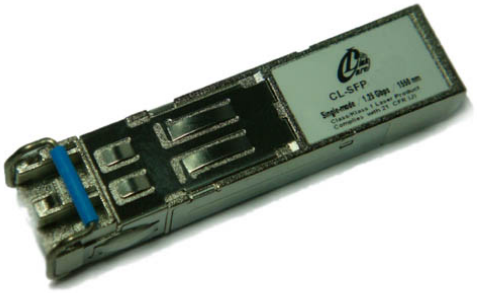
RoHS compliant
1310 nm Single-mode Transceiver
Small Form Pluggable (SFP+), with Diagnostic Monitoring
10G FC,10G BASE-LW/LR (40km)



Features

- Compliant with SFP+ MSA SFF-8431
- Compliant with IEEE802.3ae 10GBASE-LW/LR
- Ethernet standard
- Compliant with 10GFC 1200-SM-LL-L Fiber
- Channel standard
- Compliant with SFF8472 diagnostic monitoring
- interface Duplex LC connector
- Differential LVPECL inputs and CML 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
CL-SFP+_ER_40	AC/AC	TTL	3.3V/5V	-5°C to 70 °C
CL-SFP+_ER_40e	AC/AC	TTL	3.3V/5V	-30°C to 85 °C
CL-SFP+_ER_40i	AC/AC	TTL	3.3V/5V	-40°C to 85 °C

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	T_S	–40	85	°C	
Supply Voltage	Vcc	–0.5	4.0	V	
Input Voltage	V_{IN}	–0.5	Vcc	V	

Transmitter Electro-optical Characteristics

V_{CC} = 3.1 V to 3.5 V, T_C = -10 °C to 70 °C (-25 °C to 85 °C)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Data Rate	B	9.95	---	10.6	Gbps	
Output Optical Power(Average)	P_{out}	+1	---	+5	dBm	
Extinction Ratio	ER	3.5			dB	
Center Wavelength	λ_C	1290	1310	1330	nm	
Spectrum Width	$\Delta\lambda$			1	nm	
Sidemode Supression ratio	SSR_{min}	30			dB	
Relative Intensity Noise	RIN	---	---	−128	dB/Hz	
Output Eye			Compliant with IEEE802.3ae			
Reference Differential Input Impedance	Z_d		100		Ω	
Differential Input Voltage Swing	V_{DIFF}	180		700	mV	
Max. P_{out} TX-DISABLE Asserted	P_{OFF}	---	---	−35	dBm	
Transmit Fault Output-Low	TX_FAULT_L	0.0	---	0.5	V	
Transmit Fault Output-High	TX_FAULT_H	2.4	---	V_{CC}	V	
TX_DISABLE Assert Time	t_off	---	---	10	μs	
TX_DISABLE Negate Time	t_on	---	---	1	ms	
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} = 3.1 V to 3.5 V, T_C = -10 °C to 70 °C (-25 °C to 85 °C)

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Data Rate	B	9.95	---	10.6	Gbps	
Optical Input Power	P_{IN}	-15	---	+2	dBm	BER < 10^{-12}
Operating Center Wavelength	λ_C	1260	---	1565	nm	
Optical Return Loss	ORL	12	---	---	dB	
Loss of Signal-Asserted	P_A	-30	---	---	dBm	
Loss of Signal-Deasserted	P_D	---	---	-18	dBm	
Reference Differential Output Impedance	Z_d	---	100	---	Ω	
Differential Output Voltage	V_{DIFF}	350	---	850	mV	
Output Rise and Fall Time	$,T_r,T_f$			35	ps	20% to 80%
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	
Receiver Loss of Signal Assert Time (off to on)	t_{A,RX_LOS}	---	---	100	μs	
Receiver Loss of Signal Assert Time (on to off)	t_{D,RX_LOS}	---	---	100	μs	

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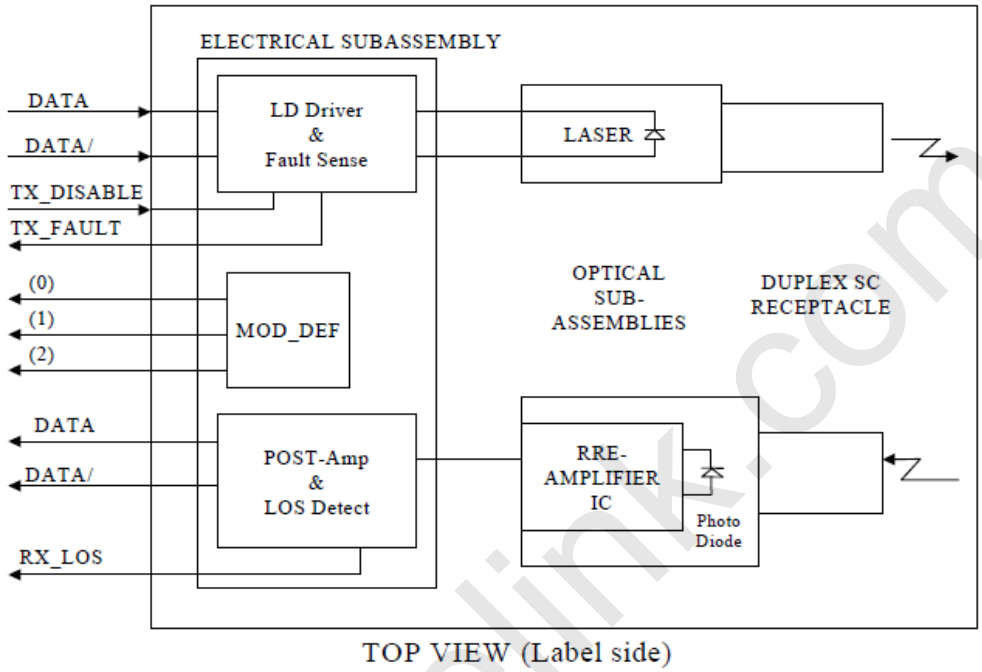
Block Diagram of Transceiver



Transmitter Section

The transmitter section consists of a 1310 nm DFB 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_FAULT

When sensing an improper power level in the laser driver, the SFP set this signal high and turns off the Laser. TX_FAULT can be reset with the TX_DISABLE line. The signal is in TTL level.

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").

Receiver Section

The receiver utilizes a MSM detector integrated with a trans-impedance preamplifier 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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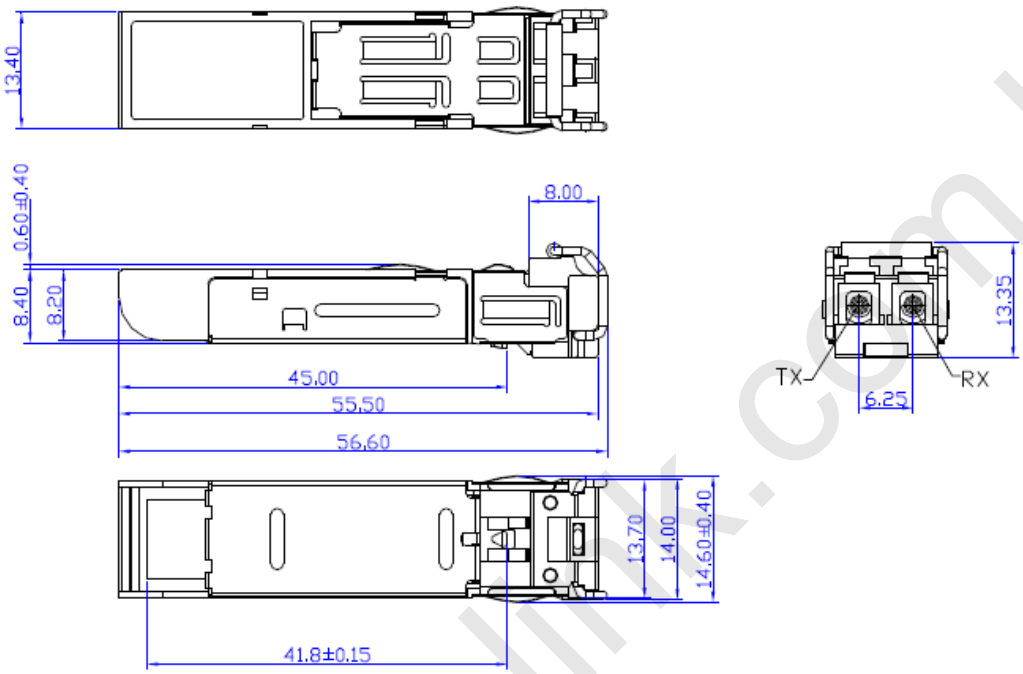
Dimensions



DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED

Unit: mm

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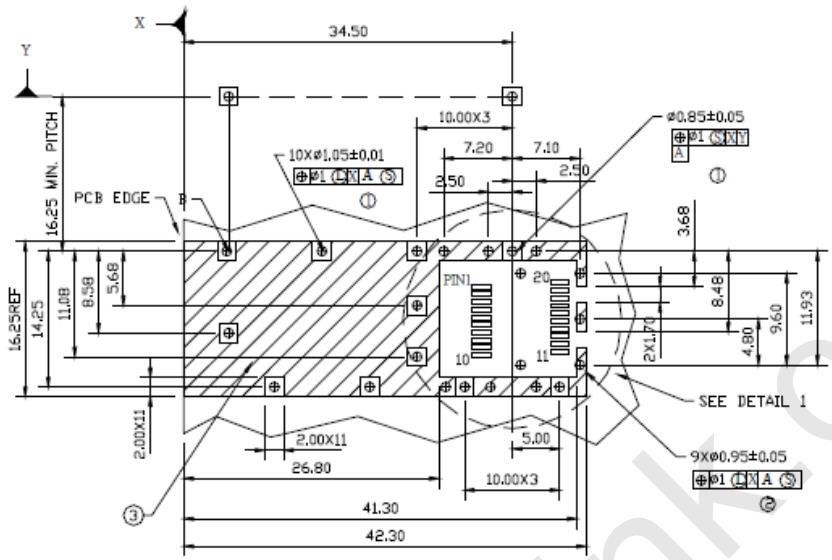
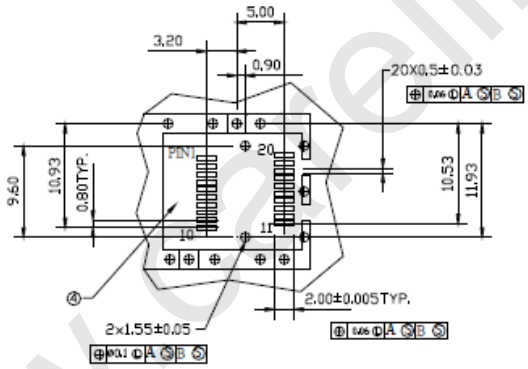
SFP host board mechanical layout





DETAIL 1

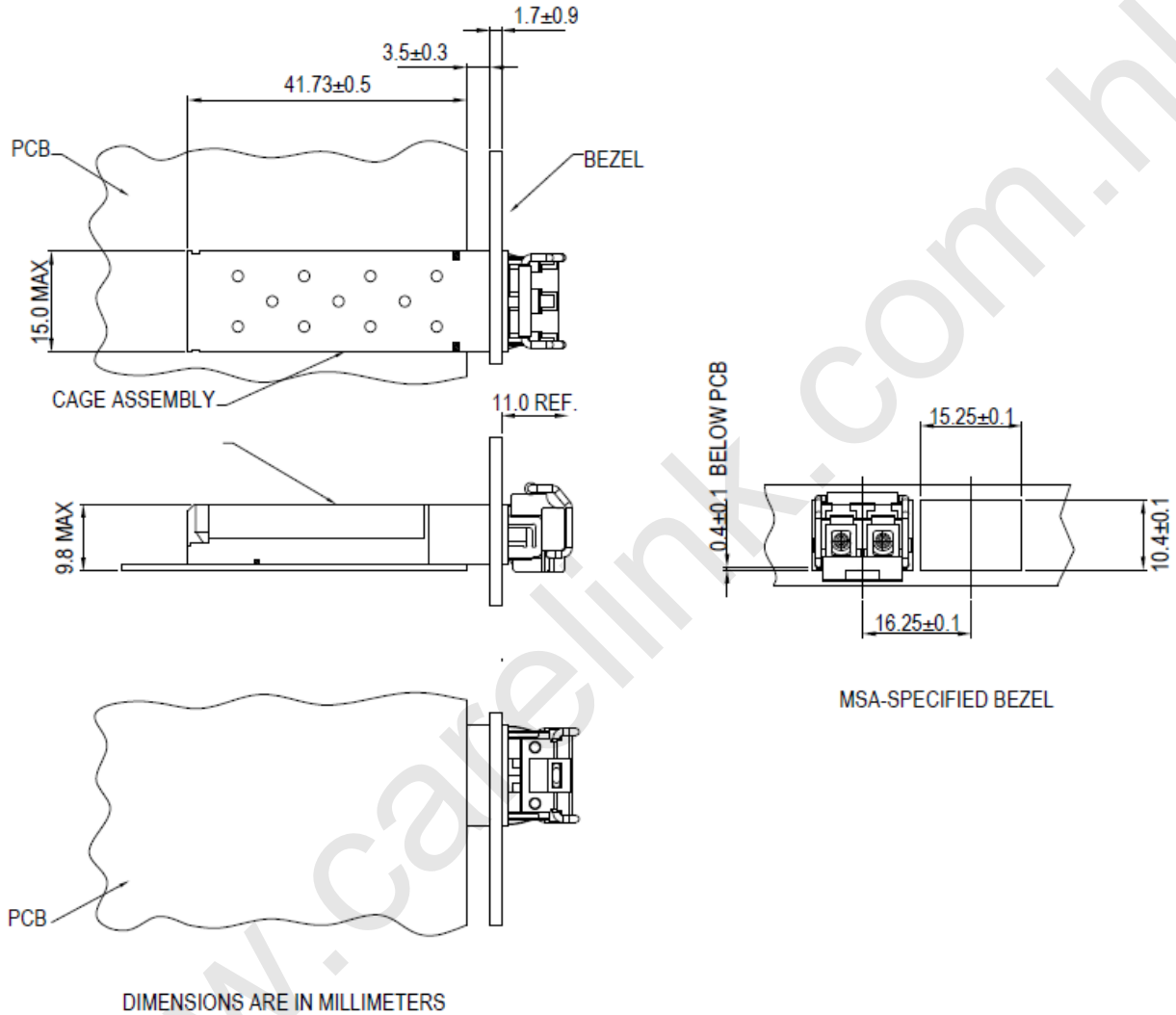
LEGEND

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



Unit: mm

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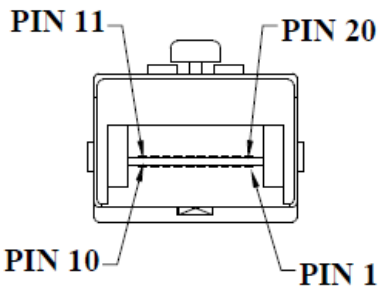
Pin Assignment

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	*RS0*	RX Rate Select
8	*RX_LOS*	Receiver Loss of Signal, TTL High, open collector
9	*RS1*	TX Rate Select
10	R_{GND}	Receiver Ground
11	R_{GND}	Receiver Ground
12	*RX–*	Receive Data out Bar, ac coupled
13	*RX+*	Receive Data out, 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 in, ac coupled
19	*TX–*	Transmit Data in Bar, ac coupled
20	T_{GND}	Transmitter Ground

Eye Safety Mark

The LS3 series 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.

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.

Required Mark

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

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