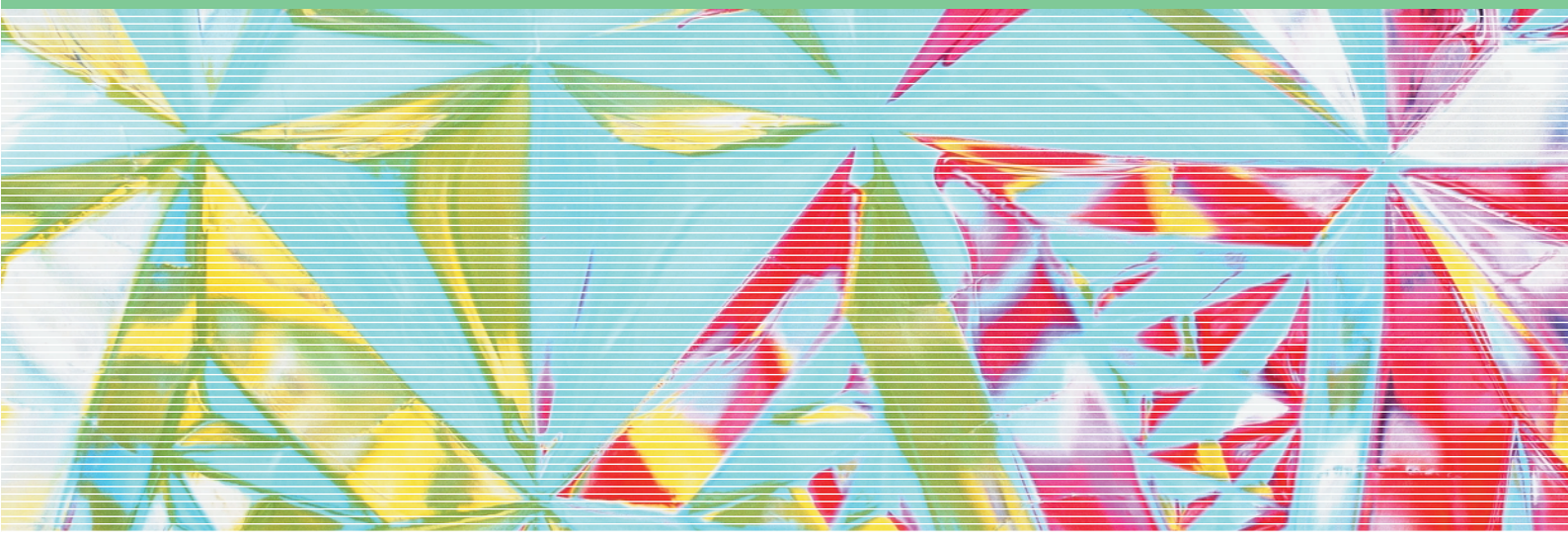
TOSHIBA

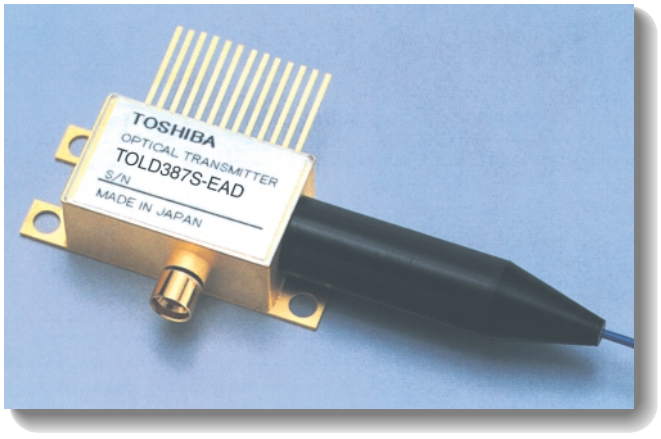
March 2002

Optical Communication Devices

10 Gb/s Optical Transmitter

TOLD387S-EAD Series





APPLICATIONS

- SONET / SDH (OC-192 / STM-64) applications
  - TOLD387S-EAD1: I-64. 2, 25-km application
  - TOLD387S-EAD2: S-64. 2b, 40-km application
  - TOLD387S-EAD3: 60-km or longer application

FEATURES

- 1.55 µm EML and Driver IC
- Optical isolator and thermoelectric cooler
- GPO compatible RF input
- Dispersion penalty: < 2 dB
- Fiber output power
  - TOLD387S-EAD1: –5 dBm (min), –1 dBm (max)
  - TOLD387S-EAD2: –1 dBm (min), +2 dBm (max)
  - TOLD387S-EAD3: –3 dBm (min)

TOLD387S-EAD Series

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit
Storage temperature	Tstg	–40	+85	˚C
Operating case temperature	Tc	–5	+70	˚C
Laser forward current	If	—	150	mA
Laser reverse voltage	Vr	—	2	V
Monitor diode (PIN-PD) bias voltage	Vm	–15	+2	V
Supply voltage to the driver IC	Vss	–6.5	+0.3	V
Cross-point reference voltage	Vref	Vss–4.8 (Min: –6.5)	Vss+2.4 (Max: 0.3)	V
Cross-point control voltage	Vxp			
Output amplitude control voltage	Voa	–6.5	Vss+1.2 (Max: 0.3)	V
Output bias control voltage	Vob	–6.5	Vss+2.4 (Max: 0.3)	V
Input data amplitude	Vin	—	1.6	Vpp
Soldering temperature	Tsol	—	260	˚C
Soldering time	tsol	—	5	s

Note: Case temperature should be measured on heat spreader directly.

ELECTRICAL AND OPTICAL CHARACTERISTICS
(Case temperature: Tc = –5 to +70 ˚C, Tset = 25 ˚C unless otherwise specified.)

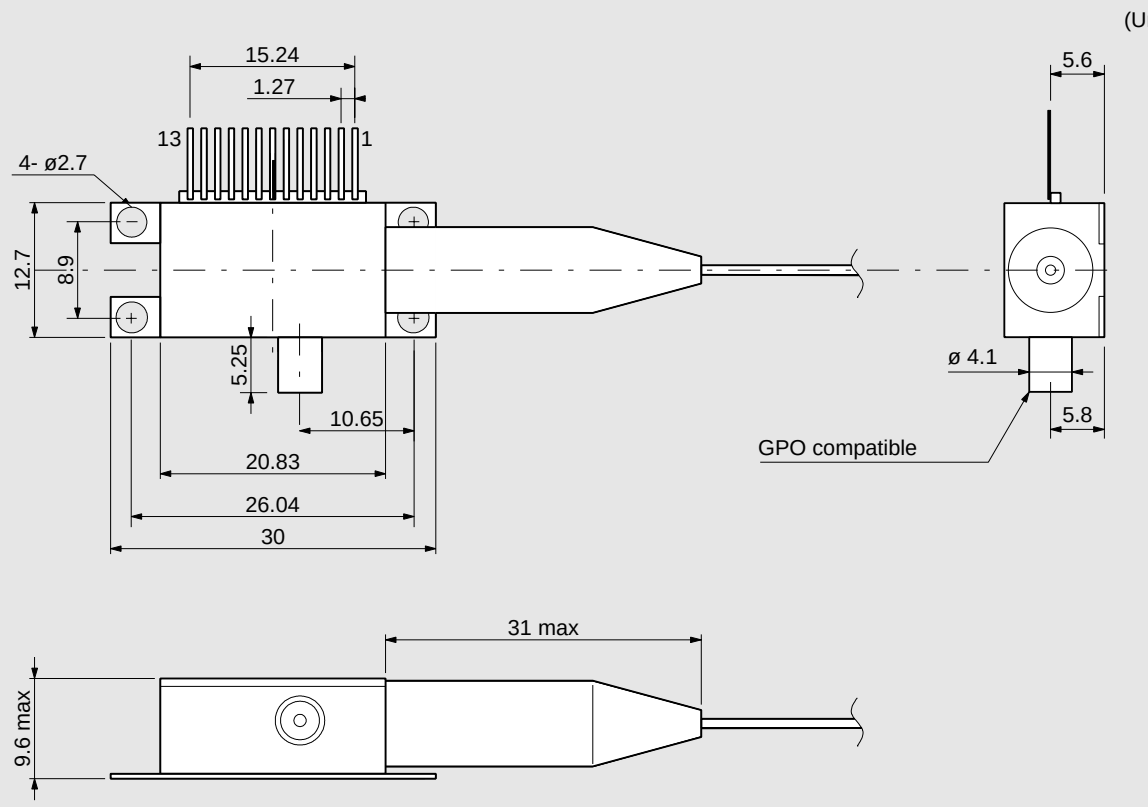
Item	Symbol	Min	Typ.	Max	Unit	Note
Threshold current	Ith	—	15	40	mA	
Operating current	Iop	50	—	100	mA	
Laser diode forward voltage	Vf	—	—	2	V	
RF input impedance	Zin	—	50	—	Ω	
Input data amplitude	Vin	0.5	—	1.0	Vpp	
Supply voltage to the driver IC	Vss	–5.5	–5.2	–5.0	V	
Supply current to the driver IC	Iss	—	0.2	0.3	A	
Cross-point reference voltage	Vref	Vss+1.1	Vss+1.3	Vss+1.5	V	(1)
Cross-point control voltage	Vxp	Vref–0.3	—	Vref+0.3	V	(1)
Output amplitude control voltage	Voa	Vss	—	Vss+1.0	V	(2)
Output bias control voltage	Vob	Vss	—	Vss+2.2	V	(3)
Peak wavelength	λ	1530	—	1565	nm	(4)
Side mode suppression ratio	SMSR	30	—	—	dB	(4)
Extinction ratio	ER	9	—	—	dB	(4)
RF Return Loss (up to 7GHz)	S_{11}	10	—	—	dB	
Monitor diode current	Im	0.05	—	—	mA	
Thermoelectric cooler current (Tc = 70˚C)	Itec	—	—	1.3	A	
Thermoelectric cooler voltage (Tc = 70˚C)	Vtec	—	—	2.6	V	
Thermistor resistance	Rth	9.5	10.0	10.5	kΩ	

Notes:
(1) When Vref is open, self-bias voltage of about Vss+1.3V is applied to Vref. To prevent dependence of Vref on the supply voltage Vss, use a regulated voltage source for Vref, or control the voltage of Vxp, so that the voltage difference, Vxp-Vref, is constant.
(2) To prevent dependence of the output amplitude on the supply voltage Vss, control the voltage of Voa, so that the voltage difference, Voa-Vss, is constant.
(3) To prevent dependence of the output bias level on the supply voltage Vss, control the voltage of Vob, so that the voltage difference, Vob-Vss, is constant.
(4) 10Gb/s, NRZ, PRBS 2^{23}–1 modulated

TOLD387S-EAD series products lineup

Part Number	Fiber Output Power (dBm)		Maximum Dispersion	Target Distance	Dispersion Penalty	Application
	Min	Max	(ps / nm)	(km)	(dB)	
TOLD387S-EAD1	–5	–1	500	25	< 2	I-64.2
TOLD387S-EAD2	–1	+2	800	40	< 2	S-64.2b
TOLD387S-EAD3	–3	–	1200	60	< 2	–

DIMENSIONAL OUTLINE AND PIN ASSIGNMENT



Pin Assignment

Pin	Function	Pin	Function
1	Thermistor	8	Cross-point reference voltage (Vref)
2	Thermistor	9	Output-amplitude control voltage (Voa)
3	LD DC bias (+)	10	Cross-point control voltage (Vxp)
4	Monitor PD anode (–)	11	Supply voltage (Vss)
5	Monitor PD cathode (+)	12	TEC (+)
6	Output bias control voltage (Vob)	13	TEC (–)
7	NC	GPO Compatible	50 Ω RF input (AC coupled)

Note: The body of the module has to be grounded.

PRECAUTIONS

(a) Power supply: Transient electric spike may cause a damage to the laser, the photodiode or IC chips. A surge-free power supply and a slow starter circuit should be used.
To avoid causing an electrical surge, pins should not be connected or disconnected on the test fixture before turning the power off.

(b) The product should be grounded for obtaining the performance.

(c) Safety: The laser emits invisible light harmful to the human eyes. Direct viewing should be avoided.

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