

TOSHIBA

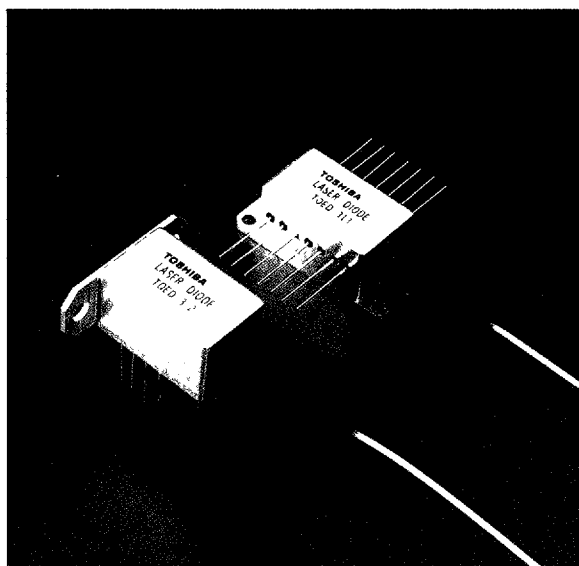
TOSHIBA (LASER/FBR OPTIC) DIV D ■ 9097252 0016080 623 ■ TOS6

LIGHT EMITTING DIODES

FOR OPTICAL COMMUNICATIONS

Edge Emitting LED Modules

TOED312/313 (1.31 μ m)



TOED312/313

Applications

- Light source for fiber optical communications.
- Light source for optical measuring instruments.

Features

- LED modules with single mode fiber.
- 1.31 μ m wavelengths.
- High power output of $P_f = 100\mu$ W.
- Built-in thermoelectric cooling device for stable emission.
- DIL and Butterfly-packages for easy circuit board mounting.

TOED312/313

TOSHIBA (LASER/FBR OPTIC) D1E D ■ 9097252 0016081 56T ■ T056

LEDs which exhibit multimode emission with a large spectral width are typically used for light sources for medium-distance, medium capacity optical communication systems. They are also incorporated in optical measurement instruments.

The Toshiba edge emitting diodes feature high optical output power and high speed modulation.

The TOED312/313 modules employ single-mode fiber pigtailes and emit at a wavelength of $1.31\mu\text{m}$. They are available in standard DIL and Butterfly packages.

Each type incorporates a monitoring photodiode and thermoelectric cooler for stable wavelength emission and optical output power.

Absolute Maximum Ratings ($T_a=25^\circ\text{C}$) (Tentative)

Item	Symbol	Rating	Units	Notes
Storage temperature	T_{stg}	-20~70	$^\circ\text{C}$	(1)
Operating temperature	T_{opr}	-20~60	$^\circ\text{C}$	(1)
Forward current	I_f	200	mA	
Reverse voltage	V_{r1}	2	V	
PD reverse voltage	V_{rm}	15	V	(2)

Notes

(1) The ambient temperature is equal to the case temperature.

(2) Ge or InGaAs PIN photodiode is available.

(3) Soldering temperature of 180°C and soldering time of 5 seconds should not be exceeded.

Electrical/Optical Characteristics ($T_a=25^\circ\text{C}$) (Tentative)

Item	Symbol	Conditions	Minimum	Typical	Maximum	Units	Notes
Forward voltage	V_f	$I_f = 150\text{mA}$	—	1.5	2.0	V	
Optical output power	P_f	$I_f = 150\text{mA}$	—	100		μW	
Tracking error	ΔP_f	$T_a = 0 \sim 60^\circ\text{C}$	—	± 0.5		dB	(1)
Peak wavelength	λ_p	$I_f = 150\text{mA}$	1280	1310	1330	nm	
Wavelength temp. coeff.	$\Delta\lambda_p/\Delta T_a$	$T_a = -20 \sim 60^\circ\text{C}$		0.3		nm/ $^\circ\text{C}$	
Polarization ratio (TM/TE)				-1		dB	
Spectral linewidth (FWHM)	$\Delta\lambda_p$	$I_f = 150\text{mA}$ $I_b = I_{th}$	—	45	—	nm	
Rise/Fall time	t_r/t_f	10~90%	—	3.5	—	ns	(2)
Monitor photo current	I_m	$I_f = 150\text{mA}$		50	—	μA	(3)
PD dark current	I_d	$V_r = 5\text{V}$	—	1		μA	(3)
Thermistor resistance	R_{th}	—		10		k Ω	
Cooling capacity	ΔT_a	—	40			$^\circ\text{C}$	
Cooler current	I_c	$\Delta T = 40^\circ\text{C}$		0.8	1	A	
Cooler voltage	V_c	$\Delta T = 40^\circ\text{C}$		1.5	2.0	V	

Notes

(1) $\Delta P_f = 10 \log (P_f(T)/P_f(25^\circ\text{C}))$, $I_m = \text{Const.}$

(2) The modulation current is 150mA.

(3) Ge or InGaAs PIN photodiode is available.

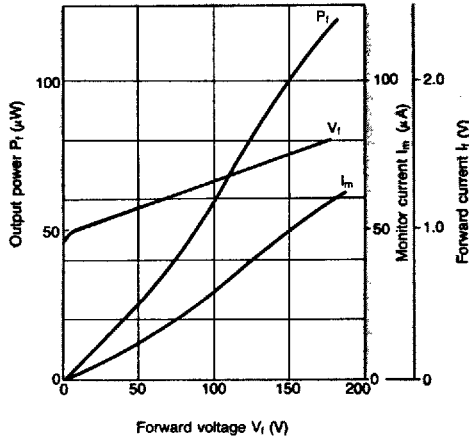
Fiber Tail

- Fiber type: single mode, self mode stripping
- Cladding diameter: $125 \pm 2\mu\text{m}$
- Concentricity error: $< 1\mu\text{m}$
- Non-circulation of core: $< 10\%$
- Non-circulation of surface: $< 2\%$
- Mode field diameter: $10 \pm 1\mu\text{m}$
- Refractive index difference: $0.3 \pm 0.04\%$
- Length: $> 1\text{m}$
- Outer coating diameter: $0.9 \pm 0.1\text{mm}$
- Fiber bendable radius: $R > 35\text{mm}$
- Cutoff wavelength: $1.1 \sim 1.28\mu\text{m}$ or $1.13 \sim 1.27\mu\text{m}$

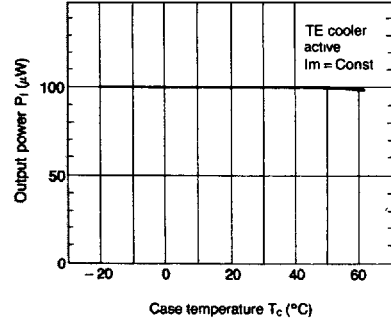
* Polarization Maintain (PM) fiber is available.

* FC/PC connector is available.

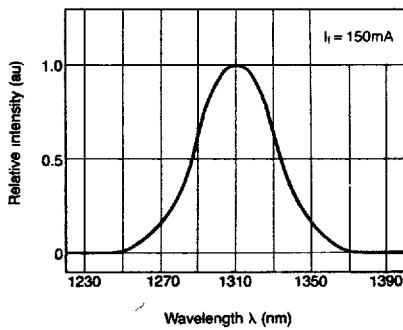
Major Characteristics Curves



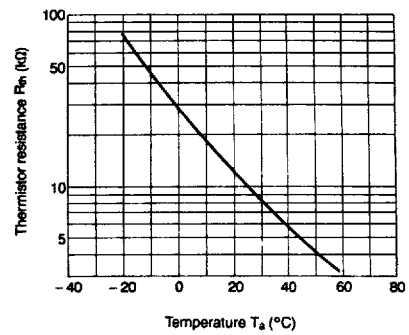
Output power, monitor current and forward voltage VS forward current



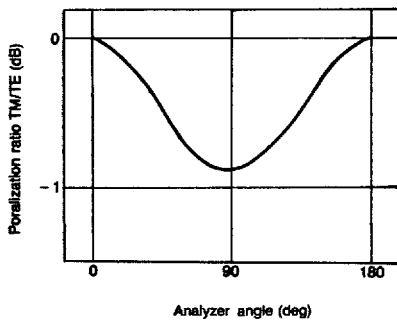
Output power VS case temperature



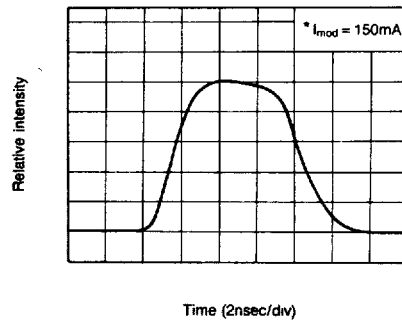
Spectrum



Thermistor resistance VS ambient temperature



Polarization ratio



Pulse response

* I_{mod} : Modulation current

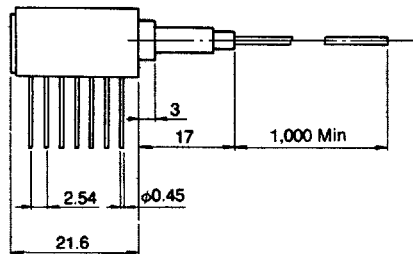
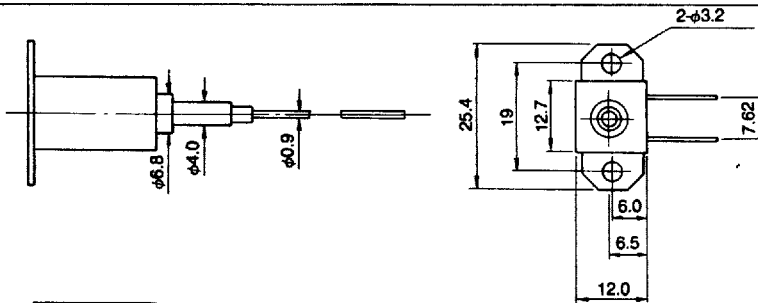
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TOED312/313

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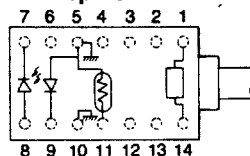
Dimensional Outlines

TOED312

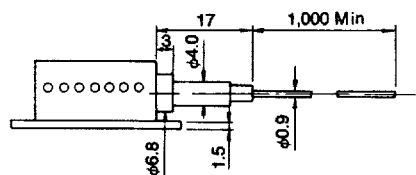
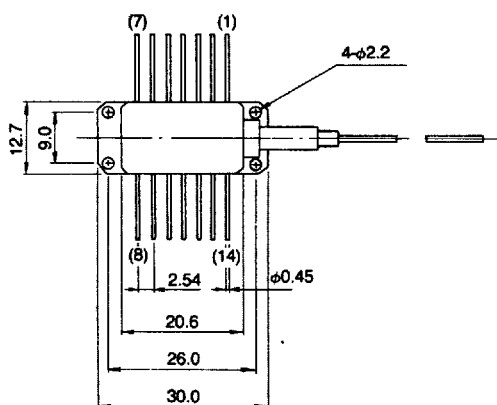


Pin configuration

Top view

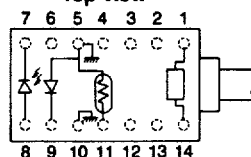


TOED313



Pin configuration

Top view



#	Function
1	Cooler (+)
2	N/C
3	N/C
4	N/C
5	LED anode
6	Thermistor, Case
7	N/C
8	Photodiode cathode
9	Photodiode anode
10	LED cathode
11	Case
12	Thermistor
13	N/C
14	N/C
14	Cooler (-)

Unit: mm

Precautions

(a) Power supply

Transit voltage may cause the LED output to exceed the absolute maximum ratings. A surge-free power supply and a slow starter circuit use are recommended.

(b) Safety

The LED light is invisible and may be harmful to human eyes. Don't look directly at high power emission when the diode is operating.

Design and specifications subject to change without notice

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