

SQ**PHILIPS****E80L**

SPECIAL QUALITY, LONG LIFE, SHOCK AND VIBRATION RESISTANT
OUTPUT PENTODE

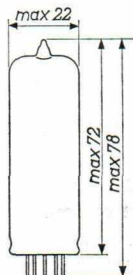
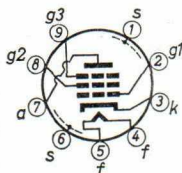
HEATING

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

Heater voltage $V_f = 6.3 \text{ V}$

Heater current $I_f = 0.7 \text{ A}$

Dimensions in mm



Base: NOVAL with gold plated pins

CHARACTERISTICS

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

II: Characteristics range values for equipment design

III: Data indicating the end point of life

Capacitances

Grid No.1 to all other elements except anode

	I	II
C_{g1}	10.0	9.2-10.8 pF

Anode to all other elements except grid No.1

C_a	6.8	6.3- 7.3 pF
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Anode to grid No.1

C_{ag1}		< 0.15 pF
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Grid No.1 to heater

C_{g1f}		< 0.25 pF
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Cathode to heater

C_{kf}	7.0	pF
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Heater current

Heater voltage

	I	II	III	
Heater voltage	$V_f = 6.3$			V
Heater current	$I_f = 0.7$	0.665-0.735	0.665-0.735	A

Heater current

CHARACTERISTICS (continued)Typical characteristics

	I	II	III
Anode supply voltage $V_{ba} =$	204.5		V
Grid No.3 voltage $V_{g3} =$	0		V
Grid No.2 supply voltage $V_{bg2} =$	204.5		V
Cathode resistor $R_k =$	130		Ω
Anode current $I_a =$	30	26.5-33.5	21 mA
Grid No.2 current $I_{g2} =$	4.1	2.7- 5.5	2.0 mA
Mutual conductance $S =$	9.0	7.4-10.6	6.0 mA/V

Output power

	I	II	III
Anode voltage $V_a =$	200		V
Grid No.3 voltage $V_{g3} =$	0		V
Grid No.2 voltage $V_{g2} =$	200		V
Anode current $I_a =$	30		mA
Load resistance $R_{a\sim} =$	7		k Ω
Output power $W_o =$	2.7	> 2.0	W

Negative grid current

	I	II	III
Anode supply voltage $V_{ba} =$	204.5		V
Grid No.3 voltage $V_{g3} =$	0		V
Grid No.2 supply voltage $V_{bg2} =$	204.5		V
Cathode resistor $R_k =$	130		Ω
Grid No.1 resistor $R_{g1} =$	0.5		M Ω
Negative grid No.1 current $-I_{g1} =$		< 0.5	1.0 μ A

Cut-off voltage

	I	II	III
Anode voltage $V_a =$	200		V
Grid No.3 voltage $V_{g3} =$	0		V
Grid No.2 voltage $V_{g2} =$	200		V
Grid No.1 voltage $V_{g1} =$	-14		V
Anode current $I_a =$		< 0.2	mA

CHARACTERISTICS (continued)Hum voltage

		I	II	III
Anode voltage	V_a	= 200		V
Grid No.3 voltage	V_{g3}	= 0		V
Grid No.2 voltage	V_{g2}	= 200		V
Cathode resistor	R_k	= 130		Ω
Anode resistor	R_a	= 1		k Ω
Hum voltage	V_{g1hum}	=	< 0.25	mV ¹⁾

Insulation between heater and cathode

		I	II	III
Voltage between heater and cathode (cathode positive)	$V_{kf}(k \text{ pos.})$	= 120		V
Series resistor	R	= 1		M Ω
Current from cathode to heater	I_{kf}	=	< 15	20 μ A

Insulation between the electrodes

		I	II	III
Voltage between two arbitrary electrodes	V	= 300		V ²⁾
Insulation resistance	R_{isol}	=	> 50	10 M Ω

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

Heater voltage	V_f	= 6.3 V
Anode voltage	V_a	= 200 V
Grid No.3 voltage	V_{g3}	= 0 V
Grid No.2 voltage	V_{g2}	= 200 V
Cathode resistor	R_k	= 130 Ω
Voltage between cathode and heater (cathode positive)	$V_{kf}(k \text{ pos.})$	= 120 V

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

¹⁾ Hum voltage referred to grid No.1, measured with straight response filter. Frequency of heater supply voltage 50 c/s. Centre tap of heater transformer grounded.

²⁾ When measured between the cathode and another electrode, the cathode should be positive

CHARACTERISTICS (continued)SHOCK RESISTANCE: about 500 g ²⁾

Forces as applied by the NRL impact machine for electronic devices caused by 5 blows of the hammer lifted over an angle of 30° in each of four different positions of the tube.

VIBRATION RESISTANCE: 2.5 g ²⁾

Vibrational forces for a period of 32 hours at a frequency of 50 c/s in each of three directions

OPERATING CHARACTERISTICS for use as output tube

Anode voltage	V_a	=	200	250 V
Grid No.3 voltage	V_{g3}	=	0	0 V
Grid No.2 voltage	V_{g2}	=	200	250 V
Grid No.2 resistor	R_{g2}	=	-	1 k Ω
Cathode resistor	R_k	=	130	270 Ω
Anode current	I_a	=	30	24 mA
Grid No.2 current	I_{g2}	=	4.1	3.3 mA
Mutual conductance	S	=	9	- mA/V
Internal resistance	R_i	=	52	- k Ω
Amplification factor of grid No.2 with respect to grid No.1	μ_{g2g1}	=	21.5	-
Load resistance	$R_{a\sim}$	=	7	10 k Ω
Output power	W_o	=	2.7	2.8 W
Total distortion	d_{tot}	=	10	10 %

OPERATING CHARACTERISTICS class AB, two tubes

Anode voltage	V_a	=	200	V
Grid No.3 voltage	V_{g3}	=	0	V
Grid No.2 voltage	V_{g2}	=	200	V
Cathode resistor	R_k	=	130	Ω
Load resistance	$R_{aa\sim}$	=	9	k Ω
Input voltage	V_1	=	0 0.31	5.2 V(RMS)
Anode current	I_a	=	2x20.6 -	2x24.6 mA
Grid No.2 current	I_{g2}	=	2x 2.8 -	2x 4.9 mA
Output power	W_o	=	0 0.05	5.7 W
Total distortion	d_{tot}	=	- -	3.0 %

²⁾ See page 3

OPERATING CHARACTERISTICS class AB, two tubes (continued)

Anode voltage	V_a	=	250	V
Grid No.3 voltage	V_{g3}	=	0	V
Grid No.2 voltage	V_{g2}	=	250	V
Cathode resistor	R_k	=	150	Ω
Load resistance	$R_{aa\sim}$	=	9	k Ω
Input voltage	V_i	=	0 0.32	7.8 V(RMS)
Anode current	I_a	=	2x23.5	- 2x29.5 mA
Grid No.2 current	I_{g2}	=	2x 3.2	- 2x 6.6 mA
Output power	W_o	=	0 0.05	9.0 W
Total distortion	d_{tot}	=	-	4.5 %

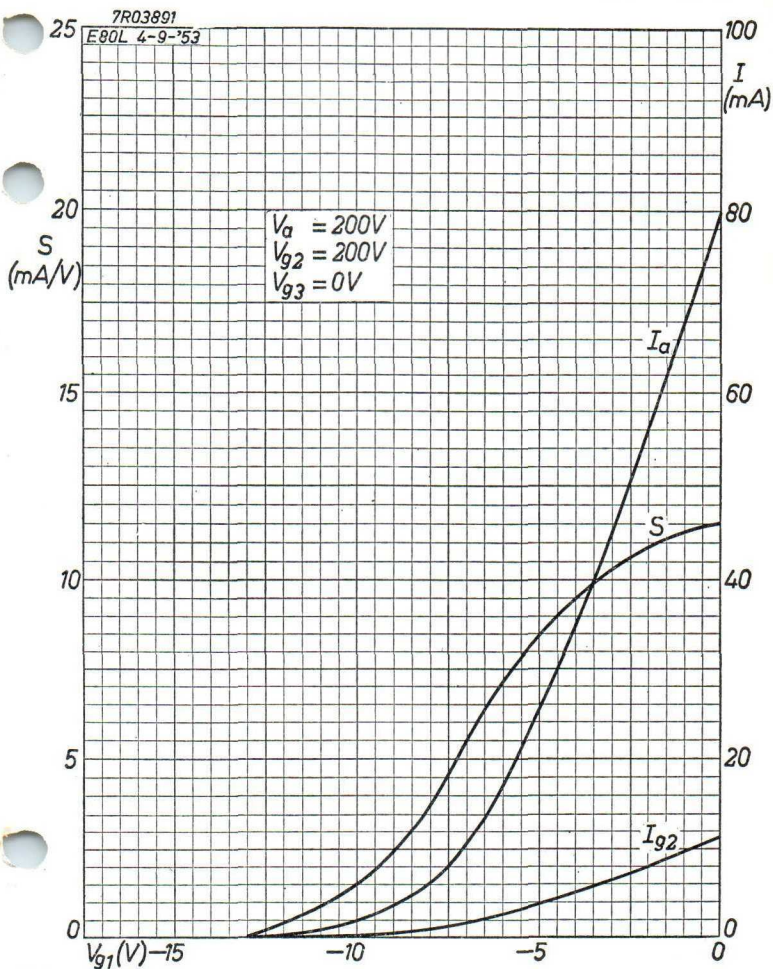
LIMITING VALUES (Absolute limits)

Anode voltage in cold condition	V_{a0}	= max.	600 V
Anode voltage	V_a	= max.	300 V
Anode dissipation	W_a	= max.	8 W
Negative grid No.3 voltage	$-V_{g3}$	= max.	100 V
Grid No.2 voltage in cold condition	V_{g20}	= max.	600 V
Grid No.2 voltage	V_{g2}	= max.	300 V
Grid No.2 dissipation	W_{g2}	= max.	2.6 W
Negative grid No.1 voltage	$-V_{g1}$	= max.	100 V
Cathode current	I_k	= max.	50 mA
Voltage between heater and cathode	V_{kf}	= max.	120 V
Heater voltage in case of parallel supply	V_f	=	6.3 V $\pm$ 5 %
Heater current in case of series supply	I_f	=	0.7 A $\pm$ 1.5 %
Bulb temperature	t_{bulb}	=	225 °C

LIMITING VALUES FOR CIRCUIT DESIGN

Grid No.1 circuit resistance in case of automatic bias	R_{g1}	= max.	1 M Ω
Circuit resistance between cathode and heater	R_{kf}	= max.	20 k Ω

¹⁾ These test conditions are only given for evaluation of the ruggedness of the tube and should by no means be interpreted as suitable operating conditions

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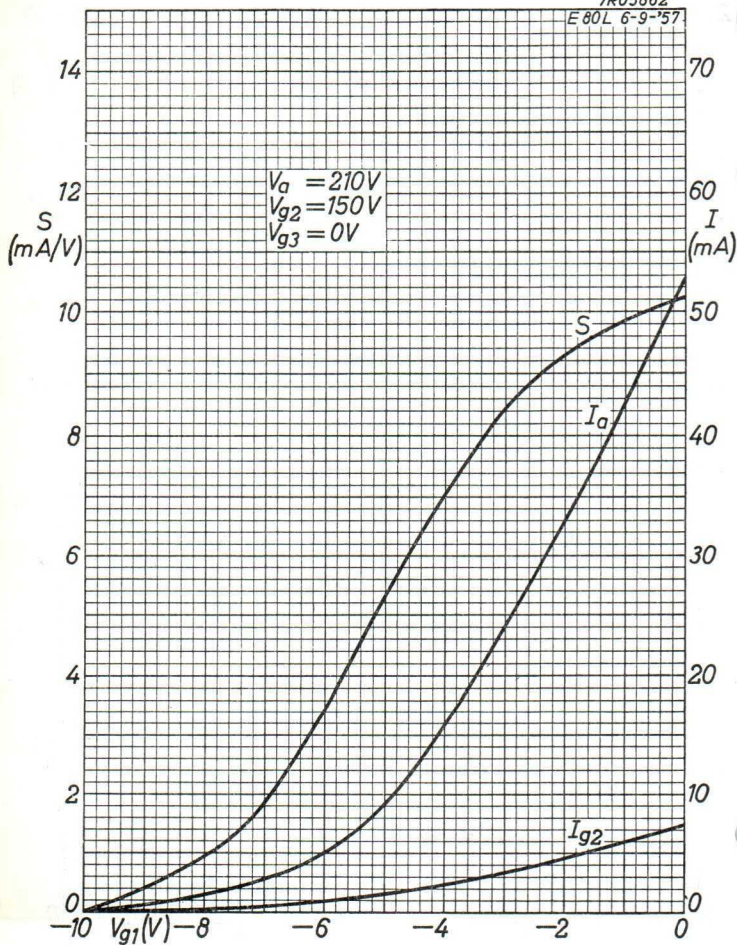
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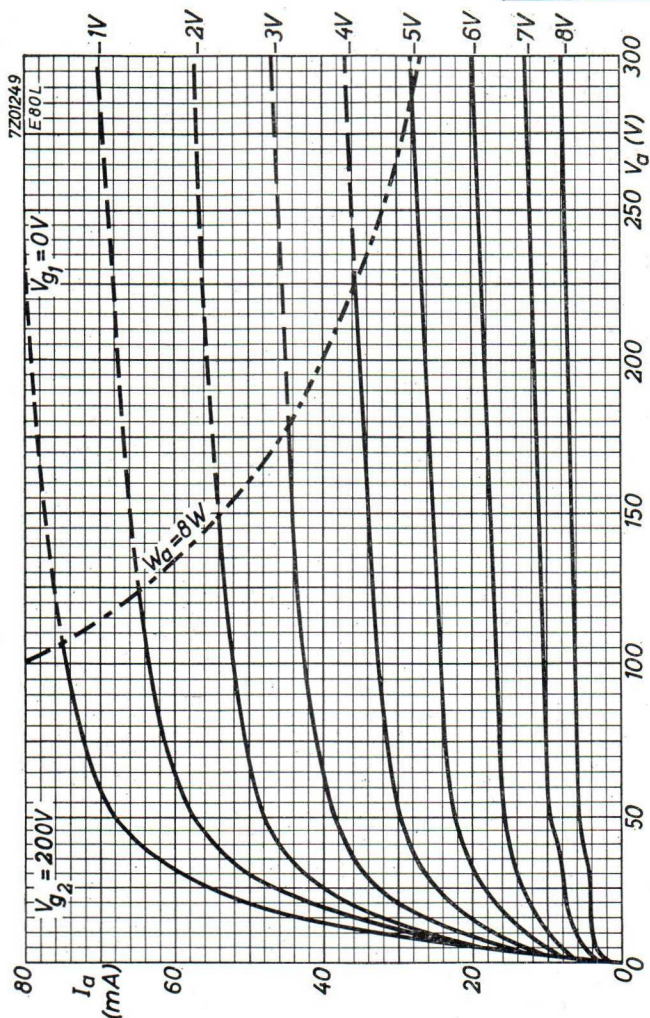
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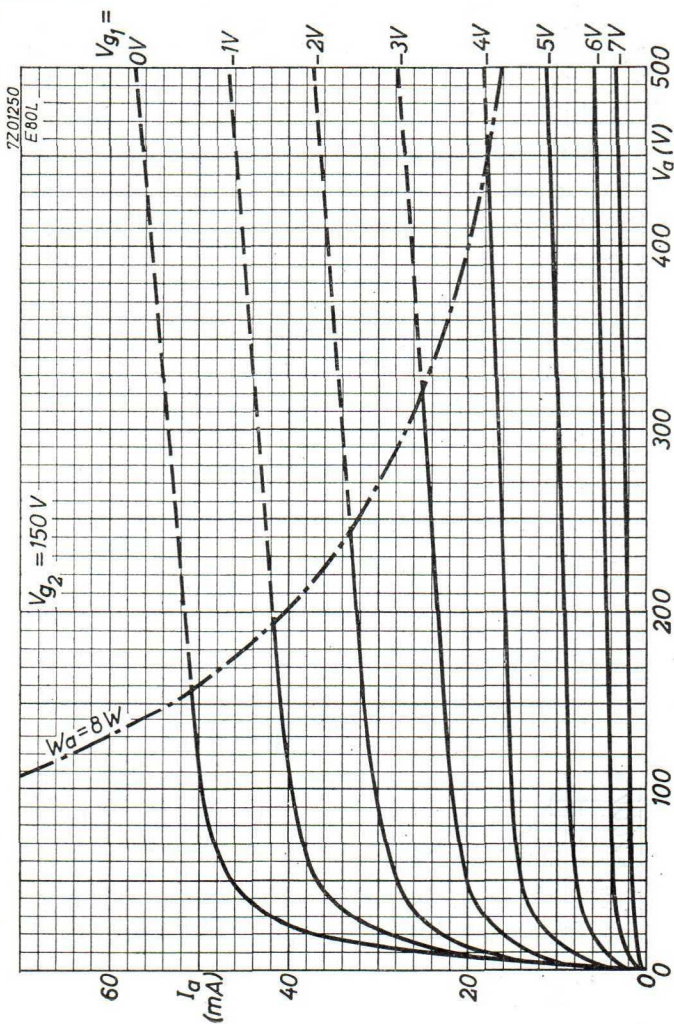
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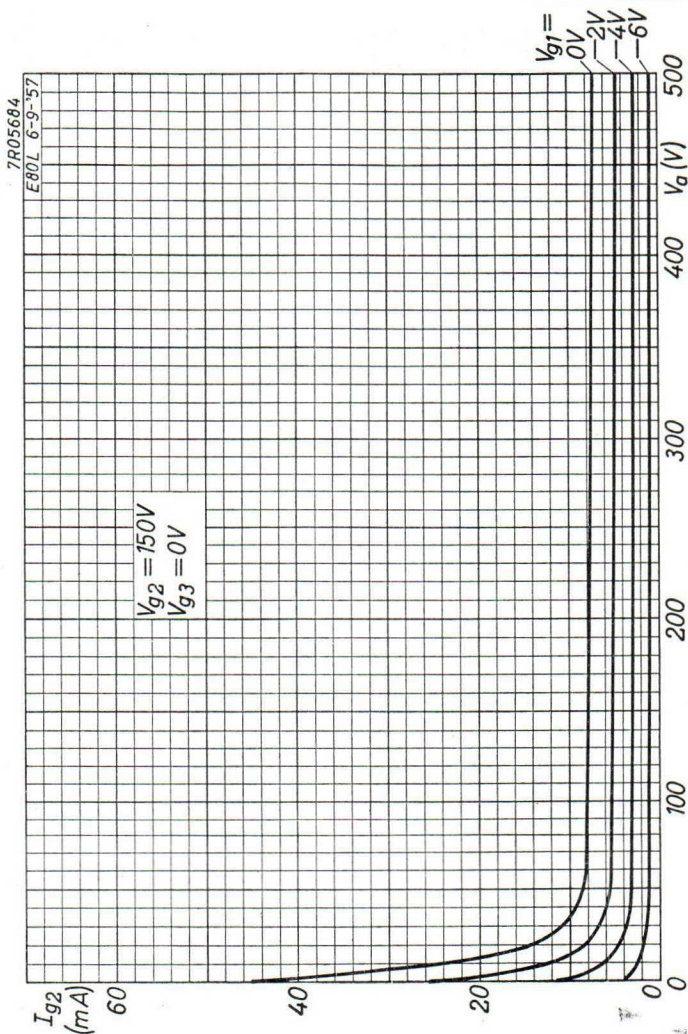
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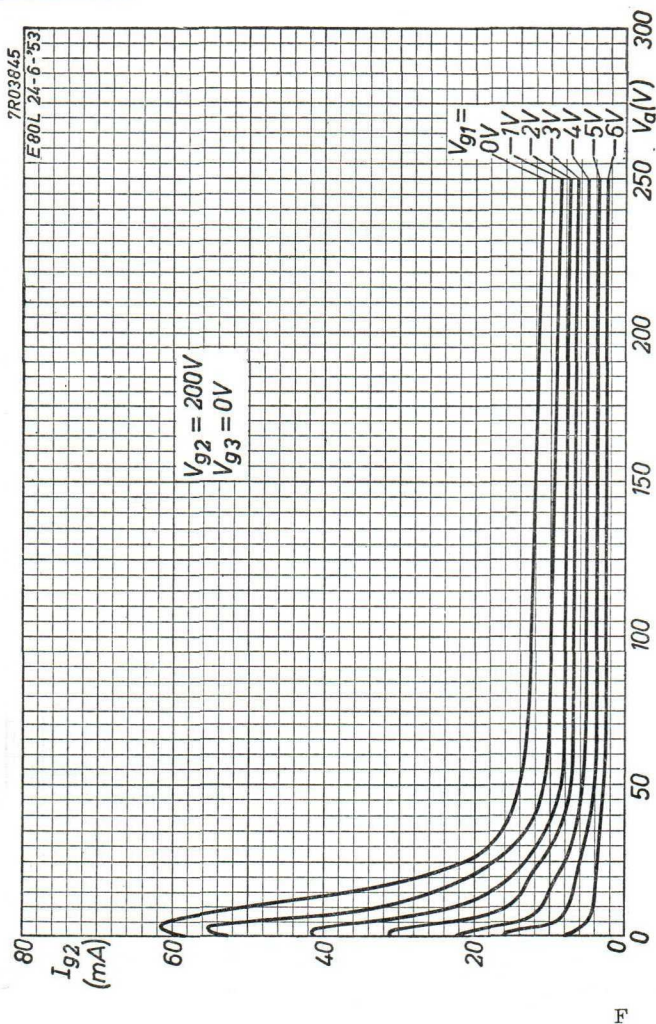
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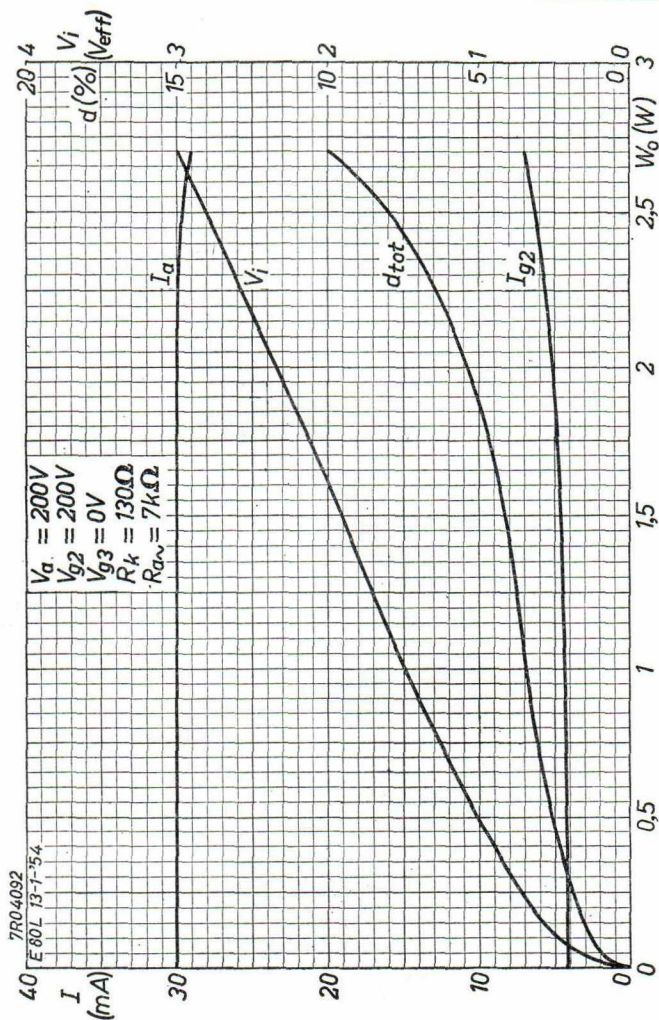
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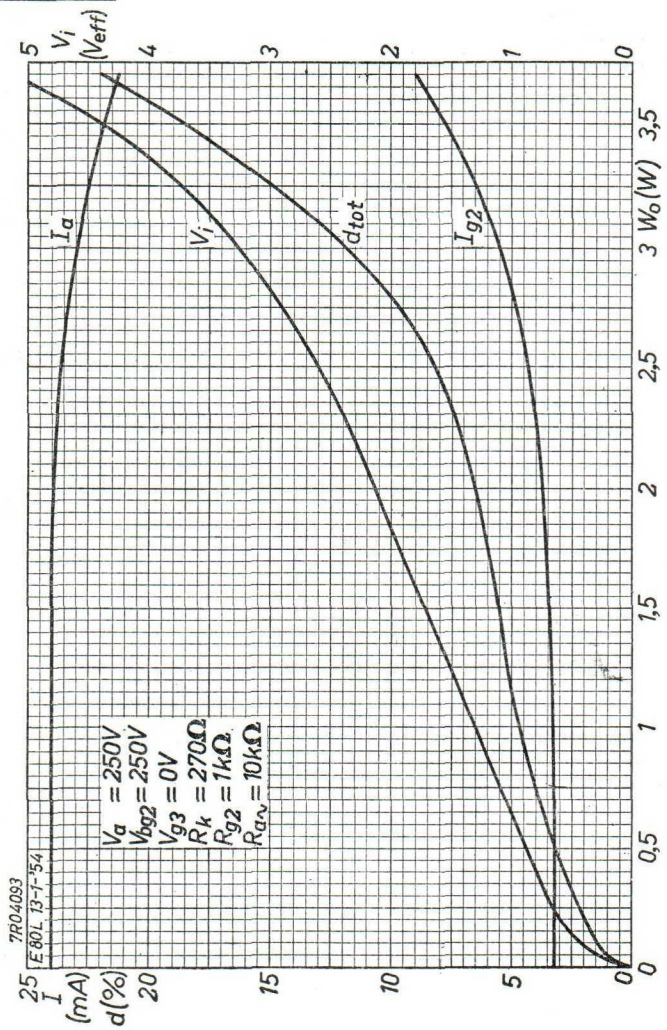
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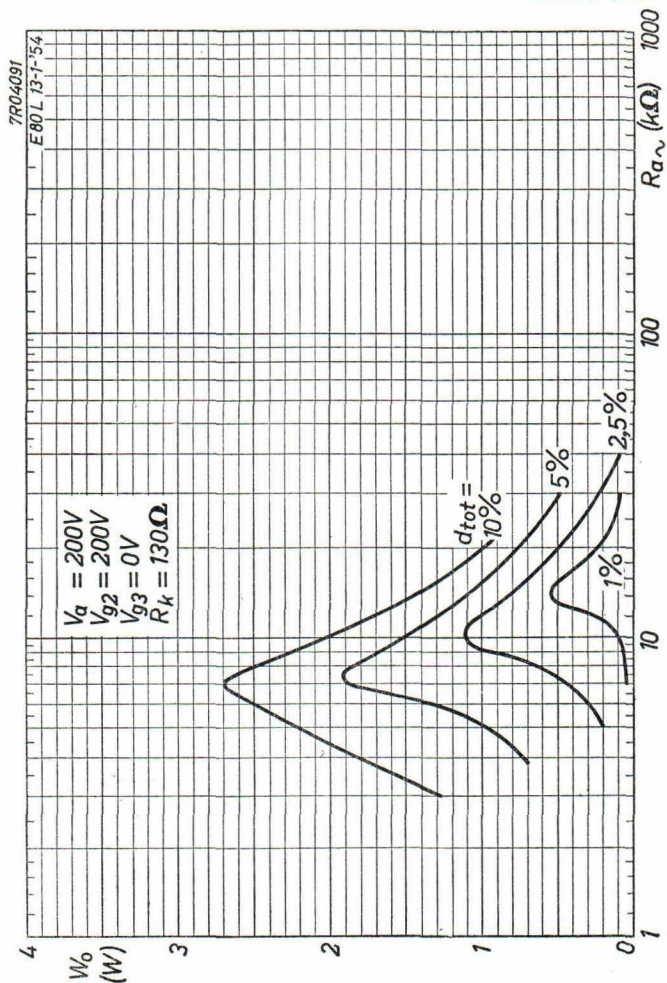


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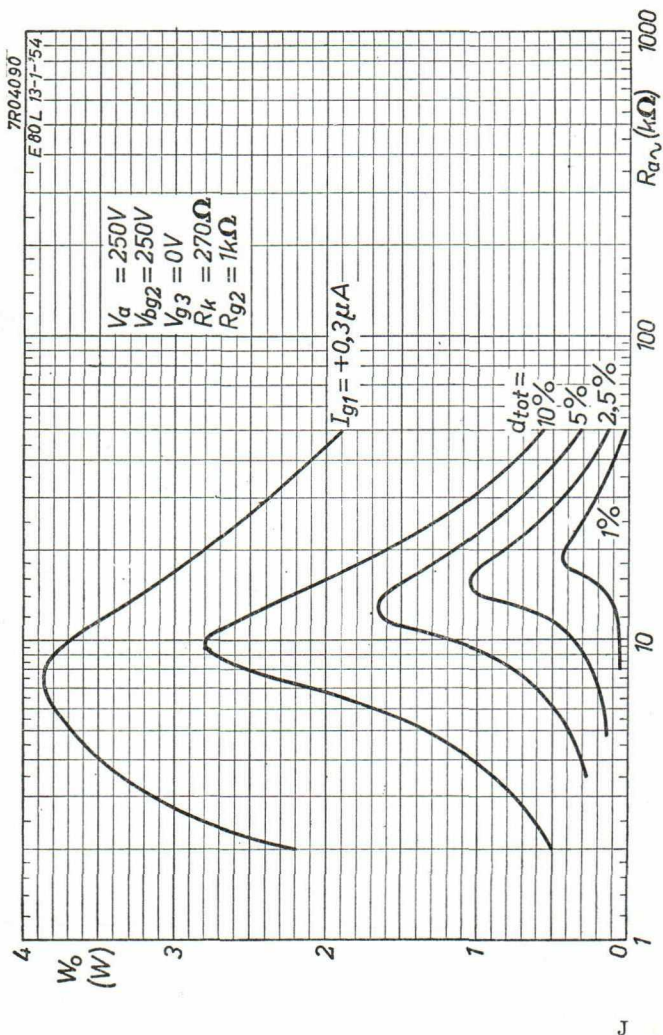
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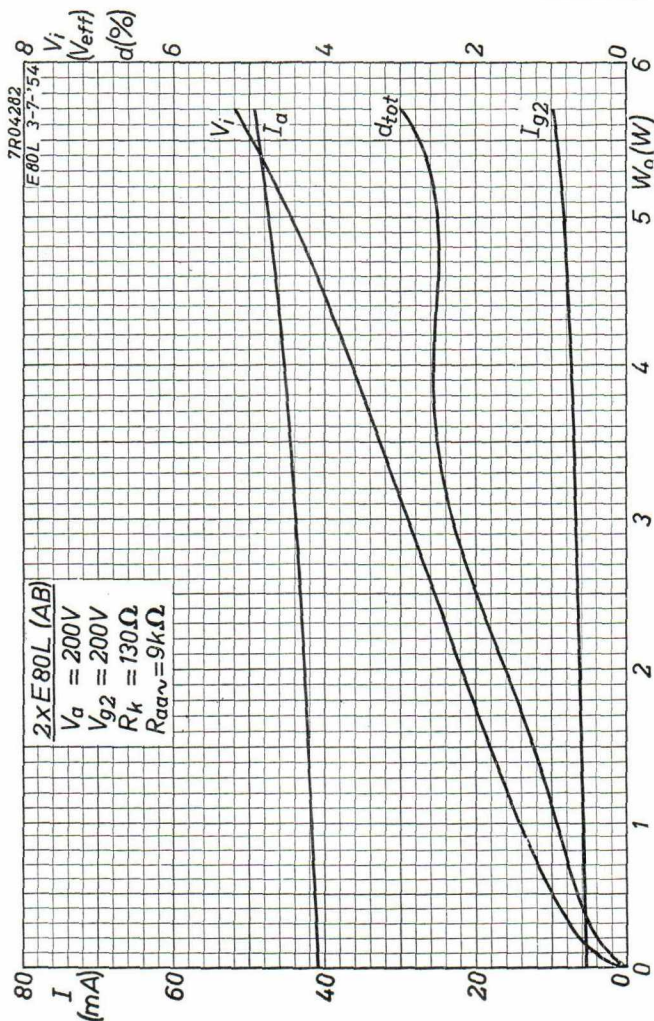
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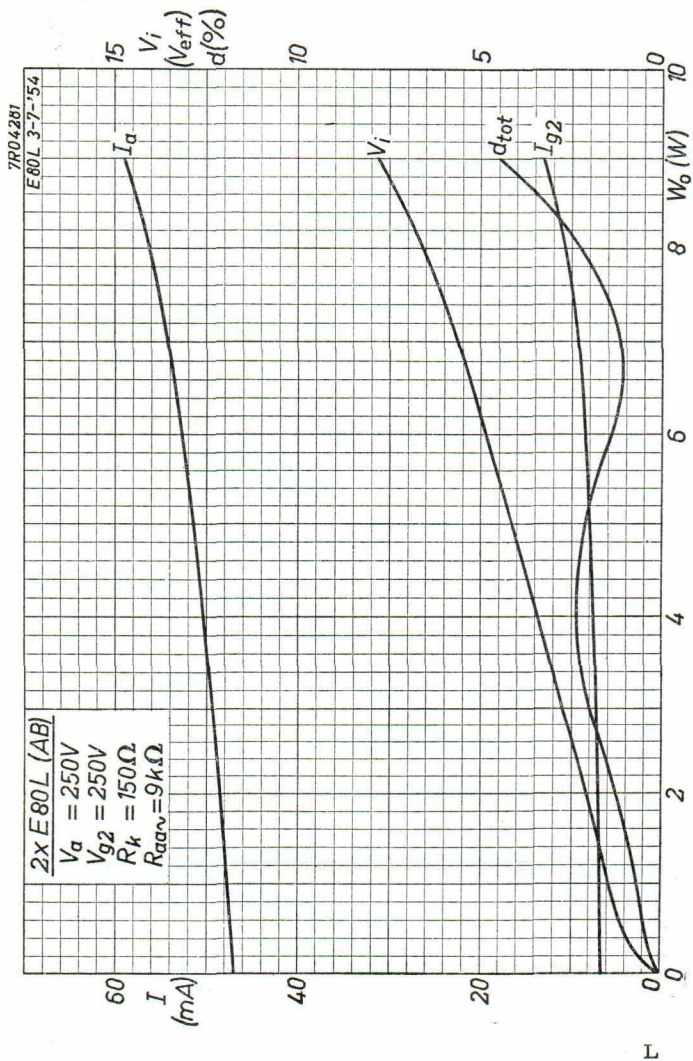
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Upper and lower current limits are indicated by arrows
Les limites supérieures et inférieures du courant sont indiquées par des flèches
Die oberen und unteren Stromgrenzen sind mittels Pfeile angegeben

7R03893

E80L 4-9-'53

