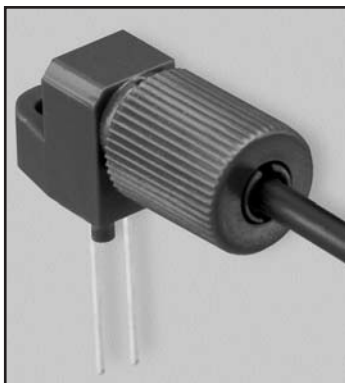




DESCRIPTION

The IF-D93 is a very high-sensitivity photodarlington detector housed in a “connector-less” style plastic fiber optic package. Optical response of the IF-D93 extends from 400 to 1100 nm, making it compatible with a wide range of visible and near-infrared LEDs and other optical sources. This includes 650 nm visible red LEDs used for optimum transmission in PMMA plastic optic fiber. The detector package features an internal micro-lens and a precision-molded PBT housing to ensure efficient optical coupling with standard 1000 μm core plastic fiber cable.

APPLICATION HIGHLIGHTS

The IF-D93 is suitable for low-speed optical links requiring high sensitivity. Triggering rates up to 1 k are possible using the IF-D93 and a suitable LED source. Photodarlington transistor operation provides very high optical gain, eliminating the need for post amplification in many circuits. The integrated design of the IF-D93 makes it a simple, cost-effective solution in a variety of applications.

APPLICATIONS

- Low-Speed Optical Links
- Optical Interrupter/Reflective Sensors
- Process Control
- Motor Controller Triggering
- Medical Instruments
- Automotive Electronics
- Robotics Control
- EMC/EMI Signal Isolation
- Electronic Games

FEATURES

- ◆ Mates with Standard 1000 μ m Core Jacketed Plastic Fiber Optic Cable
- ◆ No Optical Design Required
- ◆ Inexpensive but Rugged Plastic Connector Housing
- ◆ Internal Micro-Lens for Efficient Optical Coupling
- ◆ Connector-Less Fiber Termination
- ◆ Light-Tight Housing provides Interference Free-Transmission
- ◆ Very High Optical Sensitivity
- ◆ RoHS Compliant

MAXIMUM RATINGS

 $(T_A = 25^\circ\text{C})$

Operating and Storage Temperature Range

(T_{OP}, T_{STG}).....-40° to 85°C

Junction Temperature (T_J)85°C

Soldering Temperature
(2 mm from case bottom)

(T_S) t ≤ 5 s.....240°C

Collector Emitter Voltage (V_{CEQ})....15 V

Emitter Collector Voltage (V_{ECQ}).....5 V

Collector Current (I_C)50 mA

Collector Peak Current
(I_{CM}) $t = 1$ ms 100 mA

Power Dissipation
(P_{TOT}) $T_A=25^{\circ}C$ 100 mW

De-rate Above 25°C1.33 mW/°C

CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Min	Typ	Max	Unit
Wavelength for Maximum Photosensitivity	λ_{PEAK}	—	850	—	nm
Spectral Bandwidth (S=10% of S_{MAX})	$\Delta\lambda$	400	—	1100	nm
Switching Times (10% to 90% and 90% to 10%) ($R_L=1k\Omega$, $V_{CE}=5$ V, $\lambda=880$ nm) See Figure 2.	t_r, t_f	—	5, 2.5	—	ms
Responsivity min. @ 880 nm @ 632 nm	R	— —	400 200	— —	$\mu\text{A}/\mu\text{W}$ $\mu\text{A}/\mu\text{W}$
Collector Dark Current ($V_{CE}=15$ volts)	I_{CEO}	—	—	100	nA
Breakdown Voltage ($I_C=1$ mA)	BV_{CEO}	15	—	—	V
Breakdown Voltage ($I_C=100$ μA)	BV_{ECO}	5	—	—	V
Saturation Voltage ($I_C=0.4$ μA , $H=10$ μW)	$V_{CE \text{ sat}}$	—	1.10	—	V

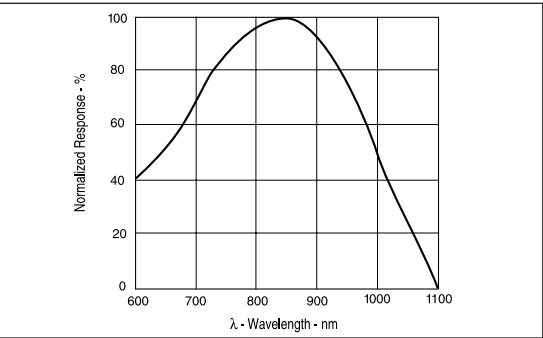


FIGURE 1. Typical detector response versus wavelength.

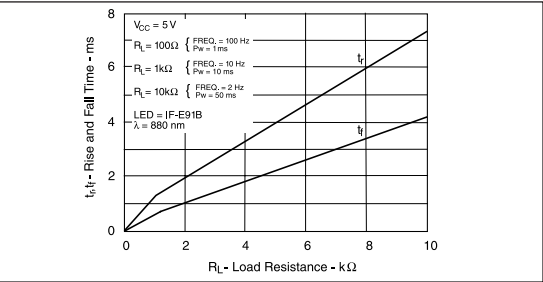


FIGURE 2. Rise and fall times versus load resistance.

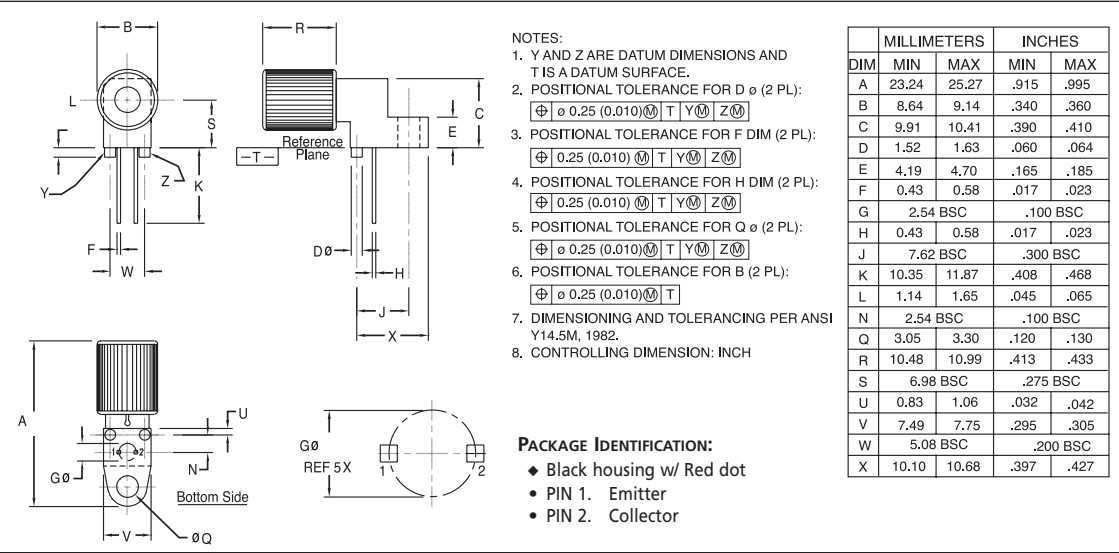


FIGURE 4. Case outline.

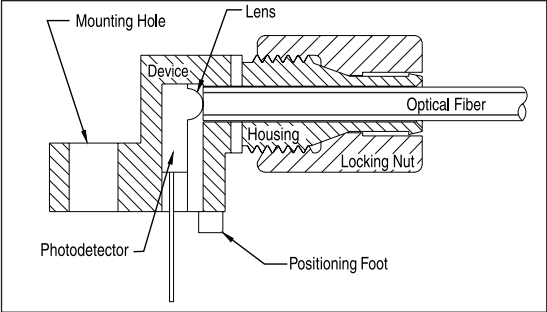


FIGURE 3. Cross-section of fiber optic device.

FIBER TERMINATION INSTRUCTIONS

1. Cut off the ends of the optical fiber with a single-edge razor blade or sharp knife. Try to obtain a precise 90-degree angle (square).
2. Insert the fiber through the locking nut and into the connector until the core tip seats against the internal micro-lens.
3. Screw the connector locking nut down to a snug fit, locking the fiber in place.