

## S.Q. TUBE

Special quality pentode designed for use as wide band amplifier.

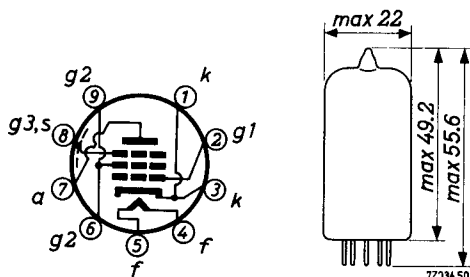
### QUICK REFERENCE DATA

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 $\Omega$
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			$\Omega$
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 $\Omega$
Amplification factor of grid No.2 to grid No.1	$\mu_{g2g1}$	57			
Negative grid current	$-I_{g1}$		max. 0.1	max. 0.2	$\mu A$
Equivalent noise resistance	$R_{eq}$	110			$\Omega$
Frequency = 45 MHz					
Input resistance	$r_{g1}$	415			$\Omega$
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			$\Omega$
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		$\mu\text{V}$
$I_{kf}$	max. 10	max. 20	$\mu\text{A}$
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	$\Omega$
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	$\Omega$
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 <sup>1)</sup>
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

<sup>1)</sup> 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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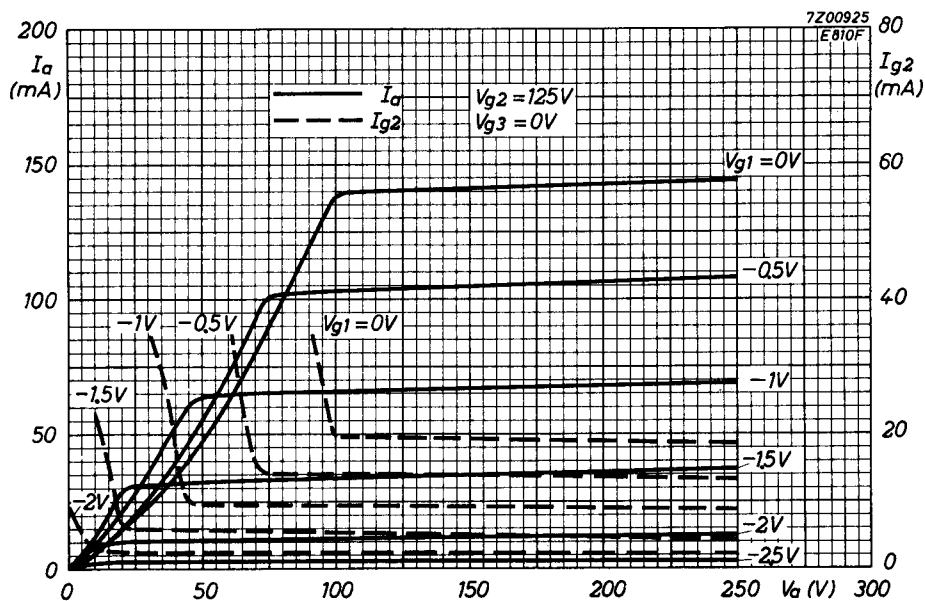
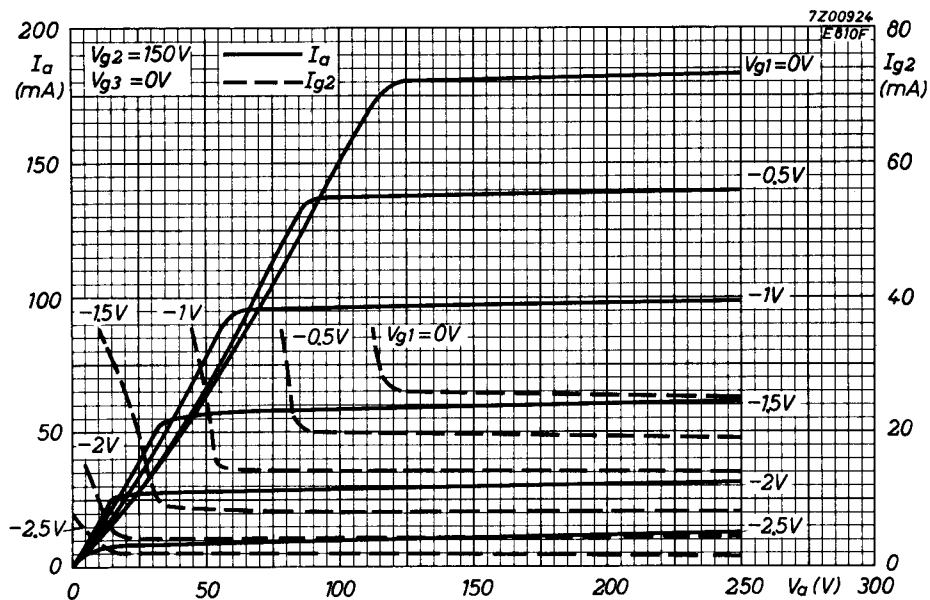
Heater voltage: The average heater voltage should be 6.3 V.

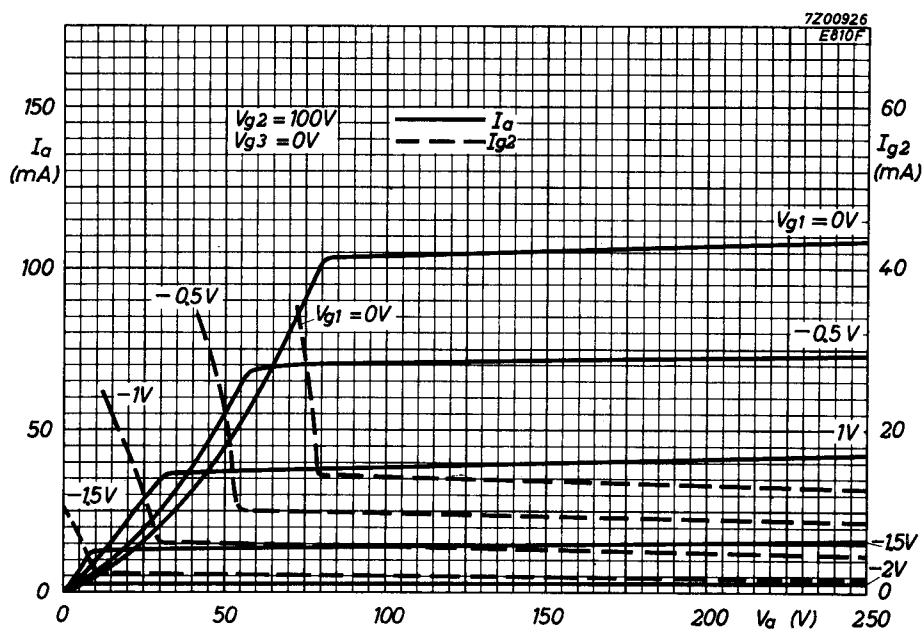
Variations of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life.

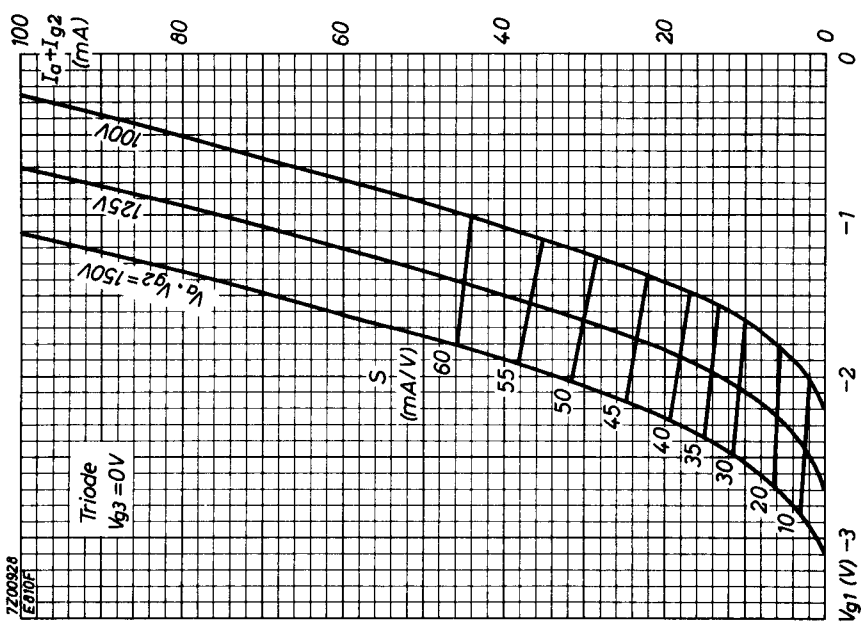
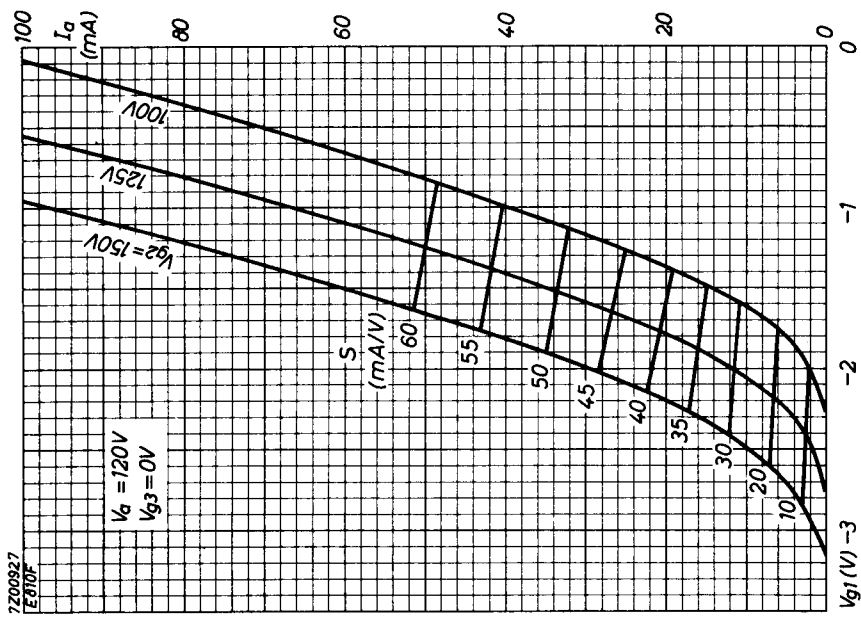
The tolerance of heater current (column II) should be taken into account.

**OPERATING CHARACTERISTICS**Output 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 $\Omega$
Cathode capacitor	$C_k$	1000 $\mu F$
Anode resistor	$R_{a\sim}$	560 $\Omega$
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

page	sheet	date
1	1	1968.12
2	2	1968.12
3	3	1968.12
4	4	1968.12
5	5	1968.12
6	6	1968.12
7	7	1968.12
8	8	1968.12
9	FP	2000.12.10