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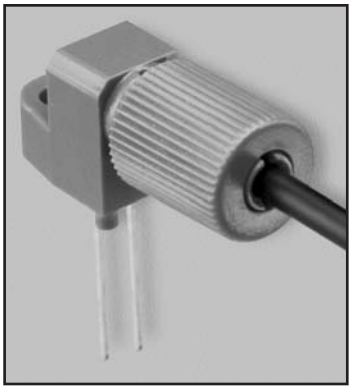
Plastic Fiber Optic Green LED — IF-E93

5/2/06



Typical Applications

- Local Area Networks (LANs)
- Optical Sensors
- Medical Instruments
- Automotive Displays
- Audio Systems
- Electronic Games
- Robotics Communications
- Fiber Optic Modems
- Fluorescent Instruments
- Wavelength Multiplexing

Description

The IF-E93 is a high-output, high-speed, green LED housed in a "connector-less" style plastic fiber optic package. The output spectrum of the green LED is produced by a Gallium Nitride die which peaks at a wavelength of 530 nm, ideally mapping to the lowest attenuation window of PMMA plastic core optical fiber. The device package features an internal LED micro-lens, and the PBT plastic housing ensures efficient optical coupling with standard 1000 µm core plastic fiber cable.

Application Highlights

The high output and fast transition times of the IF-E93 make it suitable for low-cost digital data links. When coupled to PMMA plastic optical fiber, attenuation is less than .1 dB/m, as compared to .16 dB/m with commonly used 650 nm LEDs. Using standard 1 mm core plastic fiber, the IF-E93 LED is capable of distances in excess of 150 meters at data rates of 5 Mbps. The fast rise and fall times of the IF-E93 permit data rates up to 30 Mbps. The drive circuit design is simpler than required for laser diodes, making the IF-E93 a good, low-cost alternative in a variety of analog and digital applications.

Features

- Ultra-Low Loss in Plastic Optical Fiber
- No Optical Design Required
- Mates with Standard 1000 µm Core Jacketed Plastic Fiber Cable
- Internal Micro-Lens for Efficient Coupling
- Inexpensive Plastic Connector Housing
- Connector-Less Fiber Termination and Connection
- Interference-Free Transmission from Light-Tight Housing
- Visible Light Output
- Fast Rise and Fall Times
- RoHS Compliant

Maximum Ratings

(T_A=25°C)

Operating and Storage Temperature Range (T_{OP}, T_{STG}) .....-40° to 60°C

Junction Temperature (T_J) .....85°C

Soldering Temperature (2 mm from case bottom) (T_S) t ≤ 5 s .....240°C

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

Power Dissipation (P_{TOT}) T_A=25°C.....60 mW

De-rate Above 25°C .....1.1 mW/°C

Forward Current, DC (I_F) .....35 mA

Surge Current (I_{FSM}) t ≤ 10 µs.....150 mA

Characteristics (T_A=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Peak Wavelength	λ_{PEAK}		530		nm
Spectral Bandwidth (50% of I_{MAX})	$\Delta\lambda$	–	50	–	nm
Output Power Coupled into Plastic Fiber (1 mm core diameter). Distance Lens to Fiber ≤0.1 mm, 1 m SH4001 fiber, I_F=20 mA	Φmin	95 -10.2	115 -9.4	135 -8.7	µW dBm
Switching Times (10% to 90% and 90% to 10%) (F=33 MHz, I_F=10 mA) *See Figure 3*	t_r, t_f	–	3.5, 16	–	ns
Capacitance (V_F=0, F=1 MHz)	C_0	–	100	–	pF
Forward Voltage (I_F=20 mA)	V_f	–	3.5	–	V
Temperature Coefficient, λ_{PEAK}	TC_λ		.17		nm/K

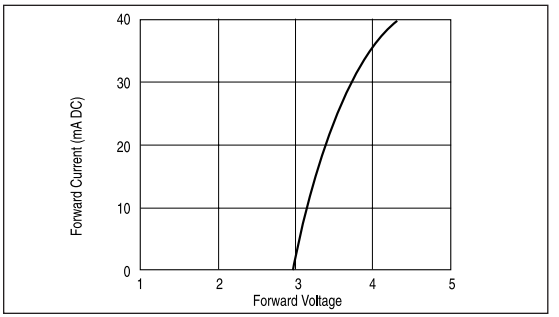


FIGURE 1. Forward current vs. forward voltage.

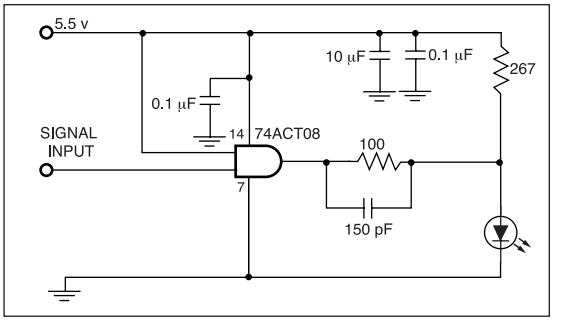


FIGURE 3. Test drive circuit (I_F = 22mA).

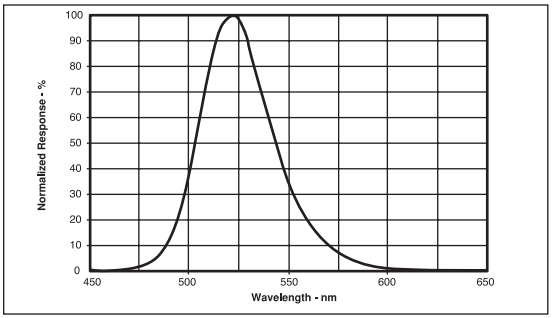


FIGURE 2. Typical spectral output vs. wavelength.

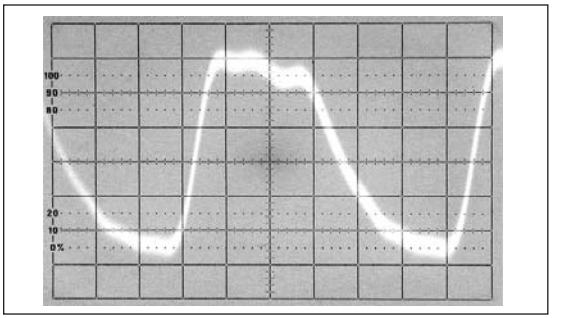
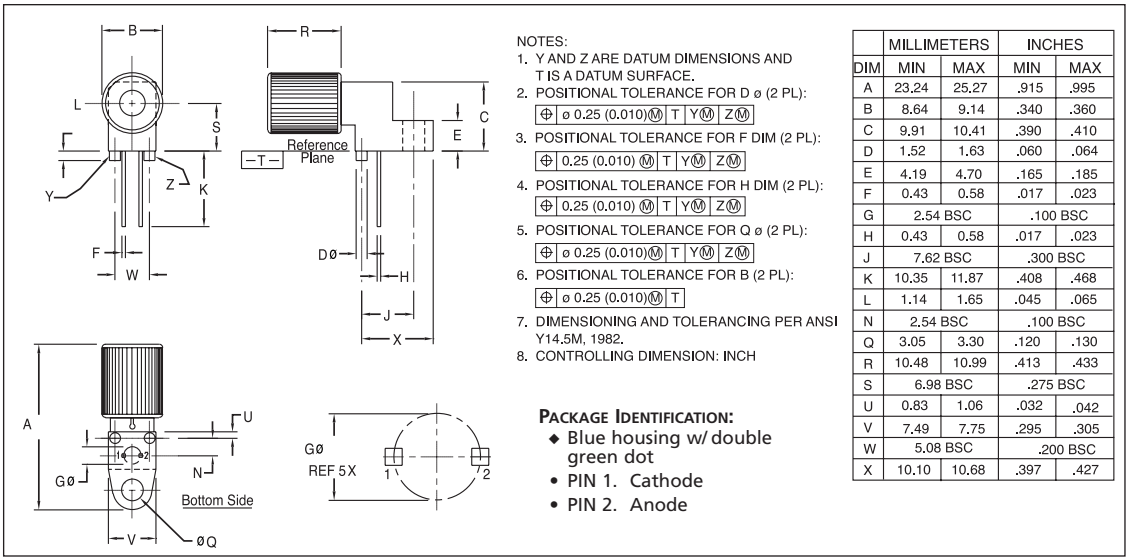


FIGURE 4. Transition times - Sweep = 5nS/div.



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 (2 PL): ⌖ | ø 0.25 (0.010)Ⓜ | T | YⓂ | ZⓂ
6. POSITIONAL TOLERANCE FOR B (2 PL): ⌖ | ø 0.25 (0.010)Ⓜ | T
7. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
8. CONTROLLING DIMENSION: INCH

PACKAGE IDENTIFICATION:
- ◆ Blue housing w/ double green dot
- • PIN 1. Cathode
- • PIN 2. Anode

	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	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

FIGURE 5. Case Outline.