

S.Q. TUBE

Special quality output pentode

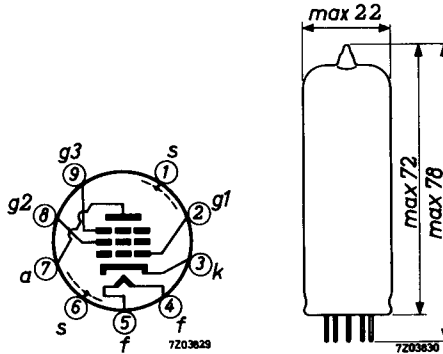
QUICK REFERENCE DATA

Life test	10 000 hours	
Low interface resistance		
Mechanical quality	Shock and vibration resistant	
Base	Noval. Gold plated pins	
Heating	Indirect A. C. or D. C. Series or parallel supply	
Heater voltage	V_f	6.3 V
Heater current	I_f	700 mA
Anode current	I_a	30 mA
Output power, one tube	W_o	2.7 W
two tubes class AB	W_o	5.7 W

DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Noval



CHARACTERISTICS

Column I Nominal value or setting of the tube

II Range values for equipment design: Initial spread

III Range values for equipment design: End of life

		I	II	III	
Heater voltage	V_f	6.3			V
Heater current	I_f	700	665 - 735		mA
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 current	I_a	30	26.5 - 33.5	min. 21	mA
Grid No. 2 current	I_{g2}	4.1	2.7 - 5.5	min. 2.0	mA
Mutual conductance	S	9.0	7.4 - 10.6	min. 6.0	mA/V
Amplification factor grid No. 2 to grid No. 1	μ_{g2g1}	21.5			
Negative grid No. 1 current	$-I_{g1}$		max. 0.5	max. 1.0	μA
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	min. 2.0		W
<u>Cut-off voltage</u>	$-V_{g1}$	14			V
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		max. 0.2		mA

CHARACTERISTICS (continued)

Hum voltage

Grid No.1 resistor $R_{g1} = 0.5 \text{ M}\Omega$

Cathode resistor by-passed

	I	II	III	
V_{g1}		max. 0.25		mV _{RMS}
I_{kf}		max. 15	max. 20	μA
R		min. 50	min. 10	$\text{M}\Omega$

Leakage current between cathode and heater

Voltage between cathode and heater $V_{kf} = 120 \text{ V}$

Insulation resistance between two electrodes

Voltage between electrodes = 300 V

CAPACITANCES

Grid No.1 to grid No.3, grid No.2, cathode heater and screen

Anode to grid No.3, grid No.2, cathode heater and screen

Anode to grid No.1

Grid No.1 to heater

Cathode to heater

	I	II	
$C_{g1/g3g2kfs}$	10	9.2 - 10.8	pF
$C_{a/g3g2kfs}$	6.8	6.3 - 7.3	pF
C_{ag1}		max. 0.15	pF
C_{g1f}		max. 0.25	pF
C_{kf}	7.0		pF

SHOCK AND VIBRATION RESISTANCE

The following test conditions are applied to assess the mechanical quality of the tube. These conditions are not intended to be used as normal operating conditions.

Shock

The tube is subjected 5 times in each of 4 positions to an acceleration of 500 g supplied by an NRL shock machine with the hammer lifted over an angle of 30°.

Vibration

The tube is subjected during 32 hours in each of 3 positions to a vibration frequency of 50 Hz with an acceleration of 2.5 g.

LIFE

Production samples are tested to be within the end of life values (column III) under the following conditions during 10 000 hours.

Anode voltage	V_a	200	V
Grid No.3 voltage	V_{g_3}	0	V
Grid No.2 voltage	V_{g_2}	200	V
Cathode resistor	R_k	130	Ω

LIMITING VALUES (Absolute max. rating system)

Anode voltage	V_{a_0}	max.	600	V
	V_a	max.	300	V
Anode dissipation	W_a	max.	8	W
Negative grid No.3 voltage	$-V_{g_3}$	max.	100	V
Grid No.2 voltage	$V_{g_{2_0}}$	max.	600	V
	V_{g_2}	max.	300	V
Grid No.2 dissipation	W_{g_2}	max.	2.6	W
Grid No.1 voltage	$-V_{g_1}$	max.	100	V
Cathode current	I_k	max.	50	mA
Voltage between cathode and heater	V_{kf}	max.	120	V
Bulb temperature	t_{bulb}	max.	225	$^{\circ}C$
Grid No.1 resistor (automatic bias)	R_{g_1}	max.	1	$M\Omega$

Heater voltage: The average heater voltage should be 6.3 V.

Variations of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life.

The tolerance of heater current (column II) should be taken into account.

OPERATING CHARACTERISTICS

Output tube class A

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	$k\Omega$
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	-	$k\Omega$
Load resistance	$R_{a\sim}$	7	10	$k\Omega$
Output power	W_o	2.7	2.8	W
Total distortion	d_{tot}	10	10	%

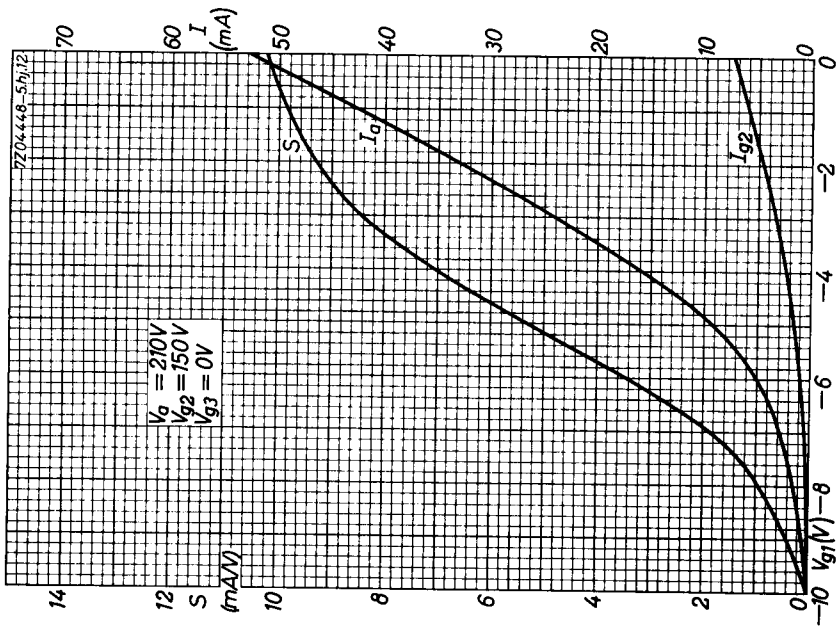
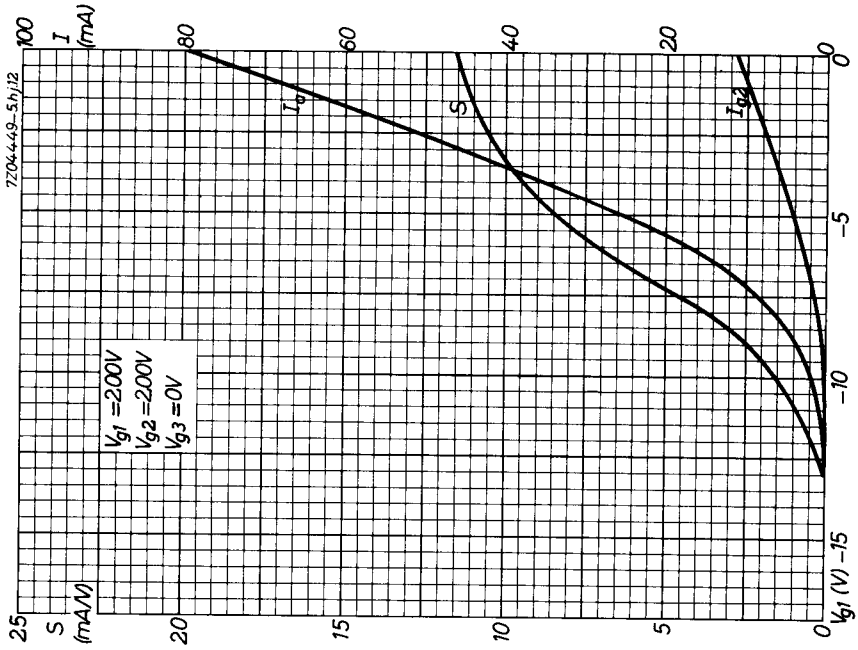
Output tube class AB (two tubes)

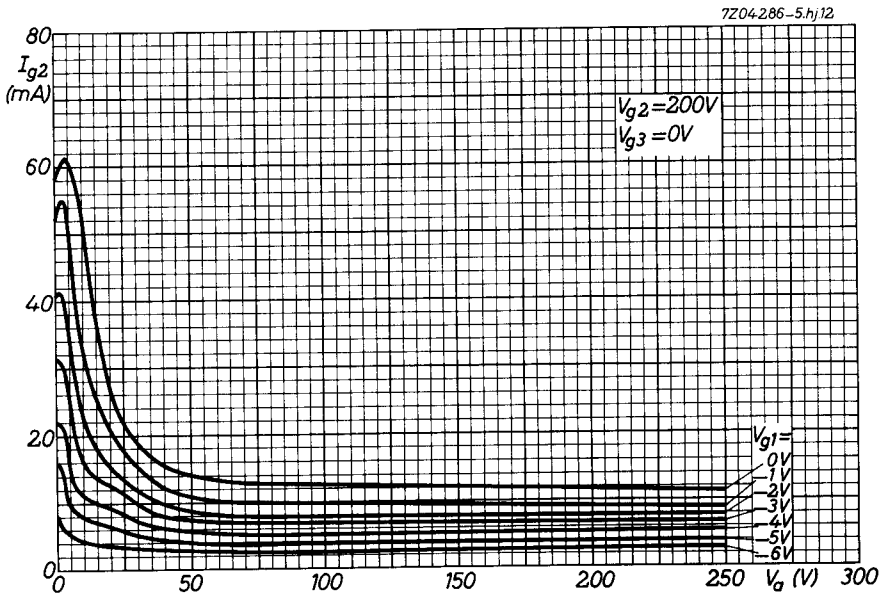
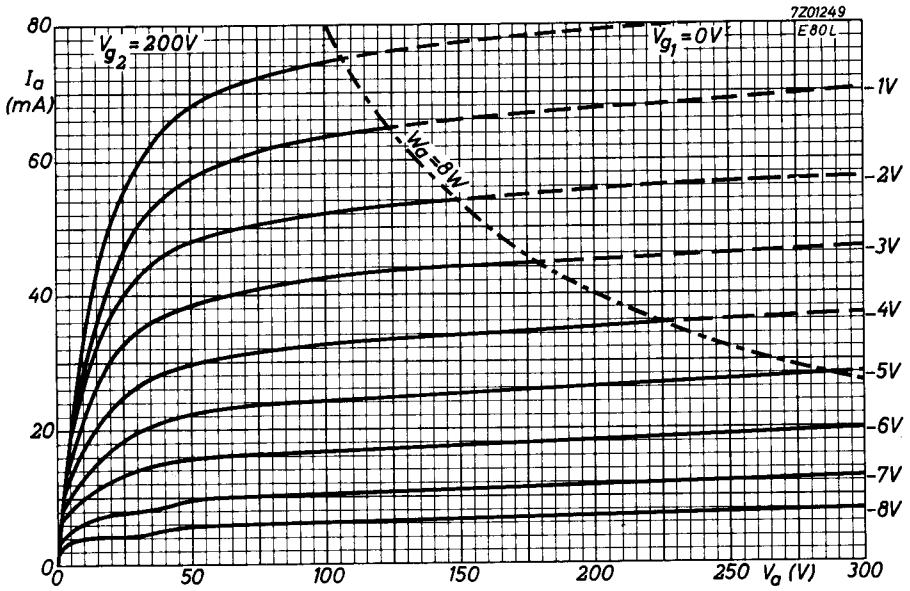
Anode voltage	V_a	200		V
Grid No.3 voltage	V_{g3}	0		V
Grid No.2 voltage	V_{g2}	200		V
Cathode resistor	R_k	130		Ω
Load resistance	$R_{aa\sim}$	9		$k\Omega$
Input voltage	V_i	0	0.31	5.2 VRMS
Anode current	I_a	2x20.6	-	2x24.6 mA
Grid No.2 current	I_{g2}	2x2.8	-	2x4.9 mA
Output power	W_o	0	0.05	5.7 W
Total distortion	d_{tot}	-	-	3.0 %

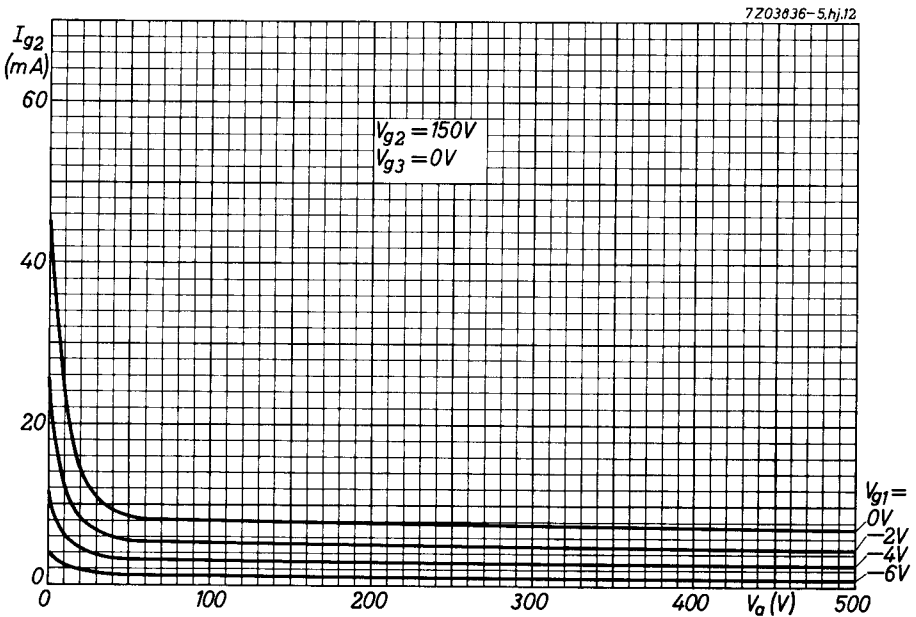
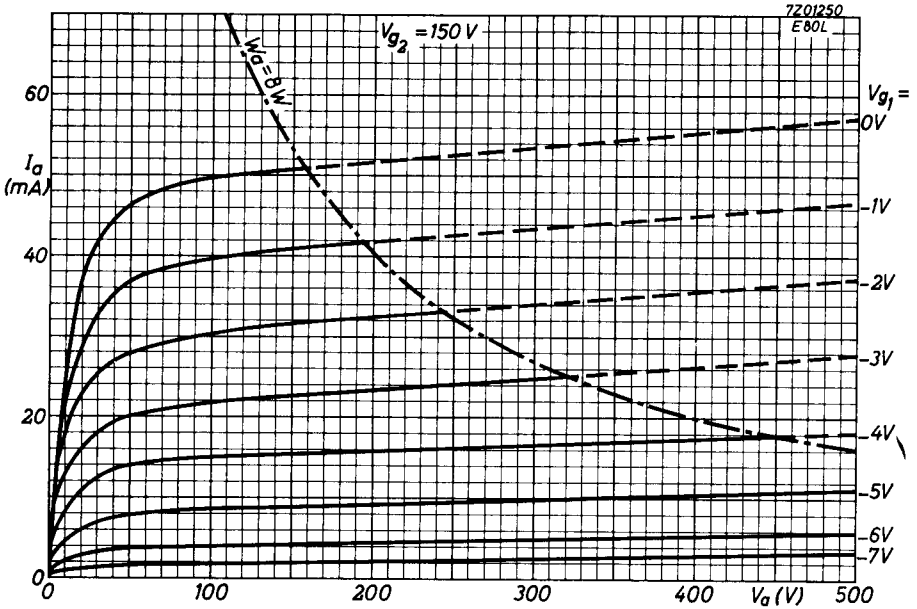
OPERATING CHARACTERISTICS (continued)

Output tube class AB (two tubes)

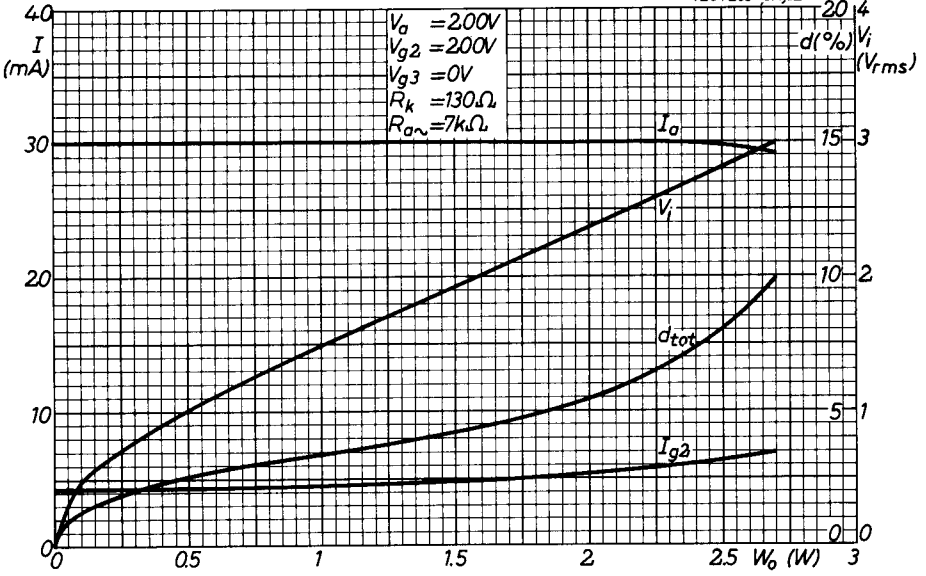
Anode voltage	V_a	250	V
Grid No.3 voltage	V_{g3}	0	V
Grid No.2 voltage	V_{g2}	250	V
Cathode resistor	R_k	150	Ω
Load resistance	$R_{aa\sim}$	9	$k\Omega$
Input voltage	V_i	0 0.32 7.8	V_{RMS}
Anode current	I_a	2x23.5 - 2x29.5	mA
Grid No.2 current	I_{g2}	2x3.2 - 2x6.6	mA
Output power	W_o	0 0.05 9	W
Total distortion	d_{tot}	- 4.5	%



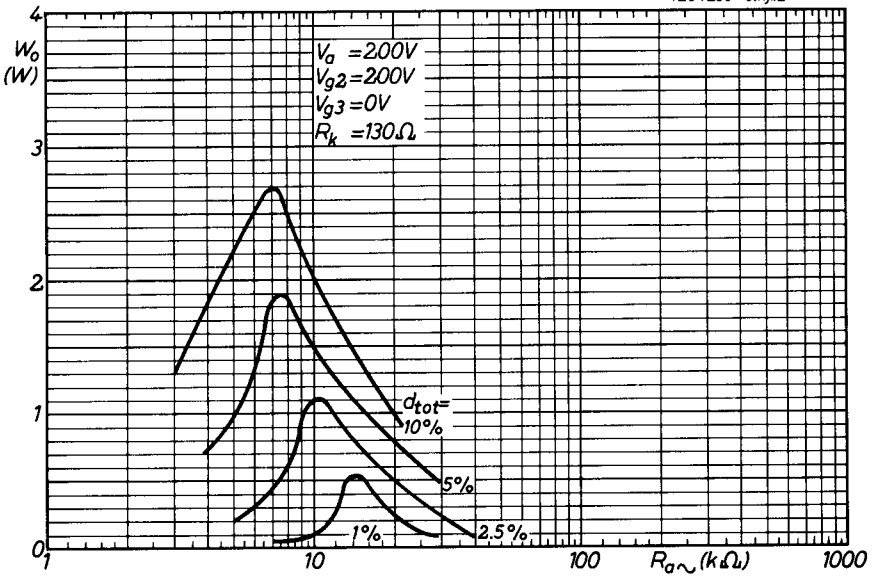


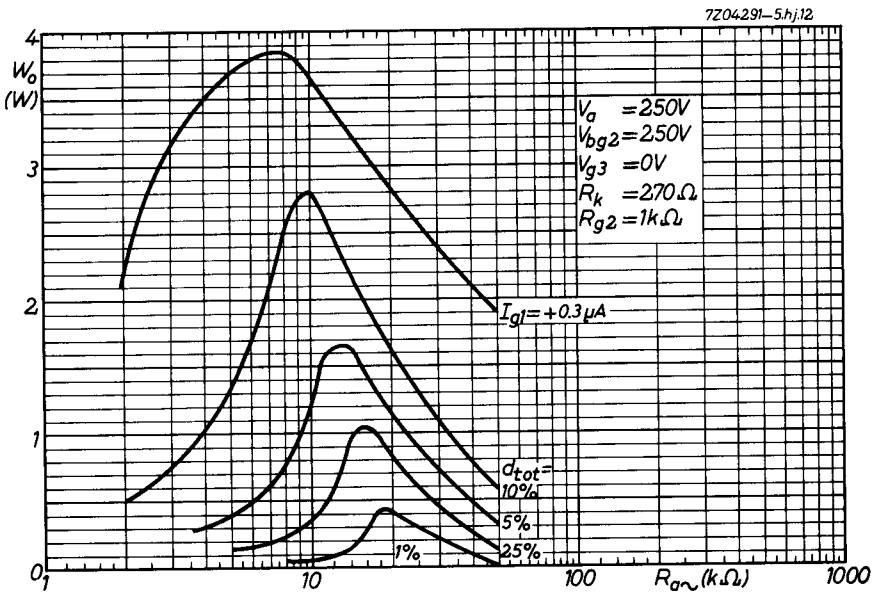
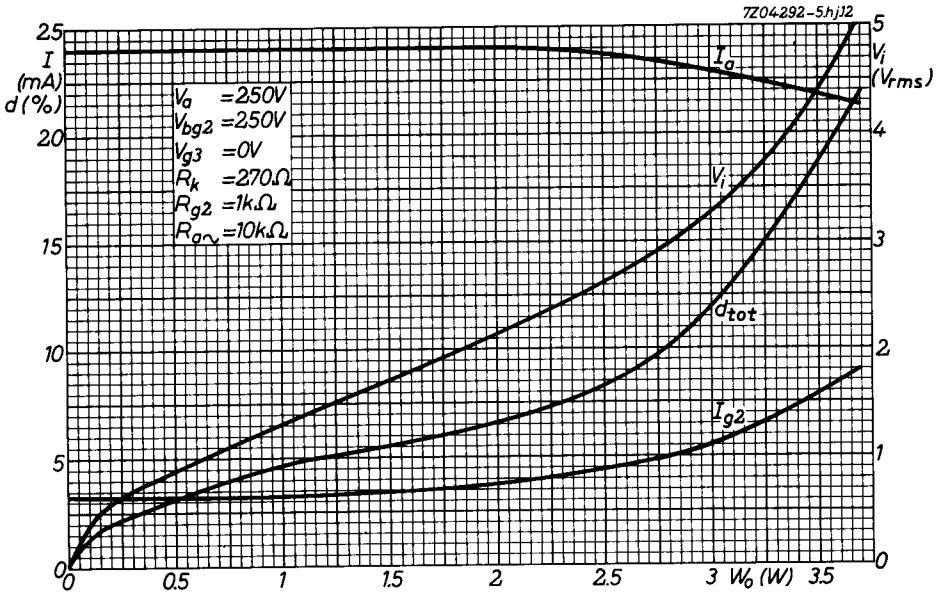


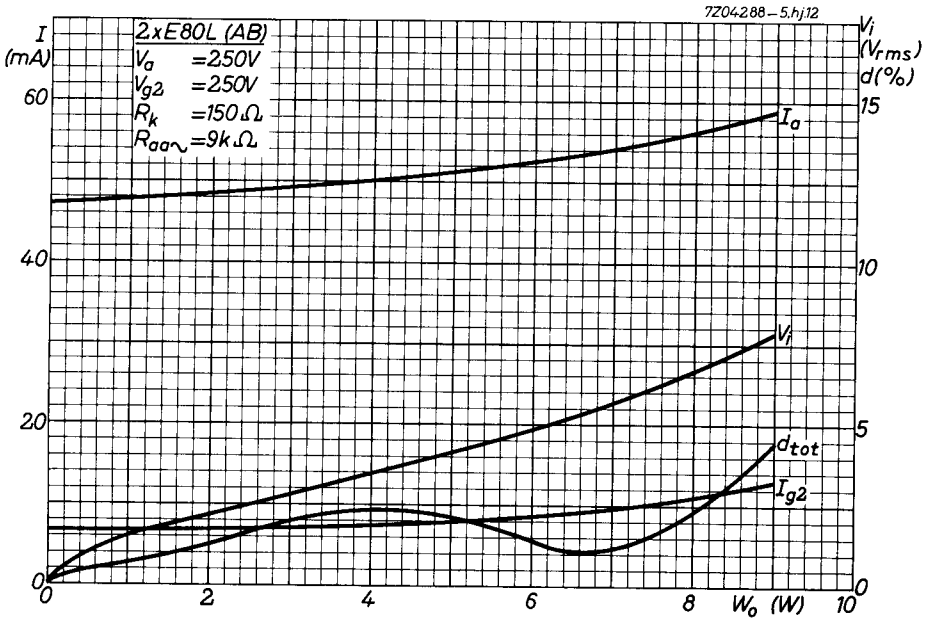
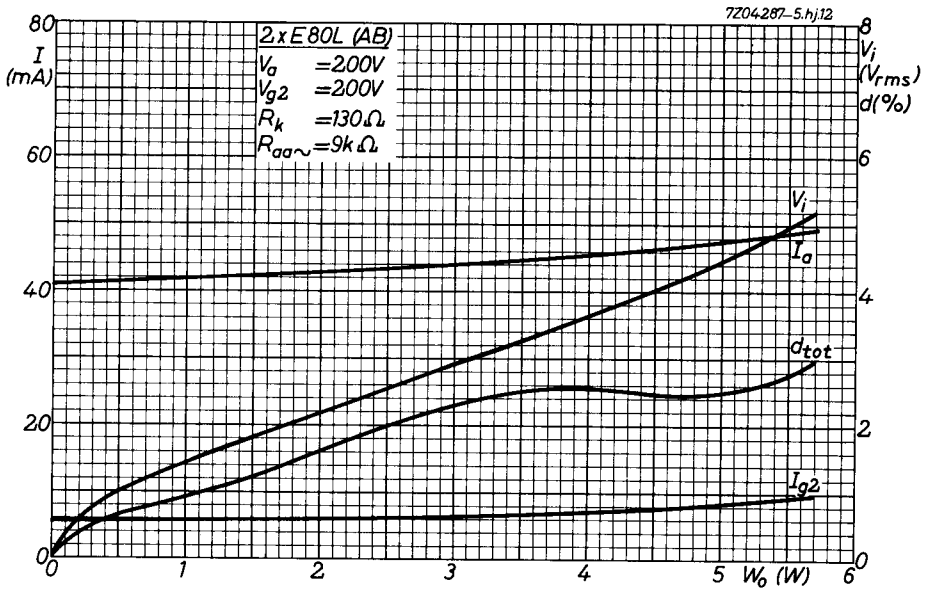
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PHILIPS

Data handbook



**Electronic
components
and materials**

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