Mitsubishi International PolymerTrade Corporation

Receivers for use with ESKA™ Products: MIC-D93

Description and Features

The MIC-D93 is a very high-sensitivity photodarlington detector housed in a connector-less style plastic fiber optic package. Its optical response extends from 400 nm to 1100 nm, making it compatible with a wide range of visible and near-infrared LED and laser diode sources. These include 650 nm visible-red LEDs used for optimum transmission with PMMA plastic optical fiber. The detector package features an internal micro-lens and a precision-molded PBT housing, ensuring efficient coupling with standard 1000µm core plastic fiber cable.

Very high optical sensitivity	Requires no optical design
Mates with standard 1000 µm core jacketed plastic fiber optic cable	Light-tight housing provides interference-free transmission
Uses inexpensive, rugged plastic connector housing	Internal micro-lens makes for efficient optical coupling
Fiber termination is connector-less, thus less expensive	

Applications

Highlights

This product is suitable for low-speed optical links requiring high sensitivity. Triggering rates can reach 1 k using a suitable LED source. Photodarlington transistor operation provides very high optical gain, eliminating the need for post-amplification in many circuits. The MIC-D93's integrated design makes it a simple, cost-effective solution in a variety of digital applications.

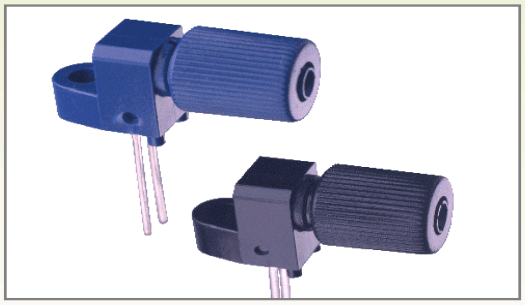
Low-speed optical links	Automotive electronics
Process control	Robotics control
Motor controller triggering	EMC / EMI signal isolation
Optical interrupter / Reflective sensors	Electronic games
	Medical instruments

Characteristics (T_A = 25°C)

Parameters		Symbol	Min.	Typ.	Max.	Unit
Wavelength for Maximum Photosensitivity		λ_{PEAK}	--	850	--	nm
Spectral Bandwidth S=10% of S_{MAX}		Δ λ	400	---	1100	nm
Switching Times 10% to 90% and 90% to 10% R_L=1kΩ,V_{CE}=5V and λ=880nm		t_r,t_f	--	5. 2.5	--	ms
Collector Dark Current V_{CE}=15V		I_{CEO}	--	--	100	nA
Responsivity Minimum @ 880nm		R	--	400	---	µA/ µW
Responsivity Minimum at @ 632nm				200		
Breakdown Voltage	I_C=1 mA	BV_{CEO}	15	--	--	V
	I_C=100 µA	BV_{ECO}	5	--	--	V
Saturation Voltage I_C=0.4µA, H=10µW		$V_{CE\ SAT}$	--	1.10	--	V

Maximum Ratings (T_A = 25°C)

Temperature Range for Operation and for Storage (T_{OP},T_{STG})	-40° to 85°C
Junction Temperature (T_J)	85°C
Soldering Temperature (2mm from case bottom) (T_S) t≤5s	240°C
Collector Emitter Voltage (V_{CEO})	15V
Emitter Collector Voltage (V_{ECO})	5V
Collector Current (I_C)	50mA
Collector Peak Current (I_{CM}) t=1ms	100mA
Power Dissipation (P_{TOT}) T_A = 25°C	100mW
De-rate above 25°C	1.33 mW/°C



Transmitters for use with ESKA™ Products: MIC-D93

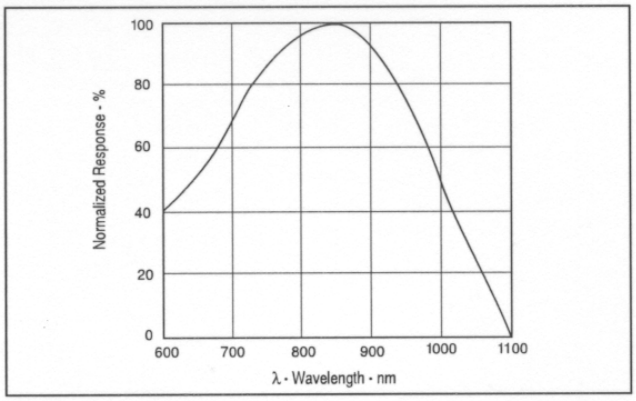


FIGURE 1. Typical detector response versus wavelength.

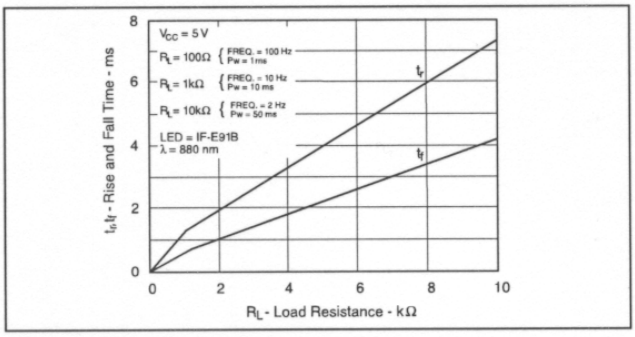


FIGURE 2. Rise and fall times versus load resistance.

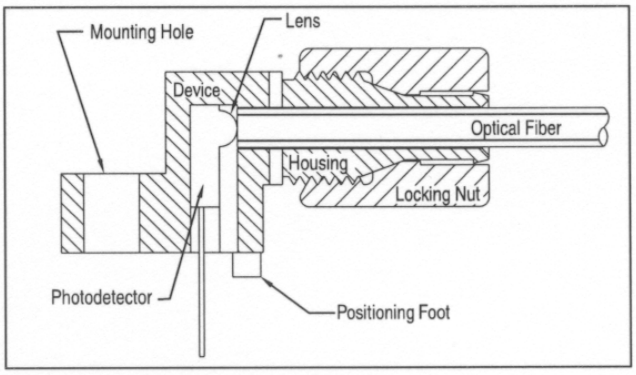
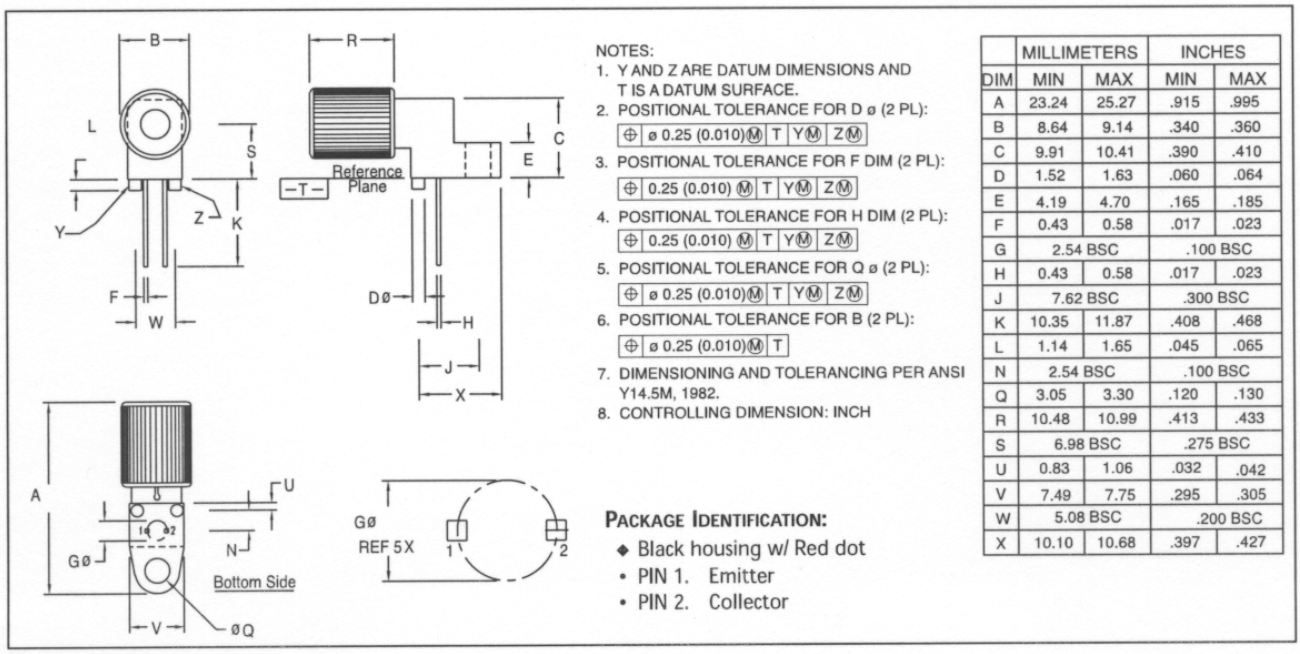


FIGURE 3. Cross-section of fiber optic device.

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.



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

	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

PACKAGE IDENTIFICATION:
- ◆ Black housing w/ Red dot
- • PIN 1. Emitter
- • PIN 2. Collector

FIGURE 4. Case outline.

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