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

CAPACITANCES[2] (measured with an external shield)

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

CHARACTERISTICS[3]

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	kΩ
μ_{g1-g2}	35	35	
R_k	0	0	Ω

ABSOLUTE MAXIMUM RATINGS[4]

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	A.Q.L.[5] (%)	Individuals[6] Bogey[9]	Individuals[6] Min.	Individuals[6] Max.	Lot average[7] Min.	Lot average[7] Max.	Lot standard deviation[8] Max.	
GROUP A								
Insulation								
a-rest, g_2-rest measured at −300V	0.25	—	100	—	—	—	—	MΩ
g_1-rest measured at −100V	0.25	—	100	—	—	—	—	MΩ
Reverse grid current								
R_{g1} max. = 500kΩ	0.25	—	—	0.1	—	—	—	μA
GROUP B								
Heater current	0.65	—	160	190	—	—	—	mA
Heater to cathode leakage current	0.65	—	—	—	—	—	—	
V_{h-k} = 100V (cathode negative)	—	—	—	10	—	—	—	μA
V_{h-k} = 100V (cathode positive)	—	—	—	10	—	—	—	μA
Anode current	0.65	7.5	5.0	11	—	—	—	mA
	—	—	—	—	6.5	8.5	0.87	mA
Screen-grid current	0.65	2.5	0.8	4.0	—	—	—	mA
	—	—	—	—	1.8	3.2	0.52	mA
Mutual conductance	0.65	5.0	4.0	6.25	—	—	—	mA/V
	—	—	—	—	4.525	5.475	0.357	mA/V
Group quality level[10]	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	—	—	—	—	—	—	
C_{in}	—	—	3.4	4.6	—	—	—	pF
C_{out}	—	—	2.45	3.25	—	—	—	pF
C_{a-g1}	—	—	—	20	—	—	—	mpF
Noise factor	4.0	—	—	2.5	—	—	—	dB

TESTS	A.Q.L.[5]	Individuals[6]			Lot average[7]		Lot standard deviation[8]	
GROUP E	(%)	Bogey[9]	Min.	Max.	Min.	Max.	Max.	
Fatigue[14]								
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} = ±100V	2.5	—	—	30	—	—	—	μA
Reverse grid current.								
R_{g1} max. = 500kΩ	2.5	—	—	0.2	—	—	—	μA
Mutual conductance	2.5	—	3.5	—	—	—	—	mA/V
Microphonic noise as in group C	2.5	—	—	90	—	—	—	mV (r.m.s.)
Sub-group quality level[10]	6.5	—	—	—	—	—	—	
Shock[15]								
No applied voltages, 500g								
Post shock tests								
Heater to cathode leakage current.								
V_{h-k} = ±100V	2.5	—	—	30	—	—	—	μA
Reverse grid current.								
R_{g1} max. = 500kΩ	2.5	—	—	0.2	—	—	—	μA
Mutual conductance	2.5	—	3.5	—	—	—	—	mA/V
Microphonic noise as in group C	2.5	—	—	90	—	—	—	mV (r.m.s.)
Sub-group quality level[10]	6.5	—	—	—	—	—	—	
GROUP F								
Stability life test[14]								
Running conditions. V_a = 150V, V_{g2} = 125V, R_{g1} = 100kΩ, R_k = 130Ω, 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					A.Q.L.[5] (%)	*Min.*	*Max.*	
Sub-group (a)								
Inoperatives[16]				500 hours	2.5	—	—	
				1000 hours	4.0	—	—	
Heater current				500 hours	2.5	160	190	mA
				1000 hours	4.0	160	190	mA
Heater to cathode leakage current. $V_{h-k} = \pm 100V$				500 hours	2.5	—	10	μA
				1000 hours	4.0	—	10	μA
Reverse grid current. R_{g1} max. = 500kΩ				500 hours	2.5	—	0.1	μA
				1000 hours	4.0	—	0.1	μA
Mutual conductance				500 hours	2.5	3.75	6.25	mA/V
				1000 hours	4.0	3.5	6.25	mA/V
Average change in mutual conductance				500 hours	—	—	15	%
Sub-group (b)								
Anode current				500 hours	4.0	4.5	11	mA
				1000 hours	6.5	4.0	11	mA
Insulation as in group A				500 hours	4.0	50	—	MΩ
				1000 hours	6.5	30	—	MΩ
Noise factor				500 hours	4.0	—	2.7	dB
				1000 hours	6.5	—	2.8	dB
Group quality level[10]				500 hours	6.5	—	—	
				1000 hours	10	—	—	
GROUP G								
Valves are held for 28 days and retested for								
Inoperatives[16]					0.5	—	—	
Reverse grid current. R_{g1} max. = 500kΩ					0.5	—	0.15	μA

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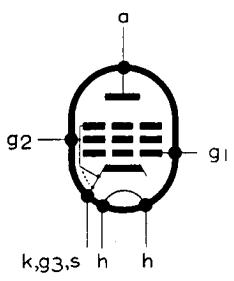
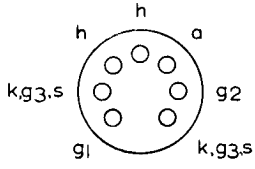
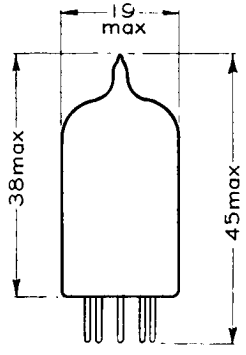




B7G Base



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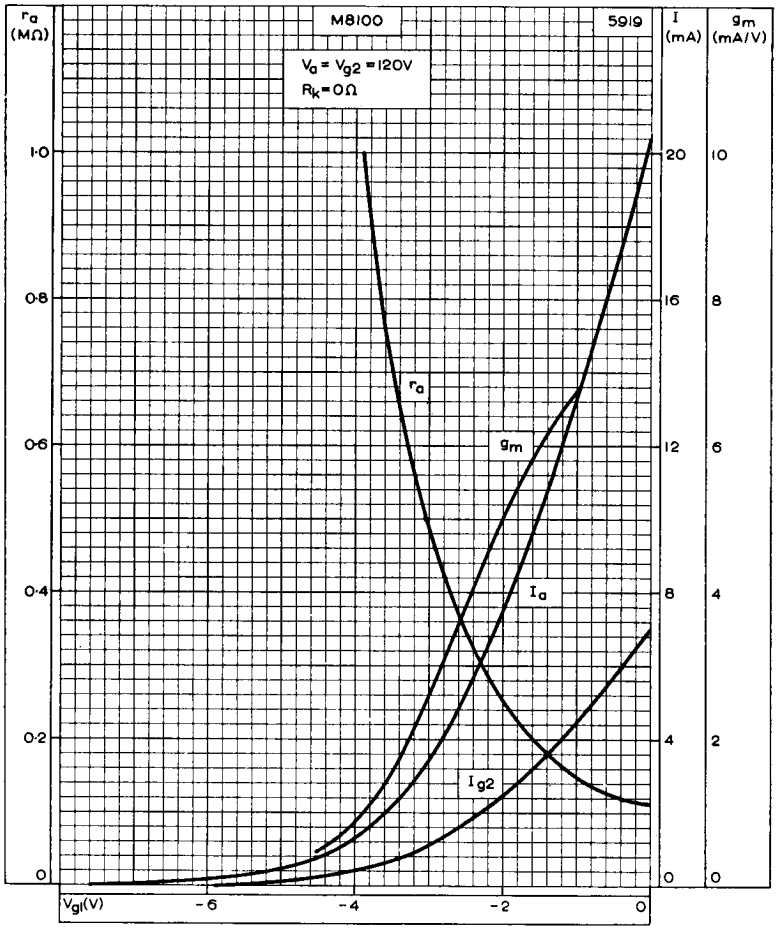
All dimensions in mm

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.
$V_a = 120V$

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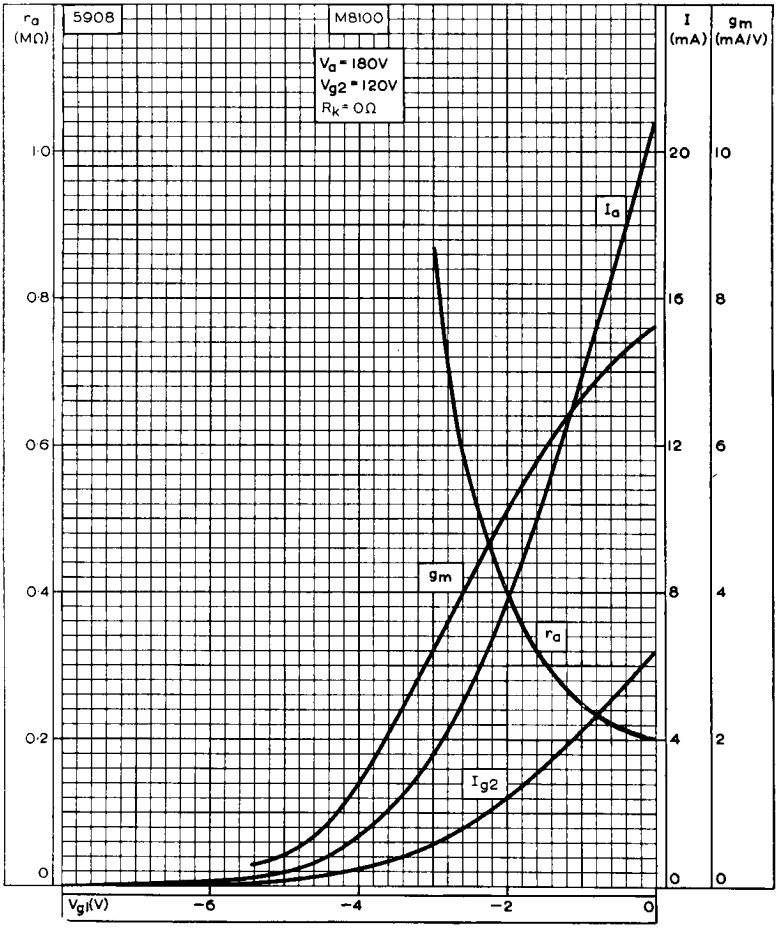
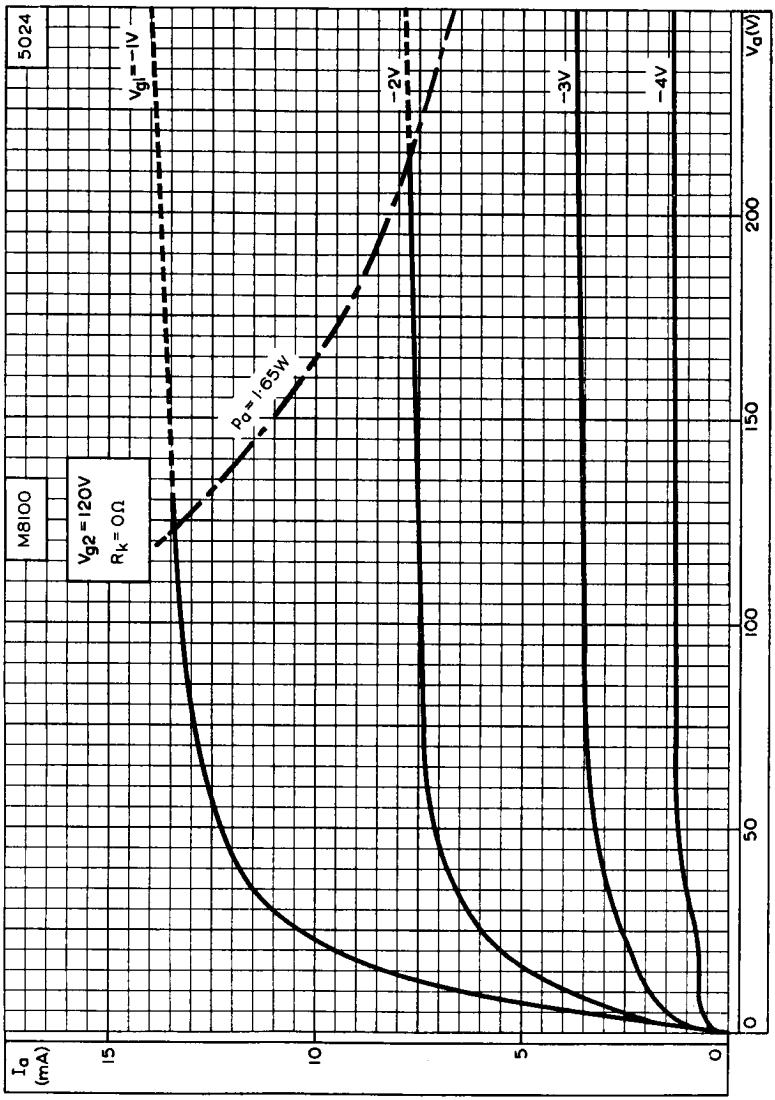
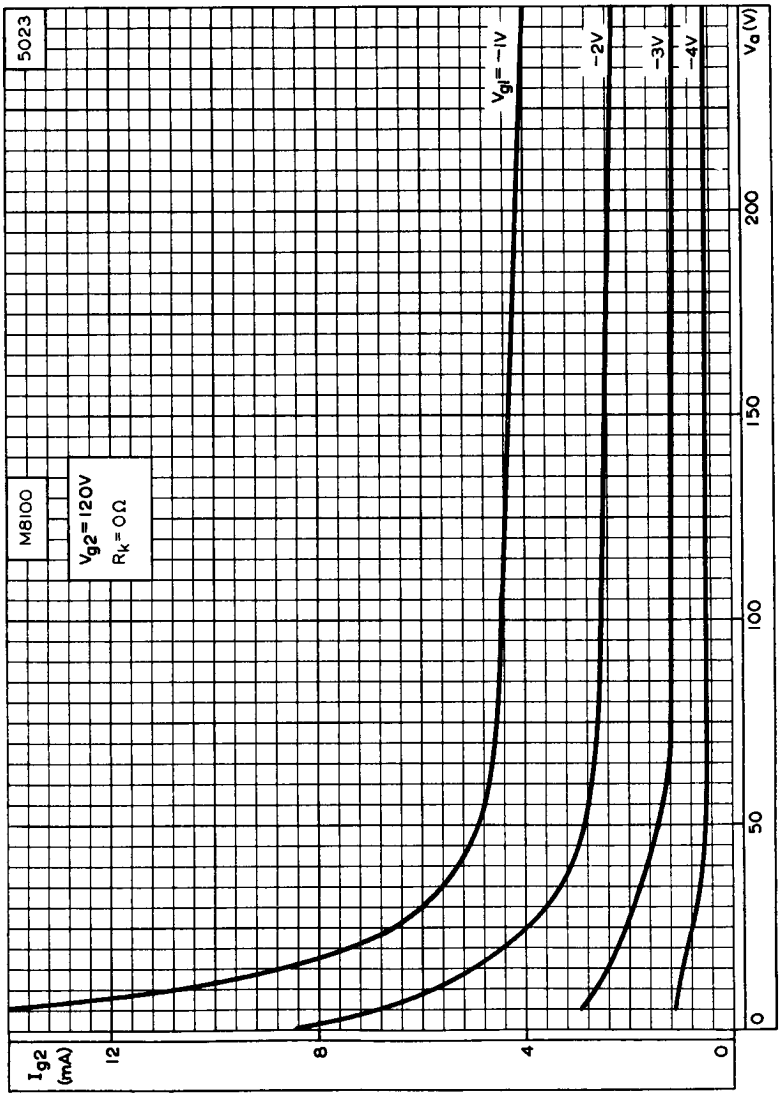


ANODE CURRENT, SCREEN-GRID CURRENT, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE.
V_a = 180V

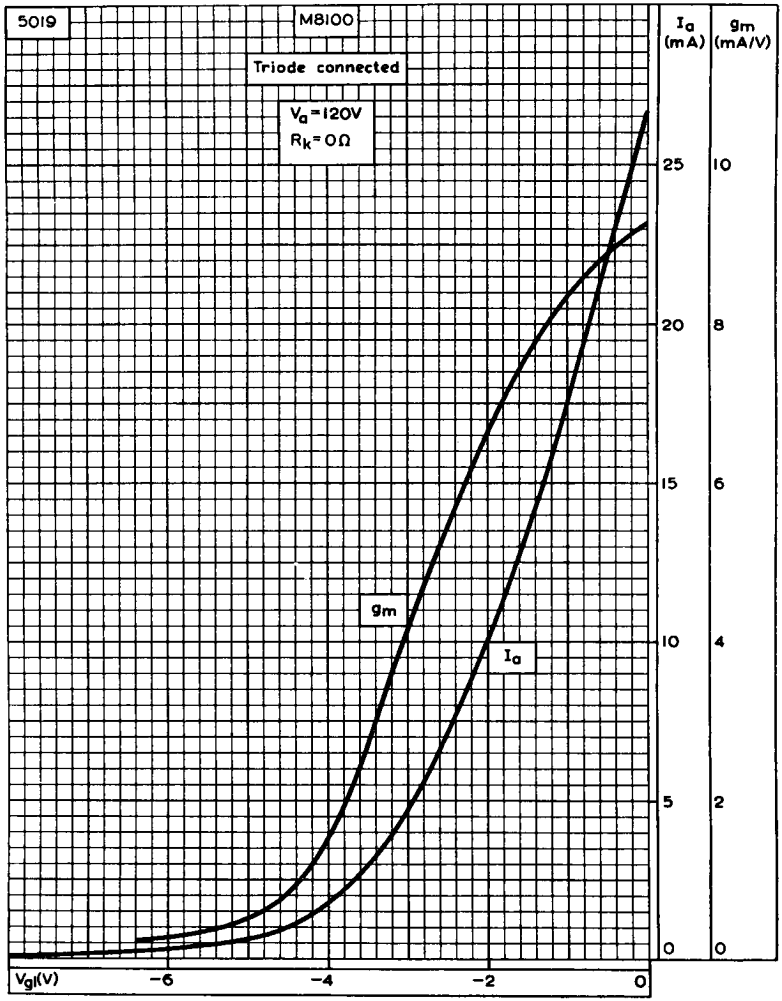


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER.

M8100 SPECIAL QUALITY V.H.F. PENTODE

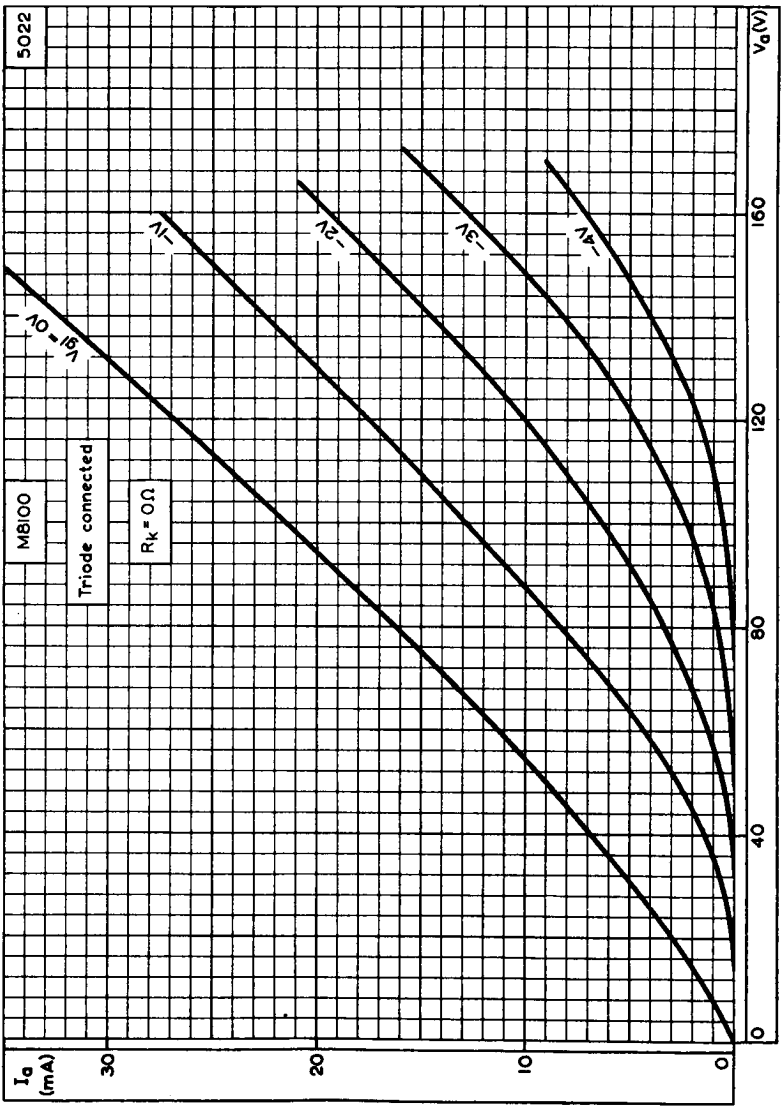


SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER.



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.