

DESCRIPTION

The IF-E96E is a low-cost, high-speed, visible red LED housed in a “connector-less” style plastic fiber optic package. The output spectrum is produced by an AlGaInP die which peaks at 645 nm, one of the optical transmission windows of PMMA plastic optical fiber. The device package features an internal micro-lens and a precision-molded PBT housing to maximize optical coupling into standard 1000 μm core plastic fiber cable.

APPLICATION HIGHLIGHTS

The performance/price ratio of the IF-E96E is particularly attractive for high volume design applications. The visible red output has low attenuation in PMMA plastic fiber and aids in troubleshooting installations. When used with an IF-D96 photologic detector the IF-E96E can achieve data rates of 5 Mbps. Fast transition times and low attenuation make the IF-E96E an excellent device selection for low cost analog and digital data link up to 75 meters.

APPLICATIONS

- Low Cost Analog and Digital Data Links
- Automotive Electronics
- Digitized Audio
- Medical Instruments
- PC-to-Peripheral Data Links
- Robotics Communications
- Motor Controller Triggering
- EMC/EMI Signal Isolation
- Local Area Networks
- Intra-System Links: Board-to-Board, Rack-to-Rack

FEATURES

- ◆ High Performance at Low Cost
- ◆ Visible Red Output Aids Troubleshooting
- ◆ Low Transmission Loss with PMMA Plastic Fiber
- ◆ Fast Transition Times
- ◆ Mates with Standard 1000 μm Core, 2.2 mm Jacketed Plastic Fiber Cable
- ◆ No Optical Design Required
- ◆ Internal Micro-Lens for Efficient Optical Coupling
- ◆ Inexpensive Plastic Connector Housing
- ◆ 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° to 85°C

Junction Temperature (T_J).....85°C

Soldering Temperature (2mm from case bottom) (T_S) $t \leq 3$ s.....260°C

Reverse Voltage (V_R).....5 V

Power Dissipation (P_{TOT}) $T_A = 25^\circ\text{C}$75 mW

De-rate Above 25°C.....1.25 mW/°C

Forward Current, DC (I_F).....30 mA

Surge Current (I_{FSM}) $t \leq 100 \mu\text{s}$ 10% duty cycle.....185 mA

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

Parameter	Symbol	Min.	Typ.	Max.	Unit
Peak Wavelength	λ_{PEAK}	–	645	–	nm
Full-Spectral Bandwidth (FWHM)	$\Delta\lambda$	–	20	–	nm
Output Power Coupled into Plastic Fiber (1 mm core diameter). Distance Lens to Fiber $\leq .1$ mm, 1m SH4001 fiber, $I_F = 20$ mA	P_O	170 -7.7	400 -4.0	600 -2.2	μW dBm
Switching Times (10% to 90% and 90% to 10%) (Figure 3)	t_r, t_f	–	25	–	ns
Capacitance ($F = 1$ MHz) ($V_F = 0$)	C_0	–	10	–	pF
Forward Voltage ($I_F = 20$ mA)	V_f	–	2.0	2.5	V

CAUTION: The IF E96E is ESD sensitive. To minimize risk of damage observe appropriate precautions during handling and processing.

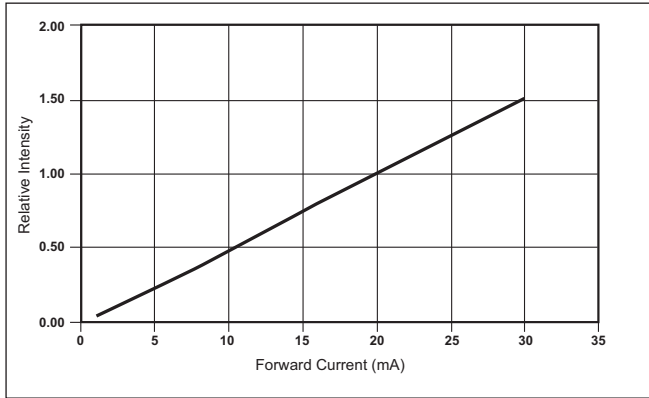


FIGURE 1. Normalized power launched versus forward current

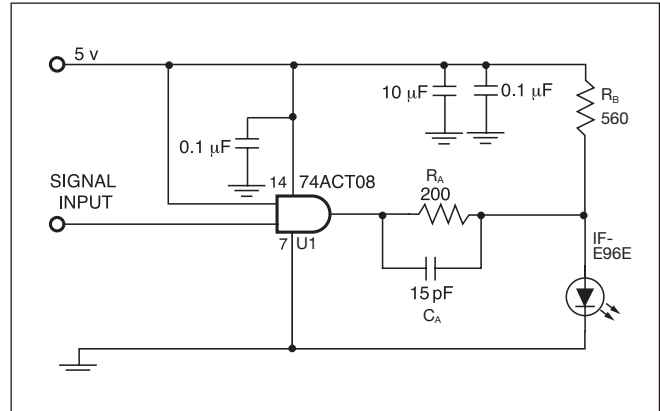


FIGURE 3. Test/Application circuit (IF = 20mA).

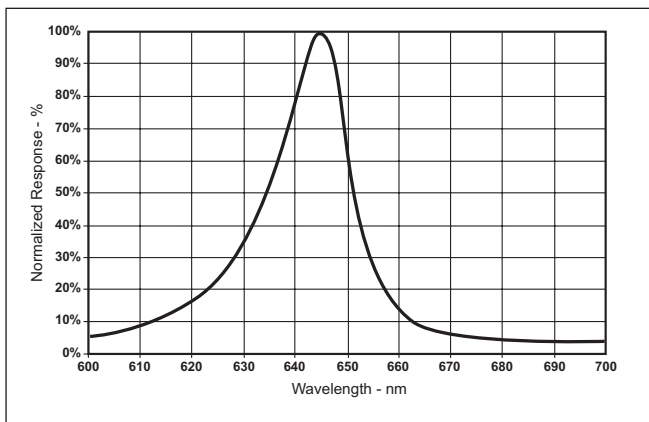


FIGURE 2. Typical spectral output versus wavelength.

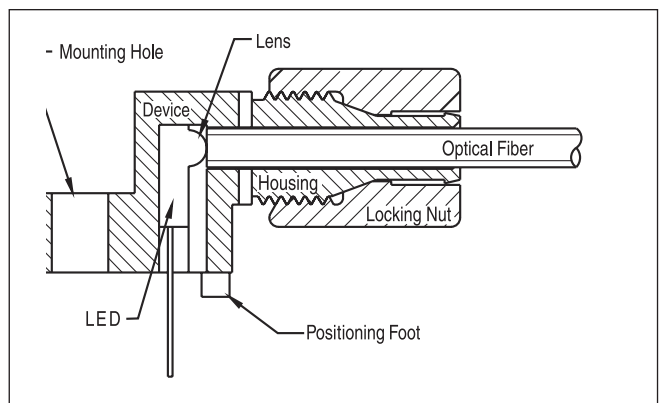


FIGURE 4. Cross-section of fiber optic device.

APPLICATION NOTES

The application circuit given in Figure 3 can be used to drive the IF-E96E for fast applications. Gate U1 represents the circuit being used to drive the IF-E96E. This must be able to supply the desired drive current at the output voltage. Resistor R_A supplies most of the drive current for the IF-E96E. The amount of current supplied is $I_A = (V_{U1} - V_f) / R_A$, where V_f is the IF-E96E forward voltage and V_{U1} is the drive circuit's output voltage under load. Resistor R_B speeds up the switching time by keeping the voltage across the IF-E96E from going to zero during turn off. It also supplies some of the drive current. The drive current from R_B is $I_B = (V_{CC} - V_f) / R_B$, where V_{CC} is the supply voltage. The total drive current to the IF-E96E is $I_A + I_B$. Some power is wasted in R_B when the IF-E96E is off. Capacitor C_A is used to increase the drive current during switching and speed up the turn on and turn off times. It must not be so large as to overdrive the IF-E96E during turn on or drive the voltage negative during turn off. For lower speed applications, only R_A is needed and C_A and R_B can be omitted.

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.

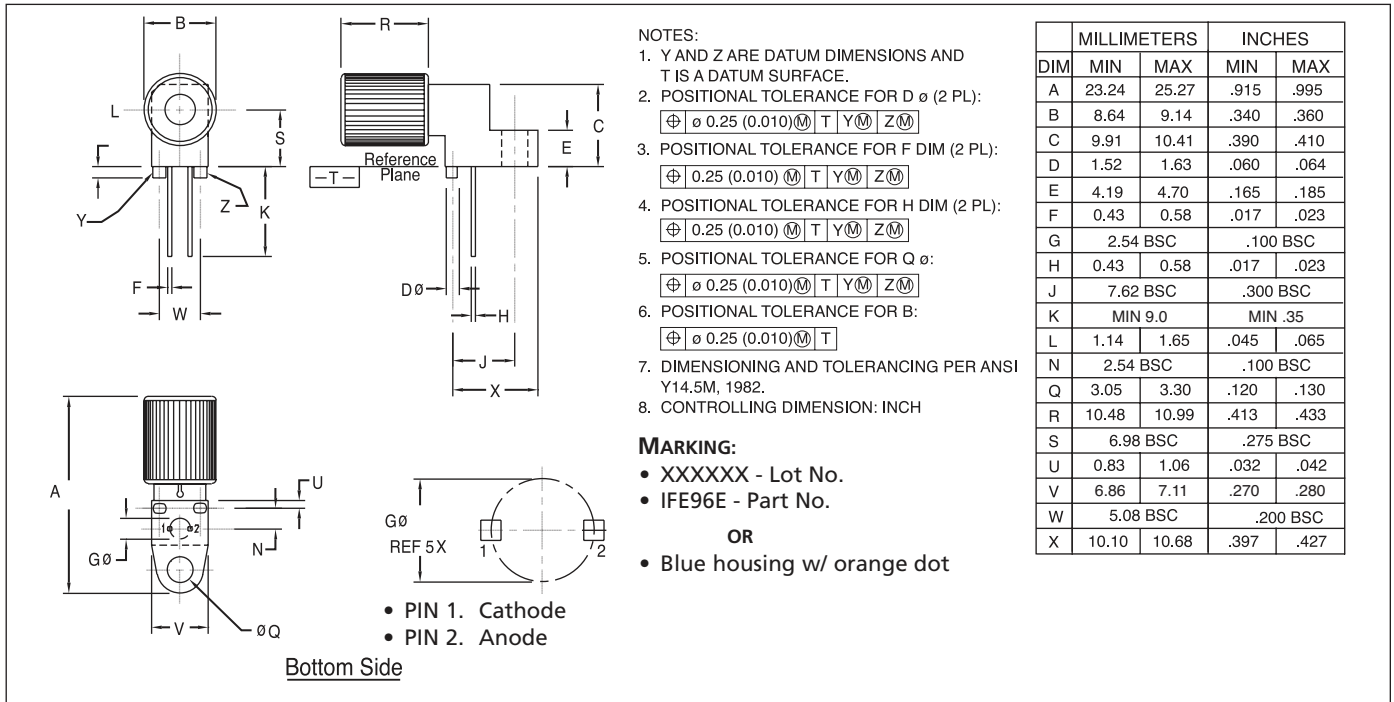


FIGURE 4. Case outline. Specifications are believed to be accurate but are subject to change. Industrial Fiber Optics assumes no responsibility for the consequences of using the information provided beyond replacement warranty for products not meeting stated specifications. Industrial Fiber Optics products are not authorized for use in life support applications without written approval from the President of Industrial Fiber Optics Corporation.

CAUTION:

- To avoid degraded device life due to package stress, do not bend or form leads outside the orientation shown on drawing.
- Ensure that solder flux does not migrate into the device and block the optical path, degrading the performance.
- If washing the device, liquid may become trapped in the part cavity. Ensure that all potentially corrosive materials are flushed out of the device.