



## **2.5Gbps TX:1490nm/RX:1550nm SMF 120km BiDi SFP LC Optical Transceiver (Commercial)**

**CS4T5-48H-3U-TC-L**



### **DESCRIPTION**

The CS4T5-48H-3U-TC-L bi-directional SFP (Small Form Pluggable) transceivers are designed for use in 2.5Gbps links up to 120km over a single strand single-mode fiber.

### **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
- Hot pluggable
- TTL signal detect indicator
- Class 1 laser product compliant with EN 60825-1
- Input/Output: AC/AC
- LOS: LVTTL
- LD Type: 1490 DFB
- Temperature: 0°C to 70°C

### **APPLICATIONS**

- Single-mode core fiber backbone links up to 120km
- 2500M / OC48 / STM-16

**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	UNIT	NOTES
Storage Temperature	T <sub>S</sub>	-40	85	°C	
Supply Voltage	V <sub>CC</sub>	-0.5	4.0	V	
Input Voltage	V <sub>IN</sub>	-0.5	V <sub>CC</sub>	V	
Optical Input Power	P <sub>in</sub>	-	-8	dBm	@1550nm

**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTES
Case Operating Temperature	T <sub>C</sub>	0	70	°C	
Supply Voltage	V <sub>CC</sub>	3.1	3.5	V	
Supply Current	I <sub>TX</sub> + I <sub>RX</sub>	-	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	

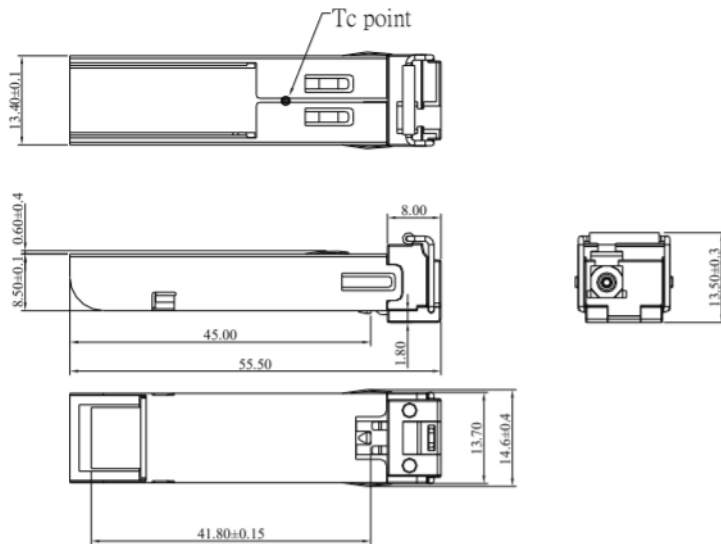
**TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS (V<sub>CC</sub> = 3.1V to 3.5V, T<sub>C</sub> = 0°C to 70°C)**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Bit Rate	B	622	-	2670	Mbps	
Output Optical Power 9/125um fiber	P <sub>out</sub>	-0.5	-	+3.5	dBm	Average
Extinction Ratio	ER	6	-	-	dB	
Center Wavelength	λ <sub>C</sub>	1480	1490	1500	nm	
Spectral Width (-20dB)	Δλ	-	-	0.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN	-	-	-120	dB/Hz	
Output Rise/Fall Time (20~80%)	T <sub>r,f</sub>	-	-	160	ps	
Output Eye	Compliant with Telcordia GR-253-CORE Issue 3 and ITU-T recommendation G-957					
Max. P <sub>out</sub> TX-DISABLE Asserted	P <sub>OFF</sub>	-	-	-45	dBm	
Differential Input Voltage	V <sub>DIFF</sub>	0.4	-	2.0	V	

**RECEIVER ELECTRO-OPTICAL CHARACTERISTICS ( $V_{CC} = 3.1V$  to  $3.5V$ ,  $T_C = 0^{\circ}C$  to  $70^{\circ}C$ )**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
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	$\lambda_C$	1540	-	1560	nm	
Optical Return Loss	ORL	14	-	-	dB	$\lambda=1540\sim 1560nm$
LOS Asserted	$P_A$	-45	-	-	dBm	
LOS Deasserted	$P_D$	-	-	-29.5	dBm	
Differential Output Voltage	$V_{DIFF}$	0.5	-	1.2	V	
Receiver Loss of Signal Output Voltage-Low	RX_LOS <sub>L</sub>	0	-	0.5	V	
Receiver Loss of Signal Output Voltage-High	RX_LOS <sub>H</sub>	2.4	-	$V_{CC}$	V	

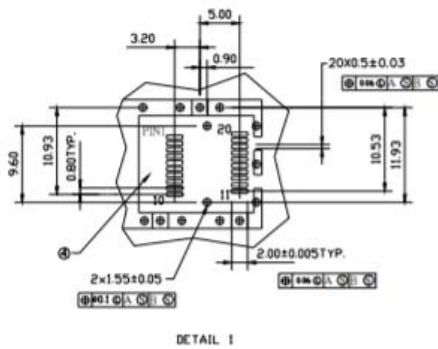
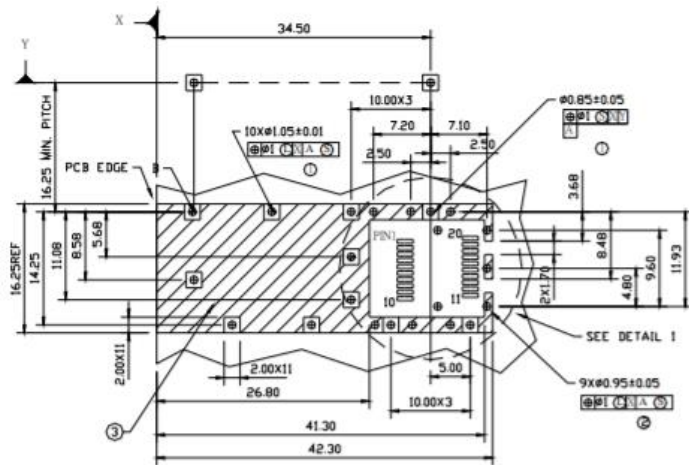
**DIMENSIONS**



**DIMENSIONS ARE IN MILLIMETERS**

**ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED**

SFP HOST BOARD MECHANICAL LAYOUT

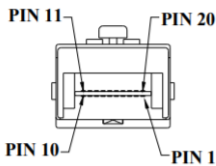


LEGEND

- 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

PIN ASSIGNMENT

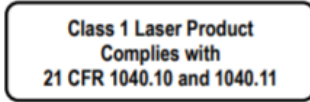


Pin	Signal Name	Description
1	$T_{GND}$	Transmit Ground
2	$TX\_FAULT$	Transmit Fault
3	$TX\_DISABLE$	Transmit Disable
4	$MOD\_DEF (2)$	SDA Serial Data Signal
5	$MOD\_DEF (1)$	SCL Serial Clock Signal
6	$MOD\_DEF (0)$	TTL Low
7	$RATE\_SELECT$	Open Circuit
8	$RX\_LOS$	Receiver Loss of Signal, TTL High, 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 PECL, ac coupled
19	$TX-$	Transmit Data Bar, Differential PECL, ac coupled
20	$T_{GND}$	Transmitter Ground

## EYE SAFETY MARK

The single-mode 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.

### Required Mark



**[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.

## ADDITIONAL NOTES

- Avoid eye or skin exposure to laser radiations.
- The device is sensitive to electro-static discharge (ESD). The device should be handled with ESD proof tools. To assemble the device on PCB, proper grounding is required to prevent ESD.
- Specifications are subject to change without notice.



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