

August 2005

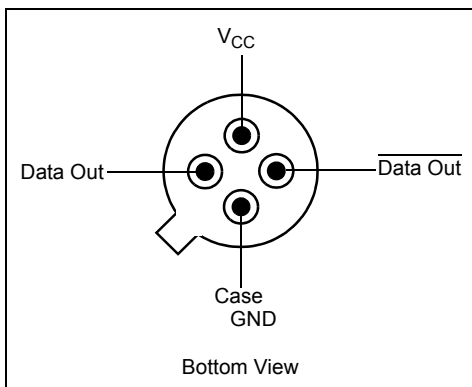


### Features

- Data rates up to 250 Mbps
- Large-area Si photodiode
- TIA with AGC
- Hermetically sealed package (MIL-STD 883)
- Single 3.3 V power supply

### Applications

- Plastic Optical Fiber (POF) based optical communication links
- IEEE Fast Ethernet
- IEEE 1394b Firewire
- Automotive, Industrial and Residential Networking



**Figure 1 - Pin-out Diagram**

### Ordering Information

ZL60038TBDE, TO-46 with lens

*The ZL60038 is also available assembled in standard optical receptacles:*

ZL60038TDDE, in ST receptacle  
 ZL60038TEDE, in SC receptacle  
 ZL60038TFDE, in FC receptacle  
 ZL60038TGDE, in SMA receptacle

*In addition the ZL60038 can also be supplied in customer-specific receptacles, on request*

**-40°C to +85°C**

### Description

The ZL60038 is a compact optical receiver designed for 650-nm plastic optical fiber (POF) based optical communication systems with data rates up to 250 Mbps.

The optical receiver is assembled in a single compact TO-46 package and contains an optimized large-area Si PIN photodiode in combination with a transimpedance amplifier (TIA) with automatic gain control (AGC). The receiver operates using a single 3.3 V power supply. It is designed for use with large-core POF with core sizes up to 980 μm. Such optical fiber types are often found in Automotive, Industrial and Residential networks.

Reliability assurance is based on Telcordia GR-468-CORE and the part is compliant to the EU directive 2002/95/EC issued 27 January 2003 [RoHS].

**Optical and Electrical Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Sensitivity (BER $10^{-12}$ )	S		-24	-22	dBm	ER = $\infty$ Note 1
Optical Saturation (BER $10^{-12}$ )	$P_{sat}$	3			dBm	ER = 10dB, Note 1
Output Voltage amplitude, differential ( $P_{in} = -22$ dBm)	$\Delta V_{OL}$		200		mV, pp	Note 1, See Figure 3
Output Voltage amplitude, differential ( $P_{in} = -3$ dBm)	$\Delta V_{OH}$		500		mV, pp	Note 1, See Figure 3
Bandwidth (3 dB <sub>el</sub> )	$f_C$		160		MHz	$P_{in} = -10$ dBm
Noise-Equivalent Power	NEP		-40		dBm	Note 2
Output Resistance (single-ended)	$R_O$		50		$\Omega$	
Power Supply Current	$I_{DD}$		20	30	mA	
Power Dissipation	$P_D$		70	100	mW	
Focal distance (from top TO-lens)	$L_{focal}$		1.3		mm	

**Test conditions:** Case Temperature, 25°C / Supply Voltage, 3.3V /  $R_L = 1000 \Omega$  differential / Plastic Optical Fiber: 980/1000  $\mu$ m, Step-index N.A. = 0.48 / Wavelength,  $\lambda = 650$  nm

Note 1: Measured using  $2^7-1$  PRBS pattern at 125 Mbps

Note 2: Measured with STM-1 filter on electrical output, i.e., 116 MHz.

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typ.	Max	Unit
Supply Voltage	$V_{CC}$	3.05		3.55	V
Output Differential Load (Note 3)	$R_L$	80	1000		$\Omega$
Operating Temperature	$T_{op}$	-40		85	°C
Signalling Rate (Note 4)	$f_D$			250	Mbps

Note 3: Typical value corresponds to the load presented by a following post-amplifier

Note 4: Data pattern having maximum run-length and DC-balance shifts no greater than those found in a PRBS-7 pattern.

**Absolute Maximum Ratings**

Functional operation is not guaranteed under these conditions. Exceeding these ratings may cause permanent damage. (Note limits need not necessarily be applied together).

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	$V_{CC}$	0	4.5	V
Storage Temperature	$T_{stg}$	-55	125	°C
Soldering Temperature (Note 5)	$T_{sld}$		260	°C

Note 5: 2 mm from case for 10 seconds.

Additional Information

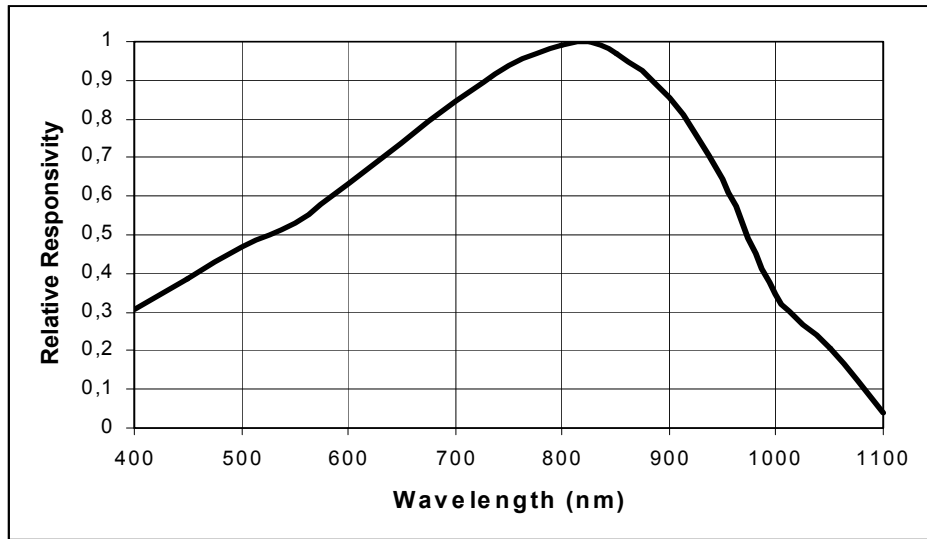


Figure 2 - Relative Responsivity vs. Wavelength

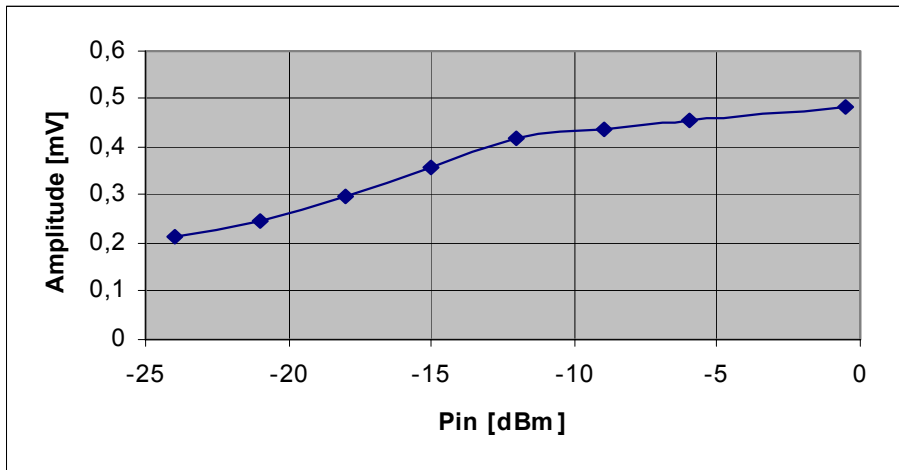


Figure 3 - Differential Output Voltage Amplitude vs. Optical Input Power

## 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.

### Host Board Layout Example

Included in the example of a Host Board Layout (Figure 4) are power supply decoupling capacitors. These are recommended for optimal performance of the receiver. A filter is also included to minimise power supply noise.

A recommended post-amplifier is shown, namely Maxim MAX3969. Alternative post-amplifiers may also be used by the customer.

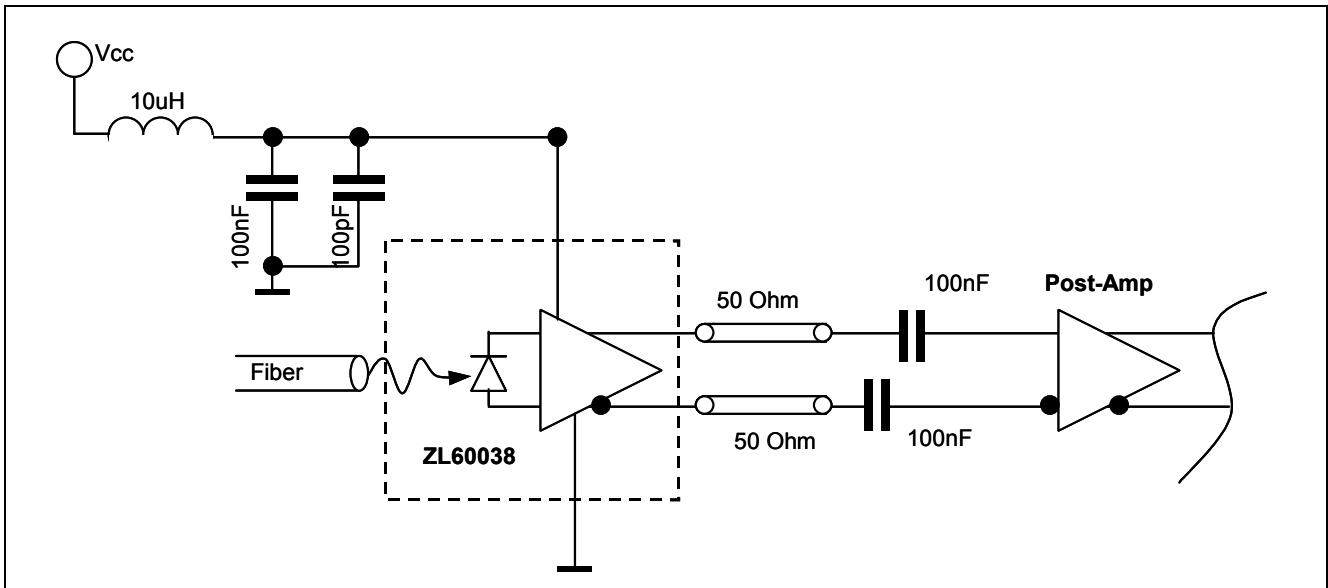
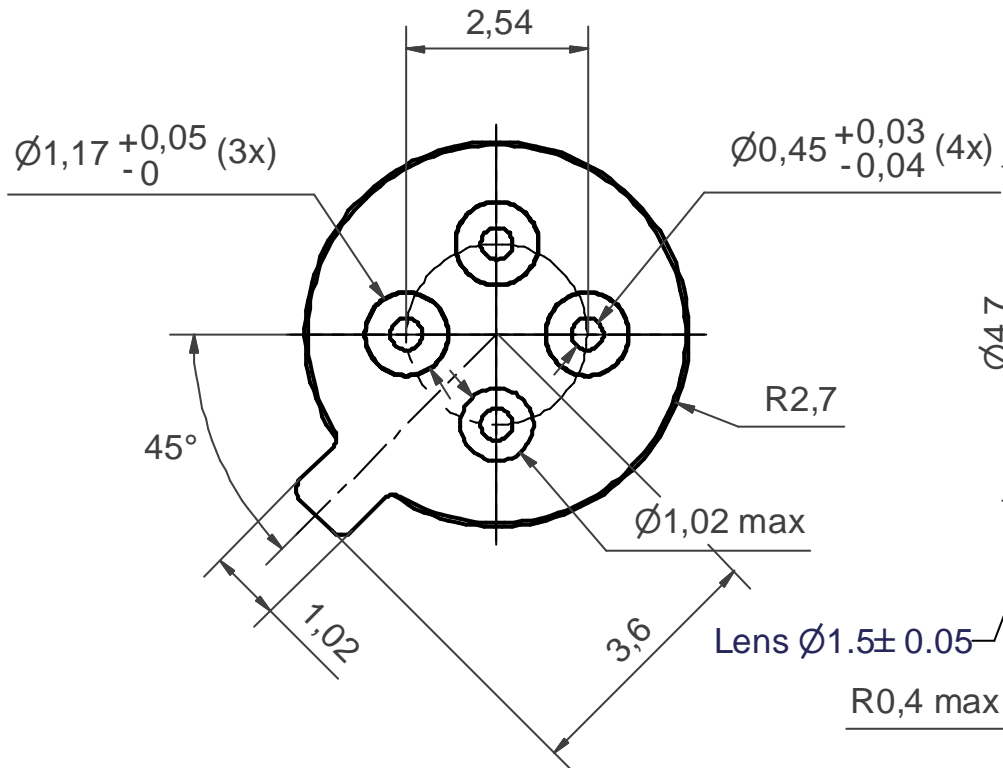
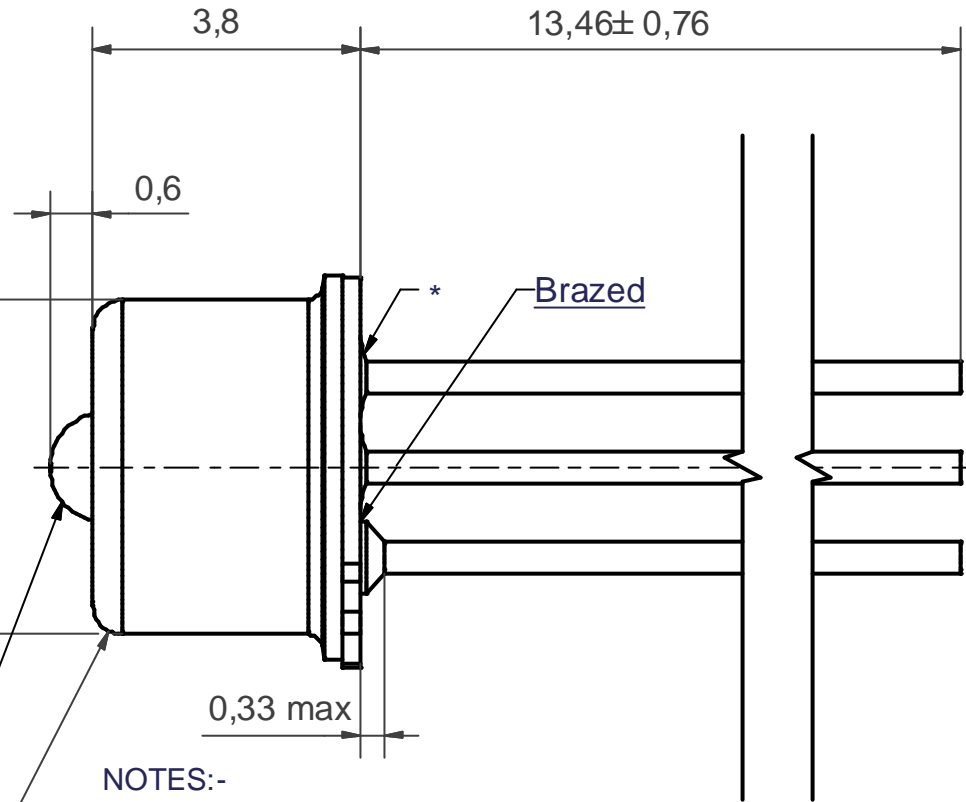


Figure 4 - Host Board Layout Example

# 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 min 0,5  $\mu$ m / Au min 1,5  $\mu$ m.

\* 0,25 max glass overmould (3x)

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ISSUE	1			
ACN	JS004078R1A			
DATE	22-MAR-03			
APPRD.	TD/BE			



Previous package codes

Package code **TB**

Drawing type  
Package drawing, TO-46 with lens

Title **JS004078**



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