

SQ**PHILIPS****18048/C3m**

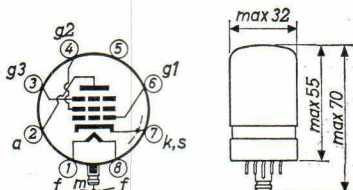
SPECIAL QUALITY, LONG LIFE PENTODE for use as A.F., I.F. or R.F. amplifier, output tube, oscillator, etc.

HEATING

Indirect by A.C. or D.C.; series or parallel supply

Heater voltage $V_f = 20\text{ V}$

Heater current $I_f = 125\text{ mA}$



Base: LOCTAL (Dimensions in mm)

CHARACTERISTICS

Column I: Setting of the tube and average measuring results of new tubes

II: Characteristics range values for equipment design

III: Data indicating the endpoint of life

Capacitances

		I	II
Grid No.1 to all other elements except anode	C_{g1}	= 8.5	7.5-9.5 pF
The same with $I_k = 19\text{ mA}$	C_{g1}	= 10.5	pF
Anode to all other elements except grid No.1	C_a	= 6.0	4.5-7.7 pF
Input + output capacitance	$C_{g1} + C_a$	=	< 16 pF
Anode to grid No.1	C_{ag1}	= 0.014	< 0.018 pF
Anode to grid No.3	C_{ag3}	= 1.2	pF
Anode to heater	C_{af}	= 0.12	pF
Grid No.1 to grid No.2	C_{g1g2}	= 3	pF
Grid No.1 to cathode	C_{g1k}	= 4.5	pF
Grid No.1 to heater	C_{g1f}	= 0.02	< 0.04 pF
Grid No.2 to grid No.3	C_{g2g3}	= 2.2	pF
Cathode to heater	C_{kf}	= 7	pF

CHARACTERISTICS (continued)Capacitances in triode connection

(Grids No.2 and 3 connected to anode)

		I	II	
Grid No.1 to all other elements except anode (+g ₂ +g ₃)	C _{g1} =	5	< 6	pF
Anode (+g ₂ +g ₃) to all other elements except grid No.1	C _a =	7.5	< 9	pF
Anode (+g ₂ +g ₃) to grid No.1	C _{ag1} =	3.2	< 4	pF

Heater current

		I	II	
Heater voltage	V _f =	20		V
Heater current	I _f =	125	120-130	mA

Typical characteristics

		I	II	III	
Anode supply voltage	V _{ba} =	225			V
Grid No.3 voltage	V _{g3} =	0			V
Grid No.2 supply voltage	V _{bg2} =	155			V
Cathode resistor	R _k =	250			Ω
Anode current	I _a =	16	13.5-19	11.5	mA
Grid No.2 current	I _{g2} =	3	2-4		mA
Mutual conductance	S =	6.5	5.5-7.8	4.5	mA/V
Internal resistance	R _i =	0.25	> 0.2		MΩ
Amplification factor of grid No.2 with respect to grid No.1	μ _{g2g1} =	19			
Aequivalent noise resistance					
R.F.	R _{eq} =	1.2	< 2.0		kΩ
A.F. (f = 500-3000 c/s)	R _{eq} =	5			kΩ
Triode connection, R.F.	R _{eq} =	650			Ω

Negative grid current

		I	II	III	
Anode supply voltage	V _{ba} =	225			V
Grid No.3 voltage	V _{g3} =	0			V
Grid No.2 supply voltage	V _{bg2} =	155			V
Cathode resistor	R _k =	250			Ω
Grid No.1 resistor	R _{g1} =	0.1			MΩ
Negative grid current	-I _{g1} =		< 0.5	1.0	μA

SQ**PHILIPS****18048/C3m**CHARACTERISTICS (continued)Grid current starting point

		I	II	III
Anode supply voltage	V_{ba}	= 225		V
Grid No.3 voltage	V_{g3}	= 0		V
Grid No.2 supply voltage	V_{bg2}	= 155		V
Positive grid No.1 current	$+I_{g1}$	= 0.3		μA
Negative grid No.1 voltage	$-V_{g1}$	=	< 1.3	V

Output power

		I	II	III
Anode supply voltage	V_{ba}	= 225		V
Grid No.3 voltage	V_{g3}	= 0		V
Grid No.2 supply voltage	V_{bg2}	= 155		V
Cathode resistor	R_k	= 250		Ω
Load resistance	$R_{a\sim}$	= 10		$k\Omega$
Total distortion	d_{tot}	= 10		%
Output power	W_o	= 1.5		W

Hum voltage (referred to grid No.1)

Measured with straight response filter. Heater supply frequency 50 c/s. Centre of heater connected to earth.

		I	II	III
Heater voltage	V_f	= 20		V
Grid No.1 resistor	R_{g1}	= 0.5		$M\Omega$
Cathode capacitor	C_k	> 100		μF
Hum voltage	V_{g1hum}	=	< 10	μV

Heating time

		I	II	III
Anode supply voltage	V_{ba}	= 225		V
Grid No.3 voltage	V_{g3}	= 0		V
Grid No.2 supply voltage	V_{bg2}	= 155		V
Cathode resistor	R_k	= 250		Ω
Heating time for anode current rise from 0 to 4 mA	T_h	= 26	19-33	sec

CHARACTERISTICS (continued)Insulation between heater and cathode

		I	II	III
Heater voltage	V_f	= 20		V
Heater to cathode voltage cathode positive	V_{kf}	= 50		V
Heater to cathode insulation resistance	R_{isol}	=	> 100	50 MΩ

Insulation between two arbitrary electrodes

		I	II	III
Heater voltage	V_f	= 20		V
Voltage between two electrodes	V	= 50		V
Insulation resistance	R_{isol}	=	>1000	300 MΩ

LIFE EXPECTANCY: 10 000 hours under the following life test conditions:

Heater voltage	V_f	=	20 V
Anode supply voltage	V_{ba}	=	225 V
Grid No.3 voltage	V_{g3}	=	0 V
Grid No.2 supply voltage	V_{bg2}	=	155 V
Cathode resistor	R_k	=	250 Ω

In case of heater parallel supply the heater voltage should be within $\pm 5\%$ of its nominal value (absolute limits). In case of heater series supply the heater current should be within $\pm 1.5\%$ of its nominal value (absolute limits).

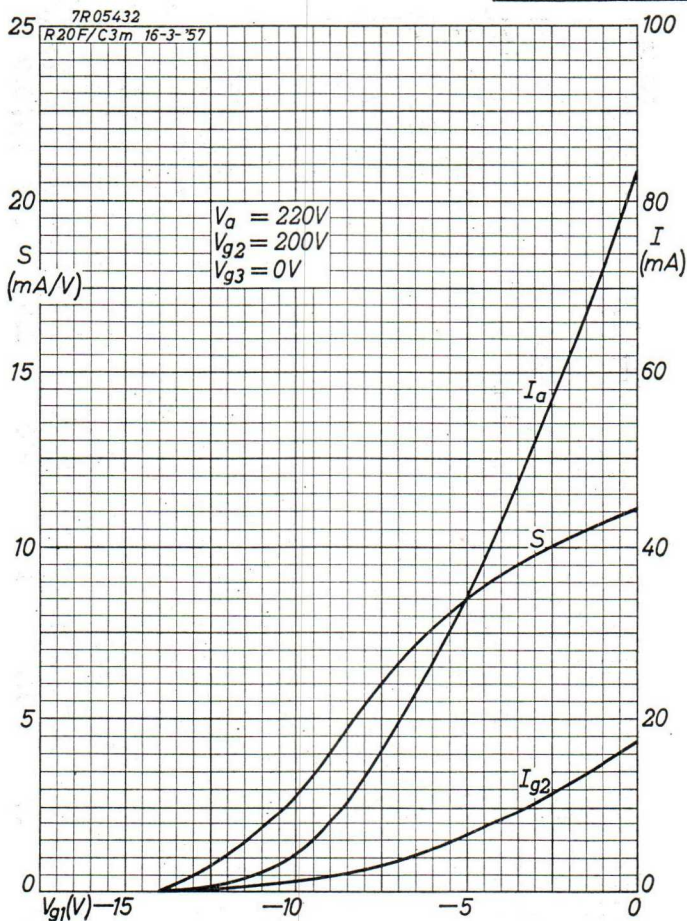
The data indicating the endpoint of life are given in column III under the heading "Characteristics".

SQ**PHILIPS****18048/C3m****LIMITING VALUES** (Design centre limits)

Anode voltage in cold condition	V_{a0}	= max.	550 V
Anode voltage	V_a	= max.	300 V
Anode dissipation	W_a	= max.	4 W ¹⁾
Grid No.3 voltage in cold condition	V_{g30}	= max.	550 V
Grid No.3 voltage	V_{g3}	= max.	300 V
Grid No.3 dissipation	W_{g3}	= max.	1 W
Grid No.2 voltage in cold condition	V_{g20}	= max.	550 V
Grid No.2 voltage	V_{g2}	= max.	300 V
Grid No.2 dissipation	W_{g2}	= max.	1 W
Negative grid No.1 voltage	$-V_{g1}$	= max.	100 V
Grid No.1 dissipation	W_{g1}	= max.	50 mW
Grid No.1 circuit resistance			
when $W_a > 1.5$ W	R_{g1}	= max.	0.5 MΩ
when $W_a < 1.5$ W	R_{g1}	= max.	3 MΩ
Cathode current	I_k	= max.	30 mA
Voltage between heater and cathode	V_{kf}	= max.	120 V
Circuit resistance between heater and cathode	R_{kf}	= max.	20 kΩ
Heater voltage in case of heater parallel supply	V_f	= 20 V ± 5 % ²⁾	
Heater current in case of heater series supply	I_f	= 125 mA ± 1.5 % ²⁾	
Temperature of metal envelope	t_{bulb}	= max.	120 °C

¹⁾ In case of triode connection $W_a + W_{g2} + W_{g3} = \text{max. } 5 \text{ W}$

²⁾ Absolute limits

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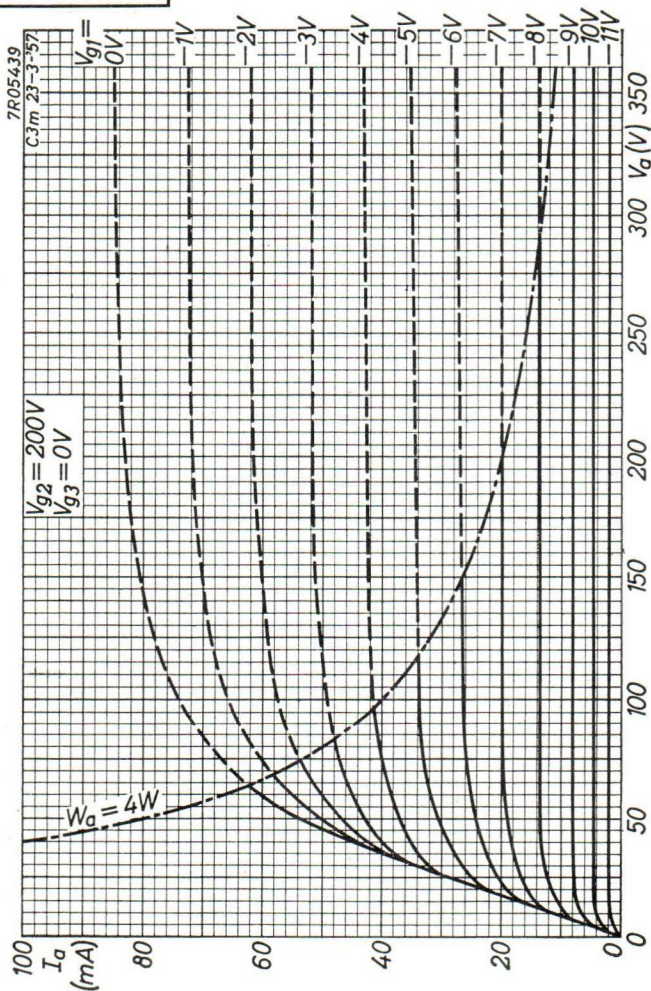
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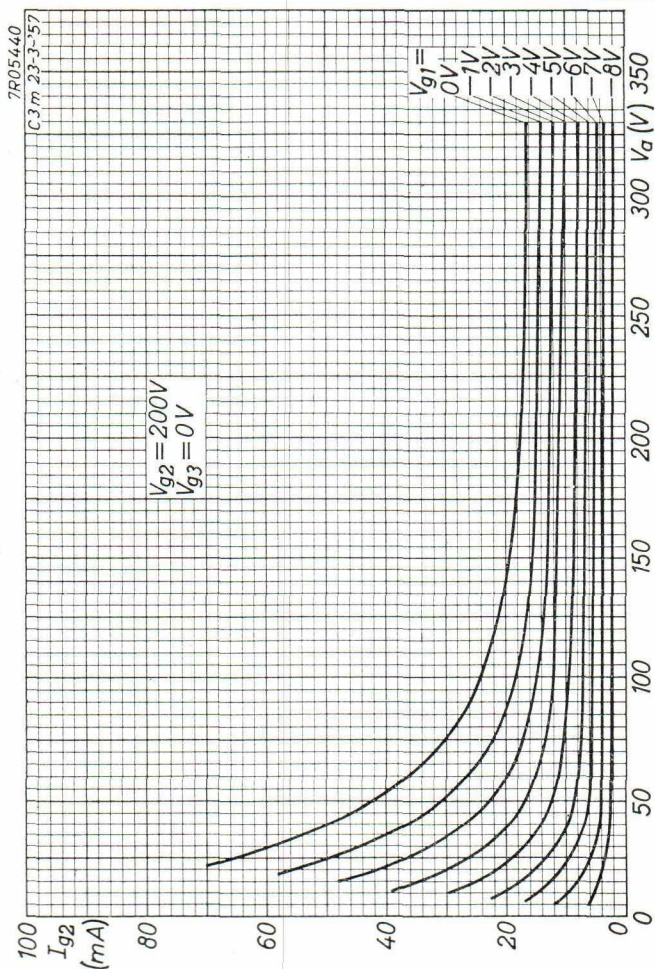
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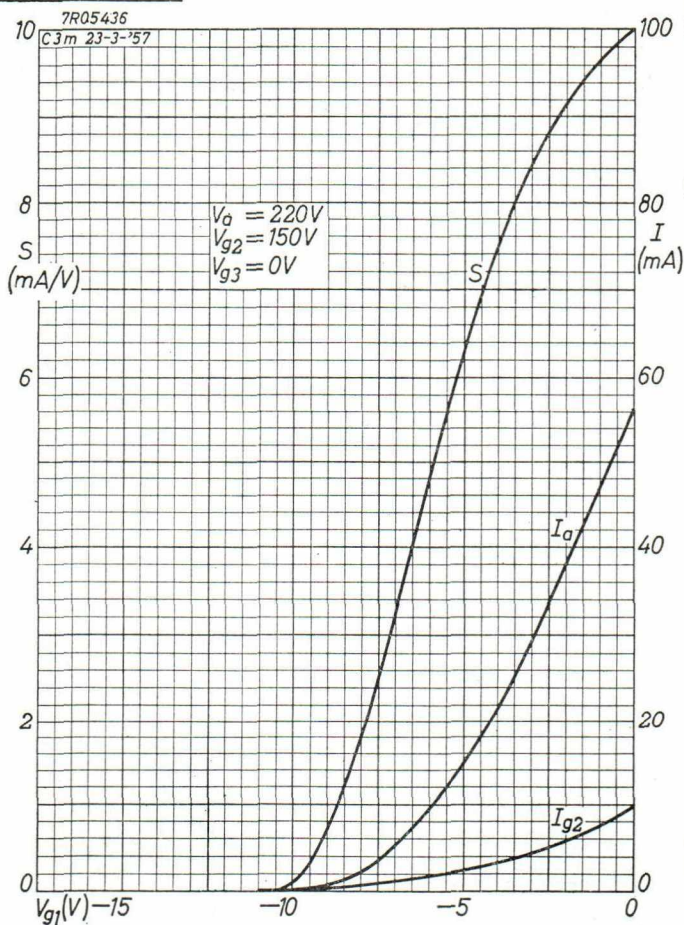
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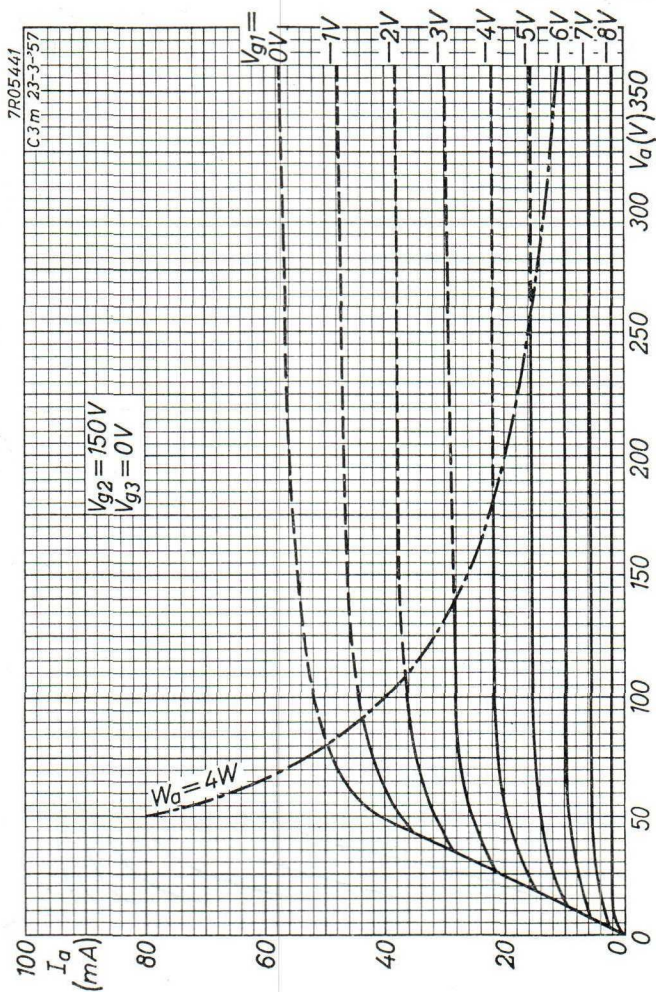
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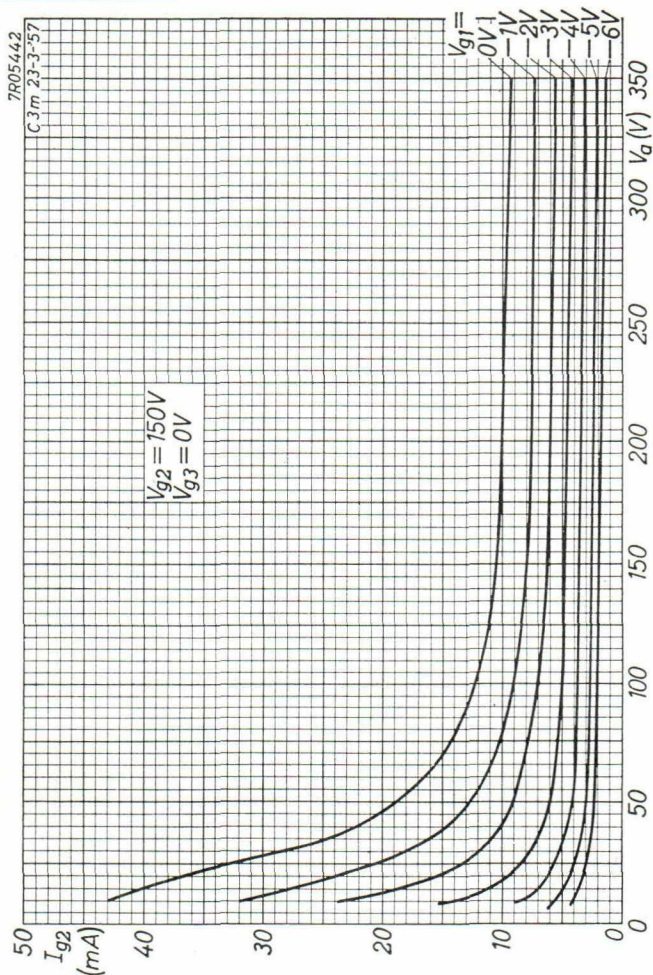
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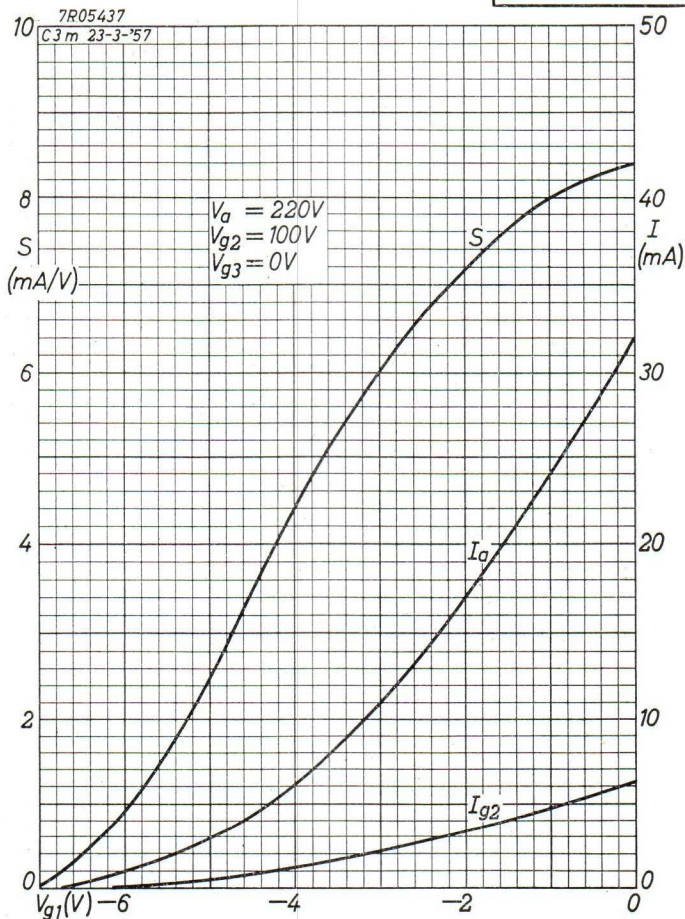
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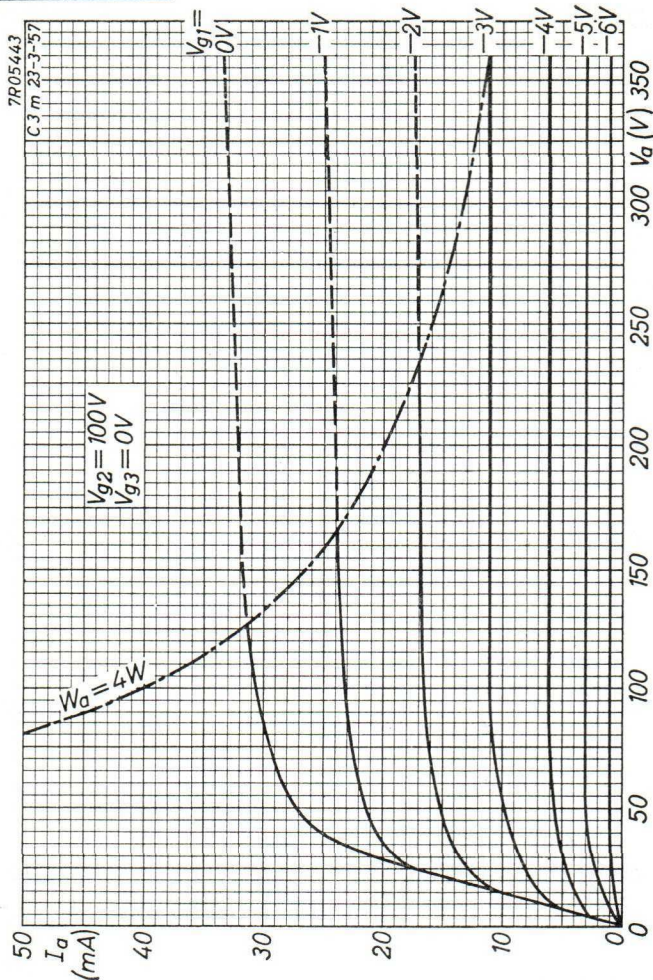
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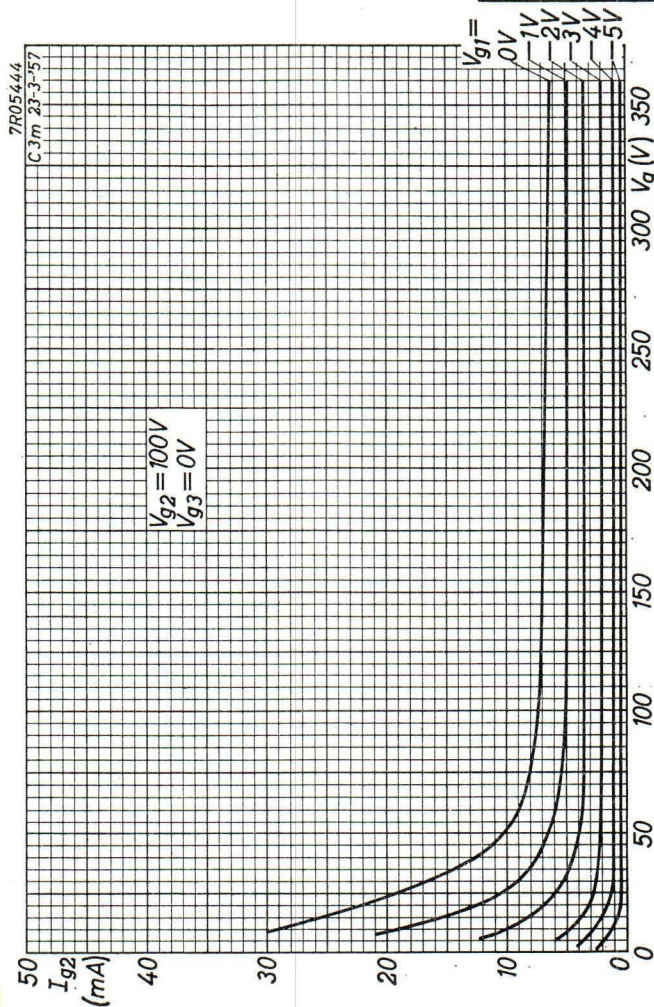
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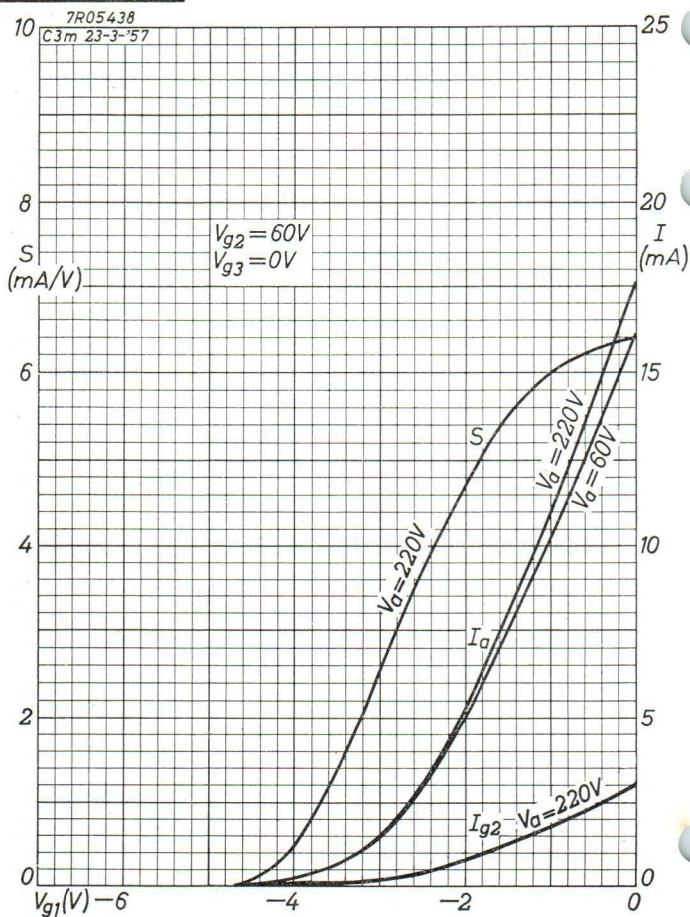
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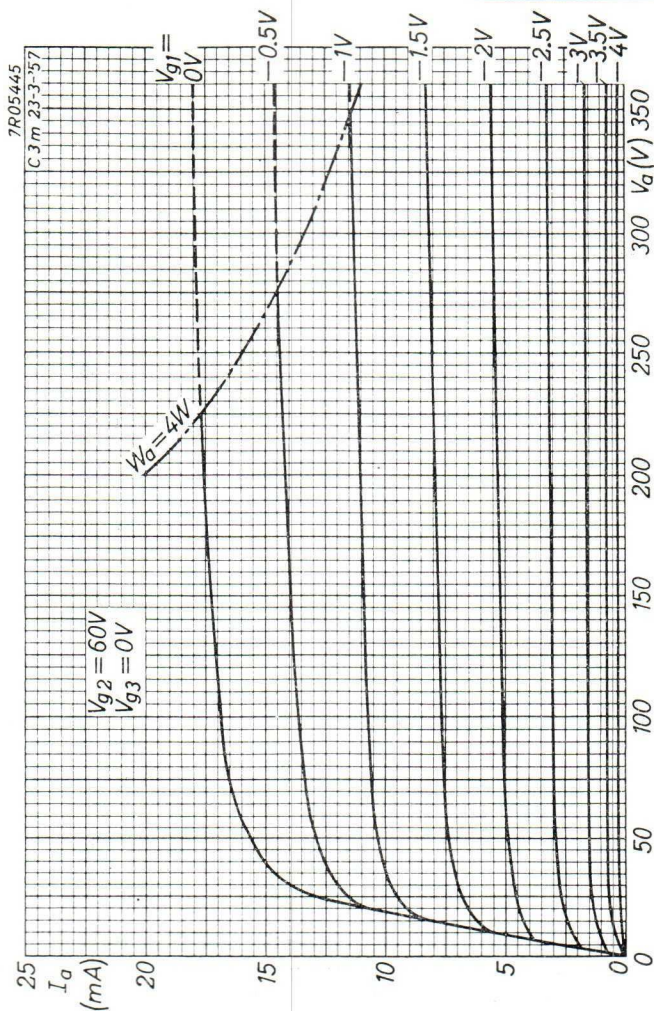
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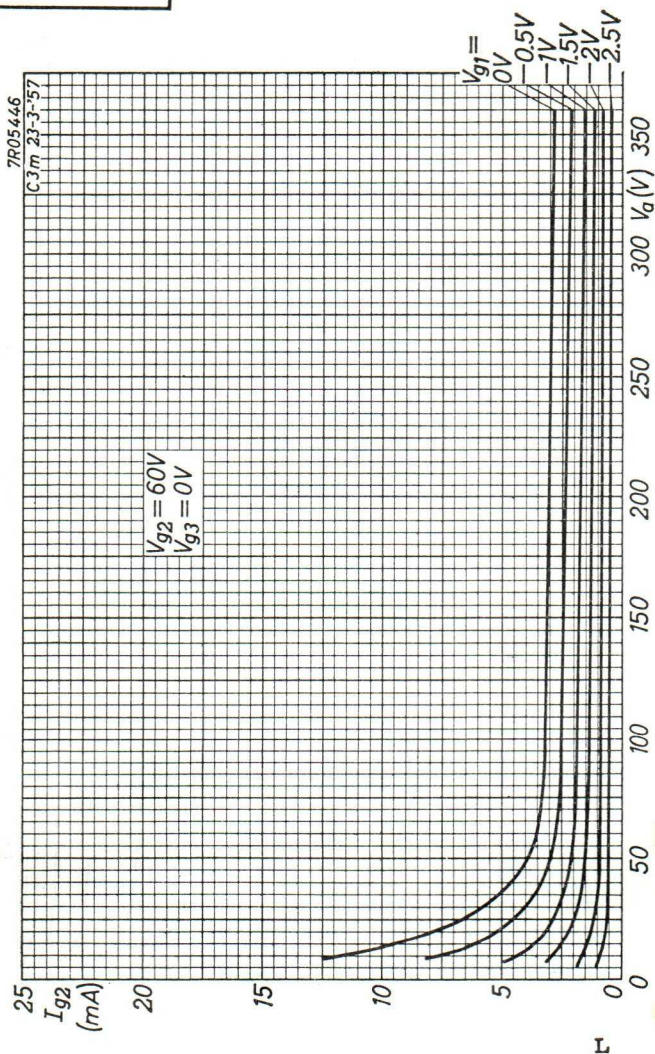
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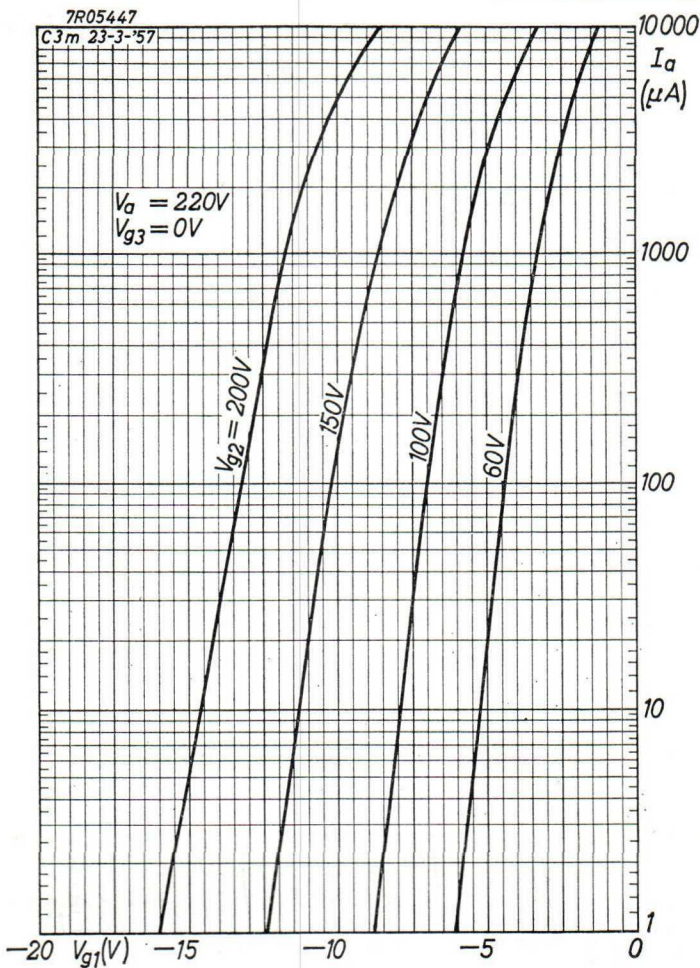
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7R05448

C3m 23-3-'57

$V_a = 220V$
 $V_{g3} = 0V$

$V_{g2} = 200V$

150V

100V

50V

10000
 S
($\mu A/V$)

1000

100

10

1

-20 $V_{g1}(V)$

-15

-10

-5

0

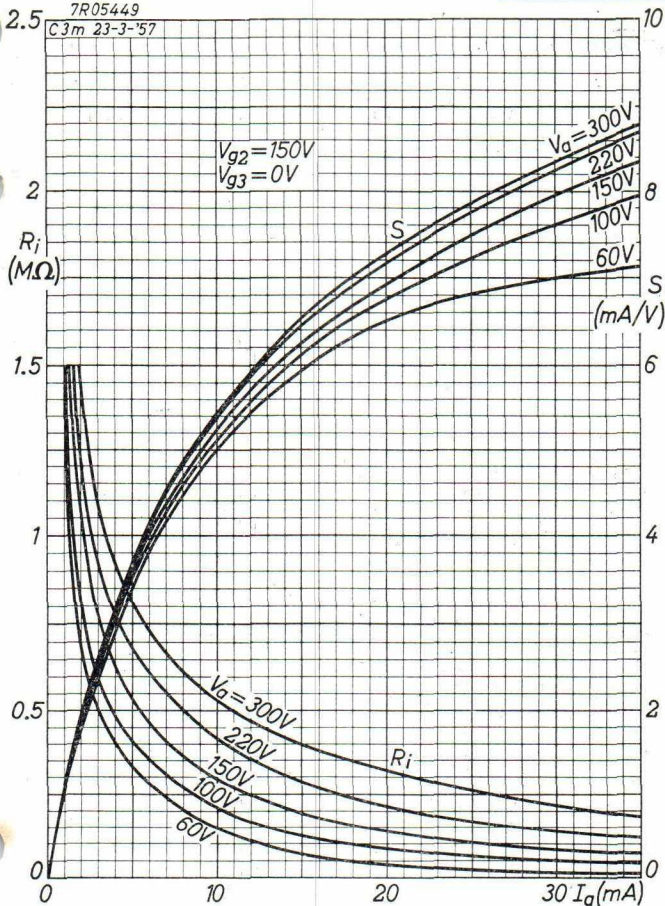
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C3m 23-3-57



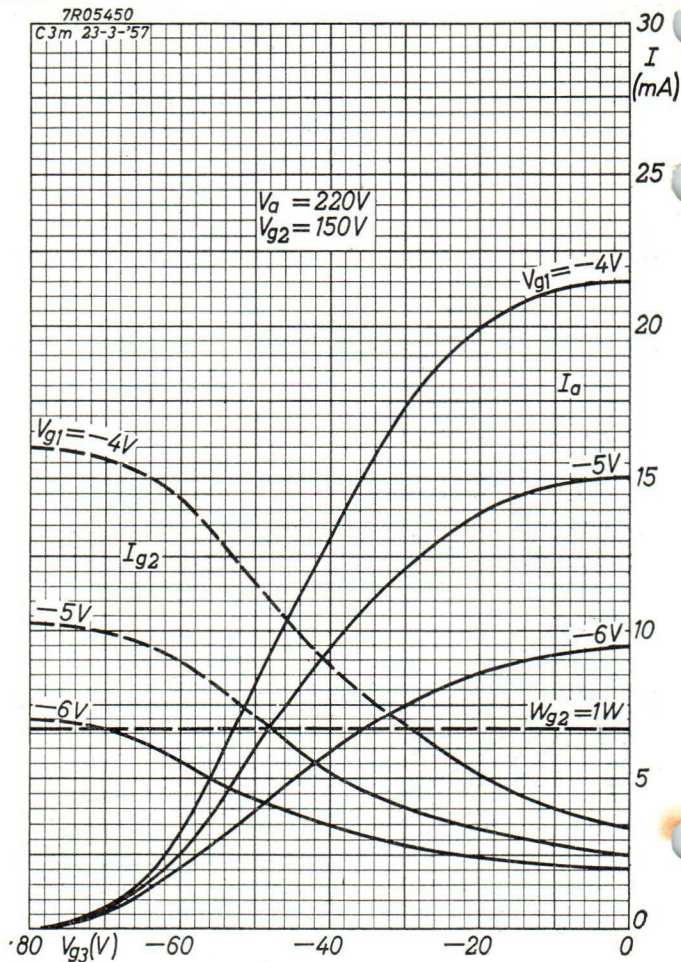
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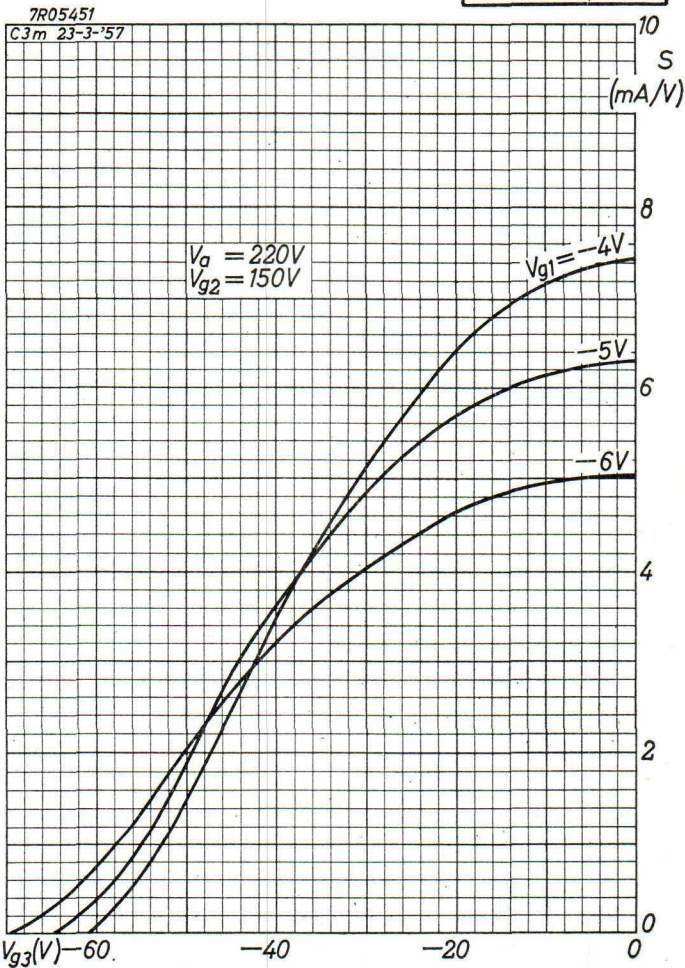
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C3m 23-3-'57



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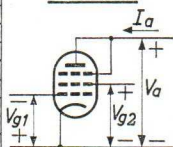
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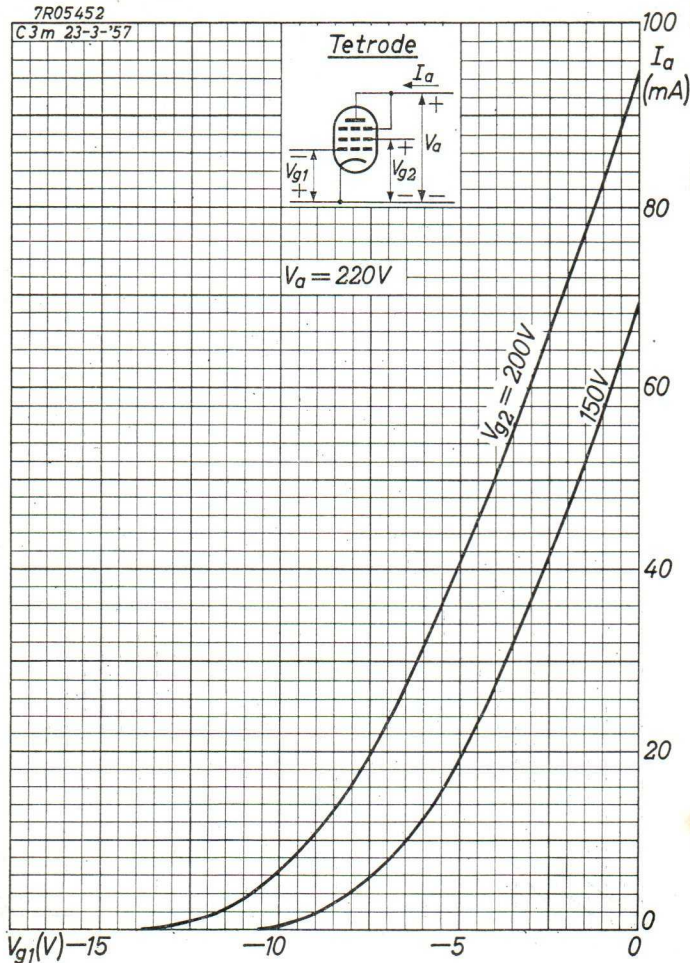
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C3m 23-3-'57

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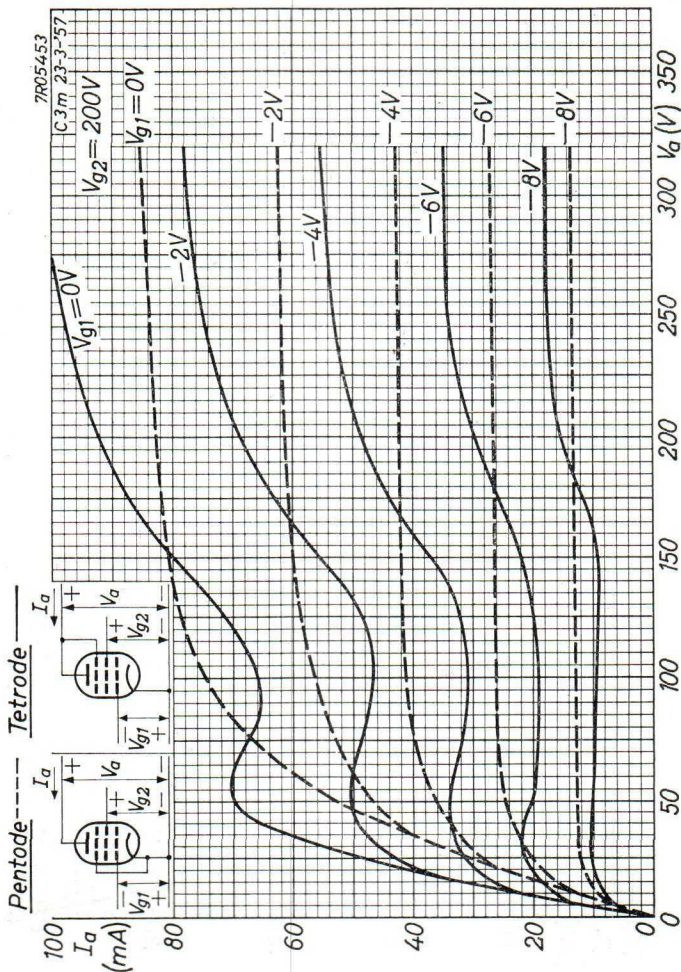
$V_a = 220V$



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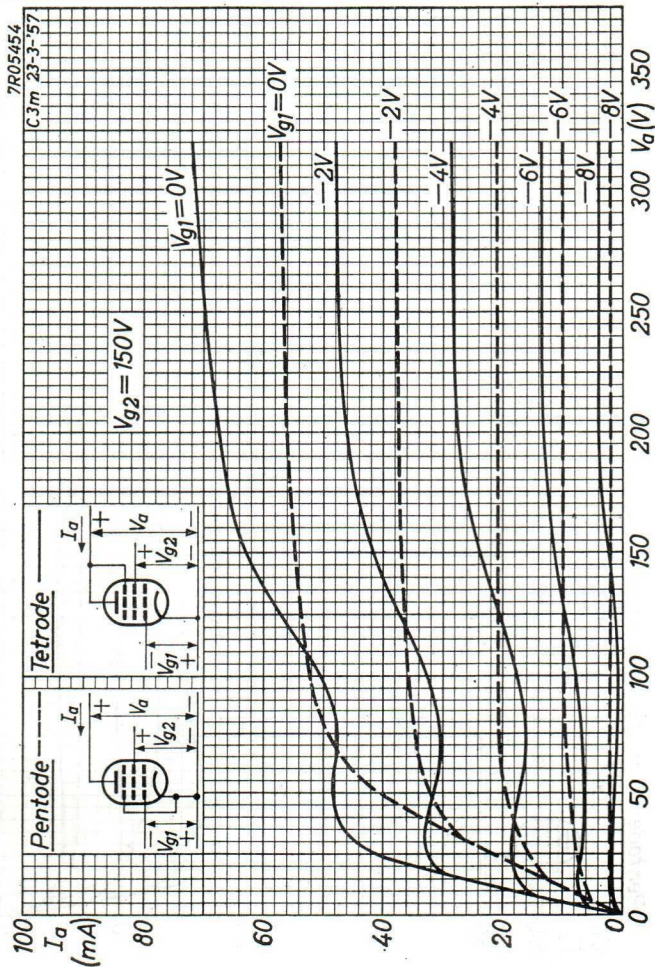
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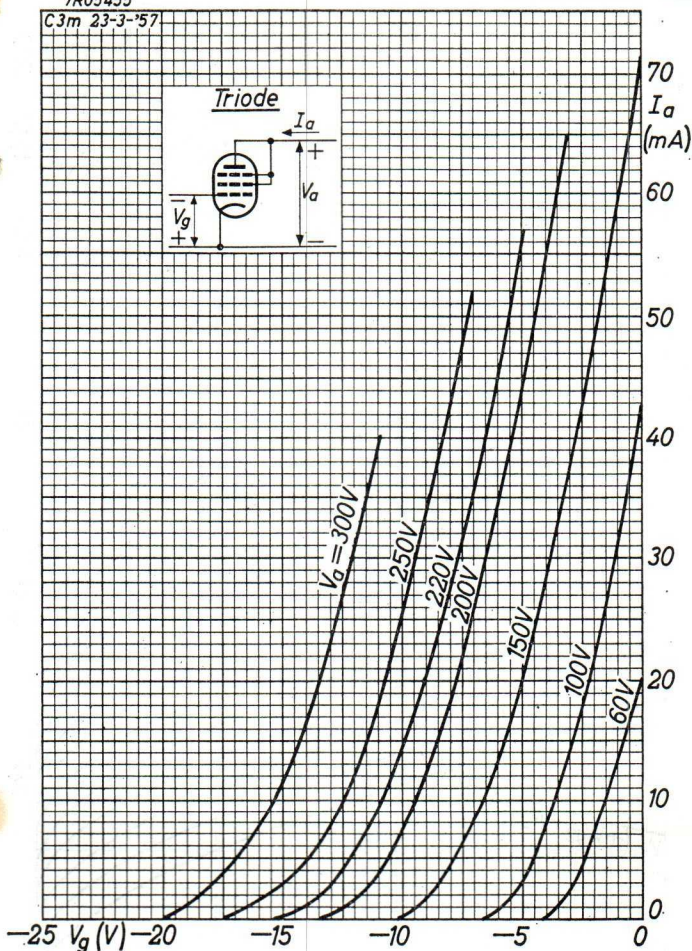
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C3m 23-3-'57



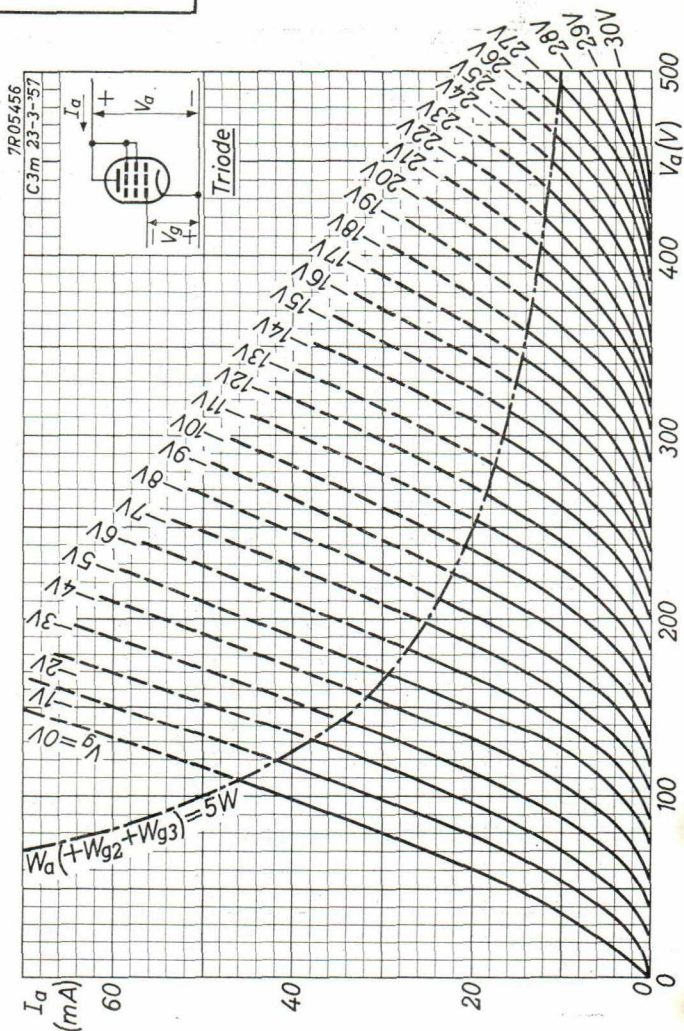
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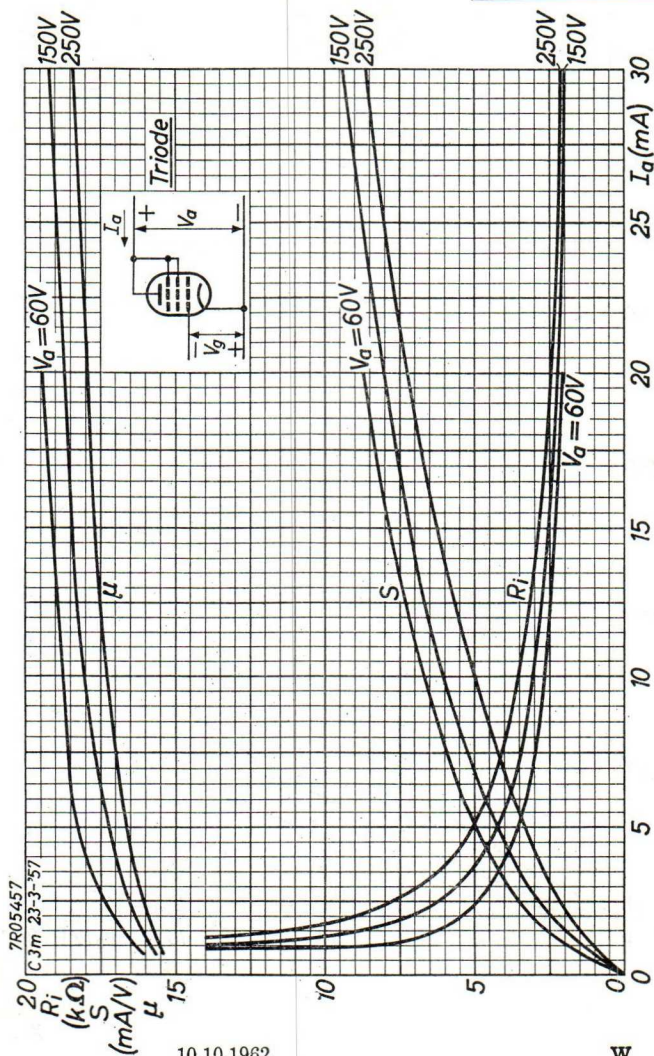
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