



**RoHS compliant**  
**1310 nm Multi-mode Transceiver (2km)**  
**Small Form Pluggable (SFP), 3.3V**  
**155 Mbps SONET OC-3/SDH STM-1/125 Mbps Fast Ethernet**



**Features**

- RoHS compliant
- SONET/SDH application
- Fast Ethernet application
- Industry standard small form pluggable (SFP) package
- Duplex LC connector
- Differential LVPECL inputs and outputs
- Single power supply 3.3V
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

**Ordering Information**

PART NUMBER	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE
LM38-A3C-TC-N	AC/AC	TTL	3.3V	0°C to 70 °C
LM38-A3C-TI-N	AC/AC	TTL	3.3V	-40°C to 85 °C



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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	TYP.	MAX	UNITS	NOTE
Case Operating Temperature	$T_C$	0 -40	---	70 85	°C	
Supply Voltage	$V_{CC}$	3.1	3.3	3.5	V	
Supply Current (@25 degree C)		---	110	---		
Supply Current (@85 degree C)	$I_{TX} + I_{RX}$	---	130	---	mA	
Supply Current (@-40~85 degree C)		---	---	160		
Power consumption (@25 degree C and 3.3V)	$I_{TX} + I_{RX}$	---	363	---		
Power consumption (@85 degree C and 3.3V)	$I_{TX} + I_{RX}$	---	429	---	mW	
Power consumption (@-40~85 degree C and 3.3V)	$I_{TX} + I_{RX}$	---	---	528		



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**Transmitter Electro-optical Characteristics**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Data Rate	$B$	50	155	200	Mb/s	
Output Optical Power 62.5/125 $\mu\text{m}$ fiber	$P_{out}$	-20	---	-14	dBm	Average
Output Optical Power 50/125 $\mu\text{m}$ fiber		-23.5	---	-14	dBm	Average
Extinction Ratio	$ER$	10	---	---	dB	
Center Wavelength	$\lambda_c$	1260	1310	1360	nm	
Spectral Width (RMS)	$\Delta\lambda$	---	---	20	nm	
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	



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**Receiver Electro-optical Characteristics**

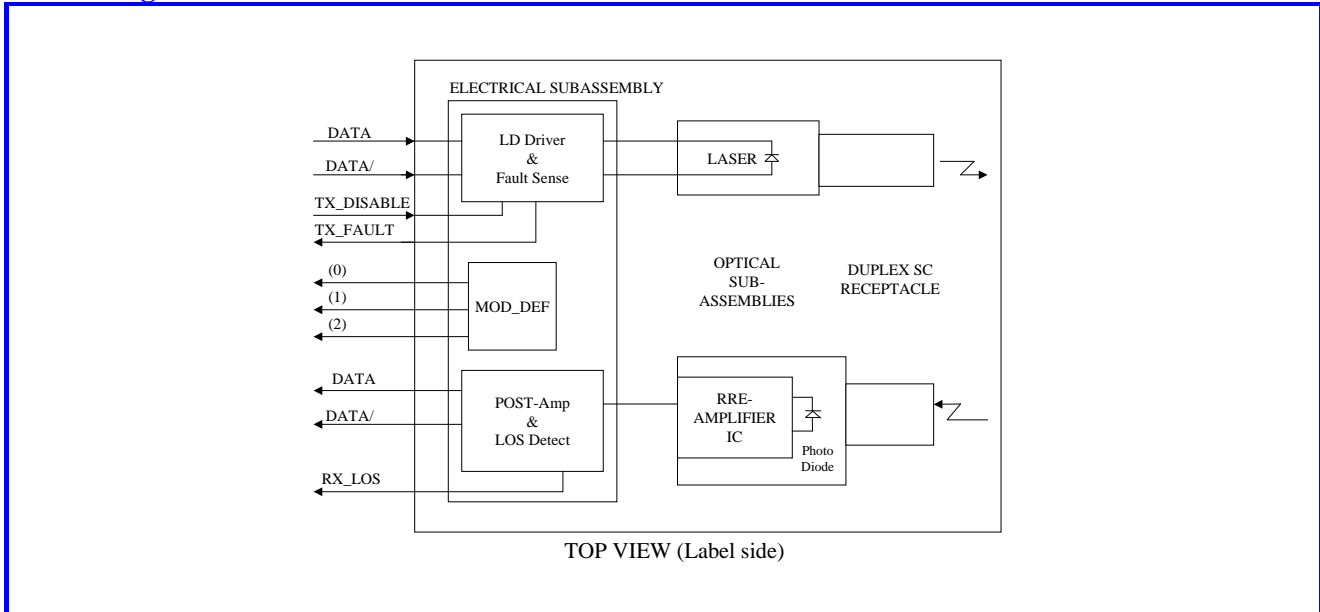
PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Data Rate	$B$	50	155	200	Mb/s	
Optical Input Power -maximum	$P_{IN}$	-8	---	---	dBm	Note 1
Optical Input Power –minimum (Sensitivity)	$P_{IN}$	---	---	-31	dBm	Note 1
Operating Center Wavelength	$\lambda_C$	1260	---	1600	nm	
Data Output Rise, Fall Time (10%~90%)	$T_{r,f}$	---	1	2	ns	
Loss of Signal-Asserted	$P_A$	-45	---	---	dBm	
Loss of Signal-Deasserted	$P_D$	---	---	-31	dBm	
Loss of Signal-Hysteresis	$P_A - P_D$	0.5	---	---	dB	
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  $1 \times 10^{-10}$ .



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**Block Diagram of Transceiver**



**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.

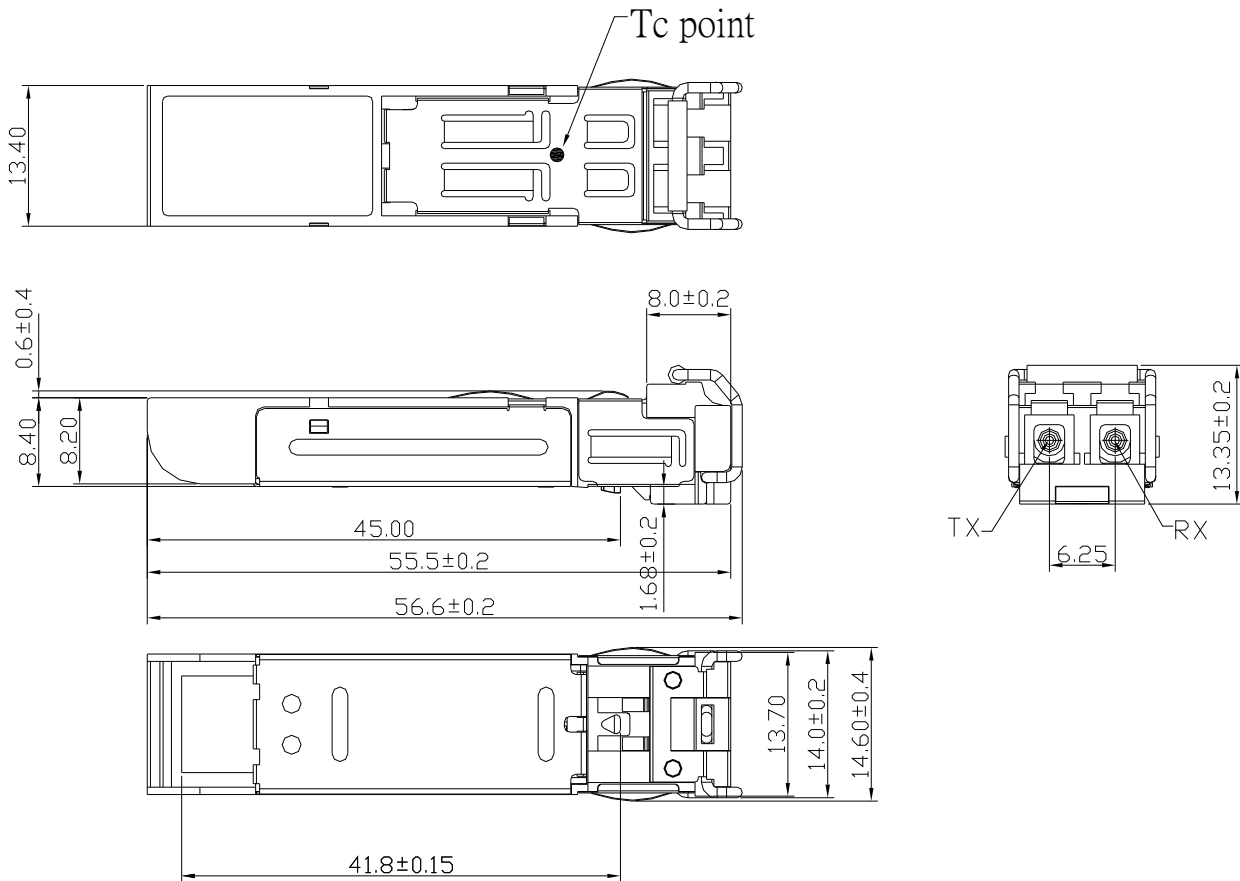
**Receive Loss (RX\_LOS)**

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

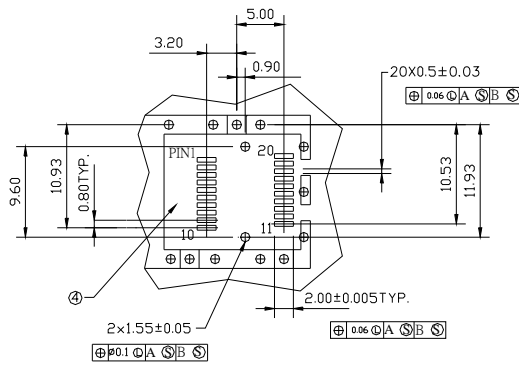
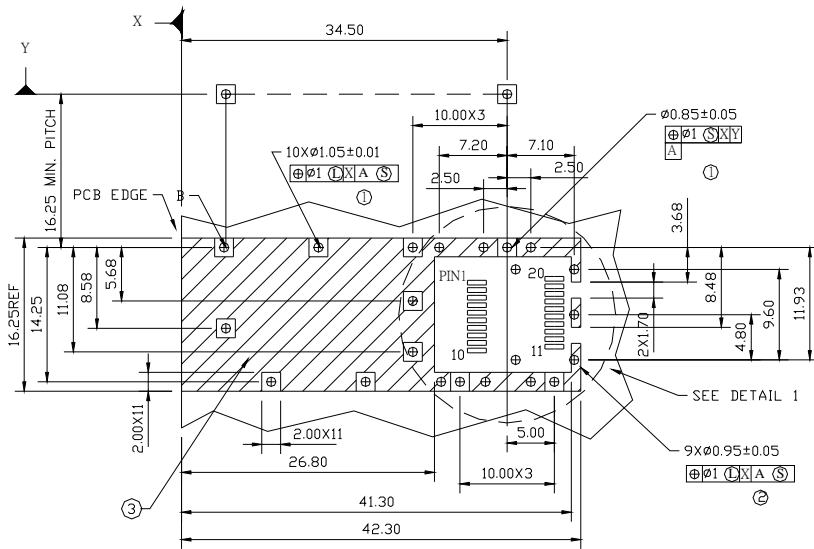


**DIMENSIONS ARE IN MILLIMETERS**

**ALL DIMENSIONS ARE ± 0.1mm UNLESS OTHERWISE SPECIFIED**

Unit: mm

**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

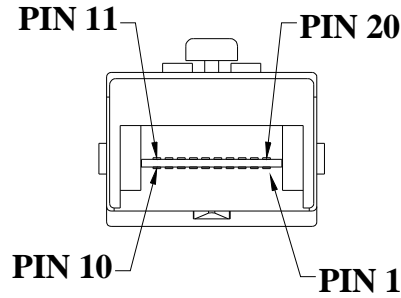
Unit: mm



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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.**