

# InGaAs PIN photodiode with preamp



G12072-54

**ROSA type, 1.3 μm, 10 Gbps**

## Features

- **φ1.25 mm sleeve type ROSA (receiver optical sub-assembly)**
- **High-speed response: 11.3 Gbps**
- **Low power supply voltage: Vcc=3.3 V**
- **Differential output**
- **Sensitivity: +5 to -19.5 dBm typ.**
- **Flexible board interface**

## Applications

- **8 gigabit fiber channel**
- **10 gigabit ethernet (LR)**
- **SFP + transceiver correspondence**

The device is susceptible to static electricity. To prevent the devices from electrostatic damage, take measures against electrostatic charges, such as grounding yourself, the workbench and tools.

## Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Supply voltage	Vcc	-0.3, +4.0	V
	VRSSI		
Operating temperature*1 *2	Topr	-20 to +90	°C
Storage temperature*1	Tstg	-40 to +90	°C

Note: Absolute maximum ratings are the values that must not be exceeded at any time. If even one of the absolute maximum ratings is exceeded even for a moment, the product quality may be impaired. Always be sure to use the product within the absolute maximum ratings.

\*1: No condensation

\*2: Case temperature

## Recommended operating conditions (Case temperature=-20 to +90 °C, no condensation)

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vcc	Vcc-GND	2.97 to 3.63	V
	VRSSI	VRSSI-GND	less than 2	V
Spectral response range	λ		1.26 to 1.37	μm
Load resistance	RL	Capacitive coupling	50	Ω
Data rate	-	NRZ, Mark ratio=1/2	8.5 to 11.3	Gbps

**Electrical and optical characteristics (Recommended operating conditions, unless otherwise noted)\*3**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Responsivity*4	R	$\lambda=1.31 \mu\text{m}$ , $\text{Pin}=-10 \text{ dBm}$	0.70	0.80	-	A/W
Supply current	I <sub>cc</sub>	Dark state, $R_L=\infty$	-	28	50	mA
Cutoff frequency	f <sub>c</sub>	$\lambda=1.31 \mu\text{m}$ , -3 dB $\text{Pin}=-18 \text{ dBm}$ , $f_{\text{ref}}=1 \text{ GHz}$	7.0	10.0	-	GHz
Low cutoff frequency	f <sub>c-L</sub>	$\lambda=1.31 \mu\text{m}$ , -3 dB $\text{Pin}=-18 \text{ dBm}$ , $f_{\text{ref}}=100 \text{ MHz}$ Extinction ratio=6 dB	-	30	100	kHz
Transimpedance*5	T <sub>z</sub>	$f=1 \text{ GHz}$ , $\text{Pin}=-18 \text{ dBm}$	1.0	2.25	-	k $\Omega$
Minimum receivable sensitivity (average)	P <sub>min</sub>	11.3 Gbps, $\lambda=1.31 \mu\text{m}$ PRBS=2 <sup>31</sup> -1, BER=10 <sup>-12</sup>	-	-19.5	-17.5	dBm
Maximum receivable sensitivity (average)	P <sub>max</sub>	Extinction ratio=14 dB	+2	+4	-	dBm
Output amplitude	V <sub>omax</sub>	Differential, $\text{Pin}=-5 \text{ dBm}$	200	280	400	mVpp
RSSI offset current	I <sub>RSSI</sub>	Dark state, $R_L=\infty$ $V_{\text{cc}}=3.3 \text{ V}$	2.5	10	17	$\mu\text{A}$
Optical return loss*6	ORL	$\lambda=1.31 \mu\text{m}$	12	14	-	dB

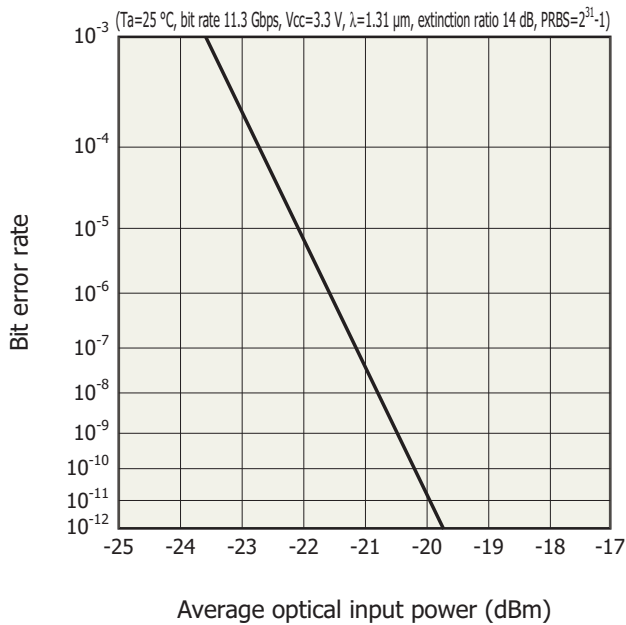
\*3: Output=capacitive coupling

\*4: Responsivity=2×(RSSI output current-RSSI offset current)/Optical input power

\*5: Single-ended (Vout+) measurement

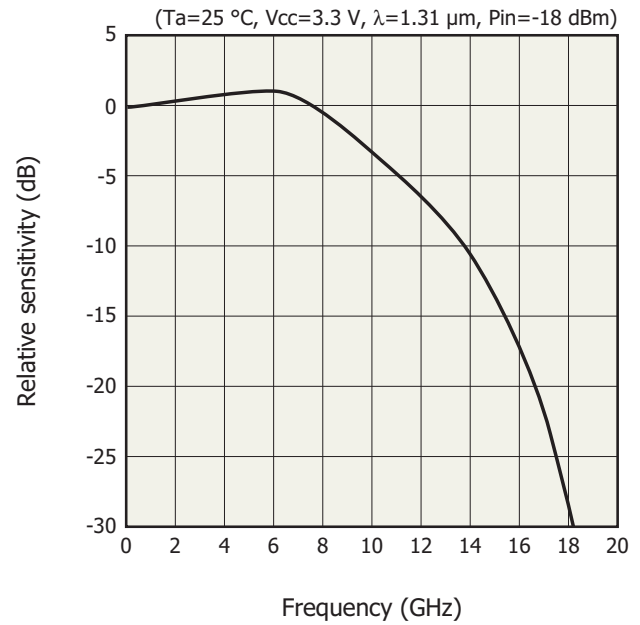
\*6: Metal package type with anti-reflection (ORL≥27 dB) is also available.

**Bit error rate**



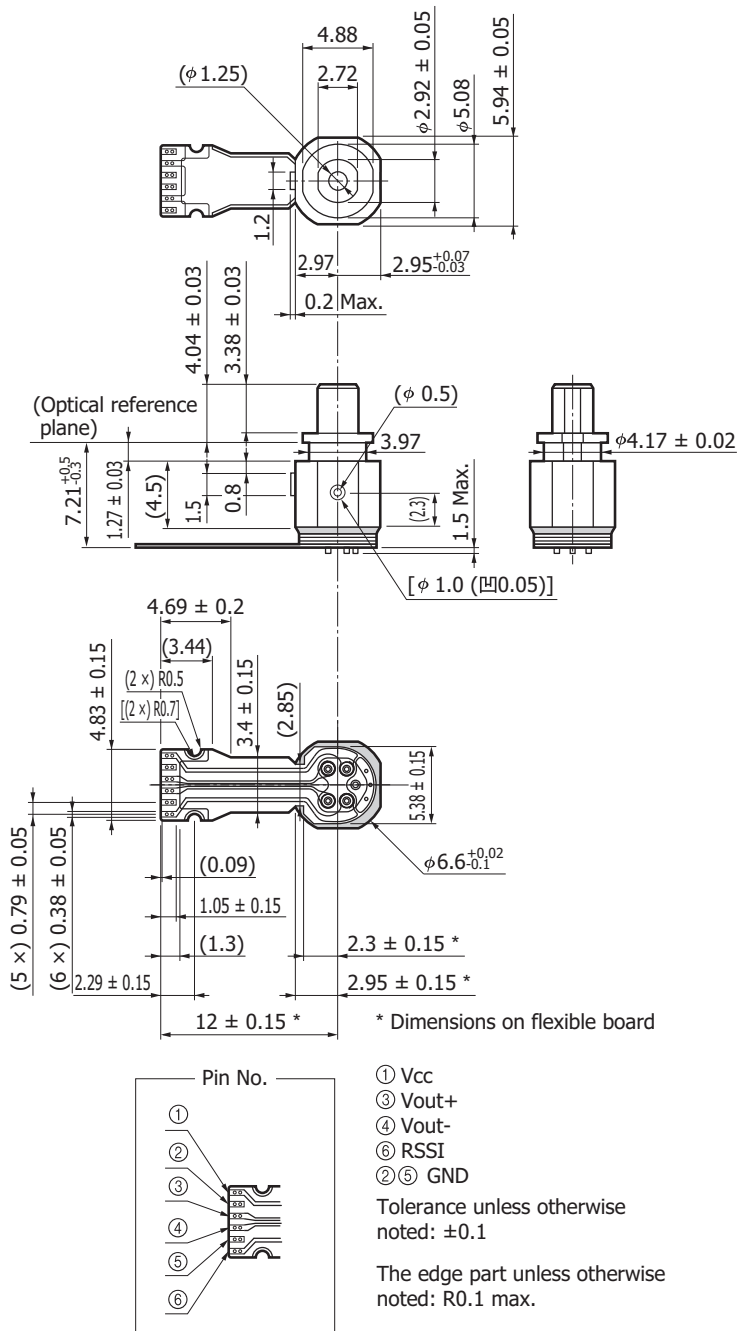
KIRD0472EA

**Frequency response**



KIRD0473EA

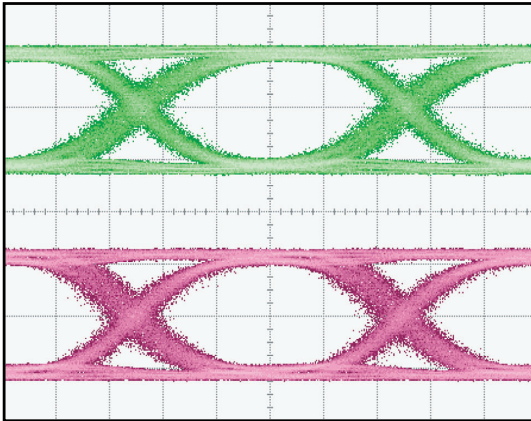
**Dimensional outlines (unit: mm)**



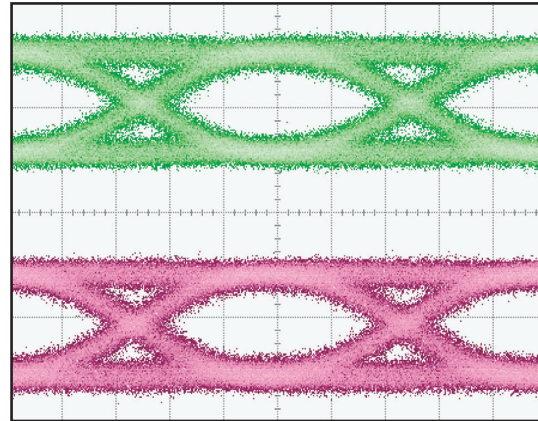
KIRDA0214EA

## Eye diagram

$T_a=25\text{ }^\circ\text{C}$ , Bit rate 11.3 Gbps, PRBS= $2^{31}-1$ , NRZ,  $\lambda=1.31\text{ }\mu\text{m}$ , Extinction ratio 14 dB,  $V_{cc}=3.3\text{ V}$



Pin=+2 dBm, 70 mV/div., 20 ps/div.



Pin=-20 dBm, 20 mV/div., 20 ps/div.

Information described in this material is current as of December, 2011.

Product specifications are subject to change without prior notice due to improvements or other reasons. Before assembly into final products, please contact us for the delivery specification sheet to check the latest information.

The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use.

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