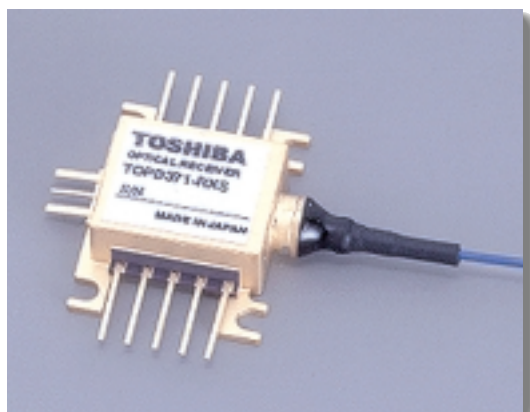


Optical Communication Devices

10 Gb/s Optical Receiver

TOPD371-RXS Series



(Lead output type: TOPD371-RXSCPW)



(SMA connector output type: TOPD371-RXSSMA)

APPLICATION

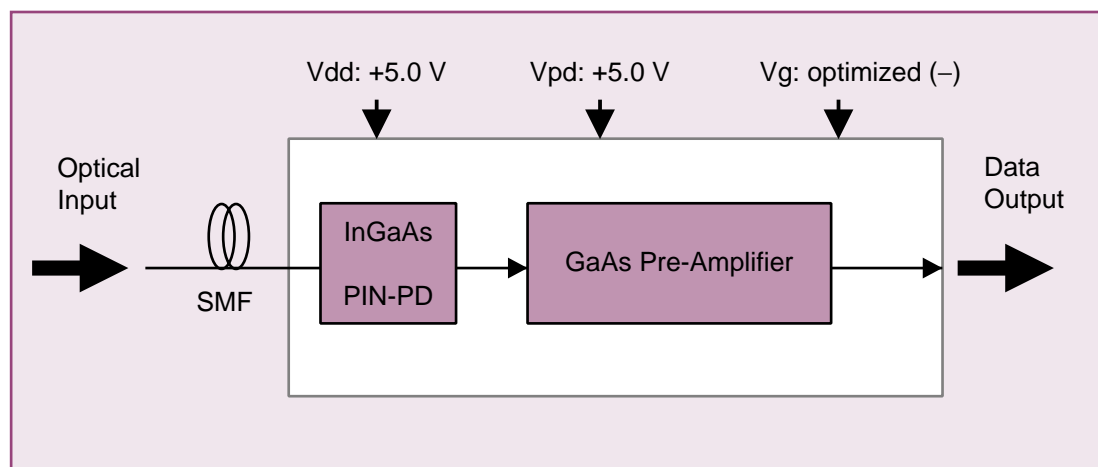
- SONET / SDH (OC-192 / STM-64) applications

FEATURES

- PIN-PD and Pre-Amplifier
- Lead output type : TOPD371-RXSCPW
- SMA connector output type: TOPD371-RXSSMA
- Sensitivity: -20 dBm (Typ. @ BER = 1×10^{-10} , PRBS $2^{31}-1$)
- Overload: 0 dBm (Min @ BER = 1×10^{-10} , PRBS $2^{31}-1$)
- Transimpedance: 700 Ω (Typ.)
- Package size
 - TOPD371-RXSCPW: 12.7 mm (W) x 16.0 mm (D) x 7.0 mm (H)
 - TOPD371-RXSSMA: 12.7 mm (W) x 20.8 mm (D) x 9.5 mm (H)

TOPD371-RXS Series

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C)

Item	Symbol	Rating	Unit
Storage temperature	Tstg	-40 to +85	°C
Operating ambient temperature	Ta	0 to +70	°C
PD forward current	If	3	mA
PD reverse current	Ir	2	mA
PD reverse voltage	Vpd	0 to +15	V
Positive voltage	Vdd	0 to +6	V
Positive current	Idd	100	mA
Gate voltage (Gain control voltage)	Vg	-3 to 0	V
Soldering temperature / time	Tsol / tsol	260 / 5	°C / s

ELECTRICAL AND OPTICAL CHARACTERISTICS

(Ta = 0 to +70 °C, $\lambda = 1.3/1.55 \mu\text{m}$, Vdd = +5 V, Vpd = +5 V) (Note 1)

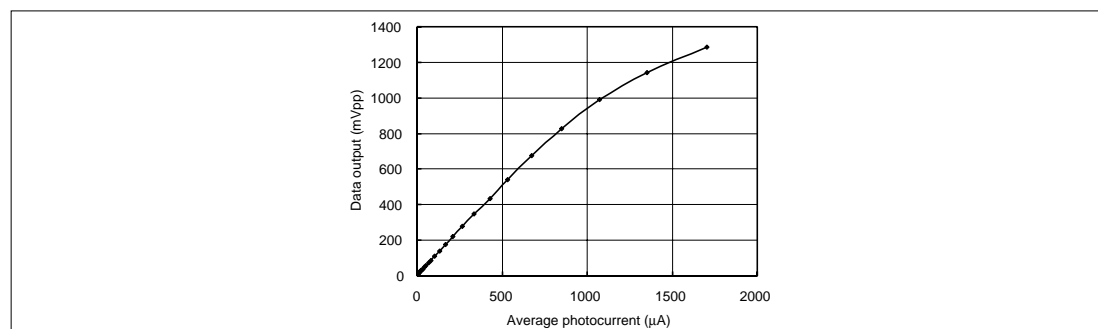
Item	Symbol	Condition	Min	Typ.	Max	Unit
Positive current	Idd	Vg=0V	—	50	100	mA
Responsivity	R1.55	-10dBm	0.6	0.75	—	A/W
Dark current	Id	—	—	—	10	nA
Cutoff frequency	fc	3 dB down from 10 MHz	8.0	9.0	—	GHz
Amplitude deviation	—	10 MHz to fc	—	—	3	dB
Transimpedance	Zt	—	500	700	—	Ω
Sensitivity	Ps	Note 2	—	-20	-18	dBm
Overload	Po	Note 2	0	—	—	dBm
Optical return loss	Ro	—	27	—	—	dB

Note 1: To optimize frequency response, Vg should be controlled by using Vsm.

See a recommended gain control circuit shown on the next page.

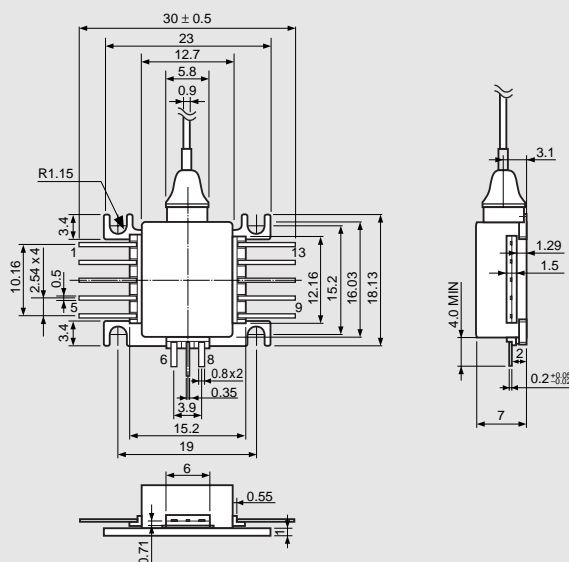
Note 2: 9.95328 Gb/s, NRZ, PRBS 2³¹-1, BER = 1 x 10⁻¹⁰

TYPICAL DATA OUTPUT AMPLITUDE VS. PIN PD PHOTOCURRENT



DIMENSIONAL OUTLINE AND PIN ASSIGNMENT

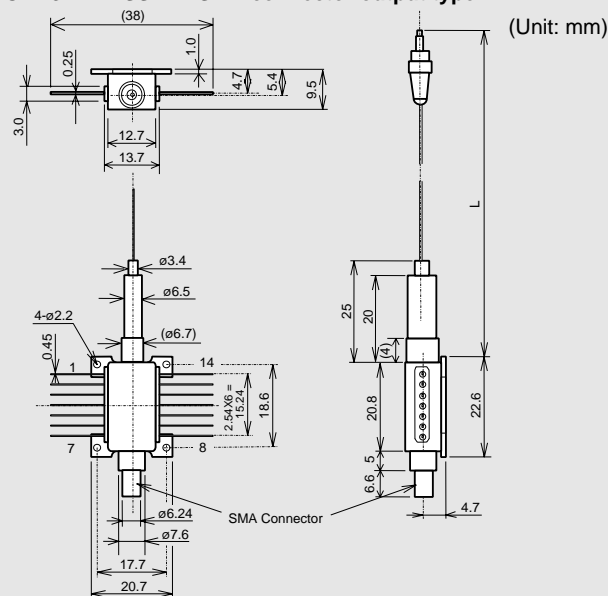
TOPD371-RXSCPW: Lead output type



Pin Assignment

Pin	Function	Pin	Function
1	GND	8	GND
2	Vpd (+5 V)	9	GND
3	GND	10	Vsm (Source voltage monitor)
4	GND	11	GND
5	Vdd (+5 V)	12	Vg (Gain control voltage)
6	GND	13	GND
7	Data Output		

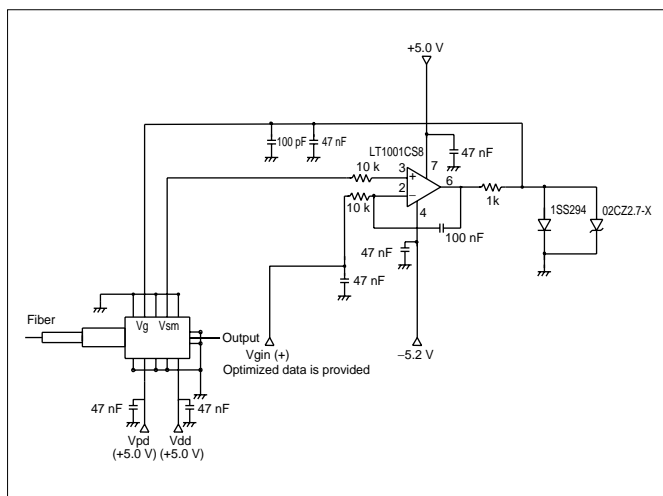
TOPD371-RXSSMA: SMA connector output type



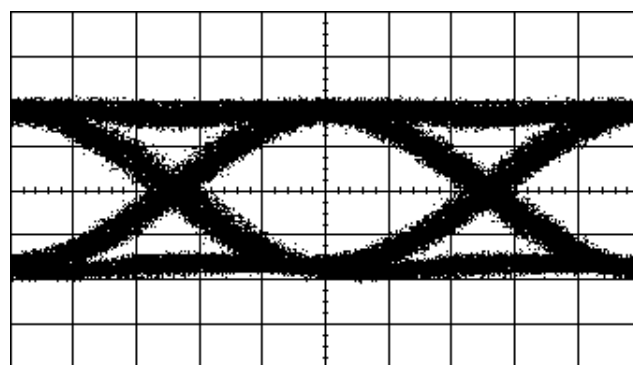
Pin Assignment

Pin	Function	Pin	Function
1	GND	8	GND
2	Vpd (+5.0 V)	9	GND
3	NC	10	GND
4	NC	11	Vsm (Source voltage monitor)
5	Vdd (+5.0 V)	12	GND
6	GND	13	Vg (Gain control voltage)
7	GND	14	GND

RECOMMENDED GAIN CONTROL CIRCUIT



EYE DIAGRAM



(X: 20 ps/div, Y: 20 mV/div)
(Condition: 9.95328 Gb/s, NRZ, PRBS $2^{31}-1$, Pr = -10 dBm)

PRECAUTIONS

- (a) Power supply: Transient electric spike may cause a damage to 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 power off.
- (b) The product should be grounded for obtaining the performance.

OVERSEAS SUBSIDIARIES AND AFFILIATES

010126(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 60015-2547, U.S.A.
Tel: (847)945-1500 Fax: (847)945-1044

Edison, NJ
2035 Lincoln Hwy. Ste. #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., Suite 650, Richardson,
TX 75081, U.S.A.
Tel: (972)480-0470 Fax: (972)235-4114

Wakefield, MA(Boston)
401 Edgewater Place, Suite #360, Wakefield,
MA 01880-6229, 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 Ingr. 2-Piano 6,
Via Paracelso n.12,
1-20041 Agrate Brianza Milan, Italy
Tel: (039)68701 Fax: (039)6870205

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

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

Toshiba Electronics Asia, Ltd.

Hong Kong Head Office
Level 11, Top Glory Insurance Building, 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)6590-8795 Fax: (010)6590-8791

Toshiba Electronics Korea Corporation

Seoul Head Office
14/F, KEC B/D, 257-7 Yangjae-Dong,
Seocho-ku, Seoul, Korea
Tel: (02)589-4334 Fax: (02)589-4302

Toshiba Technology Development (Shanghai) Co., Ltd.

23F, Shanghai Senmao International Building, 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, 0446 Taipei,
Taiwan
Tel: (02)514-9988 Fax: (02)514-7892

The information contained herein is subject to change without notice.

The information contained herein is presented only as a guide for the applications of our products.
No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.

TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..

The Toshiba products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These Toshiba products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of Toshiba products listed in this document shall be made at the customer's own risk.

The products described in this document are subject to the foreign exchange and foreign trade laws.
Gallium arsenide (GaAs) is a substance used in some of the products described in this documents. GaAs dust and fumes are toxic. Do not break, cut or pulverize the products, or use chemicals to dissolve them.
When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.

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

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