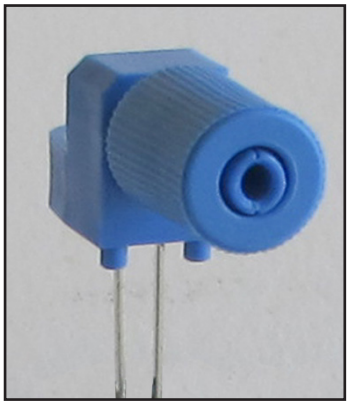
# Fiber Optic Red LED — IF E96E

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## 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 perfomance/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 Plasic Fiber Cable
- Mates with 2.2 mm Jacketed Multimode Glass Fiber, 200/230 or 400/430 using Active Device Adapter – 51 0537; 51 0538
- 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°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 ≤ 3 s.....260°C

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

Power Dissipation ($P_{TOT}$) $T_A$ =25°C.....75 mW

De-rate Above 25°C.....1.25 mW/°C

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

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

## Characteristics ($T_A$ =25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Peak Wavelength | $\lambda_{PEAK}$ | – | 645 | – | nm |
| Full-Spectral Bandwidth (FWHM) | $\Delta\lambda$ | – | 20 | – | nm |
| Output Power Coupled into Plastic Fiber (1 mm core diameter). Distance Lens to Fiber ≤ .1 mm, 1m SH4001 fiber, $I_F$=20 mA | $P_o$ | 170<br>-7.7 | 400<br>-4.0 | 600<br>-2.2 | $\mu$W<br>dBm |
| Output Power Coupled into Glass Fiber (200/230 µm core) Distance Lens to Fiber ≤0.1 mm, 1 meter BC04265-10 fiber, $I_F$=20 mA | $P_o$ | – | 34.5<br>-15.02 | – | µW<br>dBm |
| Fiber Transmission Loss SH4001 10 meter cutback | L | – | 0.28 | – | dB/m |
| 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.

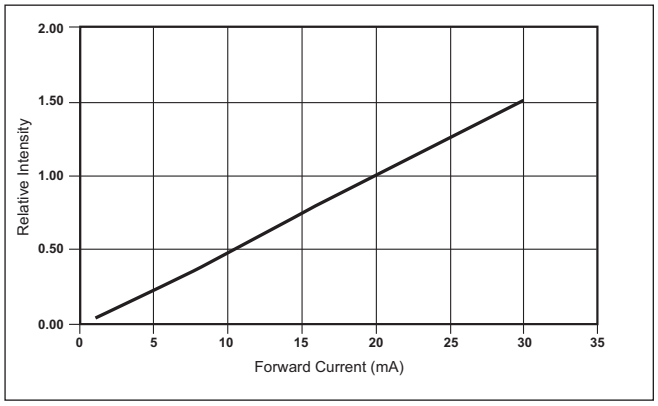



FIGURE 1. Normalized power launched versus forward current

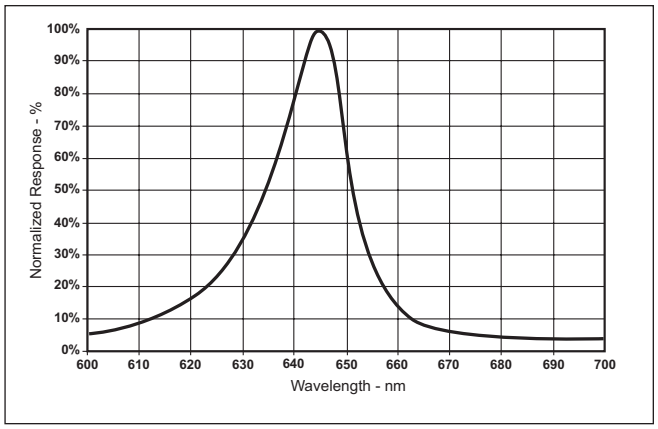



FIGURE 2. Typical spectral output versus wavelength.

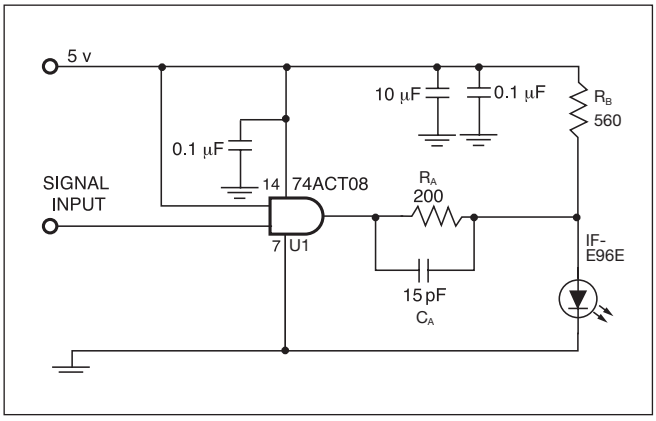



FIGURE 3. Test/Application circuit (IF = 20mA).

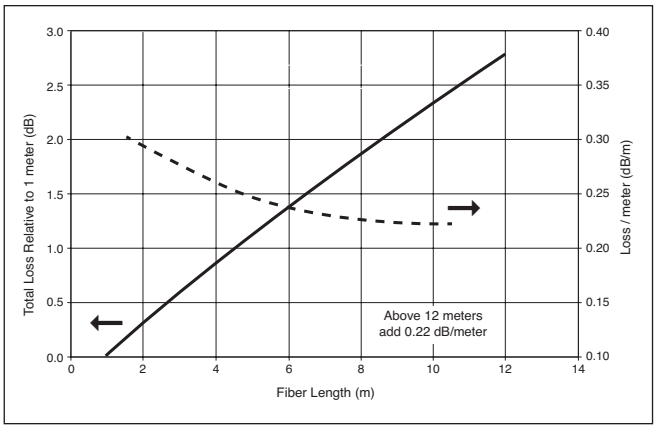



FIGURE 4. Fiber Loss in GH4001

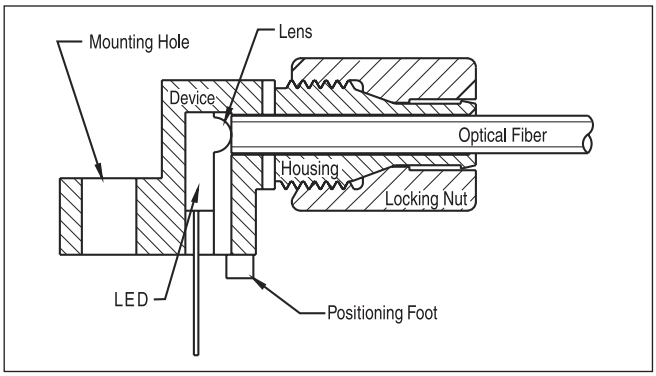



FIGURE 5. Cross-section of fiber optic device.

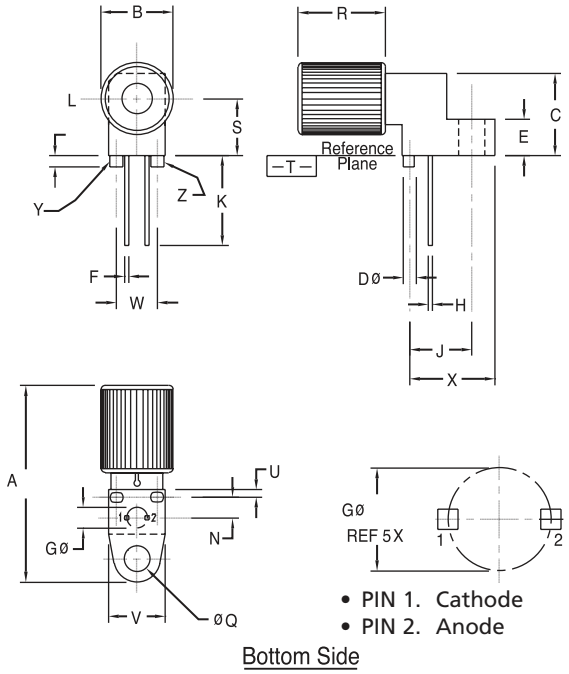
## APPLICATION NOTES

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 circuits 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 – PLASTIC OPTICAL FIBER

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. Do not exceed a torque of 0.4 N·m.

*Glass fiber – Refer to instructions listed on manufacturer's data sheet for each active device adapter.*




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

**MARKING:**
- XXXXXX - Lot No.
- IFE96E - Part No.

**OR**
- Blue housing w/ orange dot

| | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| DIM | 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 | MIN 9.0 | | MIN .35 | |
| 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 6. 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.