



**RoHS Compliant**  
**TX-1310/RX-1490 nm Single-mode Bi-directional (10km)**  
**SFP LC Simplex Connector, with Diagnostic Monitoring**  
**IEEE 802.3ah 1000BASE-BX10-U**



### Features

- RoHS Compliant
- Compliant with IEEE802.3ah 1000BASE-BX10-U Standard
- Compliant with SFF8472 Digital Diagnostic Standard
- Industry standard small form pluggable (SFP) package
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

### Ordering Information

PART NUMBER	TX/RX	TEMPERATURE	LD Type	Distance
LS38-C3S-TC-N-D9	1310/1490	0°C to 70 °C	1310 FP	10km
LS38-C3S-TI-N-D9	1310/1490	-40°C to 85 °C	1310 FP	10km

### Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 95	± 3	°C	External
Voltage	3.0 to 3.6	± 0.1	V	
Bias Current	0 to 100	± 10%	mA	
TX Power	-12 to 0	± 3 dB	dBm	
RX Power	-21 to -3	± 3 dB	dBm	



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**Absolute Maximum Ratings**

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
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	UNITS	NOTE
Case Operating Temperature	$T_C$	0 -40	70 85	°C	
Supply Voltage	$V_{CC}$	3.1	3.5	V	
Supply Current	$I_{TX} + I_{RX}$	---	300	mA	
Relative Humidity(Non-condensing)	$RH$	5	95	%	



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**Transmitter Electro-optical Characteristics**

$V_{CC} = 3.1\text{ V to }3.5\text{ V}$ ,  $T_C = 0\text{ }^\circ\text{C to }70\text{ }^\circ\text{C}$  ( $-40\text{ }^\circ\text{C to }85\text{ }^\circ\text{C}$ )

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Output Optical Power 9/125 $\mu\text{m}$ fiber	$P_{out}$	-9	---	-3	dBm	Average
Extinction Ratio	$ER$	6	---	---	dB	
Center Wavelength	$\lambda_C$	1260	---	1360	nm	
Spectral Width (RMS)	$\Delta\lambda$		Table 1		nm	
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	$\mu\text{s}$	
TX_DISABLE time to start reset	$t_{reset}$	10	---	---	$\mu\text{s}$	



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**Table 1**

<b>Center Wavelength (nm)</b>	<b>Maximum RMS spectral width (nm)</b>
1260	2.09
1270	2.52
1280	3.13
1286	3.50
1290	
1297	
1329	
1340	
1343	3.06
1350	
1360	2.58



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**Receiver Electro-optical Characteristics**

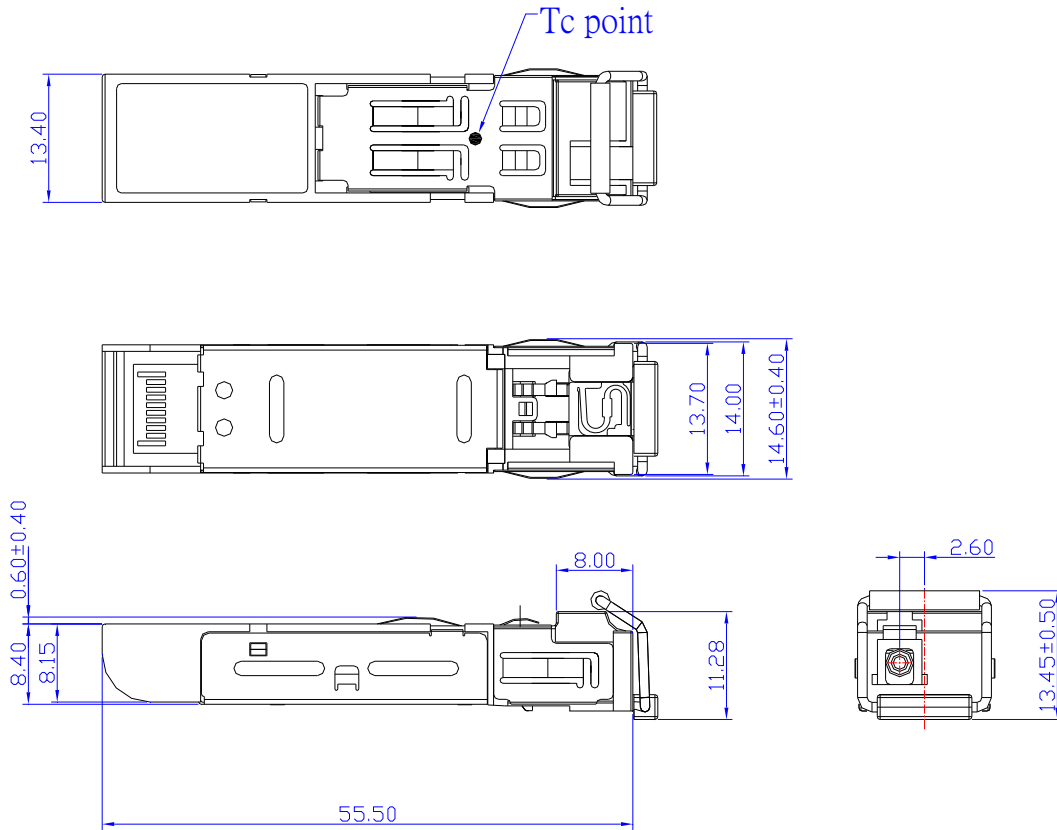
$V_{CC} = 3.1\text{ V to }3.5\text{ V}, T_C = 0^\circ\text{C to }70^\circ\text{C} (-40^\circ\text{C to }85^\circ\text{C})$

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical Input Power-maximum	$P_{IN}$	-3	---	---	dBm	PRBS7, BER < $10^{-12}$
RX Sensitivity	$P_{IN}$	---	---	-21	dBm	PRBS7, BER < $10^{-12}$
RX Sensitivity as OMA				-19.7	dBm	PRBS7, BER < $10^{-12}$
Operating Center Wavelength	$\lambda_C$	1480	---	1500	nm	
Optical Return Loss	$ORL$	14	---	---	dB	$\lambda=1480\sim1500\text{nm}$
Optical isolation	$ISO$	---	---	-45	dB	$\lambda=1260\sim1360\text{nm}$
LOS Deasserted	$P_D$	---	---	-21	dBm	
LOS Asserted	$P_A$	-35	---	---	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	



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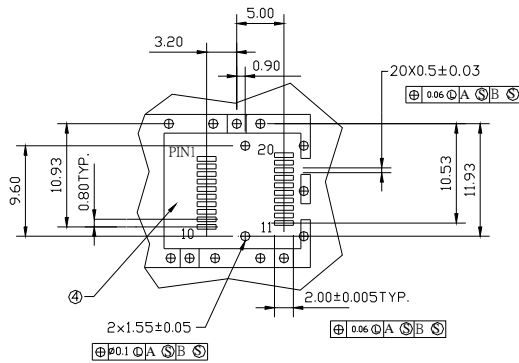
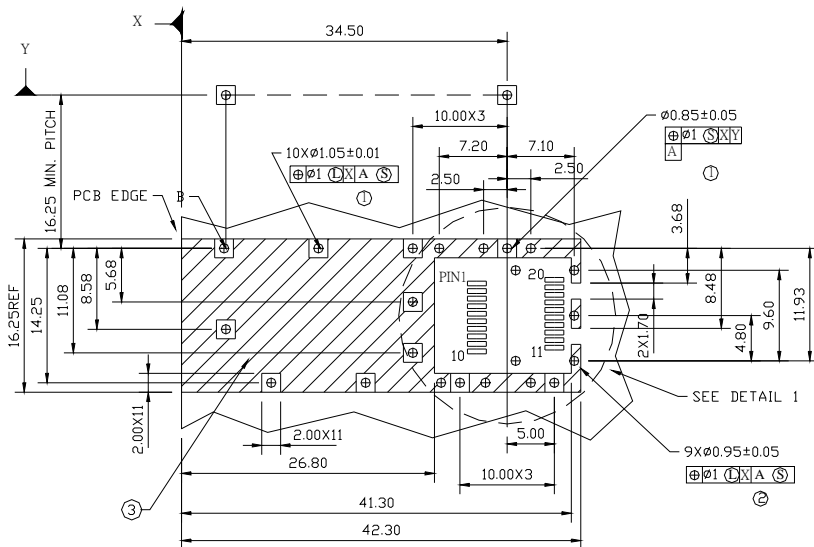
**Dimensions**



**DIMENSIONS ARE IN MILLIMETERS**

**ALL DIMENSIONS ARE  $\pm 0.2$ mm UNLESS OTHERWISE SPECIFIED**

**SFP host board mechanical layout**



DETAIL 1

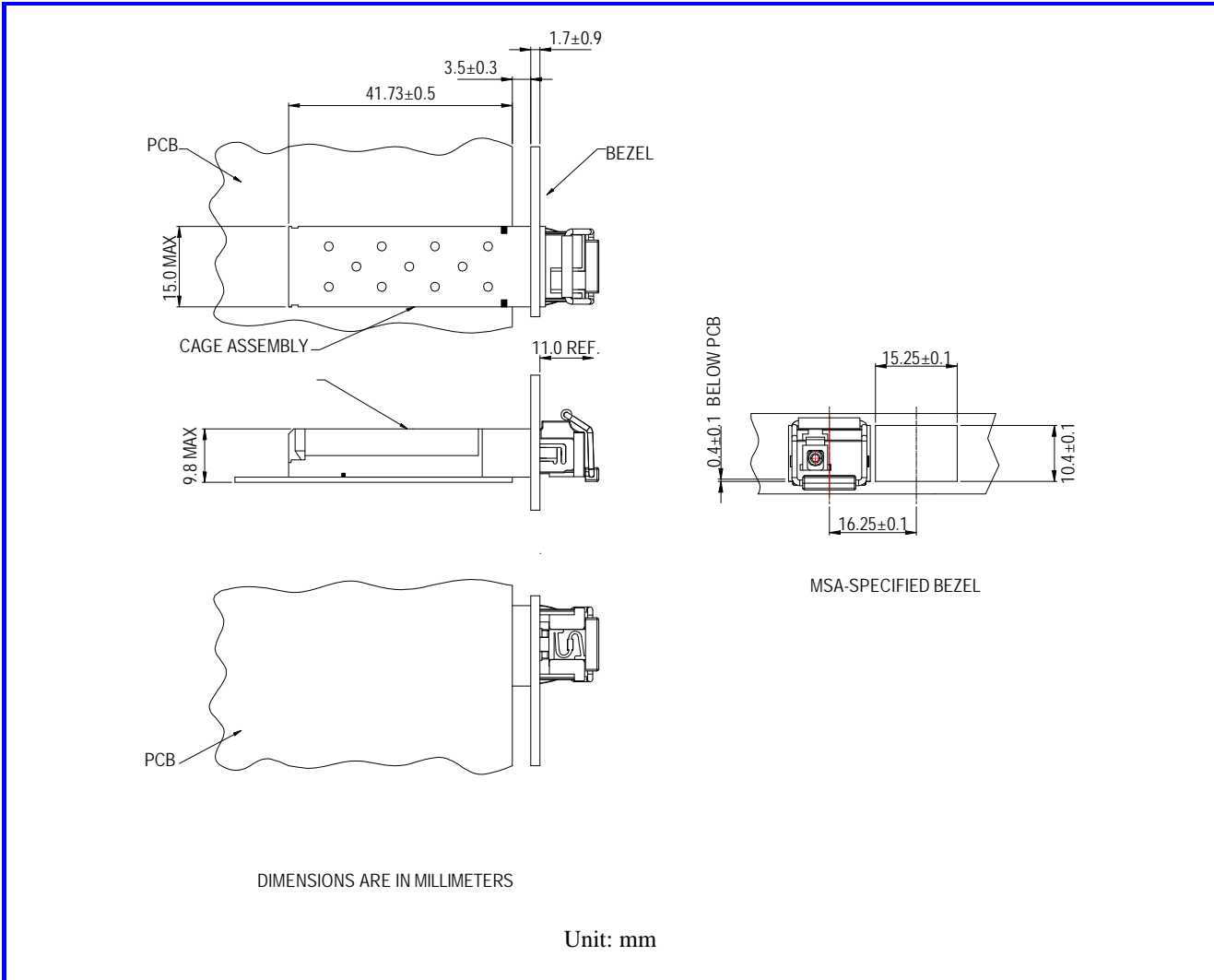
**LEGEND**

- 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

Unit: mm

**Assembly drawing**



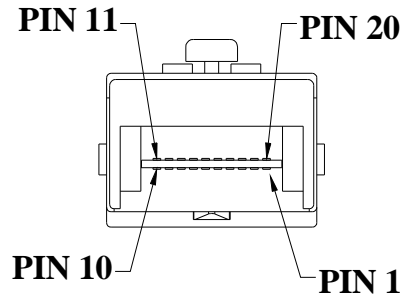




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**Pin Assignment**

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 , ac coupled
13	$RX+$	Receive Data, Differential , 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 , ac coupled
19	$TX-$	Transmit Data Bar, Differential , ac coupled
20	$T_{GND}$	Transmitter Ground

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