

S.Q. TUBE

Special quality pentode designed for use as wide band amplifier.

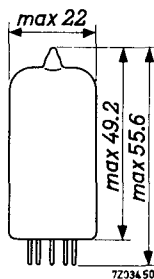
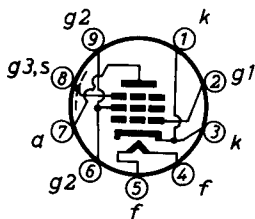
QUICK REFERENCE DATA

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.; Parallel supply	
Heater voltage	V_f	6.3 V
Heater current	I_f	340 mA
Anode current	I_a	35 mA
Mutual conductance	S	50 mA/V
Equivalent noise resistance	R_{eq}	110 Ω
Quality factor	$\frac{S}{2\pi(C_{g1} + C_a + 5)}$	250 MHz

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	340	320 - 360		mA
Anode supply voltage	V_{ba}	135			V
Grid No.3 voltage	V_{g3}	0			V
Grid No.2 supply voltage	V_{bg2}	165			V
Grid No.1 supply voltage	$+V_{bg1}$	12.5			V
Cathode resistor	R_k	360			Ω
Anode current	I_a	35	(negligible spread)		mA
Grid No.2 current	I_{g2}	5.0	4.4 - 5.6		mA
Mutual conductance	S	50	42 - 58	min. 35	mA/V
Internal resistance	R_i	42			k Ω
Amplification factor of grid No.2 to grid No.1	μ_{g2g1}	57			
Negative grid current	$-I_{g1}$		max. 0.1	max. 0.2	μA
Equivalent noise resistance	R_{eq}	110			Ω
Frequency = 45 MHz					
Input resistance	r_{g1}	415			Ω
Frequency = 100 MHz					
Quality factor $\frac{S}{2\pi(C_{g1}+C_a+5)}$					
a) without shield		250			MHz
b) with shield		245			MHz
Anode supply voltage	V_{ba}	120			V
Grid No.3 voltage	V_{g3}	0			V
Grid No 2 supply voltage	V_{bg3}	150			V
Cathode resistor	R_k	47			Ω
Anode current	I_a	35	31 - 39		mA

CHARACTERISTICS (continued)Hum voltageGrid No.1 resistor $R_{g1} = 0.5 \text{ M}\Omega$

Midtap heater transformer grounded

Cathode resistor decoupled

Leakage current between
cathode and heaterVoltage between cathode and
heater $V_{kf} = 100 \text{ V}$ Insulation resistance between
anode and other electrodesMeasured with $V = 250 \text{ V}$

	II	III	
V_{g1}	max. 150		μV
I_{kf}	max. 10	max. 20	μA
R	min. 100	min. 40	$\text{M}\Omega$

CAPACITANCES

		Without external shield		With external shield		
		I	II	I	II	
Anode to grid No.3, grid No.2, cathode, heater and screen	$C_{a/g3g2kfs}$	3.5	3.2-3.8	4.1	3.9-4.3	pF
Grid No.1 to grid No.3, grid No.2, cathode, heater and screen						
($I_k = 0 \text{ mA}$)	$C_{g1/g3g2kfs}$	14.5	13- 16	14.5	13- 16	pF
($I_k = 40 \text{ mA}; f = 100 \text{ Mc/s}$)	$C_{g1/g3g3kfs}$	24	22- 26	24	22- 26	pF
Anode to grid No.1	C_{ag1}		max. 36		max. 32	mpF
Anode to cathode	C_{ak}	60	53- 67	33	26- 40	mpF
Anode to heater	C_{af}	31	26- 36	20	12- 28	mpF
Grid No.1 to heater	C_{g1f}	60	40- 80	55	35- 75	mpF
Cathode to heater	C_{kf}			5.2	4.2-6.2	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 supply voltage	V_{ba}	165	V
Anode resistor	R_a	820	Ω
Grid No.3 voltage	V_{g3}	0	V
Grid No.2 supply voltage	V_{bg2}	165	V
Grid No.1 supply voltage	$+V_{bg1}$	12.5	V
Cathode resistor	R_k	360	Ω
Anode current	I_a	35	mA
Voltage between cathode and heater	V_{kf}	100	V

LIMITING VALUES (Absolute max. rating system)

Anode voltage	V_{a0}	max. 400	V
	V_a	max. 250	V
Anode dissipation	W_a	max. 5	W
Grid No.2 voltage	V_{g20}	max. 400	V
	V_{g2}	max. 200	V
Grid No.2 dissipation	W_{g2}	max. 1	W ¹⁾
Grid No.1 voltage	$-V_{g1}$	max. 25	V
Grid No.1 peak voltage	$-V_{g1p}$	max. 50	V
	$+V_{g1p}$	max. 50	V
Grid No.1 dissipation	W_{g1}	max. 10	mW

Maximum averaging time = 1 s

¹⁾ Care should be taken not to exceed the rated W_{g2} value due to switching of positive supply voltages.

LIMITING VALUES (Absolute max. rating system) (continued)

Grid No.1 resistor

With fixed bias	R_{g1}	max. 0.2 $M\Omega$
With automatic bias $R_k = 47 \Omega$	R_{g1}	max. 0.6 $M\Omega$
$R_k = 360 \Omega$	R_{g1}	max. 3.5 $M\Omega$

Cathode current	I_k	max. 50 mA
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Cathode current (Life expectancy 1000 hours)	I_k	max. 65 mA
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Voltage between cathode and heater	V_{kf}	max. 100 V
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Bulb temperature	t_{bulb}	max. 200 $^{\circ}C$
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Bulb temperature (Life expectancy 1000 hours)	t_{bulb}	max. 220 $^{\circ}C$
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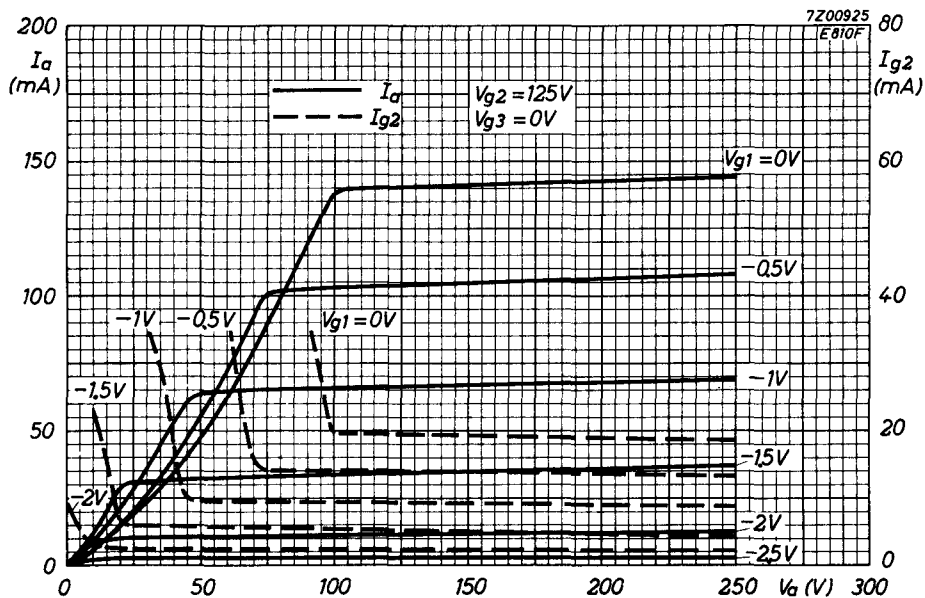
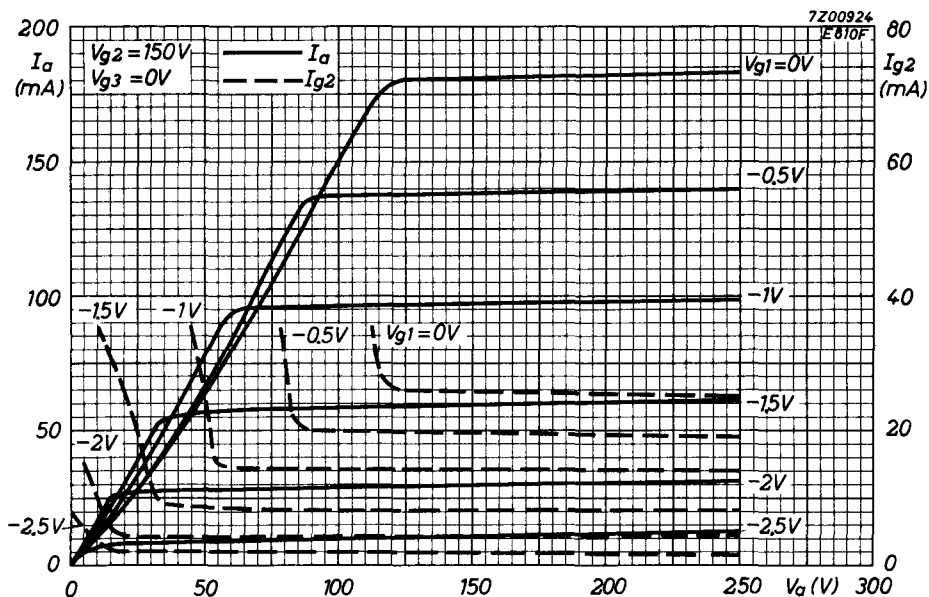
Heater voltage: The average heater voltage should be 6.3 V.

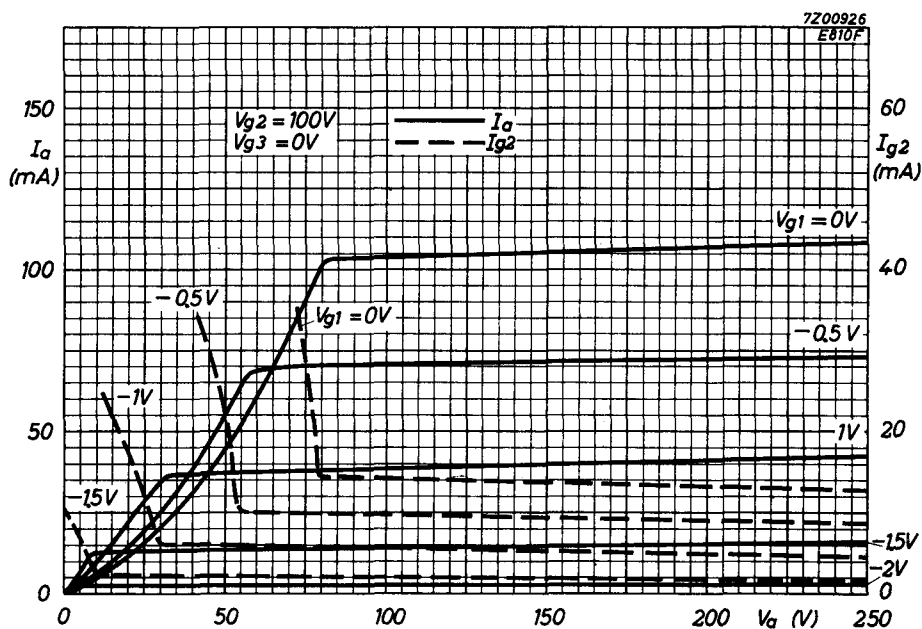
Variations of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life.

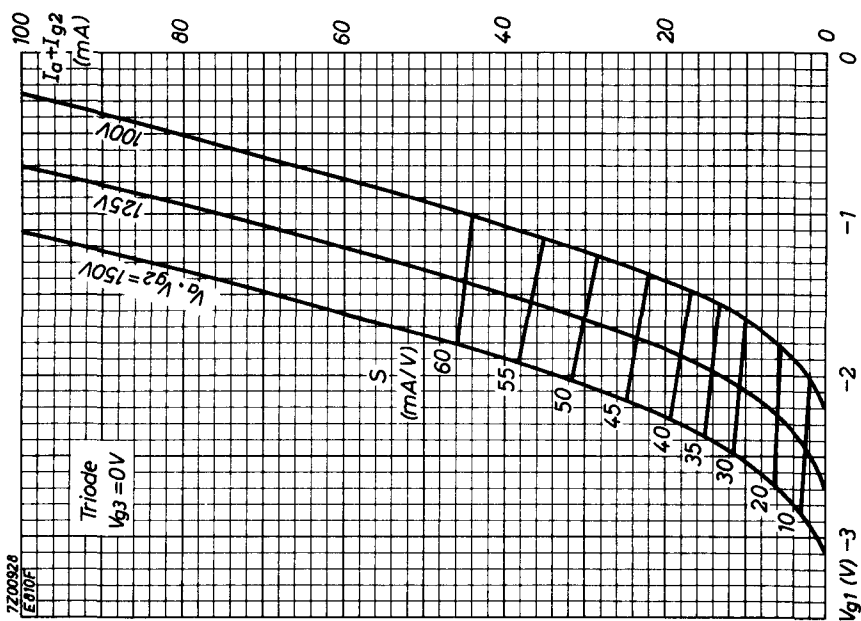
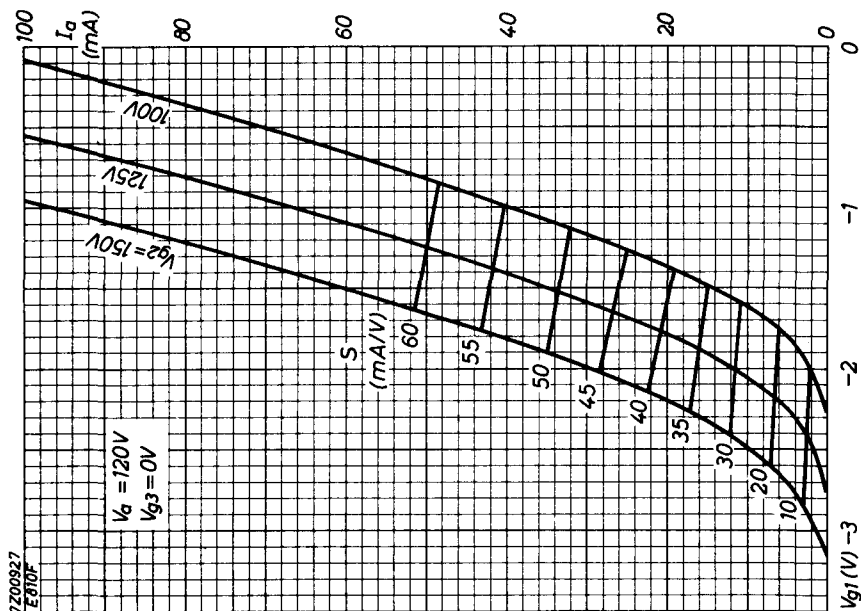
The tolerance of heater current (column II) should be taken into account.

OPERATING CHARACTERISTICSOutput tube class A

Anode supply voltage	V_{ba}	155 V
Grid No.3 voltage	V_{g3}	0 V
Grid No.2 supply voltage	V_{bg2}	165 V
Grid No.1 supply voltage	$+V_{bg1}$	12.5 V
Cathode resistor	R_k	360 Ω
Cathode capacitor	C_k	1000 μF
Anode resistor	$R_{a\sim}$	560 Ω
Anode current	I_a	35 mA
Anode current, peak to peak	I_{ap}	40 mA
Total distortion	d_{tot}	7.5 %







PHILIPS

Data handbook



**Electronic
components
and materials**

E810F

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9	FP	2000.12.10