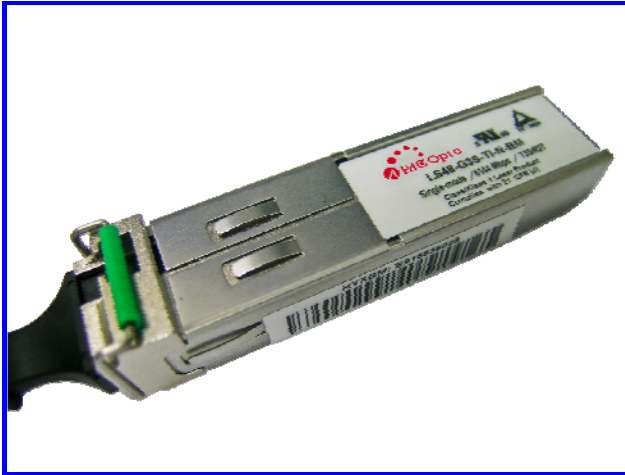




RoHS compliant
TX-1550/RX-1490 nm Single-mode Bi-directional , 120km
SFP LC Simplex Connector , with Diagnostic Monitoring
STM-4/STM-16/2.67Gbps



Features

- Telecordia GR-253-GORE and ITU-T Recommendation G.957 application
- Industry standard small form pluggable (SFP) package
- Simplex LC connector
- Single power supply 3.3V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

Ordering Information

| PART NUMBER | TX/RX | INPUT/OUTPUT | LOS | TEMPERATURE | LD Type |
|--------------------|-----------|--------------|-------|--------------|----------|
| LS48-E3U-TC-N55-WT | 1550/1490 | AC/AC | LVTTL | 0°C to 70 °C | 1550 DFB |



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Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration |
|-----------------------------|--------------|----------|------|-------------|
| Module internal temperature | -10 to 80 | ± 3 | °C | Internal |
| Module internal voltage | 3.1 to 3.5 | ± 0.1 | V | |
| Bias Current | 0 to 100 | ± 10% | mA | |
| TX Power | -3.5 to +6.5 | ± 3 dB | dBm | |
| RX Power | -29.5 to -9 | ± 3 dB | dBm | |

Absolute Maximum Ratings

| PARAMETER | SYMBOL | MIN | MAX | UNITS | NOTE |
|---------------------|----------|------|----------|-------|---------|
| Storage Temperature | T_S | -40 | 85 | °C | |
| Supply Voltage | V_{CC} | -0.5 | 4.0 | V | |
| Input Voltage | V_{IN} | -0.5 | V_{CC} | V | |
| Optical input power | P_{in} | --- | -8 | dBm | @1490nm |

Recommended Operating Conditions

| PARAMETER | SYMBOL | MIN | MAX | UNITS | NOTE |
|---------------------------------|-------------------|------------------|------|-------|------|
| Case Operating Temperature | T_C | 0 | 70 | °C | |
| Supply Voltage | V_{CC} | 3.1 | 3.5 | V | |
| Supply Current | $I_{TX} + I_{RX}$ | --- | 300 | mA | |
| Optical path loss | $Loss$ | 12.5 ~ 29 | | dB | |
| Optical fiber | --- | ITU-T G.652(SMF) | | --- | |
| Distance | D | --- | 120 | Km | |
| Optical path dispersion penalty | --- | --- | 2.5 | dB | |
| Dispersion tolerance | --- | --- | 2400 | ps/nm | |



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Transmitter Electro-optical Characteristics

$V_{CC} = 3.1\text{ V to }3.5\text{ V}, T_C = 0^\circ\text{C to }70^\circ\text{C}$

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNITS | NOTE |
|---|---|------|------|------|-------|---------|
| Bit Rate | B | 622 | --- | 2670 | Mbps | |
| Output Optical Power 9/125 μm fiber | P_{out} | -0.5 | --- | +3.5 | dBm | Average |
| Extinction Ratio | ER | 6 | --- | --- | dB | |
| Output Eye | Compliant with Telcordia GR-253-CORE Issue 3 and ITU-T recommendation G-957 | | | | | |
| Relative Intensity Noise | RIN | --- | --- | -120 | dB/Hz | |
| Output rise/fall time(20-80%) | $T_{r,f}$ | --- | --- | 160 | ps | |
| Center Wavelength | λ_C | 1540 | 1550 | 1560 | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | --- | --- | 0.5 | nm | |
| Side Mode Suppression Ratio | $SMSR$ | 30 | | | dB | |
| Output Eye | Compliant with Telcordia GR-253-CORE Issue 3 and ITU-T recommendation G-957 | | | | | |
| Max. P_{out} TX-DISABLE Asserted | P_{OFF} | --- | --- | -45 | dBm | |
| Differential Input Voltage | V_{DIFF} | 0.4 | --- | 2.0 | V | |



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Receiver Electro-optical Characteristics

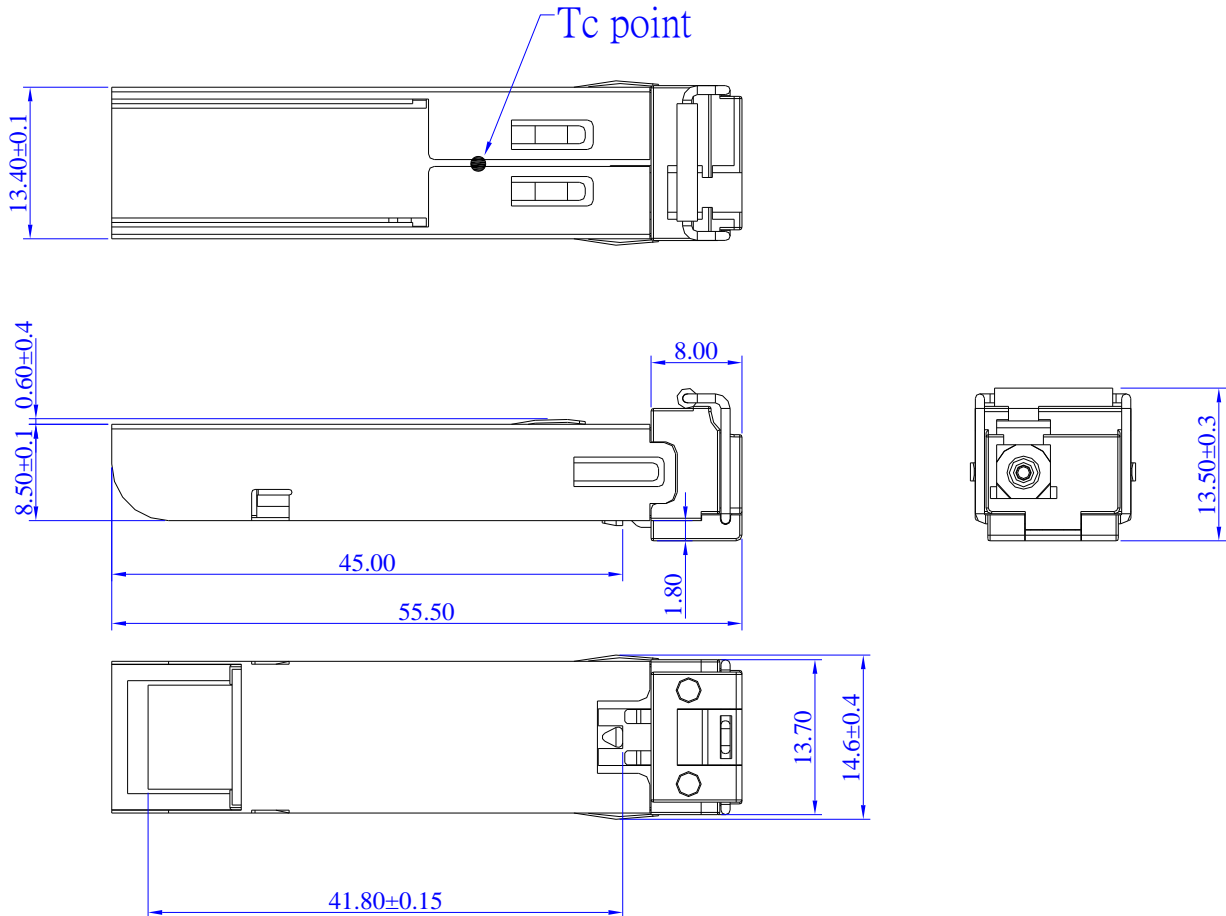
$V_{CC} = 3.1\text{ V to }3.5\text{ V}, T_C = 0^\circ\text{C to }70^\circ\text{C}$

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNITS | NOTE |
|--|-------------|------|------|----------|-------|----------------------------------|
| Bit Rate | B | 622 | --- | 2670 | Mbps | |
| Optical Input Power-maximum | P_{IN} | -9 | --- | --- | dBm | BER < 10^{-10} |
| Optical Input Power-minimum (Sensitivity) | P_{IN} | --- | --- | -29.5 | dBm | BER < 10^{-10} 2670Mbps |
| Operating Center Wavelength | λ_C | 1480 | --- | 1500 | nm | |
| Optical Return Loss | ORL | 14 | --- | --- | dB | $\lambda=1480\sim 1500\text{nm}$ |
| Loss of signal -Deasserted | P_D | --- | --- | -29.5 | dBm | |
| Loss of signal -Asserted | P_A | -45 | --- | --- | dBm | |
| Differential Output Voltage | V_{DIFF} | 0.5 | --- | 1.2 | V | |
| Receiver Loss of Signal Output Voltage-Low | RX_LOS_L | 0 | --- | 0.5 | V | |
| Receiver Loss of Signal Output Voltage-High | RX_LOS_H | 2.4 | --- | V_{CC} | V | |



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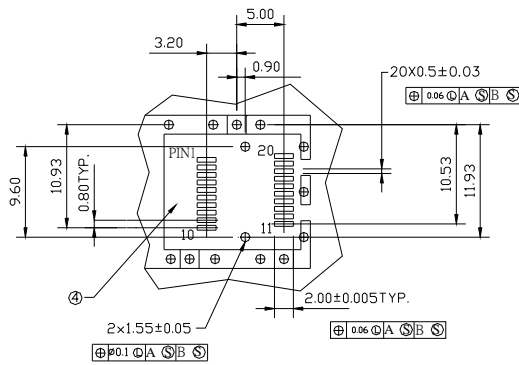
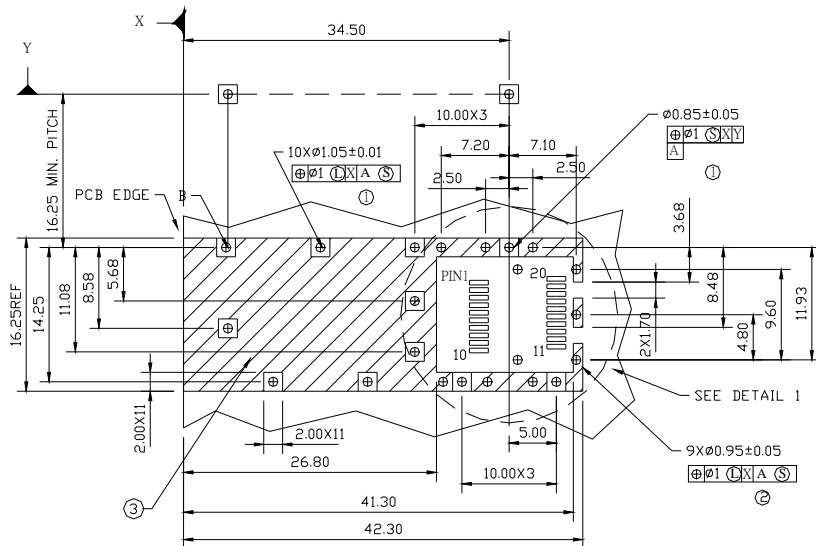
Dimensions



DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ± 0.2mm UNLESS OTHERWISE SPECIFIED

SFP host board mechanical layout



DETAIL 1

LEGEND

- 1.PADS AND VIAS ARE CHASSIS GROUND
- 2.THROUGH HOLES, PLATING OPTIONAL
- 3.HATCHED AREA DENOTES COMPONENT AND TRACE KEEPOUT(EXCEPT CHASSIS GROUND)
- 4.AREA DENOTES COMPONENT KEEPOUT (TRACES ALLOWED)

DIMENSIONS ARE IN MILLIMETERS

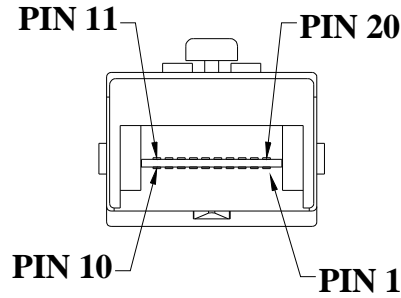
Unit: mm



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Pin Assignment

Pin-Out



| Pin | Signal Name | Description |
|-----|----------------|---|
| 1 | T_{GND} | Transmit Ground |
| 2 | TX_FAULT | Transmit Fault |
| 3 | $TX_DISABLE$ | Transmit Disable |
| 4 | $MOD_DEF (2)$ | SDA Serial Data Signal |
| 5 | $MOD_DEF (1)$ | SCL Serial Clock Signal |
| 6 | $MOD_DEF (0)$ | TTL Low |
| 7 | $RATE_SELECT$ | Open Circuit |
| 8 | RX_LOS | Receiver Loss of Signal, TTL High, open collector |
| 9 | R_{GND} | Receiver Ground |
| 10 | R_{GND} | Receiver Ground |
| 11 | R_{GND} | Receiver Ground |
| 12 | $RX-$ | Receive Data Bar, Differential PECL, ac coupled |
| 13 | $RX+$ | Receive Data, Differential PECL, ac coupled |
| 14 | R_{GND} | Receiver Ground |
| 15 | V_{CCR} | Receiver Power Supply |
| 16 | V_{CCT} | Transmitter Power Supply |
| 17 | T_{GND} | Transmitter Ground |
| 18 | $TX+$ | Transmit Data, Differential PCEL, ac coupled |
| 19 | $TX-$ | Transmit Data Bar, Differential PCEL, ac coupled |
| 20 | T_{GND} | Transmitter Ground |



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Eye Safety Mark

The LS4 series singlemode transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Caution

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.

Required Mark

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

Note : All information contained in this document is subject to change without notice.