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 TUBE and SENSOR LABORATORIES  
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### 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 FW114 is a 2¼ inch diameter high current biplanar photodiode designed by ITT for efficient optical coupling to an appropriate scintillator. This scintillator may take the form of a transparent solid or liquid accommodated within the faceplate cavity of the tube or a multicrystalline phosphor directly on the faceplate of the tube, depending on the type of radiation to be detected.

The FW114 has found particular use for the monitoring of high intensity gamma radiation of short duration. The wide dynamic range of the FW114 permits observation of the shape of these pulses down to very small fractional parts of the original pulse heights, as well as measurement of pulses of widely varying amplitude. Excellent saturation and linearity characteristics are assured in the FW114 by the plane, parallel (biplanar) electrode configuration.

The FW114 is one of a family of high current phototubes available from ITT. Two other biplanar type photodiodes are the 1¼ inch diameter FW128 and the 5-inch diameter FW127.

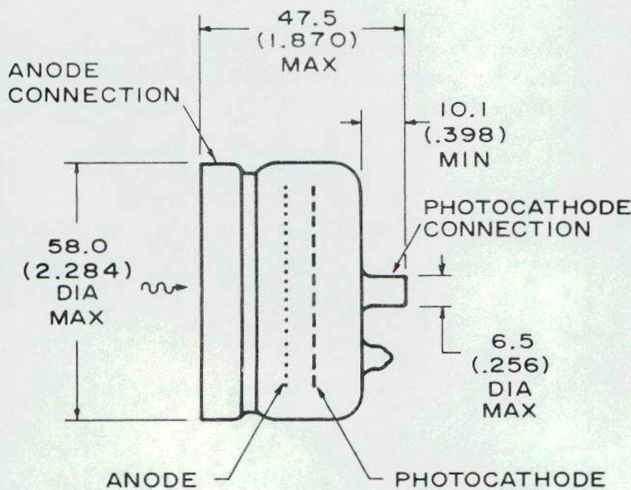


## FW114 TENTATIVE DATA

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 . . . . .	61.0 sq mm (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 $\Omega$ per square, typical
Operating voltage . . . . .	2.5 kV, typical
Photocathode spectral response . . . . .	S4
Photocathode luminous sensitivity (Note 2) . . . . .	30 $\mu$ A/lm, typical 20 $\mu$ A/lm, min.
Photocathode peak radiant sensitivity (Note 3) . . . . .	0.030 A/W, typical
Maximum peak current output (Note 4) . . . . .	5 A
Maximum average current output (Note 5) . . . . .	100 $\mu$ A
Deviation from linearity (Notes 4 & 6) . . . . .	$\pm$ 10 percent, max.
Dark current (Note 4) . . . . .	5 x 10 <sup>-10</sup> A, typical 5 x 10 <sup>-9</sup> A, max
Inter-electrode capacitance . . . . .	7 pF, typical
Rise time . . . . .	5 x 10 <sup>-10</sup> sec, max.

### 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 10<sup>-3</sup> times the luminous sensitivity in microamperes per lumen; this relationship being derived from a typical S4 spectral response peaking at 4000 Å.
4. At 2.5 kV. For lower operating voltages the permissible output current will be reduced according to the usual three halves power law of applied voltage.
5. Output current averaged over a 1 second time interval and uniformly distributed over the photocathode.
6. Deviation from direct proportionality between current output and light flux input uniformly distributed over the photocathode.



DIMENSIONS IN mm (in)

BIPLANAR TYPE PHOTOTUBE FW114



# Reference Data

Figure 1

TYPICAL ABSOLUTE SPECTRAL RESPONSE CHARACTERISTICS OF PHOTOCATHODES

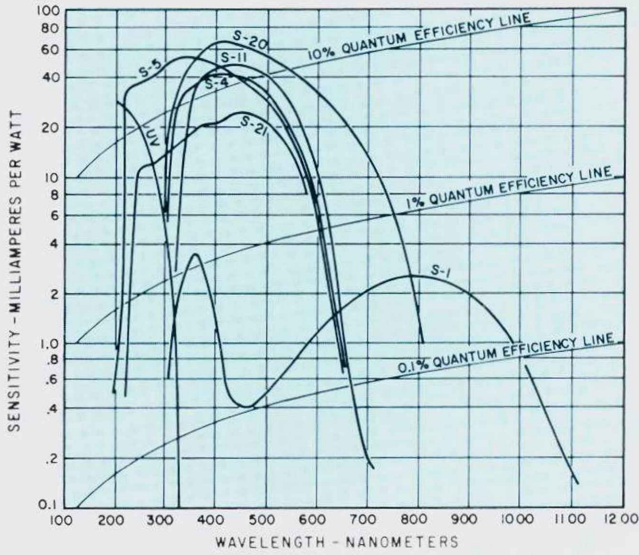


Figure 2

TYPICAL ABSOLUTE SPECTRAL RESPONSE CHARACTERISTICS OF PHOTOCATHODES

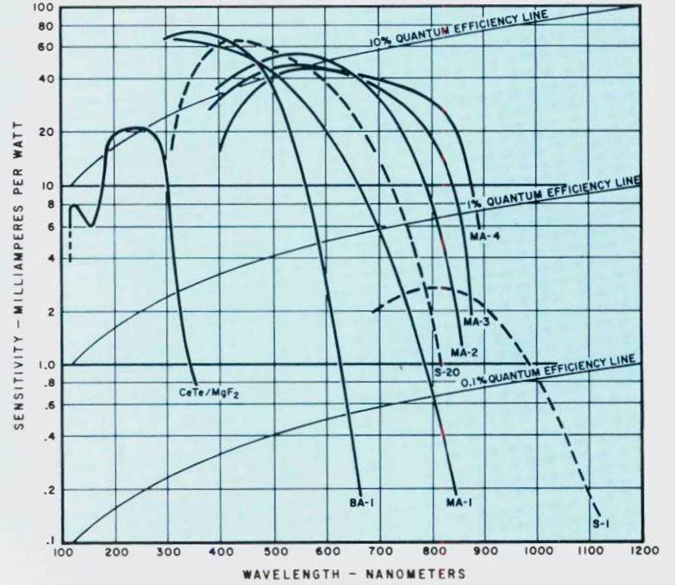
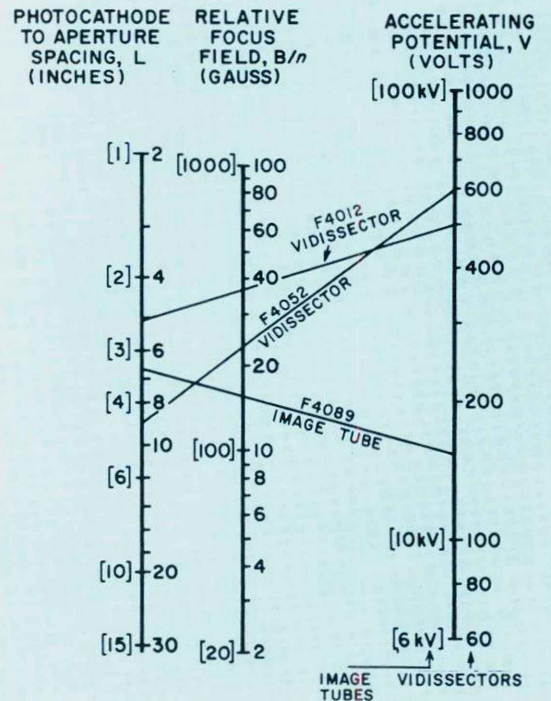


Figure 4

FOCUS FIELD NOMOGRAPH



FOR IMAGE TUBES, READ BRACKETTED SCALE CALIBRATIONS, [...]

Figure 3

TYPICAL ABSOLUTE SPECTRAL RESPONSE CHARACTERISTICS OF ALUMINIZED PHOSPHOR SCREENS

