SPECIAL QUALITY OUTPUT PENTODE

M8082

Special quality output 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 the 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	200	mA

MOUNTING POSITION

Any

CAPACITANCES[2] (measured with an external shield)

c_{in}	3.8	pF
c_{out}	6.5	pF
c_{a-g1}	<300	mpF

CHARACTERISTICS[3]

V_a	250	V
V_{g2}	250	V
I_a	16	mA
I_{g2}	2.3	mA
g_m	2.5	mA/V
r_a	130	kΩ
$\mu_{g1\ g2}$	12	
R_k	0	Ω
V_{g1}	-13.5	V

ABSOLUTE MAXIMUM RATINGS[4]

f max.	100	Mc/s
$V_{a(b)}$ max.	550	V
V_a max.	300	V
p_a max.	4.75	W
$V_{g2(b)}$ max.	550	V
V_{g2} max.	275	V
p_{g2} max.	800	mW
$-V_{g1}$ max.	110	V
V_{g1-g2} max.	300	V
I_{g1} max.	3.3	mA
I_k max.	23	mA
R_{g1-k} max. (fixed bias)	220	kΩ
V_{h-k} max.	150	V
Maximum acceleration (continuous operation)	2.5	g
Maximum shock (short duration)	500	g
T_{bulb} max.	180	°C

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TEST CONDITIONS (unless otherwise specified)

V_h (V)	$V_{a(b)}$ (V)	V_{g2-e} (V)	V_{g1-e} (V)	R_k (Ω)	R_{g1} (Ω)	C_k (μF)
6.3	250	250	0	740	0	1000

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 g_1-rest measured at –100V	0.25	—	100	—	—	—	—	MΩ
Reverse control-grid current R_{g1} max. = 500kΩ	0.25	—	—	0.5	—	—	—	μA
GROUP B								
Heater current	0.65	—	184	216	—	—	—	mA
Heater to cathode leakage current V_{h-k} = 100V cathode alternately positive and negative	0.65	—	—	10	—	—	—	μA
V_{h-k} = 100V cathode positive		—	—	—	—	3.0	—	μA
Anode current	0.65	15	12	18	—	—	—	mA
	—	—	—	—	13.9	16.1	0.86	mA
Screen-grid current	0.65	2.0	1.3	2.7	—	—	—	mA
	—	—	—	—	1.74	2.26	0.2	mA
Mutual conductance	0.65	2.55	1.95	3.15	—	—	—	mA/V
	—	—	—	—	2.33	2.77	0.17	mA/V
Group quality level[10]	1.0	—	—	—	—	—	—	

GROUP C

Anode current. $V_{g1-e} = -50V$	2.5	—	—	50	—	—	—	μA
Change in mutual conductance. $V_h = 5.7V$	2.5	—	—	15	—	—	—	%
Reverse control-grid current. $V_h = 6.9V$, $V_{a-e} = 300V$, $V_{g2-e} = 235V$	2.5	—	—	1.0	—	—	—	μA
Microphonic noise at the anode at 50c/s 2.0g min. peak acceleration, $V_{a(b)} = 250V$, $R_a = 2k\Omega$, $V_{g2-e} = 250V$.	2.5	—	—	15	—	—	—	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 (shielded). No applied voltages	6.5	—	—	—	—	—	—	
C_{in}	—	—	3.5	5.0	—	—	—	pF
C_{out}	—	—	5.8	7.2	—	—	—	pF
C_{a-g1}	—	—	—	300	—	—	—	mpF
Amplification factor (μ_{g1-g2})	6.5	—	10	14	—	—	—	

TESTS	A.Q.L.[5] (%)	Individuals[6] Bogey[9]	Min.	Max.	Lot average[7] Min.	Max.	Lot standard deviation[8] Max.	
GROUP E								
Fatigue[14]								
V_h = 6.9V, 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	—	—	20	—	—	—	μA
Reverse control-grid current R_{g1} max = 500kΩ	2.5	—	—	1.0	—	—	—	μA
Mutual conductance	2.5	—	1.8	3.2	—	—	—	mA/V
Microphonic noise as in group C	2.5	—	—	25	—	—	—	mV (r.m.s.)
Sub-group quality level[10]	4.0	—	—	—	—	—	—	
Shock[15]								
No applied voltages, 500g								
Post shock tests								
Heater to cathode leakage current. V_{h-k} = ±100V	2.5	—	—	20	—	—	—	μA
Reverse control-grid current R_{g1} max = 500kΩ	2.5	—	—	1.0	—	—	—	μA
Mutual conductance	2.5	—	1.8	3.2	—	—	—	mA/V
Microphonic noise as in group C	2.5	—	—	25	—	—	—	mV (r.m.s.)
Sub-group quality level[10]	4.0	—	—	—	—	—	—	

GROUP F

Stability life test[14]

Running conditions. $R_{g1} = 100k\Omega \pm 20\%$, $R_k = 740\Omega \pm 10\%$, $V_{h-k} = 150V$ (cathode negative)

Stability life test end point

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

Intermittent life test

Running conditions. $R_{g1} = 100k\Omega \pm 20\%$, $R_k = 740\Omega \pm 10\%$, $V_{h-k} = 150V$ (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	184	216	mA
Heater to cathode leakage current. $V_{h-k} = \pm 100V$	500 hours	2.5	—	30	μA
	1000 hours	4.0	—	30	μA
Reverse control-grid current. R_{g1} max = 500kΩ	500 hours	2.5	—	1.0	μA
	1000 hours	4.0	—	1.0	μA
Mutual conductance	500 hours	2.5	1.7	3.2	mA/V
	1000 hours	4.0	1.6	3.2	mA/V
Average change in mutual conductance	500 hours	—	—	15	%
Sub-group (b)					
Insulation as in group A	500 hours	4.0	50	—	MΩ
	1000 hours	6.5	30	—	MΩ
Group quality level[10]	500 hours	6.5	—	—	
	1000 hours	10	—	—	

	A.Q.L.[5] (%)	Min.	Max.	
Dynamic life test 100 hours				
Running conditions as a trebler. V_b = 300V, decoupling resistor = 1.0kΩ I_a+I_{g2} = 20mA, I_{g1} = 1.6mA, f = 70 to 75Mc/s P_{out} = 900mW				
Dynamic life test end point				
Change in P_{out}	—	—	20	%
GROUP G				
Valves are held for 28 days and retested for Inoperatives[16]	0.5	—	—	
Reverse control-grid current. R_{g1} max. = 500kΩ	0.5	—	0.75	μA

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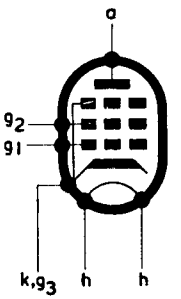
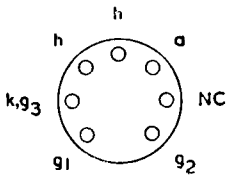
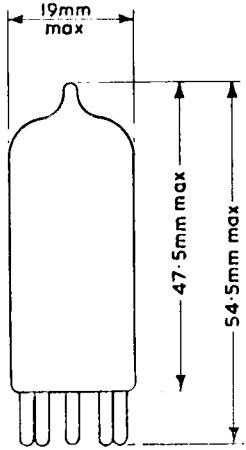




B7G Base



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

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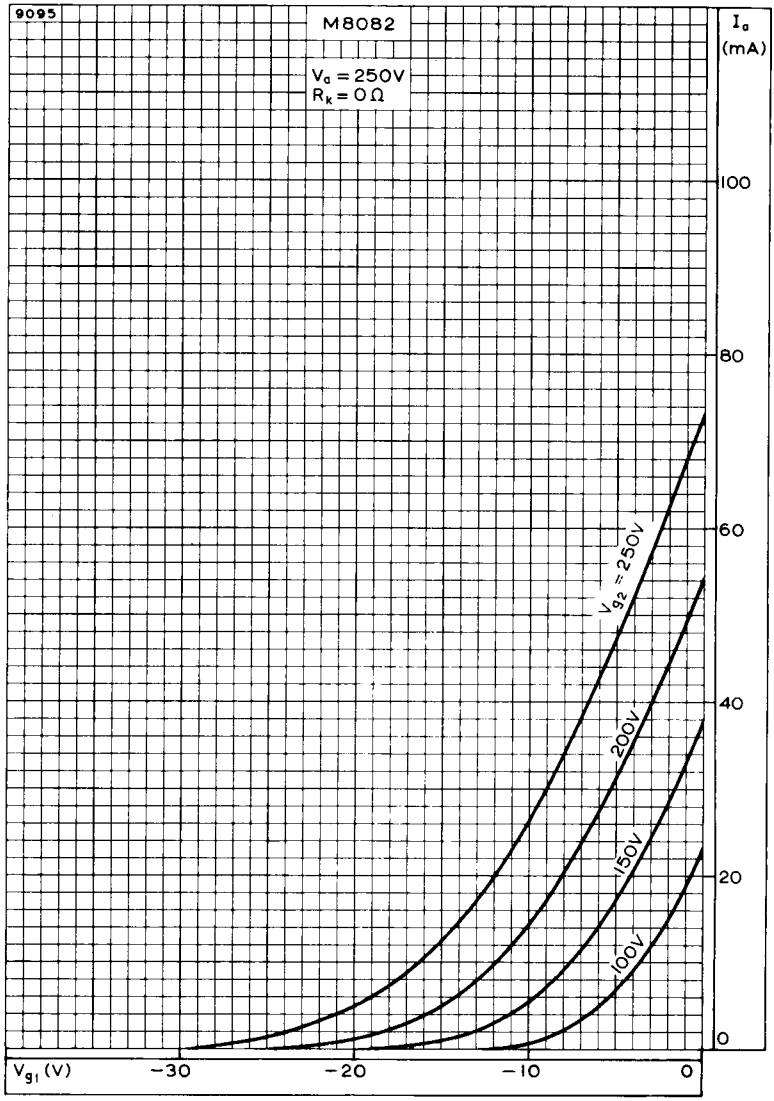
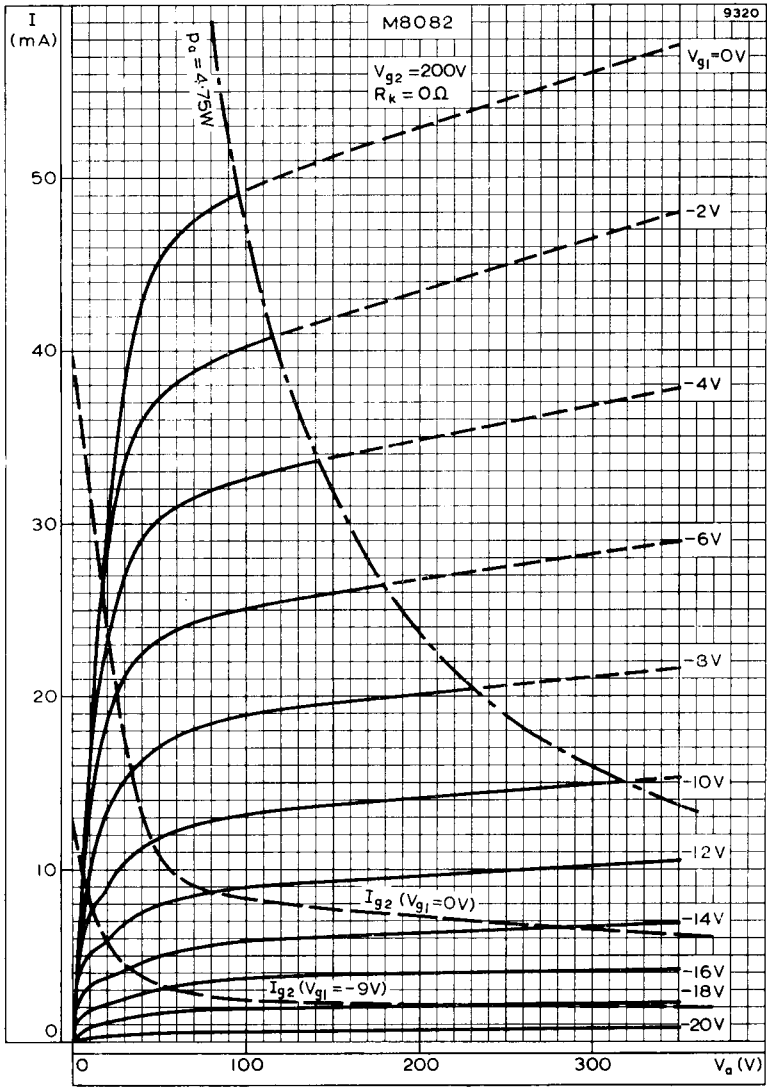
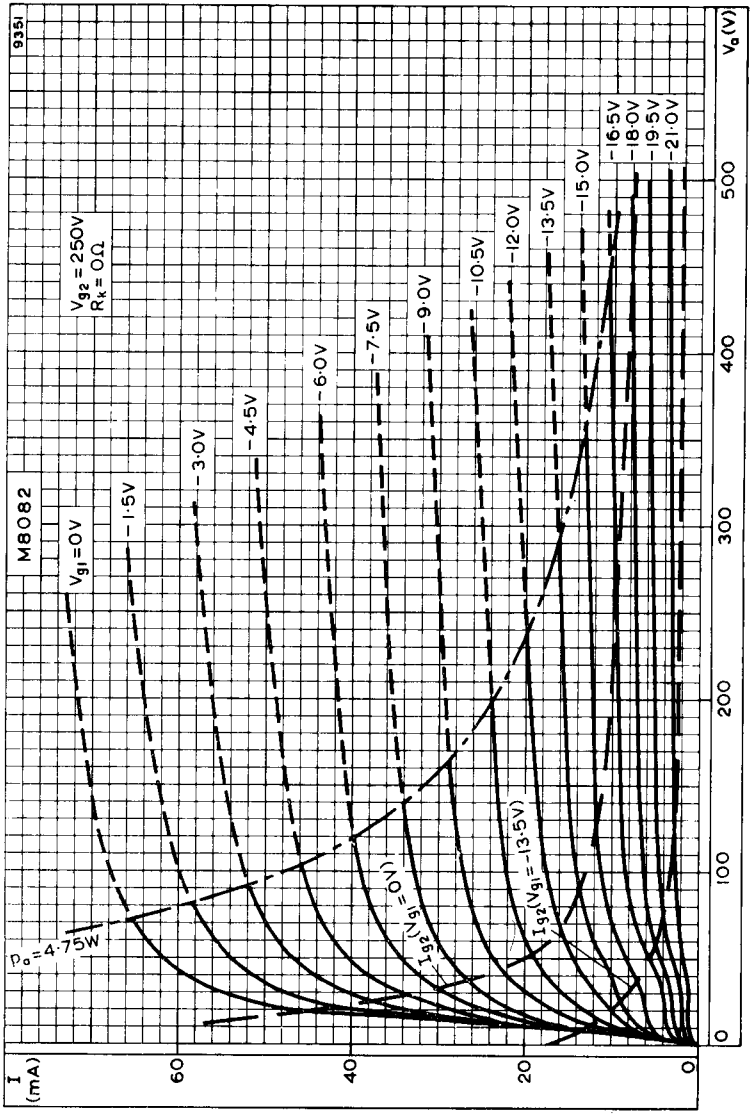


ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE WITH SCREEN-GRID VOLTAGE AS PARAMETER

ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. V_{g2} = 150V



ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. V_{g2} = 200V



ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. V_{g2} = 250V

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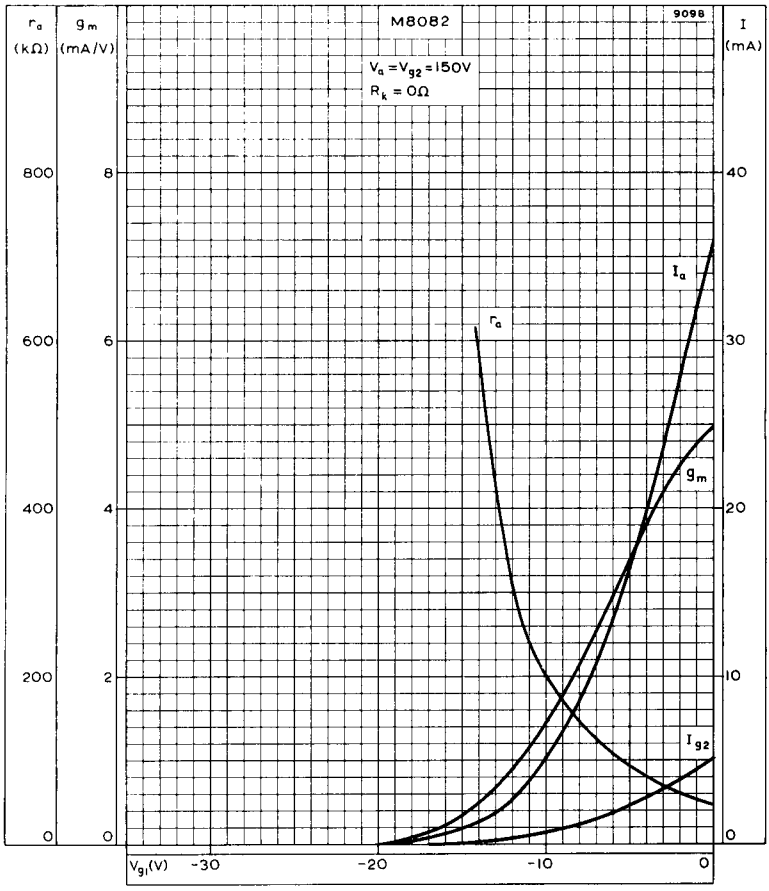
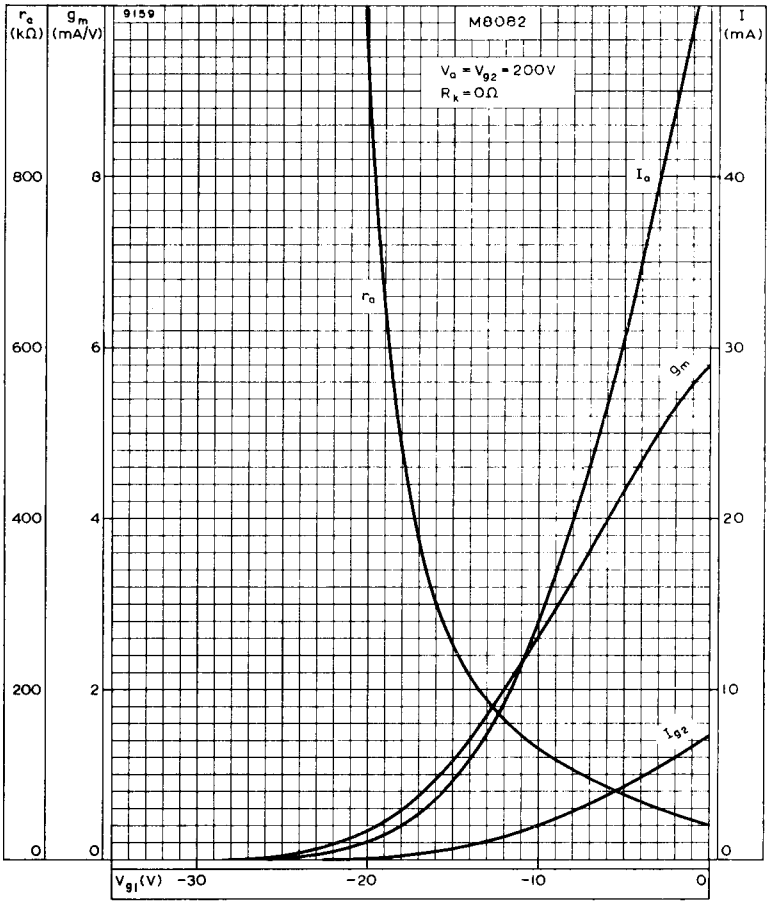
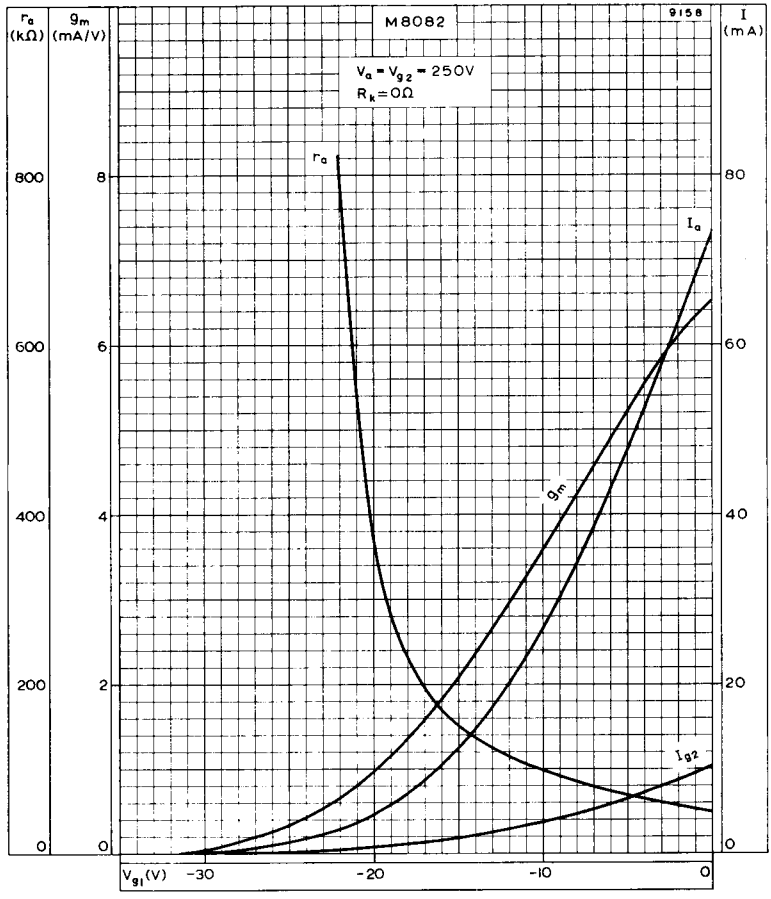


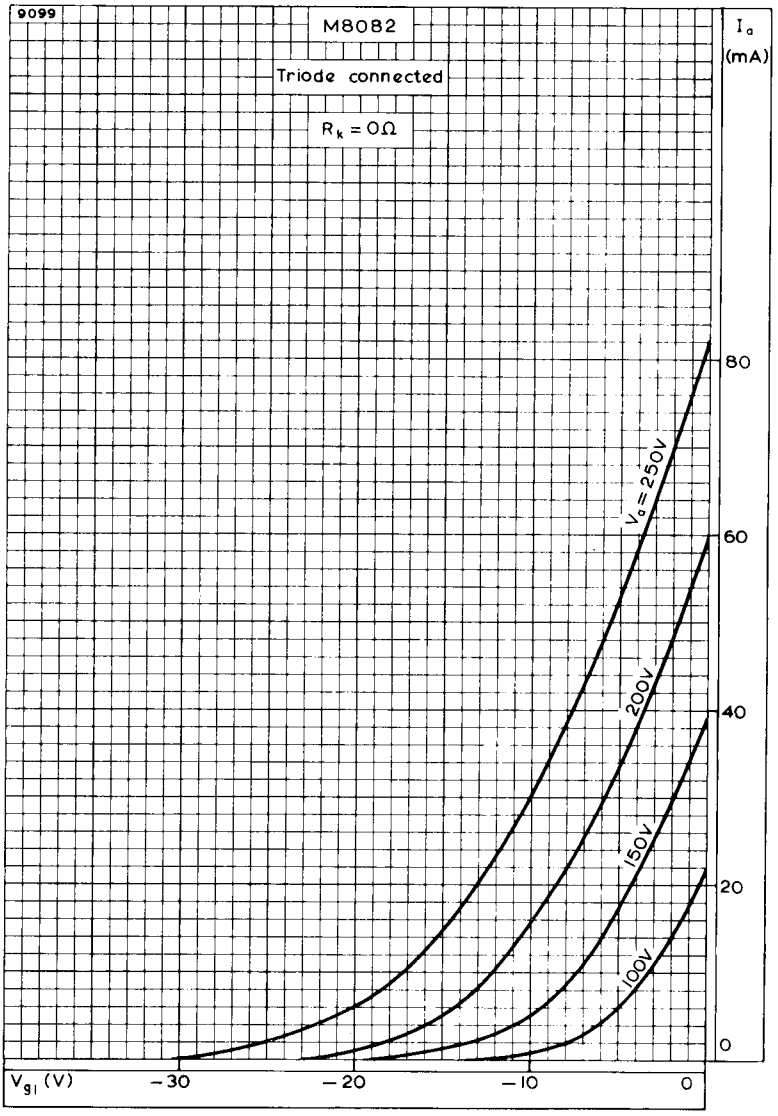
ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE



ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE.
$V_{a} = V_{g2} = 200V$



ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE.
$V_a = V_{g2} = 250V$



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

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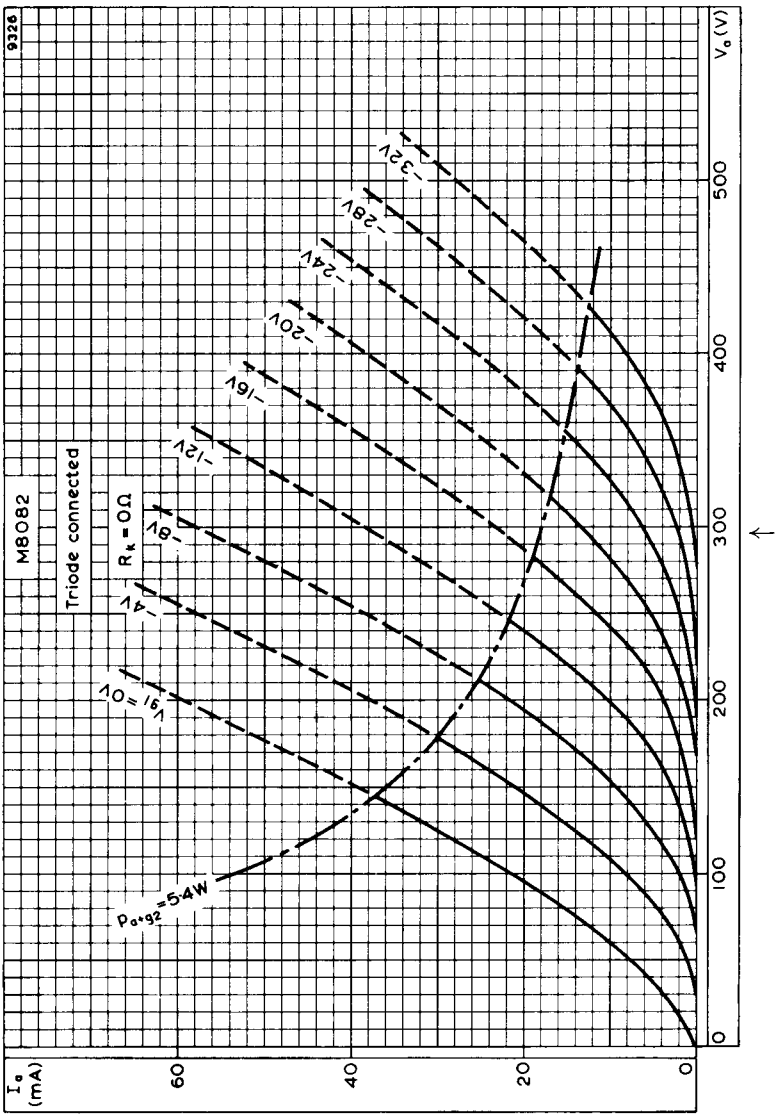

ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER, WHEN TRIODE CONNECTED