



# 1310 nm, 1550 nm 2.5 Gbps PIN with Preamp

## Data Sheet

April 2004



**Ordering Information**

ZL60006TED SC Housing  
 ZL60006/TBD TO-46 with lens  
 ZL60006/TDD ST Housing  
 -40°C to +85°C

### Features

- Data rate up to 3.125 Gbps
- 1310 nm, 1550 nm PIN photodiode
- TO-46 Assembly
- Integrated TIA and limiting amplifier
- Single 3.3 V supply
- Low power consumption

### Description

This optical receiver is a 3.3 V device which contains a PIN photodiode and a low noise transimpedance with limiting amplifier 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.

### Applications

- Sonet OC-48
- SDH STM-16
- 2.125 Gbps fiber channel
- 2.5 to 3.125 Gbps general application

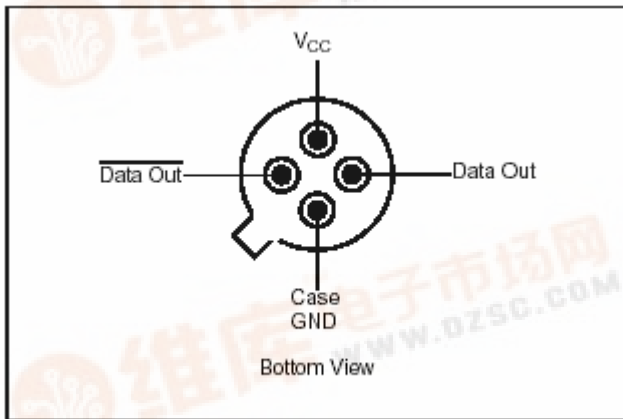


Figure 1 - Pin Diagram

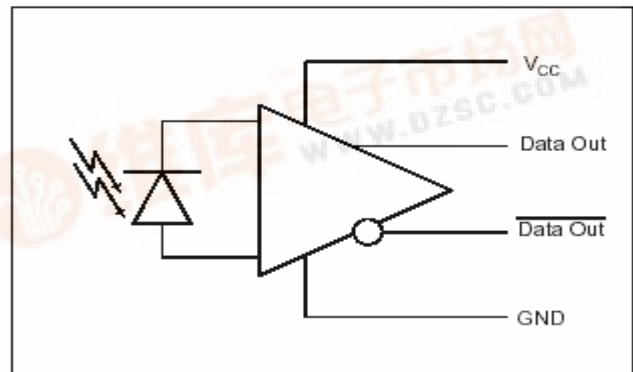


Figure 2 - Functional Schematic

### Optical and Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Responsivity, differential	$R$	4	6		kV/W	$\lambda=1310$ nm, $R_L=100 \Omega$ , Note 1
Output voltage amplitude, differential	$\Delta V_O$	200	300		mV <sub>pp</sub>	$R_L=100 \Omega$ Note 2
Bandwidth (3 dB <sub>el</sub> )	$f_c$		2.0		GHz	Pf = 10 $\mu$ W, $R_L=100 \Omega$
Optical Saturation Level	$P_{sat}$	1			dBm	$\lambda=1310$ nm, $ER = \infty$ Note 3
Noise-Equivalent Power	$NEP$		-35	-30	dBm	$\lambda=1310$ nm, Note 4
Sensitivity (BER $10^{-9}$ )	$s$		-25	-23	dBm	$\lambda=1310$ nm, $ER = \infty$ Note 3
Dynamic Range			24		dB	
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 10/125  $\mu$ m fiber.  
PRBS Pattern  $2^{23}-1$  at 2.5 Gbps.

Note 1: Pf = 10  $\mu$ W Peak-Peak Power

Note 2: Pf = 500  $\mu$ 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, i.e., 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

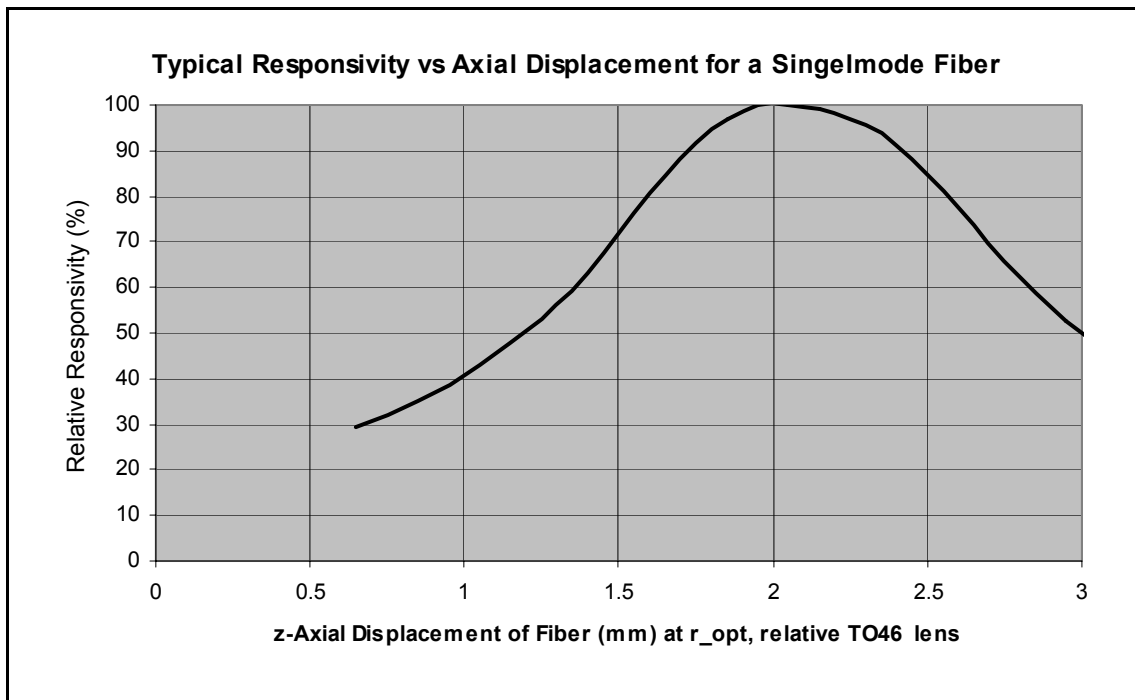
### Recommended Operating Conditions

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	$f_D$	1		3.125	Gbps

Note 5: Data pattern are to 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 Singlemode Fiber**

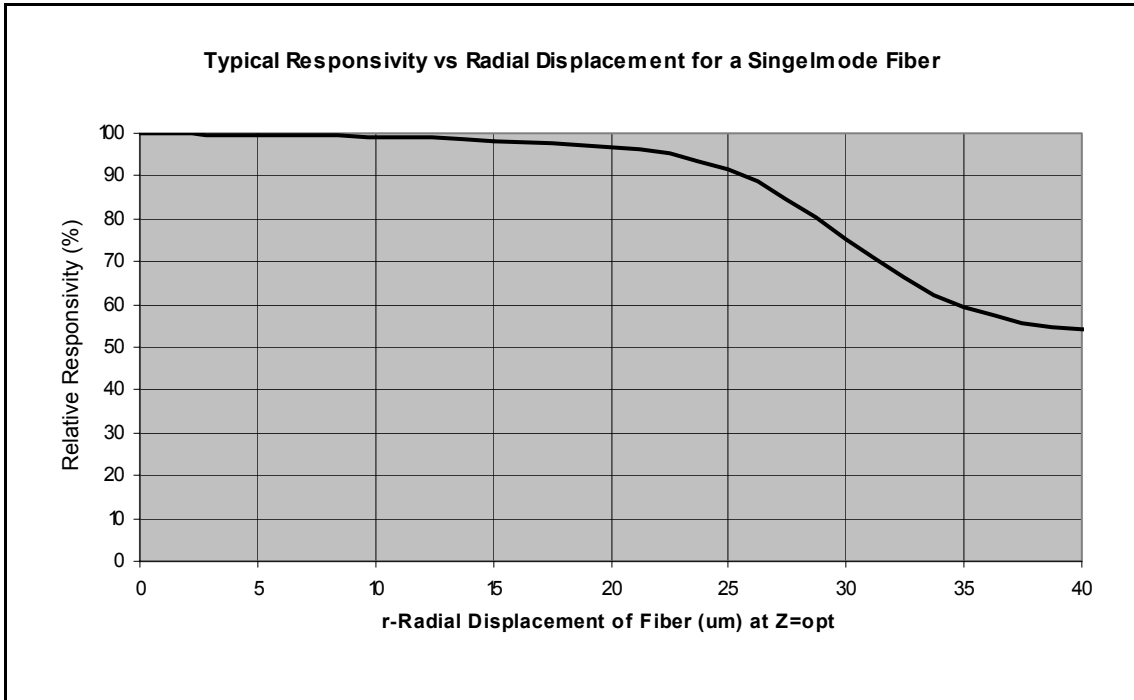


Figure 4 - Typical Responsivity vs Radial Displacement for a Singlmode Fiber

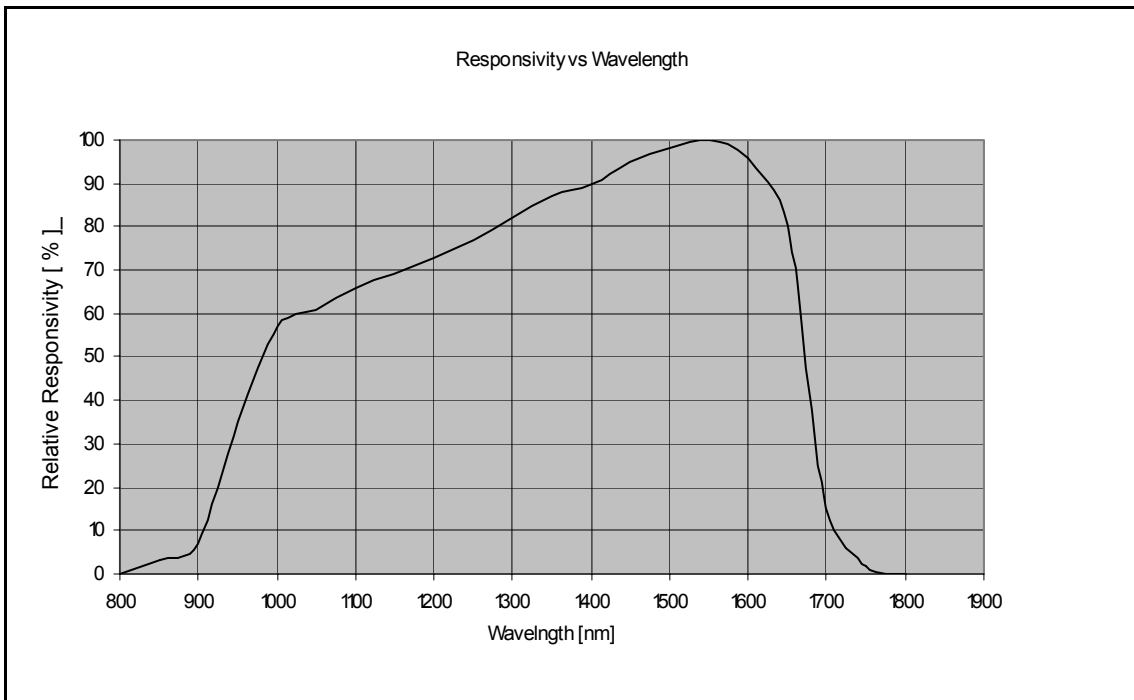


Figure 5 - Responsivity vs Wavelength of Coupled Input Power

## Application Guidelines



### ESD handling

The receiver is sensitive to electrostatic discharges. When handling the device, precautions 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 6.

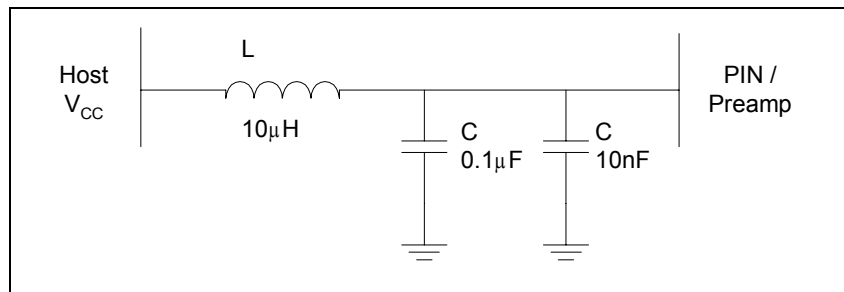


Figure 6 - Recommended Power Supply Filter

### Data Outputs

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





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