



1.25Gbps TX:1510nm/RX:1570nm SMF 120km BiDi SFP LC Optical Transceiver

CS5T7-24H-3U1-Tx-L



DESCRIPTION

The CS5T7-24H-3U1-Tx-L is a high-performance BiDi SFP optical transceiver module designed for Gigabit Ethernet and fiber communication systems. It supports a data rate of 1.25Gbps with a 1510nm transmit wavelength and a 1570nm receive wavelength over singlemode fiber (SMF), reaching distances of up to 120 kilometers.

FEATURES

- Compliant with IEEE802.3z Gigabit Ethernet Standard
- Compliant with Fiber Channel 100-SM-LC-L standard
- Industry standard small form pluggable (SFP) package
- Simplex LC connector
- Single power supply 3.3V
- Differential inputs and outputs
- TTL signal detect indicator
- Hot pluggable
- Class 1 laser product compliant with EN 60825-1
- LD Type: 1510 DFB

APPLICATIONS

- Single-mode core fiber backbone links up to 120km
- 1000Base Bidi

PRODUCT OVERVIEW

PART NUMBER	OPERATING TEMPERATURE
CS5T7-24H-3U1-TC-L	0°C to 70°C
CS5T7-24H-3U1-TI-L	-40°C to 85°C

DIAGNOSTICS

PARAMETER	RANGE	ACCURACY	UNIT	CALIBRATION	NOTES
Temperature	-10 to 85	±3	°C	External	CS5T7-24H-3U1-TC-L
	-40 to 95	±3			CS5T7-24H-3U1-TI-L
Voltage	3.1 to 3.5	±0.1	V		
Bias Current	0 to 100	±10%	mA		
TX Power	-5 to +6	±3 dB	dBm		
RX Power	-28 to -8	±3 dB	dBm		

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTES
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	

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTES
Case Operating Temperature	T _C	0	70	°C	CS5T7-24H-3U1-TC-L
		-40	85		CS5T7-24H-3U1-TI-L
Supply Voltage	V _{CC}	3.1	3.5	V	
Supply Current	I _{TX} + I _{RX}		300	mA	
Dispersion Tolerance	DS	-450	2400	ps/nm	
Dispersion Penalty	P	-	1.0	dB	

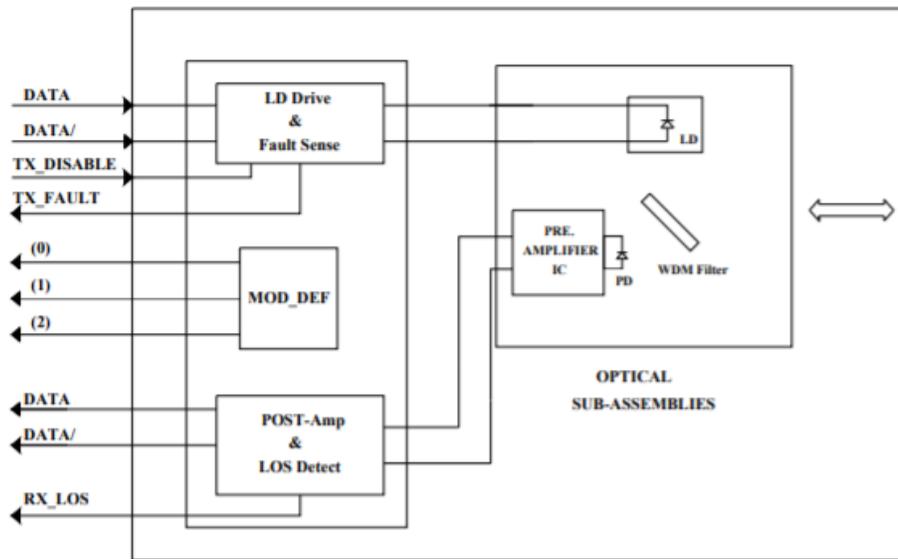
TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS (V_{CC} = 3.1V to 3.5V, T_C = 0°C to 70°C, -40°C to 85°C)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Output Optical Power 9/125um fiber	P _{out}	-2	-	+3	dBm	Average
Extinction Ratio	ER	9	-	-	dB	
Center Wavelength	λ _C	1500	1510	1520	nm	
Spectral Width (-20dB)	Δλ	-	-	0.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Rise/Fall Time (20%~80%)	T _{r, f}	-	-	260	ps	
Relative Intensity Noise	RIN	-	-	-120	dB/Hz	
Total Jitter	TJ	-	-	227	ps	
Output Eye	Compliant with IEEE802.3z					
Max. P _{out} TX-DISABLE Asserted	P _{OFF}	-	-	-45	dBm	
Differential Input Voltage	V _{DIFF}	0.4	-	2.0	V	
Transmit Fault Output-Low	TX_FAULT _L	0.0	-	0.5	V	
Transmit Fault Output-High	TX_FAULT _H	2.4	-	V _{CC}	V	
Time to initialize, include reset of TX_FAULT	t _{init}	-	-	300	ms	
TX_FAULT from fault to assertion	t _{fault}	-	-	100	us	
TX_DISABLE time to start reset	t _{reset}	10	-	-	us	

RECEIVER ELECTRO-OPTICAL CHARACTERISTICS ($V_{CC} = 3.1V$ to $3.5V$, $T_c = 0^{\circ}C$ to $70^{\circ}C$, $-40^{\circ}C$ to $85^{\circ}C$)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Optical Input Power-Maximum	P_{IN}	-8	-	-	dBm	$BER < 10^{-12}$
RX Sensitivity	P_{IN}	-	-	-33	dBm	PRBS7, $BER < 10^{-12}$
Operating Center Wavelength	λ_c	1560	-	1580	nm	
Optical Return Loss	ORL	14	-	-	dB	$\lambda = 1560 \sim 1580nm$
Signal Detect-Asserted	P_A	-	-	-33	dBm	
Signal Detect-Deasserted	P_D	-45	-	-	dBm	
Differential Output Voltage	V_{DIFF}	0.5	-	1.2	V	
Data Output Rise, Fall Time (20%~80%)	$T_{r,f}$	-	-	0.35	ns	
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	

BLOCK DIAGRAM OF TRANSCEIVER



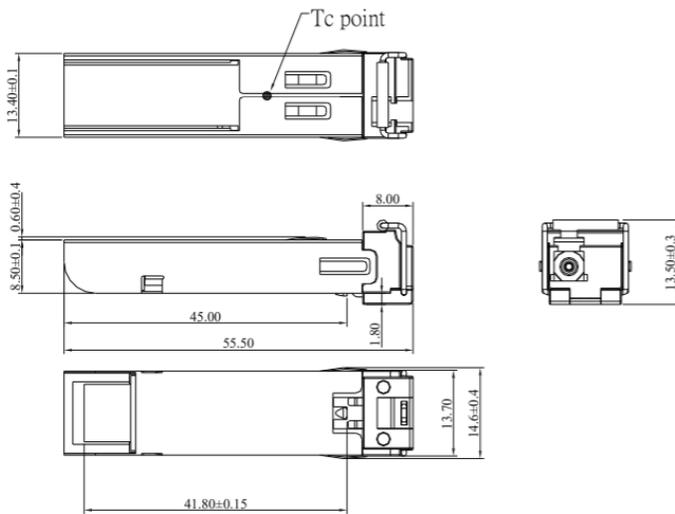
Transmitter and Receiver Optical Sub-Assembly Section - A 1510 nm InGaAsP laser and an InGaAs PIN photodiode integrate with an WDM filter to form a bi-directional single fiber optical subassembly (OSA). The laser of OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current. The photodiode of OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

TX_FAULT - When sensing an improper power level in the laser driver, the SFP set this signal high and turns off the Laser. TX_FAULT can be reset with the TX_DISABLE line. The signal is in TTL level.

TX_DISABLE - The TX_DISABLE signal is high (TTL logic "1") to turn off the laser output.

Receive Loss (RX_LOS) - The RX_LOS is high (logic "1") when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

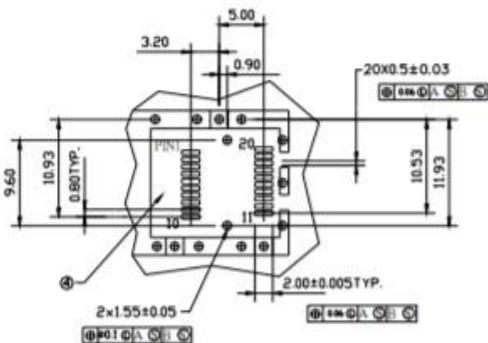
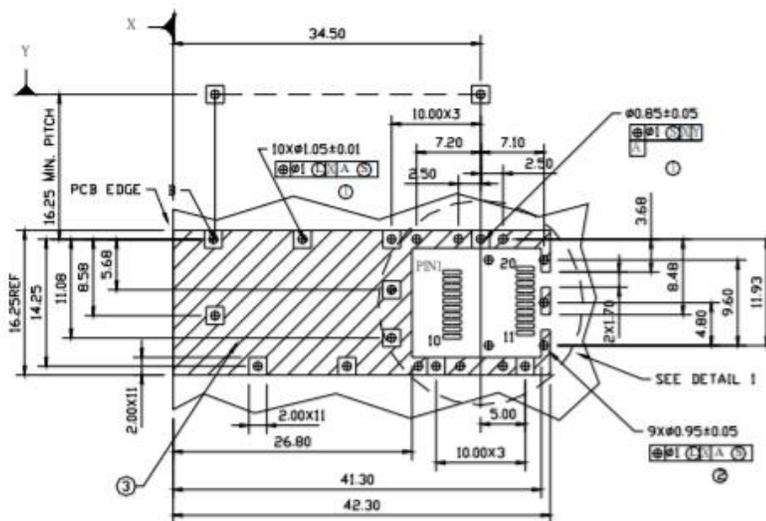
DIMENSIONS



DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED

SFP HOST BOARD MECHANICAL LAYOUT



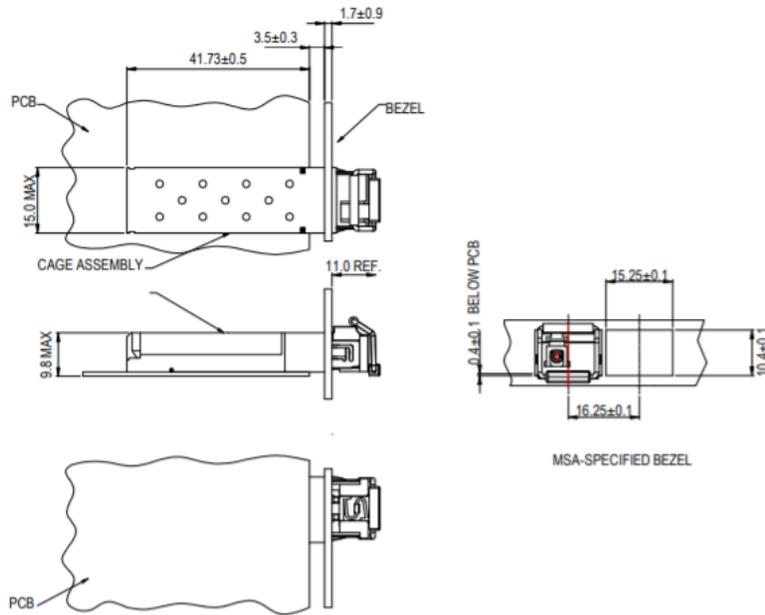
DETAIL I

LEGEND

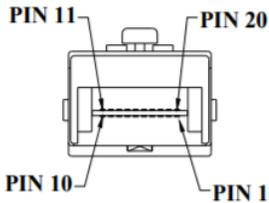
- 1.PADS AND VIAS ARE CHASSIS GROUND
- 2.THROUGH HOLES, PLATING OPTIONAL
- 3.HATCHED AREA DENOTES COMPONENT AND TRACE KEEPOUT(EXCEPT CHASSIS GROUND)
- 4.AREA DENOTES COMPONENT KEEPOUT (TRACES ALLOWED)

DIMENSIONS ARE IN MILLIMETERS

ASSEMBLY DRAWING (unit: mm)



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.

[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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