

SPECIAL QUALITY V.H.F. PENTODE

M8100

Special quality low noise, high slope r.f. pentode for use in equipment where mechanical vibration and shocks are unavoidable and where statistically controlled major electrical characteristics are required.

This data should be read in conjunction with GENERAL NOTES – SPECIAL QUALITY VALVES which precede this section of the handbook, and the index numbers are used to indicate where reference should be made to a specific note.

HEATER

V_h^1	6.3	V
I_h	175	mA

CAPACITANCES² (measured with an external shield)

C_{a-g1}	< 20	mpF
C_{in}	4.0	pF
C_{out}	3.1	pF

CHARACTERISTICS³

V_{g1}	120	180	V
V_{g2}	120	120	V
I_a	7.5	7.7	mA
I_{g2}	2.5	2.4	mA
V_{g1}	-2.0	-2.0	V
g_m	5.0	5.1	mA/V
r_a	250	400	kΩ
μ_{g1-g2}	35	35	
R_k	0	0	Ω

ABSOLUTE MAXIMUM RATINGS⁴

f max.	400	Mc/s
$V_{a(b)}$ max.	400	V
V_a max.	200	V
p_a max.	1.65	W
$V_{g2(b)}$ max.	310	V
V_{g2} max.	155	V
p_{g2} max.	550	mW
$-V_{g1}$ max.	55	V
I_{g1} max.	4.0	mA
R_{g1-k} max.	3.0	MΩ
I_k max.	20	mA
V_{h-k} max.	130	V
Maximum acceleration (continuous operation)	2.5	g
Maximum shock (short duration)	500	g
T_{bulb} max.	165	°C

TEST CONDITIONS (unless otherwise specified)

V_h (V)	V_a (V)	V_{g2} (V)	V_{g1} (V)	R_k (Ω)	V_{h-k} (V)
6.3	120	120	-2.0	0	0

TESTS

GROUP A

Insulation

a-rest, g_2 -rest measured at -300V

g_1 -rest measured at -100V

Reverse grid current

R_{g1} max. = 500k Ω

A.Q.L. ⁵ (%)	Individuals ⁶		Lot average ⁷		Lot standard deviation ⁸ Max.
	Bogey ⁹	Min.	Max.	Min.	Max.
0.25	—	100	—	—	M Ω
0.25	—	100	—	—	M Ω
0.25	—	—	0.1	—	μ A

GROUP B

Heater current

Heater to cathode leakage current

V_{h-k} = 100V (cathode negative)

V_{h-k} = 100V (cathode positive)

Anode current

Screen-grid current

Mutual conductance

Group quality level¹⁰

0.65	—	160.	190	—	—	mA
0.65	—	—	—	—	—	—
—	—	—	10	—	—	μ A
—	—	—	10	—	—	μ A
0.65	7.5	5.0	11	—	—	mA
—	—	—	—	6.5	8.5	mA
0.65	2.5	0.8	4.0	—	—	mA
—	—	—	—	1.8	3.2	mA
0.65	5.0	4.0	6.25	—	—	mA/V
—	—	—	—	4.525	5.475	mA/V
1.0	—	—	—	—	—	—

GROUP C

Anode current. $V_{g1} = -10V$	2.5	—	—	—	200	—	—	μA
Anode current. $V_{g1} = -5.5V$	2.5	—	—	—	5.0	—	—	μA
Change in mutual conductance. $V_h = 5.7V$	2.5	—	—	—	15	—	—	%
Reverse grid current. $V_h = 7.0V$, $R_{g1} = 100k\Omega$	2.5	—	—	—	0.5	—	—	μA
Microphonic noise at the anode at 50c/s and 2.0g min. peak acceleration, $V_b = 135V$, $R_a = 2k\Omega$, $R_{g2} = 10k\Omega$, $C_{g2} = 2\mu F$, $R_{g1} = 100k\Omega$								
	2.5	—	—	—	45	—	—	mV (r.m.s.)
Group quality level ¹⁰	6.5	—	—	—	—	—	—	—

GROUP D

Glass strain test ^{11A} . No applied voltages	6.5	—	—	—	—	—	—	—
Base strain test ¹² . No applied voltages	6.5	—	—	—	—	—	—	—
Capacitances ² (shielded). No applied voltages	6.5	—	—	—	—	—	—	pF
C_{in}	—	—	—	—	3.4	4.6	—	pF
C_{out}	—	—	—	—	2.45	3.25	—	mpF
C_{a-g1}	—	—	—	—	—	20	—	dB
Noise factor	4.0	—	—	—	—	2.5	—	—

TESTS	A.Q.L. ⁵ (%)	Individuals ⁶		Lot average ⁷		Lot standard deviation ⁸ Max.
		Bogey ⁹	Min.	Max.	Min.	
GROUP E Fatigue¹⁴ $V_h = 6.3V$, 1 minute on 3 minutes off. No other voltages applied, 5g min. peak acceleration, $f = 170c/s$, for 33 hours in each of 3 mutually perpendicular planes.						
Post fatigue tests Heater to cathode leakage current. $V_{h-k} = \pm 100V$ Reverse grid current. $R_{g1} \text{ max.} = 500k\Omega$ Mutual conductance Microphonic noise as in group C Sub-group quality level ¹⁰	2.5 2.5 2.5 2.5 6.5	— — — — —	— — 3.5 — —	— — — — —	— — — — —	μA μA mA/V mV (r.m.s.)
Shock¹⁵ No applied voltages, 500g						
Post shock tests Heater to cathode leakage current. $V_{h-k} = \pm 100V$ Reverse grid current. $R_{g1} \text{ max.} = 500k\Omega$ Mutual conductance Microphonic noise as in group C Sub-group quality level ¹⁰	2.5 2.5 2.5 2.5 6.5	— — — — —	— — 3.5 — —	— — — — —	— — — — —	μA μA mA/V mV (r.m.s.)

GROUP F

Stability life test¹⁴

Running conditions. $V_a = 150V$, $V_{g2} = 125V$,
 $R_{g1} = 100k\Omega$, $R_k = 130\Omega$, $V_{h-k} = 135V$
 (cathode negative).



Stability life test end points

Change in mutual conductance after 1 hour 1.0 — — 10 — —

Intermittent life test

Running conditions. $V_a = 150V$, $V_{g2} = 125V$,
 $R_{g1} = 100k\Omega$, $R_k = 130\Omega$, $V_{h-k} = 135V$
 (cathode negative).

Intermittent life test end points**Sub-group (a)**Inoperatives¹⁶

Heater current

Heater to cathode leakage current. $V_{h-k} = \pm 100V$ Reverse grid current. $R_{g1} \text{ max.} = 500k\Omega$

Mutual conductance

Average change in mutual conductance

Sub-group (b)

Anode current

Insulation as in group A

Noise factor

Group quality level¹⁰A.Q.L.⁵

(%)

Min.

Max.

%

mA

mA

mA

mA

mA

mA

mA

mA

mA

mA

mA

mA

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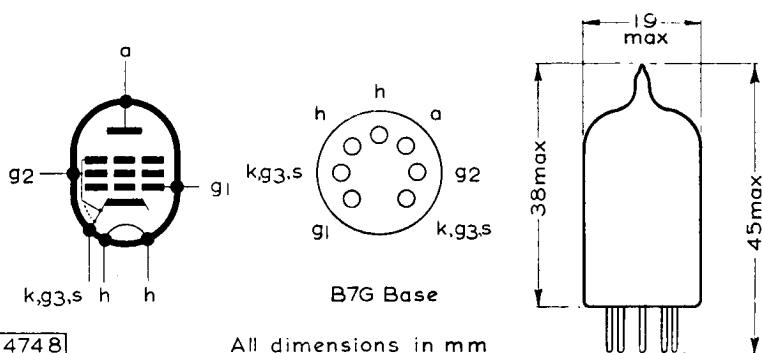
GROUP G

Valves are held for 28 days and retested for

Inoperatives¹⁶Reverse grid current. $R_{g1} \text{ max.} = 500k\Omega$ 

M8100

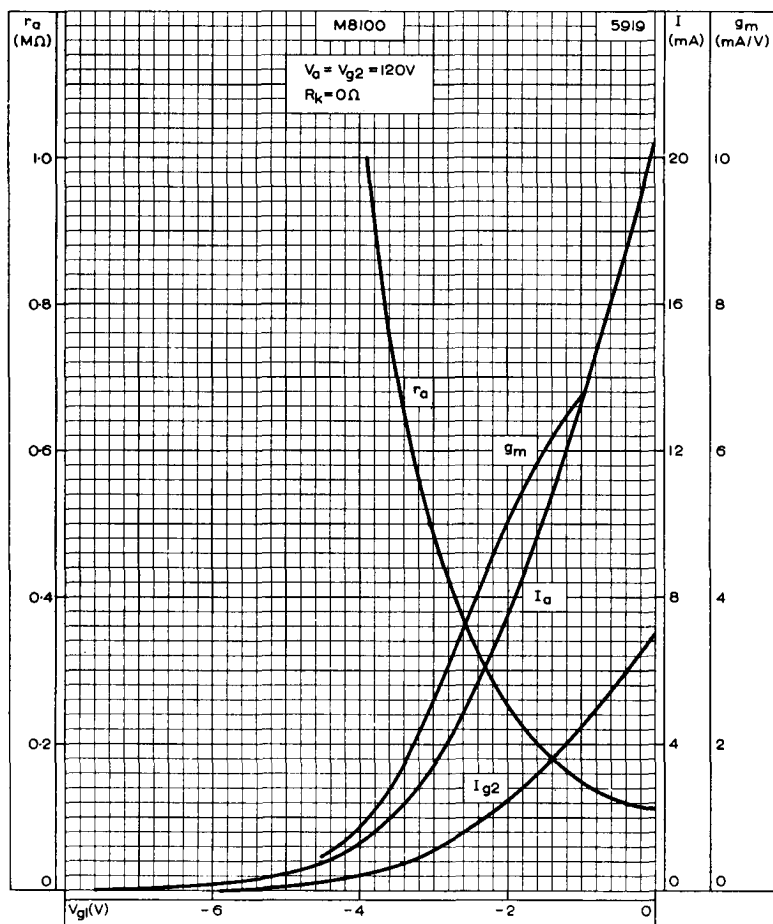
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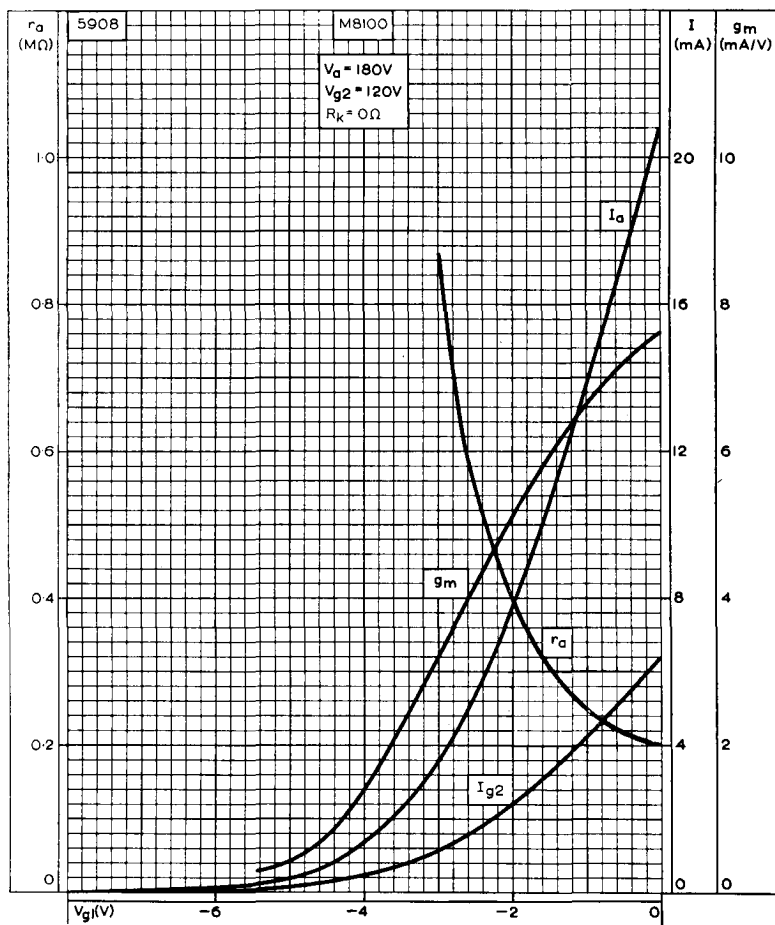
4748

All dimensions in mm

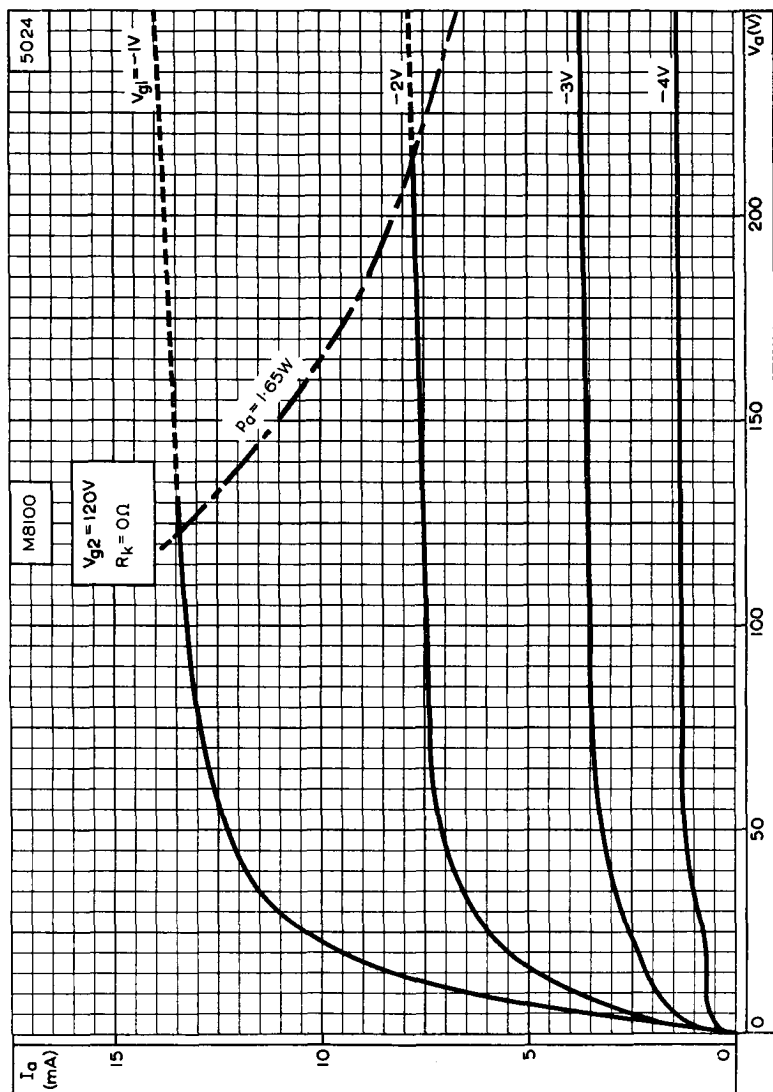
The bulb and base dimensions of this valve are in accordance with BS448, Section B7G



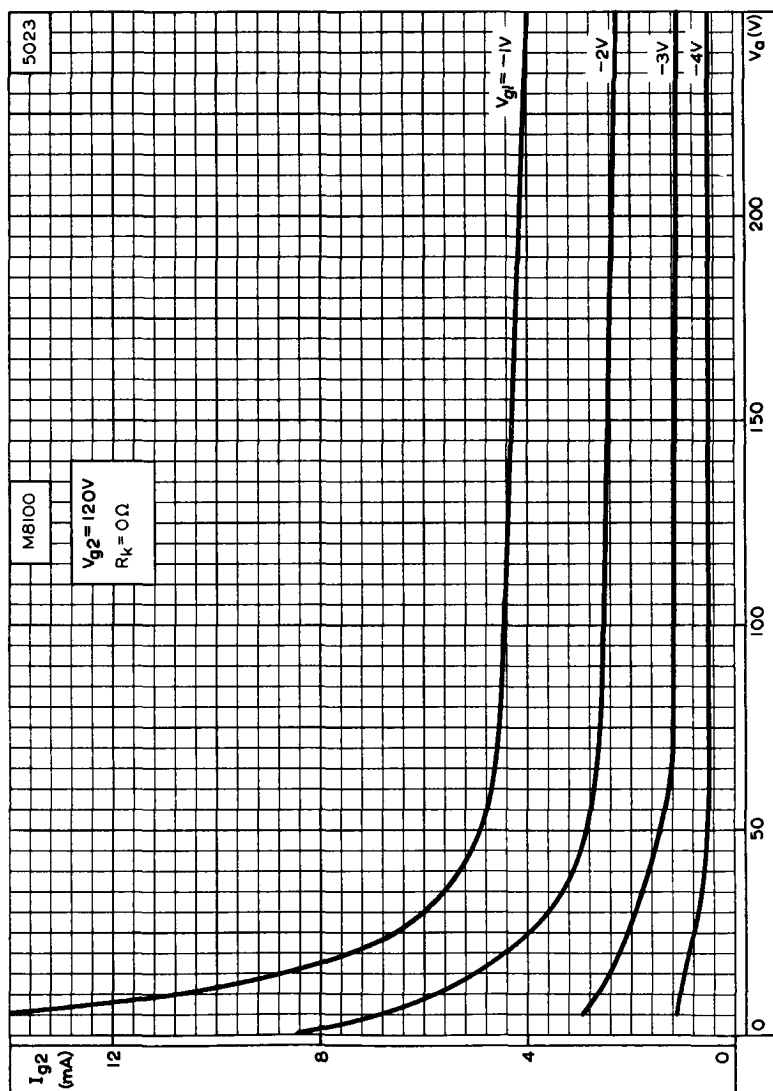
ANODE CURRENT, SCREEN-GRID CURRENT, MUTUAL CONDUCTANCE
AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE.
 $V_a = 120V$



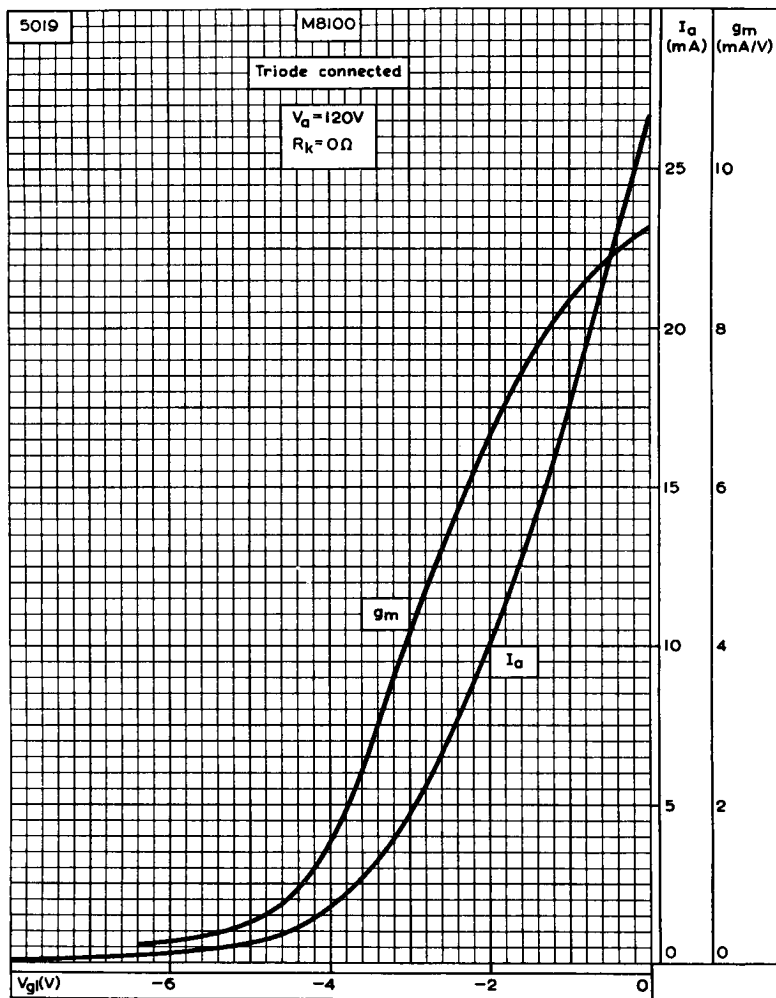
ANODE CURRENT, SCREEN-GRID CURRENT, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE.
 $V_d = 180V$



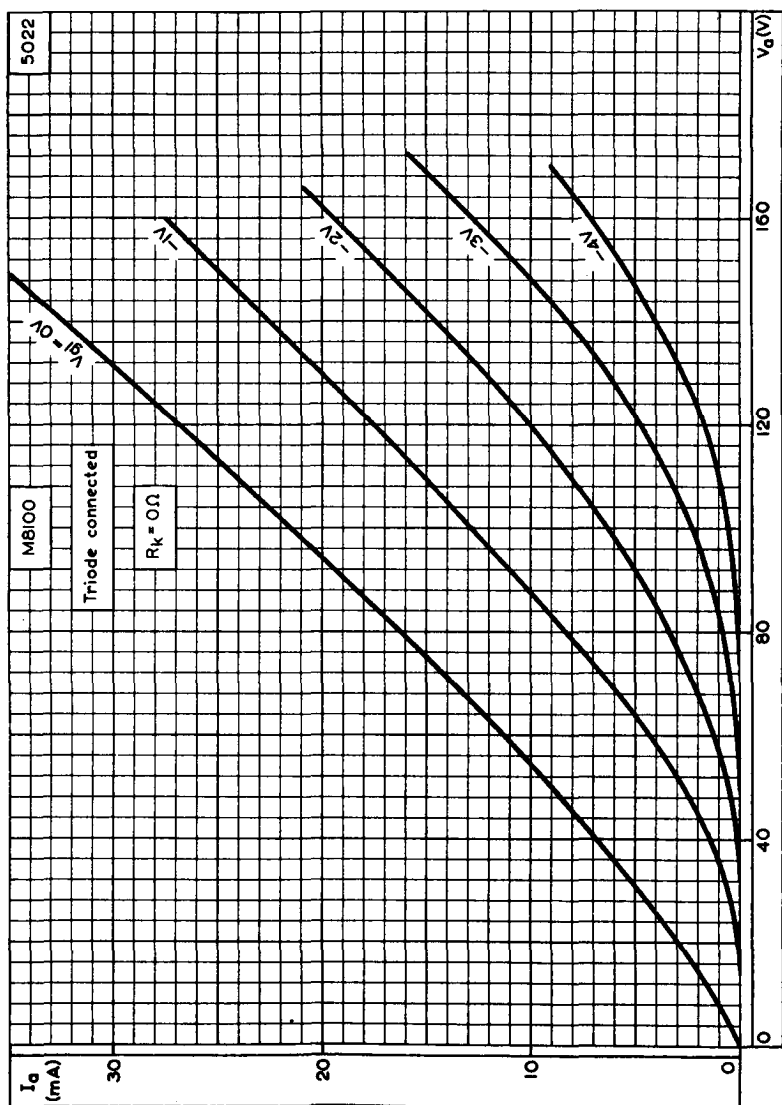
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER.



SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER.



ANODE CURRENT AND MUTUAL CONDUCTANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE, WHEN TRIODE CONNECTED.



ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER, WHEN TRIODE CONNECTED.