Amperex® ELECTRONIC CORPORATION
230 DUFFY AVENUE, HICKSVILLE, L. I., N. Y.

Item (9)

TYPE 8228/ZZ1000 VOLTAGE REFERENCE TUBE

TENTATIVE DATA

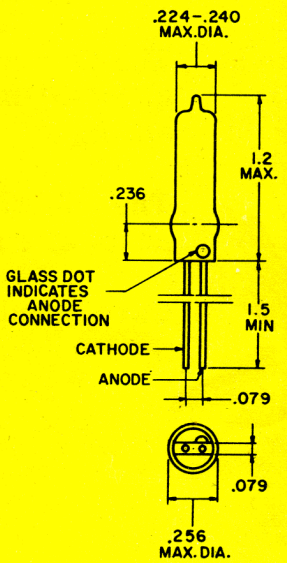
The Amperex 8228/ZZ1000 is a subminiature cold-cathode voltage reference tube for use in stable regulated power supplies, dc amplifiers, oscilloscope calibrators and similar applications.

Featuring an extremely low temperature coefficient of .004% per °C, the 8228/ZZ1000 affords excellent regulation and uniformity. The rugged construction of this extremely small voltage reference tube insures reliability. It is guaranteed for a minimum life of 30,000 hours,

GENERAL CHARACTERISTICS

ELECTRICAL

Maximum Ratings, Absolute Values	
D.C. Starting Voltage (min)	115 volts[1]
D.C. Operating Cathode Current (max)	3.5 ma
D.C. Operating Cathode Current (min)	.5 ma
Inverse Peak Voltage	70 volts
Bulb Temperature Limits	-55 to +100°C[2]
Impact Acceleration (max)	450 g
Vibrational Acceleration for extended periods	2.5 g
Altitude	78,500 ft
Typical Operation	
Recommended D.C. Operating Current	2 ma
A.C. Resistance at 2 ma (max)	500 ohms[3]
D.C. Operating Voltage at 2 ma	82 volts
D.C. Operating Voltage	84 volts max
I_k = 0.5 to 3.5 ma	81 volts min
Regulation	
I_k = 0.5 to 3.5 ma	1 volt



JETEC T2

1. The anode breakdown voltage delay time is 5 msec max and is independent of ambient illumination.
2. The temperature rise of the bulb over the ambient temperature at I_k = 3.5 ma is approximately 25°C.
3. Measured with an alternating current of 1 ma rms at 1000 cps.

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ELECTRICAL (Continued)

Noise Voltage	
I_k = 0.5 to 3.5 ma	
Frequency Band: 10 cycles to 10 kc	N = 0.5 volts max
Temperature Coefficient of Operating Voltage	-3.0 mv/°C[4] (.004 %/°C)
Change in Operating Voltage	
During First 1000 hours of Life (I_k = 2 ma, T_A = 25°C)	500 mv max
Life Expectancy - Continuous	
Operation (I_k = 2 ma)	30,000 hours min

SOLDERING PRECAUTIONS

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.

The connecting leads may be dip-soldered to a minimum of 3/16" from the seals at a solder temperature of 240°C for a maximum of 10 seconds.

Care should be taken not to bend the leads closer than 1/16" to the seals.

4. Averaged over the range -55°C to + 70°C.