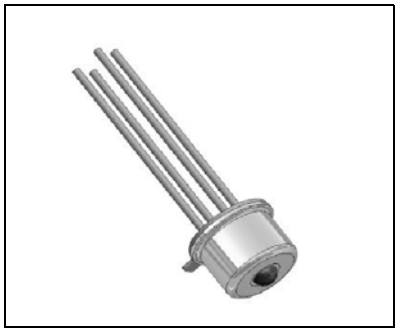
ZL60015

Optical Receiver. 1310/1550 nm, 2.5 Gbps PIN + Pre-amp with Photocurrent Monitor

Data Sheet

January 2005



Features

- Data rate up to 3.125 Gbps
- 1310/1550 nm InGaAs PIN photodiode
- Integrated TIA amplifier
- Photocurrent Monitor
- 0.155 to 3.125 Gbps multi-rate operation
- Hermetically sealed package (MIL-STD 883)
- Single 3.3 V supply
- Pb-free packaging

Applications

- SONET/SDH OC-48/STM-16
- SFF and SFP transceiver modules
- Proprietary 1310/1550 nm optical communication links

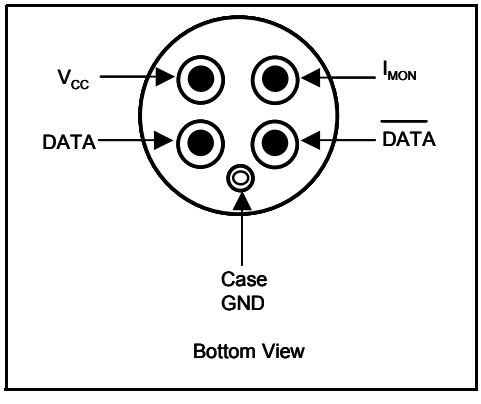


Figure 1 - Pin-out Diagram

Ordering Information

ZL60015TBD, TO-46 with lens

The ZL60015 is also available assembled in standard optical receptacles, or with a 1m 9µm fiber pigtail with or without end-connector

ZL60015TDDB, in ST receptacle
ZL60015TEDB, in SC receptacle
ZL60015TFDB, in FC receptacle
ZL60015TGDB, in SMA receptacle
ZL60015TJDB in LC-Sleeve

ZL60015PADB, pigtail with no connector
ZL60015PDDB, pigtail with ST connector
ZL60015PEDB, pigtail with SC connector
ZL60015PFDB, pigtail with FC connector
ZL60015PGDB, pigtail with SMA connector

In addition the ZL60015 can also be supplied in customer-specific fiber pigtails or receptacles, on request

-40°C to +85°C

Description

The ZL60015 is a compact optical receiver designed for 1310/1550 nm based SONET/SDH OC-48/STM-16 applications. It is ideally suited for use in multi-rate transceiver modules as well as general optical communication applications with data rates up to 3.125 Gbps.

The optical receiver is assembled in a single compact TO-46 package and contains an optimized InGaAs PIN photodiode in combination with a low-noise transimpedance amplifier (TIA). It includes an additional pin allowing the photocurrent from the detector to be directly monitored. The receiver operates using a single 3.3 V power supply. It is designed for use with a 9 µm single-mode fiber.

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^{-10})	S		-25	-23	dBm	$ER = \infty$ Note 1
Optical Saturation (BER 10^{-10})	P_{sat}	1			dBm	ER = 10 dB, Note 1
Photodiode Monitor Responsivity	R_{mon}		0.9		A/W	P_{in}= -10 dBm, See Figure 4
Output Voltage amplitude, differential (P_{in} = -23 dBm)	ΔV_{OL}	20	50		mV, pp	Note 1, ER= 10 dB See Figure 3
Output Voltage amplitude, differential (P_{in} = -3 dBm)	ΔV_{OH}	240		300	mV, pp	Note 1, ER = 10 dB See Figure 3
Bandwidth (3 dB_{el})	f_C		2		GHz	P_{in}= -10 dBm
Noise-Equivalent Power	NEP		-32	-30	dBm	Note 2
Output Resistance (single-ended)	R_{out}		50		Ω	
Power Supply Current	I_{DD}		25	38	mA	
Power Dissipation	P_D		85	140	mW	
Focal distance (from top TO-can)	L_{focal}		2.0		mm	

General Test Conditions: Case Temperature, 25°C / Supply Voltage, 3.3V / R_L=100 Ω differential / Fiber: single-mode 9/125 µm / Wavelength, λ= 1310 nm

Note 1: Measured using 2^{23}-1 PRBS pattern at 2.5 Gbps

Note 2: Measured with an STM-16 filter on electrical output, i.e., 1.875 GHz.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	3		3.6	V
Output Differential Load (Note 3)	R_L	80	100		Ω
Operating Temperature	T_{op}	-40		85	°C
Signalling Rate (Note 4)	f_D	0.155		3.125	Gbps

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-31 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	5	V
Storage Temperature	T_{stg}	-55	125	°C
Soldering Temperature (Note 5)	T_{sld}		260	°C

Note 5: 2mm from case for 10 seconds.

Additional Information

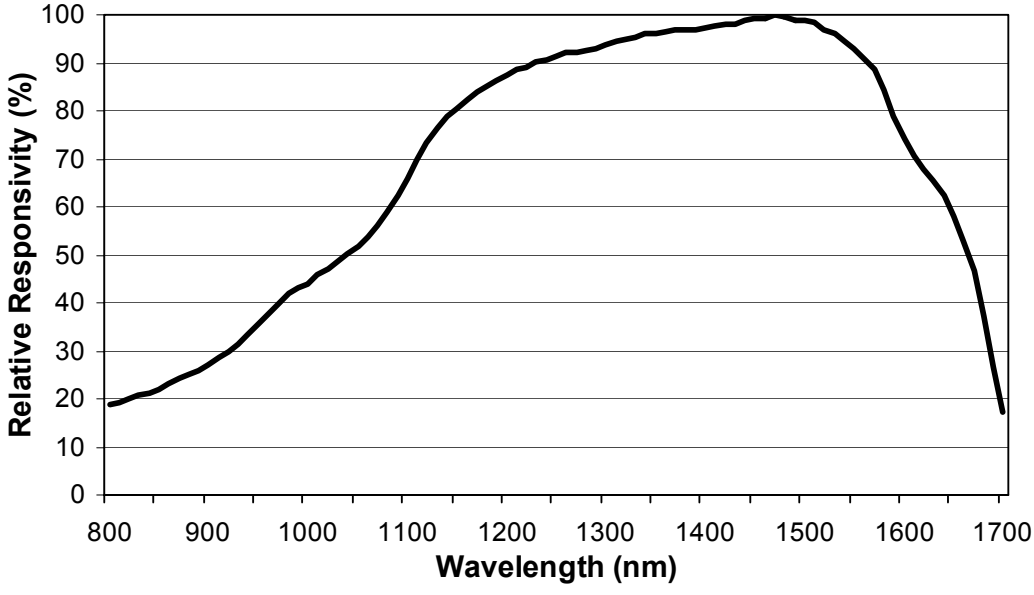


Figure 2 - Relative Detector Responsivity vs. Wavelength

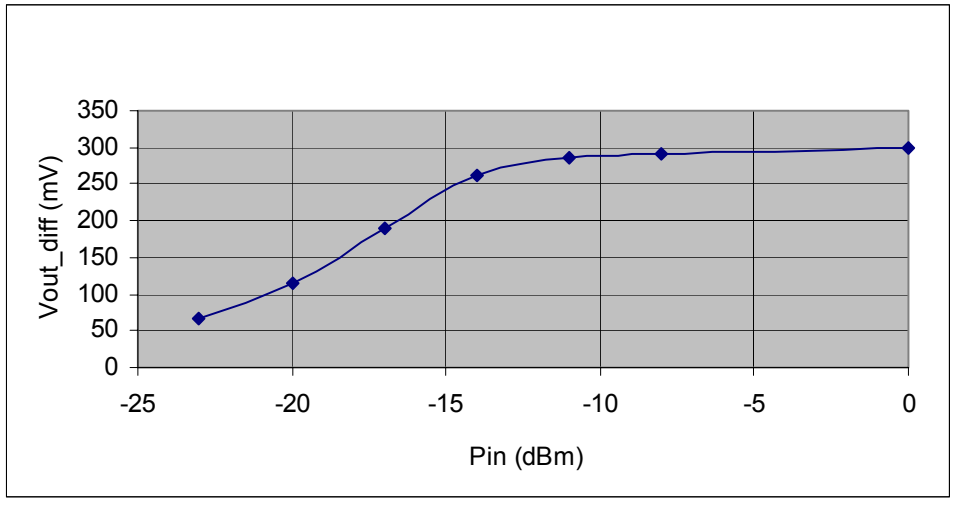


Figure 3 - Differential Output Voltage Amplitude vs. Optical Input Power

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.

Photodiode Monitor

The Monitor pin is a current sink output signal directly proportional to the optical input power. To convert the current from the Monitor pin to a voltage a resistor to V_{CC} should be used. Note to maintain linearity the Monitor pin should, when in use, be maintained at a bias > 1V.

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 suggested post-amplifier is shown, namely MAX3748. Alternative post-amplifiers may also be used by the customer.

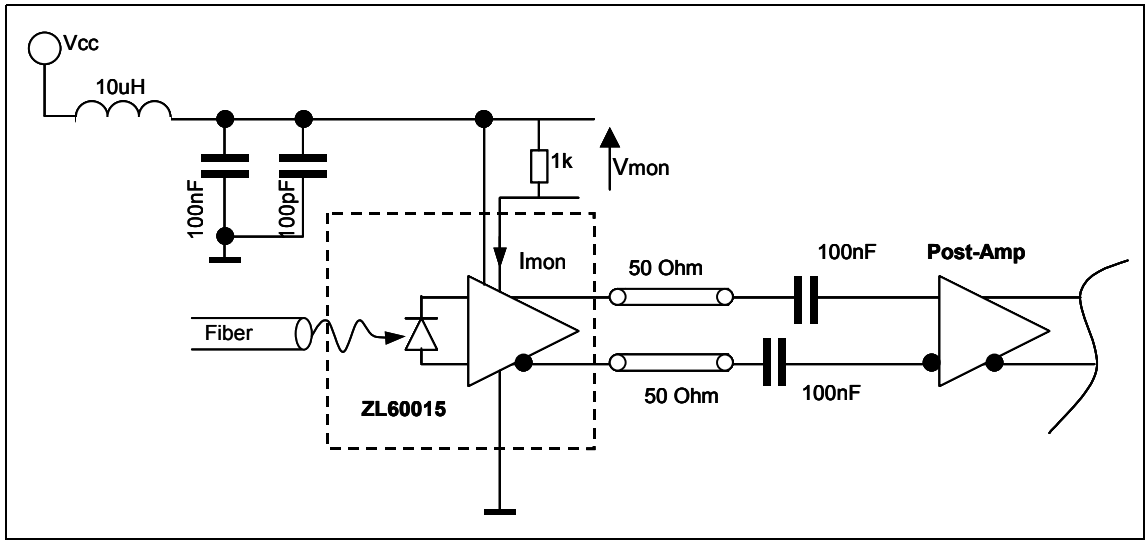
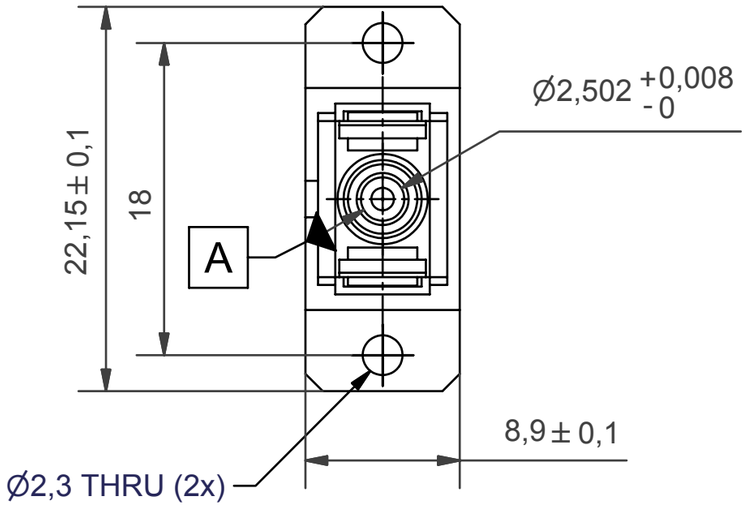
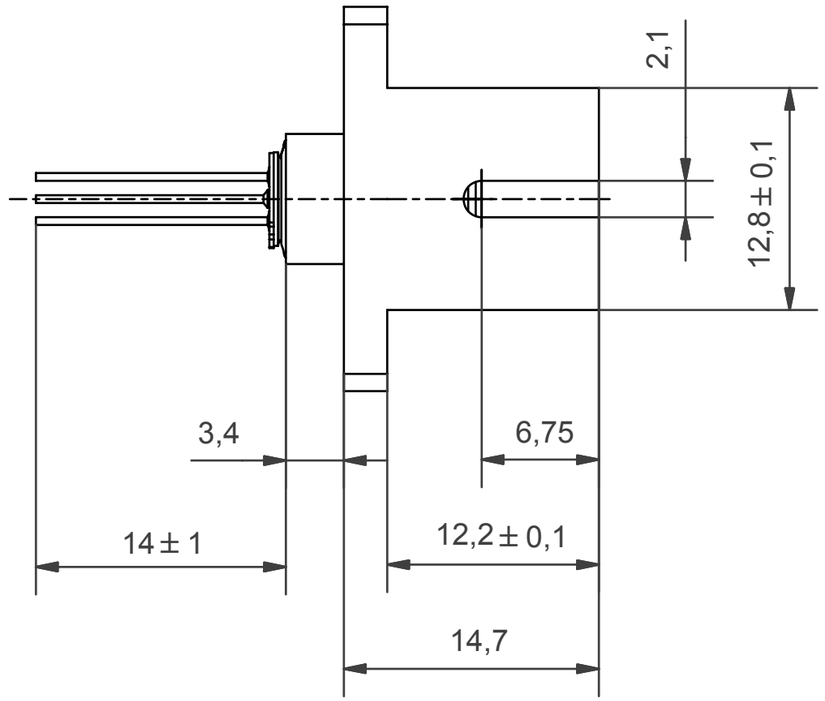


Figure 4 - Host Board Layout Example

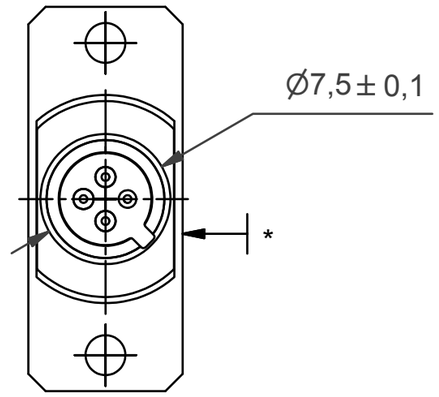
FRONT VIEW (2 : 1)



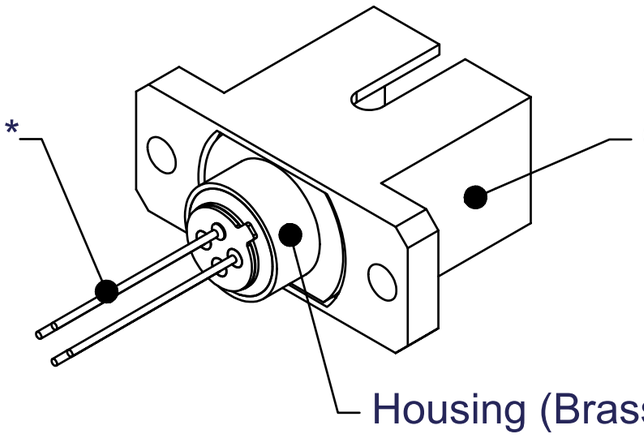
SIDE VIEW



BOTTOM VIEW



* Slot side.



NOTES:-

1. All dimensions in mm.
2. General tol. ISO-2768-mK.

* For details of the component, see separate data sheet and/or package drawing.

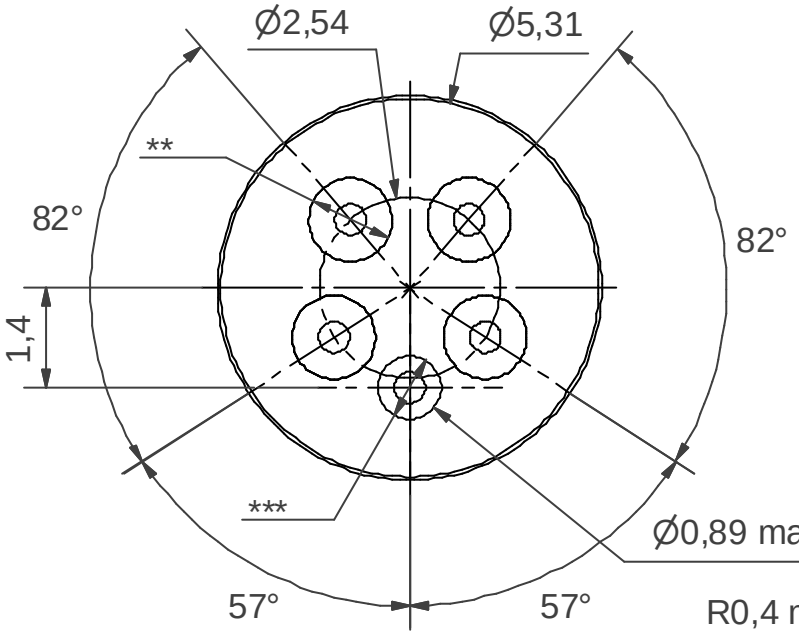
Projection Method

ISSUE	1			
ACN	102546rev 1			
DATE	9-DEC-03			
APPRD.	MD/MA			

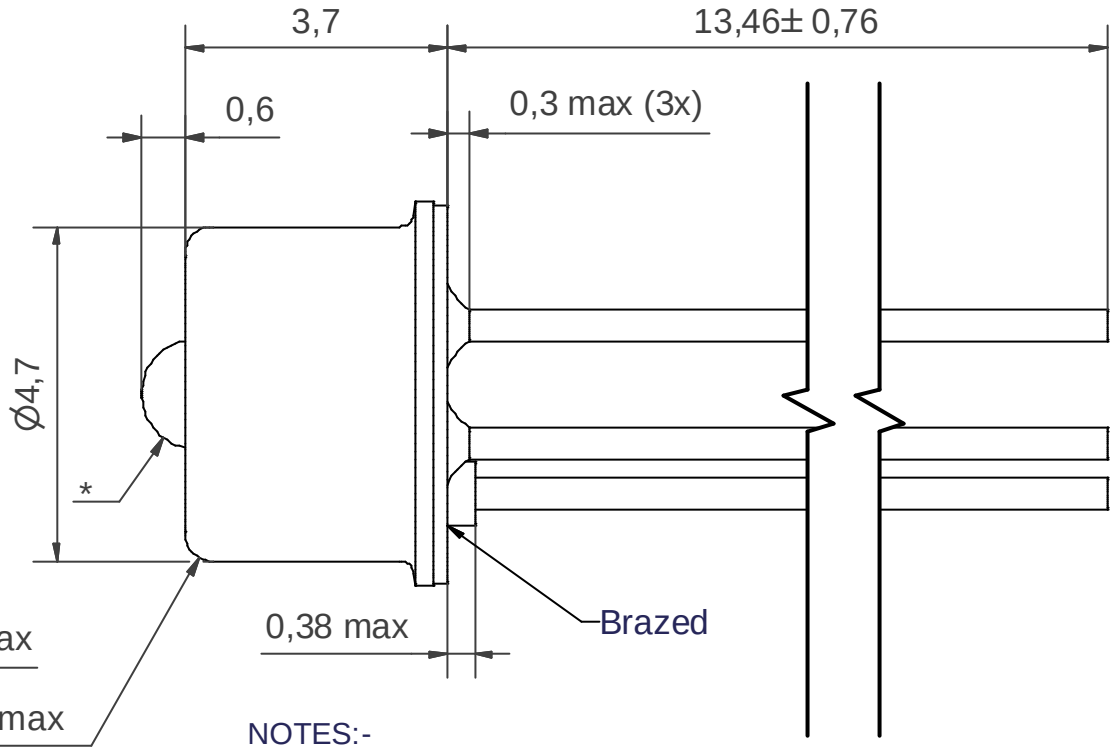
ZARLINK SEMICONDUCTOR

	Package code TE
Previous package codes	Drawing type TO-46 Package Outline in SC Connector housing
	Title 102546

BOTTOM VIEW (10 : 1)



SIDE VIEW



* Lens Ø1.5 ± 0.05

** Glass sealing (4x): Ø1,17 +0.05

*** Lead (5x): Ø0,44 +0.05/-0,025

NOTES:-

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

ISSUE	1			
ACN	JS004172R1A			
DATE	29-APR-03			
APPRD.	TD/BE			

ZARLINK SEMICONDUCTOR

Previous package codes

Package code TB

Drawing type
Package drawing, TO-46 with lens

Title JS004172

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