

SUBMINIATURE VOLTAGE REFERENCE TUBE

ZZ1000

QUICK REFERENCE DATA

81V gas-filled voltage reference tube. Shock and vibration resistant.

Preferred cathode current	3.2	mA
Maintaining voltage	81	V
Incremental resistance	200	Ω
Temperature coefficient of maintaining voltage		
averaged over the range +20 to +125°C	-1.2	mV/degC
averaged over the range -55 to +20°C	-3.2	mV/degC

This data should be read in conjunction with GENERAL OPERATIONAL
RECOMMENDATIONS - STABILISER AND REFERENCE TUBES

CHARACTERISTICS AND RANGE VALUES FOR EQUIPMENT DESIGN

Measured at an ambient temperature of between 20 and 30°C. The values given state the range over which the tube will operate, no allowance being made for supply voltage and component variations.

Limits applicable to all tubes (initial values)

Maximum ignition voltage	115	V
Maintaining voltage at $I_k = 3.2\text{mA}$ (see note 1)	80.1 to 82.5	V
Incremental resistance	max. 400 typ. 200	Ω

Typical limits (initial values)

Maximum voltage jump at $I_k = 2.0$ to 4.0mA (see note 2)	100	mV
Maximum ignition delay in darkness at $V_b = 115\text{V}$	5.0	ms
Maximum tube impedance at $I_k = 2.7$ to 3.7mA , 50Hz sinusoidal variation	400	Ω
Maximum r.m.s. noise voltage (oscillation + random) at $I_k = 2.0$ to 4.0mA , frequency band = 10Hz to 10kHz	1.0	mV
Maximum vibration noise voltage at $I_k = 3.2\text{mA}$, 2.5g peak acceleration, $f = 10$ to 50Hz, frequency band = 1 to 100Hz	100	mV

CHARACTERISTICS AND RANGE VALUES FOR EQUIPMENT DESIGN (cont'd)

Temperature coefficient of maintaining
voltage at $I_k = 3.2\text{mA}$

averaged over the range +20 to +125°C	max.	-2.0	mV/degC
	typ.	-1.2	mV/degC
averaged over the range -55 to +20°C	max.	-4.0	mV/degC
	typ.	-3.2	mV/degC

Life performance

Typical maximum variation in maintaining voltage

Continuous operation at preferred current; $T_{\text{bulb}} = 45^\circ\text{C}$

0 to 100 hours	0.3	V
0 to 2000 hours	0.7	V

Storage and standby; $T_{\text{bulb}} = 25^\circ\text{C}$

0 to 2000 hours	0.3	V
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RATINGS (ABSOLUTE MAXIMUM SYSTEM)

I_k max. (see note 3)	4.0	mA
I_k min.	2.0	mA
$i_{k(pk)}$ max. (starting) for 20s max.	20	mA
$-v_a(pk)$ max.	100	V
T_{bulb} max. during operation	+125	°C
T_{bulb} max. during storage and standby	+100	°C
T_{bulb} min.	-55	°C

CIRCUIT DESIGN VALUES

Minimum voltage to ensure ignition	120	V
Maximum value of shunt capacitor	30	nF

SHOCK AND VIBRATION RESISTANCE

These conditions are used solely to assess the mechanical quality of the tube. The tube should not be continuously operated under these conditions.

Shock resistance

500g, using a NRL impact machine for electronic devices. 5 blows of the hammer lifted over an angle of 30° in each of four positions of the tube.

Vibration resistance

2.5g (peak). 32 hours at a frequency of 50Hz in each of three directions of the tube.

NOTES

1. Thermal equilibrium is reached within two minutes of igniting the tube.
2. To avoid voltage jumps over life, current variations around the preferred current should be limited to 0.3mA.
3. For use as a stabiliser tube, I_k max. = 8.0mA. At cathode currents between 2.0 and 8.0mA voltage jumps of 0.5V may occur.



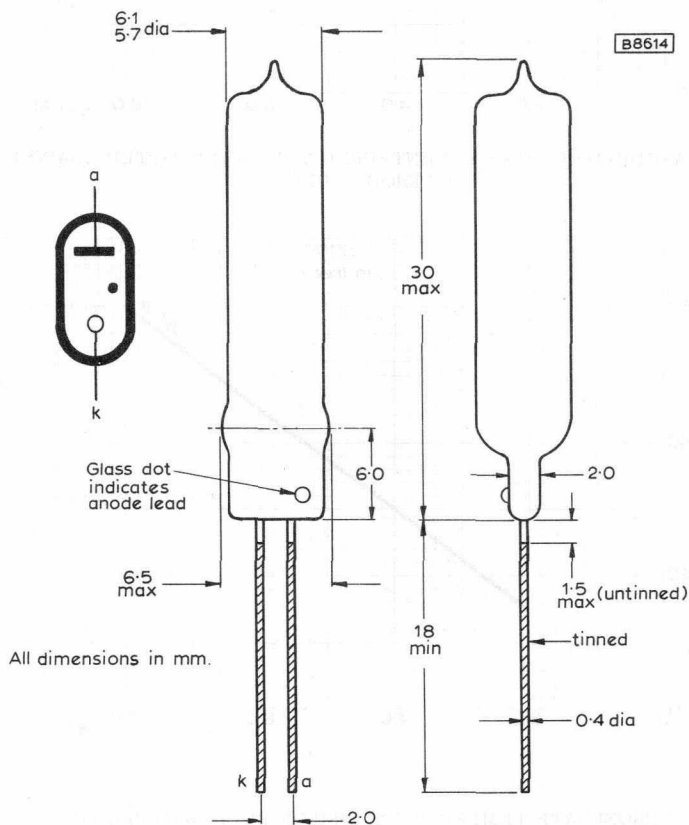
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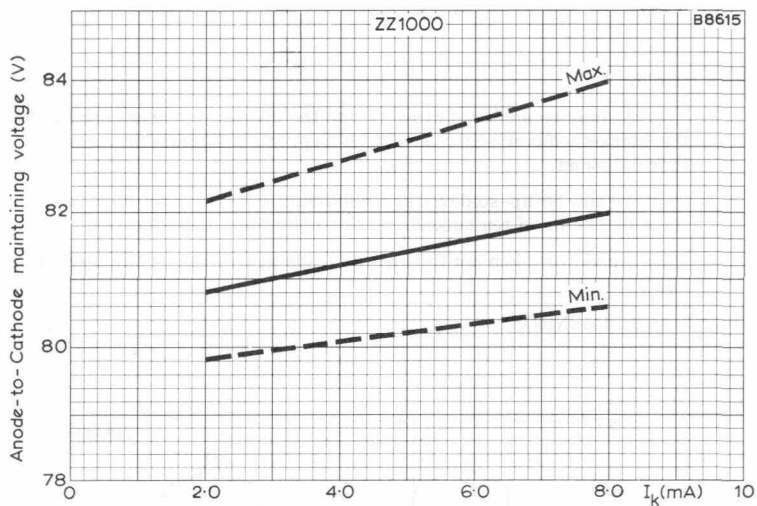
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NOTES (cont'd)

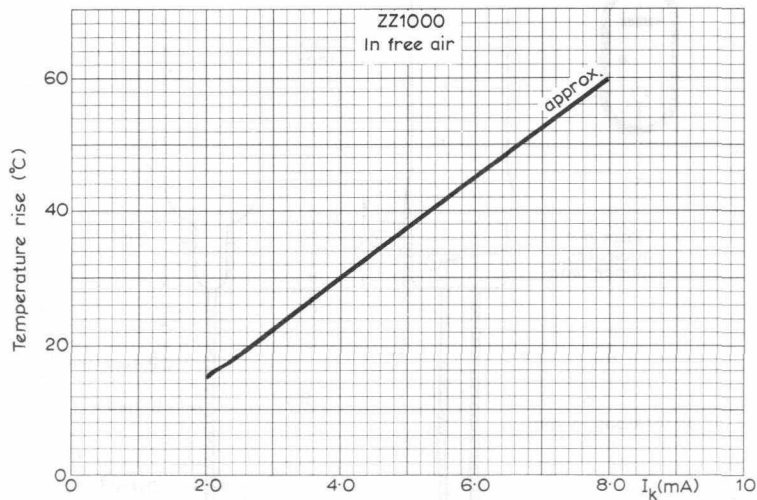
4. The tube may be soldered directly into the circuit, but heat conducted to the glass-to-metal seals should be kept to a minimum by the use of a thermal shunt.
5. The tube may be dip-soldered at a maximum solder temperature of 240°C for a maximum of ten seconds up to a point 5mm from the seal.
6. Care should be taken not to bend the leads nearer than 1.5mm from the seal.

OUTLINE AND DIMENSIONS





ANODE-TO-CATHODE MAINTAINING VOLTAGE PLOTTED AGAINST CATHODE CURRENT



APPROXIMATE TEMPERATURE RISE OF BULB PLOTTED AGAINST CATHODE CURRENT

