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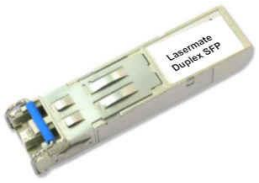
Data Sheet
Rev 01.1220

155Mbps 1550nm SMF 120km SFP Optical Transceiver with Duplex LC Connector

CS15D-03F-3U-Tx-LD



DESCRIPTION

The CS15D-03F-3U-Tx-LD duplex SFP (Small Form Pluggable) optical transceivers are high performance, cost effective optical transceiver modules for serial optical data communications application specified for a data rate of 155 Mb/s. The SFP transceiver module provides 120km transmission distance over single mode fiber at nominal wavelength of 1550nm. The optical transceiver is RoHS compliant.

FEATURES

- RoHS compliant
- Compliant with SONET/SDH application
- Compliant with Fast Ethernet standard
- Compliant with SFF8472 diagnostic monitoring interface
- Industry standard small form pluggable (SFP) packge
- Hot pluggable
- Single power supply 3.3V
- Duplex LC connector
- TTL signal detect indicator
- Class 1 laser product compliant with EN 60825-1
- Input/Output: AC/AC
- Up to 100km over single mode fiber

APPLICATIONS

- Extended L1.2

PRODUCT OVERVIEW

PART NUMBER	OPERATING TEMPERATURE
CS15D-03F-3U-TC-LD	0°C to 70°C
CS15D-03F-3U-TI-LD	-40°C to 85°C

DIAGNOSTICS

PARAMETER	RANGE	ACCURACY	UNIT	CALIBRATION
Temperature	-40 to 95	±3	°C	External
Voltage	3.1 to 3.5	±0.1	V	
Bias Current	0 to 120	±5	mA	
TX Power	-8 to +3	±3 dB	dB	
RX Power	-32 to -8	±3 dB	dB	

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
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	CS15D-03F-3U-TC-LD
		-40	85		CS15D-03F-3U-TI-LD
Supply Voltage	V_{CC}	3.1	3.5	V	
Supply Current	$I_{TX} + I_{RX}$	-	300	mA	

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

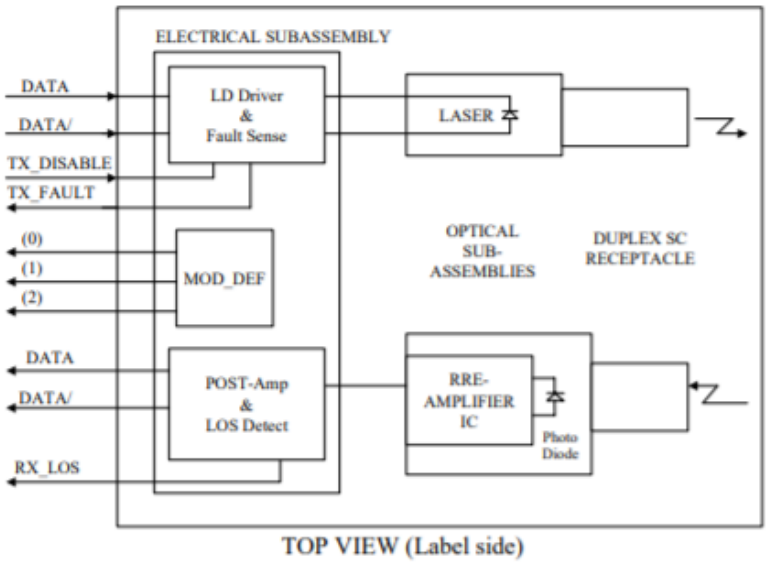
PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Data Rate	B	50	155	200	Mbps	
Output Optical Power 9/125um fiber	P_{out}	0	-	+5	dBm	Average
Extinction Ratio	ER	10	-	-	dB	
Center Wavelength	λ_C	1530	1550	1570	nm	
Spectral Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Rise/Fall Time (10~90%)	$T_{r,f}$	-	1	2	ns	
Max. P_{out} TX-DISABLE Asserted	P_{OFF}	-	-	-45	dBm	
Output Eye	Compliant with Telcordia GR-253-CORE Issue 3 and ITU-T recommendation G-957					
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	µs	
TX_DISABLE time to start reset	t_reset	10	-	-	µs	

RECEIVER 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
Data Rate	B	50	155	200	Mbps	
Optical Input Power-Maximum	P_{IN}	0	-	-	dBm	Note 1
Receiver Input Power-Minimum (Sensitivity)	P_{IN}	-	-	-35	dBm	Note 1
Operating Center Wavelength	λ_C	1260	-	1600	nm	
Loss of Signal-Asserted	P_A	-	-	-35	dBm	Average
Loss of Signal-Deasserted	P_D	-45	-	-	dBm	Average
Loss of Signal-Hysteresis	P_A-P_D	1.0	-	-	dB	
Data Output Rise, Fall time (10~90%)	$T_{r,f}$	-	1	2	ns	
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	

Note 1: The input data is at 155.52 Mbps, 2^{23}–1 PRBS data pattern. The receiver is guaranteed to provide output data with Bit Error Rate (BER) better than or equal to 1×10^{-10}.

BLOCK DIAGRAM OF TRANSCEIVER



TOP VIEW (Label side)

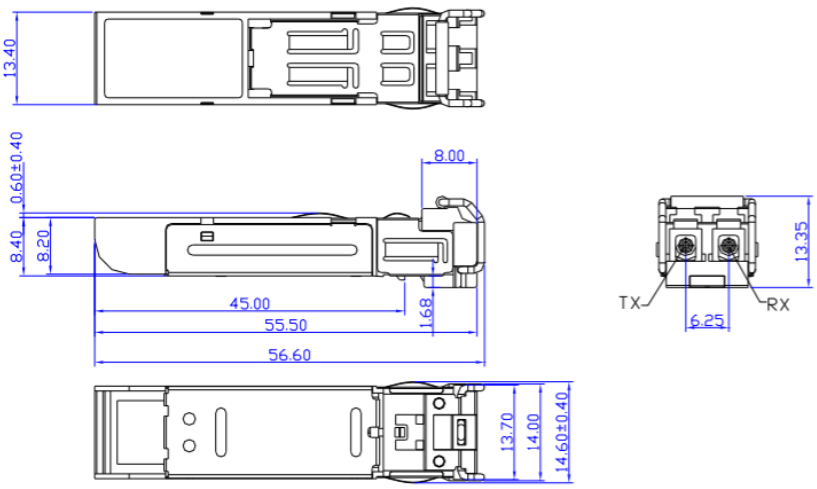
Transmitter Section - The transmitter section consists of a 1550 nm InGaAsP laser in an eye safe optical subassembly (OSA) which mates to the fiber cable. The laser OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current.

TX_DISABLE - The TX_DISABLE signal is high (TTL logic “1”) to turn off the laser output. The laser will turn on when TX_DISABLE is low (TTL logic “0”).

Receiver Section - The receiver utilizes an InGaAs PIN photodiode mounted together with a trans-impedance preamplifier IC in an OSA. This OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

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.

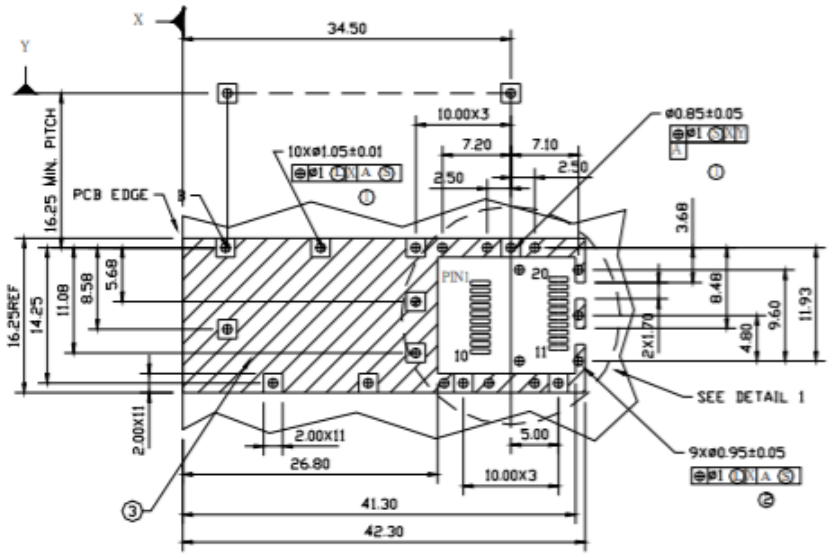
DIMENSIONS

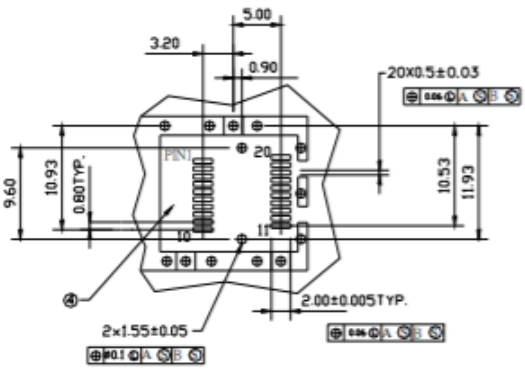


DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ± 0.2mm UNLESS OTHERWISE SPECIFIED

SFP HOST BOARD MECHANICAL LAYOUT



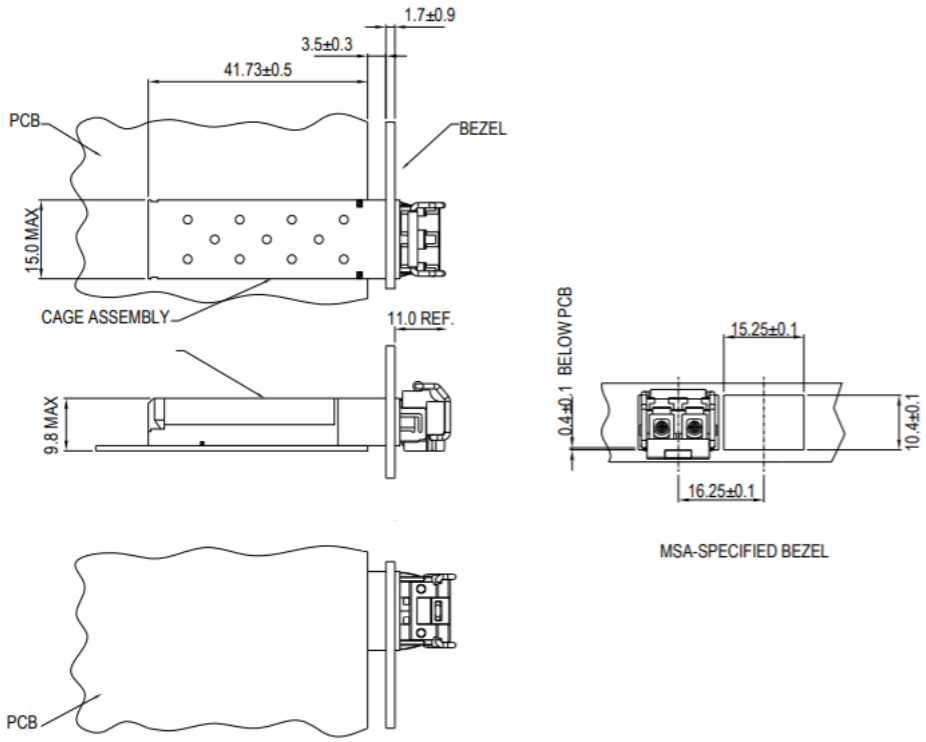


LEGEND

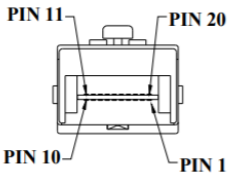
1.PADS AND VIAS ARE CHASSIS GROUND
2.THROUGH HOLES, PLATING OPTIONAL
3.HATCHED AREA DENOTES COMPONENT AND TRACE KEEPOUT(EXCEPT CHASSIS GROUND)
4.AREA DENOTES COMPONENT KEEPOUT (TRACES ALLOWED)

DIMENSIONS ARE IN MILLIMETERS

ASSEMBLY DRAWING (unit: mm)



PIN ASSIGNMENT

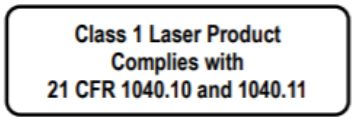


PIN	SIGNAL NAME	DESCRIPTION	PIN	SIGNAL NAME	DESCRIPTION
1	T_{GND}	Transmit Ground	11	R_{GND}	Receiver Ground
2	TX_FAULT	Transmit Fault	12	RX-	Receive Data Bar, Differential PECL, ac coupled
3	TX_DISABLE	Transmit Disable	13	RX+	Receive Data, Differential PECL, ac coupled
4	MOD_DEF (2)	SDA Serial Data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