

**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**

$V_{h1}$	6.3	V
$I_h$	175	mA

**CAPACITANCES<sup>2</sup> (measured with an external shield)**

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

**CHARACTERISTICS<sup>3</sup>**

$V_a$	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	k $\Omega$
$\mu_{g1-g2}$	35	35	
$R_k$	0	0	$\Omega$

**ABSOLUTE MAXIMUM RATINGS<sup>4</sup>**

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	M $\Omega$
$I_k$ 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	$^{\circ}$ C

### TEST CONDITIONS (unless otherwise specified)

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

### TESTS

	A.Q.L. <sup>5</sup> (%)	Individuals <sup>6</sup>		Lot average <sup>7</sup>		Lot standard deviation <sup>8</sup> Max.	
		Bogey <sup>9</sup>	Min.	Max.	Min.		Max.
<b>GROUP A</b>							
Insulation							
a-rest, $g_2$ -rest measured at -300V	0.25	—	100	—	—	—	M $\Omega$
$g_1$ -rest measured at -100V	0.25	—	100	—	—	—	M $\Omega$
Reverse grid current							
$R_{g1}$ max. = 500k $\Omega$	0.25	—	—	0.1	—	—	$\mu$ A
<b>GROUP B</b>							
Heater current							
Heater to cathode leakage current	0.65	—	160.	190	—	—	mA
$V_{h-k}$ = 100V (cathode negative)	—	—	—	10	—	—	$\mu$ A
$V_{h-k}$ = 100V (cathode positive)	—	—	—	10	—	—	$\mu$ A
Anode current	0.65	7.5	5.0	11	—	—	mA
Screen-grid current	0.65	2.5	0.8	4.0	6.5	8.5	0.87 mA
Mutual conductance	0.65	5.0	4.0	6.25	1.8	3.2	0.52 mA
Group quality level <sup>10</sup>	1.0	—	—	—	4.525	5.475	— mA/V 0.357 mA/V

## GROUP C

Anode current. $V_{g1} = -10V$	2.5	—	—	—	—	—	—	—	—	$\mu A$
Anode current. $V_{g1} = -5.5V$	2.5	—	—	—	—	5.0	—	—	—	$\mu A$
Change in mutual conductance. $V_h = 5.7V$	2.5	—	—	—	—	—	—	—	—	%
Reverse grid current. $V_h = 7.0V$ , $R_{g1} = 100k\Omega$	2.5	—	—	—	—	—	—	—	—	$\mu A$
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	—	—	—	—	—	—	—	—	mV (r.m.s.)
Group quality level <sup>10</sup>	6.5	—	—	—	—	—	—	—	—	—

## GROUP D

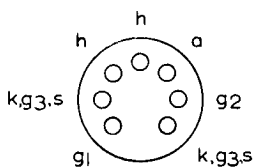
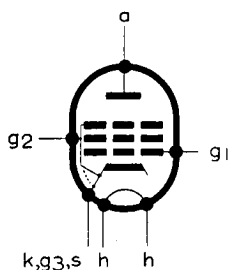
Glass strain test <sup>1,1A</sup> . No applied voltages	6.5	—	—	—	—	—	—	—	—	—
Base strain test <sup>1,2</sup> . No applied voltages	6.5	—	—	—	—	—	—	—	—	—
Capacitances <sup>2</sup> (shielded). No applied voltages	6.5	—	—	—	—	—	—	—	—	pF
$C_{in}$	—	—	—	—	—	3.4	4.6	—	—	pF
$C_{out}$	—	—	—	—	—	2.45	3.25	—	—	pF
$C_{8-g1}$	—	—	—	—	—	—	—	—	—	mpF
Noise factor	4.0	—	—	—	—	—	—	—	—	dB

TESTS	A.Q.L. <sup>5</sup> (%)	Individuals <sup>6</sup>		Lot average <sup>7</sup>		Lot standard deviation <sup>8</sup> Max.
		Bogey <sup>9</sup>	Min.	Max.	Min.	
<b>GROUP E</b>						
<b>Fatigue<sup>14</sup></b> V <sub>h</sub> = 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.						
<b>Post fatigue tests</b>						
Heater to cathode leakage current.						
V <sub>h-k</sub> = ±100V	2.5	—	30	—	—	μA
Reverse grid current.	2.5	—	0.2	—	—	μA
R <sub>g1</sub> max. = 500kΩ	2.5	3.5	—	—	—	mA/V
Mutual conductance	2.5	—	90	—	—	mV
Microphonic noise as in group C						(r.m.s.)
Sub-group quality level <sup>10</sup>	6.5	—	—	—	—	
<b>Shock<sup>15</sup></b>						
No applied voltages, 500g						
<b>Post shock tests</b>						
Heater to cathode leakage current.						
V <sub>h-k</sub> = ±100V	2.5	—	30	—	—	μA
Reverse grid current.	2.5	—	0.2	—	—	μA
R <sub>g1</sub> max. = 500kΩ	2.5	3.5	—	—	—	mA/V
Mutual conductance	2.5	—	90	—	—	mV
Microphonic noise as in group C						(r.m.s.)
Sub-group quality level <sup>10</sup>	6.5	—	—	—	—	
<b>GROUP F</b>						
<b>Stability life test<sup>14</sup></b>						
Running conditions. V <sub>a</sub> = 150V, V <sub>g2</sub> = 125V, R <sub>g1</sub> = 100kΩ, R <sub>k</sub> = 130Ω, V <sub>h-k</sub> = 135V (cathode negative).						

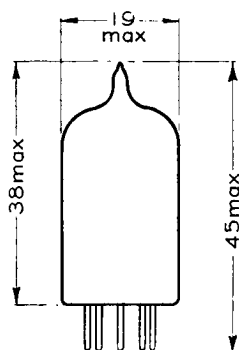
Stability life test end points		Change in mutual conductance after 1 hour		1.0		—		10		—		%	
<b>Intermittent life test</b>													
Running conditions. $V_a = 150V$ , $V_{g2} = 125V$ , $R_{g1} = 100k\Omega$ , $R_k = 130\Omega$ , $V_{h-k} = 135V$ (cathode negative).													
<b>Intermittent life test end points</b>													
Sub-group (a)													
Inoperatives <sup>16</sup>	..	..	..	..	..	..	..	..	..	..	..	..	..
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 level <sup>10</sup>	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>GROUP G</b>													
Valves are held for 28 days and retested for inoperatives <sup>16</sup>													
Reverse grid current. $R_{g1} \text{ max.} = 500k\Omega$													
A.Q.L. <sup>5</sup> (%)													
Min.													
Max.													
2.5	—	—	—	—	—	—	—	—	—	—	—	—	—
4.0	—	—	—	—	—	—	—	—	—	—	—	—	—
2.5	160	—	—	—	—	—	—	—	—	—	—	—	190 mA
4.0	160	—	—	—	—	—	—	—	—	—	—	—	190 mA
2.5	—	—	—	—	—	—	—	—	—	—	—	—	10 $\mu A$
4.0	—	—	—	—	—	—	—	—	—	—	—	—	10 $\mu A$
2.5	—	—	—	—	—	—	—	—	—	—	—	—	0.1 $\mu A$
4.0	—	—	—	—	—	—	—	—	—	—	—	—	0.1 $\mu A$
2.5	3.75	—	—	—	—	—	—	—	—	—	—	—	6.25 mA/V
4.0	3.5	—	—	—	—	—	—	—	—	—	—	—	6.25 mA/V
—	—	—	—	—	—	—	—	—	—	—	—	—	15 %
4.0	4.5	—	—	—	—	—	—	—	—	—	—	—	11 mA
6.5	4.0	—	—	—	—	—	—	—	—	—	—	—	11 mA
4.0	50	—	—	—	—	—	—	—	—	—	—	—	M $\Omega$
6.5	30	—	—	—	—	—	—	—	—	—	—	—	M $\Omega$
4.0	—	—	—	—	—	—	—	—	—	—	—	—	2.7 dB
6.5	—	—	—	—	—	—	—	—	—	—	—	—	2.8 dB
6.5	—	—	—	—	—	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—	—	—	—	—	—
0.5	—	—	—	—	—	—	—	—	—	—	—	—	—
0.5	—	—	—	—	—	—	—	—	—	—	—	—	0.15 $\mu A$

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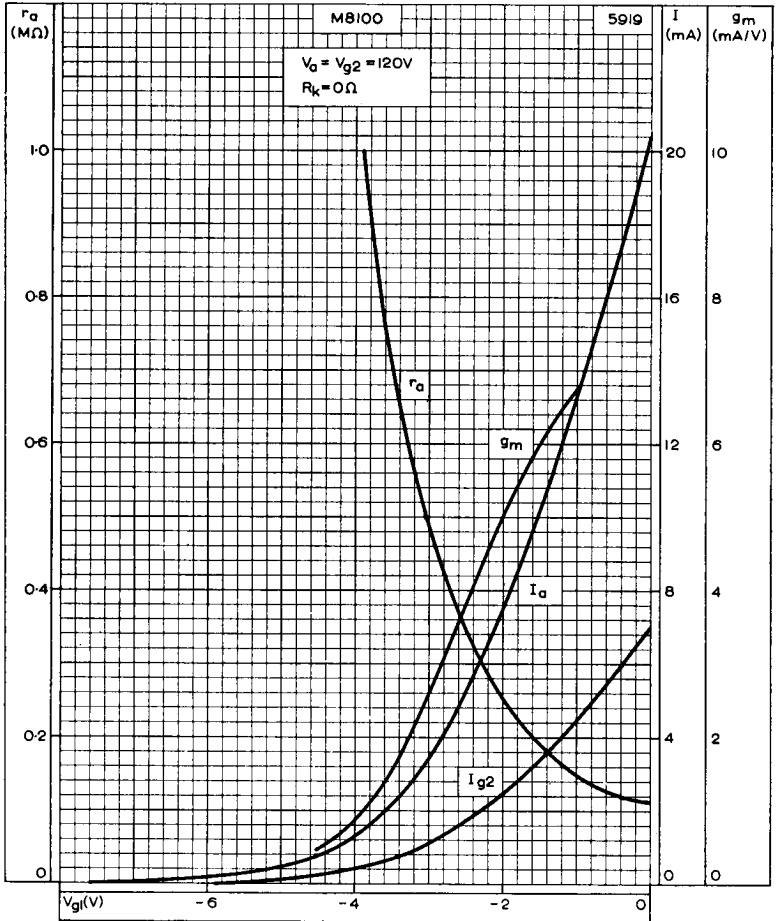
B7G Base



4748

All dimensions in mm

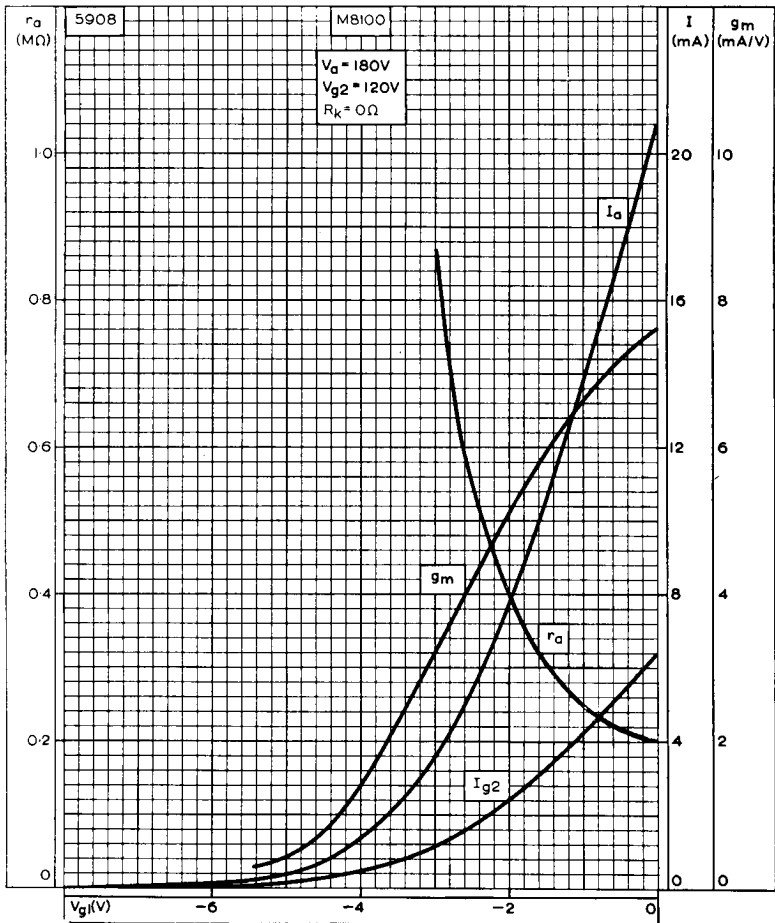
The bulb and base dimensions of this valve are in accordance with BS448, Section B7G



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

# M8100

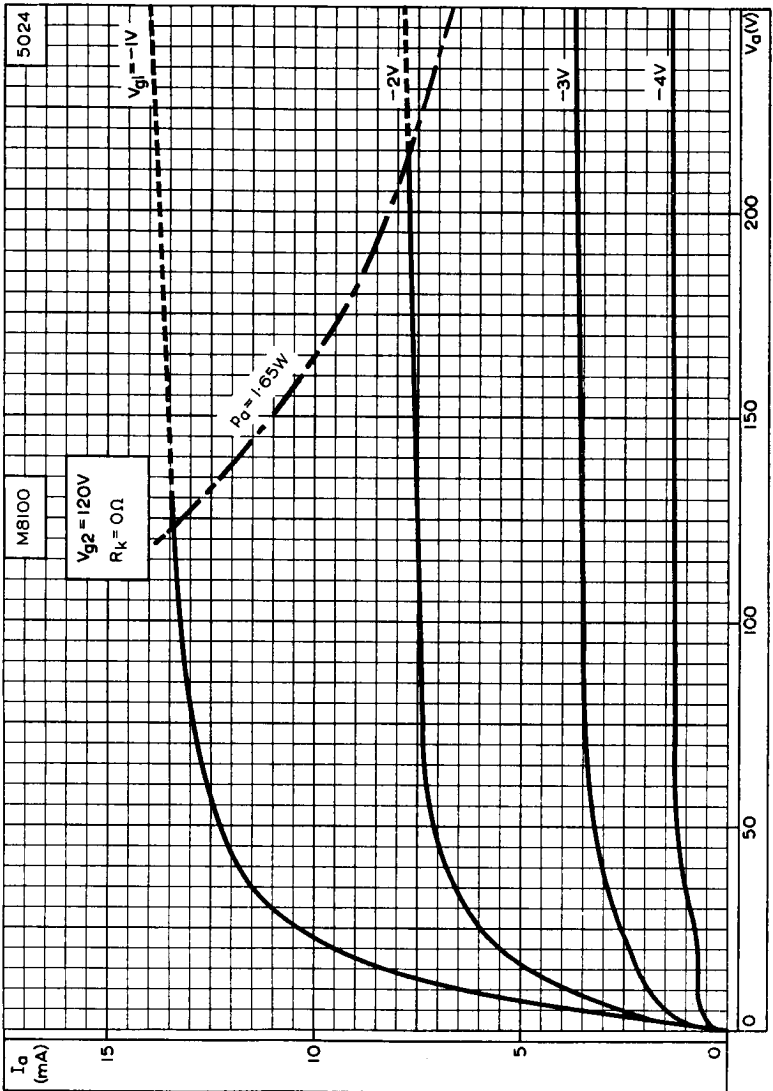
SPECIAL QUALITY V.H.F. PENTODE



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



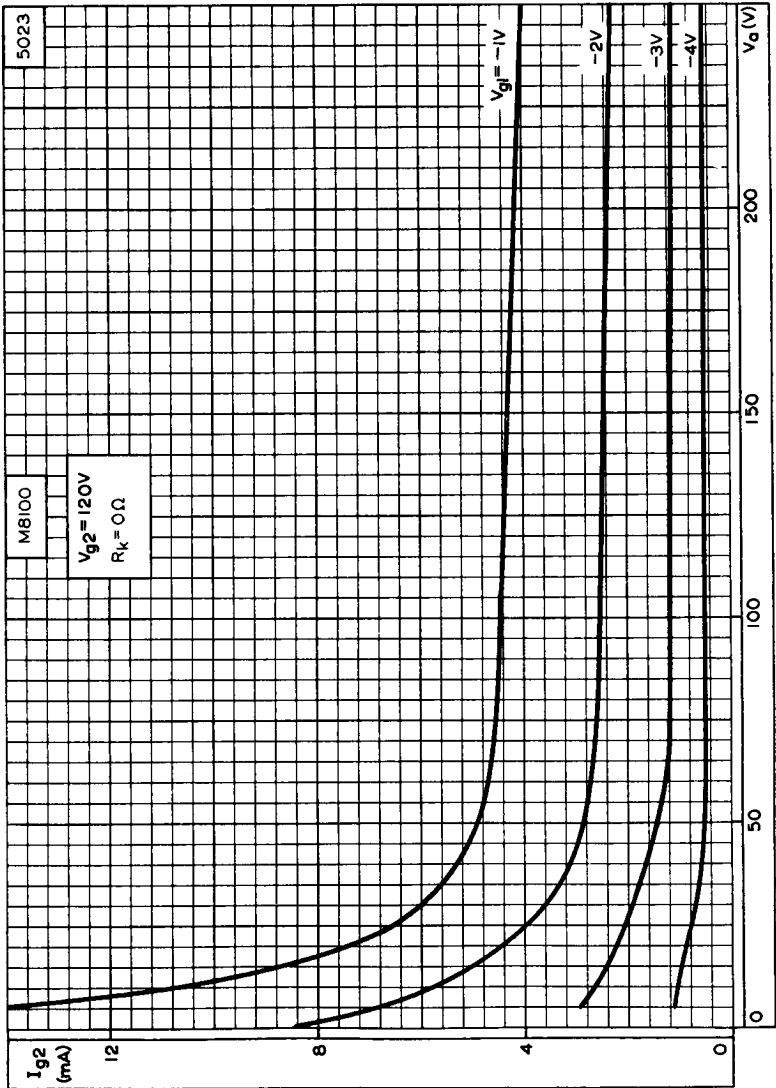




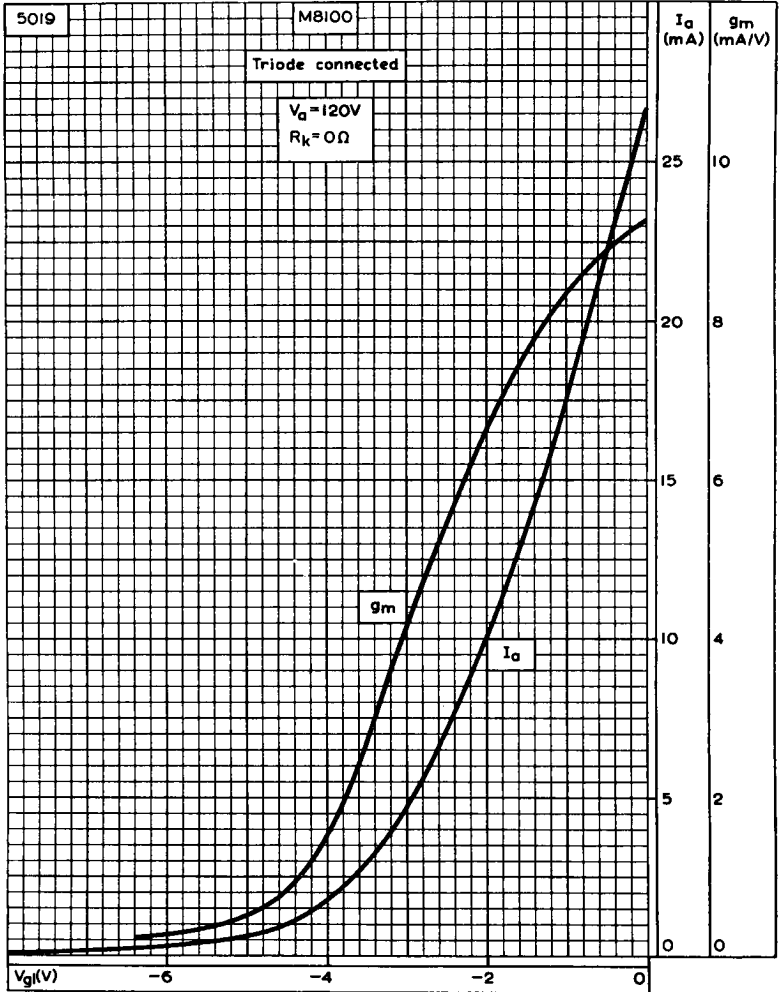
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER.

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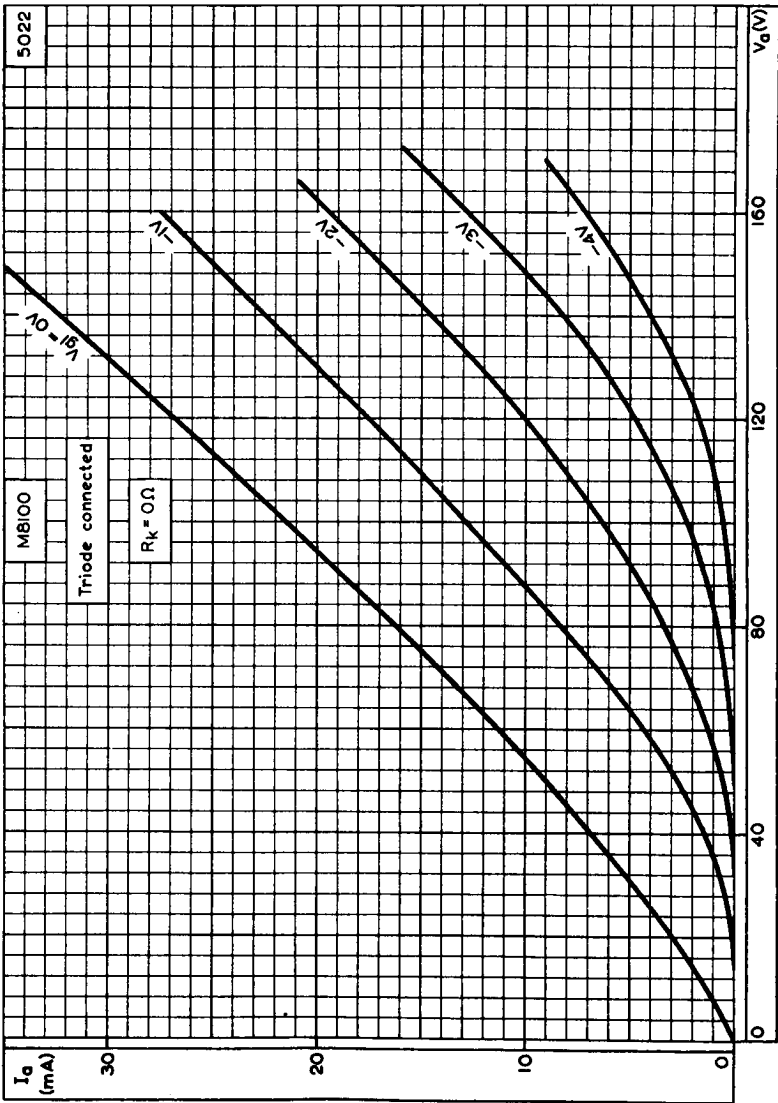
SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER.



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

# M8100

SPECIAL QUALITY V.H.F. PENTODE



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

