

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

CAPACITANCES² (measured with an external shield)

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

CHARACTERISTICS³

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
μ_{g1-g2}	12	
R_k	0	Ω
V_{g1}	-13.5	V

ABSOLUTE MAXIMUM RATINGS⁴

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_{h1} (V)	$V_{a(b)}$ (V)	V_{g2-e} (V)	V_{g1-e} (V)	R_{k1} (Ω)	R_{g1} (Ω)	C_k (μF)
6.3	250	250	0	740	0	1000

TESTS

GROUP A

Insulation

a-rest, g_2 -rest measured at -300V }
 g_1 -rest measured at -100V }

A.Q.L.⁵

(%)

Individuals⁶

Bogey⁹

Min.

Max.

Lot average⁷

Min.

Max.

Lot standard deviation⁸

Max.

M Ω

Reverse control-grid current

R_{g1} max. = 500k Ω

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

Screen-grid current

{ 0.65

2.0

1.3

2.7

—

—

—

mA

Mutual conductance

{ 0.65

2.55

1.95

3.15

—

—

—

mA/V

Group quality level¹⁰

1.0

—

—

—

—

2.33

2.77

0.17 mA/V

GROUP F

Stability life test¹⁴

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. $R_{g1} \text{ max} = 500k\Omega$	..	..	..	..	..	..	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	— M Ω
							1000 hours	6.5	30	— M Ω
							500 hours	6.5	—	—
Group quality level ¹⁰	..	..	..	..	..	..	1000 hours	10	—	—

TESTS

GROUP E

Fatigue¹⁴

$V_h = 6.9V$, 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.

$$V_{h-k} = \pm 100V$$

Reverse control-grid current

$$R_{g1} \text{ max} = 500k\Omega$$

Mutual conductance

Microphonic noise as in group C

Sub-group quality level¹⁰

Shock¹⁵

No applied voltages, 500g

Post shock tests

Heater to cathode leakage current.

$$V_{h-k} = \pm 100V$$

Reverse control-grid current

$$R_{g1} \text{ max} = 500k\Omega$$

Mutual conductance

Microphonic noise as in group C

Sub-group quality level¹⁰

A.Q.L.⁵

(%)

Individuals⁶Bogey⁹

Min.

Max.

Lot average⁷

Min.

Max.

Lot standard deviation⁸

Max.

2.5

—

—

20

—

—

— μA

2.5

—

—

1.0

—

—

— μA

2.5

—

1.8

3.2

—

—

— mA/V

2.5

—

—

25

—

—

— mV

(r.m.s.)

4.0

—

—

—

—

—

—

2.5

—

—

20

—

—

— μA

2.5

—

—

1.0

—

—

— μA

2.5

—

1.8

3.2

—

—

— mA/V

2.5

—

—

25

—

—

— mV

(r.m.s.)

4.0

—

—

—

—

—

—

GROUP F

Stability life test¹⁴

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. $R_{g1} \text{ max} = 500k\Omega$	..				..	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	— M Ω
						1000 hours	6.5	30	— M Ω
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 = $1.0k\Omega$
 $I_a + I_{g2} = 20mA$, $I_{g1} = 1.6mA$, $f = 70$ to $75Mc/s$
 $P_{out} = 900mW$

Dynamic life test end point

Change in P_{out} — — 20 %

GROUP G

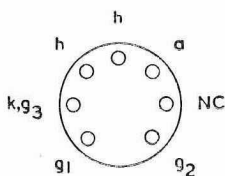
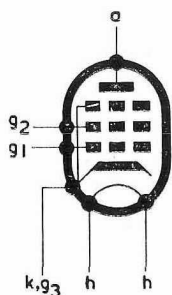
Valves are held for 28 days and retested for
Inoperatives¹⁶

0.5 — —

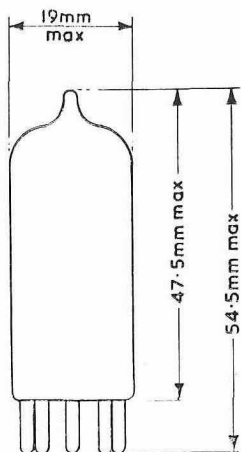
Reverse control-grid current.

R_{g1} max. = $500k\Omega$ 0.5 — 0.75 μA

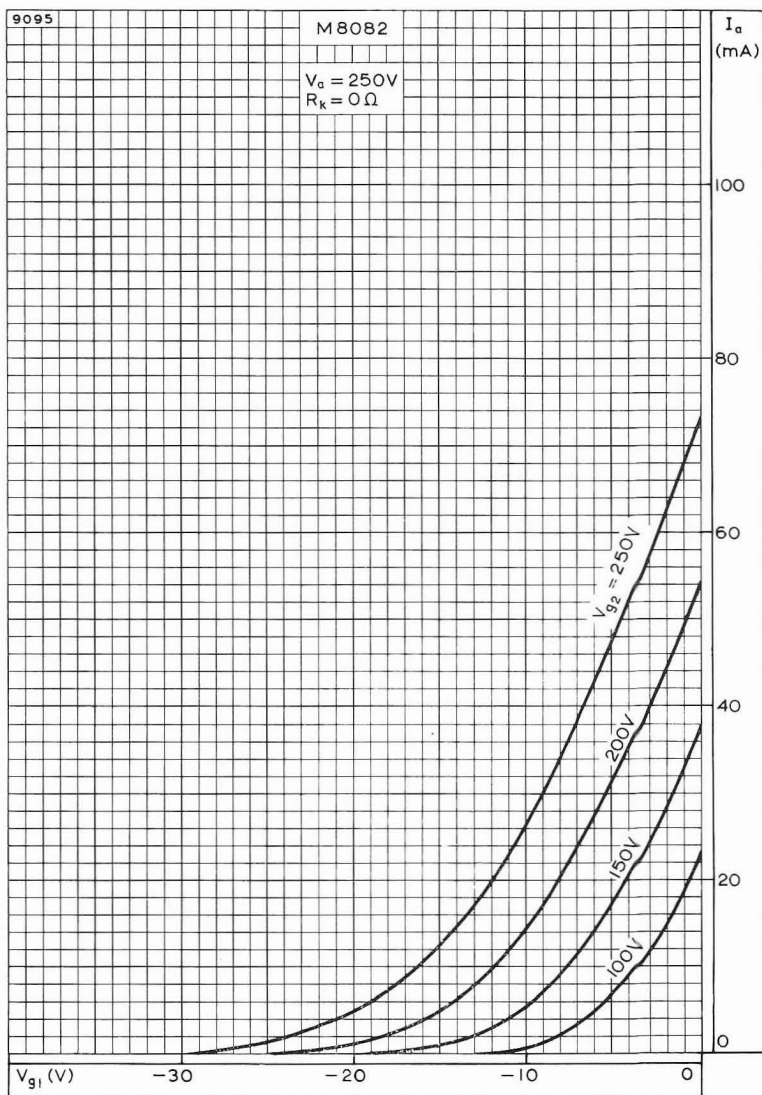
2831



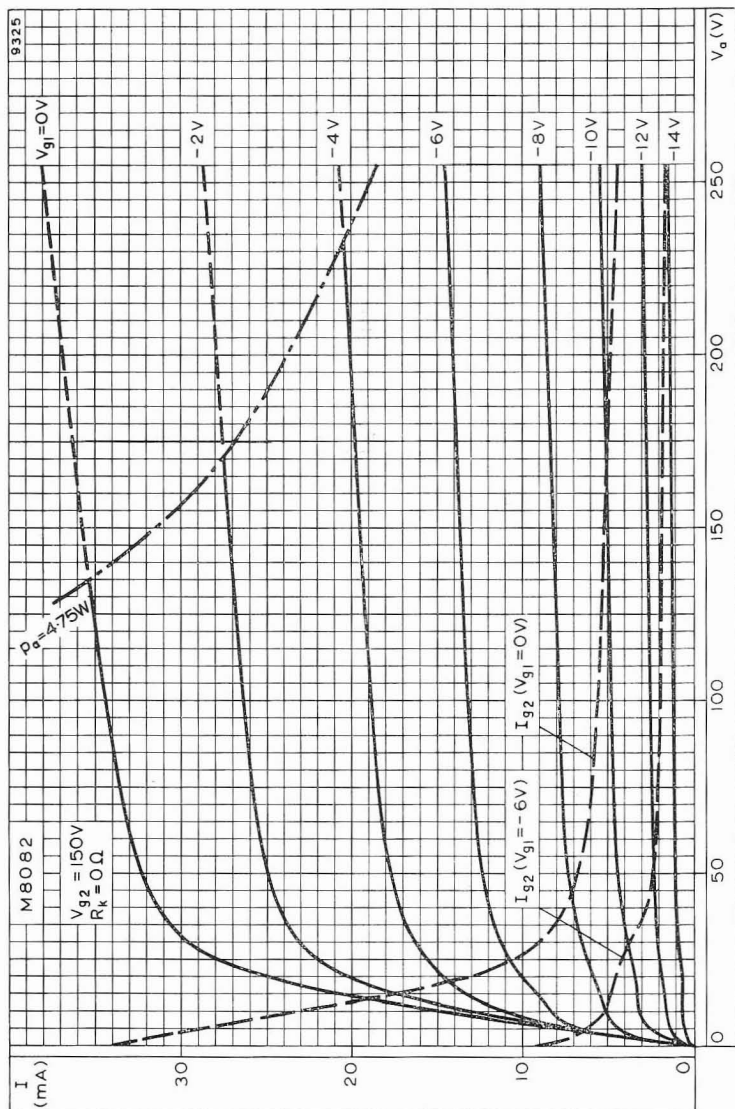
B7G Base



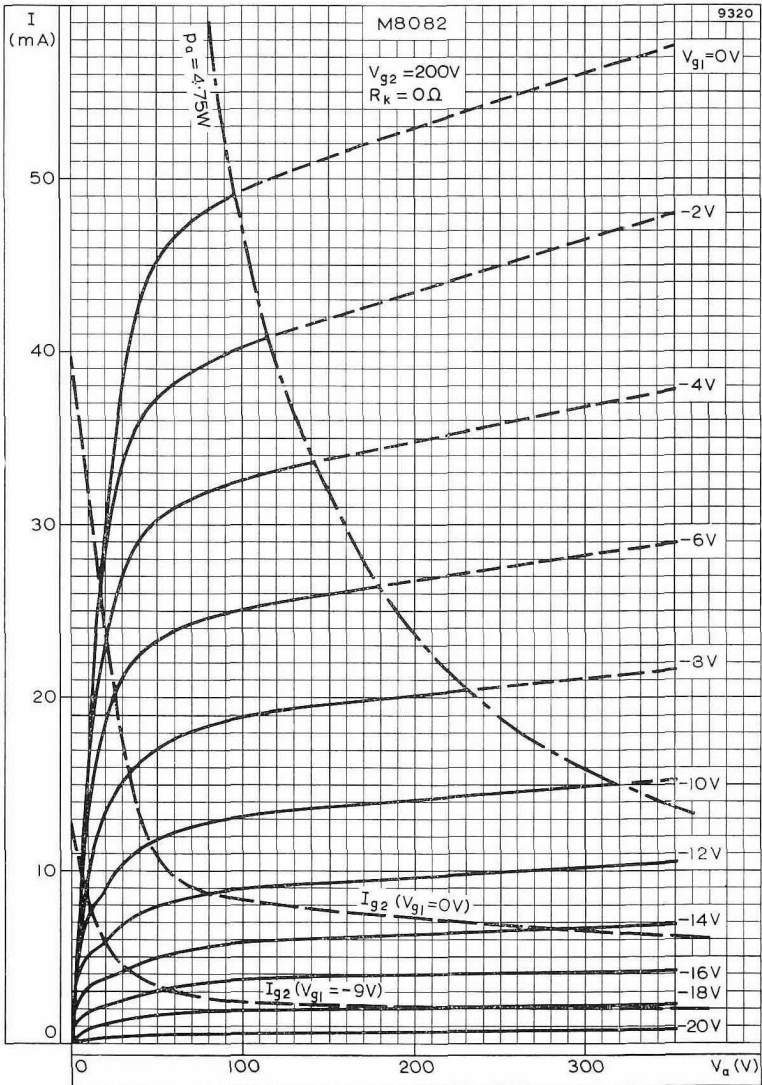
The bulb and base dimensions of this valve are in accordance with BS448, Section B7G



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



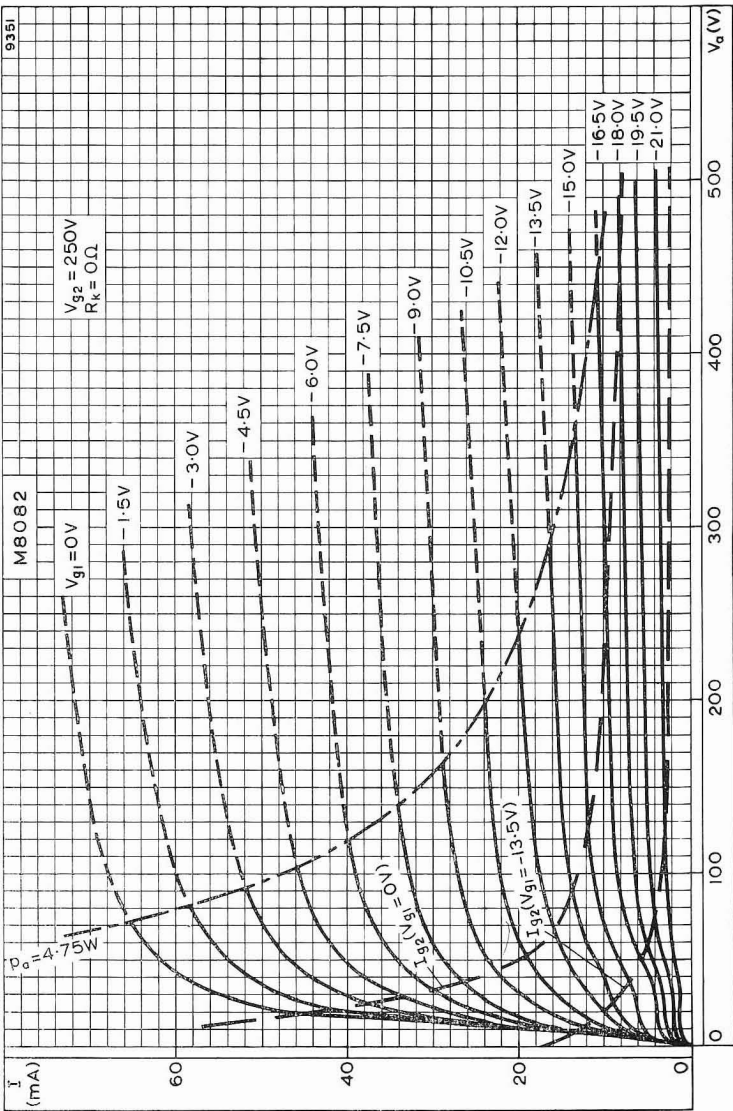
ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. $V_{g2} = 150V$



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

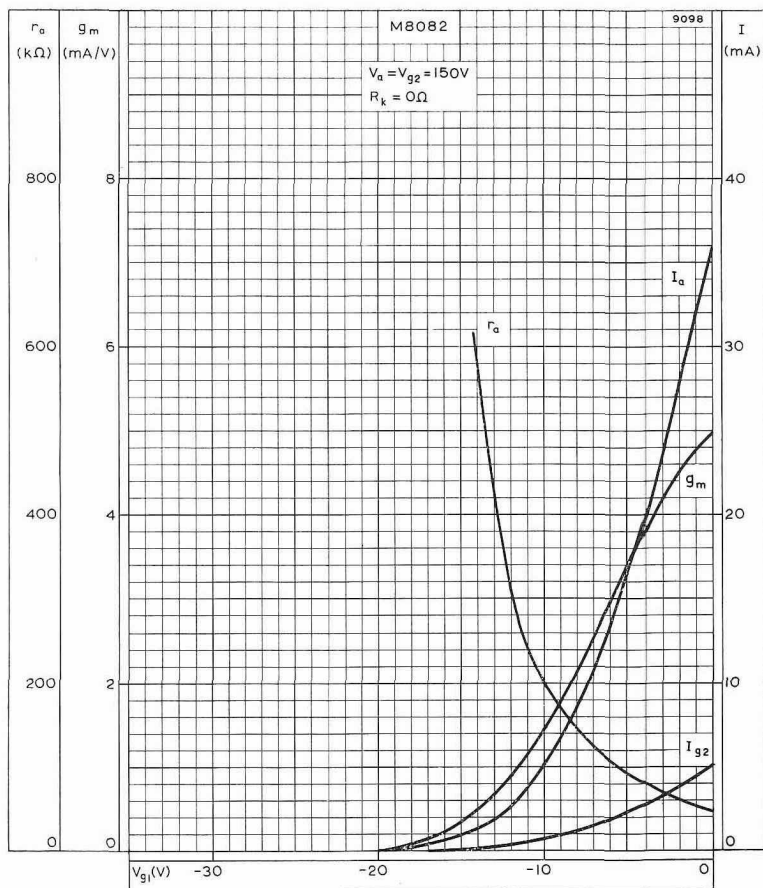
M8082

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

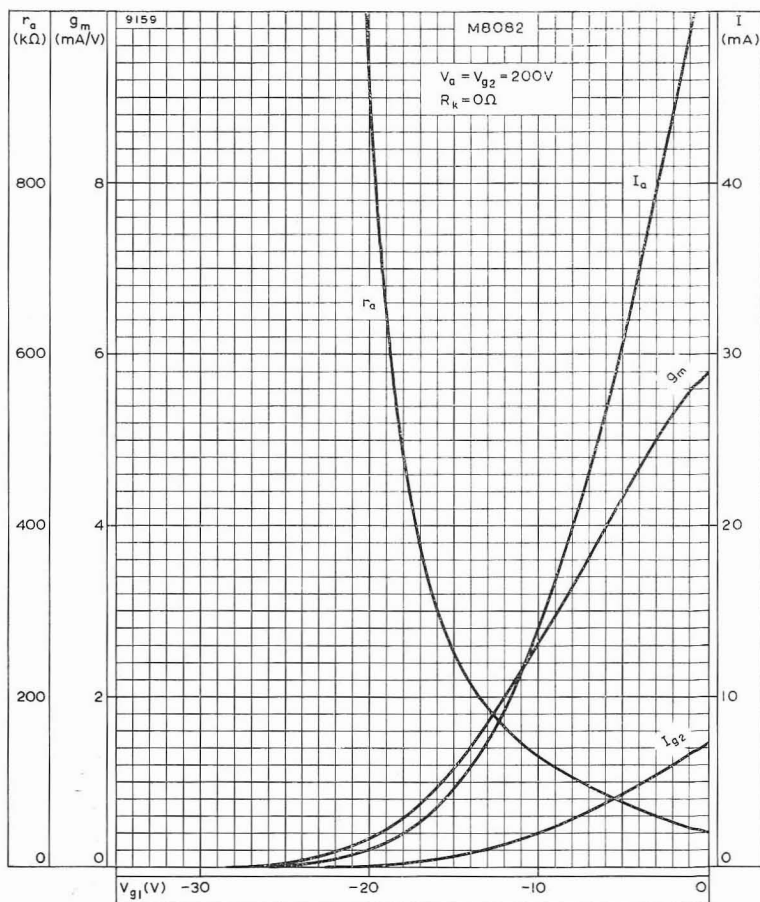




ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND
ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE

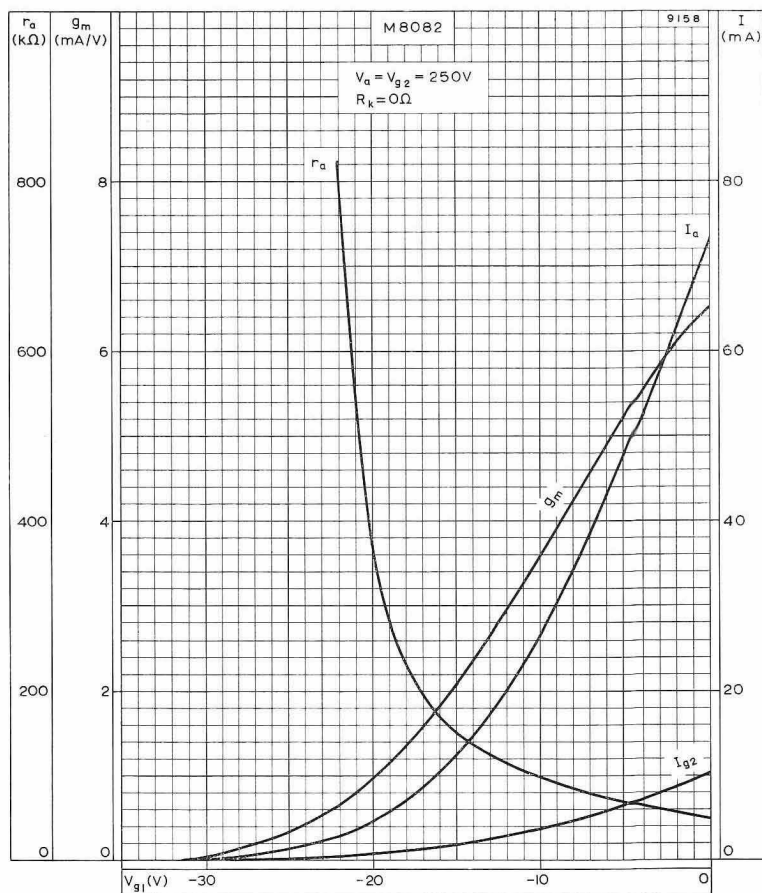
M8082

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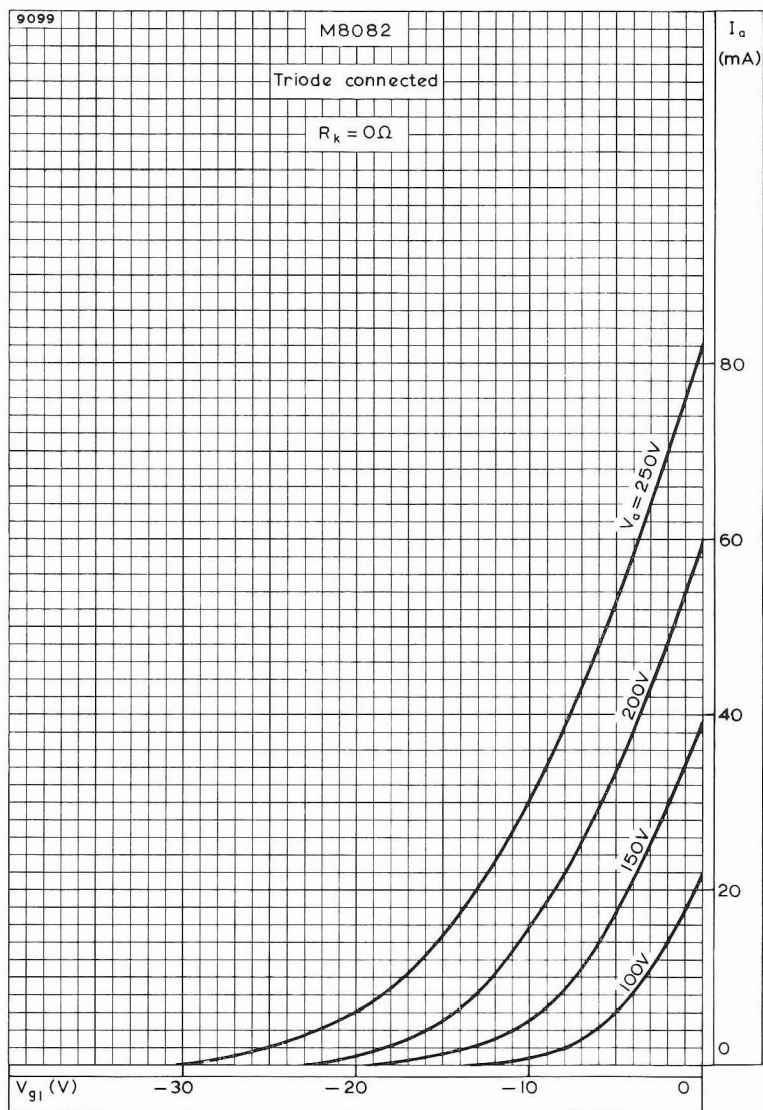


ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND
ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE.

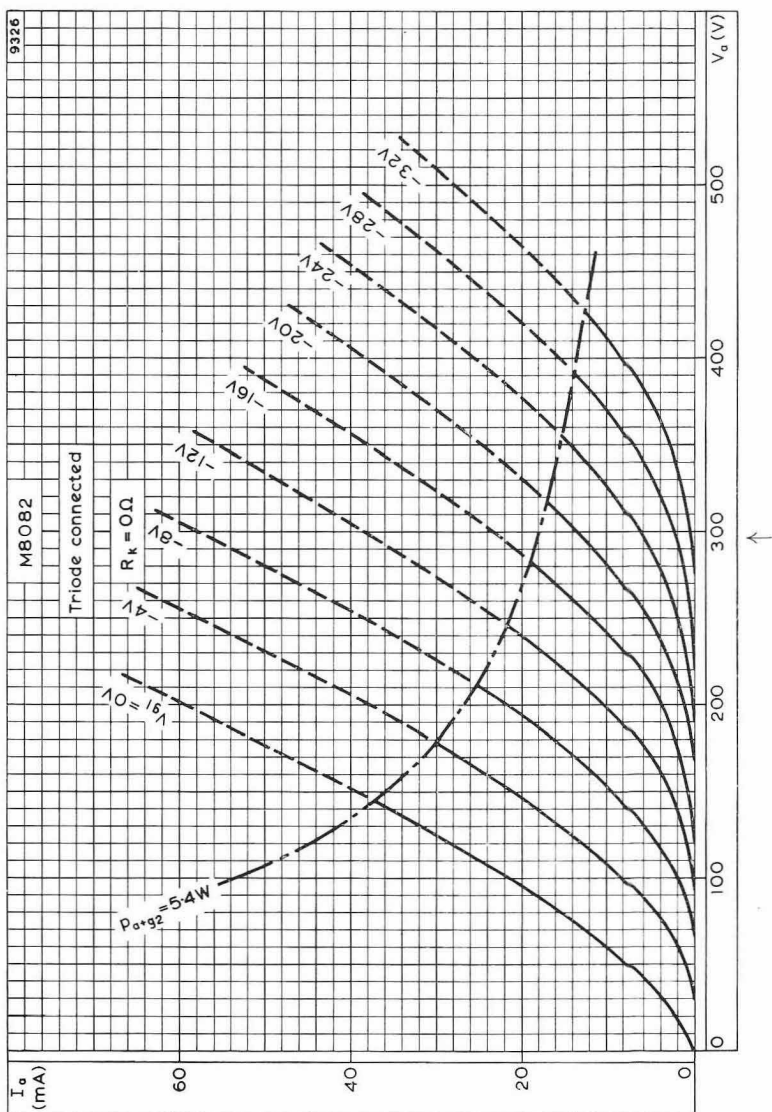
$$V_a = V_{g2} = 200V$$



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



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

