		1,000	750	1	0.75	10	1,000	A5
SJ1203F		1,200	750	1	0.75	10	1,200	A5
SJ053E, SJ053K	Silicon diffused	50	2A	Other data as Types SJ053F to SJ1203F				Suffix 'E', S2 Suffix 'K', S3
SJ103E, SJ103K		100	2A					
SJ203E, SJ203K		200	2A					
SJ303E, SJ303K		300	2A					
SJ403E, SJ403K		400	2A					
SJ603E, SJ603K		600	2A					
SJ803E, SJ803K		800	2A					
SJ1003E, SJ1003K		1,000	2A					
SJ1203E, SJ1203K		1,200	2A					
SJ054F	Silicon diffused	50	1A	1	0.75	10	50	A5
SJ104F		100	1A	1	0.75	10	100	A5
SJ204F		200	1A	1	0.75	10	200	A5
SJ304F		300	1A	1	0.75	10	300	A5
SJ404F		400	1A	1	0.75	10	400	A5
SJ604F		600	1A	1	0.75	10	600	A5
SJ054E, SJ054K	Silicon diffused	50	2.5A	Other data as types SJ054F to SJ604F				Suffix 'E', S2 Suffix 'K', S3
SJ104E, SJ104K		100	2.5A					
SJ204E, SJ204K		200	2.5A					
SJ304E, SJ304K		300	2.5A					
SJ404E, SJ404K		400	2.5A					
SJ604E, SJ604K		600	2.5A					
SL103A, SL103K	Silicon diffused	100	10A	1.2	10	50	100	S2 S3
SL203A, SL203K		200	10A	1.2	10	50	200	S2 S3
SL403A, SL403K		400	10A	1.2	10	50	400	S2 S3
SL603A, SL603K		600	10A	1.2	10	50	600	S2 S3
SL803A, SL803K		800	10A	1.2	10	50	800	S2 S3
SL1003A, SL1003K		1,000	10A	1.2	10	50	1,000	S2 S3
SL1203A, SL1203K		1,200	10A	1.2	10	50	1,200	S2 S3

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
BRIMAR								
Current Types								
BY100	Silicon	800	450*	1.5	5	10	800	A5
BY114	diffused	450	450*	1.5	5	10	450	A5
			* $T_{amb} \leq 70^{o}C$					
FERRANTI								
Obsolete Types								
ZR60		50	750*	1.1	0.75	10	50	A5
ZR61		100	750*	1.1	0.75	10	100	A5
ZR62		200	750*	1.1	0.75	10	200	A5
ZR63	Silicon	300	750*	1.1	0.75	10	300	A5
ZR64		400	750*	1.1	0.75	10	400	A5
ZR66		600	750*	1.1	0.75	10	600	A5
ZR68		800	750*	1.1	0.75	10	800	A5
Replacement Types								
ZR50		50	20A Ψ	1.2	20	500	50	S5
ZR51		100	20A Ψ	1.2	20	500	100	S5
ZR52		200	20A Ψ	1.2	20	500	200	S5
ZR53		300	20A Ψ	1.2	20	500	300	S5
ZR54	Silicon	400	20A Ψ	1.2	20	500	400	S5
ZR55		500	20A Ψ	1.2	20	500	500	S5
ZR50R to ZR55R		Reverse polarity versions of ZR50 to ZR55						S4
Current Types								
HS30		5,000	350*	13.5	0.35	5	5,000	T1
HS31		7,500	350*	19.5	0.35	5	7,500	T1
HS32		10,000	350*	23	0.35	5	10,000	T1
HS33		16,000	350*	34	0.35	5	16,000	T1
HS40A	Silicon	5,000	350*	13.5	0.35	5	5,000	T1
HS41A		7,500	350*	19.5	0.35	5	7,500	T1
HS42A		10,000	350*	23	0.35	5	10,000	T1
HS43A		16,000	350*	34	0.35	5	16,000	T1
HS40B to HS43B		Matched hole storage versions of HS40A Series						T1
HS50		6,000	175*	14	0.175	5	6,000	A16
HS52		10,000	175*	14	0.175	5	10,000	A16
HS53	Silicon	12,500	175*	14	0.175	5	12,500	A16
HS54		15,000	175*	14	0.175	5	15,000	A16
HS403		15,000	50*	50	0.05	1	15,000	A16
HS403B		15,000	50*	50	0.05	50	15,000	A16
HX30		5,000	350*	13.5	0.35	5	5,000	A17
HX31	Silicon	7,500	350*	19.5	0.35	5	7,500	A18
HX32		10,000	350*	23	0.35	5	10,000	A19
HX33		16,000	350*	35	0.35	5	16,000	A20
ZAR110‡‡		1,000	1.5A	1.5	1.5	2	1,000	A10
ZAR210‡‡	Silicon	1,000	8A††	1.5	8	2	1,000	S2
ZAR610‡‡		1,000	1.5A	1.5	1.5	10	100	A9
ZAR710‡‡		1,000	1.5A	1.5	1.5	10	100	A8
ZHS101		2,000	100	5	0.1	0.03	2,000	A1
ZHS102	Silicon	2,000	100	5	0.1	1	2,000	A1
ZHS103		2,000	100	5	0.1	0.1	2,000	A1
ZHS104		3,000	100	5	0.1	0.05	3,000	A1

(Continued)

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
FERRANTI *(Continued)*								
Current Types (Continued)								
ZHS105	Silicon	3,000	100	5	0.1	1	3,000	A1
ZHS106		3,000	100	5	0.1	0.1	3,000	A1
ZR10	Silicon	50	1.5A	1	1.5	5	50	A9
ZR10T		50	1.5A	1	1.5	5	50	S6
ZR11		100	1.5A	1	1.5	5	100	A9
ZR11T		100	1.5A	1	1.5	5	100	S6
ZR12		200	1.5A	1	1.5	5	200	A9
ZR12T		200	1.5A	1	1.5	5	200	S6
ZR13		300	1.5A	1	1.5	5	300	A9
ZR13T		300	1.5A	1	1.5	5	300	S6
ZR14		400	1.5A	1	1.5	5	400	A9
ZR14T		400	1.5A	1	1.5	5	400	S6
ZR15		500	1A	1	1	5	500	A9
ZR15T		500	1A	1	1	5	500	S6
ZR10R to ZR15R	Silicon	Reverse polarity versions of ZR10 Series						A10
ZR10TR to ZR15TR	Silicon	Reverse polarity versions of ZR10T Series						S7
ZR20	Silicon	50	8A††	1.2	5	5	50	S9
ZR21		100	8A††	1.2	5	5	100	S9
ZR22		200	8A††	1.2	5	5	200	S9
ZR23		300	8A††	1.2	5	5	300	S9
ZR24		400	8A††	1.2	5	5	400	S9
ZR20R to ZR24R	Silicon	Reverse polarity versions of ZR20 Series						S8
ZR200	Silicon	50	8A††	1.2	5	5	50	S3
ZR201		100	8A††	1.2	5	5	100	S3
ZR202		200	8A††	1.2	5	5	200	S3
ZR204		400	8A††	1.2	5	5	400	S3
ZR206		600	8A††	1.2	5	5	600	S3
ZR208		800	8A††	1.2	5	5	800	S3
ZR200R ZR201R ZR202R ZR204R ZR206R ZR208R	Silicon	Reverse polarity versions of ZR200 Series						S2
ZR601	Silicon	100	1.5A	1.1	0.75	10	100	A6
ZR602		200	1.5A	1.1	0.75	10	200	A6
ZR604		400	1.5A	1.1	0.75	10	400	A6
ZR606		600	1.5A	1.1	0.75	10	600	A6
ZR608		800	1.5A	1.1	0.75	10	800	A6
ZS30A	Silicon	50	500	1.1	0.5	0.2	50	A7
ZS30B		50	500	1.1	0.5	5	50	A7
ZS31A		100	500	1.1	0.5	0.2	100	A7
ZS31B		100	500	1.1	0.5	5	100	A7
ZS32A		200	500	1.1	0.5	0.2	200	A7
ZS32B		200	500	1.1	0.5	5	200	A7
ZS33A		300	500	1.1	0.5	0.2	300	A7
ZS33B		300	500	1.1	0.5	5	300	A7
ZS34A		400	500	1.1	0.5	0.2	400	A7
ZS34B		400	500	1.1	0.5	5	400	A7
ZS70	Silicon	50	750	1.2	0.75	5	50	A8
ZS71		100	750*	1.2	0.75	5	100	A8
ZS72		200	750*	1.2	0.75	5	200	A8
ZS73		300	750*	1.2	0.75	5	300	A8
ZS74		400	750*	1.2	0.75	5	400	A8
ZS76		600	750*	1.2	0.75	5	600	A8
ZS78		800	750*	1.2	0.75	5	800	A8

(Continued)

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
FERRANTI *(Continued)*								
Current Types (Continued)								
ZS100	Silicon junction	50	400	1	400	0.2	50	A1
ZS101		100	400	1	400	0.2	100	A1
ZS102		200	400	1	400	0.2	200	A1
ZS103		300	400	1	400	0.2	300	A1
ZS104		400	400	1	400	0.2	400	A1
ZS106		600	400	1	400	0.2	600	A1
ZS108		800	400	1	400	0.2	800	A1
ZS700	Silicon	50	1.5A*	1.2	1.5A	10	50	A8
ZS701		100	1.5A*	1.2	1.5A	10	100	A8
ZS702		200	1.5A*	1.2	1.5A	10	200	A8
ZS703		300	1.5A*	1.2	1.5A	10	300	A8
ZS704		400	1.5A*	1.2	1.5A	10	400	A8
ZS706		600	1.5A*	1.2	1.5A	10	600	A8
ZS708		800	1.5A*	1.2	1.5A	10	800	A8
ZS800		800	1A*	1.2	0.75	10	800	A8

* Resisitive or inductive load
Ψ Stud temperature = 100°C
†† Mounted on copper or aluminium fin 2¾" x 2¾" x 16 S.W.G.
‡‡ Avalanche rectifiers; avalanche voltage 1,250V (min), 1,750V (max)

HUGHES

Current Types

1N645	Silicon diffused	225	600	1	0.4	0.2	225	A1
1N646		300	600	1	0.4	0.2	300	A1
1N647		400	600	1	0.4	0.2	400	A1
1N648		500	600	1	0.4	0.2	500	A1
1N649		600	600	1	0.4	0.2	600	A1
1N905	Silicon diffused	30	300	-	-	0.1	20	A1
1N906		30	300	-	-	0.1	20	A1
1N1730	Silicon	1,000	300	5	0.1	10	1,000	A1
1N1731		1,500	300	5	0.1	10	1,500	A1
1N1732		2,000	300	9	0.1	10	2,000	A1
1N1733		3,000	240	12	0.1	10	3,000	A1
1N1734		5,000	150	18	0.1	10	5,000	A1
1N2382	Silicon	4,000	240	18	0.1	10	4,000	A1
1N2383		6,000	150	27	0.1	10	6,000	A1
1N2384		8,000	110	27	0.1	10	8,000	A1
1N2385		10,000	110	39	0.1	10	10,000	A1
HS3105	Silicon alloyed	500	165	-	-	0.2	500	A1
HS3106		600	165	-	-	0.2	600	A1
HS3108		800	165	-	-	0.2	800	A1
HS3110		1,000	165	-	-	0.2	1,000	A1
HSC1	Silicon	1,000	150	2	0.1	5	1,000	T1
HSC2		2,000	150	4	0.1	5	2,000	T1
HSC3		3,000	150	6	0.1	5	3,000	T1
HSC4		4,000	150	8	0.1	5	4,000	T1
HSC5		5,000	150	10	0.1	5	5,000	T1
HSC6		6,000	150	12	0.1	5	6,000	T1
HSC7		7,000	150	14	0.1	5	7,000	T1
HSC8		8,000	150	16	0.1	5	8,000	T1
HSC9		9,000	150	18	0.1	5	9,000	T1
HSC10		10,000	150	20	0.1	5	10,000	T1
HSC12		12,000	150	24	0.1	5	12,000	T1
HSC15		15,000	150	30	0.1	5	15,000	T1

(Continued)

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
HUGHES *(Continued)*								
Current Types (Continued)								
HSC18	Silicon	18,000	150	36	0.1	5	18,000	T1
HSC20		20,000	150	40	0.1	5	20,000	T1
HSC25		25,000	150	50	0.1	5	25,000	T1
HSC30		30,000	150	60	0.1	5	30,000	T1
INTERNATIONAL RECTIFIER CO.								
Current Types								
1N646	Silicon diffused	300	400	1	0.4	15 Ψ	300	A4
1N647		400	400	1	0.4	20 Ψ	400	A4
1N648		500	400	1	0.4	20 Ψ	500	A4
1N649		600	400	1	0.4	25 Ψ	600	A4
3MS40	Silicon	400	300	1.35	0.75	300 Ψ	400	A11
3MS60		600	300	1.35	0.75	300 Ψ	600	A11
5A4	Silicon	400	1A	0.9	1	50 Ψ	400	A22
5A6		600	1A	0.9	1	50 Ψ	600	A22
5A8		800	1A	0.9	1	50 Ψ	800	A22
5A10		1,000	1A	0.9	1	50 Ψ	1,000	A22
5MS40	Silicon	400	500	0.6	0.5	400 Ψ	400	A11
5MS60		600	500	0.6	0.5	400 Ψ	600	A11
6F40	Silicon diffused	400	6A	0.5	6	4.0mA	400	S2
6F60		600	6A	0.5	6	2.5mA	600	S2
6F80		800	6A	0.5	6	2.0mA	800	S2
6F100		1,000	6A	0.5	6	1.5mA	1,000	S2
10B4	Silicon	400	1.3A	1.1	3	500	400	A5
10B6		600	1.3A	1.1	3	500	600	A5
10B8		800	1.3A	1.1	3	500	800	A5
10B10		1,000	1.3A	1.1	3	500	1,000	A5
10D4	Silicon	400	1A	0.9	1	50 Ψ	400	A21
10D6		600	1A	0.9	1	50 Ψ	600	A21
10D8		800	1A	0.9	1	50 Ψ	800	A21
10D10		1,000	1A	0.9	1	50 Ψ	1,000	A21
SD94S	Silicon	400	1.1A	1	1	200 Ψ	400	A5
SD96S		600	1.1A	1	1	200 Ψ	600	A5
SD98S		800	1.1A	1	1	100 Ψ	800	A5
SD910S		1,000	1.1A	1	1	100 Ψ	1,000	A5

Ψ T_{case} =100° C

JOSEPH LUCAS (ELECTRICAL) Ltd.

Current Types

DD000	Silicon diffused	50	500	1	1	1	50	A12
DD003		200	500	1	1	1	200	A12
DD006		400	500	1	1	1	400	A12
DD056		400/800	500	1	1	1	400	A12
DD058		800/1,350	500	1	1	1	400	A12
DD2020	Silicon diffused	50	1.5A	1	1	1	50	A23
DD2026		400	1.5A	1	1	1	400	A23
DD2066		400/800	1.0A	1	1	1	400	A23
DD2068		800/1,350	1.0A	1	1	1	400	A23
DD3020	Silicon diffused	50	2.5A	1	1	1	50	S25
DD3026		400	2.5A	1	1	1	400	S25
DD3076		400/800	2.5A	1	1	1	400	S25

(Continued)

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
JOSEPH LUCAS (ELECTRICAL) Ltd. *(Continued)*								
Current Types (Continued)								
DD3078	Silicon diffused	800/1,350	2.5A	1	1	1	400	S25
DD4066		400/800	6A	1	6	5	400	S24
DD4068		800/1,350	6A	1	6	5	400	S24
DD4520		50	10A	1	10	10	50	S24
DD4526		400	10A	1	10	10	400	S24
MAZDA (EXPORT EDISWAN)								
Current Types								
BY100	Silicon diffused	800	450ϕ_1	1.5	5	10	800	A5
BY101		450	400ϕ_2	1.5	5	10	450	A5
BY105		800	400ϕ_2	1.5	5	10	800	A5
BY114		450	450ϕ_1	1.5	5	10	450	A5
ϕ_1 $T_{amb} \leq 70^{\circ}C$ ϕ_2 $T_{amb} \leq 75^{\circ}C$								
MULLARD								
Current Types								
BY100	Silicon junction	800	550ϕ_1	<1.5	5	<10	800	A6
BY114		450	550ϕ_1	<1.5	5	<10	450	A6
BYX10		800	200ϕ_2	1.1**	0.2	50**	800	A7
BYX22-200	Silicon	200	1Aϕ_5	1.5	5	120ϕ_6	200	A6
BYX22-400		400	1Aϕ_5	1.5	5	120ϕ_6	400	A6
BYX22-600		600	1Aϕ_5	1.5	5	120ϕ_6	600	A6
BYX22-800		800	1Aϕ_5	1.5	5	120ϕ_6	800	A6
BYY22	Silicon	200	10Aϕ_3	0.9	1	2mAϕ_6	200	S13
BYY23*								S14
BYY24		400	10Aϕ_3	0.9	1	2mAϕ_6	400	S13
BYY25*								S14
BYZ10	Silicon	800	6Aϕ_4	1.2**	5	200ϕ_6	800	S2
BYZ16*								S3
BYZ11		600	6Aϕ_4	1.2**	5	200ϕ_6	600	S2
BYZ17*								S3
BYZ12		400	6Aϕ_4	1.2**	5	200ϕ_6	400	S2
BYZ18*								S3
BYZ13		200	6Aϕ_5	1.4**	5	600	200	S2
BYZ19*								S3
SX751	Silicon	100	2.5Aϕ_5	1**	10	200**	100	S15
SX751R*								S10
SX752		200	2.5Aϕ_5	1**	10	200**	200	S15
SX752R*								S10
SX753		300	2.5Aϕ_5	1**	10	200**	300	S15
SX753R*								S10
SX754		400	2.5Aϕ_5	1**	10	200**	400	S15
SX754R*								S10

ϕ_1 $T_{amb} \leq 50^{\circ}C$
ϕ_2 $T_{amb} < 70^{\circ}C$
ϕ_3 $T_{amb} \leq 134^{\circ}C$
ϕ_4 $T_{amb} \leq 75^{\circ}C$
ϕ_5 $T_{amb} \leq 30^{\circ}C$
ϕ_6 $T_{amb} = 125^{\circ}C$

*Reverse polarity types
**Typical value

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
SEMICONDUCTORS LTD								
Current Types								
1014	Silicon planar epitaxial	100	400	1	0.4	0.2	100	A1
1024		200	400	1	0.4	0.2	200	A1
1044	Silicon mesa	400	400	1	0.4	0.2	400	A1
1064		600	400	1	0.4	0.2	600	A1
1084		800	400	1	0.4	0.2	800	A1
1104		1,000	400	1	0.4	0.2	1,000	A1
1034		300	400	1	0.4	0.2	300	A1
2602		600	250	1.15	0.25	1	600	A1
2802		800	250	1.15	0.25	1	800	A1
2K02		1,000	250	1.15	0.25	1	1,000	A1
1G8	Silicon alloy-diffused	100	750	1.1	0.75	0.3	100	A5
2G8		200	750	1.1	0.75	0.75	200	A5
3G8		300	750	1.1	0.75	1	300	A5
4G8		400	750	1.1	0.75	1.5	400	A5
5G8		500	750	1.1	0.75	1.75	500	A5
6G8		600	750	1.1	0.75	2	600	A5
8G7		800	750	1.1	0.75	3	800	A5
10G4		1,000	400	1.5	0.4	10	1,000	A5
12G4		1,200	400	1.5	0.4	10	1,200	A5
12GT		1,200	1A	1.3	1	10	1,200	A5
5AS	Silicon alloy-diffused	50	500	1.15	0.5	10	50	A5
10AS		100	500	1.15	0.5	10	100	A5
20AS		200	500	1.15	0.5	10	200	A5
30AS		300	500	1.15	0.5	10	300	A5
40AS		400	500	1.15	0.5	10	400	A5
50AS		500	500	1.15	0.5	10	500	A5
60AS		600	500	1.15	0.5	10	600	A5
80AS		800	500	1.15	0.5	10	800	A5
D0503	Silicon alloy-diffused	50	3A	1.5	3	20	50	S2
D1003		100	3A	1.5	3	20	100	S2
D2003		200	3A	1.5	3	20	200	S2
D3003		300	3A	1.5	3	20	300	S2
D4003		400	3A	1.5	3	20	400	S2
D5003		500	3A	1.5	3	20	500	S2
D6003		600	3A	1.5	3	20	600	S2
D8003		800	3A	1.5	3	20	800	S2
D0510	Silicon alloy-diffused	50	10A	1.5	10	20	50	S2
D1010		100	10A	1.5	10	20	100	S2
D2010		200	10A	1.5	10	20	200	S2
D3010		300	10A	1.5	10	20	300	S2
D4010		400	10A	1.5	10	20	400	S2
D5010		500	10A	1.5	10	20	500	S2
D6010		600	10A	1.5	10	20	600	S2
D8010		800	10A	1.5	10	20	800	S2
S.T.C.								
Obsolete Types								
BYY19†	Silicon diffused	1,000	1A	-	-	5	1,000	S10
BY102†		750	600	-	-	1mA Ψ	750	S10
BYY31†		100	600	-	-	10	100	A15
BYY32†		200	600	-	-	10	200	A15
BYY33†		300	600	-	-	10	300	A15
BYY34†		400	600	-	-	10	400	A15
BYY35†		500	600	-	-	10	500	A15
BYY36†		600	600	-	-	10	600	A15
BYY37†		700	600	-	-	10	700	A15

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
S.T.C *(Continued)*								
Replacement Types								
RS220AF	Silicon diffused	300	750	1.25	0.9	100	200	A14
RS230AF		420	750	1.25	0.9	100	300	A14
RS240AF		550	750	1.25	0.9	100	400	A14
RS250AF		700	750	1.25	0.9	100	500	A14
RS260AF		800	750	1.25	0.9	100	600	A14
RS270AF		950	750	1.25	0.9	100	700	A14
RS280AF		1,100	750	1.25	0.9	100	800	A14
RS290AF		1,200	750	1.25	0.9	100	900	A14
RS291AF		1,300	750	1.25	0.9	100	1,000	A14
Current Types								
FST3/1	Silicon diffused	100	1.25A	1.1	1.5	100	100	A6
FST3/2		300	1.25A	1.1	1.5	100	200	A6
FST3 3		450	1.25A	1.1	1.5	100	300	A6
FST3/4		550	1.25A	1.1	1.5	100	400	A6
FST3/5		700	1.25A	1.1	1.5	100	500	A6
FST3/8		*	1.25A	1.1	0.8	100	800	A6
OY5061†	Silicon diffused	100	1A	-	-	5	100	S10
OY5062†		200	1A	-	-	5	200	S10
OY5063†		300	1A	-	-	5	300	S10
OY5064†		400	1A	-	-	5	400	S10
OY5065†		500	1A	-	-	5	500	S10
OY5066†		600	1A	-	-	5	600	S10
OY5067†		700	1A	-	-	5	700	S10
RAS310AF	Silicon diffused (avalanche)	**	1.25A	1.1	1.5	100	1,000	A6
RAS508AF		***	1.25A	1.2	6	100	800	S2
RAC308AF		****	1.25A	1.1	1.5	100	800	A6

* Minimum avalanche voltage 900V
** Minimum avalanche voltage 1,250V
*** Minimum avalanche voltage 1,000V
**** Controlled avalanche voltage 900-1,250V
} peak reverse power rating 4KW

† Formerly manufactured by Brush Clevite Co. Ltd.
Ψ Stud temperature = 50°C

TEXAS

Current Types

1N1130	Silicon diffused	1,500	300	1.5	0.3	50	1,500	S2
1N1131		1,500	300	1.5	0.3	50	1,500	S3
1N2069	Silicon diffused	200	750	1.2	0.5	10	200	A24
1N2070		400	750	1.2	0.5	10	400	A24
1N2071		600	750	1.2	0.5	10	600	A24
1S020	Silicon diffused	100	1.5A	1.25	5	50	100	A5
1S021		200	1.5A	1.25	5	50	200	A5
1S023		400	1.5A	1.25	5	50	400	A5
1S025		600	1.5A	1.25	5	50	600	A5
1S027		800	1.5A	1.25	5	50	800	A5
1S100	Silicon diffused	100	750	1.25	2	2	100	A5
1S101		200	750	1.25	2	2	200	A5
1S103		400	750	1.25	2	2	400	A5
1S105		600	750	1.25	2	2	600	A5
1S107		800	750	1.25	2	2	800	A5
1S109		1,000	750	1.25	2	2	1,000	A5
1S111	Silicon alloyed	225	400	-	-	0.2	225	A4
1S113		400	400	-	-	0.2	400	A4

(Continued)

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
TEXAS *(Continued)*								
Current Types (Continued)								
1S115	Silicon alloyed	600	400	-	-	0.2	600	A4
1S117	Silicon alloyed	800	400	-	-	0.2	800	A4
1S410	Silicon diffused	100	3AΨ	1.6	10	5	100	S2, S3
1S410R	Silicon diffused	100	3AΨ	1.6	10	5	100	S2, S3
1S411	Silicon diffused	200	3AΨ	1.6	10	5	200	S2, S3
1S411R	Silicon diffused	200	3AΨ	1.6	10	5	200	S2, S3
1S413	Silicon diffused	400	3AΨ	1.6	10	5	400	S2, S3
1S413R	Silicon diffused	400	3AΨ	1.6	10	5	400	S2, S3
1S415	Silicon diffused	600	3AΨ	1.6	10	5	600	S2, S3
1S415R	Silicon diffused	600	3AΨ	1.6	10	5	600	S2, S3
1S417	Silicon diffused	800	3AΨ	1.6	10	5	800	S2, S3
1S417R	Silicon diffused	800	3AΨ	1.6	10	5	800	S2, S3
1S419	Silicon diffused	1,000	3AΨ	1.6	10	5	1,000	S2, S3
1S419R	Silicon diffused	1,000	3AΨ	1.6	10	5	1,000	S2, S3
1S420	Silicon diffused	100	10A	1.5	30	50	100	S2, S3
1S420R	Silicon diffused	100	10A	1.5	30	50	100	S2, S3
1S421	Silicon diffused	200	10A	1.5	30	50	200	S2, S3
1S421R	Silicon diffused	200	10A	1.5	30	50	200	S2, S3
1S423	Silicon diffused	400	10A	1.5	30	50	400	S2, S3
1S423R	Silicon diffused	400	10A	1.5	30	50	400	S2, S3
1S425	Silicon diffused	600	10A	1.5	30	50	600	S2, S3
1S425R	Silicon diffused	600	10A	1.5	30	50	600	S2, S3
1S427	Silicon diffused	800	10A	1.5	30	50	800	S2, S3
1S427R	Silicon diffused	800	10A	1.5	30	50	800	S2, S3

Ψ T_{stud} = 100°C

WESTINGHOUSE

Current Types

S1AR1	Silicon alloyed	100	800	0.5	0.8	2mA	100	A13
S2AR1	Silicon alloyed	200	800	0.5	0.8	2mA	200	A13
S3AR1	Silicon alloyed	300	800	0.5	0.8	2mA	300	A13
S4AR1	Silicon alloyed	400	800	0.5	0.8	2mA	400	A13
S5AR1	Silicon alloyed	500	800	0.5	0.8	2mA	500	A13
S6AR1	Silicon alloyed	600	800	0.5	0.8	2mA	600	A13
S7AR1	Silicon alloyed	700	800	0.5	0.8	2mA	700	A13
S8AR1	Silicon alloyed	800	800	0.5	0.8	2mA	800	A13
S9AR1	Silicon alloyed	900	800	0.5	0.8	2mA	900	A13
S10AR1	Silicon alloyed	1,000	800	0.5	0.8	2mA	1,000	A13
S12AR1	Silicon alloyed	1,200	800	0.5	0.8	2mA	1,200	A13
S15AR1	Silicon alloyed	1,500	800	0.5	0.8	2mA	1,500	A13
S1AR2	Silicon alloyed	100	1.1A	0.55	1.1	2mA	100	A13
S2AR2	Silicon alloyed	200	1.1A	0.55	1.1	2mA	200	A13
S3AR2	Silicon alloyed	300	1.1A	0.55	1.1	2mA	300	A13
S4AR2	Silicon alloyed	400	1.1A	0.55	1.1	2mA	400	A13
S5AR2	Silicon alloyed	500	1.1A	0.55	1.1	2mA	500	A13
S6AR2	Silicon alloyed	600	1.1A	0.55	1.1	2mA	600	A13
S8AR2	Silicon alloyed	800	1.1A	0.55	1.1	2mA	800	A13
S10AR2	Silicon alloyed	1,000	1.1A	0.55	1.1	2mA	1,000	A13
S12AR2	Silicon alloyed	1,200	1.1A	0.55	1.1	2mA	1,200	A13
S15AR2	Silicon alloyed	1,500	1.1A	0.55	1.1	2mA	1,500	A13
S18AR2	Silicon alloyed	1,800	1.1A	0.55	1.1	2mA	1,800	A13
S1BR2	Silicon alloyed	100	2.2A*	0.55	2.2	2mA	100	S15
S2BR2	Silicon alloyed	200	2.2A*	0.55	2.2	2mA	200	S15
S3BR2	Silicon alloyed	300	2.2A*	0.55	2.2	2mA	300	S15
S4BR2	Silicon alloyed	400	2.2A*	0.55	2.2	2mA	400	S15

(Continued)

Type	Construction	Peak Inverse Volts	Max. Rect. Current (mA)	Max. Forward Voltage Drop		Maximum Reverse Current		Connections
				Volts	at Amps	μA	at Volts	
WESTINGHOUSE *(Continued)*								
Current Types (Continued)								
S5BR2	Silicon alloyed	500	2.2A*	0.55	2.2	2mA	500	S15
S6BR2		600	2.2A*	0.55	2.2	2mA	600	S15
S8BR2		800	2.2A*	0.55	2.2	2mA	800	S15
S10BR2		1,000	2.2A*	0.55	2.2	2mA	1,000	S15
S12BR2		1,200	2.2A*	0.55	2.2	2mA	1,200	S15
S15BR2		1,500	2.2A*	0.55	2.2	2mA	1,500	S15
S18BR2		1,800	2.2A*	0.55	2.2	2mA	1,800	S15
S1GR2	Silicon alloyed	100	1.45A	0.55	1.45	2mA	100	A13
S2GR2		200	1.45A	0.55	1.45	2mA	200	A13
S3GR2		300	1.45A	0.55	1.45	2mA	300	A13
S4GR2		400	1.45A	0.55	1.45	2mA	400	A13
S5GR2		500	1.45A	0.55	1.45	2mA	500	A13
S6GR2		600	1.45A	0.55	1.45	2mA	600	A13
S8GR2		800	1.45A	0.55	1.45	2mA	800	A13
S10GR2		1,000	1.45A	0.55	1.45	2mA	1,000	A13
S12GR2		1,200	1.45A	0.55	1.45	2mA	1,200	A13
S15GR2		1,500	1.45A	0.55	1.45	2mA	1,500	A13
S18GR2		1,800	1.45A	0.55	1.45	2mA	1,800	A13
S3BR5	Silicon alloyed	300	10.0A*	0.55	10	10mA	300	S15
S4BR5		400	10.0A*	0.55	10	10mA	400	S15
S5BR5		500	10.0A*	0.55	10	10mA	500	S15
S6BR5		600	10.0A*	0.55	10	10mA	600	S15
S7BR5		700	10.0A*	0.55	10	10mA	700	S15
S8BR5		800	10.0A*	0.55	10	10mA	800	S15
S9BR5		900	10.0A*	0.55	10	10mA	900	S15
S10BR5		1,000	10.0A*	0.55	10	10mA	1,000	S15
S12BR5		1,200	10.0A*	0.55	10	10mA	1,200	S15
S15BR5		1,500	10.0A*	0.55	10	10mA	1,500	S15

* Diodes mounted on suitable heat sink

THYRISTORS

Type	Peak Inverse Volts	Max. Rect. Current (A)	Max. Holding Current (mA)	Max. Gate Firing Characteristics		Max. Forward Voltage Drop		Max. Reverse Current		Connections
				mA	at Volts	Volts	at Amps	mA	at Volts	
A.E.I.										
Current Types										
CR1-021C	25	1	-	10	3	2	1	-	-	C11
CR1-051C	50	1	-	10	3	2	1	-	-	C11
CR1-071C	75	1	-	10	3	2	1	-	-	C11
CR1-101C	100	1	-	10	3	2	1	-	-	C11
CR1-201C	200	1	-	10	3	2	1	-	-	C11
CR1-301C	300	1	-	10	3	2	1	-	-	C11
CR1-401C	400	1	-	10	3	2	1	-	-	C11
CR5-021B*	25	5	150	80	3	3	5	10	25	S18
CR5-051B*	50	5	150	80	3	3	5	10	50	S18
CR5-071B*	75	5	150	80	3	3	5	10	75	S18
CR5-101B*	100	5	150	80	3	3	5	10	100	S18
CR5-201B*	200	5	150	80	3	3	5	10	200	S18
CR5-301B*	300	5	150	80	3	3	5	10	300	S18
CR5-401B*	400	5	150	80	3	3	5	5	400	S18
CR5-501B*	500	5	150	80	3	3	5	5	500	S18
CR5-601B*	600	5	150	80	3	3	5	5	600	S18
CR10-051B*	50	10	150	80	3	2	10	10	50	S18
CR10-101B*	100	10	150	80	3	2	10	10	100	S18
CR10-201B*	200	10	150	80	3	2	10	10	200	S18
CR10-301B*	300	10	150	80	3	2	10	10	300	S18
CR10-401B*	400	10	150	80	3	2	10	5	400	S18

(Continued)

Type	Peak Inverse Volts	Max. Rect. Current (A)	Max. Holding Current (mA)	Max. Gate Firing Characteristics		Max. Forward Voltage Drop		Max. Reverse Current		Connections
				mA	at Volts	Volts	at Amps	mA	at Volts	
A.E.I. *(Continued)*										
Current Types (Continued)										
CR10-501B*	500	10	150	80	3	2	10	5	500	S18
CR10-601B*	600	10	150	80	3	2	10	5	600	S18
CR16-051B*	50	16	120	40	3	2	16	10	50	S18
CR16-101B*	100	16	120	40	3	2	16	10	100	S18
CR16-201B*	200	16	120	40	3	2	16	10	200	S18
CR16-301B*	300	16	120	40	3	2	16	10	300	S18
CR16-401B*	400	16	120	40	3	2	16	5	400	S18
CR16-501B*	500	16	120	40	3	2	16	5	500	S18
CR16-601B*	600	16	120	40	3	2	16	5	600	S18

* Inverter type available ($T_{off} < 20\mu s$)

INTERNATIONAL RECTIFIER CO.

Current Types

3RC5	50	3	5*	15	2	2	3	4.5	50	S19
3RC10	100	3	5*	15	2	2	3	4.5	100	S19
3RC20	200	3	5*	15	2	2	3	3	200	S19
3RC40	400	3	5*	15	2	2	3	1	400	S19
3RC50	500	3	5*	15	2	2	3	1	500	S19
3RC60	600	3	5*	15	2	2	3	1	600	S19
5RC5	50	5	5*	15	2	1.85	5	4.5	50	S19
5RC10	100	5	5*	15	2	1.85	5	4.5	100	S19
5RC20	200	5	5*	15	2	1.85	5	3	200	S19
5RC40	400	5	5*	15	2	1.85	5	1	400	S19
5RC50	500	5	5*	15	2	1.85	5	1	500	S19
5RC60	600	5	5*	15	2	1.85	5	1	600	S19
10RC5	50	10	10*	40	3	3.3	10	6.5	50	S19
10RC10	100	10	10*	40	3	3.3	10	6.5	100	S19
10RC20	200	10	10*	40	3	3.3	10	6	200	S19
10RC40	400	10	10*	40	3	3.3	10	4	400	S19
10RC50	500	10	10*	40	3	3.3	10	3	500	S19
10RC60	600	10	10*	40	3	3.3	10	2.5	600	S19
10RC70	700	10	10*	40	3	3.3	10	2.5	700	S19
10RC80	800	10	10*	40	3	3.3	10	2.5	800	S19
16RC5	50	16	10*	40	2	2.2	16	6.5	50	S19
16RC10	100	16	10*	40	2	2.2	16	6.5	100	S19
16RC20	200	16	10*	40	2	2.2	16	6	200	S19
16RC40	400	16	10*	40	2	2.2	16	4	400	S19
16RC50	500	16	10*	40	2	2.2	16	3	500	S19
16RC60	600	16	10*	40	2	2.2	16	2.5	600	S19
16RC70	700	16	10*	40	2	2.2	16	2.5	700	S19
16RC80	800	16	10*	40	2	2.2	16	2.5	800	S19

* Typical Value

MULLARD

Current Types

BTY27	50	4.7	4‡Ψ_1	15†	2†	1.6	10Ψ_1	9Ψ_1	50	S20
BTY28	100	4.7	4‡Ψ_1	15†	2†	1.6	10Ψ_1	9Ψ_1	100	S20
BTY29	150	4.7	4‡Ψ_1	15†	2†	1.6	10Ψ_1	8Ψ_1	150	S20
BTY30	250	4.7	4‡Ψ_1	15†	2†	1.6	10Ψ_1	5Ψ_1	250	S20
BTY31	300	4.7	4‡Ψ_1	15†	2†	1.6	10Ψ_1	4Ψ_1	300	S20
BTY33	50	4.7	2‡Ψ_2	15†	2†	1.6	10Ψ_2	9Ψ_2	50	S20
BTY34	100	4.7	2‡Ψ_2	15†	2†	1.6	10Ψ_2	9Ψ_2	100	S20
BTY35	150	4.7	2‡Ψ_2	15†	2†	1.6	10Ψ_2	8Ψ_2	150	S20
BTY36	200	4.7	2‡Ψ_2	15†	2†	1.6	10Ψ_2	6Ψ_2	200	S20
BTY37	250	4.7	2‡Ψ_2	15†	2†	1.6	10Ψ_2	5Ψ_2	250	S20

(Continued)

Type	Peak Inverse Volts	Max. Rect. Current (A)	Max. Holding Current (mA)	Max. Gate Firing Characteristics		Max. Forward Voltage Drop		Max. Reverse Current		Connections
				mA	at Volts	Volts	at Amps	mA	at Volts	
MULLARD *(Continued)*										
Current Types (Continued)										
BTY38	300	4.7	$2 \ddagger \Psi_2$	15†	2†	1.6	$10\ \Psi_2$	$4\ \Psi_2$	300	S20
BTY39	400	4.7	$2 \ddagger \Psi_2$	15†	2†	1.6	$10\ \Psi_2$	$2\ \Psi_2$	400	S20
BTY57	50	16	$10 \ddagger \Psi_1$	40†	3†	1.45	$10\ \Psi_1$	$13\Psi_1$	50	S21
BTY58	100	16	$10 \ddagger \Psi_1$	40†	3†	1.45	$10\ \Psi_1$	$13\Psi_1$	100	S21
BTY59	150	16	$10 \ddagger \Psi_1$	40†	3†	1.45	$10\ \Psi_1$	$13\Psi_1$	150	S21
BTY60	200	16	$10 \ddagger \Psi_1$	40†	3†	1.45	$10\ \Psi_1$	$12\Psi_1$	200	S21
BTY61	250	16	$10 \ddagger \Psi_1$	40†	3†	1.45	$10\ \Psi_1$	$11\Psi_1$	250	S21
BTY62	300	16	$10 \ddagger \Psi_1$	40†	3†	1.45	$10\ \Psi_1$	$10\Psi_1$	300	S21
BTY79-150R	150	4.7	$15 \ddagger \Psi_1$	25†	2†	2.3	$20\ \Psi_3$	$8\Psi_1$	150	S20
BTY79-250R	250	4.7	$15 \ddagger \Psi_1$	25†	2†	2.3	$20\Psi_3$	$5\Psi_1$	250	S20
BTY79-400R	400	4.7	$15 \ddagger \Psi_1$	25†	2†	2.3	$20\Psi_3$	$2\Psi_1$	400	S20
BTY87-100R	100	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$13\Psi_1$	100	S21
BTY87-150R	150	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$13\Psi_1$	150	S21
BTY87-200R	200	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$12\Psi_1$	200	S21
BTY87-250R	250	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$11\Psi_1$	250	S21
BTY87-300R	300	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$10\Psi_1$	300	S21
BTY87-400R	400	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$8\Psi_1$	400	S21
BTY87-500R	500	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$6\Psi_1$	500	S21
BTY87-600R	600	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$5\Psi_1$	600	S21
BTY87-700R	700	12	$10 \ddagger \Psi_1$	65†	3.5†	3	$50\ \Psi_3$	$4.5\Psi_1$	700	S21
BTY87-800R	800	12	$10 \ddagger \Psi_1$	45†	3.5†	3	$50\Psi_3$	$4.5\Psi_1$	800	
BTY91-100R	100	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\ \Psi_3$	$13\Psi_1$	100	S21
BTY91-150R	150	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\ \Psi_3$	$13\Psi_1$	150	S21
BTY91-200R	200	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\ \Psi_3$	$12\Psi_1$	200	S21
BTY91-250R	250	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\ \Psi_3$	$11\Psi_1$	250	S21
BTY91-300R	300	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\ \Psi_3$	$10\Psi_1$	300	S21
BTY91-400R	400	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\Psi_3$	$8\Psi_1$	400	S21
BTY91-500R	500	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\Psi_3$	$6\Psi_1$	500	S21
BTY91-600R	600	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\Psi_3$	$5\Psi_1$	600	S21
BTY91-700R	700	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\Psi_3$	$4.5\Psi_1$	700	S21
BTY91-800R	800	16	$10 \ddagger \Psi_1$	40†	3†	2	$50\Psi_3$	$4.5\Psi_1$	800	S21
BTZ18	200	4.7	$4 \ddagger \Psi_1$	15†	2†	1	$10\Psi_1$	$6\Psi_1$	200	S20
BTZ19	400	4.7	$4 \ddagger \Psi_1$	15†	2†	1.6	$10\Psi_1$	$2\Psi_1$	400	S20
BTZ21	100	16								S20

† Minimum value ‡ Typical value $\Psi_1 T_j = 125^\circ C$ $\Psi_2 T_j = 150^\circ C$ $\Psi_3 T_j = 25^\circ C$

SGS FAIRCHILD

Current Types

2N3269	100	-	2	0.2	10	2.2	10	0.2 μA	100	S23
2N3270	200	-	2	0.2	10	2.2	10	0.2 μA	200	S23
2N3271	300	-	2	0.2	10	2.2	10	0.2 μA	300	S23
2N3272	400	-	2	0.2	10	2.2	10	0.2 μA	400	S23
2N3273	100	-	2	0.2	10	2.4	5	0.2 μA	100	C11
2N3274	200	-	2	0.2	10	2.4	5	0.2 μA	200	C11
2N3275	300	-	2	0.2	10	2.4	5	0.2 μA	300	C11
2N3276	400	-	2	0.2	10	2.4	5	0.2 μA	400	C11

Note:- For all types T_{on} = 3 μs (max.) at $I_A \simeq 5A$, I_g = 100mA
T_{off} = 2 μs (max.) at $I_A = -I_A = 5A$, R_{gc} = 1.0 kΩ

S.T.C.

Current Types

CRS1/ 05AF	60	1*	20	10	3	1.2	1.5	1	50	C11
CRS1/ 10AF	120	1*	20	10	3	1.2	1.5	1	100	C11

(Continued)

Type	Peak Inverse Volts	Max. Rect. Current (A)	Max. Holding Current (mA)	Max. Gate Firing Characteristics		Max. Forward Voltage Drop		Max. Reverse Current		Connections
				mA	at Volts	Volts	at Amps	mA	at Volts	
S.T.C. *(Continued)*										
Current Types (Continued)										
CRS1/ 20AF	240	1*	20	10	3	1.2	1.5	1	200	C11
CRS1/ 30AF	360	1*	20	10	3	1.2	1.5	1	300	C11
CRS1/ 35AF	420	1*	20	10	3	1.2	1.5	1	350	C11
CRS1/ 40AF	480	1*	20	10	3	1.2	1.5	1	400	C11
CRS3/ 05AF	60	3**	25	20	3	1.3	4.5	1	50	S20
CRS3/ 10AF	120	3**	25	20	3	1.3	4.5	1	100	S20
CRS3/ 20AF	240	3**	25	20	3	1.3	4.5	1	200	S20
CRS3/ 30AF	360	3**	25	20	3	1.3	4.5	1	300	S20
CRS3/ 35AF	420	3**	25	20	3	1.3	4.5	1	350	S20
CRS3/ 40AF	480	3**	25	20	3	1.3	4.5	1	400	S20
CRS3/ 50AF	600	3**	25	20	3	1.3	4.5	1	500	S20
CRS3/ 60AF	720	3**	25	20	3	1.3	4.5	1	600	S20
		* T_{case} = 65°C				** T_{stud} = 100°C				
TEXAS										
Obsolete Types										
1S600	50	3	25	20	-	1.5	3	1	50	S20
1S601	100	3	25	20	-	1.5	3	1	100	S20
1S602	200	3	25	20	-	1.5	3	1	200	S20
1S603	300	3	25	20	-	1.5	3	1	300	S20
1S604	400	3	25	20	-	1.5	3	1	400	S20
1S610	50	1	25	20	-	1.5	1	1	50	C11
1S611	100	1	25	20	-	1.5	1	1	100	C11
1S612	200	1	25	20	-	1.5	1	1	200	C11
1S613	300	1	25	20	-	1.5	1	1	300	C11
1S614	400	1	25	20	-	1.5	1	1	400	C11
1S620	50	3	-	50	-	1.5	3	2	50	S20
1S621	100	3	-	50	-	1.5	3	2	100	S20
1S622	200	3	-	50	-	1.5	3	2	200	S20
1S623	300	3	-	50	-	1.5	3	2	300	S20
1S624	400	3	-	50	-	1.5	3	2	400	S20
1S630	50	0.75	-	50	-	1.3	0.75	2	50	C11
1S631	100	0.75	-	50	-	1.3	0.75	2	100	C11
1S632	200	0.75	-	50	-	1.3	0.75	2	200	C11
1S633	300	0.75	-	50	-	1.3	0.75	2	300	C11
1S634	400	0.75	-	50	-	1.3	0.75	2	400	C11
Current Types										
2N1595	50	1	25	10	3	2	1	1	50	C11
2N1596	100	1	25	10	3	2	1	1	100	C11
2N1597	200	1	25	10	3	2	1	1	200	C11
2N1598	300	1	25	10	3	2	1	1	300	C11
2N1599	400	1	25	10	3	2	1	1	400	C11
2N1600	50	3	25	10	3	2	3	1	50	S20
2N1601	100	3	25	10	3	2	3	1	100	S20
2N1602	200	3	25	10	3	2	3	1	200	S20
2N1603	300	3	25	10	3	2	3	1	300	S20
2N1604	400	3	25	10	3	2	3	1	400	S20
2N1770	25	4.7	-	15	1	-	-	4.5	25	S20
2N1771	50	4.7	-	15	1	0.8	4.7	4.5	50	S20
2N1772	100	4.7	-	15	1	0.8	4.7	4.5	100	S20
2N1773	150	4.7	-	15	1	0.8	4.7	4	150	S20
2N1774	200	4.7	-	15	1	0.8	4.7	3	200	S20
2N1775	250	4.7	-	15	1	0.8	4.7	2.5	250	S20
2N1776	300	4.7	-	15	1	0.8	4.7	2	300	S20
2N1777	400	4.7	-	15	1	0.8	4.7	1	400	S20
2N1843B	50	16	-	75	1	1.5	16	1	50	S22
2N1844B	100	16	-	75	1	1.5	16	1	100	S22

(Continued)

Type	Peak Inverse Volts	Max. Rect. Current (A)	Max. Holding Current (mA)	Max. Gate Firing Characteristics		Max. Forward Voltage Drop		Max. Reverse Current		Connections
				mA	at Volts	Volts	at Amps	mA	at Volts	
TEXAS *(Continued)*										
Current Types (Continued)										
2N1846B	200	16	-	75	1	1.5	16	1	200	S22
2N1848B	300	16	-	75	1	1.5	16	1	300	S22
2N1849B	400	16	-	75	1	1.5	16	1	400	S22
2N1850B	500	16	-	75	1	1.5	16	1	500	S22
2N3001	30	0.35	3	0.02	-	1.1	0.35	-	-	C12
2N3002	60	0.35	3	0.02	-	1.1	0.35	-	-	C12
2N3003	100	0.35	3	0.02	-	1.1	0.35	-	-	C12
2N3004	200	0.35	3	0.02	-	1.1	0.35	-	-	C12
2N3005	30	0.35	5	0.02	-	1.1	0.35	-	-	C12
2N3006	60	0.35	5	0.02	-	1.1	0.35	-	-	C12
2N3007	100	0.35	5	0.02	-	1.1	0.35	-	-	C12
2N3008	200	0.35	5	0.02	-	1.1	0.35	-	-	C12
2N3555	30	1.0†	3	0.02	-	1.4	1.6	-	-	C11
2N3556	60	1.0†	3	0.02	-	1.4	1.6	-	-	C11
2N3557	100	1.0†	3	0.02	-	1.4	1.6	-	-	C11
2N3558	200	1.0†	3	0.02	-	1.4	1.6	-	-	C11
2N3559	30	1.0†	5	0.2	-	1.4	1.6	-	-	C11
2N3560	60	1.0†	5	0.2	-	1.4	1.6	-	-	C11
2N3561	100	1.0†	5	0.2	-	1.4	1.6	-	-	C11
2N3562	200	1.0†	5	0.2	-	1.4	1.6	-	-	C11
TI145A0	50	0.75	50	50	1	2	1	1	50	C11
TI145A1	100	0.75	50	50	1	2	1	1	100	C11
TI145A2	200	0.75	50	50	1	2	1	1	200	C11
TI145A3	300	0.75	50	50	1	2	1	1	300	C11
TI145A4	400	0.75	50	50	1	2	1	1	400	C11
TI40A0	50	3.0	50	50	1	2	3	1	50	S20
TI40A1	100	3.0	50	50	1	2	3	1	100	S20
T140A2	200	3.0	50	50	1	2	3	1	200	S20
TI40A3	300	3.0	50	50	1	2	3	1	300	S20
TI40A4	400	3.0	50	50	1	2	3	1	400	S20

† Average value

WESTINGHOUSE

Obsolete Types

CS12B	30	1	5	15	2.5	2.5	3	2	25	S15
CS12C	60	1	5	15	2.5	2.5	3	2	50	S15
CS12D	85	1	5	15	2.5	2.5	3	2	75	S15
CS12E	125	1	5	15	2.5	2.5	3	2	100	S15
CS12G	180	1	5	15	2.5	2.5	3	2	150	S15
CS12J	250	1	5	15	2.5	2.5	3	2	200	S15
CS12K	310	1	5	15	2.5	2.5	3	2	250	S15
CS12L	375	1	5	15	2.5	2.5	3	2	300	S15
CS12M	440	1	5	15	2.5	2.5	3	2	350	S15
CS12N	500	1	5	15	2.5	2.5	3	2	400	S15

Current Types

CS11B	30	0.5	5	5	2.5	2.5	1.5	2	25	C11
CS11C	60	0.5	5	5	2.5	2.5	1.5	2	50	C11
CS11D	85	0.5	5	5	2.5	2.5	1.5	2	75	C11
CS11E	125	0.5	5	5	2.5	2.5	1.5	2	100	C11
CS11G	180	0.5	5	5	2.5	2.5	1.5	2	150	C11
CS11J	250	0.5	5	5	2.5	2.5	1.5	2	200	C11
CS11K	310	0.5	5	5	2.5	2.5	1.5	2	250	C11
CS11L	375	0.5	5	5	2.5	2.5	1.5	2	300	C11
CS11M	440	0.5	5	5	2.5	2.5	1.5	2	350	C11
CS11N	500	0.5	5	5	2.5	2.5	1.5	2	400	C11

(Continued)

Type	Peak Inverse Volts	Max. Rect. Current (A)	Max. Holding Current (mA)	Max. Gate Firing Characteristics		Max. Forward Voltage Drop		Max. Reverse Current		Connections
				mA	at Volts	Volts	at Amps	mA	at Volts	
WESTINGHOUSE *(Continued)*										
Current Types (Continued)										
CS21B	30	16	5	3.5V through 33 Ω		2	50	5	25	S22
CS21C	60	16	5	3.5V through 33 Ω		2	50	5	50	S22
CS21D	85	16	5	3.5V through 33 Ω		2	50	5	75	S22
CS21E	125	16	5	3.5V through 33 Ω		2	50	5	100	S22
CS21G	180	16	5	3.5V through 33 Ω		2	50	5	150	S22
CS21J	250	16	5	3.5V through 33 Ω		2	50	5	200	S22
CS21K	310	16	5	3.5V through 33 Ω		2	50	5	250	S22
CS21L	375	16	5	3.5V through 33 Ω		2	50	5	300	S22
CS21M	440	16	5	3.5V through 33 Ω		2	50	5	350	S22
CS21N	500	16	5	3.5V through 33 Ω		2	50	5	400	S22
CS21P	600	16	5	3.5V through 33 Ω		2	50	5	480	S22
CS21Q	700	16	5	3.5V through 33 Ω		2	50	5	560	S22
CS21R	800	16	5	3.5V through 33 Ω		2	50	5	640	S22
CS21S	900	16	5	3.5V through 33 Ω		2	50	5	720	S22
CS22B	30	10	5	3.5V through 33 Ω		2.2	30	5	25	S22
CS22C	60	10	5	3.5V through 33 Ω		2.2	30	5	50	S22
CS22D	85	10	5	3.5V through 33 Ω		2.2	30	5	75	S22
CS22E	125	10	5	3.5V through 33 Ω		2.2	30	5	100	S22
CS22G	180	10	5	3.5V through 33 Ω		2.2	30	5	150	S22
CS22J	250	10	5	3.5V through 33 Ω		2.2	30	5	200	S22
CS22K	310	10	5	3.5V through 33 Ω		2.2	30	5	250	S22
CS22L	375	10	5	3.5V through 33 Ω		2.2	30	5	300	S22
CS22M	440	10	5	3.5V through 33 Ω		2.2	30	5	350	S22
CS22N	500	10	5	3.5V through 33 Ω		2.2	30	5	400	S22
CS22P	600	10	5	3.5V through 33 Ω		2.2	30	5	480	S22
CS22Q	700	10	5	3.5V through 33 Ω		2.2	30	5	560	S22
CS22R	800	10	5	3.5V through 33 Ω		2.2	30	5	640	S22
CS22S	900	10	5	3.5V through 33 Ω		2.2	30	5	720	S22
CS32B	30	16	5	3.5V through 33 Ω		2.5	50	10	25	S22
CS32C	60	16	5	3.5V through 33 Ω		2.5	50	10	50	S22
CS32D	85	16	5	3.5V through 33 Ω		2.5	50	10	75	S22
CS32E	125	16	5	3.5V through 33 Ω		2.5	50	10	100	S22
CS32G	180	16	5	3.5V through 33 Ω		2.5	50	10	150	S22
CS32J	250	16	5	3.5V through 33 Ω		2.5	50	10	200	S22
CS32K	310	16	5	3.5V through 33 Ω		2.5	50	10	250	S22
CS32L	375	16	5	3.5V through 33 Ω		2.5	50	10	300	S22
CS32M	440	16	5	3.5V through 33 Ω		2.5	50	10	350	S22
CS32N	500	16	5	3.5V through 33 Ω		2.5	50	10	400	S22
CS32P	600	16	5	3.5V through 33 Ω		2.5	50	10	480	S22
CS32Q	700	16	5	3.5V through 33 Ω		2.5	50	10	560	S22
CS32R	800	16	5	3.5V through 33 Ω		2.5	50	10	640	S22
CS32S	900	16	5	3.5V through 33 Ω		2.5	50	10	720	S22

SILICON AND GERMANIUM RECTIFIERS STACKS

Type	Construction	Type of Rectification	Peak Inverse Volts	Max. Input Volts (R.M.S.)	Max. Rect. Current (A)	Rectified Volts
A.E.I.						
Current Types						
A11A-A	Silicon	H.W	-	45	1.5	-
A12A-A		H.W	-	85	1.5	-
A14A-A		H.W	-	170	1.5	-
A16A-A		H.W	-	270	1.5	-
A18A-A		H.W	-	360	1.5	-
A110A-A		H.W	-	450	1.5	-
A112A-A		H.W	-	540	1.5	-

(Continued)

Type	Construction	Type of Rectification	Peak Inverse Volts	Max. Input Volts (R.M.S.)	Max. Rect. Current (A)	Rectified Volts
A.E.I. *(Continued)*						
Current Types (Continued)						
A11B-A	Silicon	F.W	-	45	3.0	-
A12B-A		F.W	-	85	3.0	-
A14B-A		F.W	-	170	3.0	-
A16B-A		F.W	-	270	3.0	-
A18B-A		F.W	-	360	3.0	-
A110B-A		F.W	-	450	3.0	-
A112B-A		F.W	-	540	3.0	-
A11C-A		F.W	-	45	4.5	-
A12C-A		F.W	-	85	4.5	-
A14C-A		F.W	-	170	4.5	-
A16C-A		F.W	-	270	4.5	-
A18C-A		F.W	-	360	4.5	-
A110C-A		F.W	-	450	4.5	-
A112C-A		F.W	-	540	4.5	-
B11A-A	Silicon	H.W	-	45	2.3	-
B12A-A		H.W	-	85	2.3	-
B14A-A		H.W	-	170	2.3	-
B16A-A		H.W	-	270	2.3	-
B18A-A		H.W	-	360	2.3	-
B110A-A		H.W	-	450	2.3	-
B112A-A		H.W	-	540	2.3	-
B11B-A	Silicon	F.W	-	45	4.6	-
B12B-A		F.W	-	85	4.6	-
B14B-A		F.W	-	170	4.6	-
B16B-A		F.W	-	270	4.6	-
B18B-A		F.W	-	360	4.6	-
B110B-A		F.W	-	450	4.6	-
B112B-A		F.W	-	540	4.6	-
B11C-A	Silicon	F.W	-	45	6.9	-
B12C-A		F.W	-	85	6.9	-
B14C-A		F.W	-	170	6.9	-
B16C-A		F.W	-	270	6.9	-
B18C-A		F.W	-	360	6.9	-
B110C-A		F.W	-	450	6.9	-
B112C-A		F.W	-	540	6.9	-
E11A-AM	Silicon	H.W	-	45	10.0	-
E12A-AM		H.W	-	85	10.0	-
E14A-AM		H.W	-	170	10.0	-
E16A-AM		H.W	-	270	10.0	-
E18A-AM		H.W	-	360	10.0	-
E110A-AM		H.W	-	450	10.0	-
E112A-AM		H.W	-	540	10.0	-
GA31-A	Germanium	Bridge	200	141	2.0	125
GA51-A		Bridge	300	212	2.0	189
GA52-A		Bridge	480	340	2.0	303
GA53-A		Bridge	720	510	2.0	455
GA41-A		Bridge	75	53	2.0	46
GA61-A		Bridge	150	106	2.0	94
GA62-A		Bridge	240	170	2.0	150
GA63-A		Bridge	360	255	2.0	225
GB31-A	Germanium	Bridge	200	141	3.0	188
GB51-A		Bridge	300	212	3.0	283
GB52-A		Bridge	480	340	3.0	454
GB41-A		Bridge	75	53	3.0	69
GB61-A		Bridge	150	106	3.0	140
GB62-A		Bridge	240	170	3.0	224

Type	Construction	Type of Rectification	Peak Inverse Volts	Max. Input Volts (R.M.S.)	Max. Rect. Current (A)	Rectified Volts
INTERNATIONAL RECTIFIER CO.						
Current Types						
1B1B-SD91S	Silicon	F.W	100	25	5.0	20†
1B1B-SD92S		F.W	200	50	5.0	43†
1B1B-SD94S		F.W	400	100	5.0	88†
1B1B-SD96S		F.W	600	150	5.0	133†
1D1B-SD98S		F.W	800	200	5.0	178†
1B1B-SD910S		F.W	1,000	250	5.0	220†
1C1B-SD91S	Silicon	F.W	100	12.5	5.0	20†
1C1B-SD92S		F.W	200	25	5.0	43†
1C1B-SD94S		F.W	400	50	5.0	88†
1C1B-SD96S		F.W	600	75	5.0	133†
1C1B-SD98S		F.W	800	100	5.0	178†
1C1B-SD910S		F.W	1,000	125	5.0	220†
1DBB-SS91S	Silicon	V.D	100	25	2.5	-
1D1B-SD92S		V.D	200	50	2.5	-
1D1B-SD94S		V.D	400	100	2.5	-
1D1B-SD96S		V.D	600	150	2.5	-
1D1B-SD98S		V.D	800	200	2.5	-
1D1B-SD910S		V.D	1,000	250	2.5	-
1D1J-6F10	Silicon	V.D	100	25	6.0	-
1D1J-6F20		V.D	200	50	6.0	-
1D1J-6F40		V.D	400	100	6.0	-
1D1J-6F60		V.D	600	150	6.0	-
1D1J-6F80		V.D	800	200	6.0	-
1D1J-6F100		V.D	1,000	250	6.0	-
1H1B-SD91S	Silicon	H.W	100	25	2.5	10†
1H1B-SD92S		H.W	200	50	2.5	22†
1H1B-SD94S		H.W	400	100	2.5	44†
1H1B-SD96S		H.W	600	150	2.5	67†
1H1B-SD98S		H.W	800	200	2.5	88†
1H1B-SD910S		H.W	1,000	250	2.5	110†
1H1J-6F10	Silicon	H.W	100	25	6.0	10†
1H1J-6F20		H.W	200	50	6.0	22†
1H1J-6F40		H.W	400	100	6.0	44†
1H1J-6F60		H.W	600	150	6.0	67†
1H1J-6F80		H.W	800	200	6.0	88†
1H1J-6F100		H.W	1,000	250	6.0	110†
1T1B-SD91A	Silicon	Bridge	100	25	7.5	33.5†
1T1B-SD92A		Bridge	200	50	7.5	65.5†
1T1B-SD94A		Bridge	400	100	7.5	133†
1T1B-SD96A		Bridge	600	150	7.5	200†
1T1B-SD98A		Bridge	800	200	7.5	268†
1T1B-SD910A		Bridge	1,000	250	7.5	335†

† For R/L load

JOSEPH LUCAS (ELECTRICAL) Ltd.

Current Types

2DV400	Silicon diffused	F.W	50	35	5.0	-
2DV401		F.W	100	70	5.0	-
2DV403		F.W	200	140	5.0	-
2DV406		F.W	400	280	5.0	-
2DS500	Silicon diffused	F.W	50	35	5.0	-
2DS501		F.W	100	70	5.0	-
2DS503		F.W	200	140	5.0	-
2DS506		F.W	400	280	5.0	-

Type	Construction	Type of Rectification	Peak Inverse Volts	Max. Input Volts (R.M.S.)	Max. Rect. Current (A)	Rectified Volts
SEMICONDUCTORS LTD						
Current Types						
X1FB1003	Silicon	-	-	70	6.0	60
X1FB2003		-	-	140	6.0	124
X1FB3003		-	-	210	6.0	186
X1FB4003		-	-	280	6.0	251
X1FB5003		-	-	350	6.0	314
X1FB6003		-	-	420	6.0	378
X1FB8003		-	-	560	6.0	506
X1FPP1003	Silicon	-	-	35/0/35	6.0	30
X1FPP2003		-	-	70/0/70	6.0	62
X1FPP3003		-	-	105/0/105	6.0	93
X1FPP4003		-	-	140/0/140	6.0	125
X1FPP5003		-	-	175/0/175	6.0	157
X1FPP6003		-	-	210/0/210	6.0	188
X1FPP8003		-	-	280/0/280	6.0	251
X3FB1003	Silicon	-	-	70	9.0	89
X3FB2003		-	-	140	9.0	186
X3FB3003		-	-	210	9.0	280
X3FB4003		-	-	280	9.0	376
X3FB5003		-	-	350	9.0	470
X3FB6003		-	-	420	9.0	565
X3FB8003		-	-	560	9.0	757
S.T.C.						
Replacement Types						
RS210AF-1B1	Silicon diffused	Bridge	130	70	1.5	63
RS220AF-1B1		Bridge	260	140	1.5	126
RS230AF-1B1		Bridge	380	210	1.5	189
RS240AF-1B1		Bridge	500	280	1.5	262
RS250AF-1B1		Bridge	650	350	1.5	315
RS260AF-1B1		Bridge	750	420	1.5	378
RS270AF-1B1		Bridge	900	490	1.5	440
RS280AF-1B1		Bridge	1,000	560	1.5	505
RS290AF-1B1		Bridge	1,100	630	1.5	565
RS291AF-1B1		Bridge	1,200	700	1.5	630
Current Types						
FST3 1-1B1	Silicon diffused	Bridge	125	70	2.5	63
FST3 2-1B1		Bridge	250	140	2.5	126
FST3 3-1B1		Bridge	400	210	2.5	189
FST3 4-1B1		Bridge	500	280	2.5	262
FST3 5-1B1		Bridge	650	350	2.5	315
RAC308AF-1B1	Silicon controlled avalanche	Bridge	800	565	2.5	510
RAS310AF-1B1	Silicon avalanche	Bridge	1,200	700	2.5	630
RAS310AF-6H1		H.W.	7,000	4,000	1.25	3,600
TEXAS						
Current Types						
IN2890	Silicon	H.W	2,000	1,400 R and L 707 C	0.25	640 R and L 1,000 C
IN2900		H.W	3,000	2,100 R and L 1,060 C	0.25	950 R and L 1,500 C
IN2910		H.W	4,000	2,800 R and L 1,414 C	0.25	1,280 R and L 2,000 C

(Continued)

Type	Construction	Type of Rectification	Peak Inverse Volts	Max. Input Volts (R.M.S.)	Max. Rect. Current (A)	Rectified Volts
TEXAS *(Continued)*						
Current Types (Continued)						
IN2918	Silicon	H.W	5,000	3,500 R and L 1,770 C	0.25	1,590 R and L 2,500 C
IN2922	Silicon	H.W	6,000	4,200 R and L 2,120 C	0.25	1,910 R and L 3,000 C
IN2924	Silicon	H.W	6,500	4,550 R and L 2,300 C	0.25	2,060 R and L 3,250 C
IB05J05	Silicon	F.W	50	35	0.5	32 R and L 50 C
IB05J10	Silicon	F.W	100	71	0.5	64 R and L 100 C
IB05J20	Silicon	F.W	200	142	0.5	128 R and L 200 C
IB05J40	Silicon	F.W	400	283	0.5	285 R and L 400 C
IB10J05	Silicon	F.W	50	35	1.0	32 R and L 50 C
IB10J10	Silicon	F.W	100	71	1.0	64 R and L 100 C
IB10J20	Silicon	F.W	200	142	1.0	128 R and L 200 C
IB10J40	Silicon	F.W	400	283	1.0	285 R and L 400 C
IB20K05	Silicon	F.W	50	35	2.0	32 R and L 50 C
IB20K10	Silicon	F.W	100	71	2.0	64 R and L 100 C
IB20K20	Silicon	F.W	200	142	2.0	128 R and L 200 C
IB20K40	Silicon	F.W	400	283	2.0	285 R and L 400 C
IB20K60	Silicon	F.W	600	424	2.0	382 R and L 600 C
IB20K80	Silicon	F.W	800	565	2.0	510 R and L 800 C
IB40K05	Silicon	F.W	50	35	4.0	32 R and L 50 C
IB40K10	Silicon	F.W	100	71	4.0	64 R and L 100 C
IB40K20	Silicon	F.W	200	142	4.0	128 R and L 200 C
IB40K40	Silicon	F.W	400	283	4.0	285 R and L 400 C
IB40K60	Silicon	F.W	600	424	4.0	382 R and L 600 C
IB40K80	Silicon	F.W	800	565	4.0	510 R and L 800 C
IB100M05	Silicon	F.W	50	35	10.0	32 R and L 50 C
IB100M10	Silicon	F.W	100	71	10.0	64 R and L 100 C
IB100M20	Silicon	F.W	200	142	10.0	128 R and L 200 C
IB100M40	Silicon	F.W	400	283	10.0	285 R and L 400 C
IB100M60	Silicon	F.W	600	424	10.0	382 R and L 600 C
IB100M80	Silicon	F.W	800	565	10.0	510 R and L 800 C
3B30L05	Silicon	Bridge	50	20.4	3.0	47.6 R and L 50 C
3B30L10	Silicon	Bridge	100	40.8	3.0	95.5 R and L 100 C

(Continued)

Type	Construction	Type of Rectification	Peak Inverse Volts	Max. Input Volts (R.M.S.)	Max. Rect. Current (A)	Rectified Volts
TEXAS *(Continued)*						
Current Types (Continued)						
3B30L20	Silicon	Bridge	200	81.5	3.0	190 R and L 200 C
3B30L40	Silicon	Bridge*	400	162	3.0	380 R and L 400 C
3B30L60	Silicon	Bridge*	600	240.5	3.0	570 R and L 600 C
3B30L80	Silicon	Bridge*	800	325	3.0	760 R and L 800 C
3B60L05	Silicon	Bridge*	50	20.4	6.0	476 R and L 50 C
3B60L10	Silicon	Bridge*	100	40.8	6.0	95.5 R and L 100 C
3B60L20	Silicon	Bridge*	200	81.5	6.0	190 R and L 200 C
3B60L40	Silicon	Bridge*	400	162	6.0	380 R and L 400 C
3B60L60	Silicon	Bridge*	600	240.5	6.0	570 R and L 600 C
3B60L80	Silicon	Bridge*	800	325	6.0	760 R and L 800 C
IB15CL05	Silicon	Bridge†	50	35	1.5	32 R and L 50 C
IB15CL10	Silicon	Bridge†	100	71	1.5	64 R and L 100 C
IB15CL20	Silicon	Bridge†	200	142	1.5	128 R and L 200 C
IB15CL40	Silicon	Bridge†	400	283	1.5	285 R and L 400 C
IB40CL05	Silicon	Bridge†	50	35	4.0	32 R and L 50 C
IB40CL10	Silicon	Bridge†	100	71	4.0	64 R and L 100 C
IB40CL20	Silicon	Bridge†	200	142	4.0	128 R and L 200 C
IB40CL40	Silicon	Bridge†	400	283	4.0	285 R and L 400 C

*3-Phase F.W.
†S.C.R. Bridge

WESTINGHOUSE

Current Types

S1PB1	Silicon epoxy-resin encapsulated	F.W	100	35	2.15	25
S2PB1	Silicon epoxy-resin encapsulated	F.W	200	70	2.15	52
S3PB1	Silicon epoxy-resin encapsulated	F.W	300	105	2.15	79
S4P81	Silicon epoxy-resin encapsulated	F.W	400	140	2.15	107
S5PB1	Silicon epoxy-resin encapsulated	F.W	500	175	2.15	134
S6PB1	Silicon epoxy-resin encapsulated	F.W	600	210	2.15	161
S7PB1	Silicon epoxy-resin encapsulated	F.W	700	245	2.15	189
S8PB1	Silicon epoxy-resin encapsulated	F.W	800	280	2.15	216
S9PB1	Silicon epoxy-resin encapsulated	F.W	900	315	2.15	243
S10PB1	Silicon epoxy-resin encapsulated	F.W	1,000	350	2.15	271
S12PB1	Silicon epoxy-resin encapsulated	F.W	1,200	420	2.15	325

(Continued)

Type	Construction	Type of Rectification	Peak Inverse Volts	Max. Input Volts (R.M.S.)	Max. Rect. Current (A)	Rectified Volts
WESTINGHOUSE *(Continued)*						
Current Types (Continued)						
S15PB1	Silicon epoxy-resin encapsulated	F.W.	1,500	525	2.15	406
S1PB2		F.W.	100	35	3.8	25
S2PB2		F.W	200	70	3.8	52
S3PB2		F.W	300	105	3.8	79
S4PB2		F.W	400	140	3.8	107
S5PB2		F.W	500	175	3.8	134
S6PB2		F.W	600	210	3.8	161
S7PB2		F.W	700	245	3.8	189
S8PB2		F.W	800	280	3.8	216
S9PB2		F.W	900	315	3.8	243
S10PB2		F.W	1,000	350	3.8	271
S12PB2		F.W	1,200	420	3.8	325
S15PB2		F.W.	1,500	525	3.8	525
S18PB2		F.W.	1,800	630	3.8	630
S1PC1	Silicon epoxy-resin encapsulated	F.W	100	35	2.15	12.5
S2PC1		F.W	200	70	2.15	26
S3PC1		F.W	300	105	2.15	40
S4PC1		F.W	400	140	2.15	54
S5PC1		F.W	500	175	2.15	67
S6PC1		F.W	600	210	2.15	81
S7PC1		F.W	700	245	2.15	95
S8PC1		F.W	800	280	2.15	108
S9PC1		F.W	900	315	2.15	122
S10PC1		F.W	1,000	350	2.15	136
S12PC1		F.W	1,200	420	2.15	163
S1PC2	Silicon epoxy-resin encapsulated	F.W	100	35	3.8	12.5
S2PC2		F.W	200	70	3.8	26
S3PC2		F.W	300	105	3.8	40
S4PC2		F.W	400	140	3.8	54
S5PC2		F.W	500	175	3.8	67
S6PC2		F.W	600	210	3.8	81
S7PC2		F.W	700	245	3.8	95
S8PC2		F.W	800	280	3.8	108
S9PC2		F.W	900	315	3.8	122
S10PC2		F.W	1,000	350	3.8	136
S12PC2		F.W	1,200	420	3.8	163
S15PC2		F.W.	1,500	525	3.8	525
S18PC2		F.W.	1,800	630	3.8	630
SHTU818/5	Silicon epoxy-resin encapsulated	H.W	7,500	2,600	1.3	-
SHTU818/6		H.W	9,000	3,180	1.3	-
SHTU818/7		H.W	10,500	3,720	1.3	-
SHTU818/8		H.W	12,000	4,240	1.3	-
SHTU818/9		H.W	13,500	4,740	1.3	-
SHTU818/10		H.W	15,000	5,300	1.3	-
SHTU823/5*		H.W	7,500	2,600	1.8	-
SHTU823/6*		H.W	9,000	3,180	1.8	-
SHTU823/7*		H.W	10,500	3,720	1.8	-
SHTU823/8*		H.W	12,000	4,240	1.8	-
SHTU823/9*		H.W	13,500	4,740	1.8	-
SHTU823/10*		H.W	15,000	5,300	1.8	-
SHTU802/2*		H.W	14,000	5,100	1.8	-

*For operation under oil

SILCON REFERENCE DIODES

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
A.E.I.						
Current Types						
MR1A†	6.6	5	35	35	250	C14
MR2A††	6.6	5	35	35	250	C14
MR33H	3.3	5	50	100	250	A1
MR36H	3.6	5	47	95	250	A1
MR39H	3.9	5	44	90	250	A1
MR43H	4.3	5	42	85	250	A1
MR47H	4.7	5	40	80	250	A1
MR51H	5.1	5	38	70	250	A1
MR56H	5.6	5	35	50	250	A1
MR62H	6.2	5	33	30	250	A1
MR68H	6.8	5	29	15	250	A1
MR75H	7.5	5	27	15	250	A1
MR82H	8.2	5	25	20	250	A1
MR91H	9.1	5	23	20	250	A1
MR100H	10.0	5	21	30	250	A1
MR136H	3.6	15	44	100	250	A1
MR143H	4.3	15	40	90	250	A1
MR151H	5.1	15	35	80	250	A1
MR162H	6.2	15	29	50	250	A1
MR175H	7.5	15	25	20	250	A1
MR191H	9.1	15	21	30	250	A1
VR35E	3.5	5	1.35A	22	5.8W	S2
VR425E	4.25	5	1.22A	19	5.8W	S2
VR475E	4.75	5	1.11A	18	5.8W	S2
VR525E	5.25	5	1.03A	17	5.8W	S2
VR575E	5.75	5	960	10	5.8W	S2
VR625E	6.25	5	890	4	5.8W	S2
VR7E	7.0	5	720	4	5.8W	S2
VR8E	8.0	5	600	4	5.8W	S2
VR9E	9.0	5	550	4	5.8W	S2
VR10E	10.0	5	480	5	5.8W	S2
VR11E	11.0	5	450	6	5.8W	S2
VR12E	12.0	5	410	11	5.8W	S2
VR35F	3.5	5	525	22	2.25W	A5
VR425F	4.25	5	470	19	2.25W	A5
VR475F	4.75	5	430	18	2.25W	A5
VR525F	5.25	5	400	17	2.25W	A5
VR575F	5.75	5	370	10	2.25W	A5
VR625F	6.25	5	345	4	2.25W	A5
VR7F	7.0	5	285	4	2.25W	A5
VR8F	8.0	5	235	4	2.25W	A5
VR9F	9.0	5	210	4	2.25W	A5
VR10F	10.0	5	185	5	2.25W	A5
VR11F	11.0	5	165	6	2.25W	A5
VR12F	12.0	5	155	11	2.25W	A5

† Temp. coefficient 0.006% per °C
†† Temp. coefficient 0.001% per °C

FERRANTI						
Current Types						
KR50	15.0*	10	530	5*	10W‡	S9
KR51	18.0*	10	440	5*	10W‡	S9
KR52	22.0*	10	360	5*	10W‡	S9
KR53	27.0*	10	295	5*	10W‡	S9
KR54	33.0*	10	240	5*	10W‡	S9
KR55	39.0*	10	200	6*	10W‡	S9
KR56	47.0*	10	170	8*	10W‡	S9

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
FERRANTI *(Continued)*						
Current Types (Continued)						
KR57	56.0*	10	140	11*	10W‡	S9
KR58	68.0*	10	115	14*	10W‡	S9
KR59	82.0*	10	95	20*	10W‡	S9
KR60	100.0*	10	80	30*	10W‡	S9
KR50R to KR60R	Reverse polarity versions KR50 / 60					S8
KS033A	3.3	5	–	150	400	A2
KS036A	3.6	5	–	100	400	A2
KS039A	3.9	5	–	95	400	A2
KS043A	4.3	5	–	90	400	A2
KS047A	4.7	5	–	85	400	A2
KS051A	5.1	5	–	80	400	A2
KS056A	5.6	5	–	70	400	A2
KS062A	6.2	5	–	60	400	A2
KS068A	6.8	5	–	35	400	A2
KS075A	7.5	5	–	15	400	A2
KS082A	8.2	5	–	15	400	A2
KS091A	9.1	5	–	20	400	A2
KS100A	10.0	5	–	40	400	A2
KS110A	11.0	5	–	50	400	A2
KS120A	12.0	5	–	60	400	A2
KS150A	15.0	5	–	100	400	A2
KS180A	18.0	5	–	–	400	A2
KS30A	3.3†	5	110	130†	300	C2
KS30B	3.3†	10	110	130†	300	C2
KS31A	3.6†	5	110	100†	300	C2
KS32A	3.9†	5	90	90†	300	C2
KS32B	3.9†	10	90	90†	300	C2
KS33A	4.3†	5	80	80†	300	C2
KS34A	4.7†	5	75	75†	300	C2
KS34B	4.7†	10	75	75†	300	C2
KS35A	5.1†	5	65	70†	300	C2
KS36A	5.6†	5	60	40†	300	C2
KS36B	5.6†	10	60	65†	300	C2
KS37A	6.2†	5	50	15†	300	C2
KS38A	6.8†	5	45	10†	300	C2
KS38B	6.8†	10	45	10†	300	C2
KS39A	7.5†	5	42	10†	300	C2
KS40A	8.2†	5	40	15†	300	C2
KS40B	8.2†	10	40	15†	300	C2
KS41A	9.1†	5	35	18†	300	C2
KS42A	10.0†	5	30	25†	300	C2
KS42B	10.0†	10	30	30†	300	C2
KS43A	11.0†	5	27	40†	300	C2
KS44A	12.0†	5	25	45†	300	C2
KS44B	12.0†	10	25	45†	300	C2
KS67	9.0†	5	16	35†	150	C8
KS67B	9.0†	5	16	35†	150	C8
KS68	9.0†	5	16	35†	150	C8
KS68B	9.0†	5	16	35†	150	C8
KS69	9.0†	5	16	35†	150	C8
KS77	9.0	5	–	35	50	A1
KS77B	9.0	5	–	35	50	A1
KS78	9.0	5	–	35	50	A1
KS78B	9.0	5	–	35	50	A1

KS67 and KS68 are high stability units, for which the maximum change in Reference voltage at 5mA over the temperature range – 55 to + 125°C is 15mV (KS67) and 30mV (KS68). KS67B and KS68B are similar but the operating temperature range is 0 to + 100°C *At 50mA ‡Mounted on a standard Ferranti heat sink or on a copper or aluminium heat sink 2 ½ in. × 2½ in. × 1/16 in. † At 5mA

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
HUGHES						
Current Types						
1N702	2.6	20	–	60	250	A1
1N702A	2.6	5	–	60	250	A1
HS2027	2.7	5	–	–	250	A1
HS7027	2.7	5	–	–	400	A1
HS7030	3.0	5	–	–	400	A1
HS2033	3.3	5	–	–	250	A1
HS7033	3.3	5	–	–	400	A1
1N703	3.5	20	–	55	250	A1
1N703A	3.5	5	–	55	250	A1
HS2036	3.6	5	–	–	250	A1
HS7036	3.6	5	–	–	400	A1
HS2039	3.9	5	–	–	250	A1
HS7039	3.9	5	–	–	400	A1
1N704	4.1	20	–	45	250	A1
1N704A	4.1	5	–	45	250	A1
HS2043	4.3	5	–	–	250	A1
HS7043	4.3	5	–	–	400	A1
HS2047	4.7	5	–	–	250	A1
HS7047	4.7	5	–	–	400	A1
1N705	4.8	20	–	35	250	A1
1N705A	4.8	5	–	35	250	A1
HS2051	5.1	5	–	–	250	A1
HS7051	5.1	5	–	–	400	A1
1N708	5.6	10	–	3.6	250	A1
1N708A	5.6	5	–	3.6	250	A1
HS2056	5.6	5	–	–	250	A1
HS7056	5.6	5	–	–	400	A1
1N706	5.8	20	–	20	250	A1
1N706A	5.8	5	–	20	250	A1
1N709	6.2	10	–	4.1	250	A1
1N709A	6.2	5	–	4.1	250	A1
HS2062	6.2	5	–	–	250	A1
HS7062	6.2	5	–	–	400	A1
1N710	6.8	10	–	4.7	250	A1
1N710A	6.8	5	–	4.7	250	A1
HS2068	6.8	5	–	–	250	A1
HS7068	6.8	5	–	–	400	A1
1N707	7.1	20	–	10	250	A1
1N707A	7.1	5	–	10	250	A1
1N711	7.5	10	–	5.3	250	A1
1N711A	7.5	5	–	5.3	250	A1
HS2075	7.5	5	–	–	250	A1
HS7075	7.5	5	–	–	400	A1
1N712	8.2	10	–	6	250	A1
1N712A	8.2	5	–	6	250	A1
HS2082	8.2	5	–	–	250	A1
HS7082	8.2	5	–	–	400	A1
1N713	9.1	10	–	7	250	A1
1N713A	9.1	10	–	7	250	A1
HS2091	9.1	5	–	–	250	A1
HS7091	9.1	5	–	–	400	A1
1N714	10.0	10	–	8	250	A1
1N714A	10.0	5	–	8	250	A1
HS2100	10.0	5	–	–	250	A1
HS7100	10.0	5	–	–	400	A1
1N715	11.0	10	–	9	250	A1
1N715A	11.0	5	–	9	250	A1
HS2110	11.0	5	–	–	250	A1
HS7110	11.0	5	–	–	400	A1
1N716	12.0	10	–	10	250	A1
1N716A	12.0	5	–	10	250	A1
HS2120	12.0	5	–	–	250	A1

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
HUGHES *(Continued)*						
Current Types (Continued)						
HS7120	12.0	5	-	-	400	A1
1N717	13.0	10	-	11	250	A1
1N717A	13.0	5	-	11	250	A1
HS2135	13.5	5	-	-	250	A1
HS7135	13.5	5	-	-	400	A1
1N718	15.0	10	-	13	250	A1
1N718A	15.0	5	-	13	250	A1
HS2150	15.0	5	-	-	250	A1
HS7150	15.0	5	-	-	400	A1
1N719	16.0	10	-	15	250	A1
1N719A	16.0	5	-	15	250	A1
HS2165	16.0	5	-	-	250	A1
HS7165	16.5	5	-	-	400	A1
1N720	18.0	10	-	17	250	A1
1N720A	18.0	5	-	17	250	A1
HS2180	18.0	5	-	-	250	A1
HS7180	18.0	5	-	-	400	A1
1N721	20.0	10	-	20	250	A1
1N721A	20.0	5	-	20	250	A1
HS2200	20.0	5	-	-	250	A1
HS7200	20.0	5	-	-	400	A1
1N722	22.0	10	-	24	250	A1
1N722A	22.0	5	-	24	250	A1
HS2220	22.0	5	-	-	250	A1
HS7220	22.0	5	-	-	400	A1
1N723	24.0	10	-	28	250	A1
1N723A	24.0	5	-	28	250	A1
HS2240	24.0	5	-	-	250	A1
HS7240	24.0	5	-	-	400	A1
1N724	27.0	10	-	35	250	A1
1N724A	27.0	5	-	35	250	A1
HS2270	27.0	5	-	-	250	A1
HS7270	27.0	5	-	-	400	A1
1N725	30.0	10	-	42	250	A1
1N725A	30.0	5	-	42	250	A1
HS2300	30.0	5	-	-	250	A1
HS7300	30.0	5	-	-	400	A1
1N726	33.0	10	-	50	250	A1
1N726A	33.0	5	-	50	250	A1
HS2330	33.0	5	-	-	250	A1
HS7330	33.0	5	-	-	400	A1
INTERNATIONAL RECTIFIER CO.						
Current Types						
1N746*	3.3	10	121	28	400	A4
1N747*	3.6	10	111	24	400	A4
1N748*	3.9	10	103	23	400	A4
1N749*	4.3	10	93	22	400	A4
1N750*	4.7	10	85	19	400	A4
1N751*	5.1	10	78.5	17	400	A4
1N752*	5.6	10	71.3	11	400	A4
1N753*	6.2	10	64.5	7	400	A4
1N754*	6.8	10	59	5	400	A4
1N755*	7.5	10	53	6	400	A4
1N756*	8.2	10	49	8	400	A4
1N757*	9.1	10	44	10	400	A4
1N758*	10.0	10	40	17	400	A4

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
INTERNATIONAL RECTIFIER CO. *(Continued)*						
Current Types (Continued)						
1N1363† *	33.0	10	300	4	10W	S15
1N1364† *	36.0	10	270	5	10W	S15
1N1365† *	39.0	10	260	5	10W	S15
1N1366† *	43.0	10	230	6	10W	S15
1N1367† *	47.0	10	210	7	10W	S15
1N1368† *	51.0	10	190	8	10W	S15
1N1369† *	56.0	10	180	9	10W	S15
1N1370† *	68.0	10	160	12	10W	S15
1N1371† *	75.0	10	150	14	10W	S15
1N1372† *	82.0	10	130	20	10W	S15
1N1373† *	91.0	10	120	22	10W	S15
1N1374† *	91.0	10	110	35	10W	S15
1N1375† *	100.0	10	100	40	10W	S15
1N1783 *	33.0	10	30	33	1W	A13
1N1784 *	36.0	10	27	39	1W	A13
1N1785 *	39.0	10	26	45	1W	A13
1N1786 *	43.0	10	23	54	1W	A13
1N1787 *	47.0	10	21	64	1W	A13
1N1788 *	51.0	10	19	74	1W	A13
1N1789 *	56.0	10	12	88	1W	A13
1N1790 *	62.0	10	16	105	1W	A13
1N1791 *	68.0	10	15	125	1W	A13
1N1792 *	75.0	10	13	150	1W	A13
1N1793 *	82.0	10	12	175	1W	A13
1N1794 *	91.0	10	11	220	1W	A13
1N1795 *	100.0	10	10	260	1W	A13
1N1796 *	110.0	10	9	320	1W	A13
1N1797 *	120.0	10	8	390	1W	A13
1N1798 *	130.0	10	7.6	450	1W	A13
1N1799 *	150.0	10	6.6	600	1W	A13
1N1800 *	160.0	10	6	700	1W	A13
1N1801 *	180.0	10	5.5	900	1W	A13
1N1802 *	200.0	10	5	1,100	1W	A13
1N1809† *	110.0	10	90	47	10w	S15
1N1810† *	120.0	10	80	56	10W	S15
1N1811† *	130.0	10	76	65	10W	S15
1N1812† *	150.0	10	66	82	10W	S15
1N1813† *	160.0	10	60	93	10W	S15
1N1814† *	180.0	10	55	115	10W	S15
1N1815† *	200.0	10	50	140	10W	S15
1N3305†‡	6.8	20 ‡	6.6A	0.4	50W	S5
1N3306†‡	7.5	20 ‡	5.9A	0.5	50W	S5
1N3307†‡	8.2	20 ‡	5.2A	0.6	50W	S5
1N3308†‡	9.1	20 ‡	4.8A	0.7	50W	S5
1N3309†‡	10.0	20 ‡	4.3A	0.8	50W	S5
1N3310†‡	11.0	20 ‡	3.9A	0.9	50W	S5
1N3311†‡	12.0	20 ‡	3.6A	1.0	50W	S5
1N3312†‡	13.0	20 ‡	3.3A	1.1	50W	S5
1N3313†‡	14.0	20 ‡	3.0A	1.2	50W	S5
1N3314†‡	15.0	20 ‡	2.8A	1.4	50W	S5
1N3315†‡	16.0	20 ‡	2.65A	1.6	50W	S5
1N3316†‡	17.0	20 ‡	2.5A	1.8	50W	S5
1N3317†‡	18.0	20 ‡	2.3A	2.0	50W	S5
1N3318†‡	19.0	20	2.2A	2.2	50W	S5
1N3319†‡	20.0	20	2.1A	2.4	50W	S5
1N3320†‡	22.0	20	1.9A	2.5	50W	S5
1N3321†‡	24.0	20	1.75A	2.6	50W	S5
1N3322†‡	25.0	20	1.55A	2.7	50W	S5
1N3323†‡	27.0	20	1.5A	2.8	50W	S5
1N3324†‡	30.0	20	1.4A	3.0	50W	S5
1N3325†‡	33.0	20	1.3A	3.2	50W	S5

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
INTERNATIONAL RECTIFIER CO. *(Continued)*						
Current Types (Continued)						
1N3326†‡	36.0	20	1.15A	3.5	50W	S5
1N3327†‡	39.0	20	1.5A	4	50W	S5
1N3328†‡	43.0	20	975	4.5	50W	S5
1N3329†‡	45.0	20	930	4.5	50W	S5
1N3330†‡	47.0	20	880	5	50W	S5
1N3331†‡	50.0	20	830	5	50W	S5
1N3332†‡	51.0	20	810	5.2	50W	S5
1N3333†‡	52.0	20	790	5.5	50W	S5
1N3334†‡	56.0	20	740	6	50W	S5
1N3335†‡	62.0	20	660	7	50W	S5
1N3336†‡	68.0	20	600	8	50W	S5
1N3337†‡	75.0	20	540	9	50W	S5
1N3338†‡	82.0	20	490	11	50W	S5
1N3339†‡	91.0	20	420	15	50W	S5
1N3340†‡	100.0	20	400	20	50W	S5
1Z3.9T10**	3.9	10	250	-	1W	A11
1Z4.7T10**	4.7	10	200	-	1W	A11
1Z5.6T10**	5.6	10	175	-	1W	A11
1Z6.8T10**	6.8	10	150	-	1W	A11
1Z8.2T10**	8.2	10	120	-	1W	A11
1Z10T10**	10.0	10	100	-	1W	A11
1Z12T10**	12.0	10	80	-	1W	A11
1Z15T10**	15.0	10	65	-	1W	A11
1Z18T10**	18.0	10	55	-	1W	A11
1Z22T10**	22.0	10	45	-	1W	A11
1Z27T10**	27.0	10	35	-	1W	A11
10Z3.9T10**	3.9	10	2.5A	1.5	10W	S2
10Z4.7T10**	4.7	10	2A	1.4	10W	S2
10Z5.6T10**	5.6	10	1.75A	1	10W	S2
10Z6.8T10**	6.8	10	1.5A	0.5	10W	S2
10Z8.2T10**	8.2	10	1.2A	0.8	10W	S2
10Z10T10**	10.0	10	1A	1.8	10W	S2
10Z12T10**	12.0	10	800	2.4	10W	S2
10Z15T10**	15.0	10	650	3.5	10W	S2
10Z18T10**	18.0	10	550	5	10W	S2
10Z22T10**	22.0	10	450	7.5	10W	S2
10Z27T10**	27.0	10	350	13	750	S2
MZ3.9T10	3.9	10	180	30	750	A11
MZ4.7T10	4.7	10	150	28	750	A11
MZ5.6T10	5.6	10	130	24	750	A11
MZ6.8T10	6.8	10	110	15	750	A11
MZ8.2T10	8.2	10	90	6	750	A11
MZ10T10	10.0	10	75	6	750	A11
MZ12T10	12.0	10	60	10	750	A11
MZ15T10	15.0	10	50	25	750	A11
MZ18T10	18.0	10	40	40	750	A11
MZ22T10	22.0	10	33	70	750	A11
MZ27T10	27.0	10	26	95	750	A11

* To specify ± 5% tolerance types suffix 'A' is added to type number
** To specify ± 5% tolerance suffix 'T10' is replaced by suffix 'T5' (e.g. 10Z3.9T5)
‡ To specify ± 10% tolerance types suffix 'A' is added to type number. To specify ± 5% tolerance types suffix 'B' is added to type number
† To specify reverse polarity types suffix 'R' is added to type number (e.g. 1N1363RA)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
JOSEPH LUCAS (ELECTRICAL) Ltd.						
Current Types						
ZC012	12.0	5	50	5.5*	600	A12
ZC013	13.0	5	46	6.0*	600	A12
ZC015	15.0	5	40	7.0*	600	A12
ZC016	16.0	5	37	7.4*	600	A12
ZC018	18.0	5	33	8.25*	600	A12
ZC020	20.0	5	30	9.2*	600	A12
ZC022	22.0	5	27	10.0*	600	A12
ZC024	24.0	5	25	11.0*	600	A12
ZC027	27.0	5	22	12.5*	600	A12
ZC030	30.0	5	20	14.0*	600	A12
ZC033	33.0	5	18	15.2*	600	A12
ZC2012	12.0	5	150	5.5*	1.8W	A23
ZC2013	13.0	5	138	6.0*	1.8W	A23
ZC2015	15.0	5	120	7.0*	1.8W	A23
ZC2016	16.0	5	111	7.4*	1.8W	A23
ZC2018	18.0	5	100	8.2*	1.8W	A23
ZC2020	20.0	5	90	9.2*	1.8W	A23
ZC2022	22.0	5	80	10.0*	1.8W	A23
ZC2024	24.0	5	75	11.0*	1.8W	A23
ZC2027	27.0	5	66	12.5*	1.8W	A23
ZC2030	30.0	5	60	14.0*	1.8W	A23
ZC2033	33.0	5	44	15.2*	1.8W	A23
ZC4012	12.0	5	830	1.9**	10W	S24
ZC4013	13.0	5	770	1.9**	10W	S24
ZC4015	15.0	5	666	1.8**	10W	S24
ZC4016	16.0	5	625	1.8**	10W	S24
ZC4018	18.0	5	555	1.9**	10W	S24
ZC4020	20.0	5	500	1.9**	10W	S24
ZC4022	22.0	5	455	2.0**	10W	S24
ZC4024	24.0	5	416	2.1**	10W	S24
ZC4027	27.0	5	370	2.3**	10W	S24
ZC4030	30.0	5	333	2.5**	10W	S24
ZC4033	33.0	5	300	2.8**	10W	S24
ZC4036	36.0	5	278	3.1**	10W	S24
ZC4039	39.0	5	257	3.4**	10W	S24
ZC4043	43.0	5	233	3.8**	10W	S24
ZC4047	47.0	5	213	4.2**	10W	S24
ZC4051	51.0	5	196	4.6**	10W	S24
ZC4056	56.0	5	178	5.1**	10W	S24
ZC4062	62.0	5	161	5.8**	10W	S24
ZC4068	68.0	5	147	6.4**	10W	S24
ZC4075	75.0	5	133	7.2**	10W	S24
ZC4082	82.0	5	122	8.0**	10W	S24
ZC4091	91.0	5	110	9.0**	10W	S24
ZC4099	100.0	5	100	9.8**	10W	S24

* Typical dynamic resistance measured at 10mA
** Typical dynamic resistance measured at 50mA

MULLARD						
Current Types						
BZY78	5.3	5	25	20	280	A2
BZY88 C4V7	4.7	5	250	-	400	A1
BZY88 C5V1	5.1	5	250	-	400	A1
BZY88 C5V6	5.6	5	250	-	400	A1
BZY88 C6V2	6.2	5	250	-	400	A1

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
MULLARD *(Continued)*						
Current Types (Continued)						
BZY88 C6V8	6.8	5	250	-	400	A1
BZY88 C7V5	7.5	5	250	-	400	A1
BZY88 C8V2	8.2	5	250	-	400	A1
BZY88 C9V1	9.1	5	250	-	400	A1
OAZ222	5.6	5	7A	-	10W ϕ_2	S2
OAZ223	6.2	5	7A	-	10W ϕ_2	S2
OAZ224	6.8	5	7A	-	10W ϕ_2	S2
OAZ225	7.5	5	7A	-	10W ϕ_2	S2
OAZ226	8.2	5	7A	-	10W ϕ_2	S2
OAZ227	9.1	5	7A	-	10W ϕ_2	S2
OAZ228	10.0	5	7A	-	10W ϕ_2	S2
OAZ240	4.7	5	25	-	245 ϕ_1	A1
OAZ241	5.1	5	25	-	245 ϕ_1	A1
OAZ242	5.6	5	25	-	245 ϕ_1	A1
OAZ243	6.2	5	25	-	245 ϕ_1	A1
OAZ244	6.8	5	25	-	245 ϕ_1	A1
OAZ245	7.5	5	25	-	245 ϕ_1	A1
OAZ246	8.2	5	25	-	245 ϕ_1	A1
OAZ247	9.1	5	25	-	245 ϕ_1	A1
OAZ268	4.3	15	25	-	245 ϕ_1	A1
OAZ269	5.1	15	25	-	245 ϕ_1	A1
OAZ270	6.2	15	25	-	245 ϕ_1	A1
OAZ271	7.5	15	25	-	245 ϕ_1	A1
OAZ272	9.1	15	25	-	245 ϕ_1	A1
OAZ273	12.0	15	25	-	245 ϕ_1	A1
OAZ290	6.2	15	500	-	7W ϕ_1	S2
OAZ291	7.5	15	500	-	7W ϕ_1	S2
OAZ292	9.1	15	500	-	7W ϕ_1	S2
SZ15BN	15.0	10	-	3	25W Ψ	S15
SZ15BR	15.0	10	-	3	25W Ψ	S10
SZ15BD	15.0	10	-	3	25W Ψ	S17
SZ18BN	18.0	10	-	3	25W Ψ	S15
SZ18BR	18.0	10	-	3	25W Ψ	S10
SZ18BD	18.0	10	-	3	25W Ψ	S17
SZ22BN	22.0	10	-	3	25W Ψ	S15
SZ22BR	22.0	10	-	3	25W Ψ	S10
SZ22BD	22.0	10	-	3	25W Ψ	S17
SZ27BN	27.0	10	-	3	25W Ψ	S15
SZ27BR	27.0	10	-	3	25W Ψ	S10
SZ27BD	27.0	10	-	3	25W Ψ	S17
SZ33BN	33.0	10	-	4	25W Ψ	S15
SZ33BR	33.0	10	-	4	25W Ψ	S10
SZ39BN	39.0	10	-	5	25W Ψ	S15
SZ39BR	39.0	10	-	5	25W Ψ	S10
SZ47BN	47.0	10	-	6	25W Ψ	S15
SZ47BR	47.0	10	-	6	25W Ψ	S10
SZ56BN	56.0	10	-	7	25W Ψ	S15
SZ56BR	56.0	10	-	7	25W Ψ	S10
SZ68BN	68.0	10	-	8	25W Ψ	S15
SZ68BR	68.0	10	-	8	25W Ψ	S10
SZ56A	5.6	5	-	15	1.5W ϕ_1	A5
SZ62A	6.2	5	-	12	1.5W ϕ_1	A5
SZ68A	6.8	5	-	10	1.5W ϕ_1	A5
SZ75A	7.5	5	-	12	1.5W ϕ_1	A5
SZ82A	8.2	5	-	15	1.5W ϕ_1	A5
SZ91A	9.1	5	-	18	1.5W ϕ_1	A5
SZ12C	12.0	5	-	30	1.5W ϕ_1	A5
SZ13C	13.0	5	-	40	1.5W ϕ_1	A5

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
MULLARD *(Continued)*						
Current Types (Continued)						
SZ15C	15.0	5	-	50	$1.5W\phi_1$	A5
SZ16C	16.0	5	-	60	$1.5W\phi_1$	A5
SZ18C	18.0	5	-	75	$1.5W\phi_1$	A5
SZ20C	20.0	5	-	90	$1.5W\phi_1$	A5
SZ22C	22.0	5	-	100	$1.5W\phi_1$	A5
SZ24C	24.0	5	-	120	$1.5W\phi_1$	A5
SZ27C	27.0	5	-	140	$1.5W\phi_1$	A5
SZ30C	30.0	5	-	160	$1.5W\phi_1$	A5
SZ33C	33.0	5	-	180	$1.5W\phi_1$	A5
SZ10C	10.0	5	-	20	$1.5W\phi_1$	A5
SZ11C	11.0	5	-	25	$1.5W\phi_1$	A5
ϕ_1 T_{amb} = 40°C			ϕ_2 T_{amb} = 45°C		Ψ T_{case} = 85°C	
S.T.C.						
Current Types						
Z2A33CF†	3.3	5	-	37	1W	A22
Z2A36CF†	3.6	5	-	35	1W	A22
Z2A39CF†	3.9	5	-	33	1W	A22
Z2A43CF†	4.3	5	-	31	1W	A22
Z2A47CF†	4.7	5	-	26	1W	A22
Z2A51CF†	5.1	5	-	26	1W	A22
Z2A56CF†	5.6	5	-	23	1W	A22
Z2A62CF†	6.2	5	-	19	1W	A22
Z2A68CF†	6.8	5	-	15	1W	A22
Z2A75CF†	7.5	5	-	15	1W	A22
Z2A82CF†	8.2	5	-	19	1W	A22
Z2A91CF†	9.1	5	-	23	1W	A22
Z2A100CF†	10.0	5	-	27	1W	A22
Z2A110CF†	11.0	5	-	32	1W	A22
Z2A120CF†	12.0	5	-	36	1W	A22
Z2A130CF†	13.0	5	-	43	1W	A22
Z2A150CF†	15.0	5	-	50	1W	A22
Z2A160CF†	16.0	5	-	58	1W	A22
Z2A180CF†	18.0	5	-	67	1W	A22
Z2A200CF†	20.0	5	-	81	1W	A22
Z2A220CF†	22.0	5	-	95	1W	A22
Z2A240CF†	24.0	5	-	118	1W	A22
Z2A270CF†	27.0	5	-	125	1W	A22
Z2A300CF†	30.0	5	-	140	1W	A22
Z3B33CF†	3.3	5	-	30	1.5W	A5
Z3B36CF†	3.6	5	-	25	1.5W	A5
Z3B39CF†	3.9	5	-	22	1.5W	A5
Z3B43CF†	4.3	5	-	19	1.5W	A5
Z3B47CF†	4.7	5	-	18	1.5W	A5
Z3B51CF†	5.1	5	-	18	1.5W	A5
Z3B56CF†	5.6	5	-	14	1.5W	A5
Z3B62CF†	6.2	5	-	7	1.5W	A5
Z3B68CF†	6.8	5	-	4	1.5W	A5
Z3B75CF†	7.5	5	-	4	1.5W	A5
Z3B82CF†	8.2	5	-	4	1.5W	A5
Z3B91CF†	9.1	5	-	4	1.5W	A5
Z3B100CF†	10.0	5	-	5	1.5W	A5
Z3B110CF†	11.0	5	-	6	1.5W	A5
Z3B120CF†	12.0	5	-	8	1.5W	A5
Z3B130CF†	13.0	5	-	10	1.5W	A5
Z3B150CF†	15.0	5	-	11	1.5W	A5
Z3B160CF†	16.0	5	-	12	1.5W	A5
Z3B180CF†	18.0	5	-	13	1.5W	A5
Z3B200CF†	20.0	5	-	14	1.5W	A5
Z3B220CF†	22.0	5	-	15	1.5W	A5
Z3B240CF†	24.0	5	-	16	1.5W	A5
Z3B270CF†	27.0	5	-	19	1.5W	A5
Z3B300CF†	30.0	5	-	23	1.5W	A5

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ±%	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
S.T.C. *(Continued)*						
Current Types (Continued)						
Z3B330CF†	33.0	5	-	28	1.5W	A5
Z3B360CF†	36.0	5	-	33	1.5W	A5
Z3B390CF†	39.0	5	-	38	1.5W	A5
Z3B430CF†	43.0	5	-	44	1.5W	A5
Z3B470CF†	47.0	5	-	51	1.5W	A5
Z3B510CF†	51.0	5	-	59	1.5W	A5
Z3B560CF†	56.0	5	-	70	1.5W	A5
Z3B620CF†	62.0	5	-	82	1.5W	A5
Z3B680CF†	68.0	5	-	95	1.5W	A5
Z3B750CF†	75.0	5	-	110	1.5W	A5
Z3B820CF†	82.0	5	-	125	1.5W	A5
Z3B910CF†	91.0	5	-	145	1.5W	A5
Z3B100CF†	100.0	5	-	180	1.5W	A5
Z5D82CF †	8.2	5	-	2.5	10W	S2
Z5D91CF †	9.1	5	-	2.5	10W	S2
Z5D100CF†	10.0	5	-	2.5	10W	S2
Z5D110CF†	11.0	5	-	2.5	10W	S2
Z5D120CF†	12.0	5	-	2.5	10W	S2
Z5D130CF†	13.0	5	-	2.5	10W	S2
Z5D150CF†	15.0	5	-	5	10W	S2
Z5D160CF†	16.0	5	-	5	10W	S2
Z5D180CF†	18.0	5	-	5	10W	S2
Z5D200CF†	20.0	5	-	5	10W	S2
Z5D220CF†	22.0	5	-	5	10W	S2
Z5D240CF†	24.0	5	-	5	10W	S2
Z5D270CF†	27.0	5	-	5	10W	S2
Z5D300CF†	30.0	5	-	8	10W	S2
Z5D330CF†	33.0	5	-	8	10W	S2
Z5D360CF†	36.0	5	-	8	10W	S2
Z5D390CF†	39.0	5	-	8	10W	S2
Z5D430CF†	43.0	5	-	10	10W	S2
Z5D470CF†	47.0	5	-	10	10W	S2
Z5D510CF†	51.0	5	-	10	10W	S2
Z5D560CF†	56.0	5	-	10	10W	S2
Z5D620CF†	62.0	5	-	15	10W	S2
Z5D680CF†	68.0	5	-	15	10W	S2
Z5D750CF†	75.0	5	-	30	10W	S2
Z5D820CF†	82.0	5	-	30	10W	S2
Z5D910CF†	91.0	5	-	40	10W	S2
Z5D100CF†	100.0	5	-	40	10W	S2
ZB 4.3*	4.3	5	47	100	250††φ	C5
ZB 4.7*	4.7	5	43	80	250††φ	C5
ZB 5.1*	5.1	5	40	80	250††φ	C5
ZB 5.6*	5.6	5	36	60	250††φ	C5
ZB 6.2*	6.2	5	32	30	250††φ	C5
ZB 6.8*	6.8	5	29	25	250††φ	C5
ZB 7.5*	7.5	5	27	20	250††φ	C5
ZB 8.2*	8.2	5	24	15	250††φ	C5
ZB 9.1*	9.1	5	22	20	250††φ	C5
ZB 10*	10.0	5	20	20	250††φ	C5
ZB 11*	11.0	5	18	20	250††φ	C5
ZB 12*	12.0	5	16	30	250††φ	C5
ZB 13*	13.0	5	15	45	250††φ	C5
ZB 15*	15.0	5	13.5	55	250††φ	C5
ZB 16*	16.0	5	12	75	250††φ	C5
ZB 18*	18.0	5	11	90	250††φ	C5
ZB 20*	20.0	5	10	100	250††φ	C5
ZB 22*	22.0	5	9	120	250††φ	C5
ZB 24*	24.0	5	8.5	140	250††φ	C5
ZE 4.7*	4.7	10	40	100	250††φ	C5
ZE 5.6*	5.6	10	33	80	250††φ	C5

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ±%	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
S.T.C. *(Continued)*						
Current Types (Continued)						
ZE 6.8*	6.8	10	28	30	250†††φ	C5
ZE 8.2*	8.2	10	23	20	250†††φ	C5
ZE 10*	10.0	10	19	20	250†††φ	C5
ZE 12*	12.0	10	15	45	250†††φ	C5
ZE 15*	15.0	10	12.5	70	250†††φ	C5
ZE 18*	18.0	10	11	90	250†††φ	C5
ZE 22*	22.0	10	9	130	250†††φ	C5
ZF 2.7*	2.7	5	103	80	400	A4
ZF 3*	3.0	5	94	80	400	A4
ZF 3.3 *	3.3	5	86	80	400	A4
ZF 3.6*	3.6	5	80	80	400	A4
ZF 3.9*	3.9	5	75	80	400	A4
ZF 4.3 *	4.3	5	68	75	400	A4
ZF 4.7 *	4.7	5	63	70	400	A4
ZF 5.1 *	5.1	5	58	60	400	A4
ZF 5.6 *	5.6	5	52	40	400	A4
ZF 6.2 *	6.2	5	47	10	400	A4
ZF 6.8 *	6.8	5	43	8	400	A4
ZF 7.5 *	7.5	5	39	7	400	A4
ZF 8.2 *	8.2	5	35	7	400	A4
ZF 9.1 *	9.1	5	32	10	400	A4
ZF 10 *	10.0	5	29	15	400	A4
ZF 11 *	11.0	5	26	20	400	A4
ZF 12 *	12.0	5	23	20	400	A4
ZF 13 *	13.0	5	21	25	400	A4
ZF 15 *	15.0	5	19	30	400	A4
ZF 16 *	16.0	5	18	40	400	A4
ZF 18 *	18.0	5	15	55	400	A4
ZF 20 *	20.0	5	14	55	400	A4
ZF 22 *	22.0	5	13	55	400	A4
ZF 24 *	24.0	5	11.5	80	400	A4
ZF 27 *	27.0	5	10.5	80	400	A4
ZF 30 *	30.0	5	9.5	80	400	A4
ZF 33 *	33.0	5	8.5	80	400	A4
ZG 2.7 *	2.7	10	90	100	400	A4
ZG 3.3 *	3.3	10	80	100	400	A4
ZG 3.9 *	3.9	10	68	100	400	A4
ZG 4.7 *	4.7	10	55	90	400	A4
ZG 5.6 *	5.6	10	45	75	400	A4
ZG 6.8 *	6.8	10	38	8	400	A4
ZG 8.2 *	8.2	10	32	7	400	A4
ZG 10 *	10.0	10	26	15	400	A4
ZG 12 *	12.0	10	21	30	400	A4
ZG 15 *	15.0	10	17	55	400	A4
ZG 18 *	18.0	10	14	55	400	A4
ZG 22 *	22.0	10	12	55	400	A4
ZG 27 *	27.0	10	9	100	400	A4
ZG 33 *	33.0	10	7	100	400	A4
Z3B47CF	4.7	5	265	4	1.5W	A5
Z3B51CF	5.1	5	250	3	1.5W	A5
Z3B56CF	5.6	5	240	2	1.5W	A5
Z3B62CF	6.2	5	220	2	1.5W	A5
Z3B68CF	6.8	5	200	2	1.5W	A5
Z3B75CF	7.5	5	180	2	1 5W	A5
Z3B82CF	8.2	5	170	2	1.5W	A5
Z3B91CF	9.1	5	150	4	1.5W	A5
Z3B100CF	10.0	5	140	4	1.5W	A5
Z3B110CF	11.0	5	125	6	1.5W	A5
Z3B120CF	12.0	5	110	7	1.5W	A5
Z3B130CF	13.0	5	105	9	1.5W	A5
Z3B150CF	15.0	5	95	11	1.5W	A5

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
S.T.C. *(Continued)*						
Current Types (Continued)						
Z3B160CF	16.0	5	85	14	1.5W	A5
Z3B180CF	18.0	5	75	18	1.5W	A5
Z3B200CF	20.0	5	70	21	1.5W	A5
Z3B220CF	22.0	5	65	25	1.5W	A5
Z3B240CF	24.0	5	60	29	1.5W	A5
Z3B270CF	27.0	5	50	32	1.5W	A5
Z3B300CF	30.0	5	45	38	1.5W	A5
Z3B330CF	33.0	5	40	45	1.5W	A5
Z3B47BF	4.7	10	255	4	1.5W	A5
Z3B56BF	5.6	10	230	3	1.5W	A5
Z3B68BF	6.8	10	190	2	1.5W	A5
Z3B82BF	8.2	10	160	2	1.5W	A5
Z3B100BF	10.0	10	130	6	1.5W	A5
Z3B120BF	12.0	10	105	9	1.5W	A5
Z3B150BF	15.0	10	90	14	1.5W	A5
Z3B180BF	18.0	10	70	21	1.5W	A5
Z3B220BF	22.0	10	60	29	1.5W	A5
Z3B270BF	27.0	10	45	38	1.5W	A5
Z3B330BF	33.0	10	35	45	1.5W	A5
ZX4.7	4.7	5	1,530	4	1.3W **φ	S2
ZX5.1	5.1	5	1,440	3	1.3W **φ	S2
ZX5.6	5.6	5	1,380	2	1.3W **φ	S2
ZX6.2	6.2	5	1,330	2	1.3W **φ	S2
ZX6.8	6.8	5	1,250	2	1.3W **φ	S2
ZX7.5	7.5	5	1,100	2	1.3W **φ	S2
Z5B82CF	8.2	5	1,000	2	1.3W **φ	S2
Z5B91CF	9.1	5	835	4	1.3W **φ	S2
Z5B100CF	10.0	5	785	4	1.3W **φ	S2
Z5B110CF	11.0	5	690	6	1.3W **φ	S2
Z5B120CF	12.0	5	620	7	1.3W **φ	S2
Z5B130CF	13.0	5	565	9	1.3W **φ	S2
Z5D150CF	15.0	5	520	11	1.3W **φ	S2
Z5D160CF	16.0	5	465	14	1.3W **φ	S2
Z5D180CF	18.0	5	415	18	1.3W **φ	S2
Z5D200CF	20.0	5	380	21	1.3W **φ	S2
Z5D220CF	22.0	5	340	25	1.3W **φ	S2
Z5D240CF	24.0	5	315	29	1.3W **φ	S2
Z5D270CF	27.0	5	295	32	1.3W **φ	S2
Z5D300CF	30.0	5	265	38	1.3W **φ	S2
Z5D330CF	33.0	5	240	45	1.3W **φ	S2
Z5D360CF	36.0	5	235	40	1.3W ***φ	S10
Z5D390CF	39.0	5	210	40	1.3W ***φ	S10
Z5D430CF	43.0	5	192	45	1.3W ***φ	S10
Z5D470CF	47.0	5	175	45	1.3W ***φ	S10
Z5D510CF	51.0	5	162	60	1.3W ***φ	S10
Z5D560CF	56.0	5	150	60	1.3W ***φ	S10
Z5D620CF	62.0	5	137	80	1.3W ***φ	S10
Z5D680CF	68.0	5	125	80	1.3W ***φ	S10
Z5D750CF	75.0	5	112	100	1.3W ***φ	S10
Z5D820CF	82.0	5	100	100	1.3W ***φ	S10
Z5D910CF	91.0	5	92	200	1.3W ***φ	S10
Z5D1000CF	100.0	5	85	200	1.3W ***φ	S10
Z5D1100CF	110.0	5	77	250	1.3W ***φ	S10
ZX120*	120.0	5	70	250	1.3W ***φ	S10
ZX130*	130.0	5	63	300	1.3W ***φ	S10
ZX150*	150.0	5	56	300	1.3W ***φ	S10
ZX160*	160.0	5	51	350	1.3W ***φ	S10
ZX180*	180.0	5	46	350	1.3W ***φ	S10
ZX200*	200 0	5	42	350	1.3W ***φ	S10

* Formerly manufactured by Brush Clevite †† Can be increased to 350mW with clip and heat sink ** Can be increased to 10.7W on heat sink (100 × 100 × 2mm) *** Can be increased to 10W on heat sink (100 × 100 × 2mm) † Also available in ± 10% and ±20% tolerance, penultimate code letter becomes B o. A respectively (e.g. Z2A39AF) φ T_{amb} = 45°C

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
TEXAS						
Current Types						
1S2030A*	3.0	5	-	200	400	A4
1S2033A*	3.3	5	-	120	400	A4
1S2036A*	3.6	5	-	110	400	A4
1S2039A*	3.9	5	-	100	400	A4
1S2043A*	4.3	5	-	90	400	A4
1S2047A*	4.7	5	-	85	400	A4
1S2051A*	5.1	5	-	80	400	A4
1S2056A*	5.6	5	-	75	400	A4
1S2062A*	6.2	5	-	40	400	A4
1S2068A*	6.8	5	-	15	400	A4
1S2075A*	7.5	5	-	15	400	A4
1S2082A*	8.2	5	-	15	400	A4
1S2091A*	9.1	5	-	15	400	A4
1S2100A*	10.0	5	-	20	400	A4
1S2110A*	11.0	5	-	40	400	A4
1S2120A*	12.0	5	-	60	400	A4
1S2130A*	13.0	5	-	75	400	A4
1S2150A*	15.0	5	-	90	400	A4
1S2160A*	16.0	5	-	120	400	A4
1S5015A	15.0	5	-	5	10W	S3
1S5015RA	15.0	5	-	5	10W	S2
1S5015	15.0	10	-	5	10W	S3
1S5015R	15.0	10	-	5	10W	S2
1S5015C	15.0	10	-	5	10W	S16
1S5016A	16.0	5	-	5	10W	S3
1S5016RA	16.0	5	-	5	10W	S2
1S5016	16.0	10	-	5	10W	S3
1S5016R	16.0	10	-	5	10W	S2
1S5016C	16.0	10	-	5	10W	S16
1S5018A	18.0	5	-	5	10W	S3
1S5018RA	18.0	5	-	5	10W	S2
1S5018	18.0	10	-	5	10W	S3
1S5018R	18.0	10	-	5	10W	S2
1S5018C	18.0	10	-	5	10W	S16
1S5020A	20.0	5	-	5	10W	S3
1S5020RA	20.0	5	-	5	10W	S2
1S5020	20.0	5	-	5	10W	S3
1S5020R	20.0	10	-	5	10W	S2
1S5020C	20.0	10	-	5	10W	S16
1S5022A	22.0	5	-	5	10W	S3
1S5022RA	22.0	5	-	5	10W	S2
1S5022	22.0	10	-	5	10W	S3
1S5022R	22.0	10	-	5	10W	S2
1S5022C	22.0	10	-	5	10W	S16
1S5024A	24.0	5	-	5	10W	S3
1S5024RA	24.0	5	-	5	10W	S2
1S5024	24.0	10	-	5	10W	S3
1S5024R	24.0	10	-	5	10W	S2
1S5024C	24.0	10	-	5	10W	S16
1S5027A	27.0	5	-	5	10W	S3
1S5027RA	27.0	5	-	5	10W	S2
1S5027	27.0	10	-	5	10W	S3
1S5027R	27.0	10	-	5	10W	S2
1S5027C	27.0	10	-	5	10W	S16
1S5030A	30.0	5	-	8	10W	S3
1S5030RA	30.0	5	-	8	10W	S2
1S5030	30.0	10	-	8	10W	S3
1S5030R	30.0	10	-	8	10W	S2
1S5030C	30.0	10	-	8	10W	S16
1S5033A	33.0	5	-	8	10W	S3
1S5033RA	33.0	5	-	8	10W	S2

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ±%	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
TEXAS *(Continued)*						
Current Types (Continued)						
1S5033	33.0	10	-	8	10W	S3
1S5033R	33.0	10	-	8	10W	S2
1S5033C	33.0	10	-	8	10W	S16
1S5036A	36.0	5	-	8	10W	S3
1S5036RA	36.0	5	-	8	10W	S2
1S5036	36.0	10	-	8	10W	S3
1S5036R	36.0	10	-	8	10W	S2
1S5036C	36.0	10	-	8	10W	S16
1S5039A	39.0	5	-	8	10W	S3
1S5039RA	39.0	5	-	8	10W	S2
1S5039	39.0	10	-	8	10W	S3
1S5039R	39.0	10	-	8	10W	S2
1S5039C	39.0	10	-	8	10W	S16
1S5043A	43.0	5	-	10	10W	S3
1S5043RA	43.0	5	-	10	10W	S2
1S5043	43.0	10	-	10	10W	S3
1S5043R	43.0	10	-	10	10W	S2
1S5043C	43.0	10	-	10	10W	S16
1S5047A	47.0	5	-	10	10W	S3
1S5047RA	47.0	5	-	10	10W	S2
1S5047	47.0	10	-	10	10W	S3
1S5047R	47.0	10	-	10	10W	S2
1S5047C	47.0	10	-	10	10W	S16
1S5056A	56.0	5	-	10	10W	S3
1S5056RA	56.0	5	-	10	10W	S2
1S5056	56.0	10	-	10	10W	S3
1S5056R	56.0	10	-	10	10W	S2
1S5056C	56.0	10	-	10	10W	S16
1S5062A	62.0	5	-	15	10W	S3
1S5062RA	62.0	5	-	15	10W	S2
1S5062	62.0	10	-	15	10W	S3
1S5062R	62.0	10	-	15	10W	S2
1S5062C	62.0	10	-	15	10W	S16
1S5068A	68.0	5	-	15	10W	S3
1S5068RA	68.0	5	-	15	10W	S2
1S5068	68.0	10	-	15	10W	S3
1S5068R	68.0	10	-	15	10W	S2
1S5068C	68.0	10	-	15	10W	S16
1S5075A	75.0	5	-	30	10W	S3
1S5075RA	75.0	5	-	30	10W	S2
1S5075	75.0	10	-	30	10W	S3
1S5075R	75.0	10	-	30	10W	S2
1S5075C	75.0	10	-	30	10W	S16
1S5082A	82.0	5	-	30	10W	S3
1S5082RA	82.0	5	-	30	10W	S2
1S5082	82.0	10	-	30	10W	S3
1S5082R	82.0	10	-	30	10W	S2
1S5082C	82.0	10	-	30	10W	S16
1S5091A	91.0	5	-	40	10W	S3
1S5091RA	91.0	5	-	40	10W	S2
1S5091	91.0	10	-	40	10W	S3
1S5091R	91.0	10	-	40	10W	S2
1S5091C	91.0	10	-	40	10W	S16
1S5100A	100.0	5	-	40	10W	S3
1S5100RA	100.0	5	-	40	10W	S2
1S5100	100.0	10	-	40	10W	S3
1S5100R	100.0	10	-	40	10W	S2
1S5100C	100.0	10	-	40	10W	S16
1S5110A	110.0	5	-	40	10W	S3
1S5110RA	110.0	5	-	40	10W	S2
1S5110	110.0	10	-	40	10W	S3

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
TEXAS *(Continued)*						
Current Types (Continued)						
1S5110R	110.0	10	-	40	10W	S2
1S5110C	110.0	10	-	40	10W	S16
1S5120A	120.0	5	-	50	10W	S3
1S5120RA	120.0	5	-	50	10W	S2
1S5120	120.0	10	-	50	10W	S3
1S5120R	120.0	10	-	50	10W	S2
1S5120C	120.0	10	-	50	10W	S16
1S5130A	130.0	5	-	50	10W	S3
1S5130RA	130.0	5	-	50	10W	S2
1S5130	130.0	10	-	50	10W	S3
1S5130R	130.0	10	-	50	10W	S2
1S5130C	130.0	10	-	50	10W	S16
1S5150A	150.0	5	-	50	10W	S3
1S5150RA	150.0	5	-	50	10W	S2
1S5150	150.0	10	-	50	10W	S3
1S5150R	150.0	10	-	50	10W	S2
1S5150C	150.0	10	-	50	10W	S16
1S6006A	6.8	5	-	4	10W	S3
1S6006RA	6.8	5	-	4	10W	S2
1S6006	6.8	10	-	4	10W	S3
1S6006R	6.8	10	-	4	10W	S2
1S6007A	7.5	5	-	2.5	10W	S3
1S6007RA	7.5	5	-	2.5	10W	S2
1S6007	7.5	10	-	2.5	10W	S3
1S6007R	7.5	10	-	2.5	10W	S2
1S6008A	8.2	5	-	2.5	10W	S3
1S6008RA	8.2	5	-	2.5	10W	S2
1S6008	8.2	10	-	2.5	10W	S3
1S6008R	8.2	10	-	2.5	10W	S2
1S6009A	9.1	5	-	2.5	10W	S3
1S6009RA	9.1	5	-	2.5	10W	S2
1S6009	9.1	10	-	2.5	10W	S3
1S6009R	9.1	10	-	2.5	10W	S2
1S6010A	10.0	5	-	2.5	10W	S3
1S6010RA	10.0	5	-	2.5	10W	S2
1S6010	10.0	10	-	2.5	10W	S3
1S6010R	10.0	10	-	2.5	10W	S2
1S6011A	11.0	5	-	2.5	10W	S3
1S6011RA	11.0	5	-	2.5	10W	S2
1S6011	11.0	10	-	2.5	10W	S3
1S6011R	11.0	10	-	2.5	10W	S2
1S6012A	12.0	5	-	2.5	10W	S3
1S6012RA	12.0	5	-	2.5	10W	S2
1S6012	12.0	10	-	2.5	10W	S3
1S6012R	12.0	10	-	2.5	10W	S2
1S6013A	13.0	5	-	2.5	10W	S3
1S6013RA	13.0	5	-	2.5	10W	S2
1S6013	13.0	10	-	2.5	10W	S3
1S6013R	13.0	10	-	2.5	10W	S2
1S6015A	15.0	5	-	5	10W	S3
1S6015RA	15.0	5	-	5	10W	S2
1S6015	15.0	10	-	5	10W	S3
1S6015R	15.0	10	-	5	10W	S2
1S6016A	16.0	5	-	5	10W	S3
1S6016RA	16.0	5	-	5	10W	S2
1S6016	16.0	10	-	5	10W	S3
1S6016R	16.0	10	-	5	10W	S2
1S6018A	18.0	5	-	5	10W	S3
1S6018RA	18.0	5	-	5	10W	S2
1S6018	18.0	10	-	5	10W	S3
1S6018R	18.0	10	-	5	10W	S2

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
TEXAS *(Continued)*						
Current Types (Continued)						
1S6020A	20.0	5	-	5	10W	S3
1S6020RA	20.0	5	-	5	10W	S2
1S6020	20.0	10	-	5	10W	S3
1S6020R	20.0	10	-	5	10W	S2
1S6022A	22.0	5	-	5	10W	S3
1S6022RA	22.0	5	-	5	10W	S2
1S6022	22.0	10	-	5	10W	S3
1S6022R	22.0	10	-	5	10W	S2
1S6024A	24.0	5	-	5	10W	S3
1S6024RA	24.0	5	-	5	10W	S2
1S6024	24.0	10	-	5	10W	S3
1S6024R	24.0	10	-	5	10W	S2
1S6027A	27.0	5	-	5	10W	S3
1S027RA	27.0	5	-	5	10W	S2
1S027	27.0	10	-	5	10W	S3
1S027R	27.0	10	-	5	10W	S2
1S6030A	30.0	5	-	8	10W	S3
1S6030RA	30.0	5	-	8	10W	S2
1S6030	30.0	10	-	8	10W	S3
1S6030R	30.0	10	-	8	10W	S2
1S6033A	33.0	5	-	8	10W	S3
1S6033RA	33.0	5	-	8	10W	S2
1S6033	33.0	10	-	8	10W	S3
1S6033R	33.0	10	-	8	10W	S2
1S6036A	36.0	5	-	8	10W	S3
1S6036RA	36.0	5	-	8	10W	S2
1S6036	36.0	10	-	8	10W	S3
1S6036R	36.0	10	-	8	10W	S2
1S6039A	39.0	5	-	8	10W	S3
1S6039RA	39.0	5	-	8	10W	S2
1S6039	39.0	10	-	8	10W	S3
1S6039R	39.0	10	-	8	10W	S2
1S6043A	43.0	5	-	10	10W	S3
1S6043RA	43.0	5	-	10	10W	S2
1S6043	43.0	10	-	10	10W	S3
1S6043R	43.0	10	-	10	10W	S2
1S6047A	47.0	5	-	10	10W	S3
1S6047RA	47.0	5	-	10	10W	S2
1S6047	47.0	10	-	10	10W	S3
1S6047R	47.0	10	-	10	10W	S2
1S6051A	51.0	5	-	10	10W	S3
1S6051RA	51.0	5	-	10	10W	S2
1S6051	51.0	10	-	10	10W	S3
1S6051R	51.0	10	-	10	10W	S2
1S6056A	56.0	5	-	10	10W	S3
1S6056RA	56.0	5	-	10	10W	S2
1S6056	56.0	10	-	10	10W	S3
1S6056R	56.0	10	-	10	10W	S2
1S6062A	62.0	5	-	15	10W	S3
1S6062RA	62.0	5	-	15	10W	S2
1S6062	62.0	10	-	15	10W	S3
1S6062R	62.0	10	-	15	10W	S2
1S6068A	68.0	5	-	50	10W	S3
1S6068RA	68.0	5	-	50	10W	S2
1S6068	68.0	10	-	50	10W	S3
1S6068R	68.0	10	-	50	10W	S2
1S6075A	75.0	5	-	50	10W	S3
1S6075RA	75.0	5	-	50	10W	S2
1S6075	75.0	10	-	50	10W	S3
1S6075R	75.0	10	-	50	10W	S2
1S6082A	82.0	5	-	50	10W	S3

(Continued)

Type	Nominal Zener Voltage (V)	Tolerance ± %	Max. Zener Current (mA)	Max. Dynamic Resistance (Ω)	Max. Dissipation (mW)	Connections
TEXAS *(Continued)*						
Current Types (Continued)						
1S6082RA	82.0	5	-	50	10W	S2
1S6082	82.0	10	-	50	10W	S3
1S6082R	82.0	10	-	50	10W	S2
1S6091A	91.0	5	-	60	10W	S3
1S6091RA	91.0	5	-	60	10W	S2
1S6091	91.0	10	-	60	10W	S3
1S6091R	91.0	10	-	60	10W	S2
1S6100A	100.0	5	-	60	10W	S3
1S6100RA	100.0	5	-	60	10W	S2
1S6100	100.0	10	-	60	10W	S3
1S6100R	100.0	10	-	60	10W	S2
1S6110A	110.0	5	-	60	10W	S3
1S6110RA	110.0	5	-	60	10W	S2
1S6110	110.0	10	-	60	10W	S3
1S6110R	110.0	10	-	60	10W	S2
1S6120A	120.0	5	-	80	10W	S3
1S6120RA	120.0	5	-	80	10W	S2
1S6120	120.0	10	-	80	10W	S3
1S6120R	120.0	10	-	80	10W	S2
1S6130A	130.0	5	-	80	10W	S3
1S6130RA	130.0	5	-	80	10W	S2
1S6130	130.0	10	-	80	10W	S3
1S6130R	130.0	10	-	80	10W	S2
1S6150A	150.0	5	-	180	10W	S3
1S6150RA	150.0	5	-	180	10W	S2
1S6150	150.0	10	-	180	10W	S3
1S6150R	150.0	10	-	180	10W	S2
1S6160A	160.0	5	-	200	10W	S3
1S6160RA	160.0	5	-	200	10W	S2
1S6160	160.0	10	-	200	10W	S3
1S6160R	160.0	10	-	200	10W	S2
1S6180A	180.0	5	-	250	10W	S3
1S6180RA	180.0	5	-	250	10W	S2
1S6180	180.0	10	-	250	10W	S3
1S6180R	180.0	10	-	250	10W	S2
1S6200A	200.0	5	-	300	10W	S3
1S6200RA	200.0	5	-	300	10W	S2
1S6200	200.0	10	-	300	10W	S3
1S6200R	200.0	10	-	300	10W	S2
1S7030A **	3.0	5	-	200	400	A4
1S7033A **	3.3	5	-	100	400	A4
1S7036A **	3.6	5	-	95	400	A4
1S7039A **	3.9	5	-	90	400	A4
1S7043A **	4.3	5	-	85	400	A4
1S7047A **	4.7	5	-	80	400	A4
1S7051A **	5.1	5	-	70	400	A4
1S7056A **	5.6	5	-	60	400	A4
1S7062A **	6.2	5	-	35	400	A4
1S7068A **	6.8	5	-	15	400	A4
1S7075A **	7.5	5	-	15	400	A4
1S7082A **	8.2	5	-	15	400	A4
1S7091A **	9.1	5	-	15	400	A4
1S7100A **	10.0	5	-	20	400	A4
1S7110A **	11.0	5	-	40	400	A4
1S7120A **	12.0	5	-	50	400	A4
1S7130A **	13.0	5	-	60	400	A4
1S7150A **	15.0	5	-	70	400	A4
1S7160A **	16.0	5	-	100	400	A4

* To specify ± 10% tolerance omit suffix 'A'. ** To specify ± 10% tolerance omit suffix 'A' ; to specify ± 15% tolerance substitute suffix 'B'

EXPLANATION OF VALVE BASE CONNECTIONS

The following pages of valve-base diagrams show all the sets of base connections that are necessary to cover the valves listed in the tables of characteristics. They are grouped into sections according to the base designations (B7G, B8A, B9A, etc.), and within a section each diagram has a code number to the bottom right of it which identifies that particular set of connections.

Thus to find the base connections of a valve listed in the tables, it is first of all necessary to look up the designation in the 'Base Type' column, which gives the right section of diagrams, and then the number in the 'Base Ref.' column, which gives the code number of a particular diagram in that section. For example, to obtain the connections of the 6F33 valve, one would have to turn to the section of diagrams headed 'B7G' and then look for diagram No. 21.

British and American bases which are not interchangeable are given their standard designations. American bases which are interchangeable with British are in some cases given the British designations. Thus, B7G is used to cover both British and American miniature 7-pin bases and B9A for the British 9-pin and the American Noval. The term International Octal (IO) is used to cover both the British B8-O designation and the American standard Octal.

The designation B8B is now out of date; however, it is used here to cover the British B8G base and the American Loctal and Lock-in types. None of these is identical but the differences are so slight that all will fit the same valveholder. The differences are concerned chiefly with minor points about the spigot material, spigot taper and so on.

Care must be taken to distinguish between the IO and MO bases, particularly as the latter is sometimes called the British Octal and is now designated B8-MO. The two differ in pin spacing and in spigot size and are not interchangeable. The MO is used by one manufacturer only and has the larger diameter spigot of the two.

Similar electrodes which operate in turn on the same electron stream are numbered in order from the cathode, the numbers being appended as subscripts to the electrode symbols.

Similar electrode systems in multiple valves are distinguished by a single tick (′) for the first electrode system, by a double (″) for the second, and so on, the ticks being appended to the appropriate electrode symbols.

Dissimilar electrode systems in multiple valves are distinguished by additional letter subscripts appended to the symbols for the less complex electrode structures.

A number against a pin indicates that it is joined internally to the pin of that number.

Where more than one electrode is joined internally to the same pin only the electrode of major importance is usually designated. Thus, the suppressor grid of a pentode is not always shown when it is joined internally to cathode or filament negative. An exception is made when it may be important to the user to know precisely which electrodes are joined together.

No distinction is normally made between valves with and without external metal screens. The base connections show an 'M' for such a screen in cases where all or only some valves have it, but others with the same code reference may have no such screen or an internal screen. The 'M' pin should, therefore, normally be earthed.

Abbreviations for Valve-base Connections

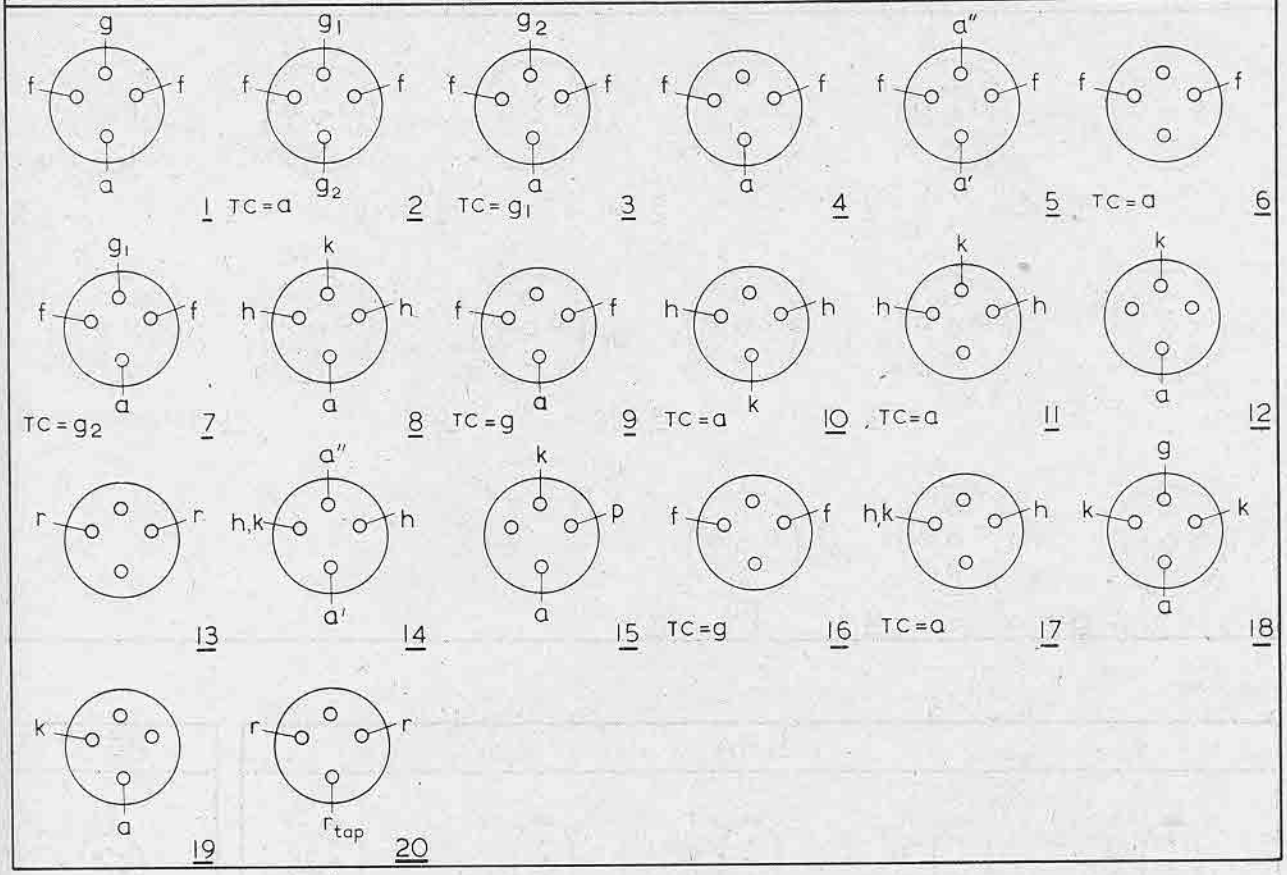
MAIN SYMBOLS

a	=	anode
bp	=	beam plates
ce	=	control electrode
f	=	filament
g	=	grid
h	=	heater
ic	=	internal connection (external connections must not be made to a pin so designated)
jp	=	jumper
k	=	cathode
M	=	external conducting coating
m	=	internal conducting coating
p	=	priming electrode
r	=	resistance
s	=	internal shield
st	=	spark trap
t	=	target
tr	=	trigger
TC	=	top cap
SC	=	side cap

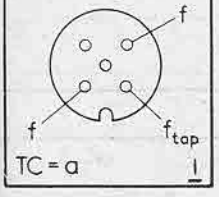
SUBSCRIPT SYMBOLS

d	=	diode	tap	= filament or heater tapping
p	=	pentode	(+)	= positive
r	=	rectifier	(-)	= negative
t	=	triode		

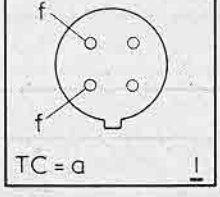
B 4



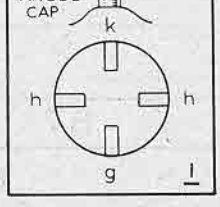
B4A



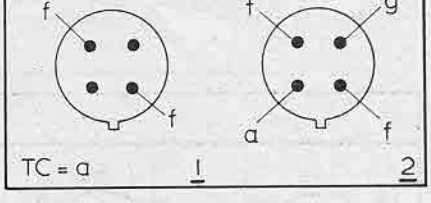
B4D



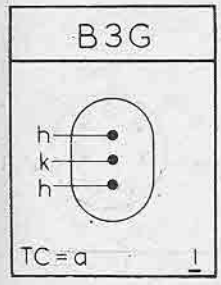
B 4E



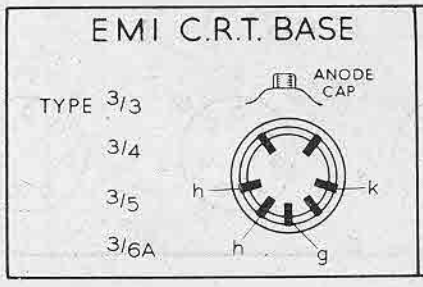
B4F



B3G

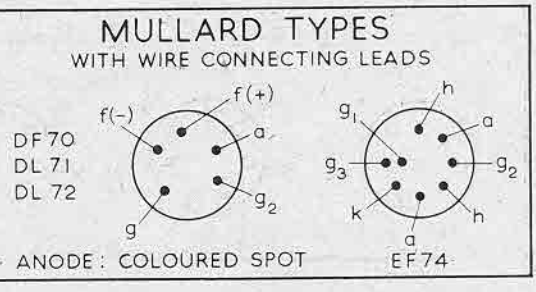


EMI C.R.T. BASE

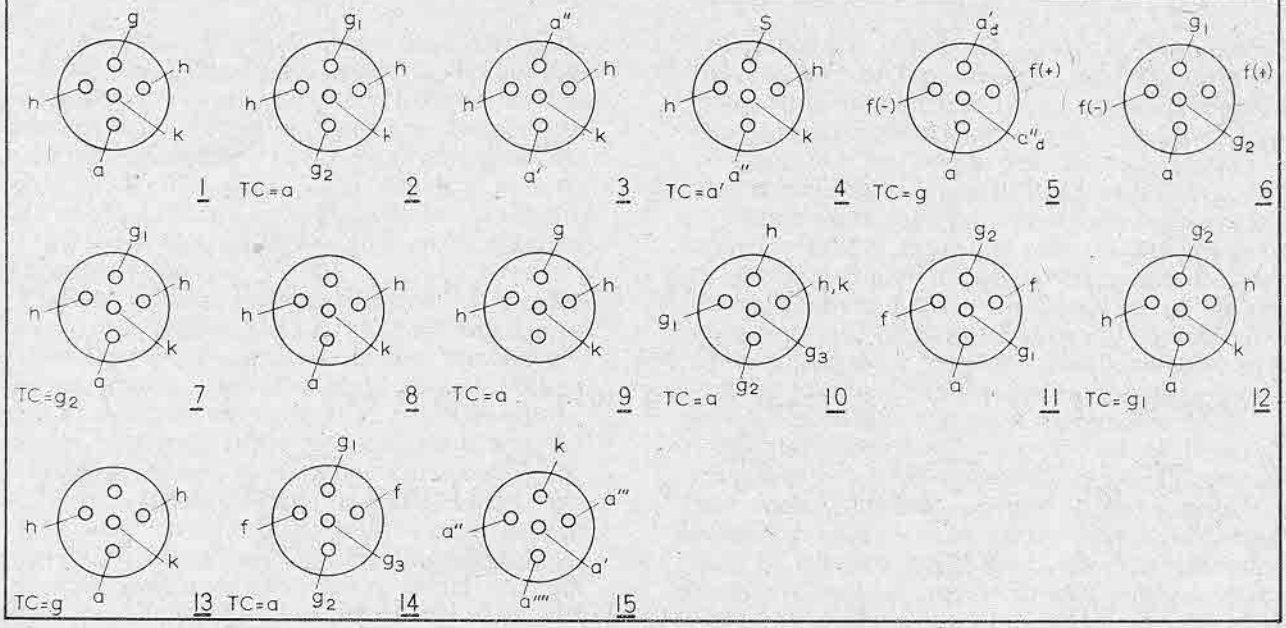


MULLARD TYPES

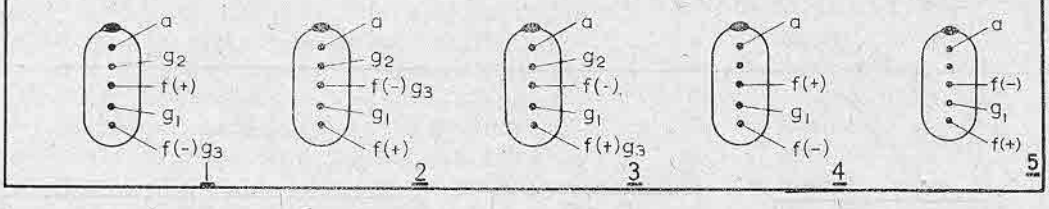
WITH WIRE CONNECTING LEADS



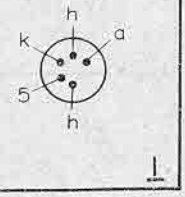
B5


g h h k a 1
g1 h h k g2 TC=a 2
a'' h h k a' 3
S h h k a' a'' 4 TC=a'
a'd f(+) f(-) c''d a TC=g 5
g1 f(+) f(-) g2 a 6
g1 h h k a TC=g2 7
h h k a 8
g h h k TC=a 9
h h,k g1 g3 g2 TC=a 10
g2 f f g1 a 11
g2 h h k a TC=g1 12
h h k a TC=g 13
g1 f f g3 TC=a g2 14
k a''' a'' a' a'''' 15

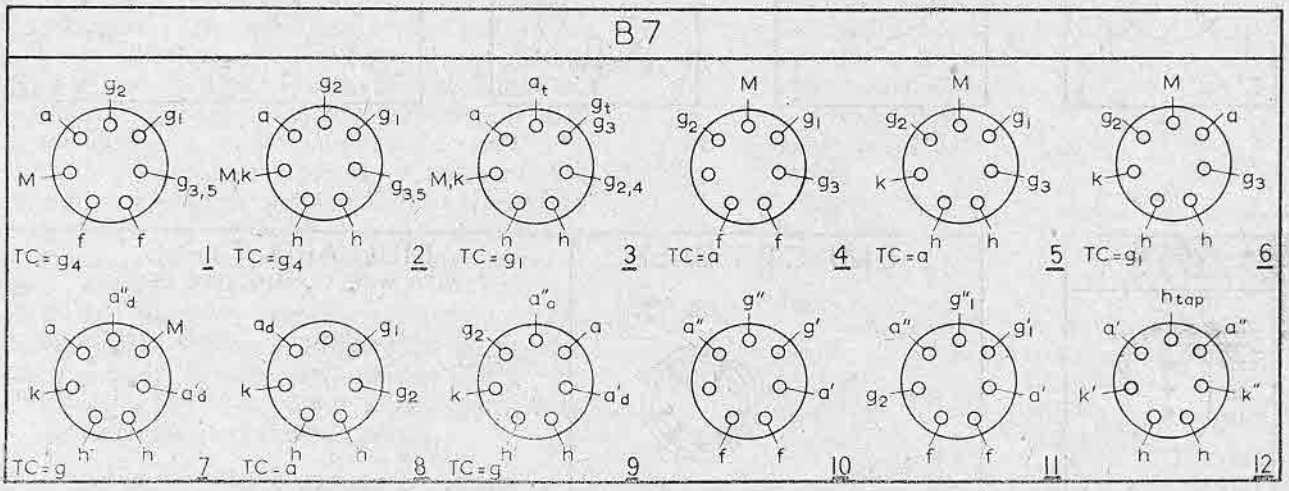
B5A


a g2 f(+) g1 f(-)g3 1
a g2 f(-)g3 g1 f(+) 2
a g2 f(-) g1 f(+)g3 3
a f(+) g1 f(-) 4
a f(-) g1 f(+) 5

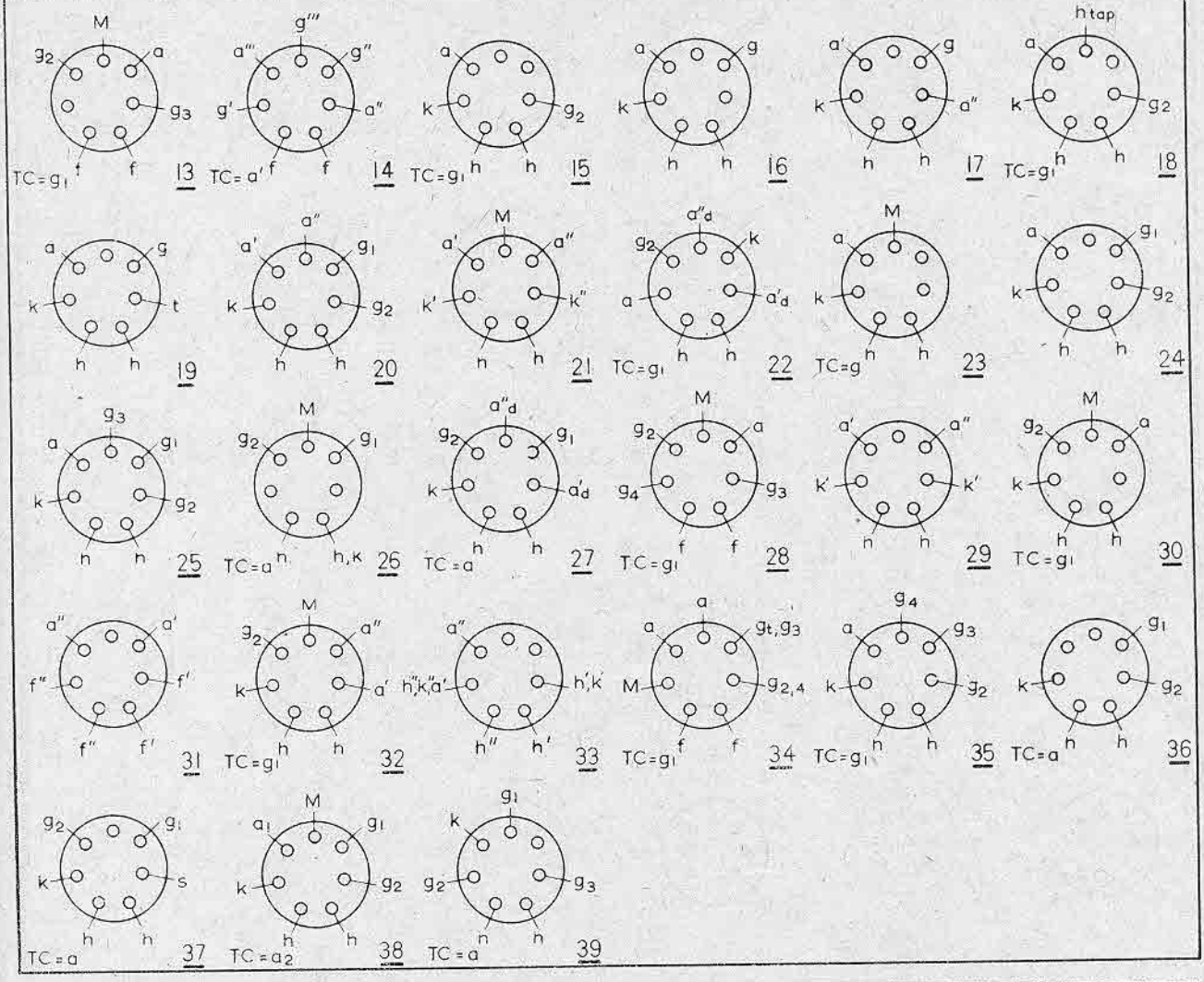
B5B


h k a 5 h 1

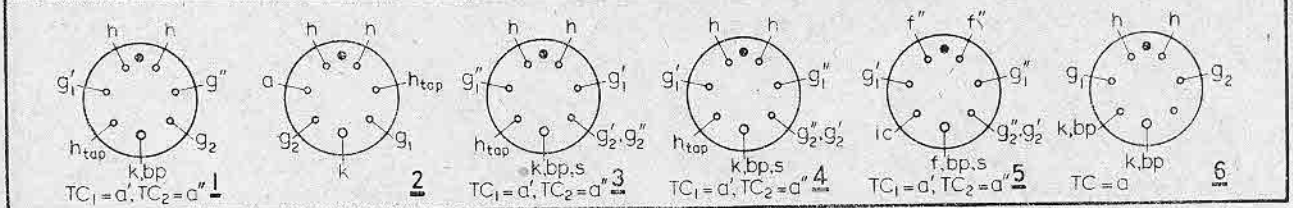
B7


g2 a g1 M g3,5 f f TC=g4 1
g2 a g1 M,k g3,5 h h TC=g4 2
at gt g3 a M,k g2,4 h h TC=g1 3
M g2 g1 g3 f f TC=a 4
M g2 g1 k g3 h h TC=a 5
M g2 a k g3 h h TC=g1 6
a''d a M k a'd h h TC=g 7
ad g1 k g2 h h TC=a 8
a''a g2 a k a'd h h TC=g 9
g'' a'' g' a' f f 10
g''1 a'' g'1 g2 a' f f 11
htap a' a'' k' k'' h h 12

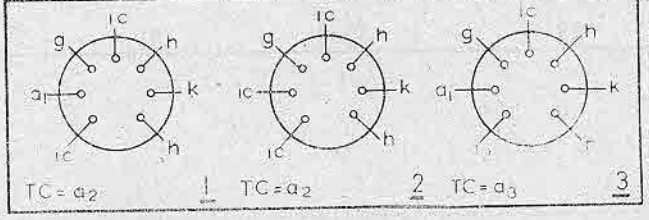
B 7 (Continued)



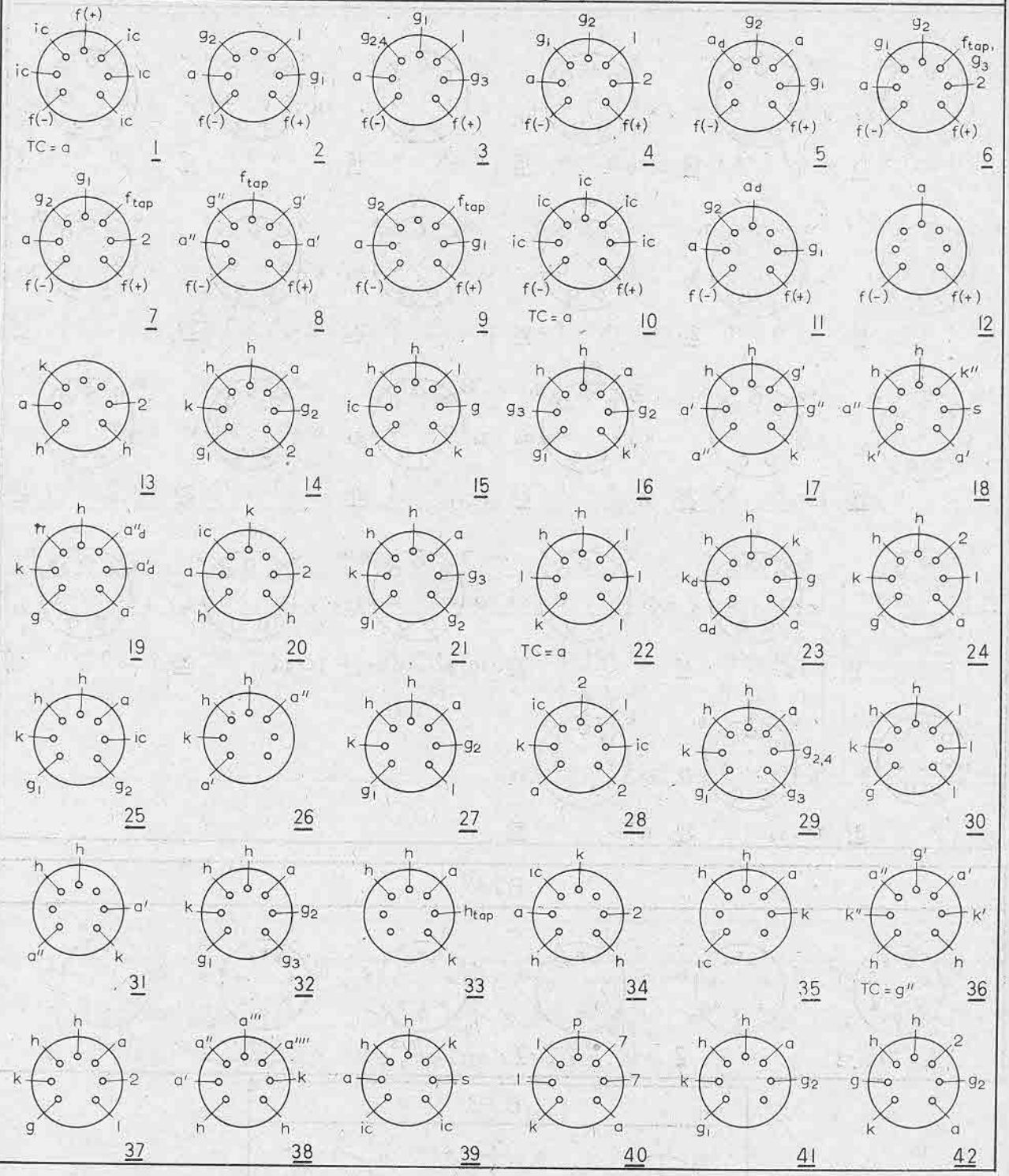
B7A



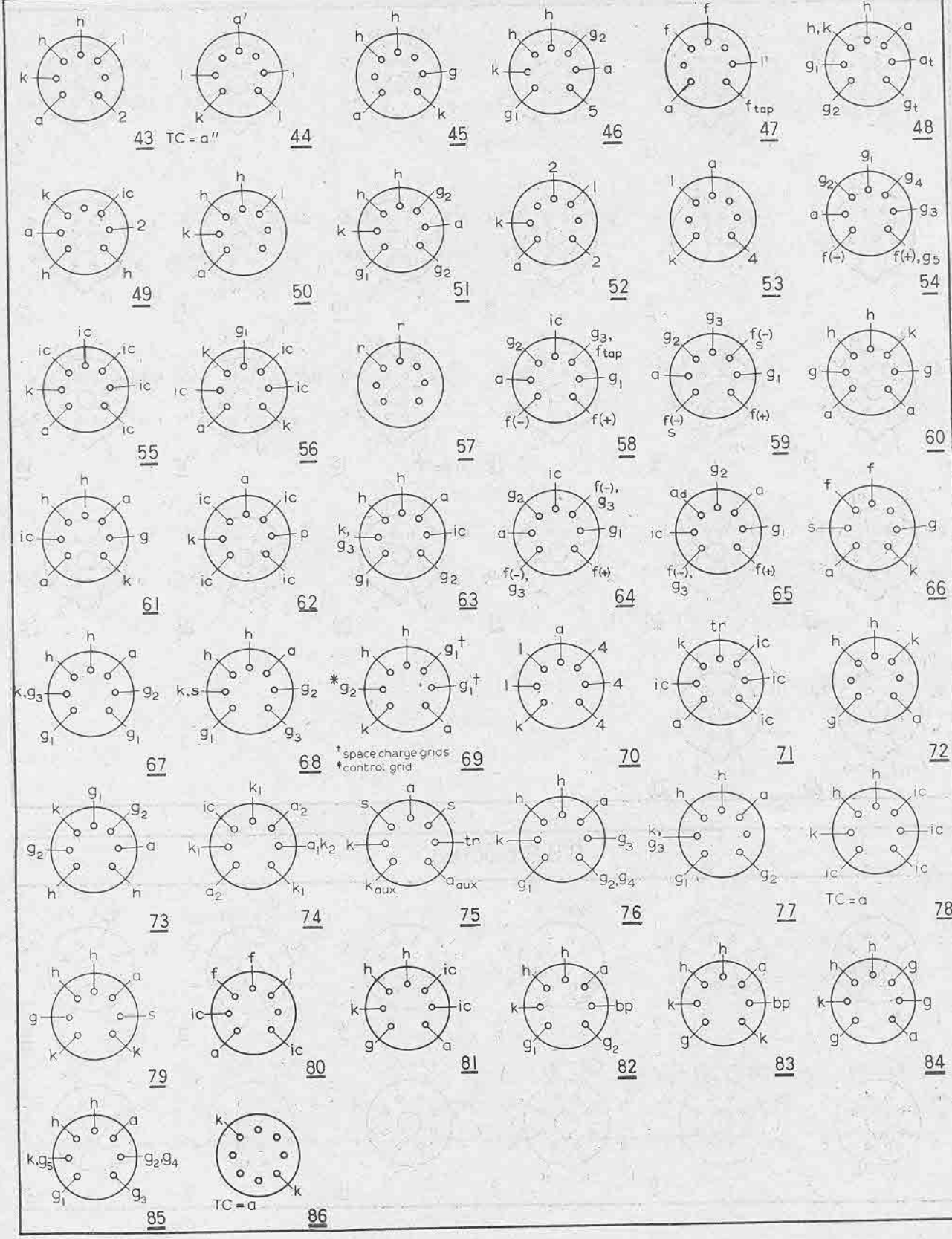
B7B



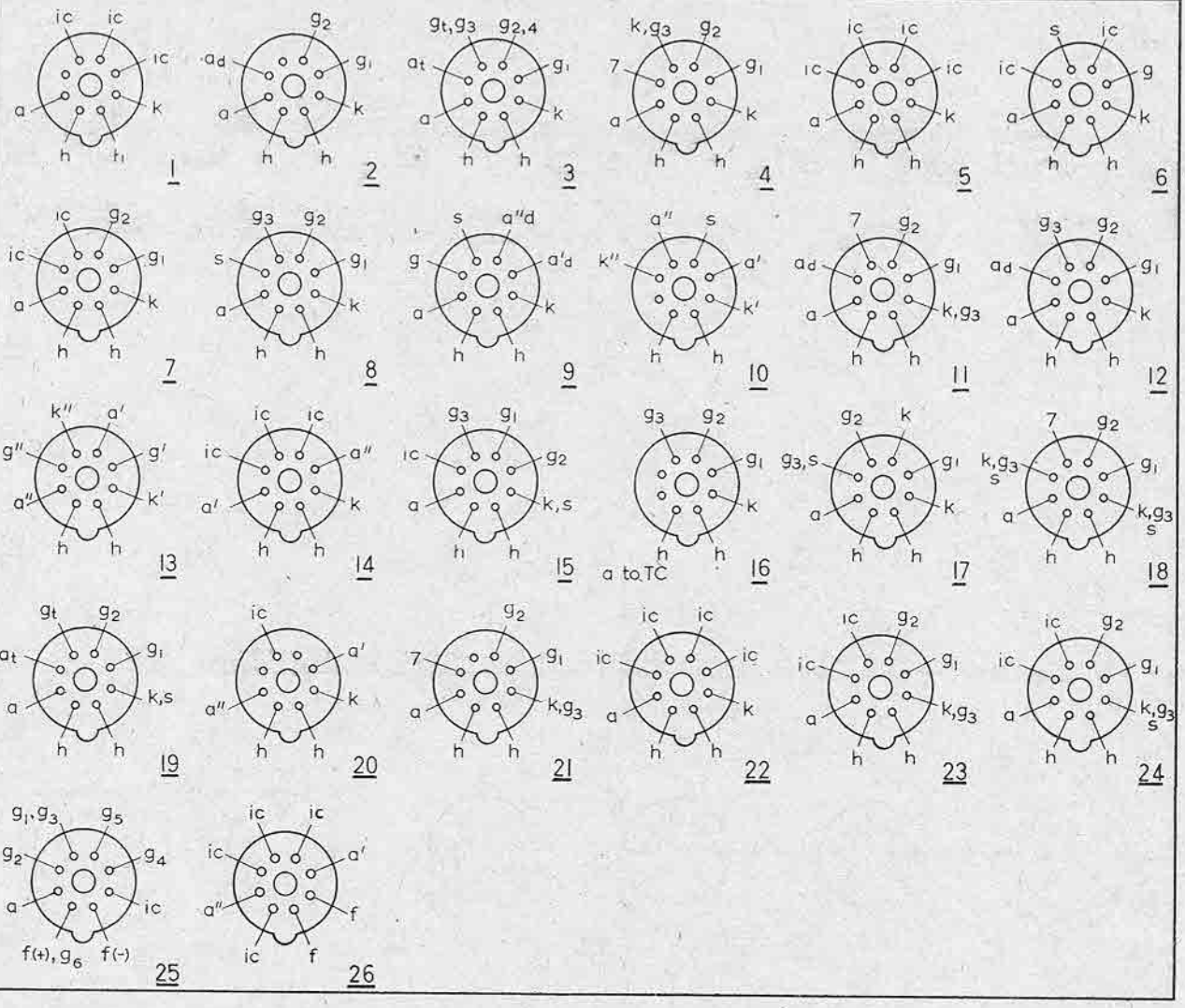
B 7G


f(+)
ic
ic
ic
ic
f(-)
ic
TC = a
1
g2
l
a
g1
f(-)
f(+)
2
g1
g2,4
l
a
g3
f(-)
f(+)
3
g2
g1
l
a
2
f(-)
f(+)
4
g2
ad
a
g1
f(-)
f(+)
5
g2
g1
ftap1
g3
a
2
f(-)
f(+)
6
g1
g2
ftap
a
2
f(-)
f(+)
7
ftap
g''
g'
a''
a'
f(-)
f(+)
8
g2
ftap
a
g1
f(-)
f(+)
9
ic
ic
ic
ic
f(-)
f(+)
TC = a
10
ad
g2
a
g1
f(-)
f(+)
11
a
f(-)
f(+)
12
k
a
2
h
h
13
h
h
a
k
g2
g1
2
14
h
h
l
ic
g
a
k
15
h
h
a
g3
g2
g1
k'
16
h
h
g'
a'
g''
a''
k
17
h
h
k''
a''
s
k'
a'
18
h
a''d
k
a'd
g
a
19
k
ic
a
2
h
h
20
h
h
a
k
g3
g1
g2
21
h
h
l
l
l
k
l
TC = a
22
h
h
k
kd
g
ad
a
23
h
h
2
k
l
g
a
24
h
h
a
k
ic
g1
g2
25
h
h
a''
k
a'
26
h
h
a
k
g2
g1
l
27
2
ic
l
k
ic
a
2
28
h
h
a
k
g2,4
g1
g3
29
h
h
l
k
l
g
l
30
h
h
a'
a''
k
31
h
h
a
k
g2
g1
g3
32
h
h
a
htap
k
33
k
ic
a
2
h
h
34
h
h
a
k
ic
35
g'
a''
a'
k''
k'
h
h
TC = g''
36
h
h
a
k
2
g
l
37
a'''
a''
a''''
a'
k
h
h
38
h
h
k
a
s
ic
ic
39
p
l
7
l
7
k
a
40
h
h
a
k
g2
g1
41
h
h
2
g
g2
k
a
42

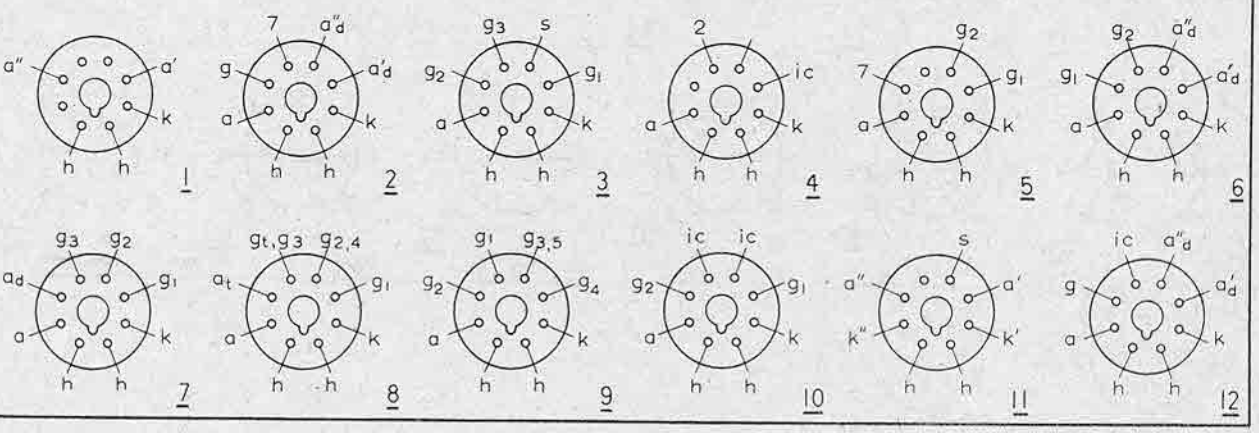
B 7G (Continued)



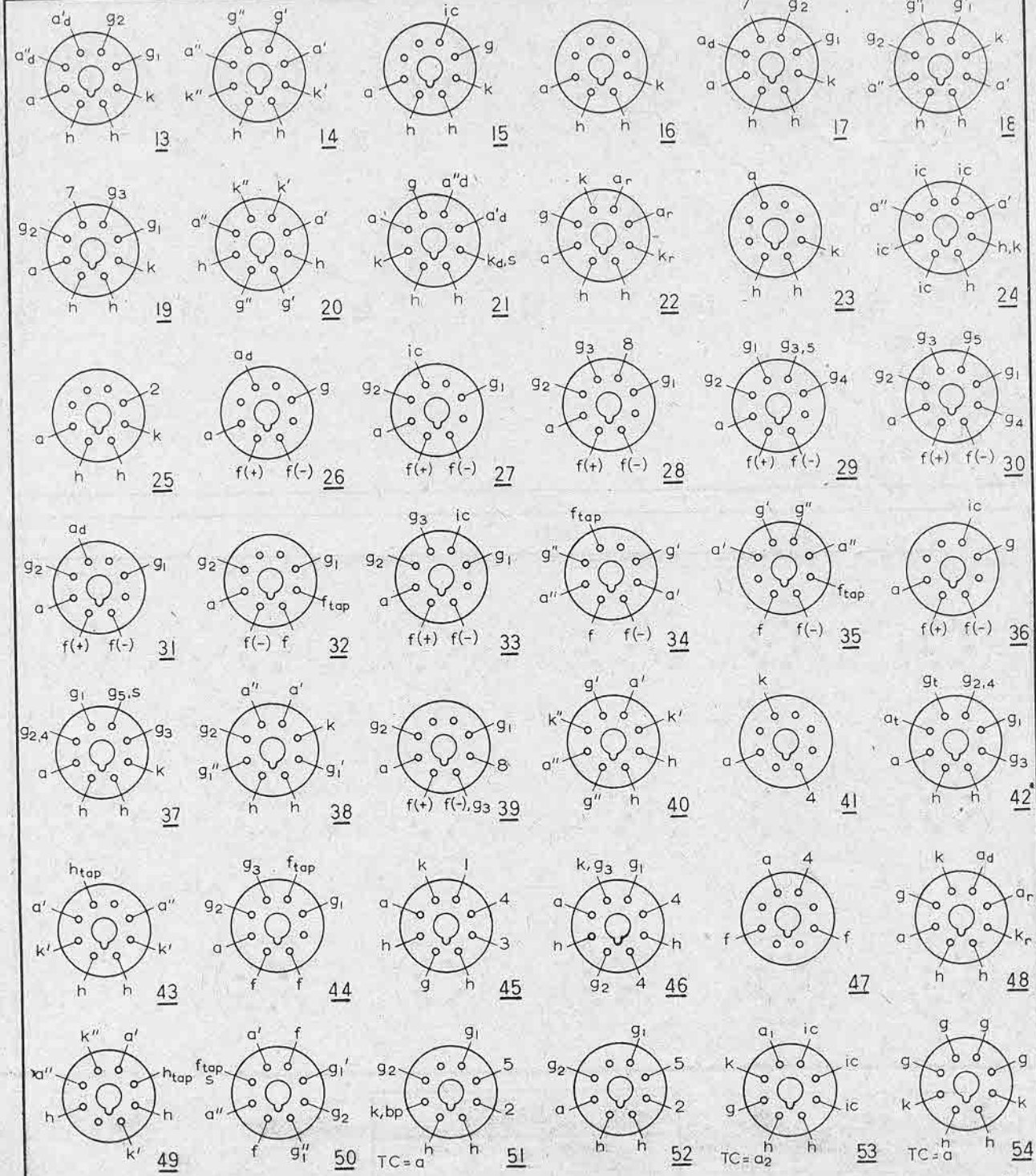
B8A



B8B (LOCTAL)

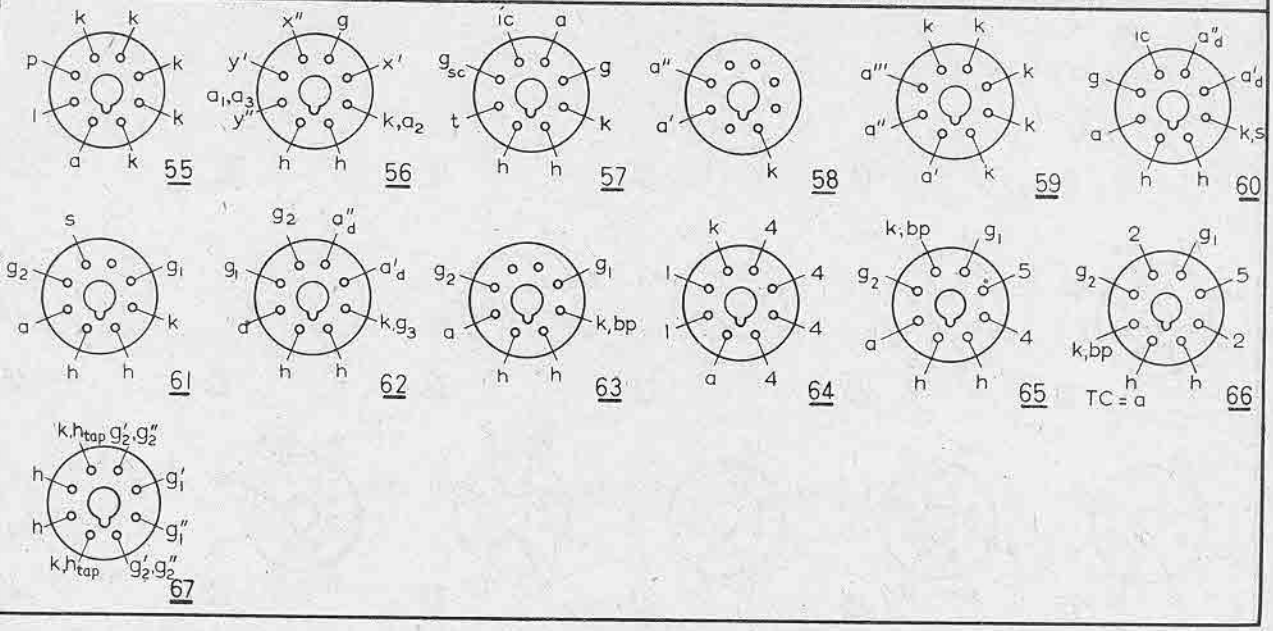


B8B (Continued)

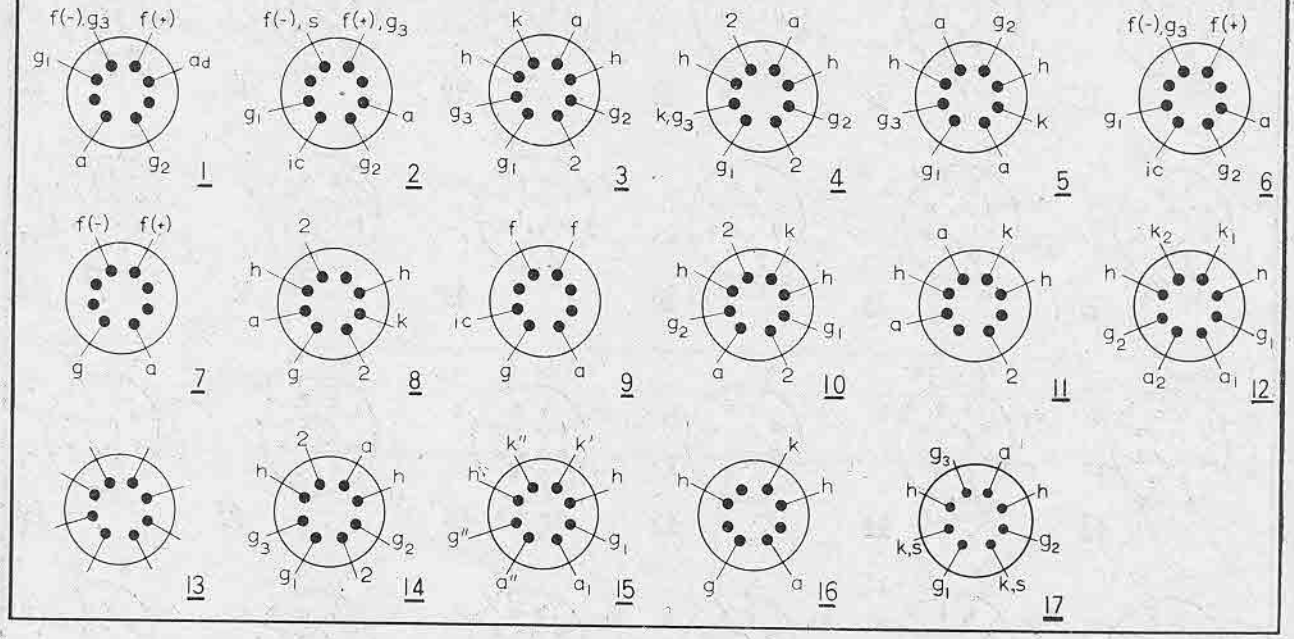


*K and g_s to centre spigot

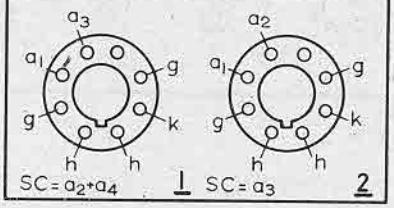
B8B (continued)



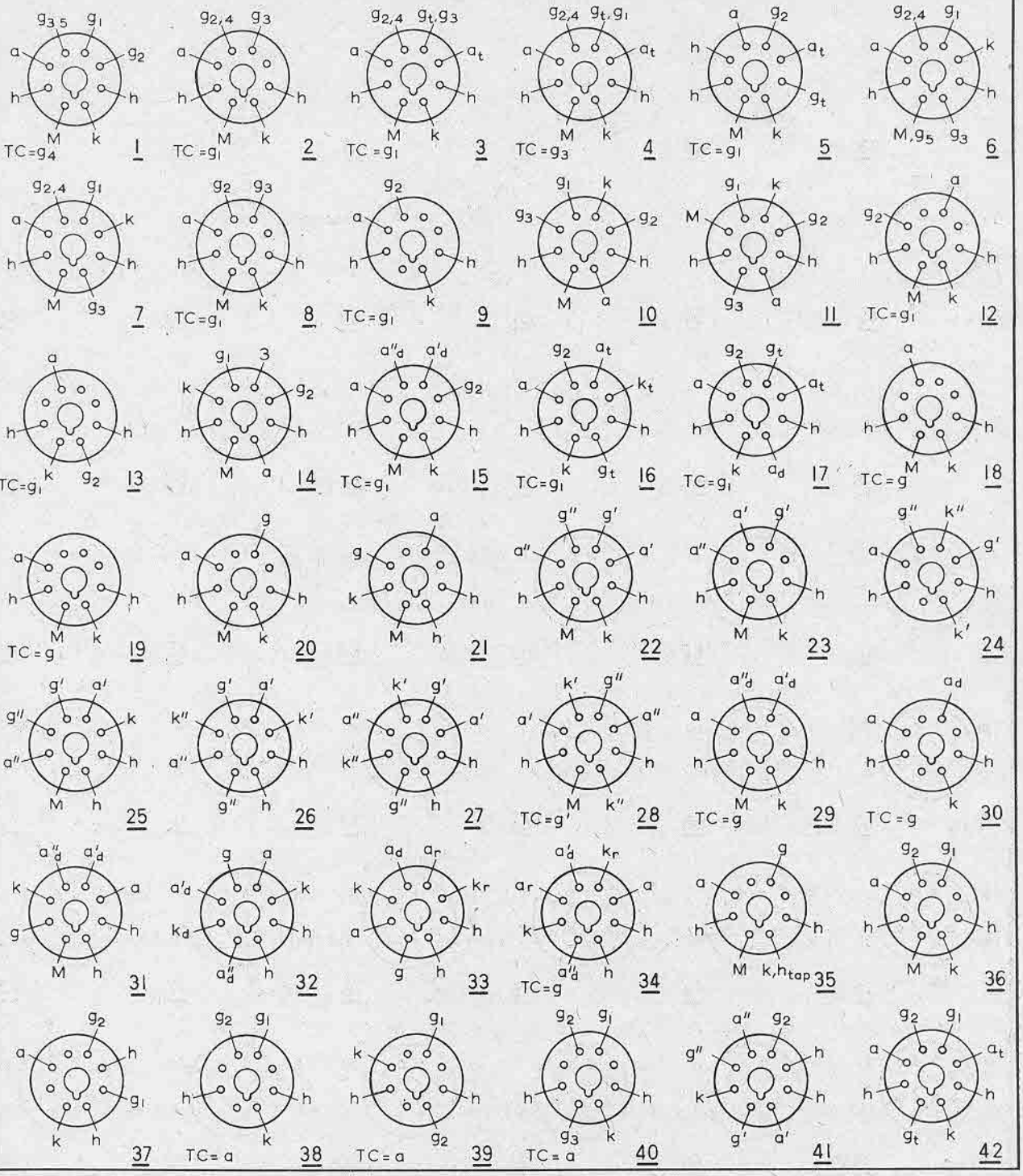
B8D



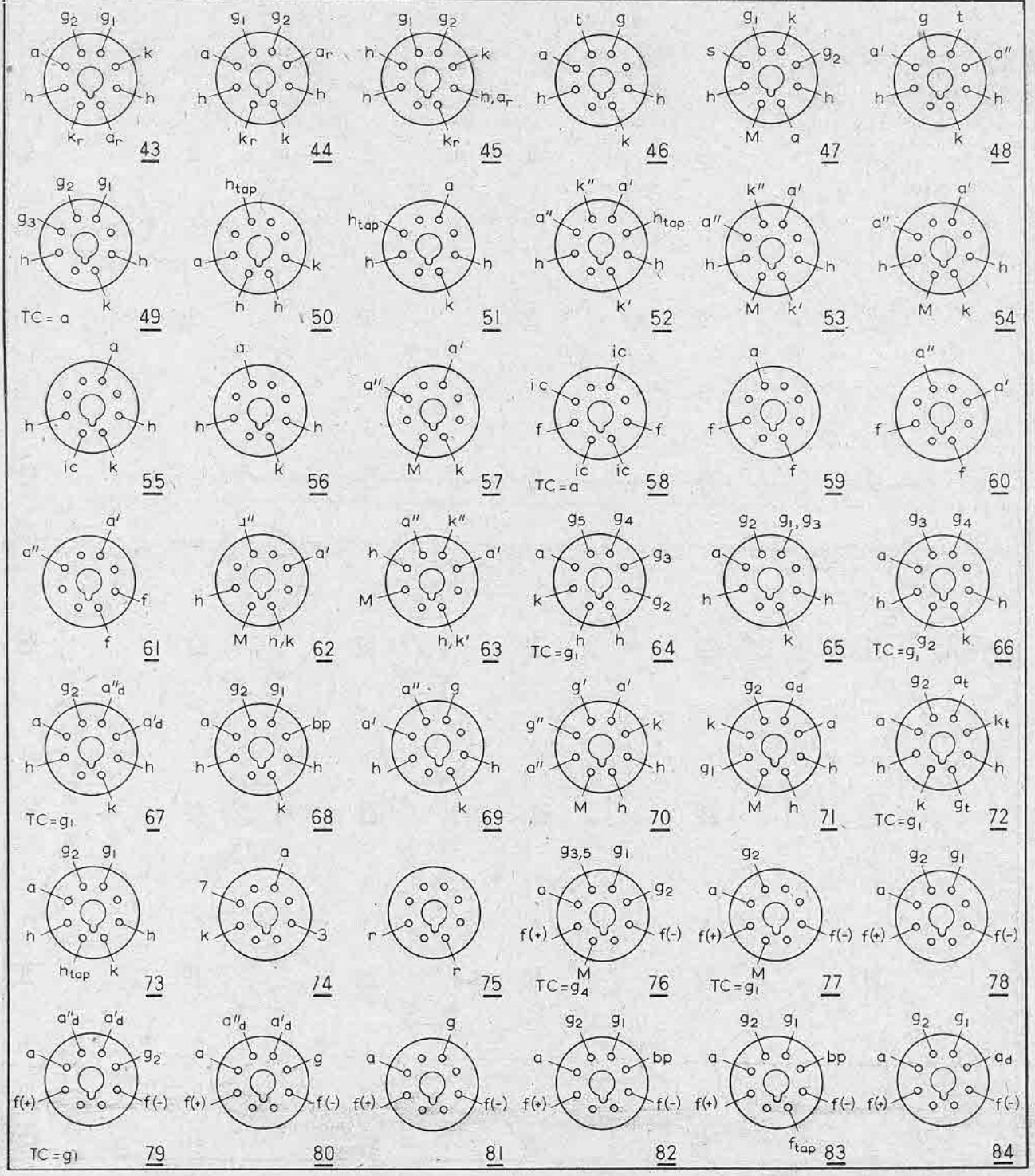
B8H



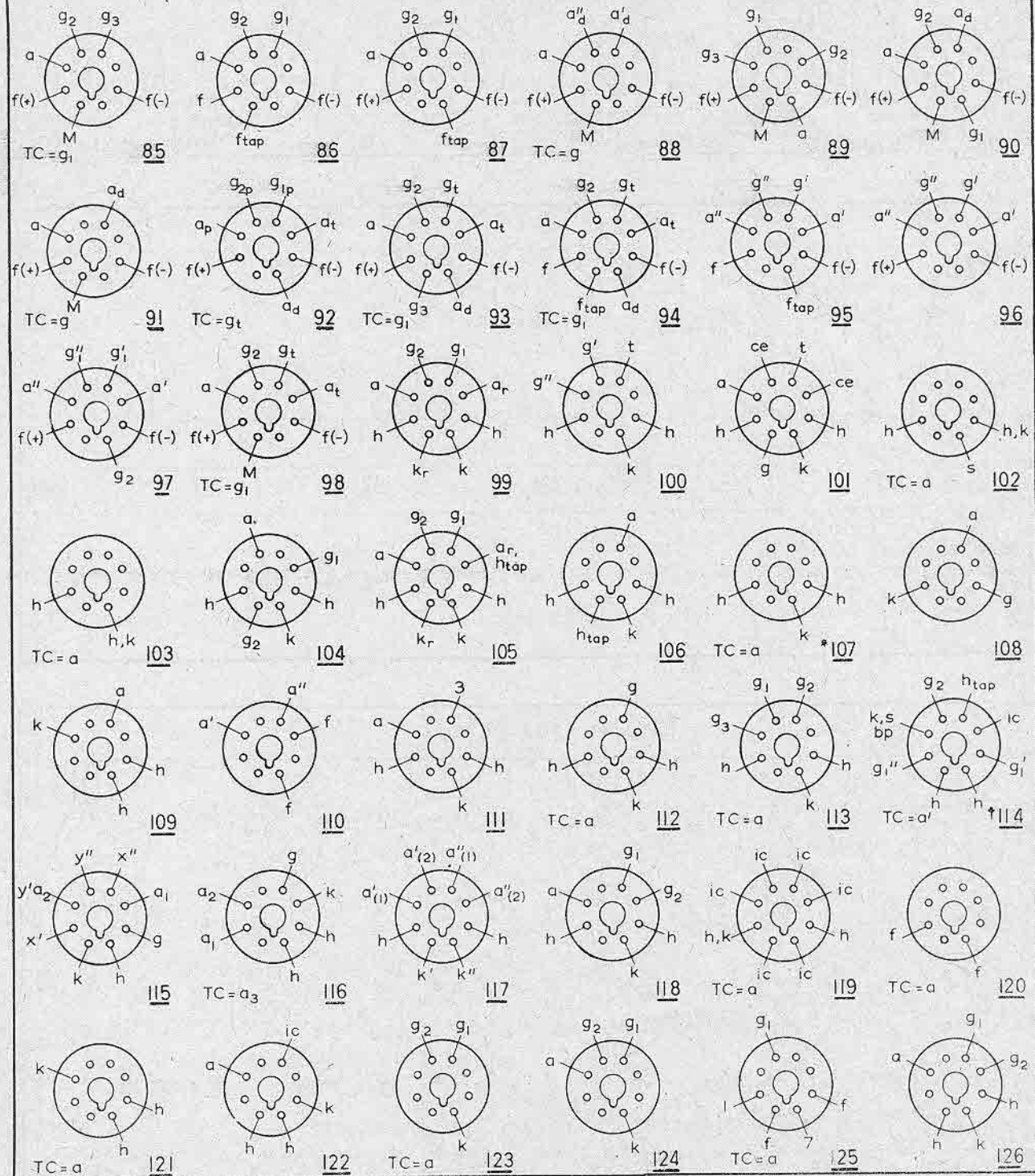
IO (INTERNATIONAL OCTAL)



10 (Continued)



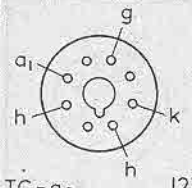
10 (continued)



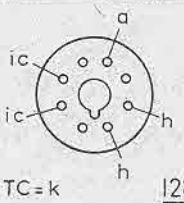
*g_1 to other TC

†a'' to other TC

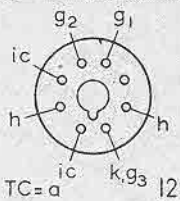
10 (continued)



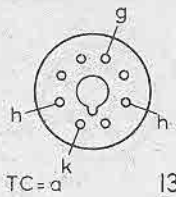
TC = a2 127



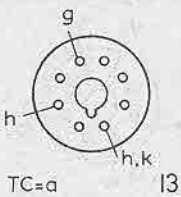
TC = k 128



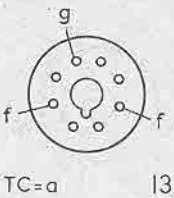
TC = a 129



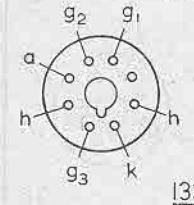
TC = a 130



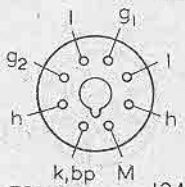
TC = a 131



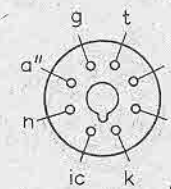
TC = a 132



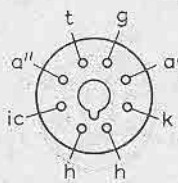
133



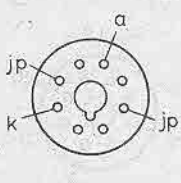
TC = a 134



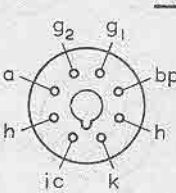
135



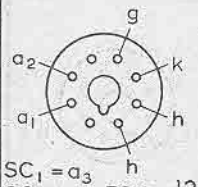
136



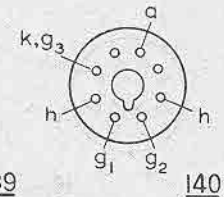
137



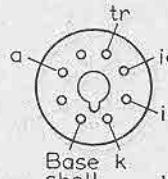
138



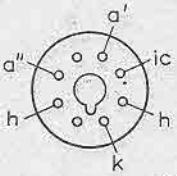
SC1 = a3
SC2 = a4, PDA 139



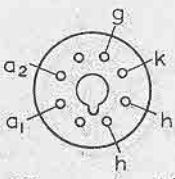
140



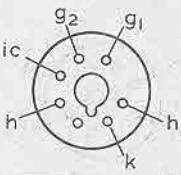
Base shell 141



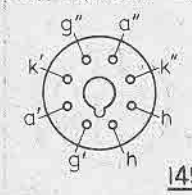
142



SC = a3 143

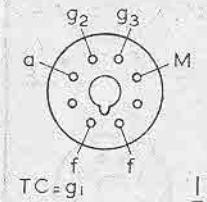


TC = a 144

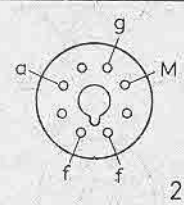


145

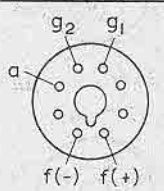
MO (MAZDA OCTAL)



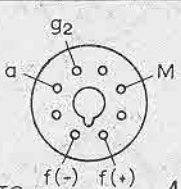
TC = g1 1



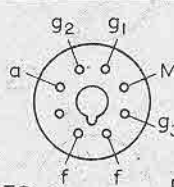
2



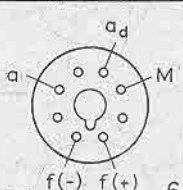
3



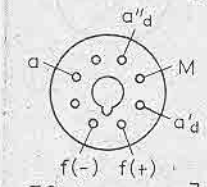
TC = g1 4



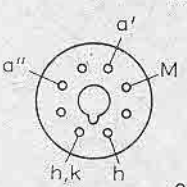
TC = g4 5



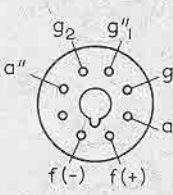
TC = g 6



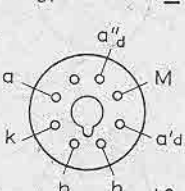
TC = g 7



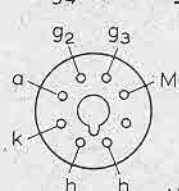
8



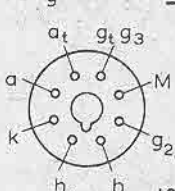
9



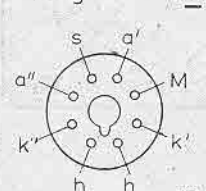
TC = g 10



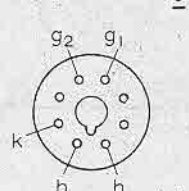
TC = g1 11



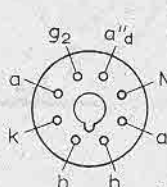
TC = g1 12



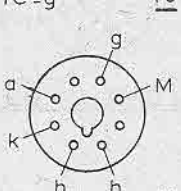
13



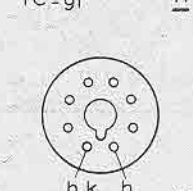
TC = a 14



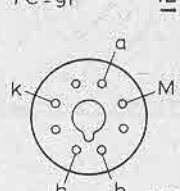
TC = g1 15



16

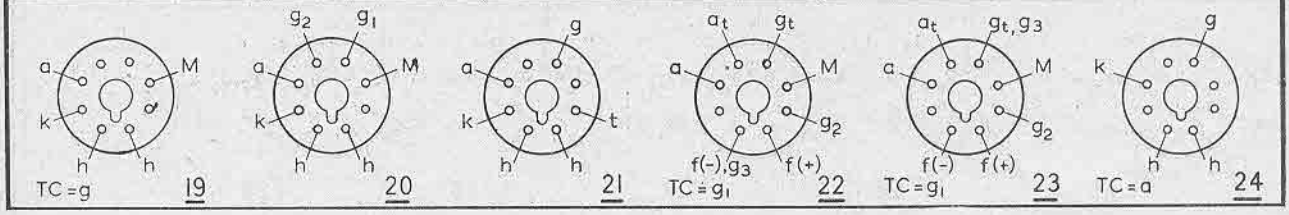


TC = a 17

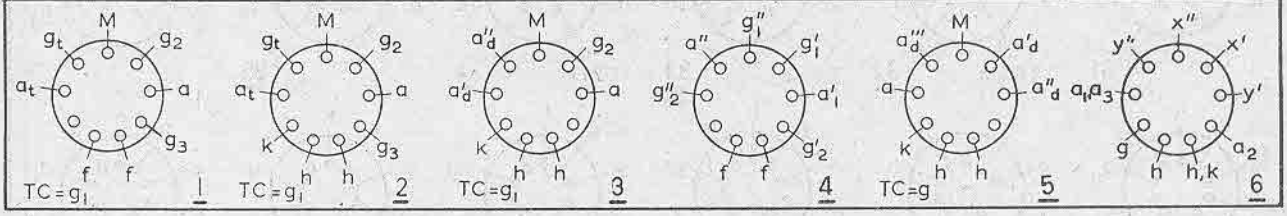


18

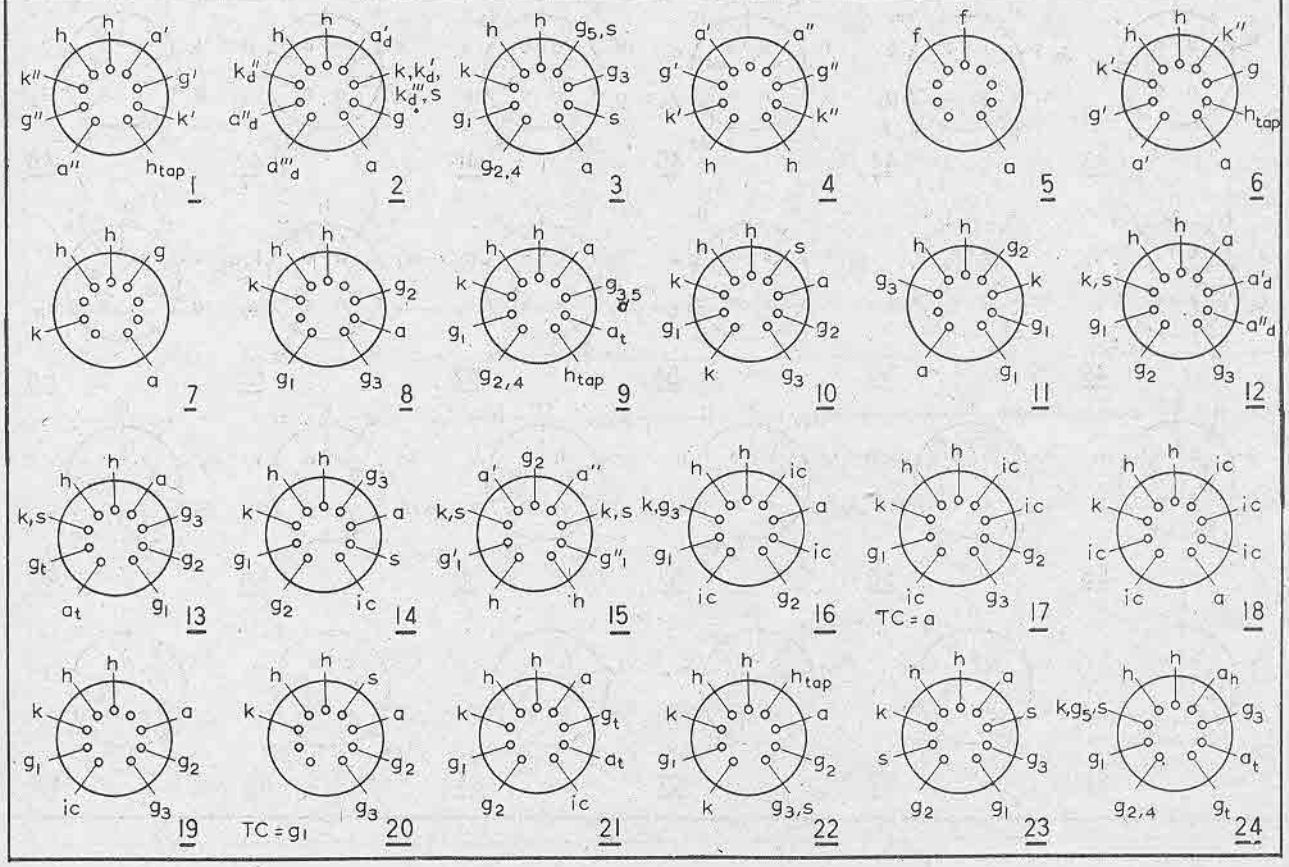
MO (continued)



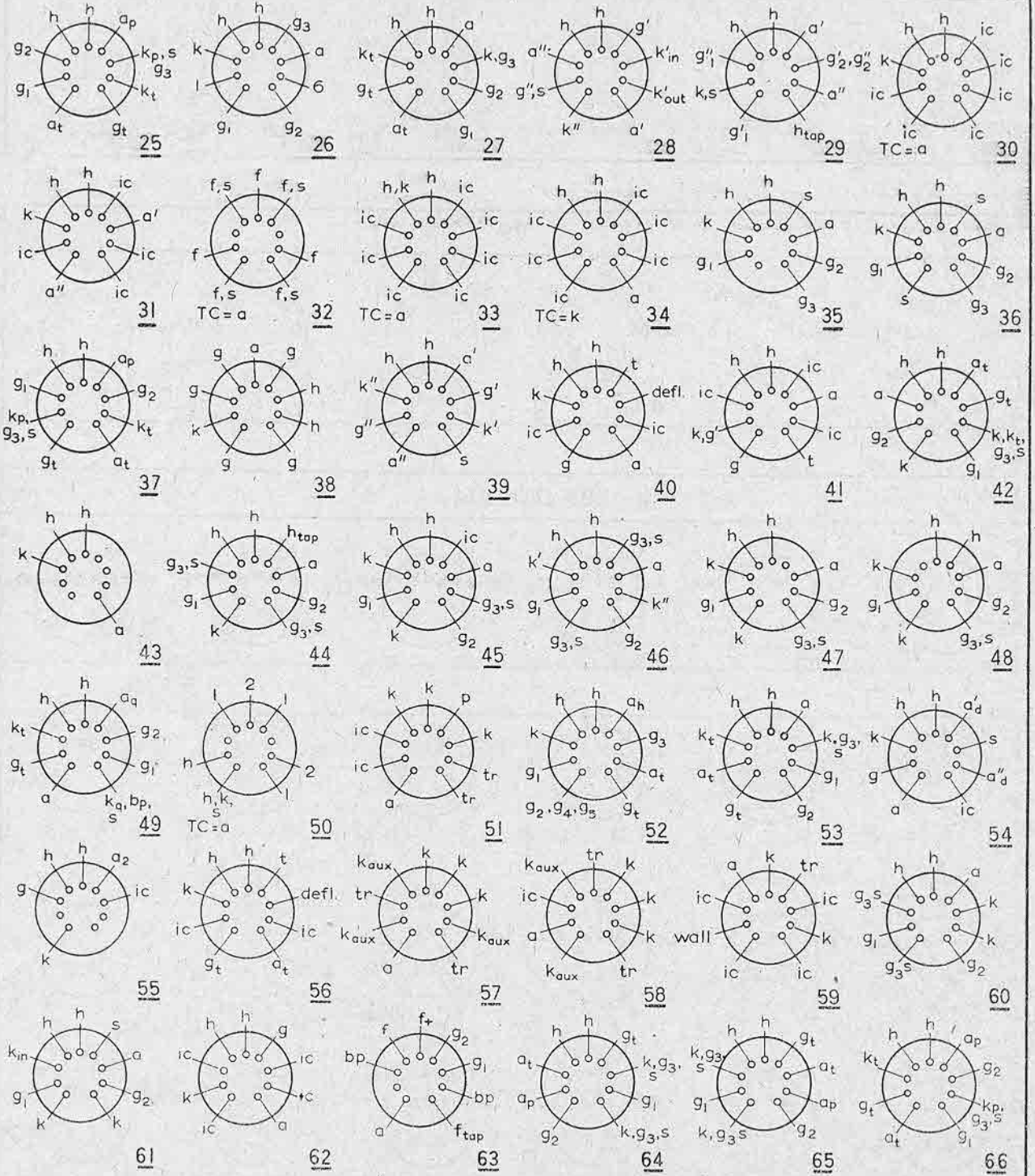
B9



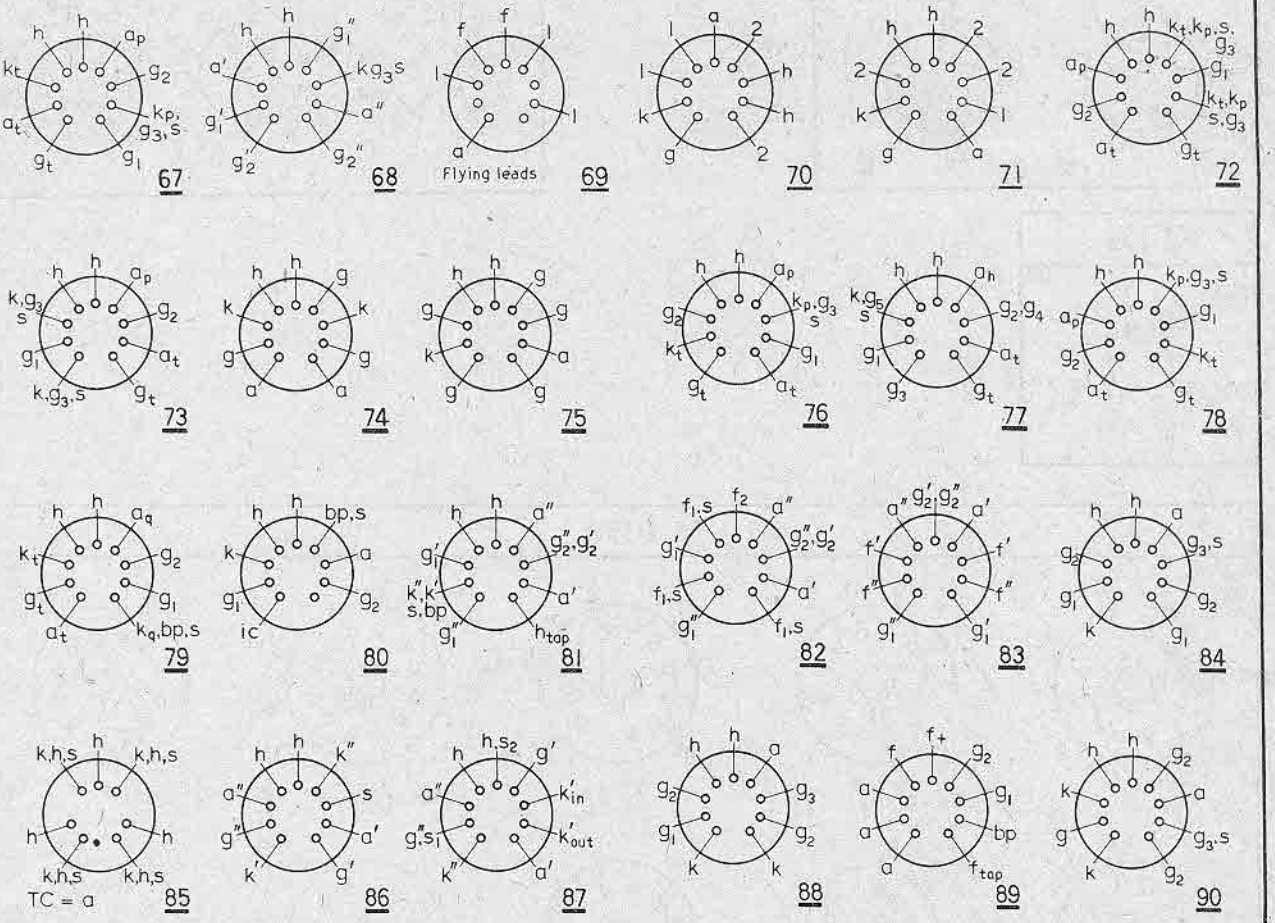
B9A (NOVAL)



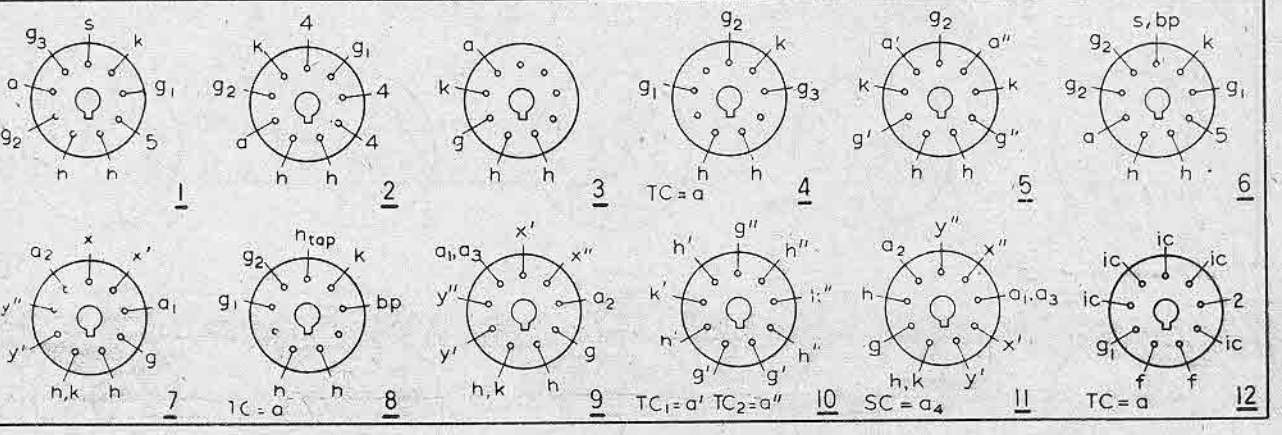
B9A (Continued)



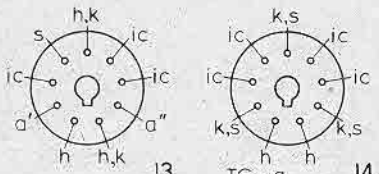
B9A (continued)



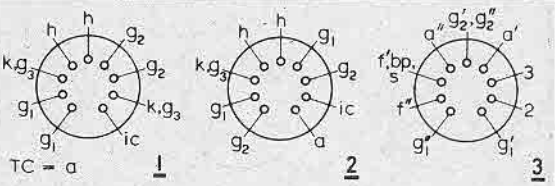
B9G



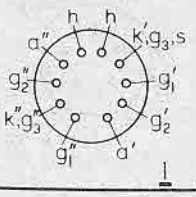
B9G (continued)



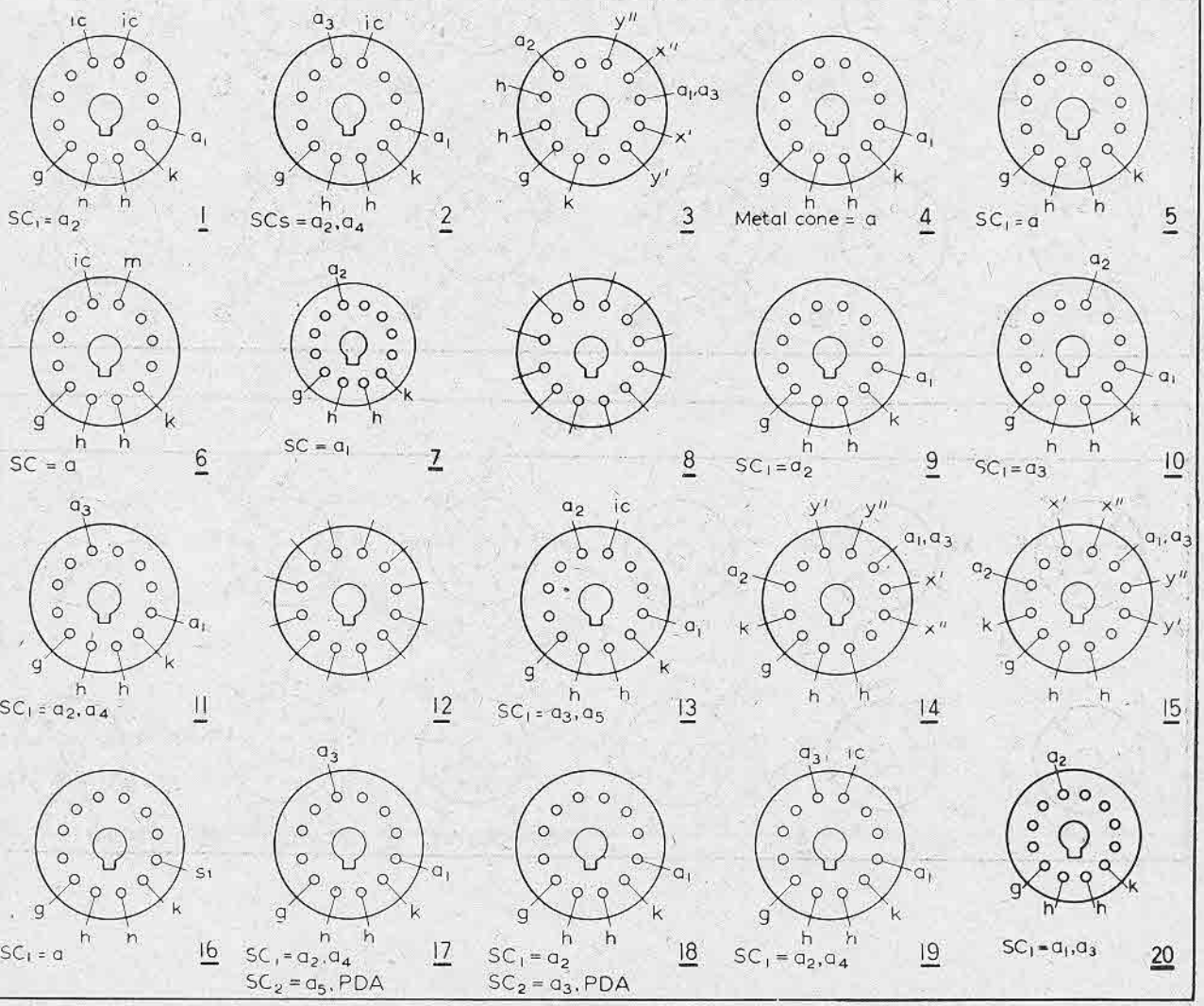
B9D



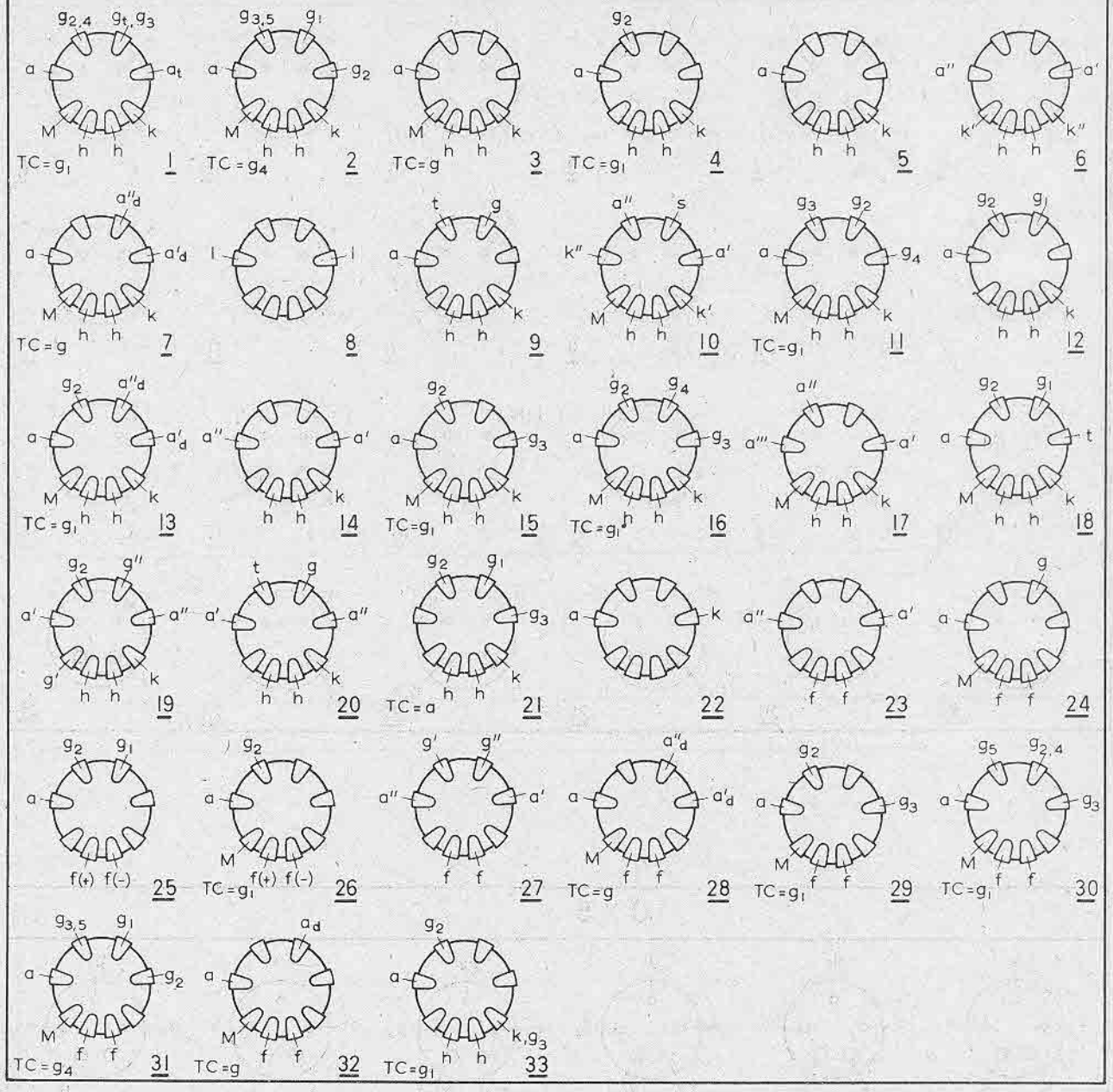
B10B



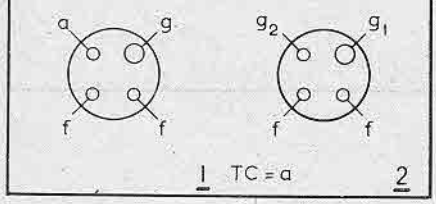
B12A



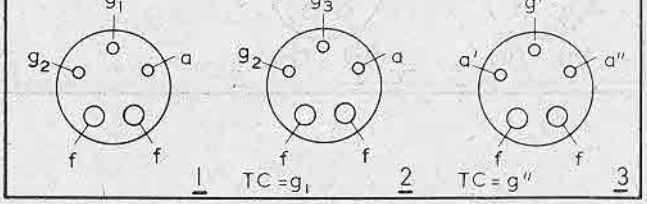
Ct 8 (SIDE CONTACT)



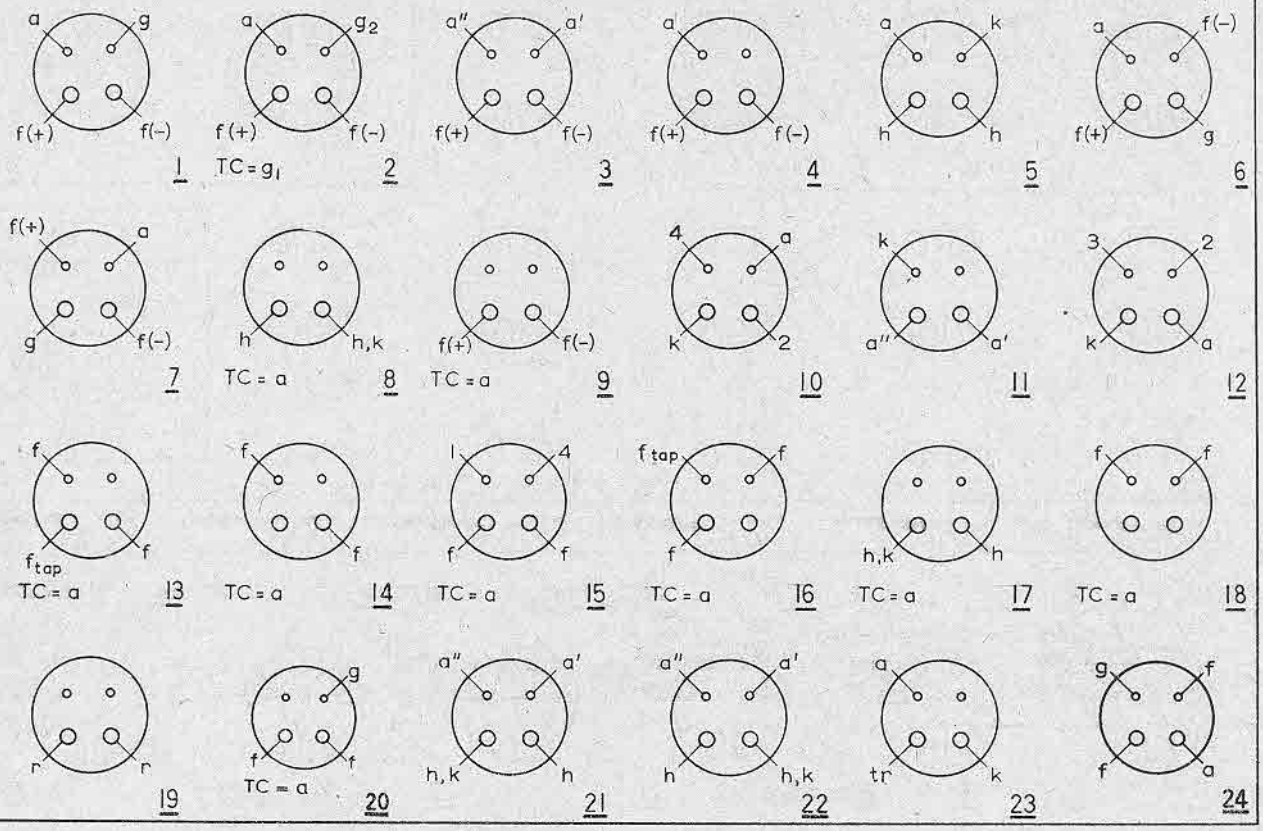
Sm 4



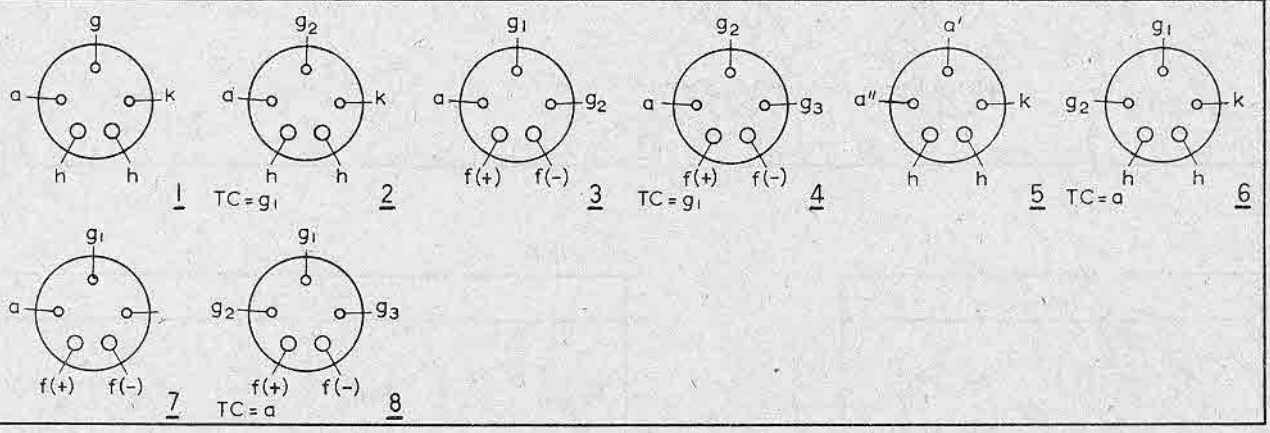
Sm 5



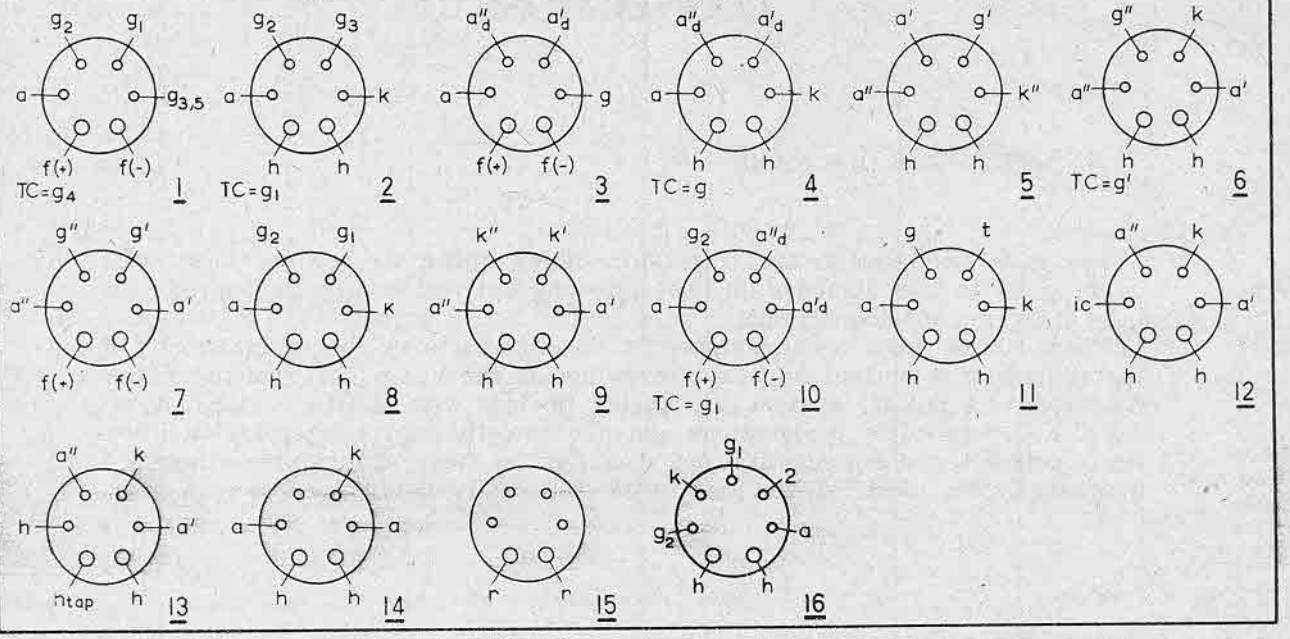
U X 4


a g f(+) f(−) 1
a g2 f(+) f(−) TC = g1 2
a'' a' f(+) f(−) 3
a f(+) f(−) 4
a k h h 5
a f(−) f(+) g 6
f(+) a g f(−) 7
h h,k 8
f(+) f(−) TC = a 9
4 a k 2 10
k a'' a' 11
3 2 k a 12
f f tap f TC = a 13
f f TC = a 14
1 4 f f TC = a 15
f tap f f TC = a 16
h,k h TC = a 17
f f TC = a 18
r r 19
g f f TC = a 20
a'' a' h,k h 21
a'' a' h h,k 22
a tr k 23
g f f a 24

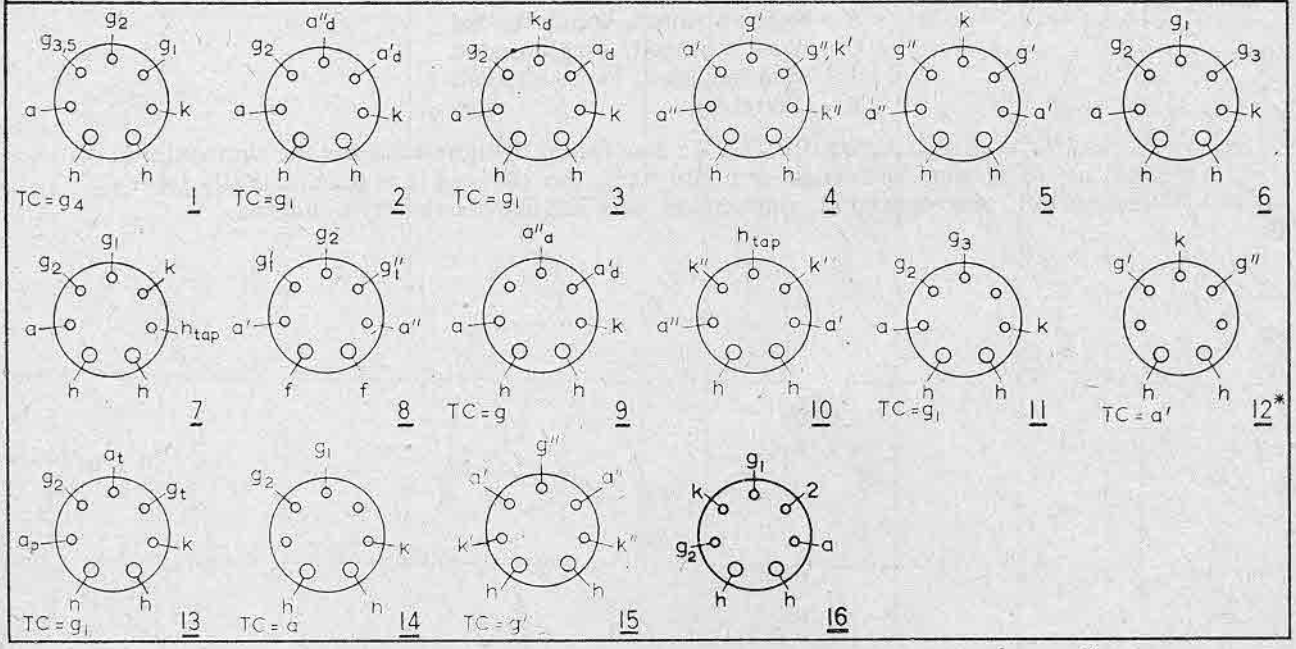
U X 5


g a k h h 1
g2 a k h h TC = g1 2
g1 a g2 f(+) f(−) 3
g2 a g3 f(+) f(−) TC = g1 4
a' a'' k h h 5
g1 g2 k h h TC = a 6
g1 a f(+) f(−) 7
g1 g2 g3 f(+) f(−) TC = a 8

UX6



UX7



* a" to other TC

EXPLANATION OF TRANSISTOR AND DIODE CONNECTIONS

TRANSISTOR BASE DIAGRAMS

The code numbers in the transistor tables under the heading 'Base Ref.' correspond to the numbers in the following list and identify the appropriate base diagrams and connections.

Where these have been assigned by the manufactures the designations for the dimensional outline and base drawings in the V.A.S.C.A. system and the American J.E.D.E.C. system are given. Devices with similar V.A.S.C.A. or J.E.D.E.C. equivalent designations are mechanically interchangeable, but since the electrical connections are not specified in these systems these may not necessarily be identical and should be separately determined in each case.

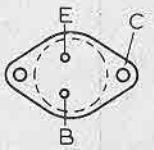
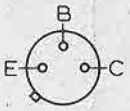
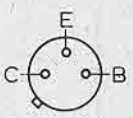
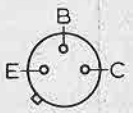
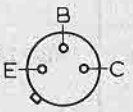
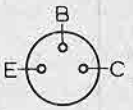
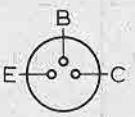
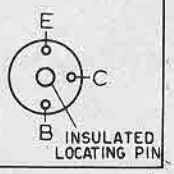
DIODE AND RECTIFIER CONNECTIONS

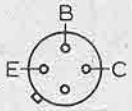
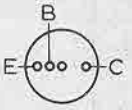
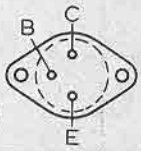
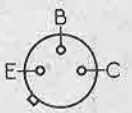
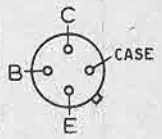
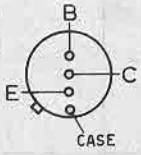
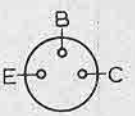
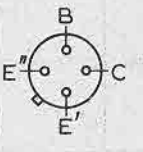
Under the heading 'Connections' in the diode and rectifier tables the code letter followed by a serial number identifies the particular set of connections in the following list. The code letter is also used to give a brief indication of the physical structure of the device, i.e.

A - Wire mounted, double ended
C - Wire mounted, single ended
S - Stud mounted, double ended
T - Cartridge

Similar V.A.S.C.A. or J.E.D.E.C. equivalent designations for the dimensional outline and base drawings indicate that the devices are mechanically interchangeable, the electrical connections vary and are separately indicated.

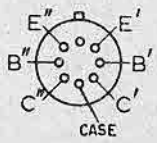
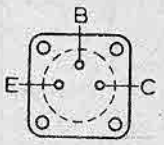
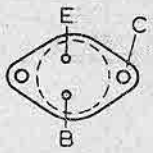
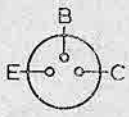
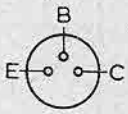
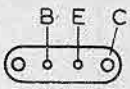
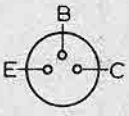
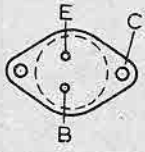
TRANSISTOR BASE DIAGRAMS

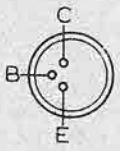
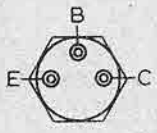
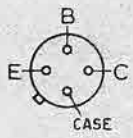
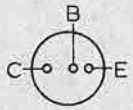
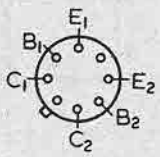
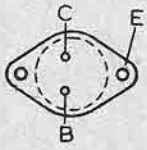
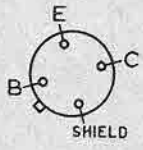
Ref.	VASCA Designation		JEDEC Equivalent	Base Diagram
	Base	Outline		
1	SB2-2	SO-5A SO-5B	TO-3	
2	SB3-3A	SO-3 SO-44 SO-44A	TO-5	
3	SB3-3B	SO-3 SO-44	TO-39	
4	SB3-6A SB3-6B	SO-12A	TO-18	
5	SB3-6A	SO-12C	TO-46	
6	SB3-9	SO-22	TO-8	
7	SB3-10	SO-21	TO-1	
8	SB3-12	SO-37	TO-36	

Ref.	VASCA Designation		JEDEC Equivalent	Base Diagram
	Base	Outline		
9	SB4-1B	SO-3 SO-44	TO-12	
10	SB4-4	SO-23	TO-7	
11	-	-	TO-37	
12	-	-	TO-52	
13	-	-	TO-18-1	
14	-	-	TO-18-2	
15	SB3-2	SO-2	-	
16	SB4-3	SO-12A	-	

(Continued)

Transistor Base Diagrams (Continued)

Ref.	VASCA Designation		JEDEC Equivalent	Base Diagram
	Base	Outline		
17	SB8-1B	SO-44B	-	
18	-	-	-	
19	-	-	-	
20	-	-	-	
21	-	-	-	
22	-	-	-	
23	-	-	-	
24	-	-	-	

Ref.	VASCA Designation		JEDEC Equivalent	Base Diagram
	Base	Outline		
25	-	-	-	
26	-	-	-	
27	-	-	-	
28	-	-	-	
29	SB8-1A	-	-	
30	-	-	-	
31	SB4-3	SO-12A	-	

DIODE AND RECTIFIER CONNECTIONS

A-WIRE MOUNTED, DOUBLE ENDED

Ref	VASCA Designation	JEDEC Equivalent	Connections
A1	SO-6	DO-7	Cathode end marked with coloured band
A2	SO-6	DO-7	Anode end marked with coloured band
A3	-	-	Cathode end marked with coloured band (s)
A4	SO-7	-	Cathode end marked with coloured band
A5	SO-16	DO-1 DO-2 DO-3	Cathode to flange
A6	SO-16	DO-1 DO-2 DO-3	Anode to flange
A7	SO-8	DO-14	Cathode end marked with red band
A8	SO-15	-	Cathode end marked with red band
A9	SO-16	DO-1 DO-2 DO-3	Cathode lead red sleeved. Black case
A10	SO-16	DO-1 DO-2 DO-3	Anode lead sleeved. Red case
A11	-	-	Cathode to flange
A12	SO-45	-	Cathode end marked with red band
A13	-	-	Anode to case
A14	SO-25	-	Cathode end marked red
A15	-	-	Cathode to case
A16	-	-	Cathode end marked red

(Continued)

Diode and Rectifier Connections (Continued)

A-WIRE MOUNTED, DOUBLE ENDED (continued)

Ref	VASCA Designation	JEDEC Equivalent	Connections
A17	SO-62	-	Cathode end marked red
A18	SO-63	-	Cathode end marked red
A19	SO-64	-	Cathode end marked red
A20	SO-66	-	Cathode end marked red
A21	SO-8	DO-14	Polarity indicated by rectifier symbol
A22	SO-15	-	Polarity indicated by rectifier symbol
A23	SO-16	DO-1 DO-2 DO-3	Polarity indicated by rectifier symbol
A24	-	-	Polarity indicated by rectifier symbol
A25	SO-6	DO-7	Polarity indicated by rectifier symbol

Diode and Rectifier Connections (Continued)

WIRE MOUNTED, SINGLE ENDED

Ref	VASCA Designation	JEDEC Equivalent	Connections
C1	SO-12A/SB2-3	-	Cathode lead (adjacent to yellow dot) connected to case
C2	SO-1/SB2-1	-	Cathode lead adjacent to red dot
C3	SO-1/SB2-1	-	Cathode lead (adjacent to yellow dot) connected to case
C4	-	-	Anode lead adjacent to dot
C5	-	-	Cathode lead adjacent to dot
C6	-	-	Middle lead common anode
C7	SO-2/SB2-1	-	Cathode lead adjacent to dot
C8	SO-44A/SB2-4	-	Anode lead adjacent to tab
C9	SO-12A/SB3-6B	TO-18	Clockwise from tab: (1) anode (2) (3) cathode and case
C10	SO12A/SB3-6A	TO-18	Clockwise from tab: (1) (2) anode (3) cathode
C11	SO-3/SB3-3B	TO-5	Clockwise from tab: (1) cathode (2) gate (3) anode
C12	SO12/SB3-6	TO-18	Clockwise from tab: (1) cathode (2) gate (3) anode
C13	-	-	Anode adjacent to notch
C14	-	-	Polarity indicated by rectifier symbol

Diode and Rectifier Connections (Continued)

S-STUD MOUNTED, DOUBLE ENDED

Ref.	VASCA Designation	JEDEC Equivalent	Connections
S1	-	-	Cathode to larger stud
S2	SO-10	DO-4	Cathode to stud
S3	SO-10	DO-4	Anode to stud
S4	SO-13	DO-5	Cathode to stud
S5	SO-13	DO-5	Anode to stud
S6	SO-17B	-	Anode to stud
S7	SO-17B	-	Cathode to stud
S8	SO-31	-	Cathode to stud
S9	SO-31	-	Anode to stud
S10	-	-	Cathode to stud
S11	SO-32A	-	Cathode to stud
S12	SO-32A	-	Anode to stud
S13	SO-32B	-	Cathode to stud
S14	SO-32B	-	Anode to stud
S15	-	-	Anode to stud
S16	SO-10	DO-4	Double anode

(Continued)

Diode and Rectifier Connections (Continued)

S-STUD MOUNTED, DOUBLE ENDED (continued)

Ref.	VASCA Designation	JEDEC Equivalent	Connections
S17	-	-	Double anode
S18	SO-28	-	Anode to stud
S19	-	-	Cathode to stud - anode to lug
S20	SO-35A	DO-16	Anode to stud-cathode to long lead
S21	SO-36	TO-48	Anode to stud-cathode to large terminal
S22	-	-	Anode to stud-cathode to large terminal
S23	-	-	Clockwise from lug: (1) cathode (2) case (3) anode
S24	SO-10	DO-4	Polarity indicated by rectifier symbol
S25	SO-17B	-	Polarity indicated by rectifier symbol

T-CARTRIDGE

Ref.	VASCA Designation	JEDEC Equivalent	Connections
T1	-	-	Cathode end red cap

TRADE NAMES AND MANUFACTURERS' ADDRESSES

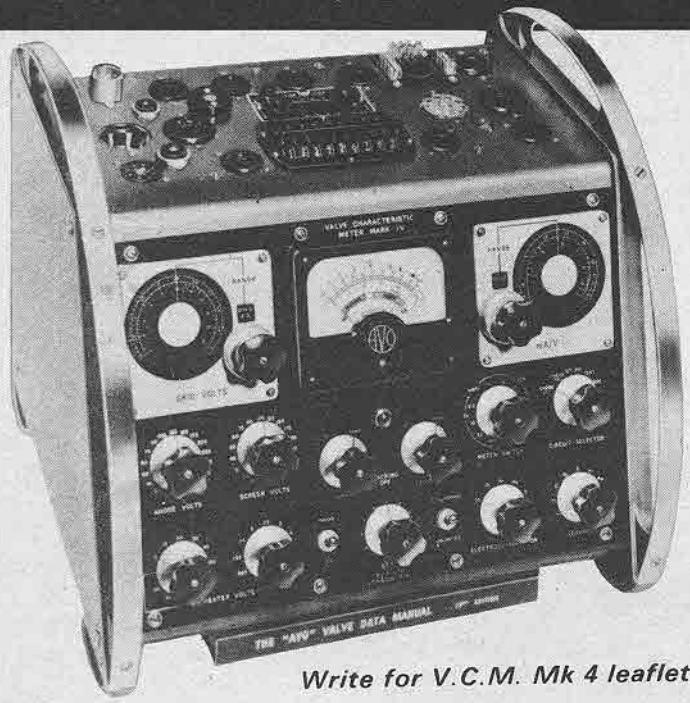
A.E.I.	Associated Electrical Industries Ltd., Electronic Apparatus Division, Carholme Road, Lincoln.
BRIMAR, MAZDA (EXPORT EDISWAN)	Thorne - A.E.I. Radio Valves & Tubes Ltd., 7 Soho Square, London, W.C.1.
CATHODEON	Cathodeon Electronic Ltd., Bircham Road, Southend-on-Sea.
EMISCOPE, EMITRON, MARCONI	Electronic Tubes Ltd., Suffolk Works, 313 London Road, High Wycombe, Bucks.
ENGLISH ELECTRIC VALVE CO. LTD.	English Electric Valve Co. Ltd., Waterhouse Lane, Chelmsford, Essex.
FERRANTI	Ferranti Ltd., Electronics Department, Hollinwood, Lancashire.
HIVAC LTD.	Hivac Ltd., Stonefield Way, Victoria Road, South Ruislip, Middlesex.
HUGHES INTERNATIONAL (U.K.) LTD.	Hughes International (U.K.) Ltd., Queensway Industrial Estate Glenrothes, Fife, Scotland.
INTERNATIONAL RECTIFIER	International Rectifier Co. (G.B.) Ltd., Hurst Green, Oxted, Surrey.
JOSEPH LUCAS (ELECTRICAL) LTD.	Messrs. Joseph Lucas (Electrical) Ltd., Mere Green Road, Four Oaks, Sutton Coldfield, Warwickshire.
M-O VALVE	The M-O Valve Co. Ltd., Brook Green Works, London, W.6.
MULLARD	Mullard Ltd., Mullard House, Torrington Place, London, W.C.1.
NEWMARKET TRANSISTORS LTD.	Newmarket Transistors Ltd., Exning Road, Newmarket, Suffolk.
SALFORD ELECTRICAL INSTRUMENTS LTD.	Salford Electrical Instruments Ltd., Peel Works, Barton Lane, Eccles, Manchester.
SEMICONDUCTORS LTD.	Semiconductors Ltd., Cheney Manor, Swindon, Wilts.
SGS FAIRCHILD	SGS Fairchild Ltd., 23 Stonefield Way, Ruislip, Middlesex.
S.T.C. TRANSISTORS LTD.	Standard Telephones & Cables Ltd., Footscray, Sidcup, Kent.
S.T.C. Rectifier Division	Standard Telephones & Cables Ltd., Rectifier Division, Edinburgh Way, Harlow, Essex.
S.T.C. Valve Division	Standard Telephones & Cables Ltd., Brixham Road, Paignton, Devon.
TEXAS	Texas Instruments Ltd., Manton Lane, Bedford.
TUNGSRAM	British Tungsram Radio Works Ltd., West Road, Tottenham, London, N.17.
WESTINGHOUSE BRAKE & SIGNAL CO. LTD.	Westinghouse Brake & Signal Co. Ltd., 82 York Way, King's Cross, London, N.1.
20th CENTURY	20th Century Electronics Ltd., Centronics Works, King Henry's Drive, New Addington, Croydon, Surrey.

INDEX TO VALVES AND VALVE EQUIVALENTS

Valve	Pages	Equivalents
0 (ZERO) - All entries under "zero" and "O" will be found together under O in the alphabetic section of the index. Where individual manufacturers have indicated either zero or O this has been followed in the tables		
1A5	21, 24	
1A7	1, 2, 6	
1AB6	9	DK98, 1C3, DK96, X25
1AB6/DK96	3	
1AC6	9	DK92, 1C2, X20 X18
1AC6/DK92	3	
1AH5	20	DAF96, 1FD1, ZD25
1AJ4	20	DF96, 1F1, W25
1C1	5	DK91, 1R5, X17
1C2	5	DK92, 1AC6, X20, X18
1C3	5	DK96, 1AB6, X25
1C5	21, 22, 23 28	
1C5GT	31	DL35, N14
1D5	74	U4020, C10B, 40SUA, RZ, URIC
1D6	74	
1D13	69	DA90, 1A3
1F1	16	DF96, 1AJ4, W25
1F2	15	DF92, 1L4
1F3	16	DF91, 1T4, W17
1FD1	16	DAF96, 1AH5, ZD25
1FD9	16	DAF91, 1S5, ZD17
1G6	44	
1H5	42, 44, 49	
1L4	10, 12, 15 20	1F2, DF92
1LA6	1	
1LD5	10, 12	
1LN5	10	
1M1	63	DM71, 1N3, Y25, 1M3, DM70
1N5	11, 13, 17	
1N5GT	20	DF33, Z14, 1N5VG
1P1	27, 36	DL96, 3C4, N25
1P10	27, 36	DL92, 3S4, N17
1P11	27	DL94, 3V4, N19
1P11/3V4	36	DL94, 3V4, N19
1Q5	24	
1R5	5, 9	1C1, DK91, X17
1R5/DK91	3	
1S4	21, 24, 31, 32	DL91
1S5	12, 16, 20	ZD17, DAF91, 1FD9
1S5/DAF91	13	1FD9, DAF91, 1S5, ZD17
1T4	12, 16, 20	DF91, 1F3, W17
1T4/DF91	13	
1U5	10	
1W4-350	79	
1W4-500	79	
2A3	21, 32	
2A5	31	
2A6	51	
2A7	8	
2D2	70	
2D4A	70	
2D4B	70	
2D13C	70	
2D21	64, 66	E1955, CV797, G4S2, PL21, PL2D21, QX21, Ste1300/01/05, 885, 884, 502A, EN91, 20A3, 4G/280K, 5121, 5727, ASG5121, WT-210-0001
2P	22	
3/1	57	
3/2	57	
3/3	57	
3/4	57	
3/5	57	
3/6A	57	
3/16	57	
3/18	57	
3/20	57	
3/31	57	
3/32	57	
3A/146J	55	CV53
3A/147J	55	CV82
3A/148J	55	3A/145J, CV88
3A/154M	55	
3A/167M	51	437A, CV5112, EC20
3A4	23, 31, 55	DL93
3B28	79	3885A, 5221, DX2, AX224, RR3-250, TH5221V/B, DCX4/1000, ESU103, GXU1, G10/11V, RR3-25O, TH5221, 2G/402A, 2H/28, DX4/1000, CV1835
3B/240M	55	
3B/241M	55	CV5116
3C4	31, 38	DL96, 1P1, N25
3C23	64	
3C24	53	3-25D3, 25T, 25TG, B1109, HK24G, PE130A
3D6	21, 23	
3D22	66	4G/401A, 3870A, CV2851
3Q4	21, 31, 32	DL95, N18
3Q5	21, 24, 28	
3Q5GT	31	DL33, N16
3S4	21, 23, 24, 27, 31, 32, 38	DL92, 1P10, N17
3S4/DL92	34	
3V4	21, 27, 31 32	1P11, DL94, N19
3V4/DL94	24, 34	
4/13	57	
4/14T	57	
4/14TG	58	
4/15T	57	
4/15TG	58	
4A88	92	
4C1017	92	
4D1	42	HL1320, C30B, DA, HL13C, 3A/172B
4D32	53	C1123, QY3-65, RK4D32
4D958	92	
4THA	2	A36C, X41, AC/TH1
4TSA	11	
5/2	57	
5/2T	57	SE14/70(1)
5/3	57	
5/3T	57	SE17/70(1)
5A/102D	19	CV1724
5A/152M/G	19	
5A/162D	19	6P12, 5A/166D
5A/163K	19	
5A/170K	19	6688, CV3998, E180F, EF861, PTT216
5A/180M	19	436A, PTT243
5B/110M	19	CV8263
5B/254M	38, 55	5B/111A, CV428, 5B/251M, 807, 5B/300B, 5B/300D, 5B/350A, CV8033, QE06/60
5B/255M	38, 55	5B/252M, 5932, CV391, CV8028
5B/256M	55	5B/253M, CV499
5B/257M	55	CV2220

We've counted them!

Over 8,000 valves can be tested with the AVO Valve Characteristic Meter *Mk 4*



The Avo Valve Characteristic Meter Mk 4 can test, accurately and simply, any type of standard receiving or small transmitting valve having up to a maximum anode dissipation of 25 W.

The construction of the instrument combines modern streamlined appearance with mechanical strength. All controls are protected by 'roll-round' handles, and the fold-away lid safeguards valve holders.

Tests that can be carried out include:

- **Inter-electrode insulation**
- **Anode current**
- **Mutual conductance**
- **'Gas' current**

families of curves can also be plotted.

The Avo Valve Characteristic Meter is supplied complete with a current copy of the Avo Valve Data Manual* which gives in-line testing information without the necessity of referring to individual manufacturers' literature.

** The 17th edition is now available. Extra copies available from Avo Spares Dept. at 35/-, post free.*

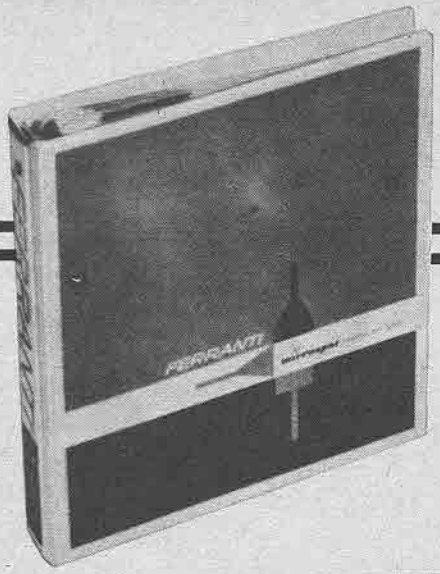
Write for V.C.M. Mk 4 leaflet

AVO LTD AVOCET HOUSE, ARCHCLIFFE ROAD, DOVER, KENT *Telephone: Dover 2626*

M GROUP

VC9

FERRANTI TECHNICAL HANDBOOKS



Application Reports and Notes

These publications give detailed information on particular applications of semiconductor devices, they are available on request from the Electronics Sales Department at Gem Mill. Titles of some of the publications presently available are given below:

Silicon Industrial Transistors and Micro-Alloy Diodes in Switching Circuits.

Voltage Transient Protection of Silicon Rectifiers.

Electronic Time-Sharing System for Welder Control.

The cooling of Silicon Power Transistors, Rectifiers and Regulators.

ZHS Series of Silicon Rectifiers in E.H.T. Supplies.

The Controlled Avalanche Rectifier: General and High Voltage Applications.

A 10 kV Stabilised E.H.T. Supply using Silicon Transistors.

ZLA10 Wideband Linear Amplifier as Stable Crystal Oscillator.

A Wide Range Stroboscope using Silicon Transistors.

Silicon Photocells in Data Processing and other Applications.

Other Publications available include "An Introduction to the Silicon Transistor used in Simple Circuits," "Silicon Microlin Circuits" and "Silicon Micronor Circuits."

Ferranti Semiconductors.

Silicon General Purpose Diodes, Power Rectifiers, High Voltage Rectifiers, Switching Diodes, Voltage Reference Diodes, Voltage Variable Capacitors, Photocells, Strain Gauges, Gallium Phosphide and Gallium Arsenide Light Emitting Diodes, Thermoelectric Devices, Silicon General Purpose Transistors, Switching Transistors, Power Transistors, V.H.F. and U.H.F. Transistors, Solid State Integrated Digital Circuits, Solid State Integrated Linear Circuits, Parametric Amplifiers, Special Purpose Products.

Ferranti Microspot Cathode Ray Tubes

The Measurement of Light Output and Resolution, Performance Factors, Cathode Ray Tubes for Flying-Spot Scanning, Radar Display Tubes, Miniature and High Altitude Radar Tubes, Very High Resolution Tubes for Film Recording, Phosphor Data, Focus and Scan Coil Data.

Ferranti High Vacuum Equipment

Absorption Forepumps, Getter Ion Pumps, Titanium Sublimation Pumps, Pumping Systems, Control Equipment, High Vacuum Valves, Manifold Systems and Vacuum Pipelines, Ceramic Seals, Ceramic High Power Microwave Windows, Feed-through Assemblies, and Viewing Ports.

These Handbooks are available on payment of a subscription. This covers the special binder together with a complete set of data sheets and also includes the issue of all new and amended data sheets.

The subscription rates are as follows:-

'Ferranti Semiconductors'	Handbook £2.0.0 each
'Ferranti Microspot Cathode Ray Tubes'	Handbook £1.0.0 each
'Ferranti High Vacuum Equipment'	Handbook £1.0.0 each

Send for an official order form:

FERRANTI LTD., GEM MILL, CHADDERTON, OLDHAM, LANCS.
Telephone: (061) MAln 6661

FE 268

MAZDA

take such care–for your good name!

This is one of 500 quality control tests and inspections to ensure the electron gun's absolute reliability. Every 625 electron gun for every Mazda Gold Star picture tube has each one of its 15 welds inspected. Doubtful welding is tested by tweezers. In addition to this 100% inspection, the whole Gun Assembly Department is subject to constant Patrol Inspections covering every assembly operation. Before delivery to your Mazda wholesaler, each Mazda Gold Star picture tube and its component parts must pass the 500 quality control tests and inspections imposed by Mazda.

sell sets fitted with

MAZDA ★ GOLD STAR PICTURE TUBES

MEMBER BVA

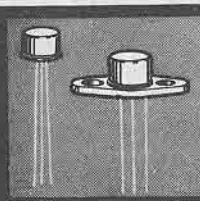
Thorn-AEI Radio Valves and Tubes Ltd

Head Office: 7 Soho Square · London, W.1 · Tel: GERrard 5233

By foreseeing the needs of the public; by anticipating the practical requirements of setmakers; by helping to solve the problems of service engineers and dealers; by building reliability and performance into every product they make, **MULLARD** have created a unique business philosophy.... in a word **INTRINSICALITY.**

Mullard

RCA ANNOUNCES A SILICON POWER LINE UP TO 30 AMP/f_T=700 Kc AT NEW LOW PRICES

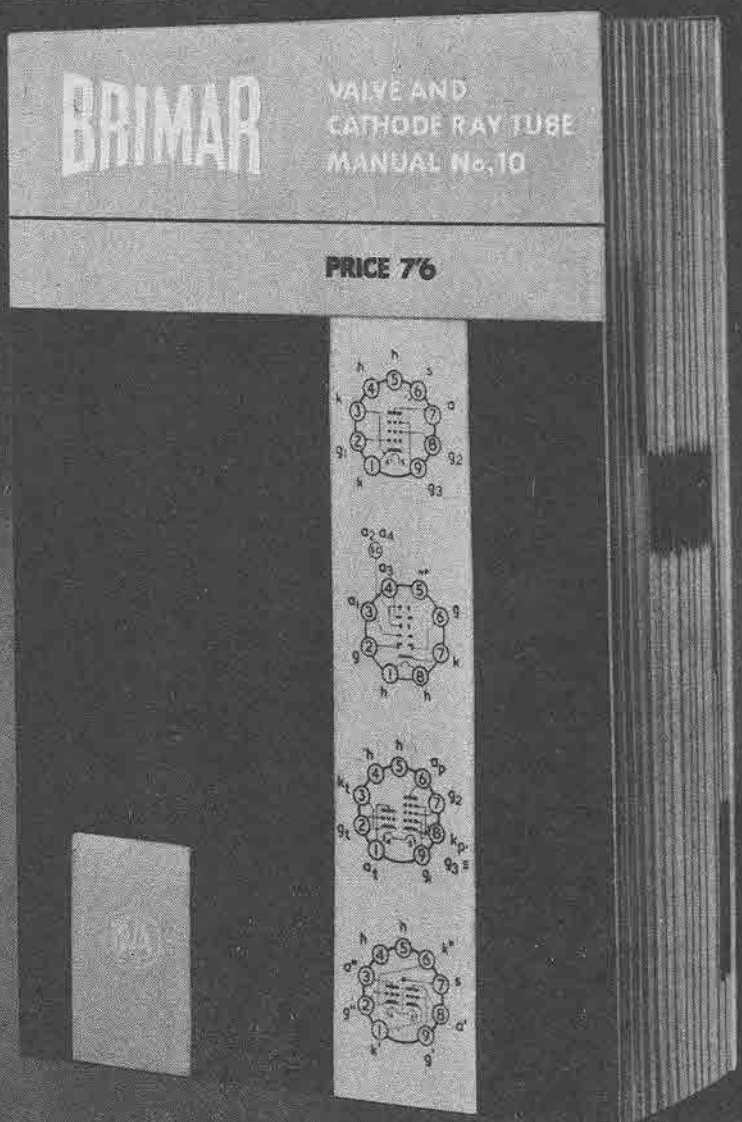
RCA's Broad Economy Silicon Line Offers Blocking Voltages to 450 V Currents to 30 Amperes	 TO-5 AND FLANGED TO-5 I_c MAX to 1 AMP P_c MAX = 5 and 10 W	 TO-66 PKG. I_c MAX to 4 AMP P_c MAX = 29 W	 TO-3 PKG. I_c MAX to 15 AMP P_c MAX = 117 W	 TO-3 PKG. I_c MAX to 30 AMP P_c MAX = 150 W
12-Volt Supply/Inverter Power to 350W/Audio Power to 100W/ Regulators Short-Circuit-Proof to 150W	RCA 2N3053 V_{CEV} max 60V h_{FE} @ I_c = 150 ma 50-250 f_T 100 Mc (min)	RCA 40250 V_{CEV} max 50V h_{FE} @ I_c = 1.5A 25-100 f_T (typ) 1 Mc	RCA 40251 V_{CEV} 50V h_{FE} @ I_c = 8A 15-60 f_T (typ) 0.5 Mc	2N3771 V_{CEO} 40V h_{FE} @ I_c = 15A 15-60 f_T (typ) 700 Kc
Medium-Voltage/Inverter Power to 800W/Audio Power to 300W/ Regulators Short-Circuit-Proof to 150W		RCA 2N3054 V_{CEV} max 90V h_{FE} @ I_c = 0.5A 25-100 f_T (typ) 1 Mc	RCA 2N3055 V_{CEV} 100V h_{FE} @ I_c = 4A 20-70 f_T (typ) 0.5 Mc	2N3772 V_{CEO} 60V h_{FE} @ I_c = 10A 15-60 f_T (typ) 700 Kc
High Voltage High Transients Inverter Power to 1KW Audio Power to 300W Regulators Short-Circuit-Proof to 150W	RCA 2N3440 V_{CEO} (sus) min 250V h_{FE} @ I_c = 20 ma 40-160 f_T 20 Mc (min) RCA 40256 (TO-5 w/flange) $\theta_{j\text{-}c}$ = 15° C/W	RCA 2N3441 V_{CEV} max 160V h_{FE} @ I_c = 0.5 Adc 20-80 f_T (typ) 0.8 Mc	RCA 2N3442 V_{CEV} 160V h_{FE} @ I_c = 3Adc 20-70 f_T (typ) 0.6 Mc	2N3773 V_{CEO} 140V h_{FE} @ I_c = 8A 15-60 f_T (typ) 500 Kc

For Economy, for Silicon, for Performance, check these new high performance RCA Economy Silicon Transistors. For prices and delivery, and for technical data and your copy of SMA-35, 12-VOLT AUDIO AMPLIFIER AND CONVERTER DESIGNS EMPLOYING RCA SILICON POWER TRANSISTORS,

RCA® THE MOST TRUSTED NAME IN ELECTRONICS

RCA GREAT BRITAIN LIMITED Sales Division, Lincoln Way, Windmill Road, Sunbury-on-Thames.
Associate Company of Radio Corporation of America. Telephone: Sunbury 5511.

THE MOST REWARDING 7'6 YOU'LL EVER SPEND!



BRIMAR No. 10 VALVE MANUAL

With more than 25 years' experience in compiling valve data, Brimar have now produced their most comprehensive manual to date . . . the *Brimar No. 10 Valve Manual.*
Contents include:-

☐ 416 pages, giving data on 629 types of Brimar valves and teletubes.
☐ The largest yet Equivalents List, giving over 1,200 types and C.V. numbers.
☐ A Comprehensive Obsolete Section, giving data on all valve types from the days of single triodes.
☐ Design data with curves on 'current equipment' types.
☐ Full data on 'maintenance' types.
☐ A wealth of other reference information.
☐ A quick self-indexing system which takes all the hard work out of finding the data you require.

The Brimar No. 10 Valve Manual is a *must* for industrial electronics designers, service engineers and 'hams'.
Get your copy NOW through your Brimar wholesaler, price 7/6, or direct from the Brimar Publicity Department (postage 1/6 extra).
Also available from large booksellers.

MEMBER BVA

Thorn-AEI Radio Valves and Tubes Ltd

Head Office: 7 Soho Square · London, W.1 · Telephone: GERrard 5233

INDEX TO TRANSISTORS AND SEMICONDUCTOR DIODES AND RECTIFIERS