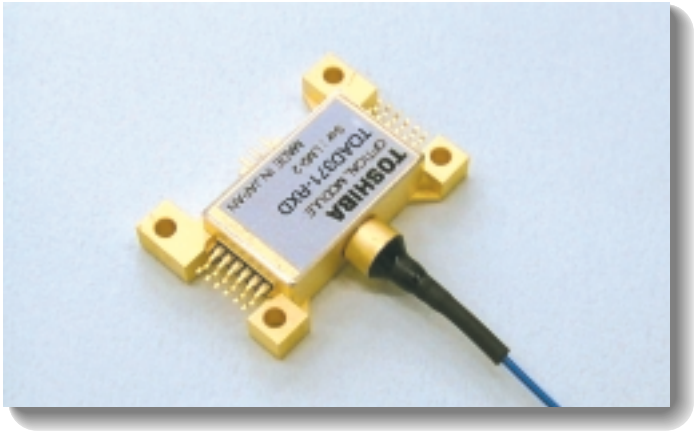
TOSHIBA

September 2001

Optical Communication Devices

10 Gb/s Optical Receiver

TOAD371-RXD Series



APPLICATION

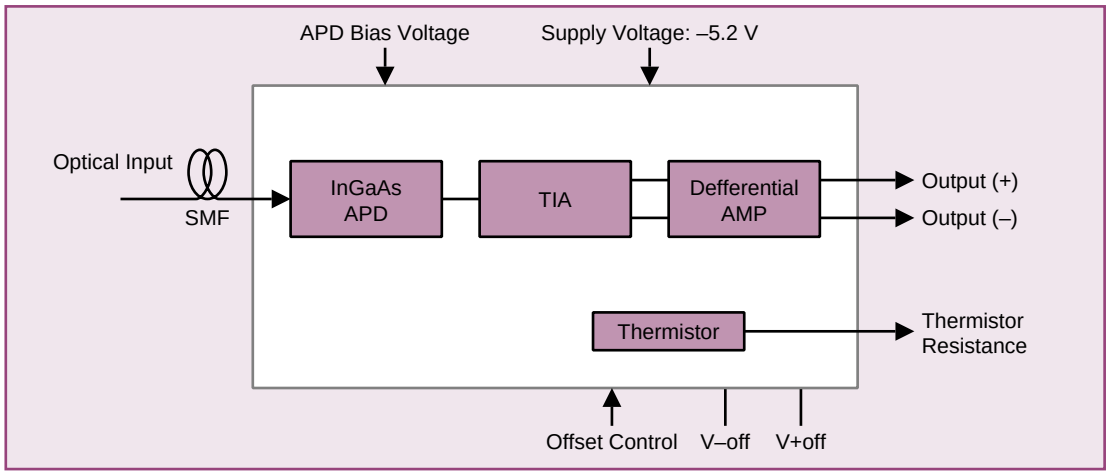
- SONET / SDH (OC-192 / STM-64) applications

FEATURES

- InGaAs APD and TIA
- Differential output
- Sensitivity: –24 dBm (typ. @ BER = 1 x 10^{-10}, PRBS 2^{31}–1)
- Overload: –7 dBm (typ. @ BER = 1 x 10^{-10}, PRBS 2^{31}–1)
- Transimpedance: 1000 Ω (typ.)
- Wavelength: 1.3/1.55 μm
- Optical return loss: 27 dB (min)

TOAD371-RXD Series

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Tc = 25 ˚C)

Item	Symbol	Rating	Unit
Storage temperature	Tstg	–40 to +85	˚C
Operating case temperature	Tc	0 to +70	˚C
APD reverse current	Ir	1	mA
APD reverse voltage	V_R	0 to V_B	V
Supply voltage	Vss	–6 to 0	V
Soldering temperature / time	Tsol / tsol	260 / 5	˚C / s

ELECTRICAL AND OPTICAL CHARACTERISTICS (λ = 1.55 μm, Vss = –5.2 V, Tc = 25 ˚C)

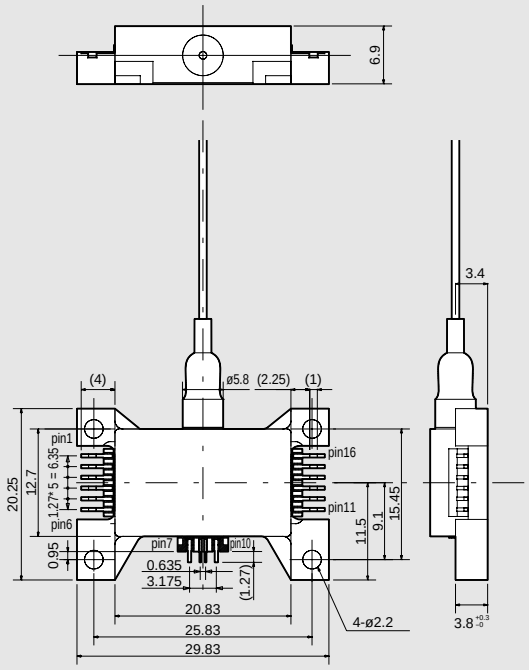
Item	Symbol	Condition	Min	Typ.	Max	Unit
Responsivity	R1.55	M = 1	0.65	0.70	—	A/W
APD breakdown voltage	V_B	Id = 10 μA	20	—	60	V
Temperature coefficient of V_B	γ	Note 1	—	0.05	—	V/˚C
Transimpedance (AC)	Zt	RL = 50 Ω, f = 200 MHz	700	1000	—	Ω
Cutoff frequency	fc	–3 dB from 500 MHz RL = 50 Ω	—	8.0	—	GHz
Sensitivity	Ps	Note 2	—	–24	–23	dBm
Overload	Po	Note 2	–8	–7	—	dBm
Optical return loss	ORL	—	27	—	—	dB
Power supply current	Iss	—	—	110	—	mA
Power supply voltage	Vss	—	–5.46	–5.2	–4.94	V
Thermistor resistance	Rth	—	9.5	10	10.5	kΩ
Thermistor B constant	B	—	3800	3900	4000	K

Note 1: $\gamma = dV_B / dTc$

Note 2: 9.95328 Gb/s, NRZ, PRBS 2^{31}–1, BER = 1 x 10^{-10}

DIMENSIONAL OUTLINE AND PIN ASSIGNMENT

(Unit: mm)

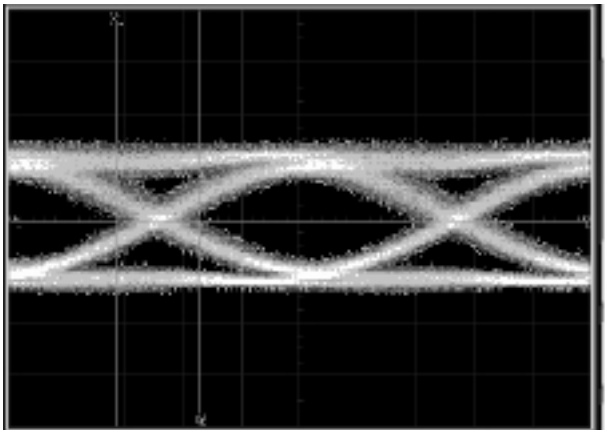


Pin Assignment

Pin	Function	Pin	Function
1	APD Bias (+)	9	OUTPUT (+)
2	GND	10	GND
3	Vss (–5.2 V)	11	NC
4	NC	12	V-off
5	NC	13	V+off
6	NC	14	Offset Control
7	GND	15	NC
8	OUTPUT (–)	16	Thermistor

MAJOR CHARACTERISTICS

Eye Diagram



(20ps/div)

(Condition: Ta = 25 ˚C, RL = 50 Ω, Pin = –27 dBm, Vss = –5.2 V, 9.95328 Gb/s, PRBS 2^{31}–1, NRZ)

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 obtaininng the performance.

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