

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

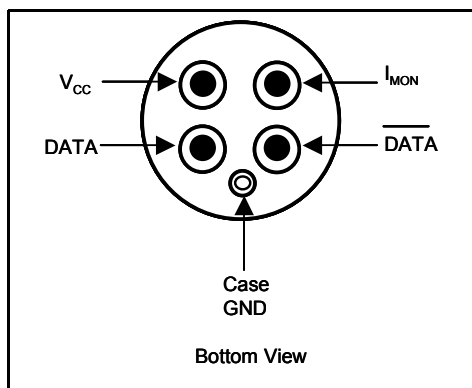


Figure 1 - Pin-out Diagram

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 = ∞ 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 μ m / 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

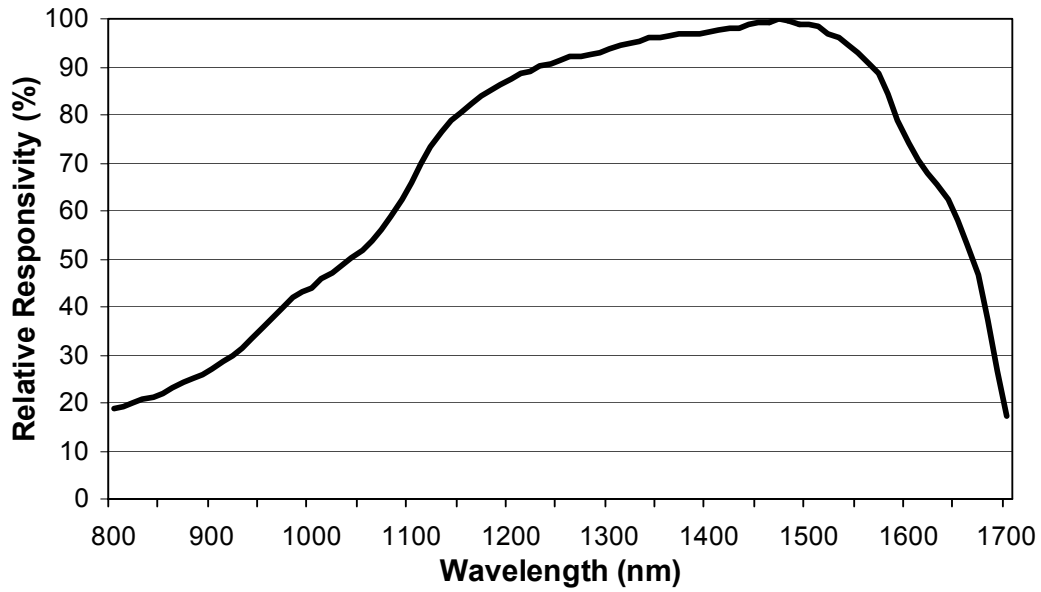


Figure 2 - Relative Detector Responsivity vs. Wavelength

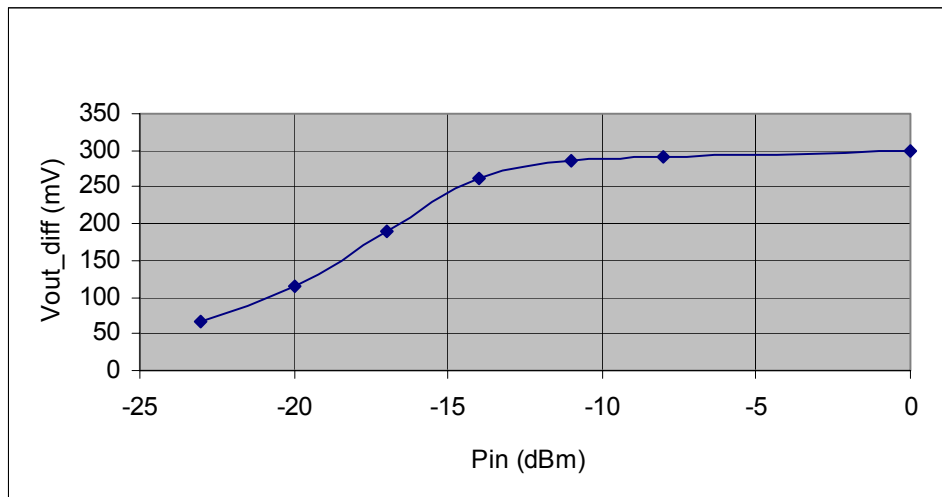


Figure 3 - Differential Output Voltage Amplitude vs. Optical Input Power

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.

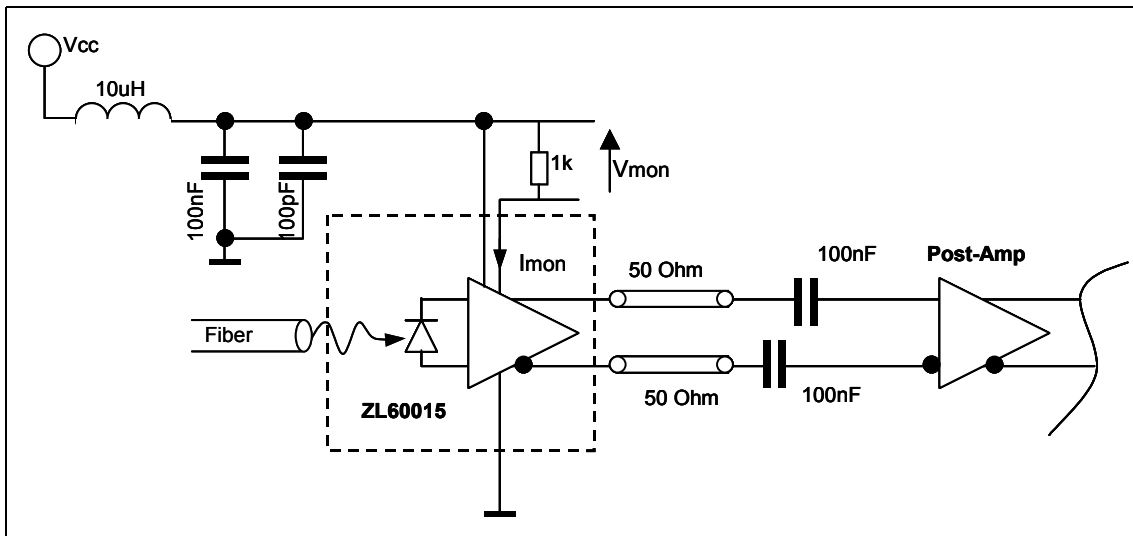
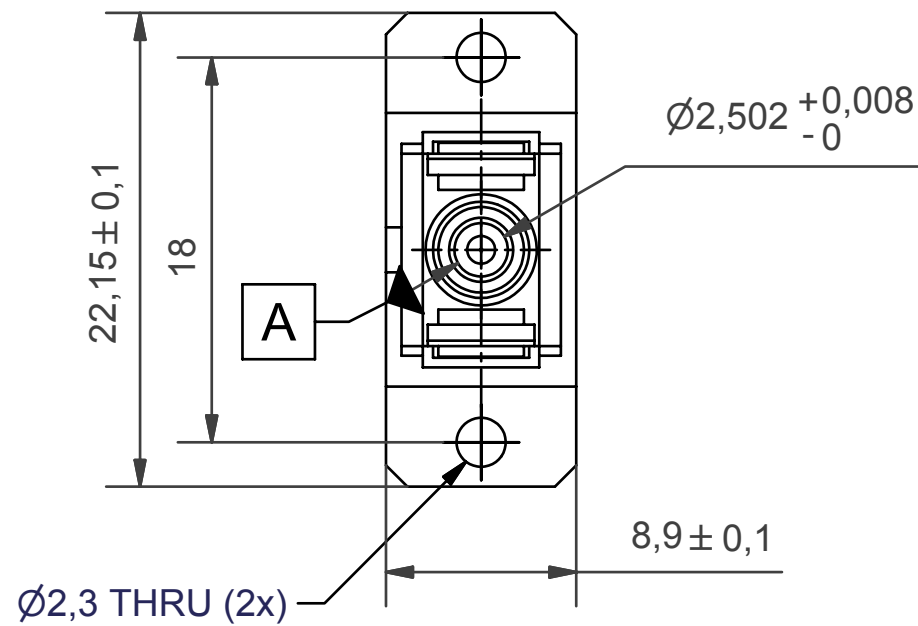
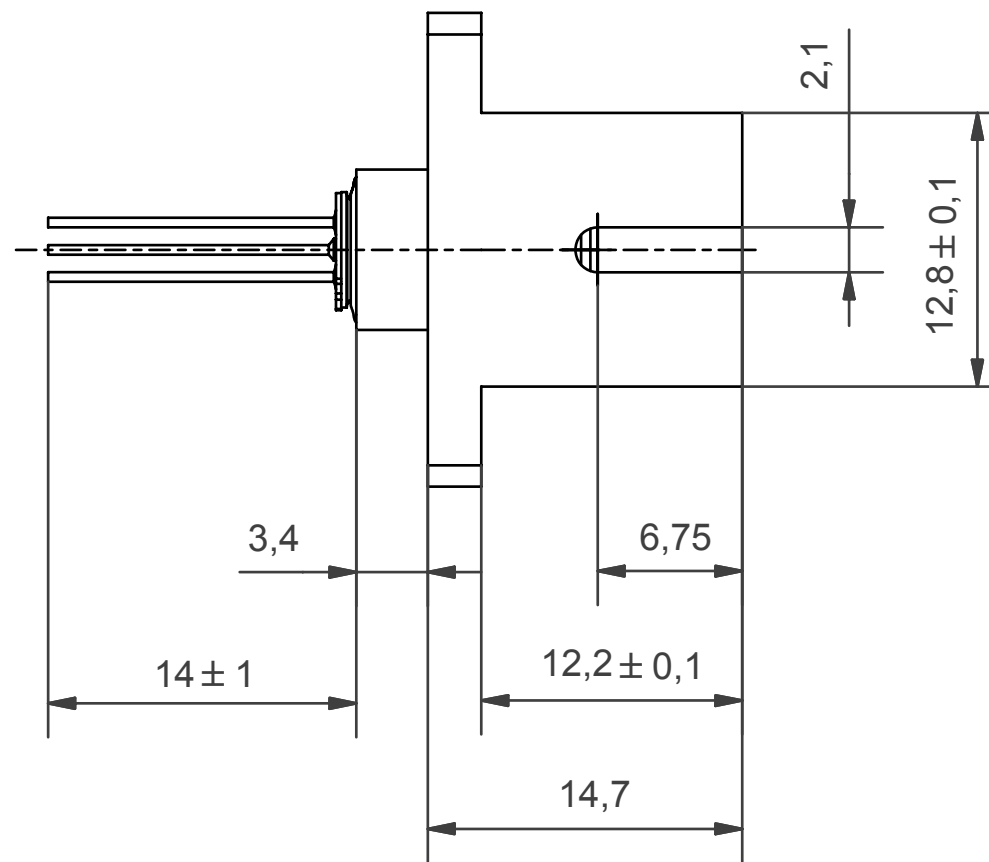


Figure 4 - Host Board Layout Example

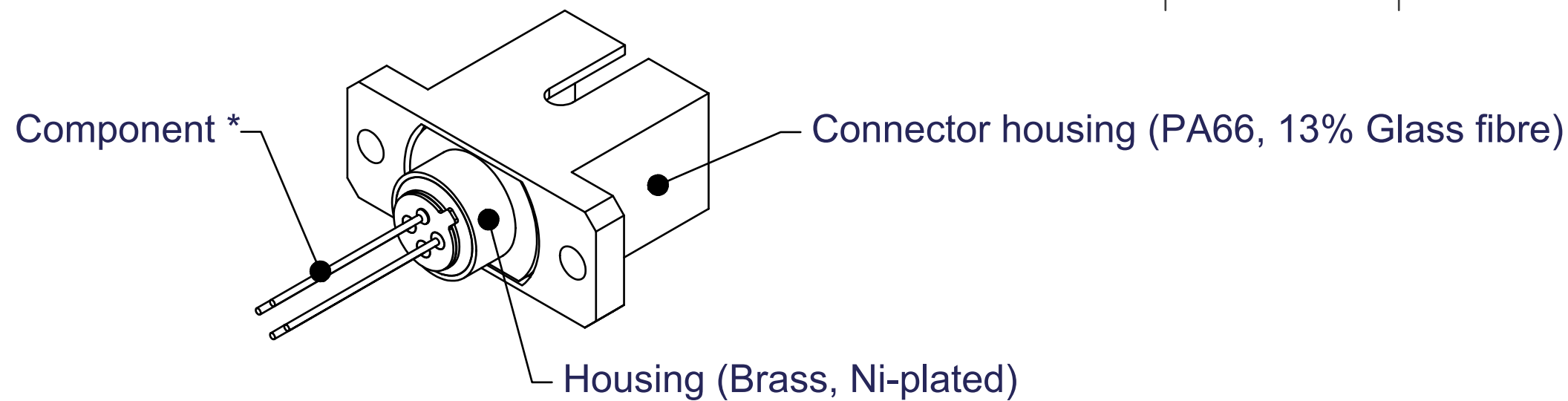
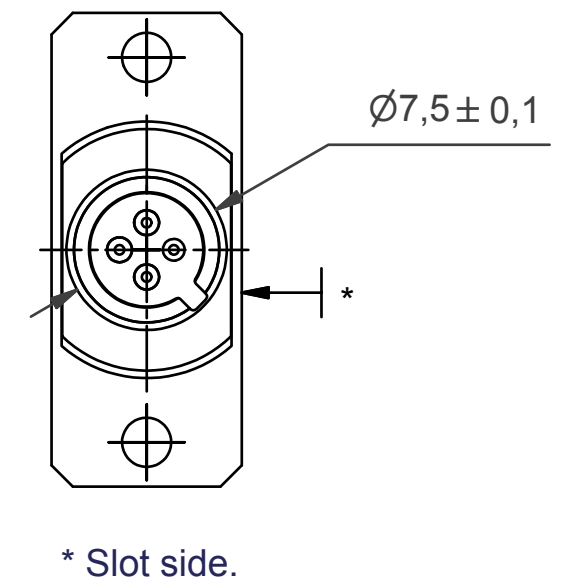
FRONT VIEW (2 : 1)



SIDE VIEW



BOTTOM VIEW



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

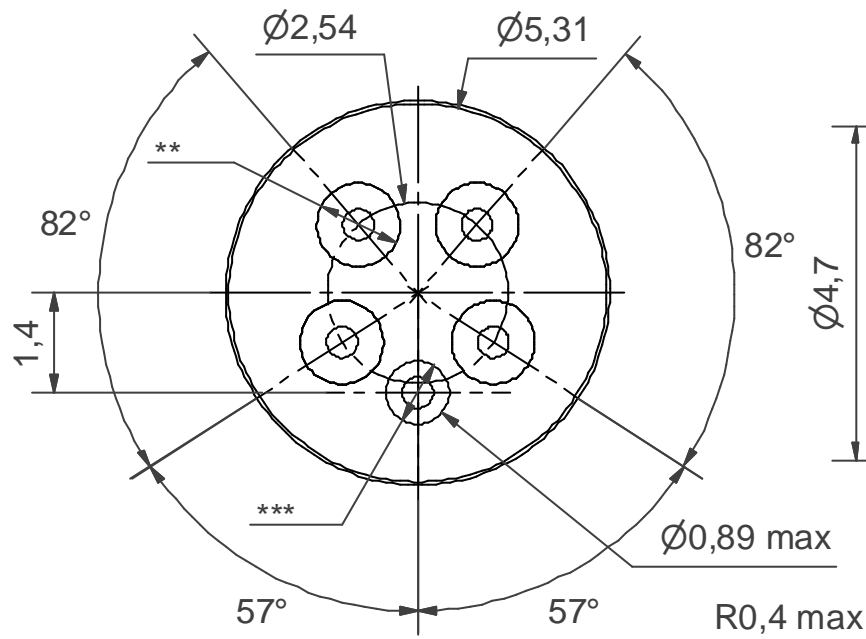
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| ISSUE | 1 | | | |
| ACN | 102546rev 1 | | | |
| DATE | 9-DEC-03 | | | |
| APPRD. | MD/MA | | | |

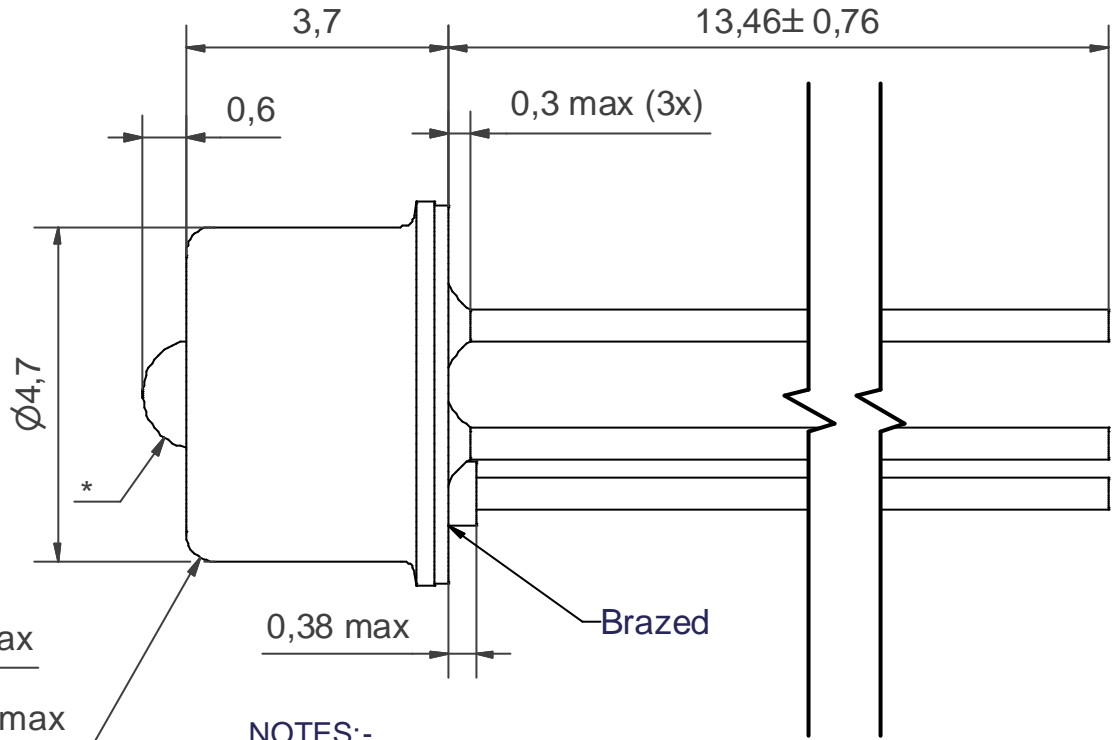


| | |
|------------------------|--|
| Package code | TE |
| Previous package codes | Drawing type TO-46 Package Outline in SC Connector housing |
| | Title 102546 |

BOTTOM VIEW (10 : 1)



SIDE VIEW



- * Lens $\varnothing 1.5 \pm 0.05$
- ** Glass sealing (4x): $\varnothing 1,17 + 0.05$
- *** Lead (5x): $\varnothing 0,44 + 0.05 / - 0,025$

- 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 .

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



| | |
|------------------------|--|
| | Package code TB |
| Previous package codes | Drawing type Package drawing, TO-46 with lens |
| | Title JS004172 |



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