

ELECTRO-OPTICAL PRODUCTS DIVISION
 TUBE and SENSOR LABORATORIES
 3700 East Pontiac Street
 Fort Wayne, Indiana 46803
 Telephone 219-423-4341 TWX 810-332-1413



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 FW114A is a 2¼-inch diameter high vacuum photodiode with an opaque photocathode having an S-20 type spectral response. (See Note 7.) Visible light transmitting glass is used for the entrance window. The FW114A was developed by ITT specifically for laser detection applications such as the investigation of fundamental laser properties, laser communications systems, and laser radar systems.

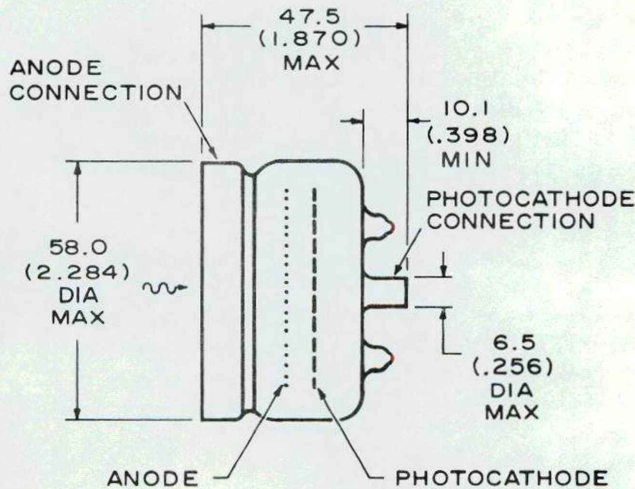
The plane parallel (biplanar) and coaxial electrode geometry combined with high voltage ratings, low dark current, and red response extending beyond 7000Å make the FW114A particularly valuable for the detection and monitoring of high energy pulsed ruby laser radiation. Linear output currents exceeding 5 amperes can be delivered to a terminated coaxial cable with a rise time of less than 5×10^{-10} seconds. The radiant energy spectrum of the laser generator can be examined in detail over a minimum of 9 orders of magnitude in intensity within the gigacycle frequency range.

The FW114A is one of a family of biplanar phototubes available from ITT. Three other biplanar type photodiodes are the 2¼-inch diameter FW114, the 1½-inch diameter FW128, and the 5-inch diameter FW127. Information on several other types under development is available on request.

FW114A

FW114A TENTATIVE DATA

Over-all length	47.5 mm (1.870 in.) max
Over-all diameter	58.0 mm (2.284 in.) max
Weight	63.79 g (2.25 oz)
Photocathode to anode spacing	6.4 mm (0.250 in.) nominal
Effective photocathode diameter	44.5 mm (1.75 in.) nominal
Effective photocathode area	15.5 cm ² (2.4 sq. in.) nominal
Window diameter	44.5 mm (1.75 in.) nominal
Anode mesh (Note 1)	20 openings/25.4 mm (1 in.)
Anode mesh transmission	80 percent, typical
Resistance of anode mesh	0.5 Ω per square, typical
Operating voltage	2.5 kV, typical
Photocathode spectral response (Note 7)	S-20
Photocathode luminous sensitivity (Note 2)	80 μ A/lm, typical 50 μ A/lm, min.
Photocathode peak radiant sensitivity (Note 3)	0.034 A/W, typical
Maximum peak current output (Note 4)	5 A
Maximum average current output (Note 5)	100 μ A
Deviation from linearity (Notes 4 & 6)	\pm 10 percent, max.
Dark current (Note 4)	2.5 x 10 ⁻¹⁰ A, typical 5 x 10 ⁻⁹ A, max
Interelectrode capacitance	7 pF, typical
Rise time	5 x 10 ⁻¹⁰ sec, max.



DIMENSIONS IN mm (in)

BIPLANAR TYPE PHOTOTUBE FW114A

NOTES:

1. Electroformed nickel.
2. 2870 degrees K color temperature tungsten radiation incident on faceplate. Two-hundred volts anode potential.
3. Calculated from the approximate relationship: peak radiant sensitivity in amperes per watt equals 4.3×10^{-4} times the luminous sensitivity in microamperes per lumen, this relationship being derived from a typical S-20 spectral response peaking at 4200 Å.
4. At 2.5 kV.
5. Output current averaged over a 1-second time interval and uniformly distributed over the photocathode. For lower operating voltages the permissible output current will be reduced according to the usual three halves power law of applied voltage.
6. Deviation from direct proportionality between current output and light flux input uniformly distributed over the photocathode.
7. The S-20 designation is for a multi-alkali photosurface on a translucent glass substrate. The FW114A photocathode is formed on an opaque metal substrate. Therefore, there may be a departure from the typical S-20 spectral response curve.