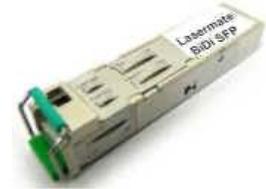# 155Mbps TX:1550nm/RX:1310nm SMF 20km BiDi SFP LC Optical Transceiver

CS5T3-03H-3S-Tx-L

DESCRIPTION

The CS5T3-03H-3S-Tx-L is a high-performance, cost-effective BiDi SFP optical transceiver supporting 155Mbps data rates over single-mode fiber (SMF). Designed for bidirectional communication, the module features a 1550nm transmitter and 1310nm receiver, and supports transmission distances up to 20km. It uses a duplex LC connector.

FEATURES

- Compliant with SONET/SDH standard
- Compliant with Fast Ethernet standard
- Industry standard small form pluggable (SFP) package
- Simplex LC connector
- Single power supply 3.3V
- Differential LVPECL inputs and outputs
- TTL signal detect indicator
- Hot pluggable
- Class 1 laser product compliant with EN 60825-1
- LD Type: 1550 FP

APPLICATIONS

- Single-mode core fiber backbone links up to 20km
- S1.1 / Fast Ethernet

PRODUCT OVERVIEW

PART NUMBER	OPERATING TEMPERATURE
CS5T3-03H-3S-TC-L	0ºC to 70ºC
CS5T3-03H-3S-TI-L	-40ºC to 85ºC

DIAGNOSTICS

PARAMETER	RANGE	ACCURACY	UNIT	CALIBRATION
Temperature	-40 to 95	±3	°C	
Voltage	3.0 to 3.6	±0.1	V	
Bias Current	0 to 100	±5	mA	External
TX Power	-17 to -5	±3 dB	dBm	
RX Power	-31 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	
Output Current	I_o	-	50	mA	
Operating Current	I_{OP}	-	400	mA	

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTES
Case Operating Temperature	T_C	0	70	°C	CS5T3-03H-3S-TC-L
		-40	85		CS5T3-03H-3S-TI-L
Supply Voltage	V_{CC}	3.1	3.5	V	
Supply Current	$I_{TX} + I_{RX}$	-	200	mA	

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

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Output Optical Power 9/125um fiber	P_{out}	-14	-	-8	dBm	Average
Extinction Ratio	ER	8.2	-	-	dB	
Center Wavelength	λ_C	1480	1530	1576	nm	
Spectral Width (RMS)	$\Delta\lambda$	-	-	2.5	nm	
Rise/Fall Time, 10%~90%	$T_{r, f}$	-	1	2	ns	
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	
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 = 0ºC to 70ºC, -40ºC to 85ºC)

| PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Optical Input Power-Maximum	P_{IN}	0	-	-	dBm	BER<10^{-10}
RX Sensitivity @OC-3	P_{IN}	-	-	-32	dBm	PRBS23, BER<10^{-10}
RX Sensitivity @125Mbps	P_{IN}	-	-	-32	dBm	PRBS7, BER<10^{-10}
Operating Center Wavelength	λ_C	1260	-	1360	nm	
Optical Return Loss	ORL	14	-	-	dB	λ=1260~1360nm
Optical Isolation	ISO	-	-	-45	dB	λ=1480~1600nm
Loss of Signal-Asserted	P_A	-	-	-32	dBm	
Loss of Signal-Deasserted	P_D	-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	

BLOCK DIAGRAM OF TRANSCEIVER
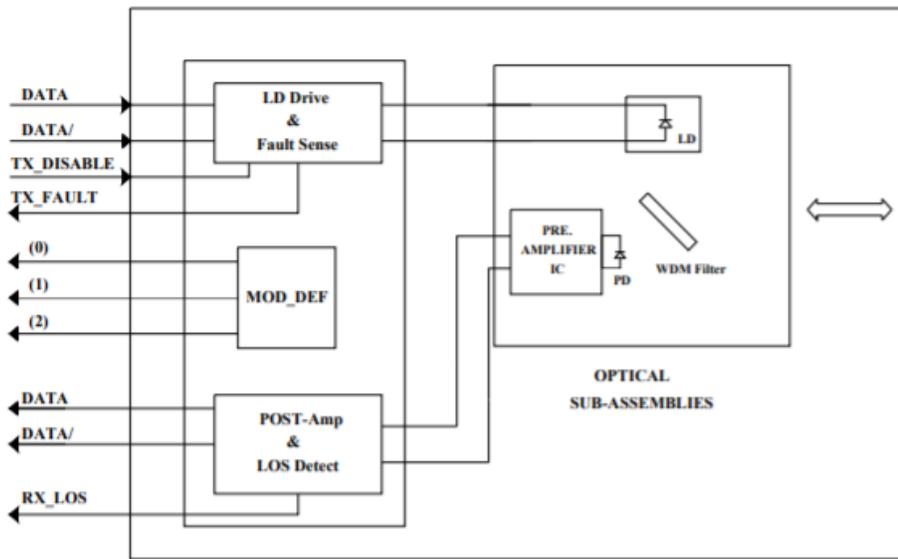
Transmitter and Receiver Optical Sub-Assembly Section - A 1550 nm InGaAsP laser and an InGaAs PIN photodiode integrate with an WDM filter to form a bi-directional single fiber optical subassembly (OSA). The laser of OSA is driven by a LD driver IC which converts differential input LVPECL logic signals 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.
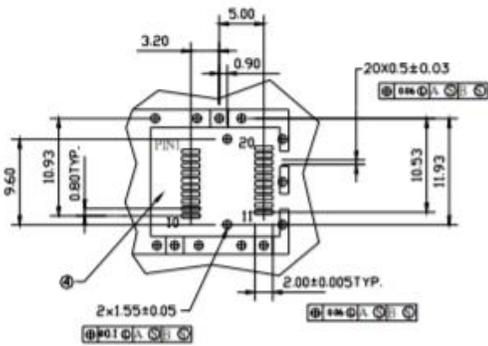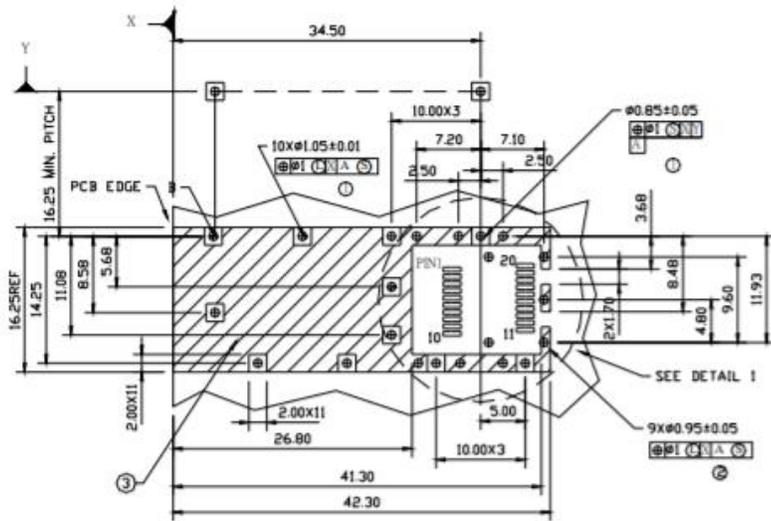
DIMENSIONS
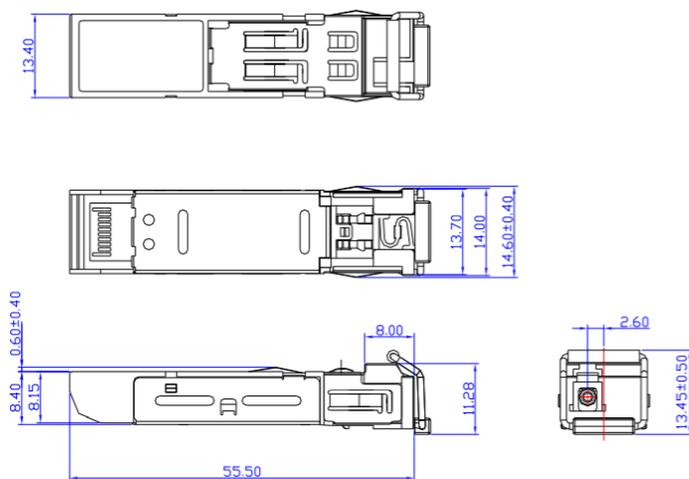
DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ± 0.2mm UNLESS OTHERWISE SPECIFIED
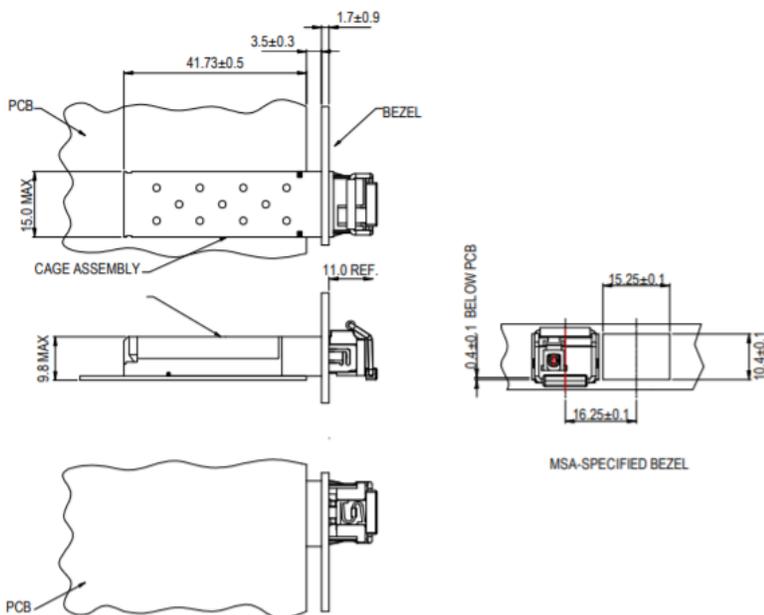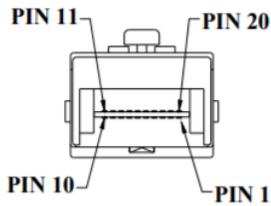
SFP HOST BOARD MECHANICAL LAYOUT

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

DETAIL 1

ASSEMBLY DRAWING (unit: mm)

MSA-SPECIFIED BEZEL

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

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.

www.lasermate.com

Lasermate Group, Inc.
19608 Camino De Rosa
Walnut, CA 91789 USA
Tel: (909)718-0999
Fax: (909)718-0998
sales@lasermate.com
www.lasermate.com