

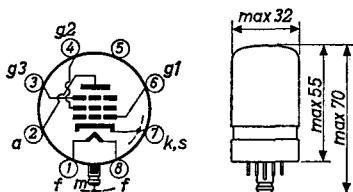
SPECIAL QUALITY, LONG LIFE PENTODE for use as A.F., I.F. or R.F. amplifier, output tube, oscillator, etc.

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		M Ω
Amplification factor of grid No.2 with respect to grid No.1	$\mu_{g2g1} =$	19			
Aequivalent noise resistance					
R.F.	$R_{eq} =$	1.2	< 2.0		k Ω
A.F. ($f = 500-3000$ c/s)	$R_{eq} =$	5			k Ω
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			M Ω
Negative grid current	$-I_{g1} =$		< 0.5	1.0	μ A

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 Ω
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 Ω
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).

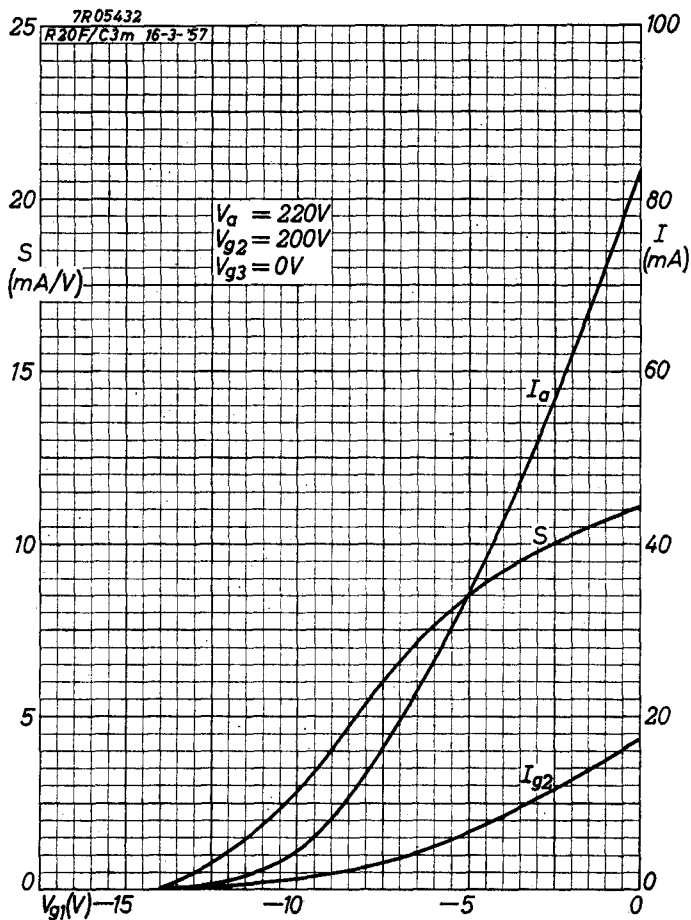
The data indicating the endpoint of life are given in column III under the heading "Characteristics".

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

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

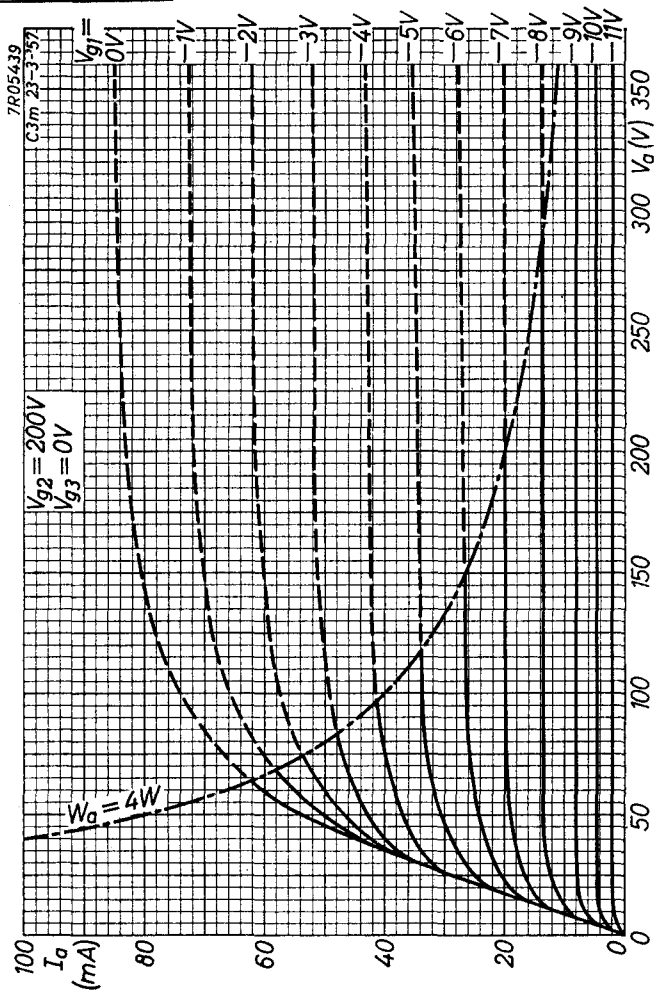
10.10.1962

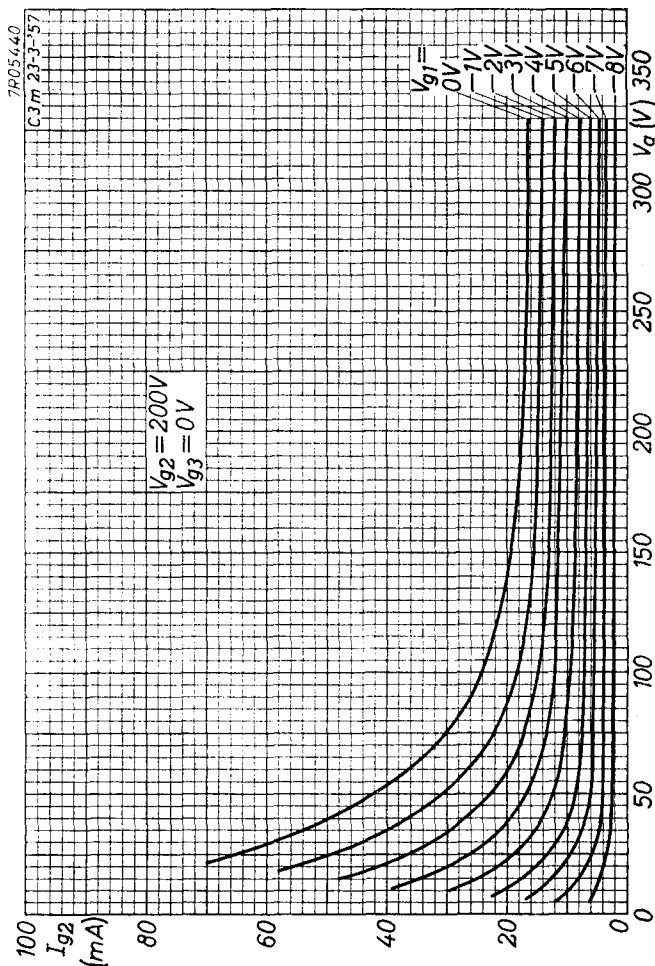
A

18048/C3m

PHILIPS

SQ



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

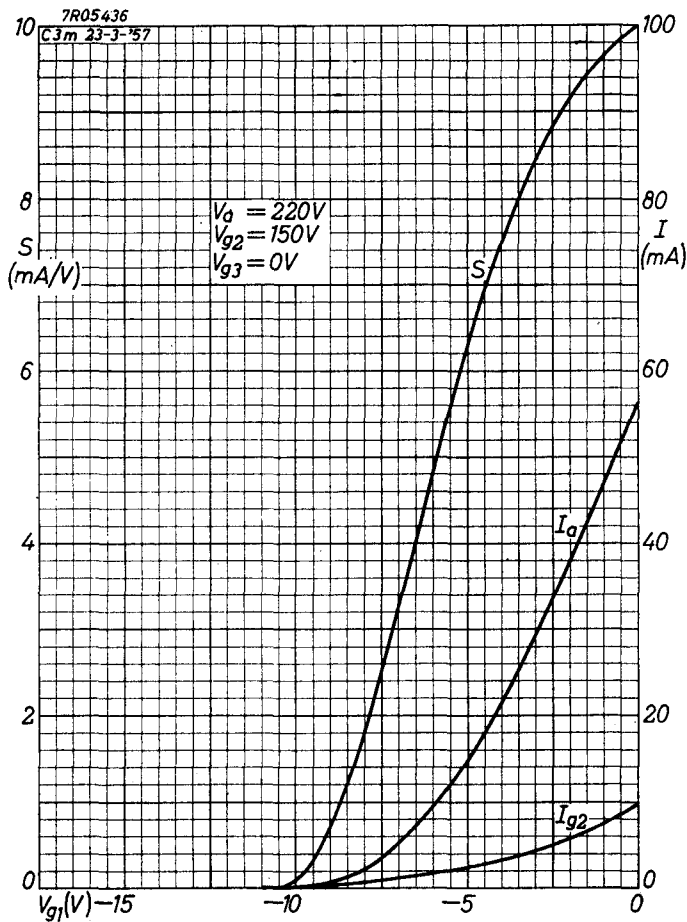
10.10.1962

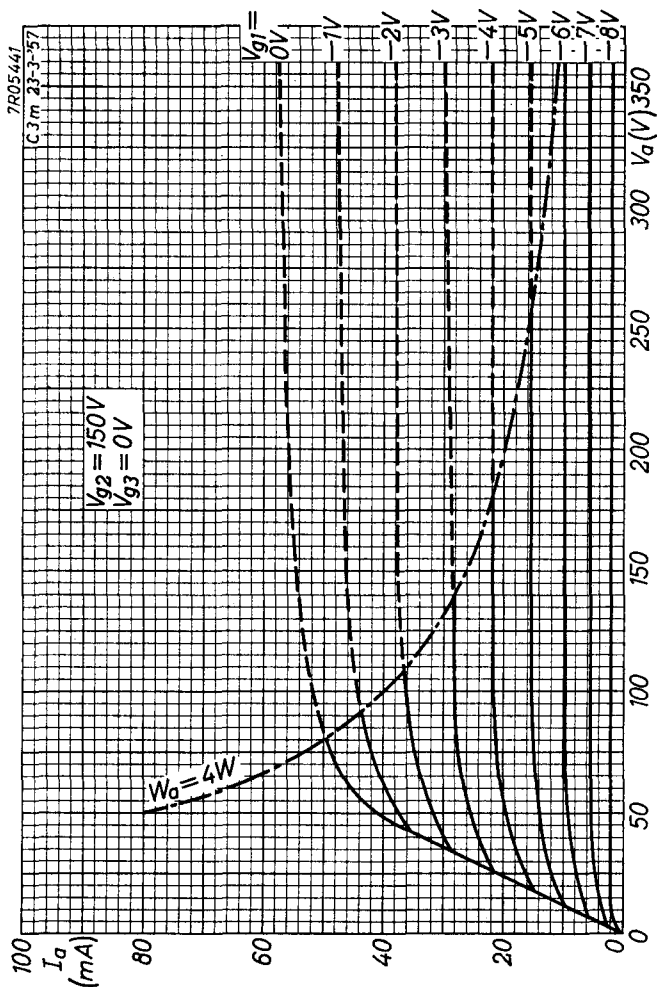
c

18048/C3m

PHILIPS

SQ



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

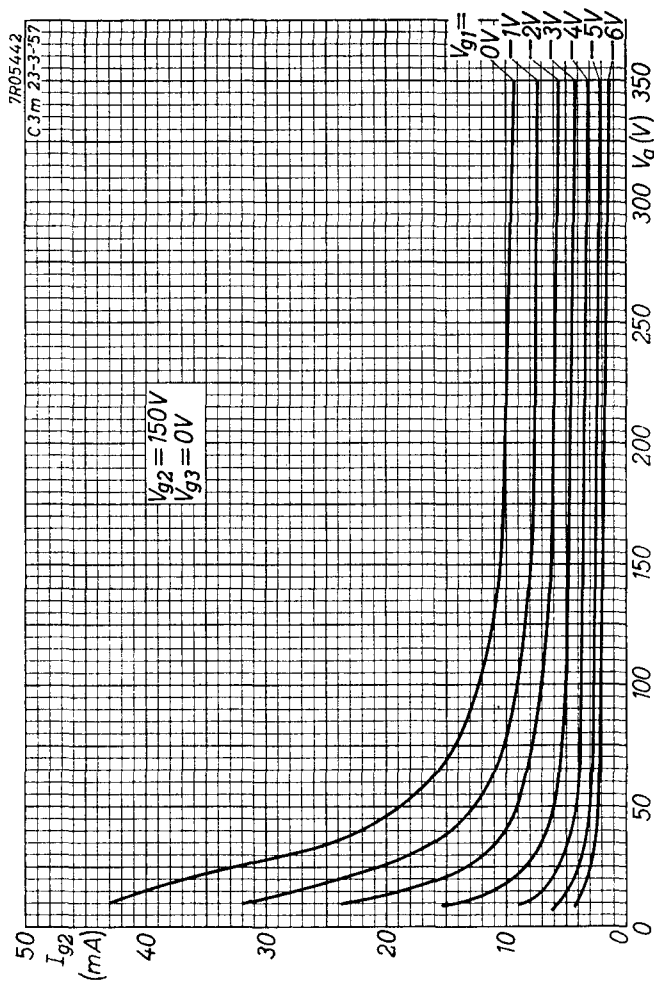
10.10.1962

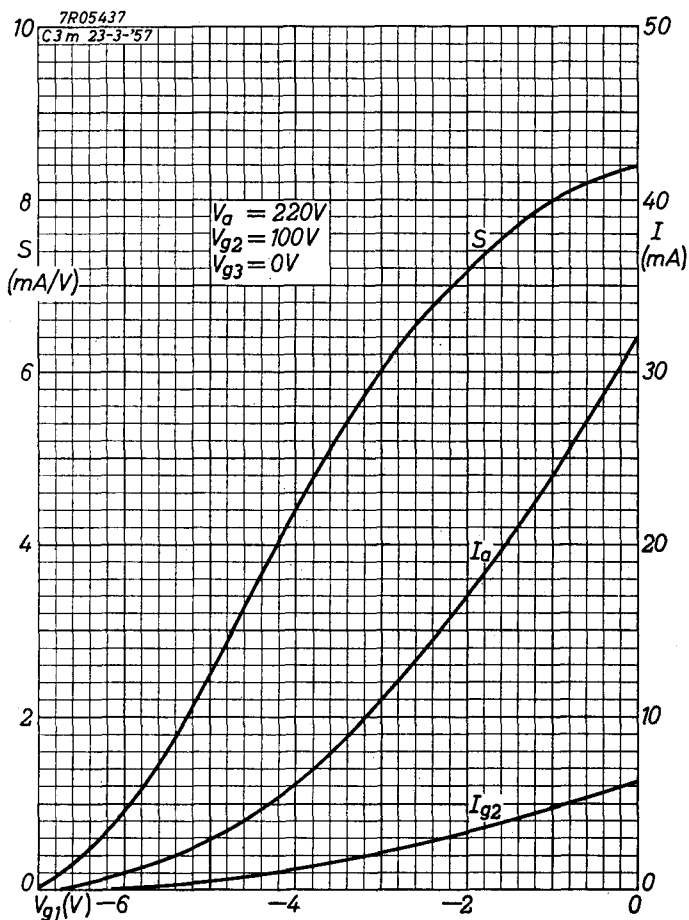
E

18048/C3m

PHILIPS

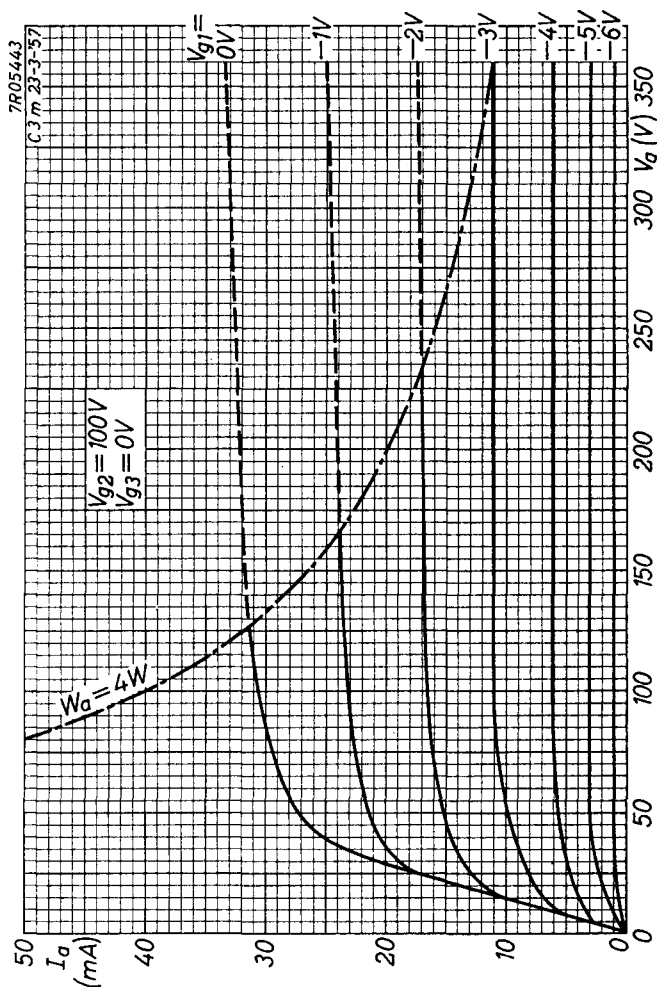
SQ

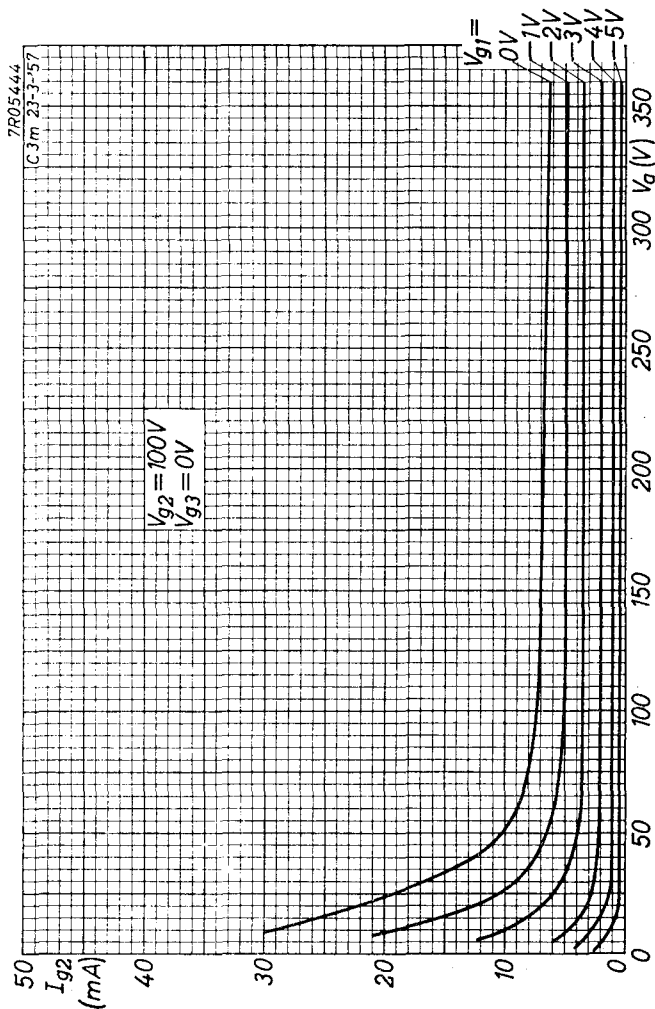


SQ**PHILIPS****18048/C3m**

10.10.1962

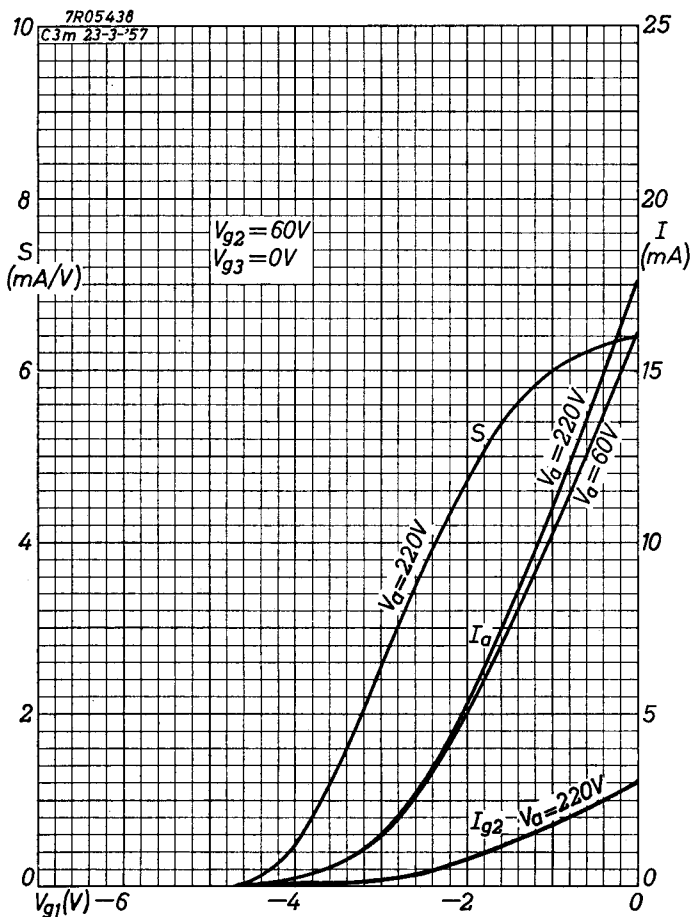
G

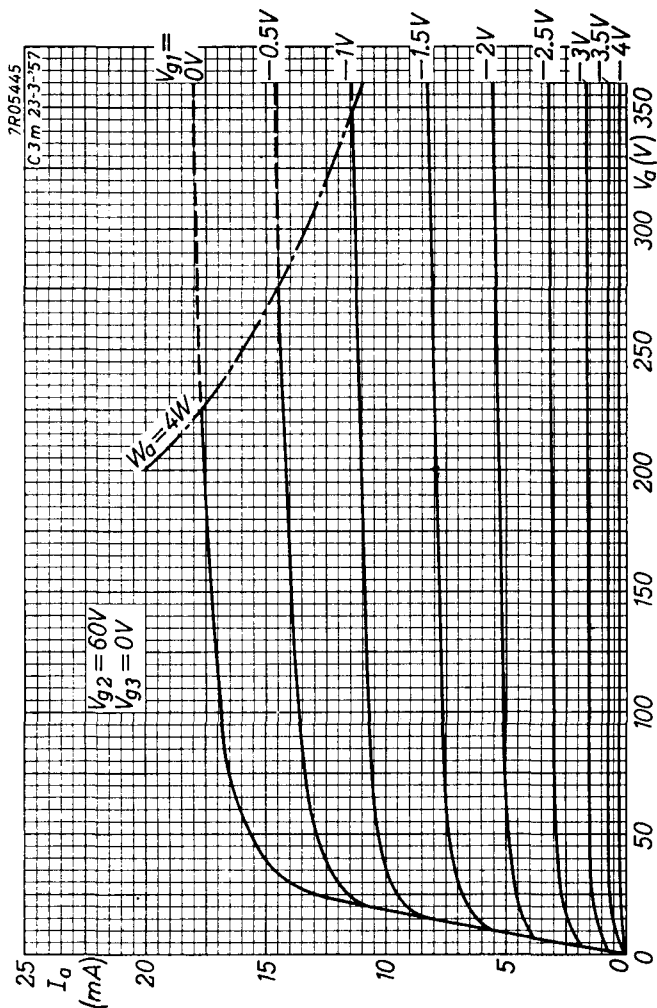
18048/C3m**PHILIPS****SQ**

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

10.10.1962

I

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

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

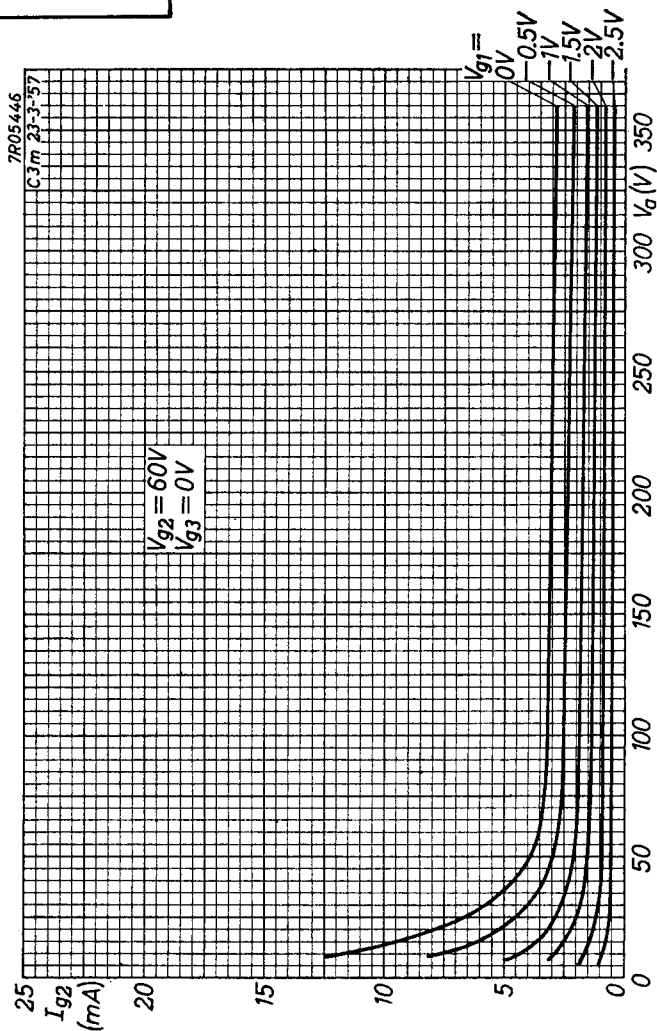
10.10.1962

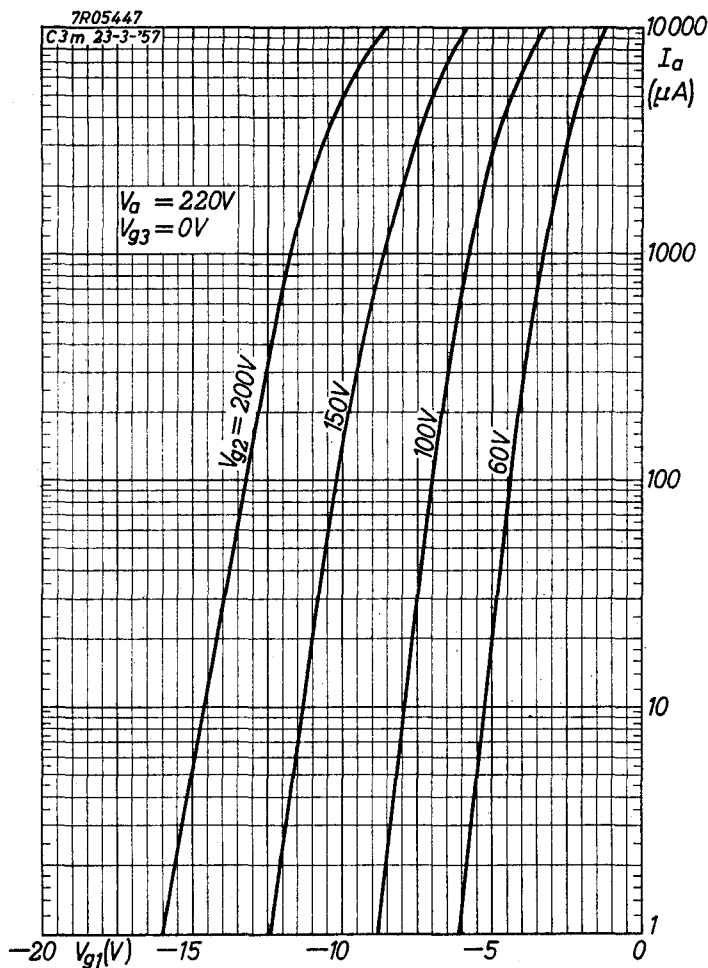
K

18048/C3m

PHILIPS

SQ



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

18048/C3m

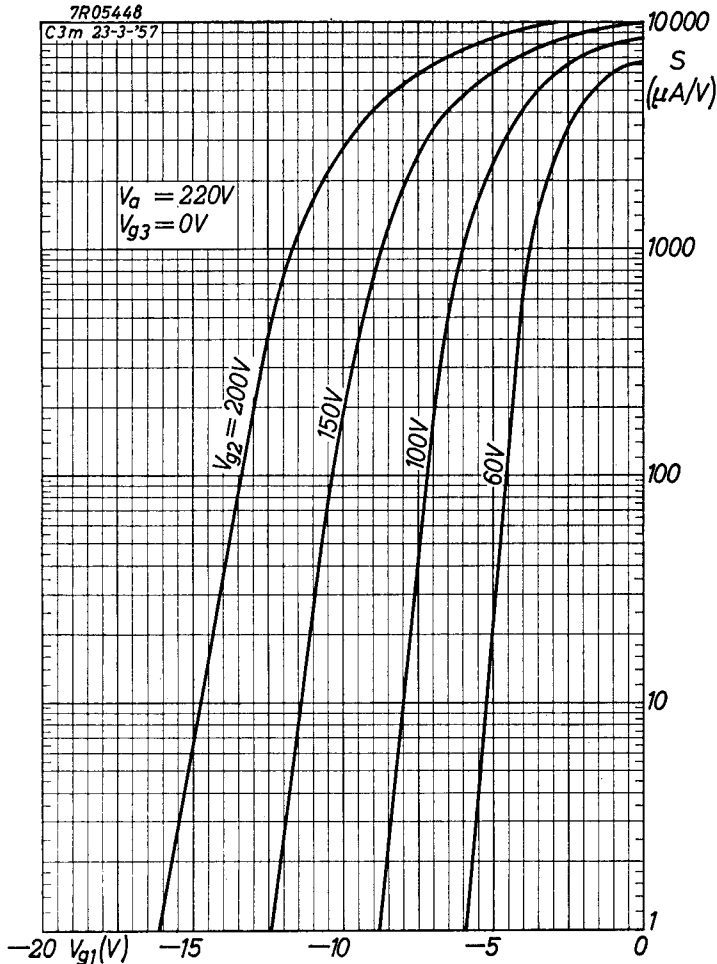
PHILIPS

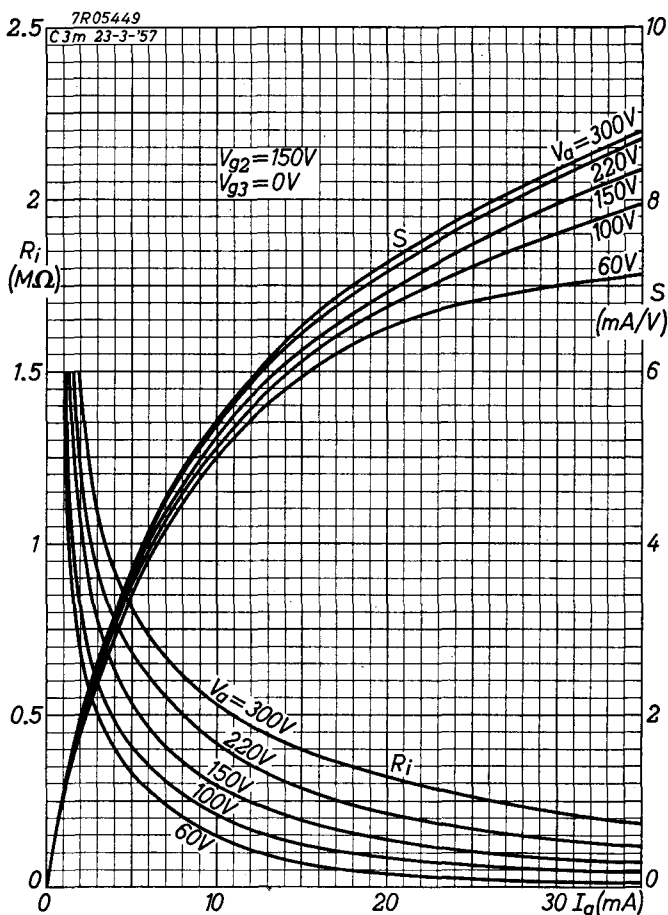
SQ

7R05448

C3m 23-3-57

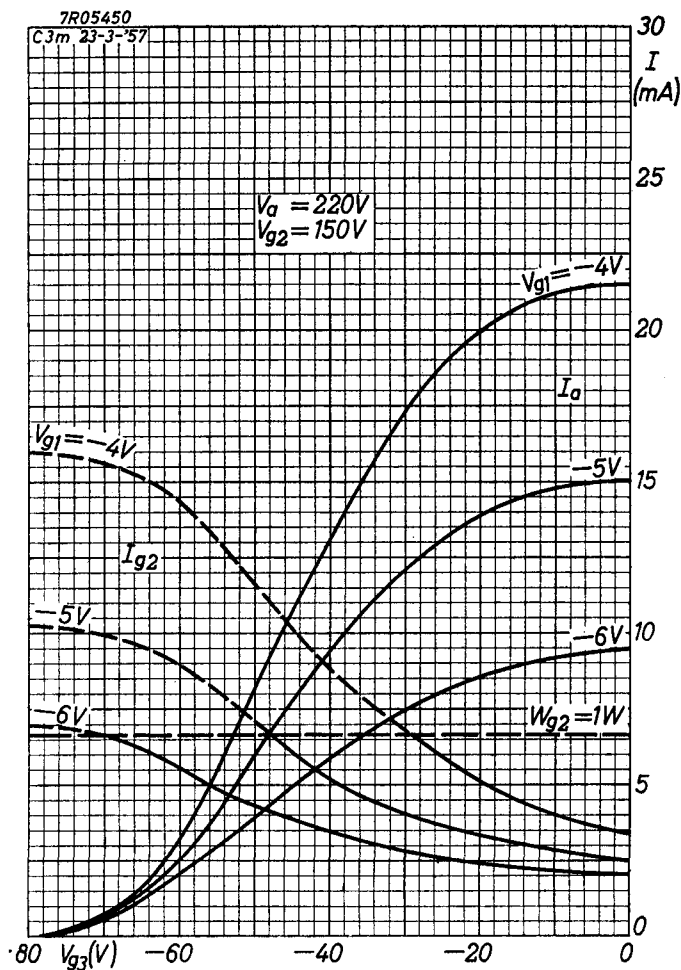
$V_a = 220V$
 $V_{g3} = 0V$



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

10.10.1962

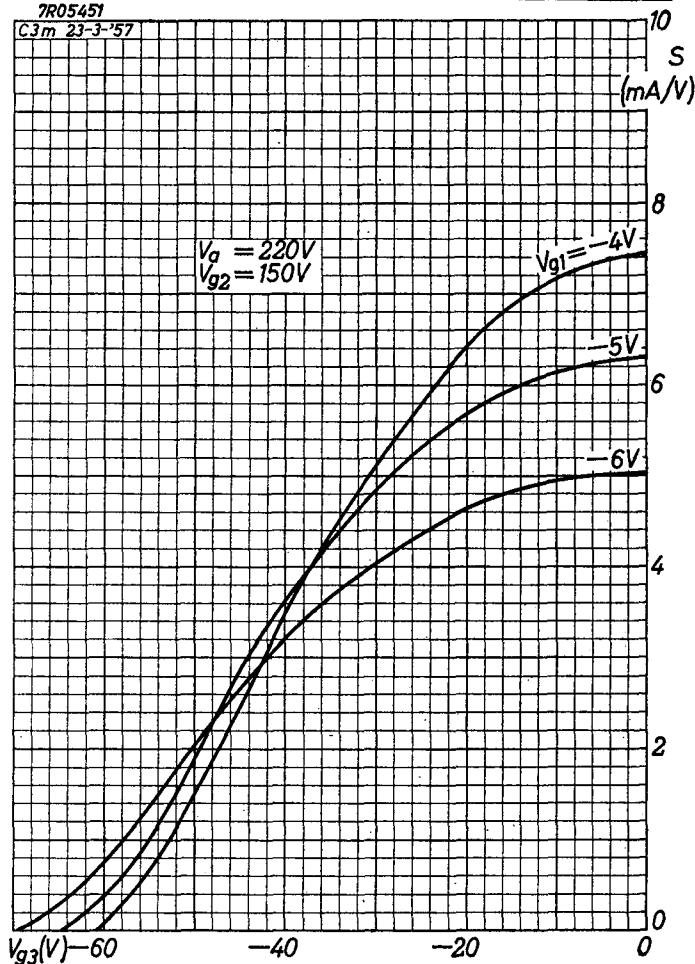
0

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

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

7R05451

C3m 23-3-'57



10.10.1962

Q

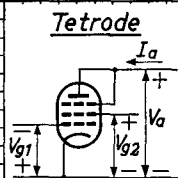
18048/C3m

PHILIPS

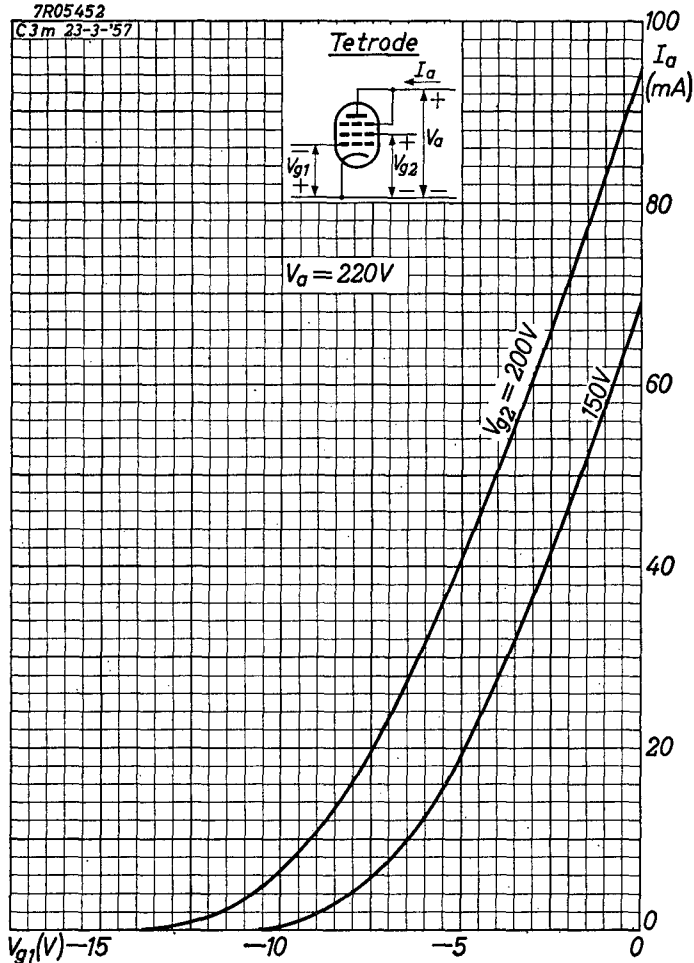
SQ

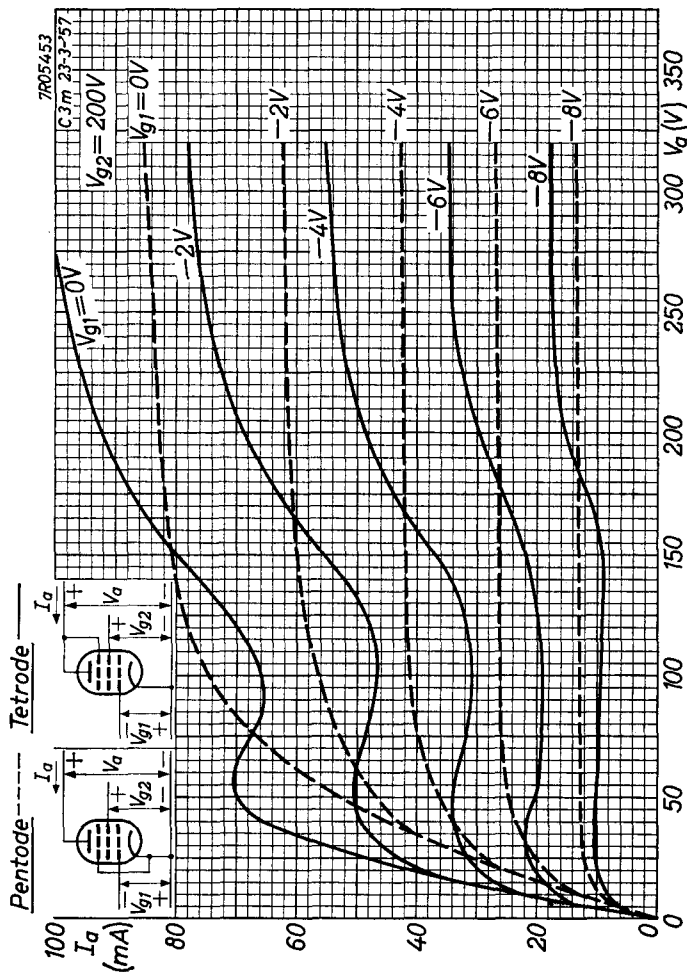
7R05452

C3m 23-3-'57



$V_a = 220V$



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

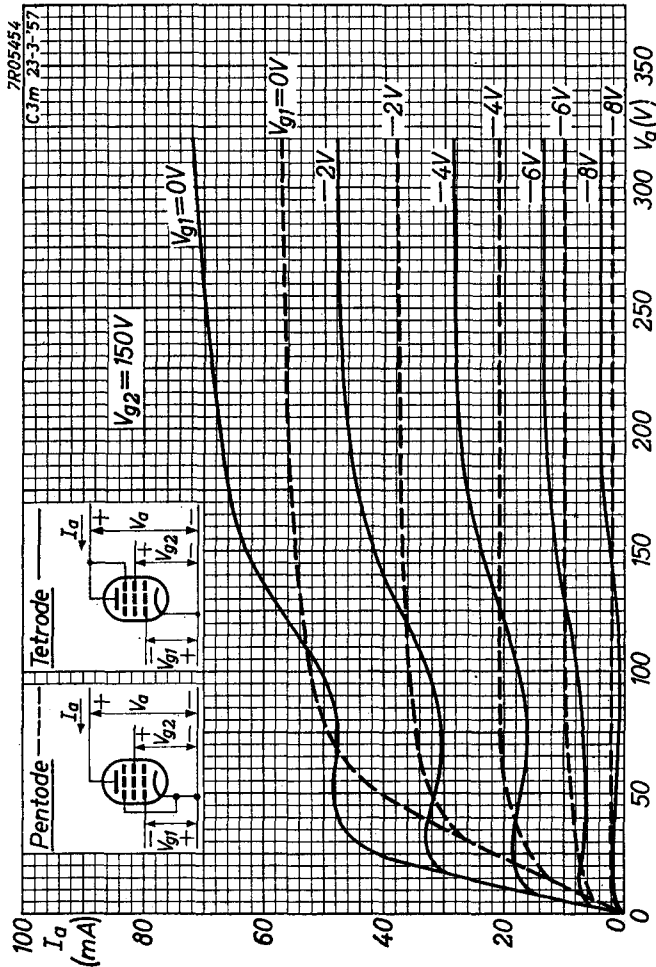
10.10.1962

5

18048/C3m

PHILIPS

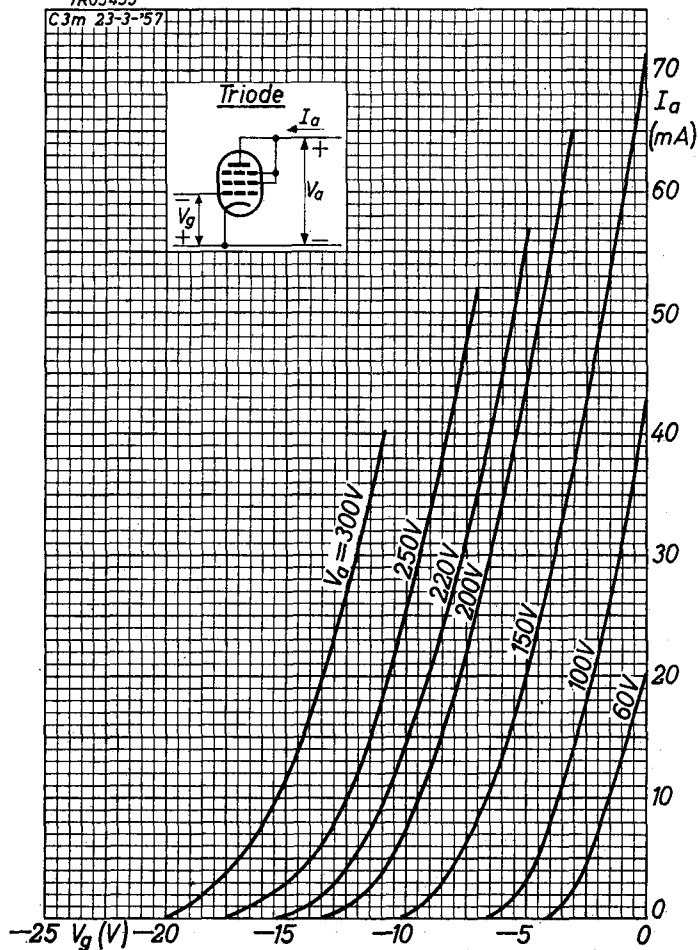
SQ



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

7R05455

C3m 23-3-'57



10.10.1962

U

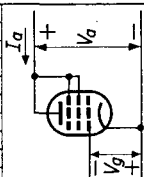
18048/C3m

PHILIPS

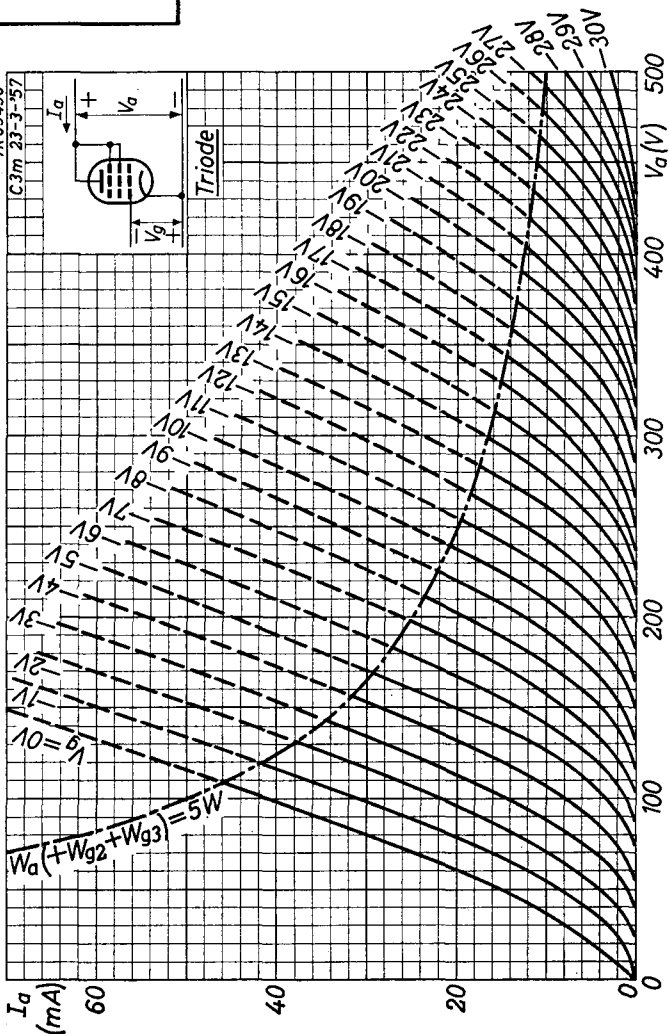
SQ

7R05456

C3m 23-3-57

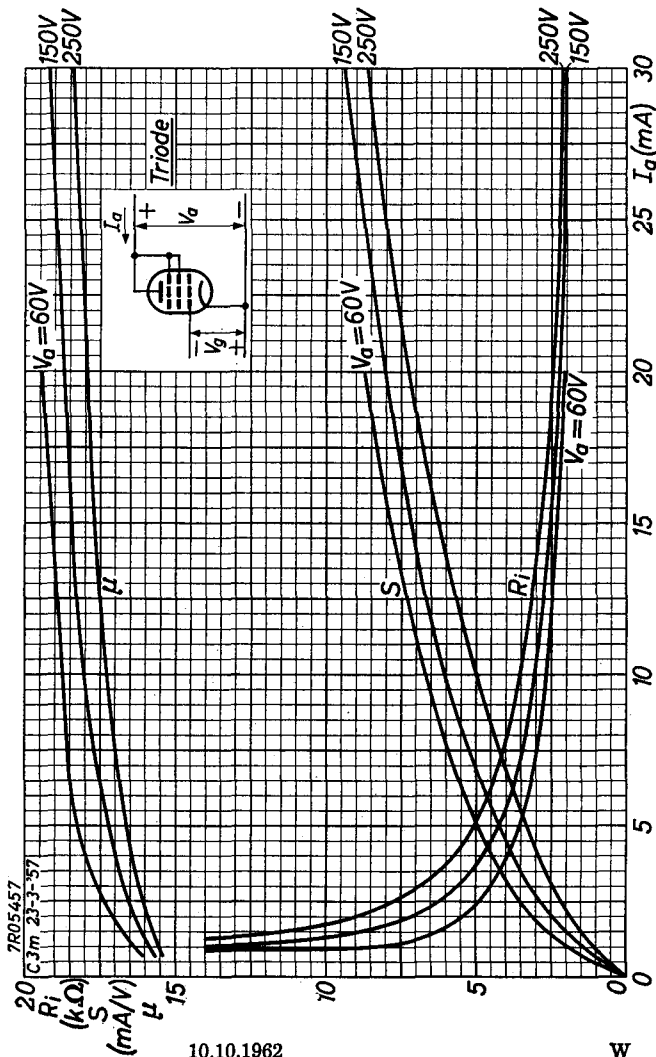


Triode



PHILIPS

18048/C3m



10.10.1962

W

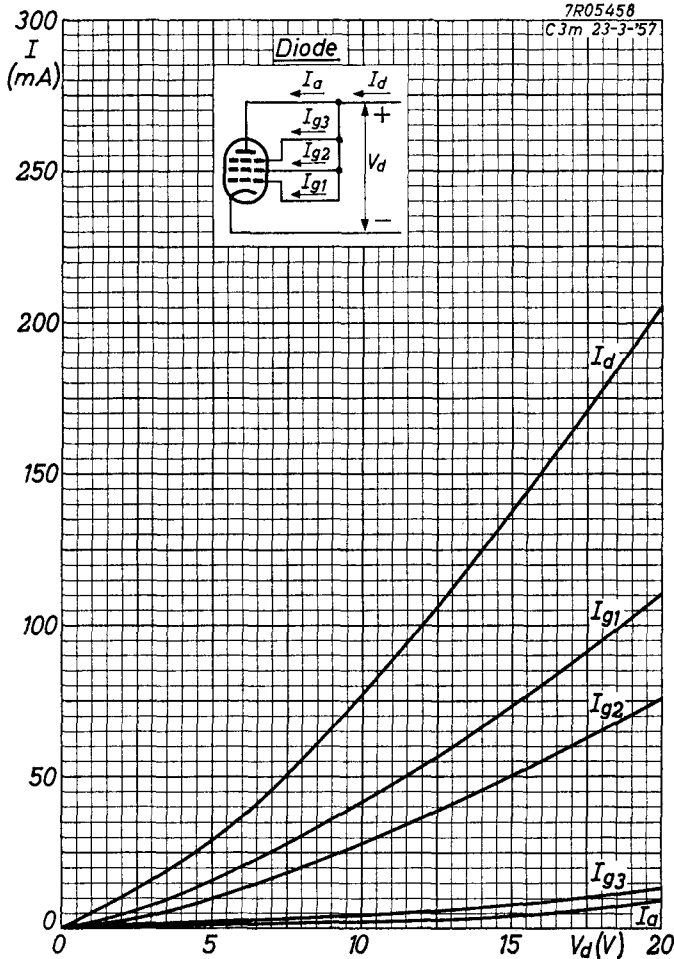
18048/C3m

PHILIPS

SQ

7R05458

C3m 23-3-57





	18048	
page	sheet	date
1	1	1962.10.10
2	2	1962.10.10
3	3	1962.10.10
4	4	1962.10.10
5	5	1962.10.10
6	A	1962.10.10
7	B	1962.10.10
8	C	1962.10.10
9	D	1962.10.10
10	E	1962.10.10
11	F	1962.10.10
12	G	1962.10.10
13	H	1962.10.10
14	I	1962.10.10
15	J	1962.10.10
16	K	1962.10.10
17	L	1962.10.10
18	M	1962.10.10
19	N	1962.10.10

20	O	1962.10.10
21	P	1962.10.10
22	Q	1962.10.10
23	R	1962.10.10
24	S	1962.10.10
25	T	1962.10.10
26	U	1962.10.10
27	V	1962.10.10
28	W	1962.10.10
29	X	1962.10.10
30, 31	FP	1999.08.14