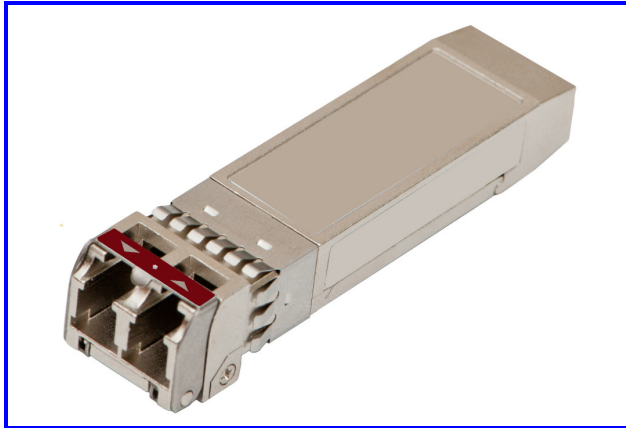




**RoHS Compliant**  
**CWDM 1470~1610nm Single-mode Transceiver**  
**Small Form Pluggable (SFP+), with Diagnostic Monitoring**  
**10G BASE-EW/ER Ethernet**



### Features

- Compliant with SFF8472 diagnostic monitoring interface Duplex LC connector
- Single power supply 3.3V
- Hot Pluggable
- Up to 40km transmission on SMF
- EML laser and PIN receiver
- Class 1 laser product complies with EN 60825-1
- Support CPRI line bit rate option 7: 9830.4 Mbit/s

### Ordering Information

PART NUMBER	WAVELENGTH	VOLTAGE	TEMPERATURE
LE48-H3L-TC-NC-47	1471	3.3V	0°C to 70 °C
LE48-H3L-TC-NC-49	1491	3.3V	0°C to 70 °C
LE48-H3L-TC-NC-51	1511	3.3V	0°C to 70 °C
LE48-H3L-TC-NC-53	1531	3.3V	0°C to 70 °C
LE48-H3L-TC-NC-55	1551	3.3V	0°C to 70 °C
LE48-H3L-TC-NC-57	1571	3.3V	0°C to 70 °C
LE48-H3L-TC-NC-59	1591	3.3V	0°C to 70 °C
LE48-H3L-TC-NC-61	1611	3.3V	0°C to 70 °C
LE48-H3L-TI-NC-47	1471	3.3V	-40°C to 85 °C
LE48-H3L-TI-NC-49	1491	3.3V	-40°C to 85 °C
LE48-H3L-TI-NC-51	1511	3.3V	-40°C to 85 °C
LE48-H3L-TI-NC-53	1531	3.3V	-40°C to 85 °C
LE48-H3L-TI-NC-55	1551	3.3V	-40°C to 85 °C
LE48-H3L-TI-NC-57	1571	3.3V	-40°C to 85 °C
LE48-H3L-TI-NC-59	1591	3.3V	-40°C to 85 °C
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**Diagnostics**

PARAMETER	RANGE	ACCURACY	UNIT	CALIBRATION
Temperature	-40 to 85	± 3	°C	
Voltage	3.14 to 3.46	± 0.1	V	
Bias Current	0 to 120	± 10%	mA	Internal
TX Power	-4.7 to +4	± 3	dB	
RX average Power	-16 to -1	± 3	dB	

**Absolute Maximum Ratings**

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	$T_S$	-40	85	°C	
Operating Relative Humidity	$RH$	0	85	%	
Supply Voltage	$V_{cc}$	0	3.6	V	
Input Voltage	$V_{in}$	0	$V_{cc}$	V	

**Recommended Operating Conditions**

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Case operating Temperature	$T_C$	0	70	°C	LE48-H3L-TC-NC-xx
		-40	85		LE48-H3L-TI-NC-xx
Supply Voltage	$V_{cc}$	3.14	3.46	V	
Supply Current	$I_{TX} + I_{RX}$			390	LE48-H3L-TC-NC-xx
				450	LE48-H3L-TI-NC-xx
Power Consumption@3.3V	$P$			1.3	LE48-H3L-TC-NC-xx
				1.5	LE48-H3L-TI-NC-xx



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**Transmitter Electro-optical Characteristics**

**V<sub>cc</sub> = 3.14 V to 3.46 V, Over Operating Case Temperature.**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Data Rate	<i>B</i>		10.3125		Gbps	
Output Optical Power	<i>P<sub>out</sub></i>	-4.7	---	+4.0	dBm	
Extinction Ratio	<i>ER</i>	8.2			dB	
Center Wavelength	$\lambda_c$	-6.5	X	+6.5	nm	X = specified center wavelength
Spectrum Width	$\Delta \lambda$			1	nm	
Side mode Suppression ratio	<i>SSR<sub>min</sub></i>	30			dB	
Transmitter and Dispersion Penalty	<i>TDP</i>			2	dB	
Relative Intensity Noise	<i>RIN</i>	---	---	-128	dB/Hz	
Optical Return Loss	<i>ORL</i>	21	---	---	dB	
Output Eye						Compliant with IEEE802.3ae
Differential Input Impedance	<i>Z<sub>d</sub></i>		100		$\Omega$	
Differential Input Voltage Swing	<i>V<sub>DIFF</sub></i>	300		1000	mVpp	
Transmit Fault Output-Low	<i>TX_FAULT<sub>L</sub></i>	0.0	---	0.5	V	
Transmit Fault Output-High	<i>TX_FAULT<sub>H</sub></i>	2.4	---	<i>V<sub>CC</sub></i>	V	
TX_DISABLE Assert Time	<i>t<sub>off</sub></i>	---	---	100	$\mu$ s	
TX_DISABLE Negate Time	<i>t<sub>on</sub></i>	---	---	2	ms	
Tx_Fault assert for cooled module	<i>t<sub>fault</sub></i>	---	---	50	ms	
TX_DISABLE time to start reset	<i>t<sub>reset</sub></i>	10	---	---	$\mu$ s	



**RoHS Compliant**  
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**Receiver Electro-optical Characteristics**

$V_{CC} = 3.14 \text{ V to } 3.46 \text{ V}$ , Over Operating Case Temperature.

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
	<b>L</b>					
Data Rate	$B$		10.3125		Gbps	
Optical Input Power-maximum	$P_{IN}$	-1.0	---	---	dBm	BER < $10^{-12}$
Receiver Sensitivity@10.3125Gbps	$P_{IN}$	---	---	-15.8	dBm	BER < $10^{-12}$
Receiver Sensitivity(OMA)	$P_{IN}$	---	---	-14.1	dBm	BER < $10^{-12}$
Stressed Receiver Sensitivity(OMA)	$P_{IN}$	---	---	-11.3	dBm	BER < $10^{-12}$
Receiver Reflectance	$Ref$	---	---	-26	dB	
Operating Center Wavelength	$\lambda_C$	1460	---	1620	nm	
Loss of Signal-Asserted	$P_A$	-30	---	---	dBm	
Loss of Signal-Deasserted	$P_D$	---	---	-18	dBm	
Differential Output Impedance	$Z_d$	---	100	---	$\Omega$	
Differential Output Voltage	$V_{DIFF}$	300	---	800	mVpp	
Receiver Loss of Signal Output Voltage-Low	$RX\_LO$ $S_L$	0	---	0.5	V	
Receiver Loss of Signal Output Voltage-High	$RX\_LO$ $S_H$	2.4	---	$V_{CC}$	V	
Receiver Loss of Signal Assert Time (off to on)	$t_{A,RX\_LOS}$	---	---	100	$\mu s$	
Receiver Loss of Signal Assert Time (on to off)	$t_{D,RX\_LOS}$	---	---	100	$\mu s$	

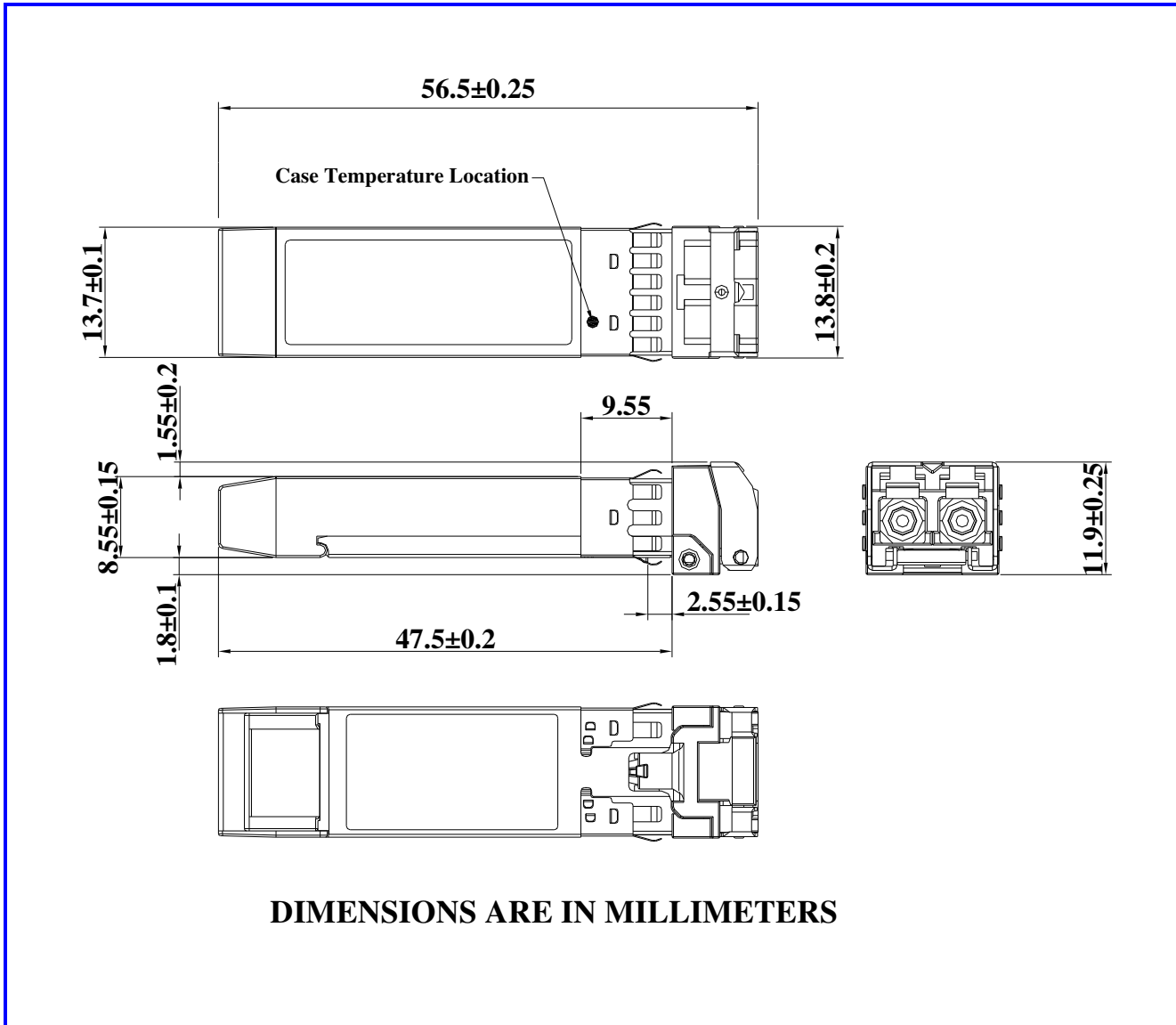
**Timing Parameters**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Time to initialize	$t_{start\_up}$			10	s	



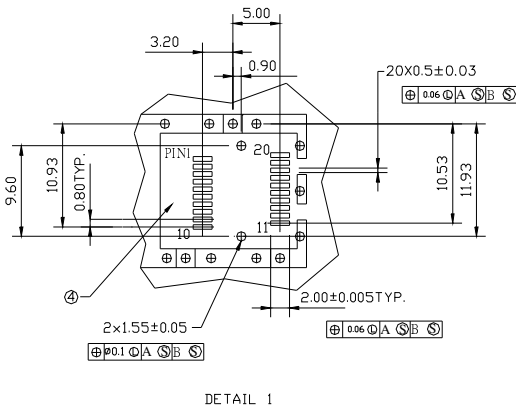
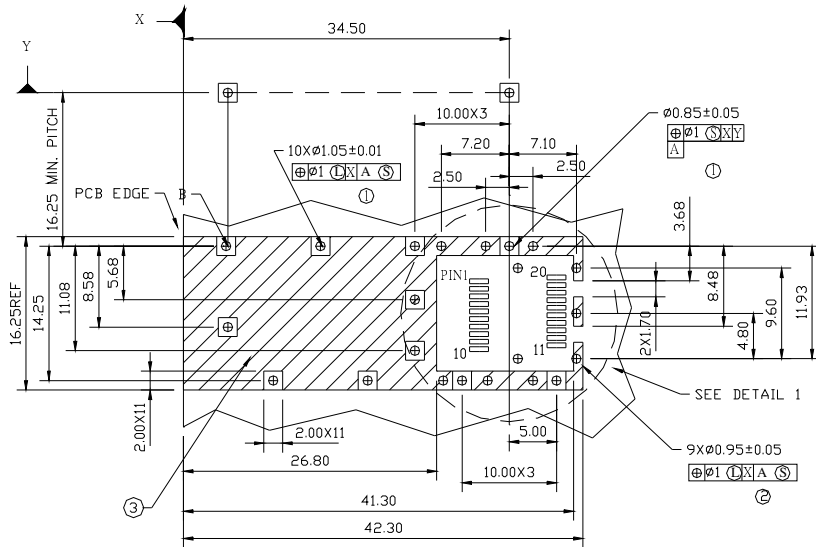
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**Dimensions**



The bail color is red.

**SFP host board mechanical layout**



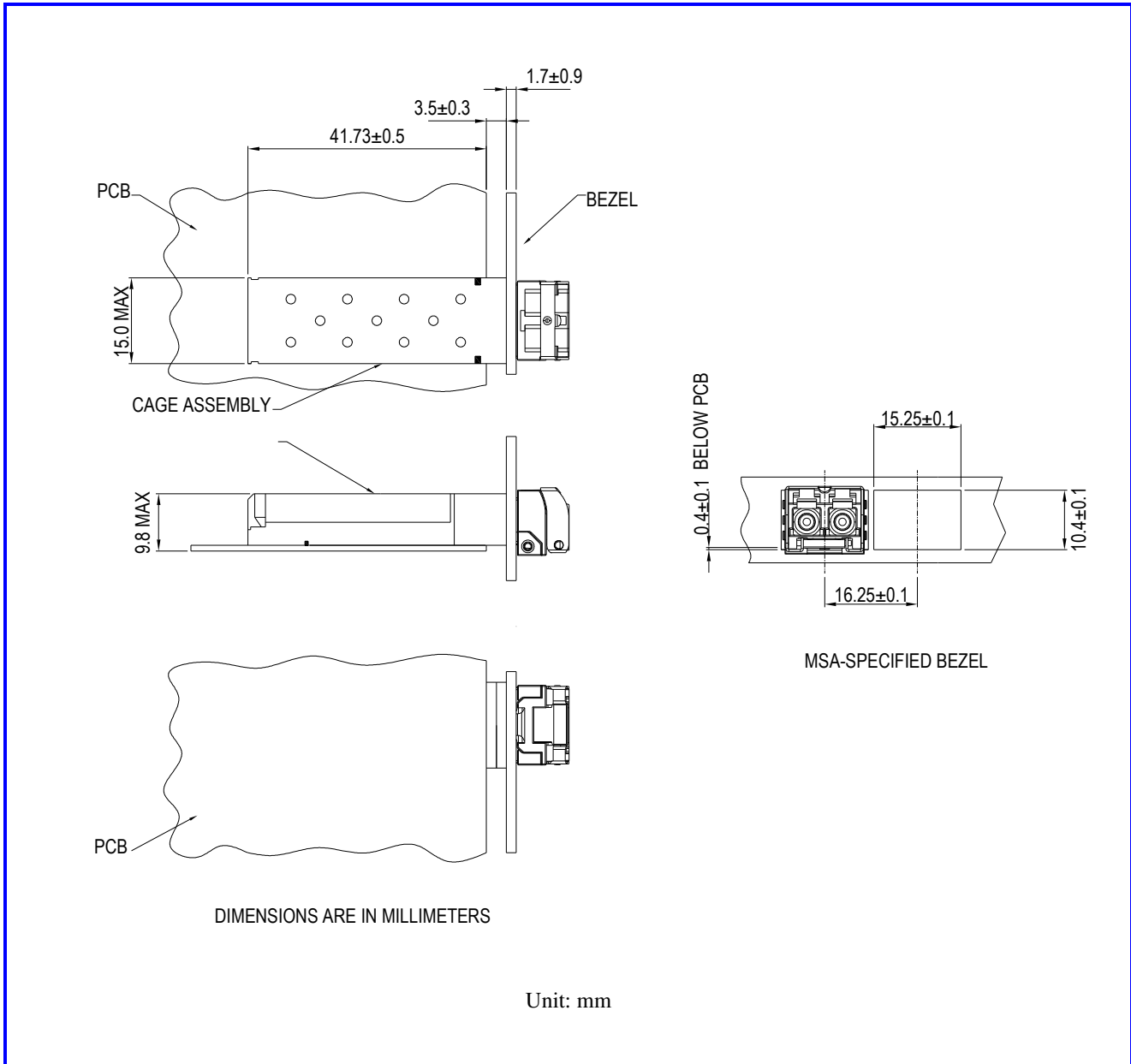
**LEGEND**

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

Unit: mm

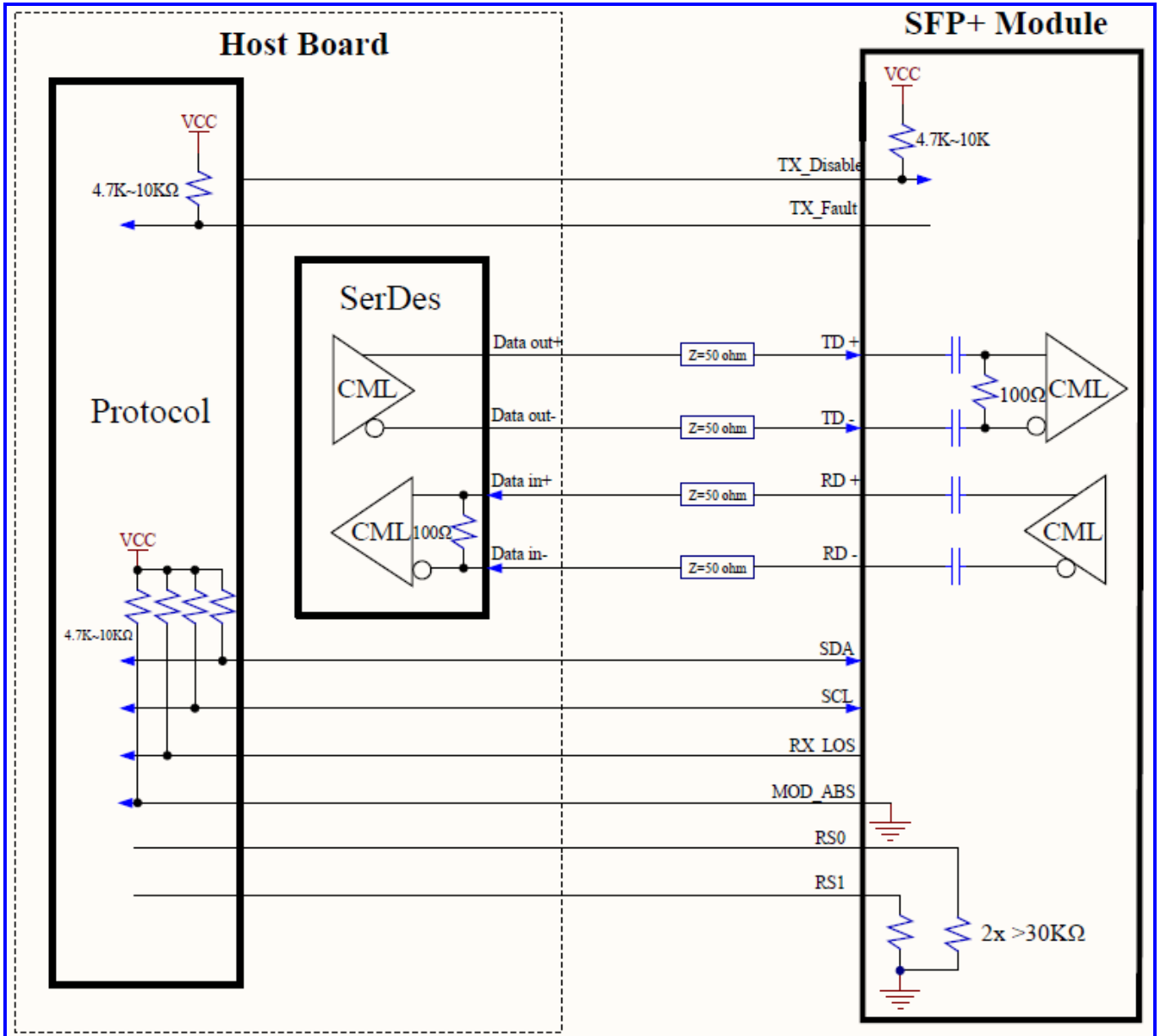
**Assembly Drawing**





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Recommended Interface Circuit



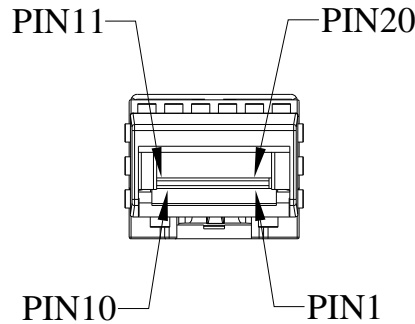




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**Pin Assignment**

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, No function implemented
8	$RX\_LOS$	Receiver Loss of Signal, TTL High, open collector
9	$RS1$	TX Rate Select, No function implemented
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

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