The GigaTech Products **ONS-SI-155-SR-MM-GT** is programmed to be fully compatible and functional with all intended Cisco OC-3, OC-12, OC-48 switching devices. This SFP optical transceiver is based on the ATM/SONET/SONET standard and is designed to be compliant with SFF-8472 SFP Multi-source Agreement (MSA). This module is designed for multimode fiber and operates at a nominal wavelength of 1310nm.

Features:

- Up to 155MBd bi-directional data links
- Hot-pluggable SFP footprint
- 1310nm LED transmitter
- Duplex LC Connectors
- Up to 2km over MMF
- Single power supply 3.3V
- Operating temperature range

  I-Temp: -40℃ to 85℃

Compliance:

- ANSI-T1.646, ATM and SONET and SDH for OC-3/STM-1
- SFP MSA SFF-8472
- RoHS
- Class 1 laser product EN 60825

Applications

- SONET OC-3 SR-0/SDH STM S-1

Warranty:

GigaTech Branded Optical Transceivers- Lifetime Warranty

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	*DR*		155		MBd	
Bit Error Rate	*BER*			10^{-12}		
Input Voltage	V_{CC}	3	3.3	3.6	V	
Supply Current	I_s		165	300	mA	Electric Power Interface
Storage Temperature	T_{sto}	-40		85	℃	Ambient Temperature

O ptical Characteristics - Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	λ	1280		1380	nm	
Output Optical Power @ 62.5um	P_{OUT_1}	-20		-14	dBm	
Output Optical Power @ 50um	P_{OUT_1}	-23.5		-14	dBm	
Extinction Ratio	*ER*	10			dB	
Spectral Width (RMS)	$\Delta\lambda$			175	nm	Note 1
Relative Intensity Noise	*RIN*			– 120	dB/Hz	
Optical Rise/Fall Time	T_{RF_IN}		1000	3000	ps	
Generated Jitter (peak to peak)	GT_T			0.07	UI	
Generated Jitter (rms)	GT_{RMS}			0.007	UI	
Output Eye	Compliant with SONET OC-3/SDH STM-1 Standard					

Note1: Specified to meet curves in FDDI PMD3 Figure 9, which allow trade-off between wavelength, spectral width and transmitter rise/fall times

Optical Characteristics - Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	λ_C	1270		1600	nm	
Receiver Sensitivity @ OC3	R_{X_SEN}	-31		-8	dBm	PRBS 2^{23}-1
Optical Return Loss	*ORL*	12			dB	
Rx Electrical 3dB Upper Cutoff Fx				1500	MHz	
Loss of Signal-Asserted	P_{LOS_A}	-45			dBm	
Loss of Signal-Deasserted	P_{LOS_D}			-33	dBm	
Loss of Signal-Hysteresis		1.5			dB	

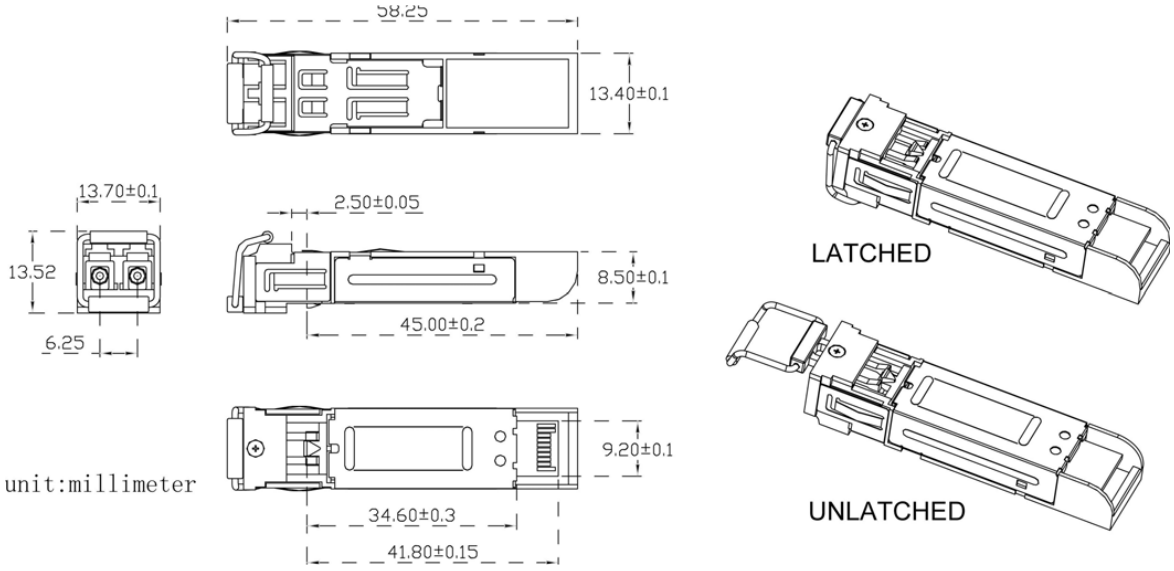
Electrical Characteristics – Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R_{in}		100		Ω	Non Condensing
Single ended data input swing	V_{IN_PP}	250		1200	mV	
Transmit Disable Voltage	V_D	2		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	V_{EE}		V_{EE} +0.8	V	
Transmit Disable Assert Time				10	Us	

Electrical Characteristics – Receiver

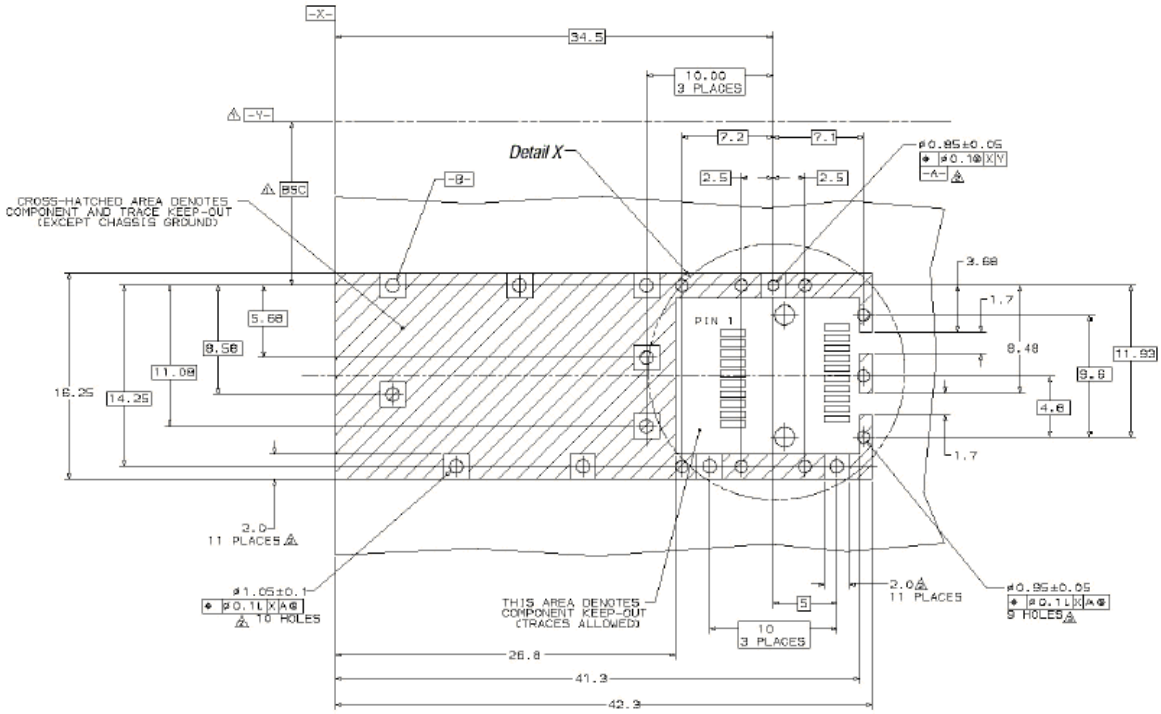
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Single ended data output swing	V_{OUT_PP}	250	400	900	mV	
Data output rise time	T_R	0.6		5	Ns	20%-80%
LOS Fault	V_{LOS_F}	2		V_{CC_HOST}	V	
LOS Normal	V_{LOS_N}	V_{EE}		V_{EE} +0.5	V	
Systematic Jitter Contribution	$RX\_\Delta SJ$			2	ns	
Dependent Jitter Contribution	$RX\_\Delta DJ$			1.2	ns	

Dimensions



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED UNIT: mm

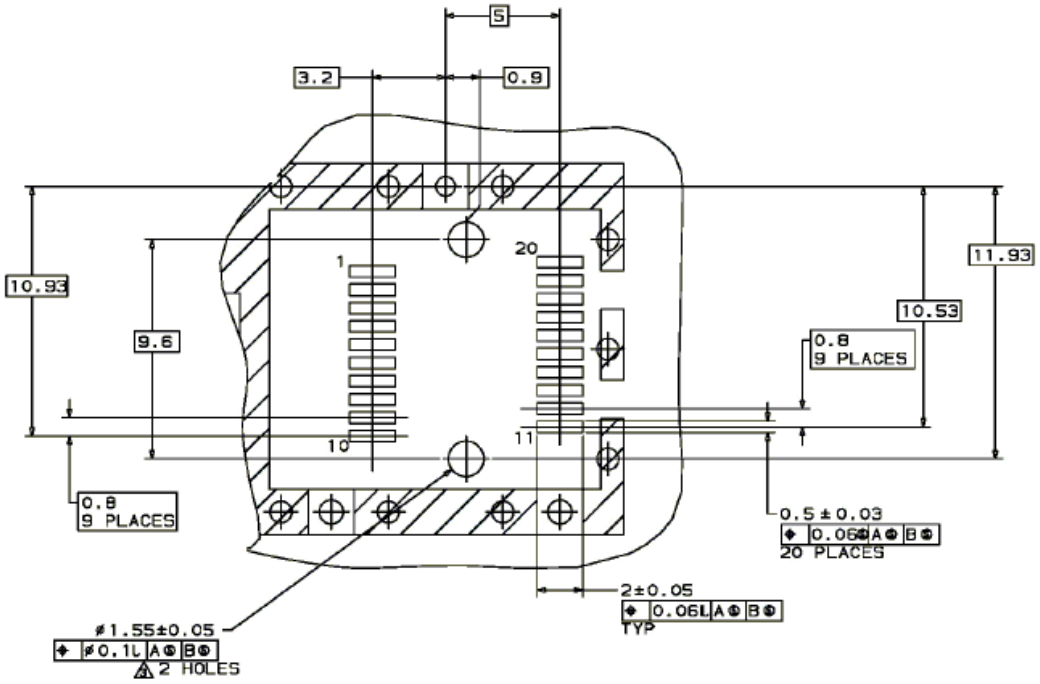
PCB Layout Recommendation



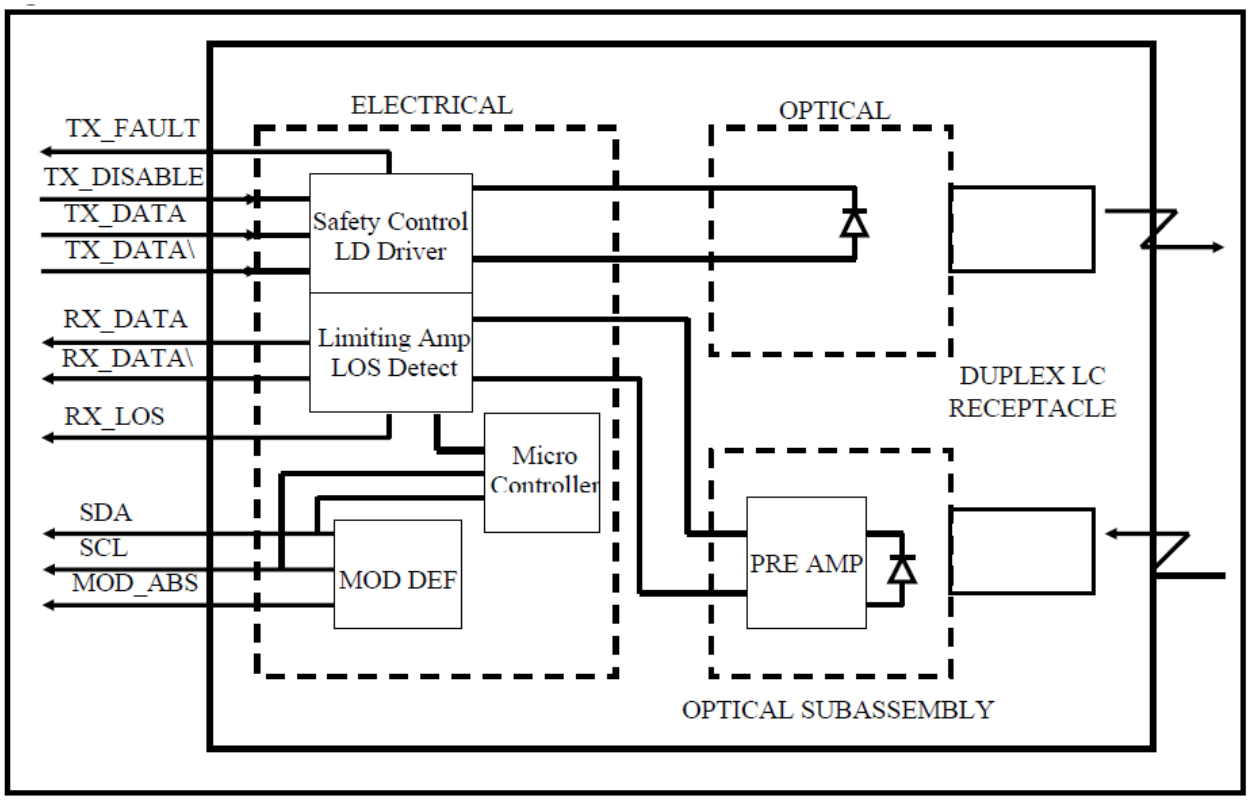
Datum and Basic Dimension Established by Customer

Pads and Vias are Chassis Ground, 11 Places

Through Holes are Unplated



Block Diagram of Transceiver



Transmitter Section- The Laser driver accept differential input data and provide bias and modulation currents for driving a laser. An automatic power-control (APC) feedback loop is incorporated to maintain a constant average optical power.1310nm LED in an eye safe optical subassembly (OSA) mates to the fiber cable.

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

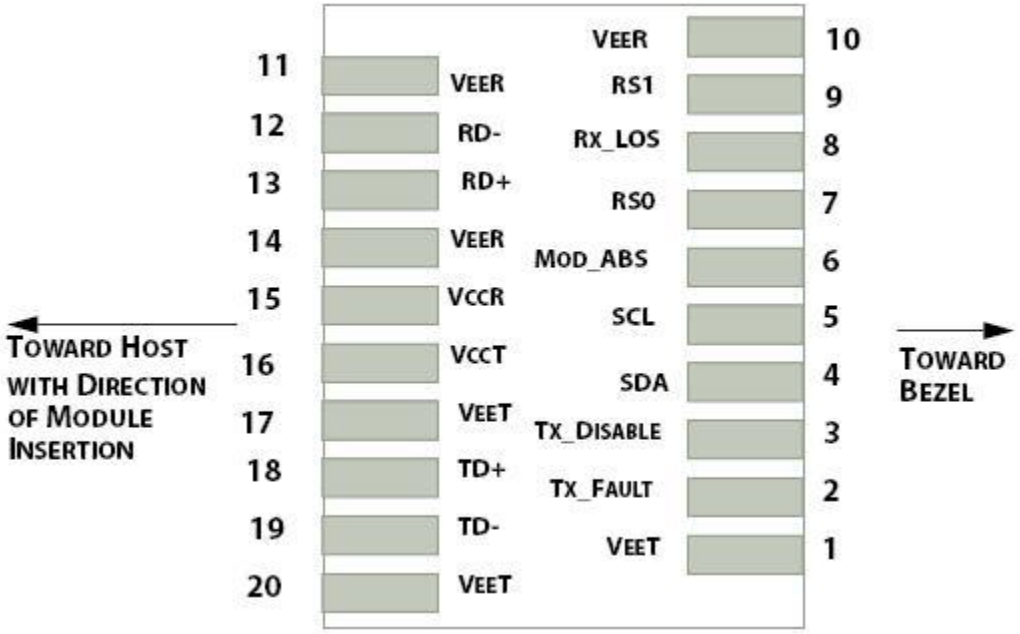
TX_FAULT- When the TX_FAULT signal is high, output indicates a laser fault of some kind. Low indicates normal operation.

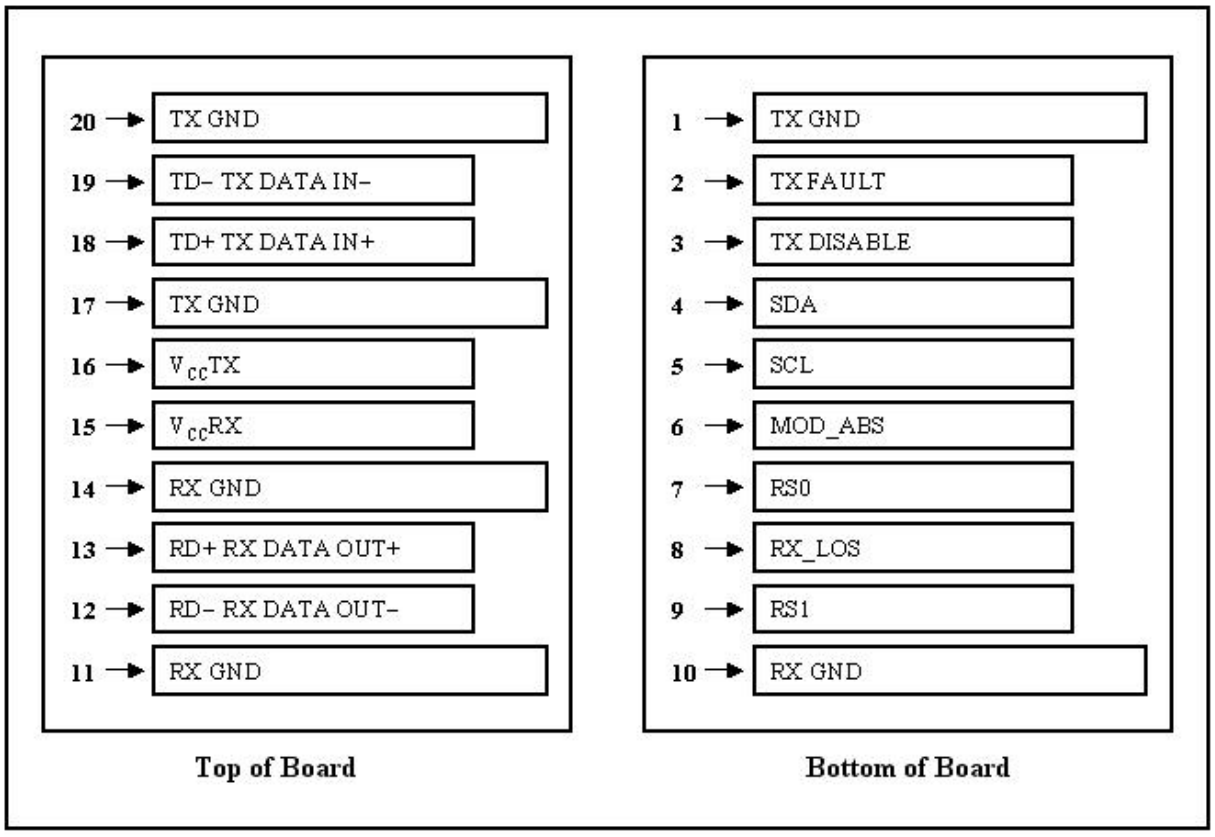
Receiver Section- The receiver utilizes a PIN detector integrated with a trans-impedance preamplifier in an OSA. This OSA is connected to a Limiting Amplifier which providing post-amplification quantization, and optical signal detection. The limiting Amplifier is AC-coupled to the transimpedance amplifier, with internal 100Ω differential termination.

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.

Controller Section- The micro controller unit monitors the operation information of LD driver and Limiting Amplifier and report these status to the customer.

Electrical Pad Layout





Pin Assignment

PIN #	*Symbol*	*Description*	*Remarks*
1	VEET	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground
2	TFAULT	Transmitter Fault	
3	TDIS	Transmitter Disable. Laser output disable on high or open	Disabled: TDIS>2V or open Enabled: TDIS<0.8V
4	SDA	Data line for serial ID	Should Be pulled up with 4.7k – 10k ohm on host board to a voltage between 2V and 3.6V
5	SCL	Clock line for serial ID	
6	MOD_ABS	Module Absent. Ground within the module	
7	RS0	No Connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	LOS is open collector output
9	RS1	+3.3V Power Supply	Circuit ground is isolated from chassis ground
10	VEER	Receiver ground (common with transmitter ground)	
11	VEER	Receiver ground (common with transmitter ground)	
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	VEER	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
15	VCCR	Receiver power supply	
16	VCCT	Transmitter power supply	Same as Pin# 1
17	VEET	Transmitter ground (common with receiver ground)	Circuit ground is connected to chassis ground
18	TD+	Transmitter Non-inverted DATA out. AC coupled	
19	TD-	Transmitter Inverted DATA out. AC coupled	
20	VEET	Transmitter ground (common with receiver ground)	Circuit ground is connected to chassis ground

References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.
2. ISO/IEC 9314-3 “Information Processing Systems – Fiber Distributed Data Interface (FDDI), Part 3, Physical Layer Medium Dependent (PMD).” 1990.
3. ANSI T1.416.01-1999. “Network to Customer Installation Interfaces – Synchronous Optical NETwork (SNONET) Physical Media Dependent Specification: Multi-Mode Fiber” ANSI, 1999.