

## 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 optical 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.

## FEATURES

- ◆ Mates with Standard 1000 μm 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

## 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

## MAXIMUM RATINGS

(T<sub>A</sub> = 25°C)

Operating and Storage Temperature Range (T <sub>OP</sub> , T <sub>STG</sub> ).....	-40° to 85°C
Junction Temperature (T <sub>J</sub> ) .....	85°C
Soldering Temperature (2 mm from case bottom) (T <sub>S</sub> ) t ≤ 5s.....	240°C
Collector Emitter Voltage (V <sub>CEO</sub> )....	15 V
Emitter Collector Voltage (V <sub>ECO</sub> ).....	5 V
Collector Current (I <sub>C</sub> ) .....	50 mA
Collector Peak Current (I <sub>CM</sub> ) t = 1 ms .....	100 mA
Power Dissipation (P <sub>TOT</sub> ) T <sub>A</sub> = 25°C .....	100 mW
De-rate Above 25°C .....	1.33 mW/°C

## CHARACTERISTICS (T<sub>A</sub> = 25°C)

Parameter	Symbol	Min	Typ	Max	Unit
Wavelength for Maximum Photosensitivity	λ <sub>PEAK</sub>	-	850	-	nm
Spectral Bandwidth (S=10% of S <sub>MAX</sub> )	Δλ	400	-	1100	nm
Switching Times (10% to 90% and 90% to 10%) (R <sub>L</sub> =1kΩ, V <sub>CE</sub> =5 V, λ=880 nm) See Figure 2.	t <sub>r</sub> , t <sub>f</sub>	-	5, 2.5	-	ms
Responsivity min. @ 880 nm @ 632 nm	R	-	400 200	-	μA/μW μA/μW
Collector Dark Current (V <sub>CE</sub> =15 volts)	I <sub>CEO</sub>	-	-	100	nA
Breakdown Voltage (I <sub>C</sub> =1 mA)	BV <sub>CEO</sub>	15	-	-	V
Breakdown Voltage (I <sub>C</sub> =100 μA)	BV <sub>ECO</sub>	5	-	-	V
Saturation Voltage (I <sub>C</sub> =0.4 μA, H=10 μW)	V <sub>CE sat</sub>	-	1.10	-	V

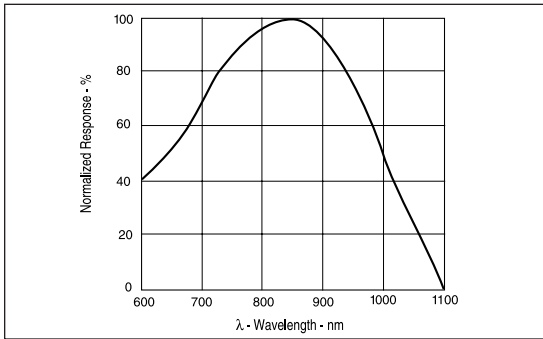


FIGURE 1. Typical detector response versus wavelength.

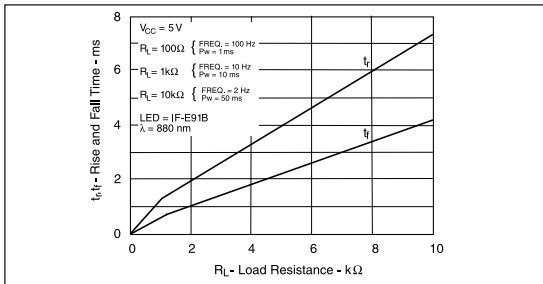


FIGURE 2. Rise and fall times versus load resistance.

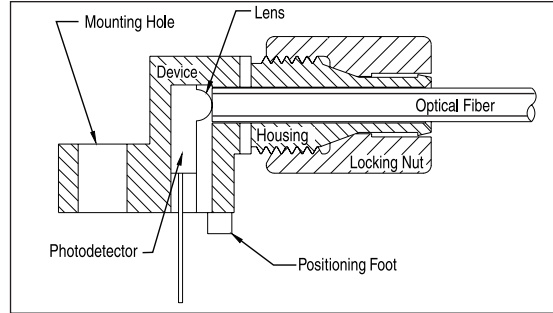


FIGURE 3. Cross-section of fiber optic device.

## 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.

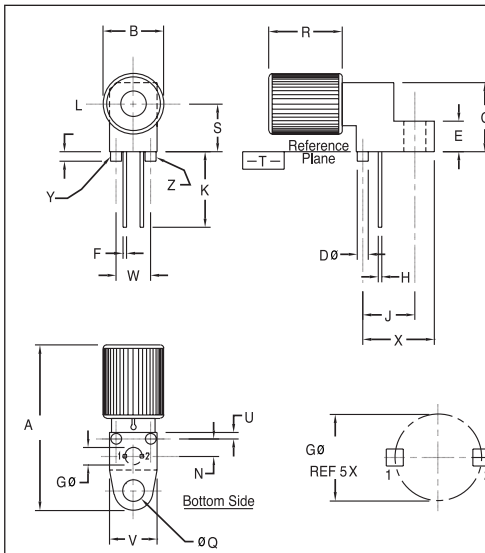


FIGURE 4. Case outline.

### NOTES:

1. Y AND Z ARE DATUM DIMENSIONS AND T IS A DATUM SURFACE.
2. POSITIONAL TOLERANCE FOR D  $\phi$  (2 PL):  
 $\phi 0.25 (0.010) \text{ (M) T | Y (M) | Z (M)}$
3. POSITIONAL TOLERANCE FOR F DIM (2 PL):  
 $\phi 0.25 (0.010) \text{ (M) T | Y (M) | Z (M)}$
4. POSITIONAL TOLERANCE FOR H DIM (2 PL):  
 $\phi 0.25 (0.010) \text{ (M) T | Y (M) | Z (M)}$
5. POSITIONAL TOLERANCE FOR Q  $\phi$  (2 PL):  
 $\phi 0.25 (0.010) \text{ (M) T | Y (M) | Z (M)}$
6. POSITIONAL TOLERANCE FOR B (2 PL):  
 $\phi 0.25 (0.010) \text{ (M) T}$
7. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
8. CONTROLLING DIMENSION: INCH

### PACKAGE IDENTIFICATION:

- Black housing w/ Red dot
- PIN 1. Emitter
- PIN 2. Collector

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	23.24	25.27	.915	.995
B	8.64	9.14	.340	.360
C	9.91	10.41	.390	.410
D	1.52	1.63	.060	.064
E	4.19	4.70	.165	.185
F	0.43	0.58	.017	.023
G	2.54 BSC		.100 BSC	
H	0.43	0.58	.017	.023
J	7.62 BSC		.300 BSC	
K	10.35	11.87	.408	.468
L	1.14	1.65	.045	.065
N	2.54 BSC		.100 BSC	
Q	3.05	3.30	.120	.130
R	10.48	10.99	.413	.433
S	6.98 BSC		.275 BSC	
U	0.83	1.06	.032	.042
V	7.49	7.75	.295	.305
W	5.08 BSC		.200 BSC	
X	10.10	10.68	.397	.427