

ELECTRO-OPTICAL PRODUCTS DIVISION
TUBE and SENSOR LABORATORIES
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FW127



BIPLANAR PHOTOTUBE

- Fast Picosecond Response
- Biplanar Geometry
- Ultra-linear
- Wide Dynamic Range
- Calibration Standard Dependability
- Damage Resistant Long-Life
- Broad Spectral Response
- Low Impedance Photocathode
- Coaxial Output

GENERAL DESCRIPTION

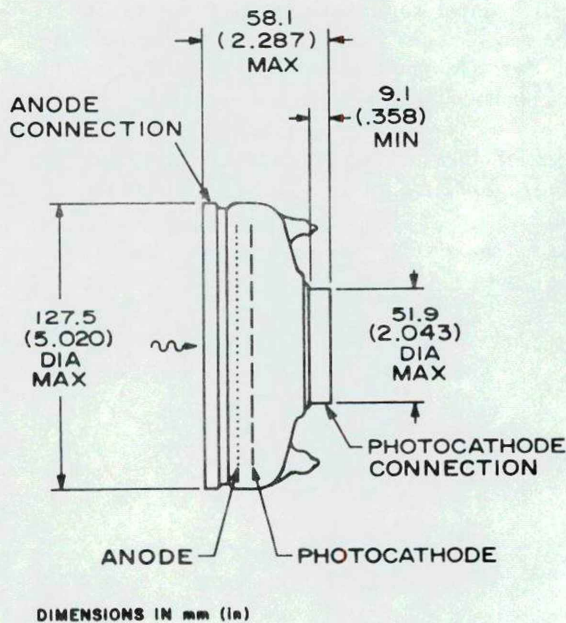
The FW127 is a 5-inch diameter biplanar type photodiode designed for close optical coupling to a flat disc scintillator accommodated in the faceplate cavity of the tube. It is one of a family of high-current phototubes developed by ITT which have become standard items for measurement of high-density gamma radiation of short time duration. Using a scintillation phosphor, the FW127 phototube can also be used to monitor cosmic rays, X-rays, and nuclear particles. Since the maximum dark current at 2500 volts is 1×10^{-8} ampere and the tube is linear to 30 amperes, the dynamic range of the FW127 is at least 3×10^9 . The actual operating dynamic range is usually limited by the characteristics of the associated circuitry.

Two other sizes of high-current phototubes of similar construction available from ITT are the 1.25-inch FW128 and the 2.25-inch FW114.

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FW127 TENTATIVE DATA

Operating voltage	.2.5 kV, typical
Photocathode spectral response	.S-4
Photocathode luminous sensitivity (Note 1)	.30 μ A/lm, typical 20 μ A/lm, min
Photocathode peak radiant sensitivity (Note 2)	.0.030 A/W, typical
Effective photocathode diameter	.107 mm (4.25 in.)
Effective photocathode area	.360.7 sq mm (14.2 sq. in.)
Window diameter	.107 mm (4.25 in.)
Anode mesh (Note 3)	.20 openings/25.4 mm (1 in.)
Anode mesh transmission	.80%
Resistance of anode mesh	.0.5 Ω /sq., typical
Dark current (Note 4)	.1 $\times 10^{-9}$ A, typical 1 $\times 10^{-8}$ A, maximum
Interelectrode capacitance	.26 pF, typical
Maximum peak current output (Note 4)	.30 A
Maximum average current output (Note 5)	.500 μ A
Deviation from linearity (Notes 4, 6)	.10%, max
Over-all length	.58.1 mm (2.287 in.) max
Over-all diameter	.127.5 mm (5.020 in.) max
Weight	.340.20 g (12. oz.)
Photocathode to anode spacing	.6.4 mm (0.250 in.) nominal



Biplanar Type Phototube FW127

NOTES:

1. 2854 degrees K color temperature tungsten radiation incident on faceplate. 200 volt anode potential.
2. Calculated from the approximate relationship: peak radiant sensitivity in amperes per watt equals 10^{-3} times the luminous sensitivity in micro-amperes per lumen; this relationship being derived from a typical S-4 spectral response peaking at 400 nanometers.
3. Electroformed nickel.
4. At 2.5 kV.
5. Output current averaged over 1-second time interval and uniformly distributed over photocathode. For lower operating voltages the permissible output current will be reduced according to the usual $3/2$ power law of the applied voltage.
6. Deviation from direct proportionality between current output and light flux input uniformly distributed over photocathode.