



RoHS compliant
TX-1490/RX-1550 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-N49-WT	1490/1550	AC/AC	LVTTL	0°C to 70 °C	1490 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	@1550nm

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_{rf}	---	---	160	ps	
Center Wavelength	λ_C	1480	1490	1500	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

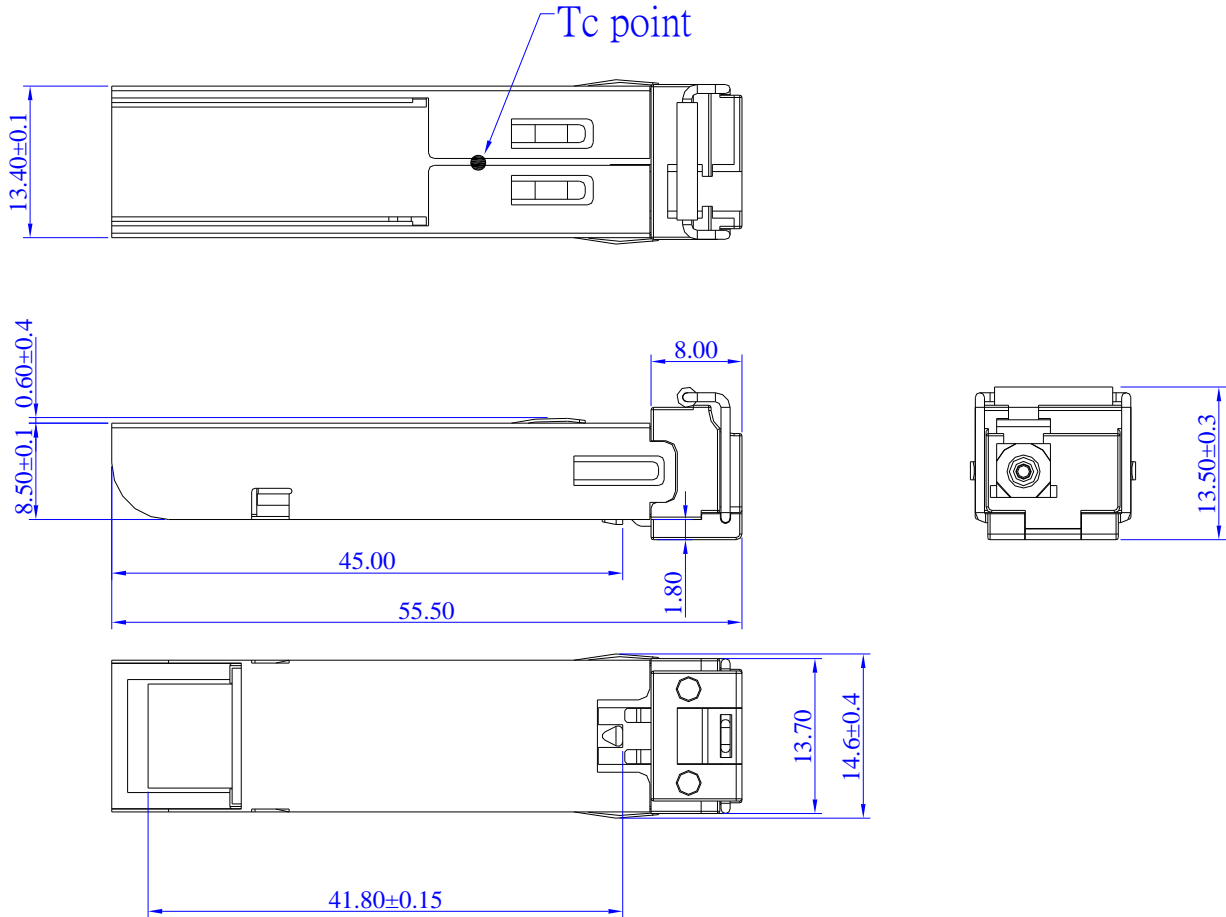
$V_{CC} = 3.1\text{ V to }3.5\text{ V}, T_C = 0^\circ\text{C to }70^\circ\text{C}$

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	1540	---	1560	nm	
Optical Return Loss	ORL	14	---	---	dB	$\lambda=1540\sim1560\text{nm}$
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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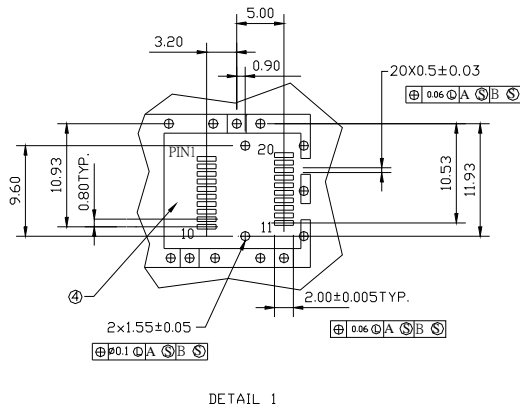
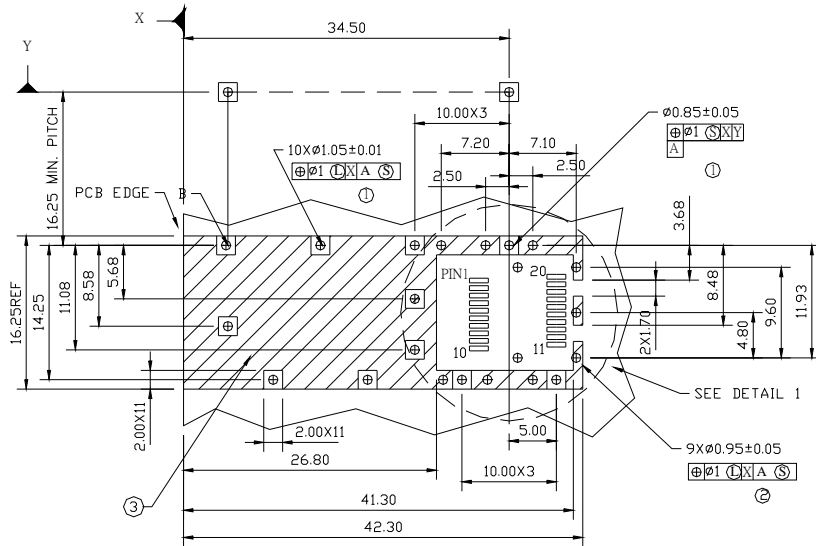
Dimensions



DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ± 0.2mm UNLESS OTHERWISE SPECIFIED

SFP host board mechanical layout



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

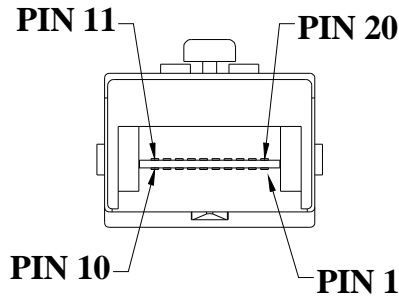
Unit: mm



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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.