

S.Q. TUBE

Special quality pentode designed for use as amplifier.

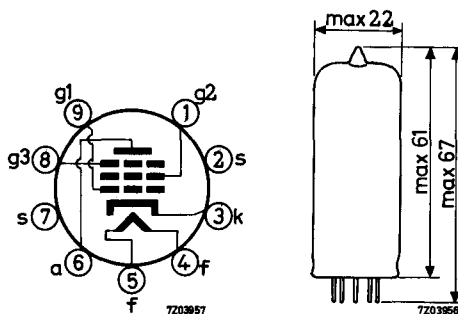
QUICK REFERENCE DATA

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	300 mA
Anode current	I_a	3 mA
Mutual conductance	S	1.85 mA/V
Equivalent noise resistance (A.F.)	R_{eq}	40 k Ω
Hum voltage	V_{g1}	max. 5 μV_{RMS}

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	300	285- 315		mA
Anode voltage	V_a	250			V
Grid No.3 voltage	V_{g3}	0			V
Grid No.2 voltage	V_{g2}	100			V
Cathode resistor	R_k	550			Ω
Anode current	I_a	3	2.5- 3.5	min. 2.0	mA
Grid No.2 current	I_{g2}	0.65	0.45-0.85	min. 0.35	mA
Mutual conductance	S	1.85	1.5- 2.2	min. 1.2	mA/V
Internal resistance	R_i	1.5	min. 1.0		M Ω
Amplification factor grid No.2 to grid No.1	μ_{g2g1}	25			
<u>Equivalent noise resistance</u>	R_{eq}		max. 40		k Ω
Frequency 0-10 kHz					
Grid No.1 resistor $R_{g1} = 0 \Omega$					
<u>Negative grid No.1 current</u>	$-I_{g1}$		max. 0.1	max. 0.2	μA
<u>Cut off voltage</u>	$-V_{g1}$	7.5			V
Anode voltage	V_a	250			V
Grid No.3 voltage	V_{g3}	0			V
Grid No.2 voltage	V_{g2}	100			V
Anode current	I_a		max. 20		μA
<u>Hum voltage</u>	V_{g1}		max. 5		μV_{RMS}
Grid resistor $R_{g1} = 1 M\Omega$					
Cathode resistor bypassed					
<u>Leakage current between cathode and heater</u>			max. 12		μA
Voltage between cathode and heater $V_{kf} = 120 V$					

CAPACITANCES With external shield

	I	II	
Anode to grid No.2, grid No.3, cathode and heater	C_{a/g_2g_3kf}	7.3	6.8-7.8 pF
Grid No.1 to grid No.2, grid No.3, cathode and heater	C_{g_1/g_2g_3kf}	5.0	4.5-5.5 pF
Anode to grid No.1	C_{ag_1}		max. 25 mpF
Grid No.1 to heater	C_{g_1f}		max. 2 mpF
Cathode to heater	C_{kf}	3.7	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	250	V
Grid No.3 voltage	V_{g_3}	0	V
Grid No.2 voltage	V_{g_2}	100	V
Cathode resistor	R_k	550	Ω

LIMITING VALUES (Absolute max. rating system)

Anode voltage	V_{a0}	max. 600 V
	V_a	max. 300 V
Anode dissipation	W_a	max. 1.3 W
Grid No.2 voltage	V_{g20}	max. 600 V
	V_{g2}	max. 200 V
Grid No.2 dissipation	W_{g2}	max. 0.4 W
Negative grid No.3 voltage	$-V_{g3}$	max. 100 V
Negative grid No.1 voltage	$-V_{g1}$	max. 100 V
Cathode current	I_k	max. 9 mA
Voltage between cathode and heater		
Cathode positive	$V_{kf} \text{ (k pos)}$	max. 120 V
Cathode negative	$V_{kf} \text{ (k neg)}$	max. 60 V
Grid No.1 resistor	R_{g1}	See curve on page G
Bulb temperature		max. 170 °C

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.

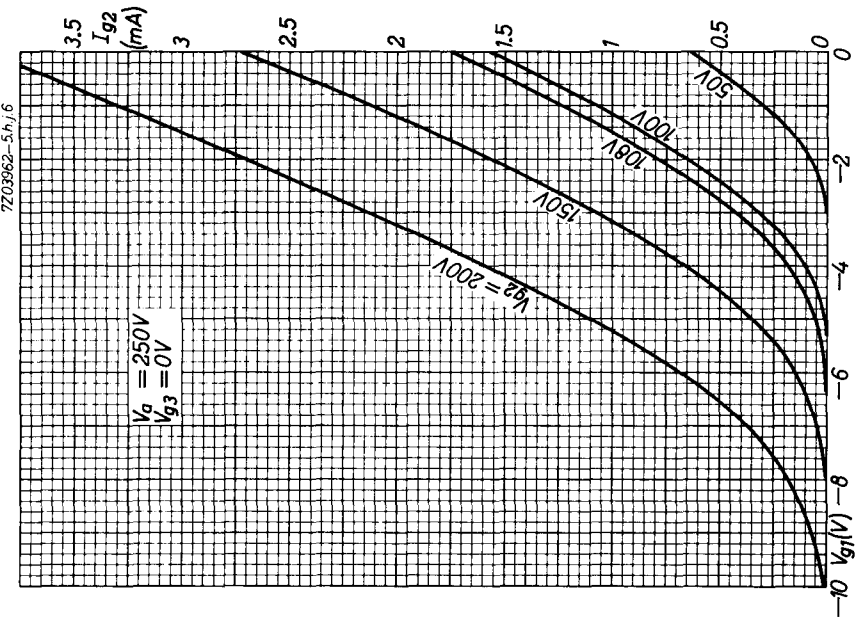
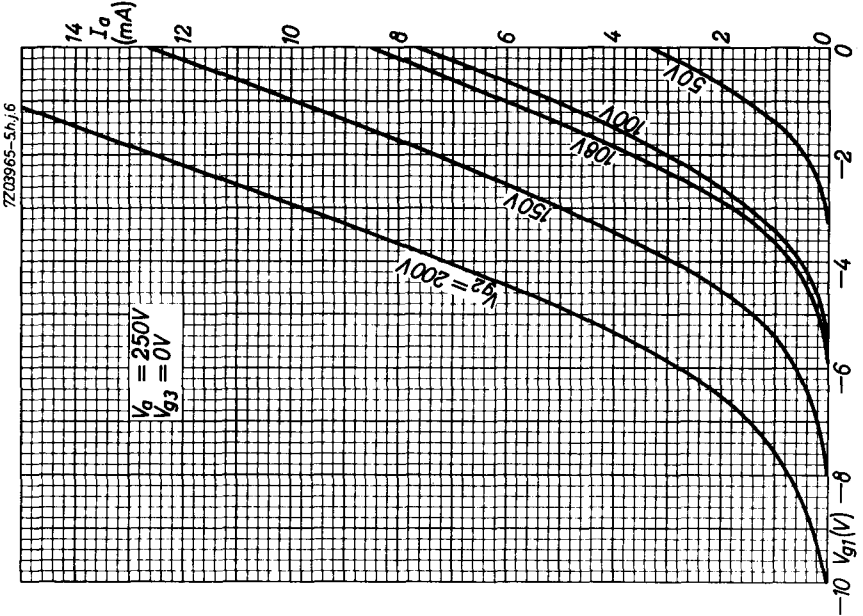
OPERATING CHARACTERISTICS

Resistance coupled A.F. amplifier

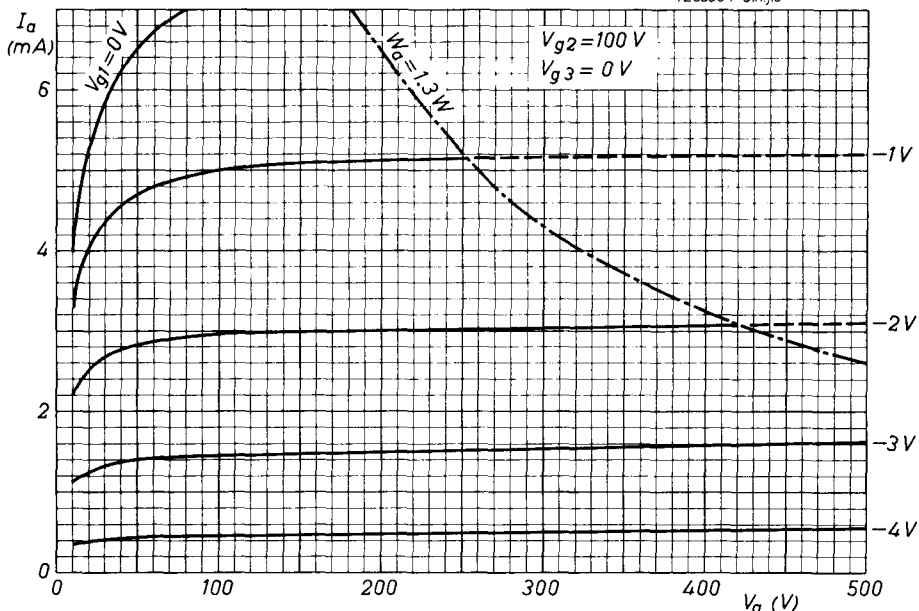
Anode supply voltage	V_{ba}	100	200	250	300	400	V
Grid No.2 supply voltage	V_{bg_2}	100	200	250	300	400	V
Anode resistor	R_a	0.22	0.22	0.22	0.22	0.22	$M\Omega$
Grid No.2 resistor	R_{g_2}	1.0	1.2	1.2	1.2	1.2	$M\Omega$
Cathode resistor	R_k	3.3	1.8	1.5	1.2	1.0	$k\Omega$
Grid No.1 resistor	R_{g_1}	1	1	1	1	1	$M\Omega$
Grid resistor next stage	$R_{g_1'}$	0.68	0.68	0.68	0.68	0.68	$M\Omega$
Anode current	I_a	0.29	0.61	0.80	0.98	1.37	mA
Grid No.2 current	I_{g_2}	0.07	0.13	0.17	0.20	0.28	mA
Gain	V_o/V_i	120	165	175	190	200	
Output voltage at $+I_g = 0.3 \mu A$	V_o	8	20	25	30	40	V_{RMS}
Total distortion	d_{tot}	1.7	1.6	1.4	1.1	0.9	%

Electrometer pentode

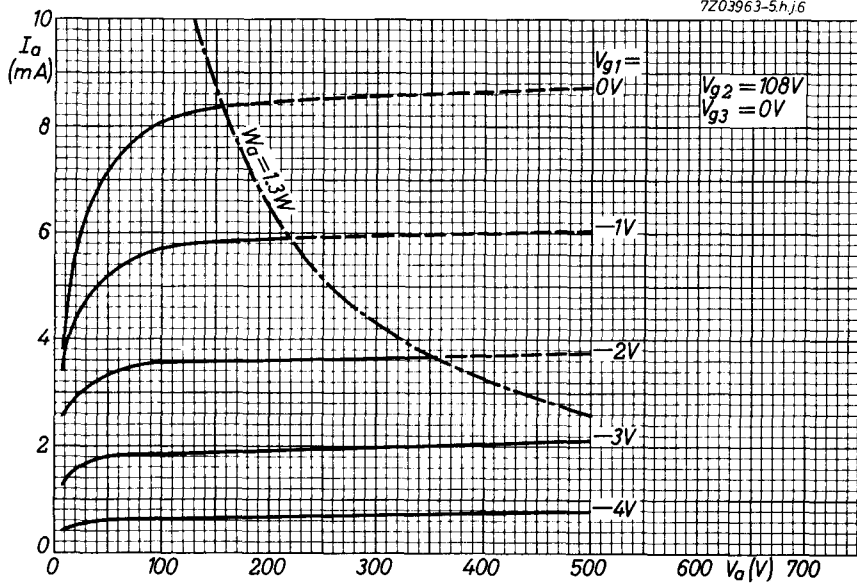
Heater voltage	V_f	4.5	V
Anode voltage	V_a	40	V
Grid No.3 voltage	V_{g_3}	0	V
Grid No.2 voltage	V_{g_2}	40	V
Negative grid No.1 voltage	$-V_{g_1}$	2.15	V
Anode current	I_a	40	μA
Grid No.2 current	I_{g_2}	9	μA
Negative grid No.1 current	$-I_{g_1}$	max. 10^{-10}	A



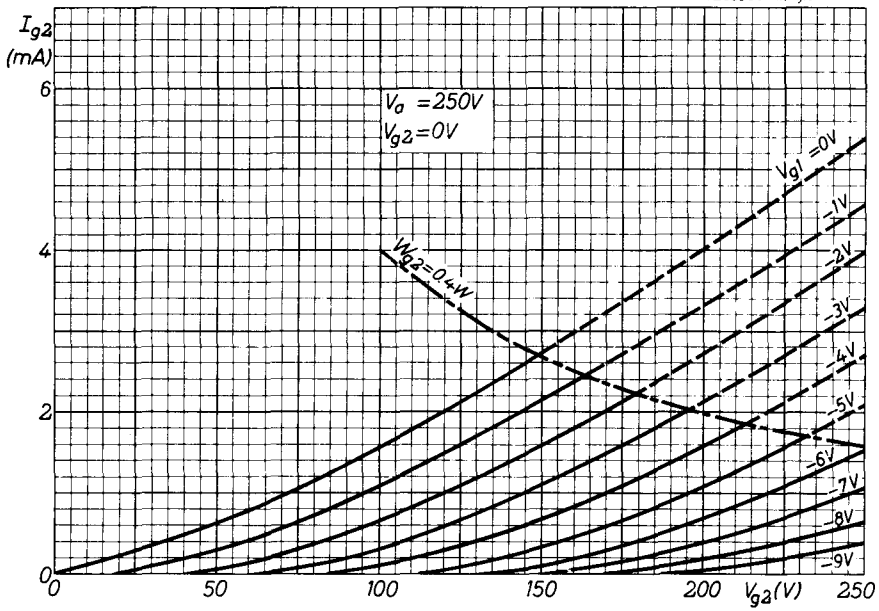
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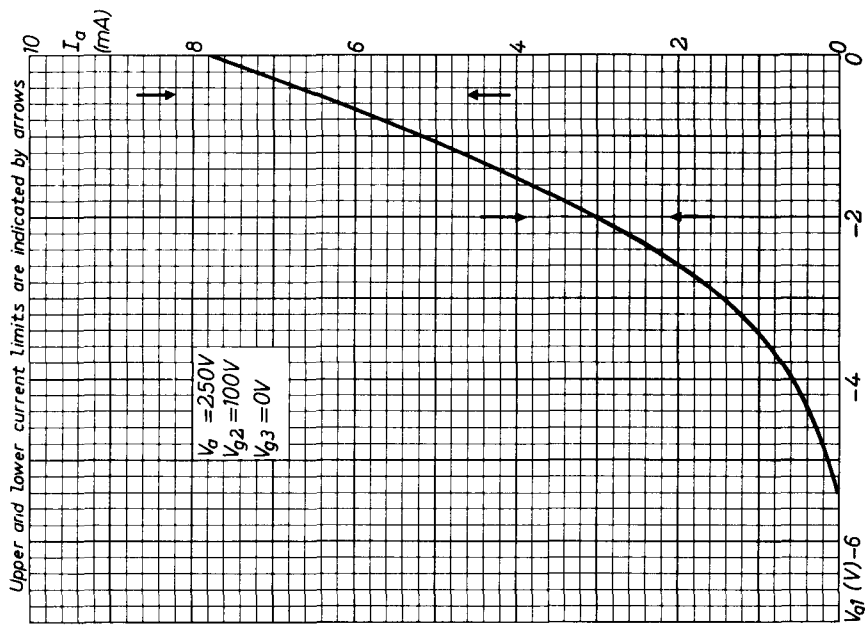
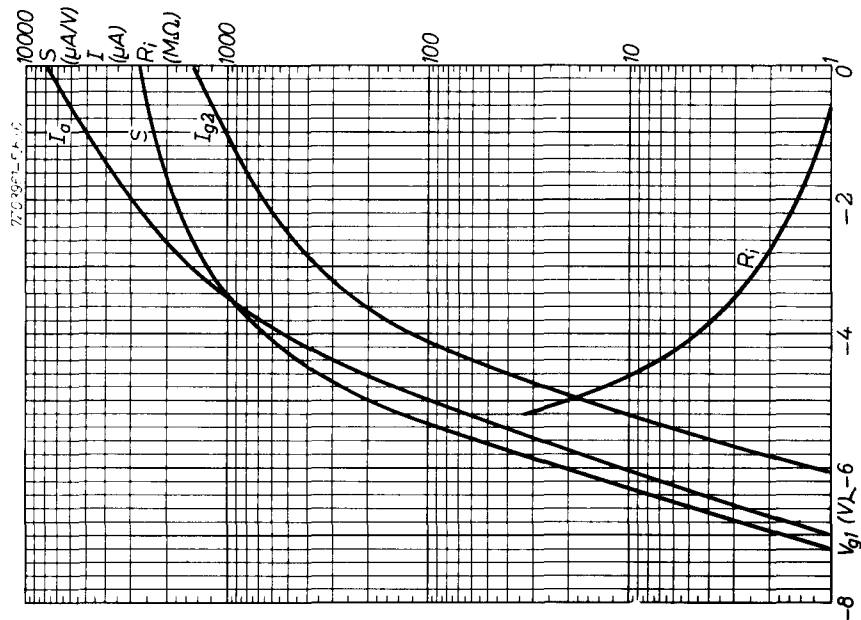


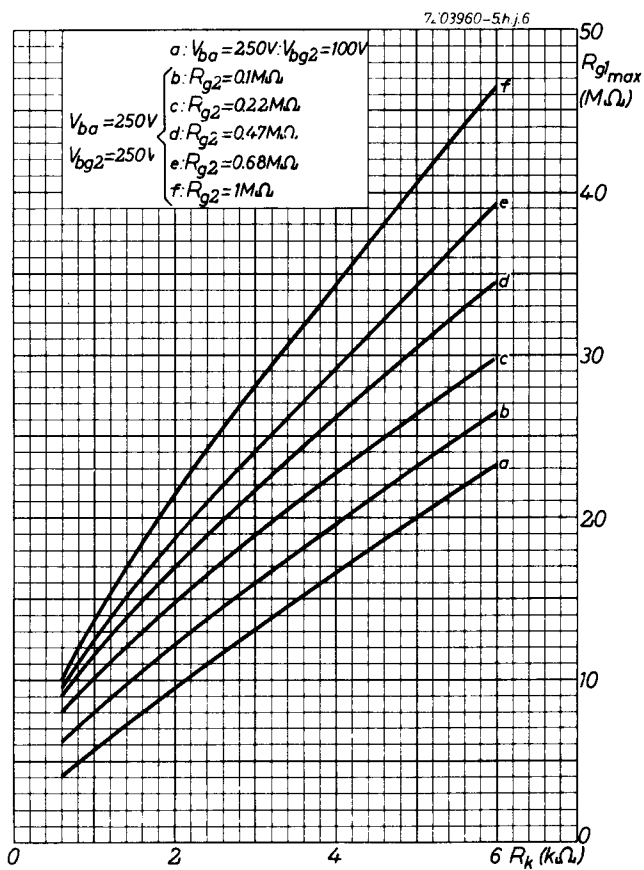
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PHILIPS

Data handbook



**Electronic
components
and materials**

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