RoHS compliant
Multi-Rate 1310 nm Single-mode Transceiver, (SR/I-16)
Small Form Pluggable (SFP), with Diagnostic Monitoring
2.67Gb/OC48/2FC/GbE/FC/OC12/OC3/Fast Ethernet

Features

- Compliant with SFF8472 diagnostic monitoring interface
- Industry standard small form pluggable (SFP) package
- Multi-Rate
- Duplex LC connector
- Differential LVPECL inputs and outputs
- Single power supply 3.3V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

Ordering Information

PART NUMBER	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE	LD Type
LS38-E3C-TC-N-DD	AC/AC	TTL	3.3V	0°C to 70 $^{\circ}$C	FP
LS38-E3C-TI-N-DD	AC/AC	TTL	3.3V	-40°C to 85 $^{\circ}$C	FP

Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 85	± 3	$^{\circ}$C	
Voltage	3.1 to 3.5	± 0.1	V	
Bias Current	0 to 90	± 5	mA	External
TX Power	-12 to 0	± 3 dB	dBm	
RX Power	-20 to –3	± 3 dB	dBm	

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	T_S	−40	85	$^\circ$C	
Supply Voltage	Vcc	−0.5	4.0	V	
Input Voltage	V_{IN}	−0.5	Vcc	V	

Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Case Operating Temperature	T_C	0	70	$^\circ$C	
		-40	85		
Supply Voltage	Vcc	3.1	3.5	V	
Supply Current	$I_{TX} + I_{RX}$	---	250	mA	

Transmitter Electro-optical Characteristics

Vcc = 3.1 V to 3.5 V, T_C = 0 $^\circ$C to 70 $^\circ$C (-40 $^\circ$C to 85 $^\circ$C)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Output Optical Power 9/125 μm fiber	P_{out}	−9	---	−3	dBm	Average
Extinction Ratio	ER	8.2	---	---	dB	
Center Wavelength	λ_C	1260	1310	1360	nm	
Spectral Width (RMS)	$\Delta\lambda$	---	---	4	nm	
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

Vcc = 3.1 V to 3.5 V, T_C = 0 ˚C to 70 ˚C (-40 ˚C to 85 ˚C)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical Input Power-maximum	P_{IN}	−3	---	---	dBm	BER $< 10^{-10}$
RX Sensitivity @2.67 Gb/s	P_{IN}	---	---	−20	dBm	PRBS23, BER $< 10^{-10}$
RX Sensitivity @OC-48	P_{IN}	---	---	−20	dBm	PRBS23, BER $< 10^{-10}$
RX Sensitivity @2xFC	P_{IN}	---	---	−20	dBm	PRBS7, BER $< 10^{-12}$
RX Sensitivity @GbE	P_{IN}	---	---	−20	dBm	PRBS7, BER $< 10^{-12}$
RX Sensitivity @OC-12	P_{IN}	---	---	−20	dBm	PRBS23, BER $< 10^{-10}$
RX Sensitivity @OC-3	P_{IN}	---	---	−20	dBm	PRBS23, BER $< 10^{-10}$
RX Sensitivity @Fast ethernet	P_{IN}	---	---	−20	dBm	PRBS7, BER $< 10^{-10}$
Operating Center Wavelength	λ_C	1260	---	1610	nm	
Signal Detect-Asserted	P_A	---	---	−20	dBm	
Signal Detect-Deasserted	P_D	−30	---	---	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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Block Diagram of Transceiver

TOP VIEW (Label side)

Transmitter Section

The transmitter section consists of a 1310 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.
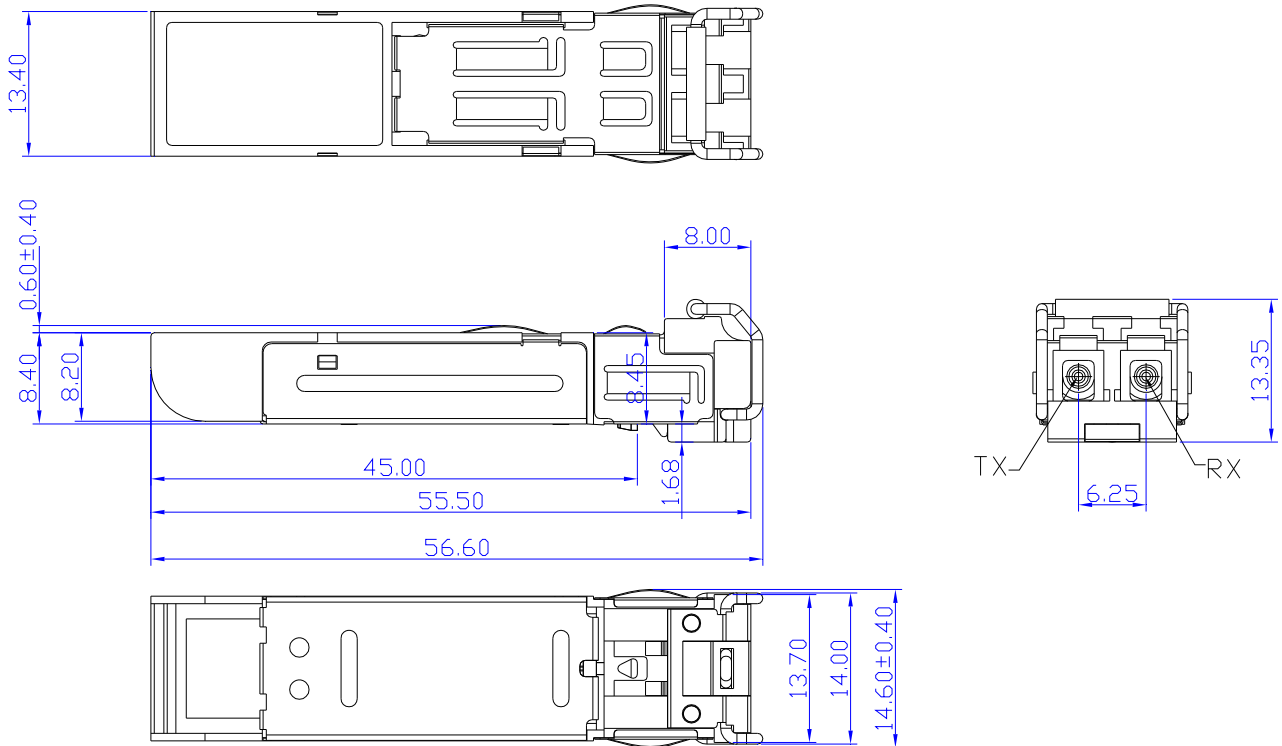
Receive Loss (RX_LOS)

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.

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Dimensions

DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ± 0.2mm UNLESS OTHERWISE SPECIFIED

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SFP host board mechanical layout
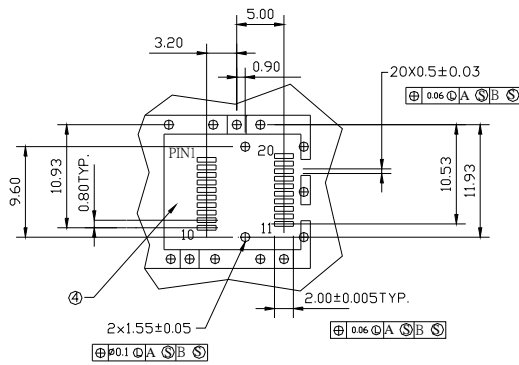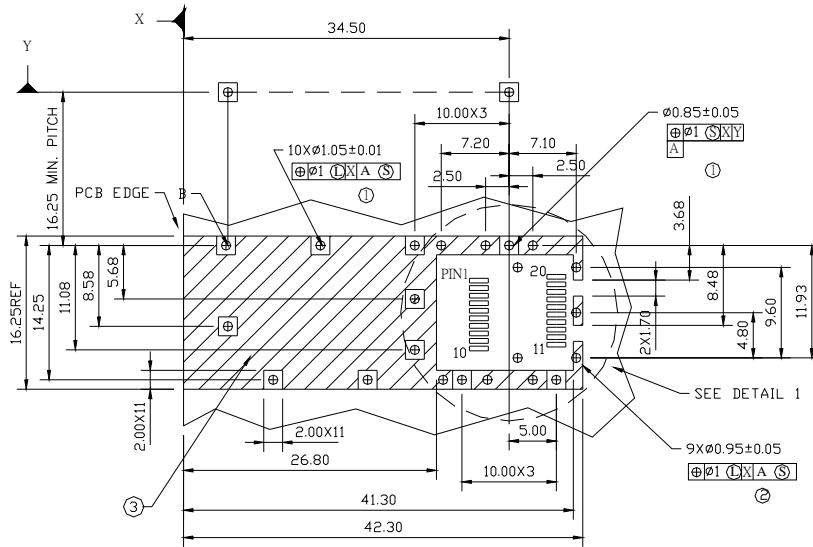
LEGEND

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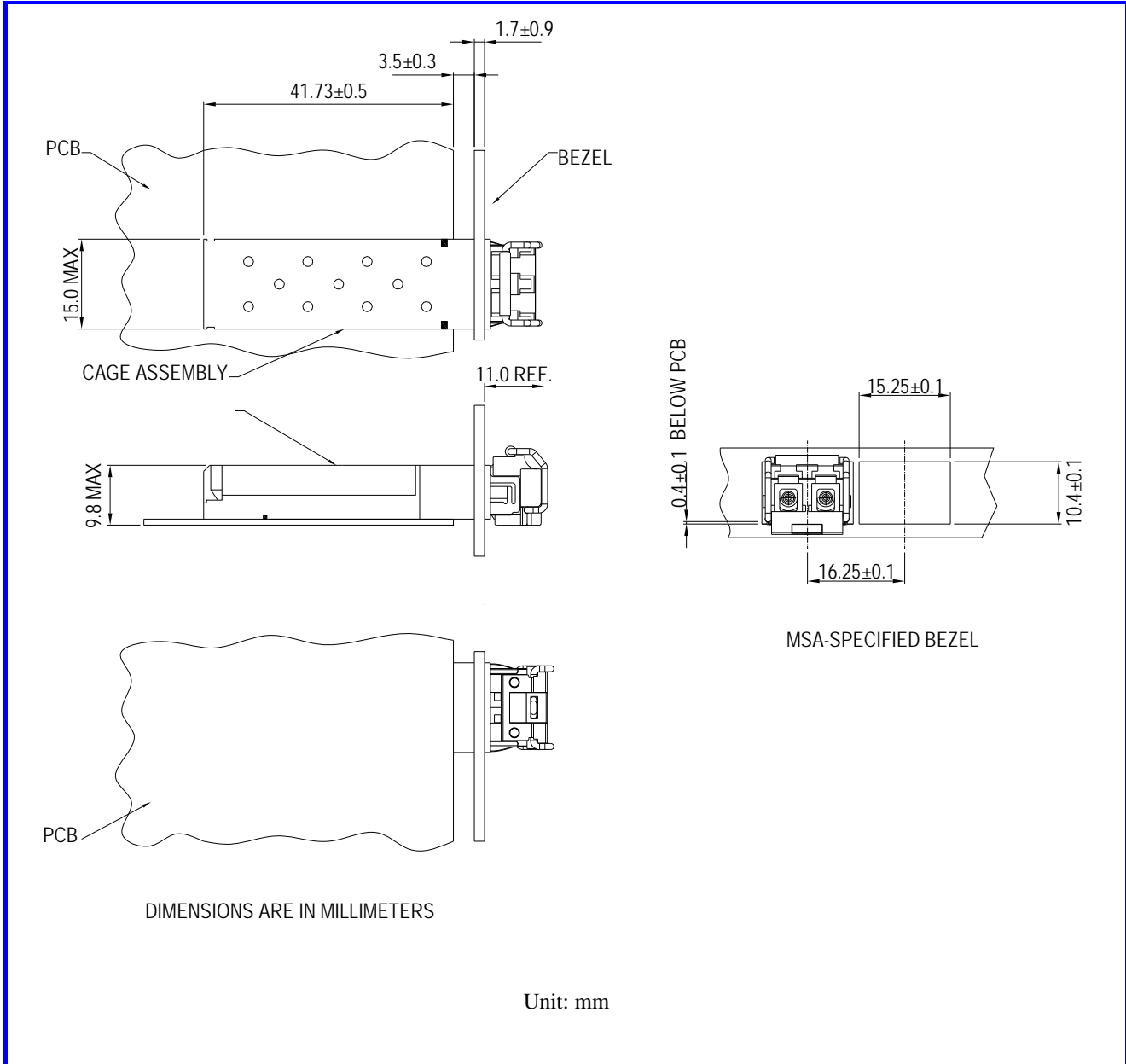   GROUND)
4. AREA DENOTES COMPONENT KEEPOUT
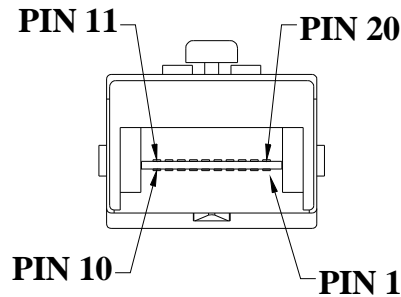   (TRACES ALLOWED)

DIMENSIONS ARE IN MILLIMETERS

DETAIL 1

Unit: mm

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Assembly drawing

PCB

41.73±0.5

3.5±0.3

1.7±0.9

BEZEL

15.0 MAX

CAGE ASSEMBLY

9.8 MAX

11.0 REF.

0.4±0.1 BELOW PCB

15.25±0.1

16.25±0.1

10.4±0.1

MSA-SPECIFIED BEZEL

PCB

DIMENSIONS ARE IN MILLIMETERS

Unit: mm

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

Note : All information contained in this document is subject to change without notice.

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