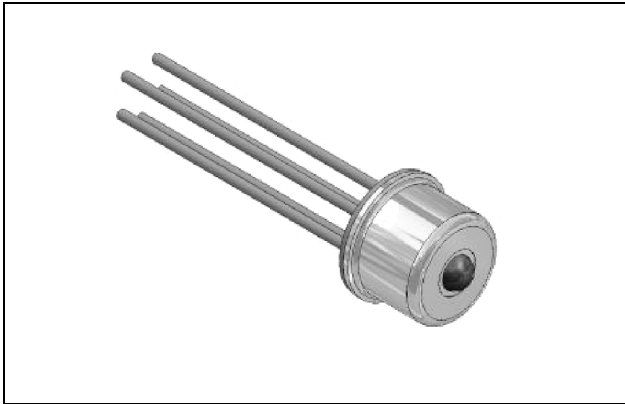


July 2004



### Ordering Information

ZL60011/TBD TO-46 with lens

**-40°C to +85°C**

### Description

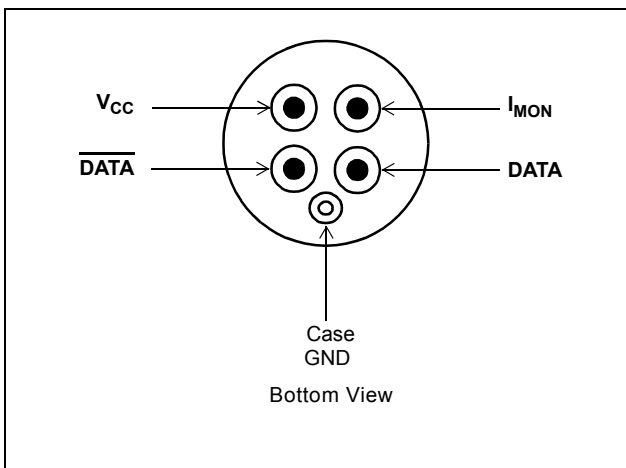
This optical receiver is a 3.3 V device which contains a PIN photodiode and a low noise transimpedance with limiting amplifier assembled with photocurrent monitor function in a TO-46 package with lens cap. It is designed for OC-48 operation and single mode fiber. Reliability Assurance based on Telcordia GR-468-CORE.

### Features

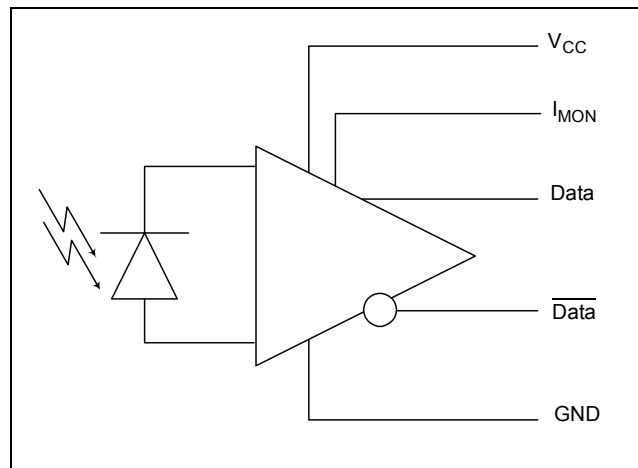
- Data Rate up to 3.125 Gbps
- 1310 nm, 1550 nm PIN
- TO-46 Assembly
- Integrated TIA and limiting amplifier
- Single 3.3 V supply
- Differential Output
- Photocurrent monitor
- Low power consumption

### Applications

- Sonet OC-48
- SDH STM-16
- 2.125 Gbps fiber channel
- 0.1 to 3.125 Gbps multi Rate application



**Figure 1 - Pin Diagram**



**Figure 2 - Functional Schematic**

**Optical and Electrical Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Responsivity, differential	$R$	4	6		kV/W	$\lambda = 1310 \text{ nm}$ , $R_L = 100\Omega$ , Note 1
Photo Monitor current	$I_{mon}$		0.8		A/W	$\lambda = 1310 \text{ nm}$ , $R_L = <2000\Omega$
Output voltage, differential	$\Delta V_O$	200	300		mV <sub>pp</sub>	$R_L = 100\Omega$ Note 2
Bandwidth (3dB <sub>e1</sub> )	$f_c$		2.0		GHz	$P_f = 10 \mu\text{W}$ , $R_L = 100\Omega$
Optical Saturation Level	$P_{sat}$	1	3.0		dBm	$\lambda = 1310 \text{ nm}$ , $E_R = \infty$ Note 3
Noise-Equivalent Power	$NEP$		-35	-30	dBm	$1\lambda = 1310 \text{ nm}$ , Note 4
Sensitivity (BER $10^{-10}$ )	$S$		-25	-23	dBm	$\lambda = 1310 \text{ nm}$ , $E_R = \infty$ Note 3
Output Resistance (single)	$R_O$		50		$\Omega$	
Power Dissipation	$P_D$		85	140	mW	
Power Supply Current	$I_{DD}$		25	38	mA	DATA & $\overline{\text{DATA}}$ AC Coupled

Operating Conditions: 25°C Case Temperature/3.3 V Supply Voltage/Fiber: Single-mode fiber.  
Pattern  $2^{23}-1$  at 2.5 Gbps.

Note 1:  $P_f = 10 \mu\text{W}$  Peak-Peak Power

Note 2:  $P_f = 500 \mu\text{W}$  Peak-Peak Power

Note 3: Measured at  $10^{-10}$  BER with a  $2^{23}-1$  PRBS at 2.5 Gbps

Note 4: Measured with STM-16 filter on electrical output, e.g. 1.875 GHz

**Absolute Maximum Ratings**

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	$V_{CC}$	0	3.6	V
Storage Temperature	$T_{stg}$	-40	125	°C

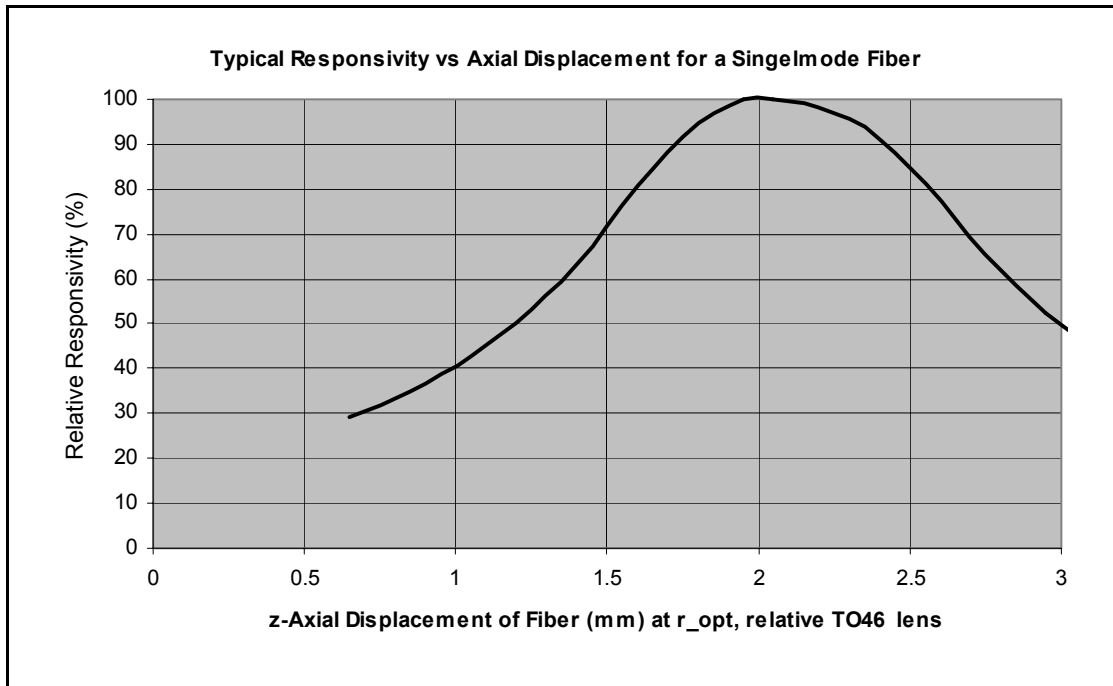
**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	$V_{CC}-V_{EE}$	3	3.3	3.6	V
Operating Temperature	$T_{op}$	-40		85	°C
Signalling Rate, Note 5	$f_D$	0.155		3.125	Gbps

Note 5: Data pattern have maximum runlength and DC-balance shifts no more than that of a PRBS-31 pattern.

**Typical Responsivity**

	Wavelength	Fiber core/cladding diameter numerical aperture
		10/125 $\mu\text{m}$ , NA = 0.11
Differential responsivity	1310 nm	6 kV/W
Differential responsivity	1550 nm	7.4 kV/W



**Figure 3 - Typical Responsivity vs Axial Displacement for a Singelmode Fiber**

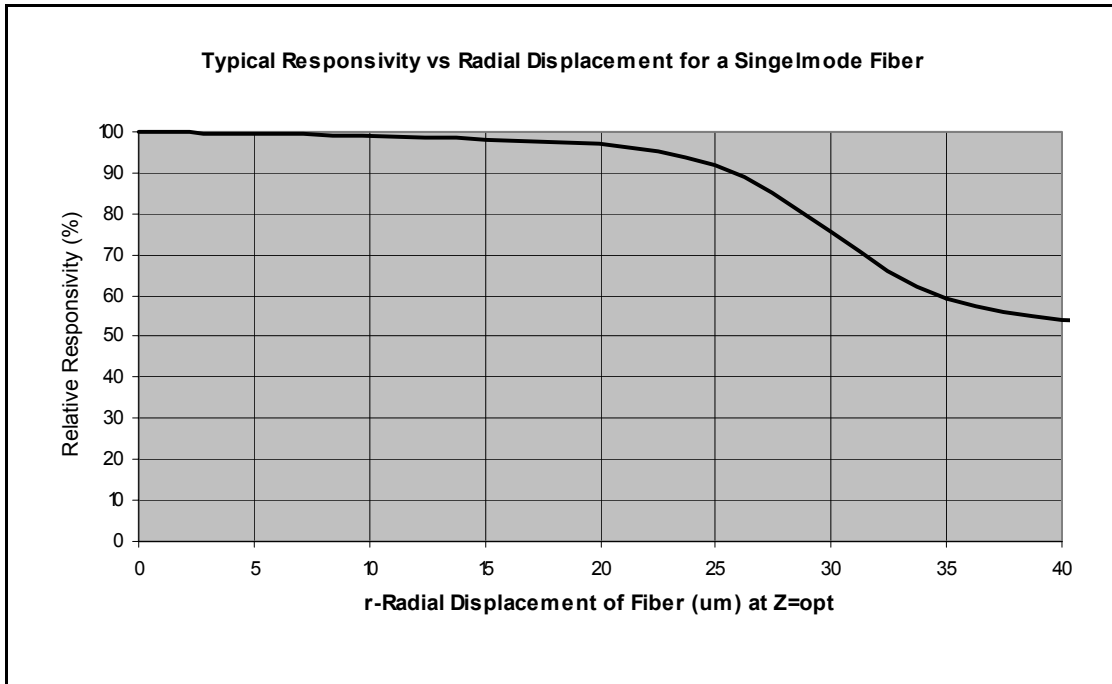


Figure 4 - Typical Responsivity vs Radial Displacement for a Singelmode Fiber

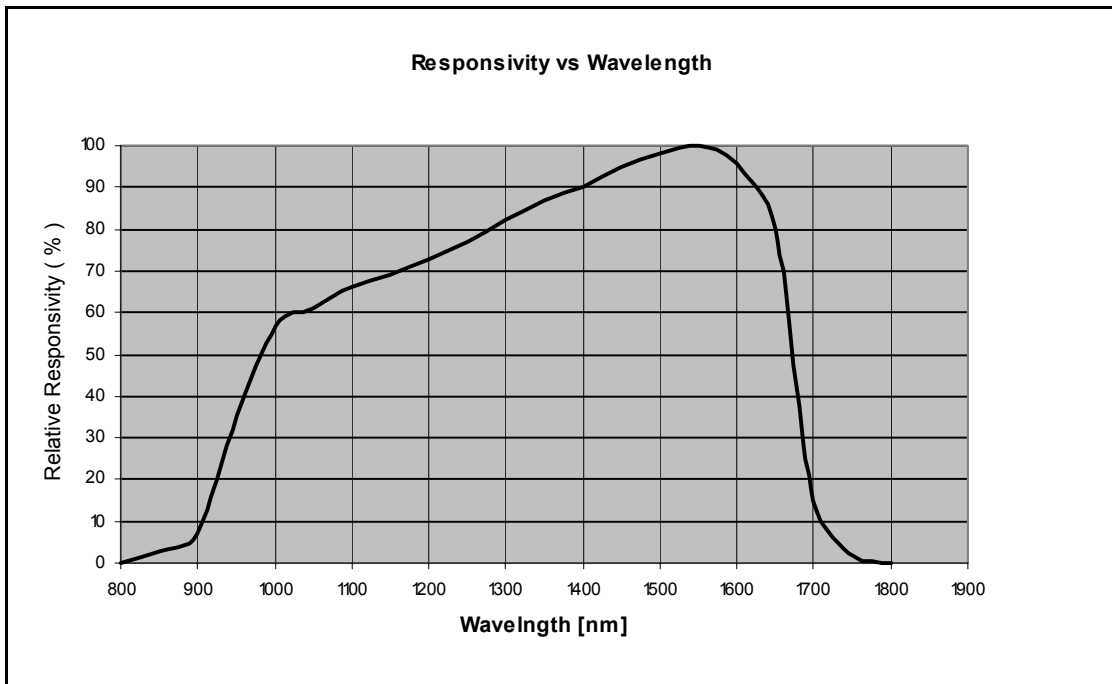


Figure 5 - Responsivity vs Wavelength of Coupled Input Power

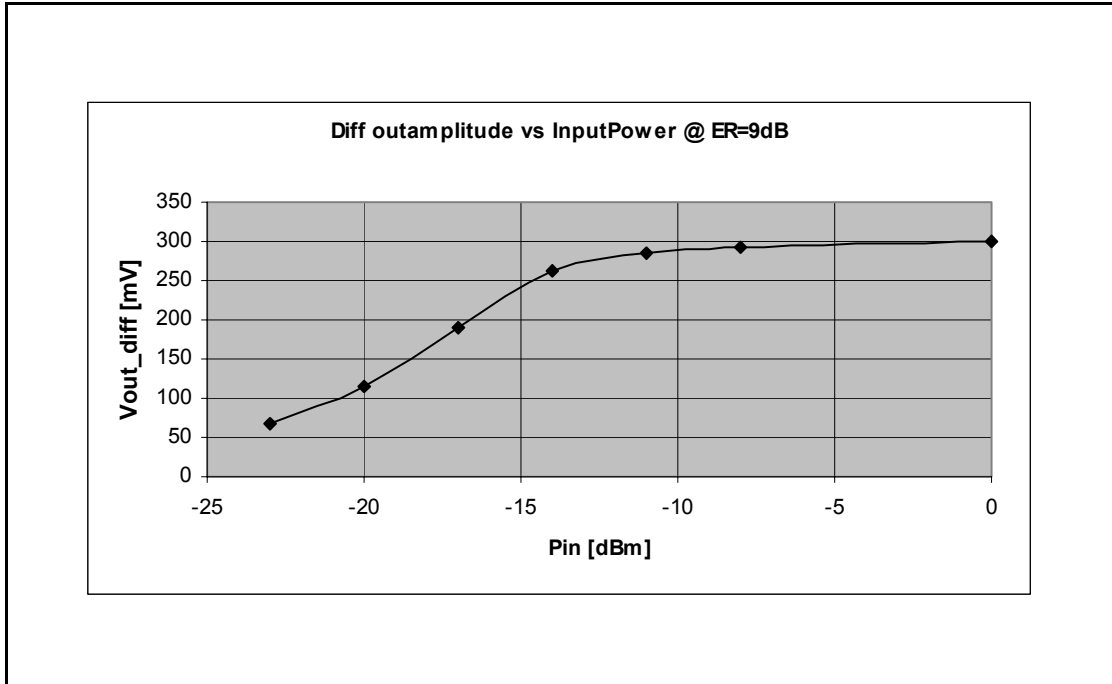


Figure 6 - Differential Out Amplitude vs Input Power

**Application Guidelines**



**ESD handling**

The receiver is sensitive to electrostatic discharges. When handling the device, precaution for ESD sensitive devices should be taken. These precautions include use of ESD protected work area with wrist straps, controlled work benches, floors etc.

**Power Supply Filter**

Power Supply decoupling capacitors are recommended for optimal performance of the receiver. A filter is recommended to minimize power supply noise. See Figure 7.

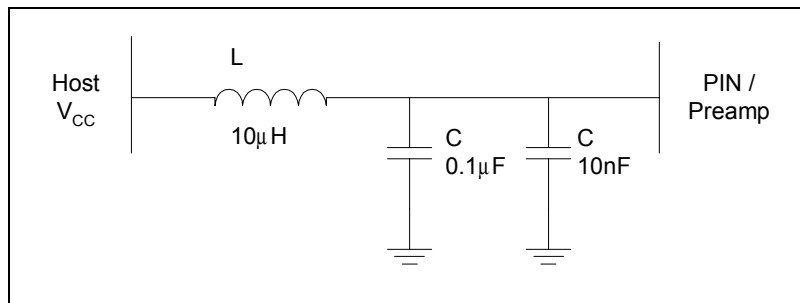


Figure 7 - Recommended Power Supply Filter

## Data Outputs

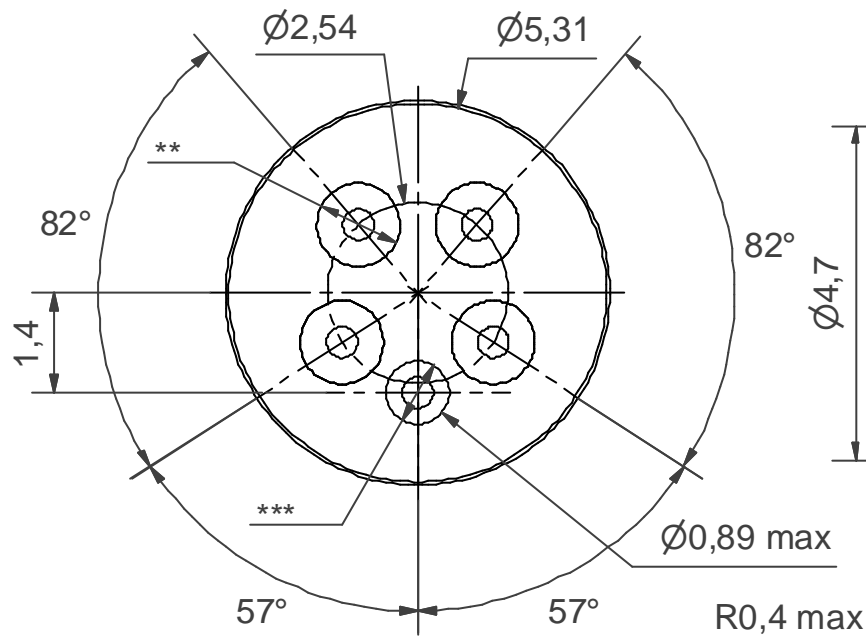
Outputs, Data and  $\overline{\text{Data}}$ , need to be AC-coupled. Typical value for the capacitors are 0.1 $\mu$ F.

## Monitor

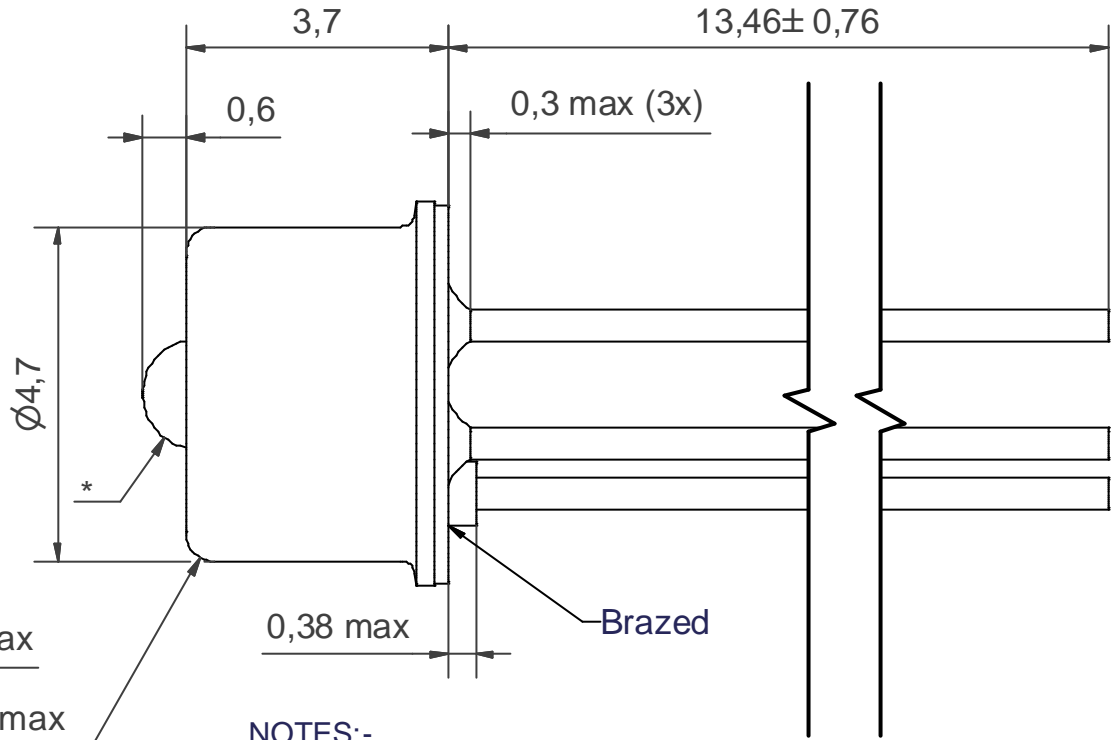
The Monitor pin is a current sink output signal which is proportional to the optical input power. The current flows into the pin.

To convert this current to a voltage a resistor to VCC should be used. Note that for linearity, ensure that the monitor pin is always >1 V, when it is used.

# BOTTOM VIEW ( 10 : 1 )



# SIDE VIEW



### NOTES:-

1. All dimensions in mm.
2. General tol. ISO-2768-mK.
3. Coating: Case: Ni 1,5-2,5  $\mu$ m.  
Header: Ni 2-3  $\mu$ m / Au min 0.8  $\mu$ m.

\* Lens  $\varnothing 1.5 \pm 0.05$

\*\* Glass sealing (4x):  $\varnothing 1,17 + 0.05$

\*\*\* Lead (5x):  $\varnothing 0,44 + 0.05 / - 0,025$

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	Package code <b>TB</b>
Previous package codes	Drawing type Package drawing, TO-46 with lens
	Title <b>JS004172</b>



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