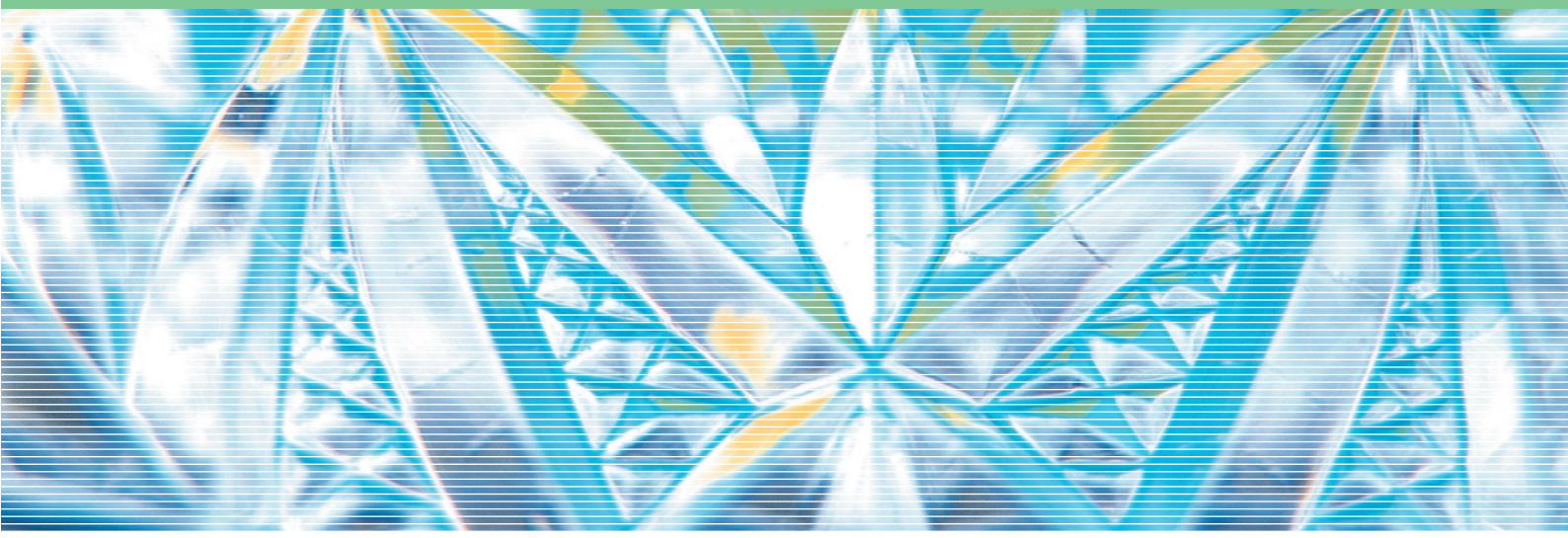
TOSHIBA

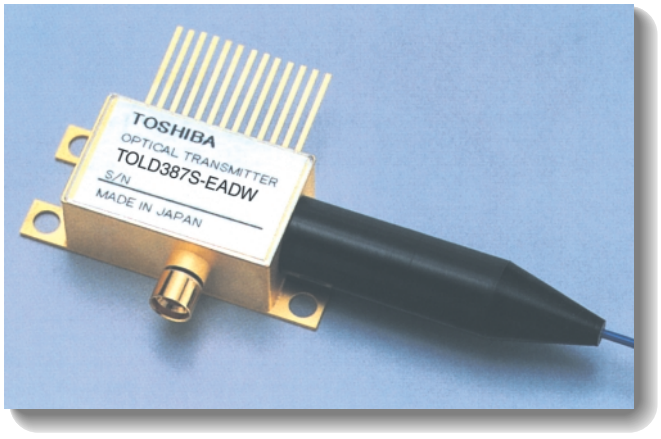
March 2002

Optical Communication Devices

10 Gb/s Optical Transmitter

TOLD387S-EADW Series





APPLICATIONS

- SONET / SDH (OC-192 / STM-64) applications
- 10 Gb/s DWDM applications
  - TOLD387S-EADW1 : 40 km application
  - TOLD387S-EADW2 : 60 km application

FEATURES

- 1.55 μm EML and Driver IC
- Optical isolator and thermoelectric cooler
- Wavelength stability: ±0.5 pm / ˚C
- GPO compatible RF input
- Dispersion penalty : < 2 dB
- Fiber output power
  - TOLD387S-EADW1 : – 2 dBm(min), + 2 dBm (max)
  - TOLD387S-EADW2 : – 5 dBm(min)

TOLD387S-EADW Series

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit
Storage temperature	Tstg	–40	+85	˚C
Operating case temperature	Topr	–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)

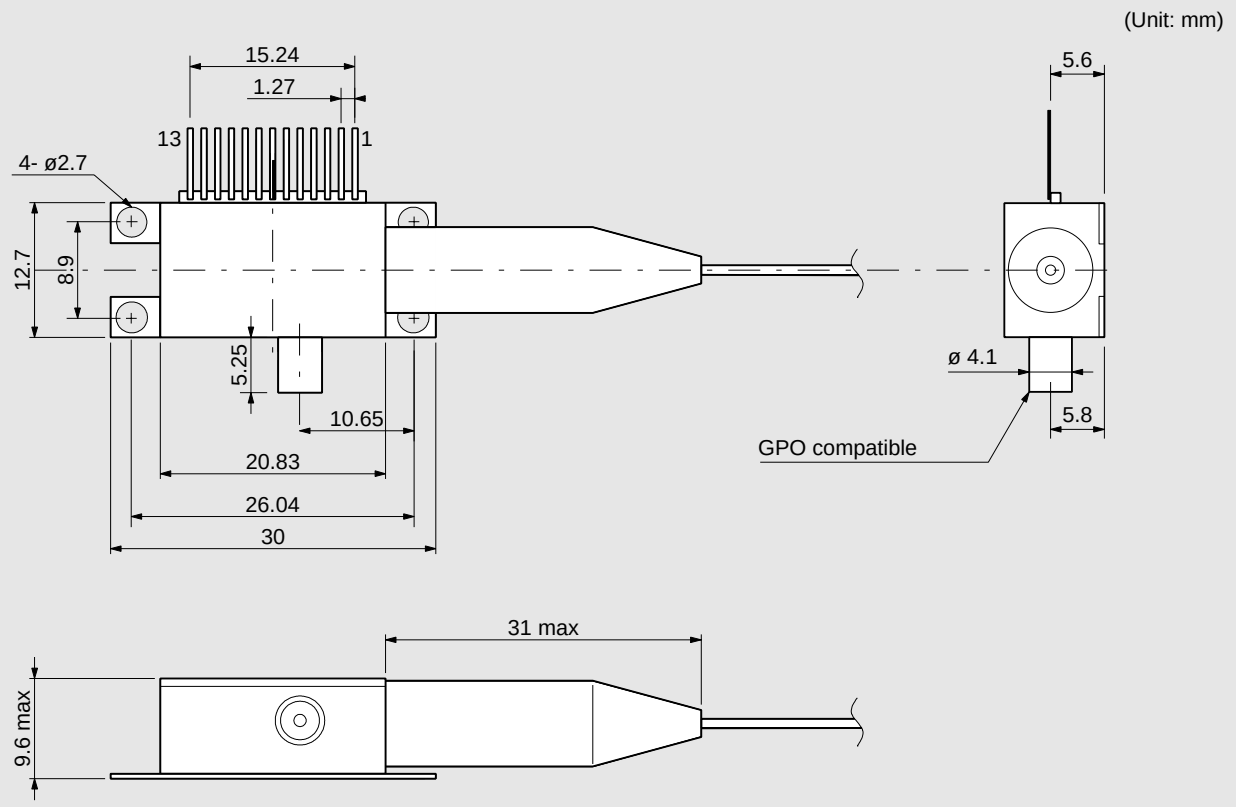
Item	Symbol	Min	Typ.	Max	Unit	Note
Laser set temperature	Tset	20	—	35	˚C	
Threshold current	Ith	—	—	40	mA	
Operating current	Iop	50	75	100	mA	
Laser diode forward voltage	Vf	—	—	2	V	
RF input impedance	Zin	—	50	—	Ω	
Input data amplitude	Vin	0.5	—	1.0	Vpp	
Supply voltage to the driver IC	Vss	–5.5	–5.2	–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)
Fiber output power change with case temperature	ΔPf	–0.5	—	0.5	dB	(4)
Peak wavelength	λ	ITU-T Grid, 100 GHz Spacing, from 1528.77 to 1560.61 nm				(4)
Wavelength change with case temperature	dλ/dTc	–0.5	—	0.5	pm/˚C	(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 (Tset = 25˚C)	Rth	9.5	10.0	10.5	kΩ	
Thermistor B constant	B	—	3450	—	K	

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) 10 Gb/s, NRZ, PRBS 2^{23}-1 modulated

TOLD387S-EADW series products lineup

Part Number	Fiber output power (dBm)		Maximum dispersion	Target distance	Dispersion penalty
	Min	Max	(ps / nm)	(km)	(dB)
TOLD387S-EADW1	–2	+2	800	40	< 2
TOLD387S-EADW2	–5	–	1200	60	< 2

DIMENSIONAL OUTLINE AND PIN ASSIGNMENT



Pin Assignment

Pin	Function	Pin	Function
1	Thermistor (grounded)	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)

Notes: The body of the module has to be grounded.
The grounded pin #1 should be used for temperature sensing circuit only.

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.

OVERSEAS SUBSIDIARIES AND AFFILIATES

011025 (X)

Toshiba America Electronic Components, Inc.

Headquarters-Irvine, CA
9775 Toledo Way, Irvine, CA 92618, U.S.A.
Tel: (949)455-2000 Fax: (949)859-3963

Deerfield, IL(Chicago)
One Pkwy., North, Suite 500, Deerfield,
IL 60015, U.S.A.
Tel: (847)945-1500 Fax: (847)945-1044

Edison, NJ
2035 Lincoln Hwy. #3000, Edison.
NJ 08817, U.S.A.
Tel: (732)248-8070 Fax: (732)248-8030

Raleigh, NC
5511 Capitol Center Dr., #114,
Raleigh, NC 27606, U.S.A.
Tel: (919)859-2800 Fax: (919)859-2898

Richardson, TX(Dallas)
777 East Campbell Rd., #650, Richardson,
TX 75081, U.S.A.
Tel: (972)480-0470 Fax: (972)235-4114

Wakefield, MA(Boston)
401 Edgewater Place, #360, Wakefield,
MA 01880, U.S.A.
Tel: (781)224-0074 Fax: (781)224-1095

Toshiba Electronics Europe GmbH

Düsseldorf Head Office
Hansaallee 181, D-40549 Düsseldorf,
Germany
Tel: (0211)5296-0 Fax: (0211)5296-400

Toshiba Electronics Italiana S.R.L.
Centro Direzionale Colleoni,
Palazzo Perseo 3,
1-20041 Agrate Brianza, (Milan), Italy
Tel: (039)68701 Fax:(039)6870205

Toshiba Electronics(UK) Ltd.
Riverside Way, Camberley Surrey,
GU15 3YA, U.K.
Tel: (01276)69-4600 Fax: (01276)69-4800

Toshiba Electronics Scandinavia A.B.
Gustavslundsvägen 12, 2nd Floor,
S-161 15 Bromma, Sweden
Tel: (08)704-0900 Fax: (08)80-8459

Toshiba Electronics Asia (Singapore) Pte. Ltd.

Singapore Head Office
438B Alexandra Road, #06-08/12 Alexandra
Technopark, Singapore 119968
Tel: (278)5252 Fax: (271)5155

Toshiba Electronics Asia, Ltd.

Hong Kong Head Office
Level 11, Tower 2, Grand Century
Place, No.193, Prince Edward Road West,
Mong Kok, Kowloon, Hong Kong
Tel: 2375-6111 Fax: 2375-0969

Beijing Office
Rm 714, Beijing Fortune Building,
No.5 Dong San Huan Bei-Lu, Chao Yang District,
Beijing, 100004, China
Tel: (010)6590-8796 Fax: (010)6590-8791

Toshiba Electronics Korea Corporation

Seoul Head Office
14/F, KEC B/D, 275-7 Yangjae-dong,
Seocho-ku, Seoul, Korea
Tel: (02)589-4300 Fax: (02)589-4302

Toshiba Technology Development (Shanghai) Co., Ltd.

23F, HSBC Tower, 101
Yin Cheng East Road, Pudong New Area, Shanghai,
200120, China
Tel: (021)6841-0666 Fax: (021)6841-5002

Toshiba Electronics Taiwan Corporation

Taipei Head Office
17F, Union Enterprise Plaza Bldg. 109
Min Sheng East Rd., Section 3, 10446 Taipei,Taiwan
Tel: (02)2514-9988 Fax: (02)2514-7892

(As of August, 2001)

In Touch with Tomorrow

TOSHIBA

TOSHIBA CORPORATION

Electronic Devices Sales & Marketing Division
1-1, Shibaura 1-chome, Minato-ku, Tokyo, 105-8001, Japan
Tel: +81-3-3457-3405 Fax: +81-3-5444-9431

Website: http://www.semicon.toshiba.co.jp/eng/index.html

36108C-0203 D5