

## DESCRIPTION

The IF-D92 is a high-sensitivity NPN phototransistor detector housed in a “connector-less” style plastic fiber optic package. Optical response of the IF-D92 extends from 400 to 1100 nm, making it compatible with a wide range of visible and near-infrared LEDs and laser diode 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  $\mu\text{m}$  core plastic fiber cable.

## APPLICATION HIGHLIGHTS

The IF-D92 is suitable for digital data links at rates up to 25 kbps. Analog bandwidths greater than 15 kHz are possible making the IF-D92 usable for high frequency audio transmission. Phototransistor operation provides high internal gain – reducing the amount of post-amplification required in many circuits. The integrated design of the IF-D92 makes it a simple, cost-effective solution in a variety of analog and digital applications.

## APPLICATIONS

- Low-Speed Digital Data Links
- Motor Controller Triggering
- Audio Links
- Medical Instruments
- Automotive Electronics
- Robotics Communications
- EMC/EMI Signal Isolation
- Electronic Games
- Process Control

## FEATURES

- ◆ High Optical Sensitivity
- ◆ Mates with Standard 1000  $\mu\text{m}$  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
- ◆ RoHS Compliant

## MAXIMUM RATINGS

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

Operating and Storage Temperature Range ( $T_{OP}, T_{STG}$ )..... $-40^\circ$  to  $85^\circ\text{C}$   
 Junction Temperature ( $T_J$ ) ..... $85^\circ\text{C}$   
 Soldering Temperature (2 mm from case bottom) ( $T_S$ )  $t \leq 5\text{s}$ ..... $240^\circ\text{C}$   
 Collector Emitter Voltage ( $V_{CEO}$ )....30 V  
 Emitter Collector Voltage ( $V_{ECO}$ ) .....5 V  
 Collector Current ( $I_C$ ).....50 mA  
 Collector Peak Current ( $I_{CM}$ )  $t = 1\text{ms}$  .....100 mA  
 Power Dissipation ( $P_{TOT}$ )  $T_A=25^\circ\text{C}$  .....100 mW  
 De-rate Above  $25^\circ\text{C}$  .....1.33 mW/ $^\circ\text{C}$

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

Parameter	Symbol	Min	Typ	Max	Unit
Wavelength for Maximum Photosensitivity	$\lambda_{PEAK}$	-	870	-	nm
Spectral Bandwidth ( $S=10\%$ of $S_{MAX}$ )	$\Delta\lambda$	400	-	1100	nm
Switching Times (10% to 90% and 90% to 10%) ( $R_L=1\text{ k}\Omega$ , $I_C=1.0\text{ mA}$ , $V_{CE}=5\text{ V}$ , $\lambda=950\text{ nm}$ )	$t_r, t_f$	-	20	-	$\mu\text{s}$
Responsivity min. @ 880 nm @ 632 nm	R	-	100 50	-	$\mu\text{A}/\mu\text{W}$ $\mu\text{A}/\mu\text{W}$
Collector Dark Current ( $V_{CE}=15\text{ volts}$ )	$I_{CEO}$	-	-	100	nA
Breakdown Voltage ( $I_C=100\mu\text{A}$ )	$BV_{CEO}$	30	-	-	V
Breakdown Voltage ( $I_C=-100\mu\text{A}$ )	$BV_{ECO}$	5	-	-	V
Saturation Voltage ( $I_C=250\mu\text{A}$ , $H=100\mu\text{W}$ )	$V_{CE\text{ sat}}$	-	0.15	-	V

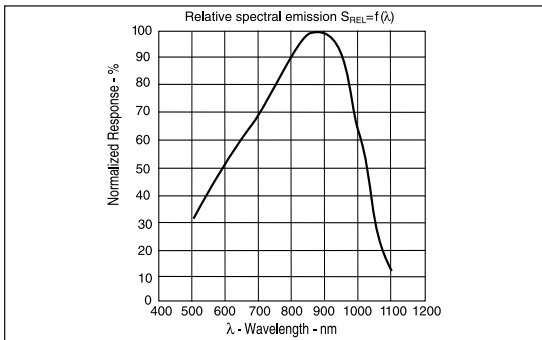


FIGURE 1. Typical detector response versus wavelength.

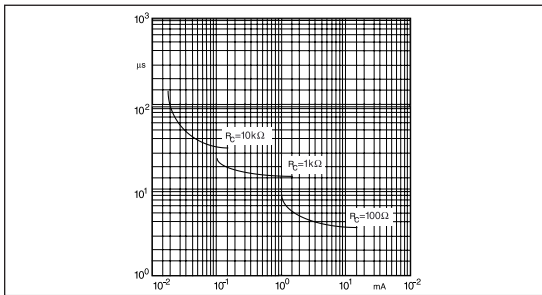


FIGURE 2. Rise and fall times of phototransistor.

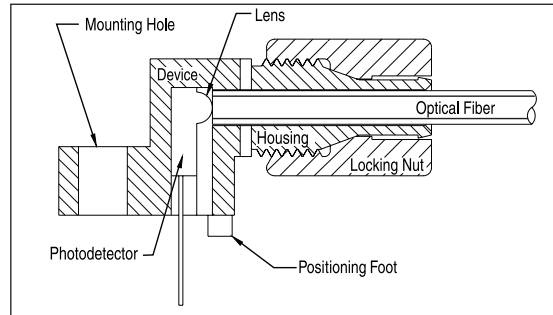
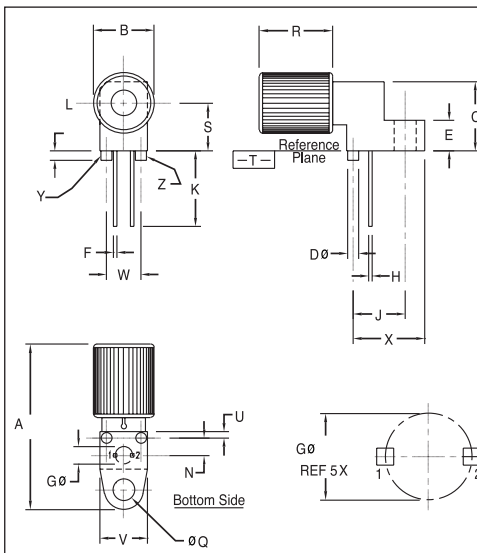


FIGURE 3. Cross-section of fiber optic device.

## 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.



### NOTES:

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

### PACKAGE IDENTIFICATION:

- ◆ Black housing w/ White 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	6.86	7.11	.270	.280
W	5.08 BSC .200 BSC			
X	10.10	10.68	.397	.427

FIGURE 4. Case outline.