



1000BASE-LX 1.25 Gigabit Ethernet 1310nm SMF Mini SFF Optical Transceiver

CS13-1GM-3L-TI



Description

The CS13-1GM-3L-TI transceivers provide products for maximum bandwidth of 1Gbps and transmission up to 10km. The transceiver is provided in mini SFF with duplex LC connector interface.

Features

- Compliant with IEEE802.3z Gigabit Ethernet Standard
- Single power supply 3.3V
- Duplex LC optical connection
- Class 1 laser product compliant with EN 60825-1
- Input/Output: AC/AC
- Industrial temperature range -40°C to 85°C

Applications

- Single mode fiber backbone links up to 10km

Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Internal Transceiver Temperature	-40 to 95	±3	°C	Internal
Internal Transceiver Voltage	3.0 to 3.6	±0.1	V	
Bias Current	0 to 100	±10%	mA	
TX Power	-9 to +2	±3	dB	
RX Average Power	-16 to 0	±3	dB	

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
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	
Hand Soldering Temperature	T _{SOLD}	-	360	°C	<5 seconds, for 1x12 pins
Hand Soldering Temperature	T _{SOLD}	-	360	°C	<15 seconds, for housing fix pins

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit	Notes
Case Operating Temperature	T_C	-40	85	°C	
Supply Voltage	V_{CC}	3.14	3.46	V	
Supply Current	$I_{TX} + I_{RX}$		300	mA	
Power Consumption	P	-	1.0	W	

Transmitter Electro-Optical Characteristics ($V_{CC} = 3.14V$ to $3.46V$, $T_C = -40^\circ C$ to $85^\circ C$)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Rate	B		1.25		Gbps	
Output Optical Power	P_{out}	-9	-	-3	dBm	
Extinction Ratio	ER	9			dB	
Center Wavelength	λ_C	1260	1310	1360	nm	
Spectral Width (RMS)	$\Delta\lambda$	-	-	2.5	nm	
Relative Intensity Noise	RIN	-	-	-120	dB/Hz	
Output Eye	Compliant with IEEE802.3z					
Max. P_{out} TX-DISABLE Asserted	P_{OFF}	-	-	-45	dBm	
Differential Input Impedance	Z_d	75	100	125	Ω	
Differential Input Voltage Swing	V_{DIFF}	200		800	mV	
TX_DISABLE Assert Time	t_{off}	-	-	100	μs	
TX_DISABLE Negate Time	t_{on}	-	-	2	ms	
Time to Initialize	t_{init}	-	-	300	ms	
TX_DISABLE Time to start reset	t_{reset}	10	-	-	μs	

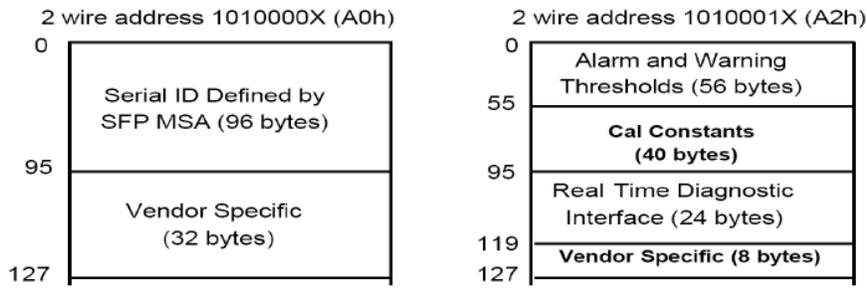
Receiver Electro-Optical Characteristics ($V_{CC} = 3.14V$ to $3.46V$, $T_C = -40^\circ C$ to $85^\circ C$)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Rate	B		1.25		Gbps	
Optical Input Power-Maximum	P_{IN}	-3	-	-	dBm	BER<10 ⁻¹²
Receiver Sensitivity (OMA)	P_{IN}	-	-	-21	dBm	BER<10 ⁻¹²
Operating Center Wavelength	λ_C	1260	-	1360	nm	
Optical Return Loss	ORL	12	-	-	dB	
Loss of Signal-Asserted	P_A	-35	-	-	dBm	Note 1
Loss of Signal-Deasserted	P_D	-	-	-21	dBm	Note 1
Differential Output Impedance	Z_d	75	100	125	Ω	
Differential Output Voltage	V_{DIFF}	300	-	800	mV	

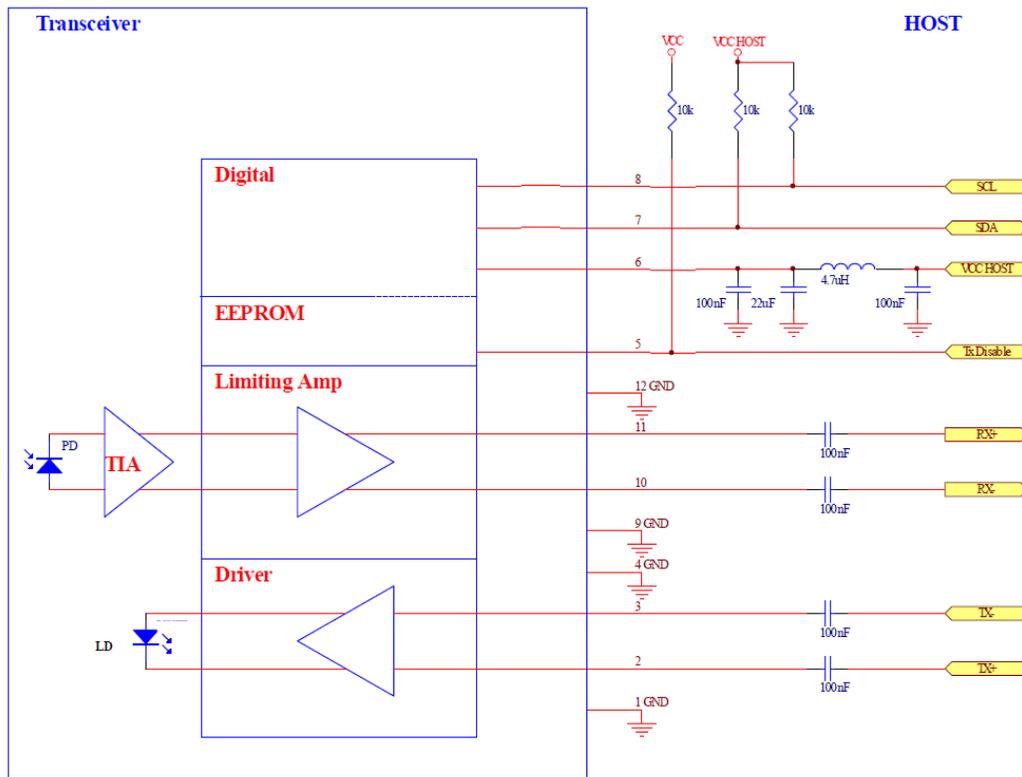
Note:

1. The LOS state is monitored and defined at SFF-8472 byte 110 bit 1.

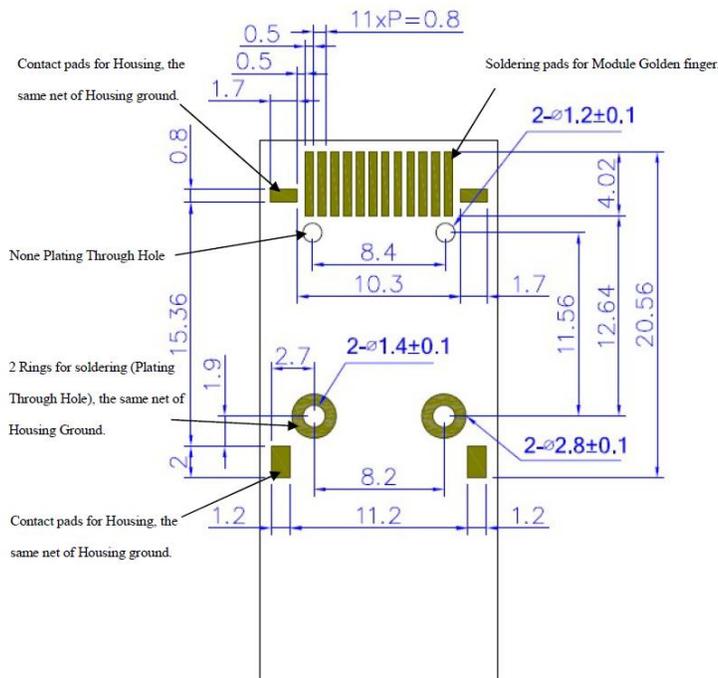
Digital Diagnostic Memory Map



Recommended Interface Circuit



Recommended Host Board Mechanical Layout (unit: mm)

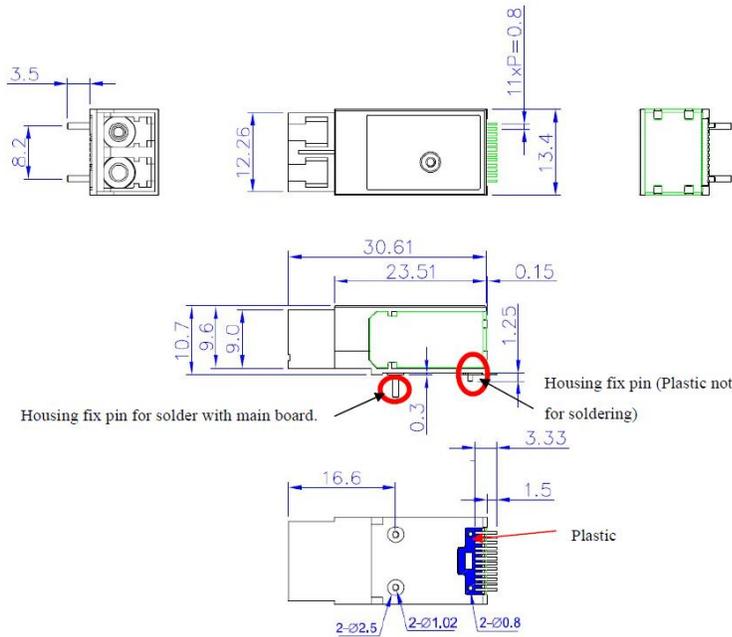


Soldering and Handling

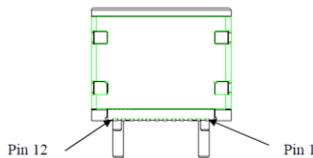
The transceivers are delivered with protective process plugs inserted into the duplex LC connector receptacle. This process plug protects the optical subassemblies during hand soldering and acts as a dust cover during shipping.

Soldering Method	Temperature(°C)	Time(sec)	Note
Hand Soldering	350 ±10	< 5	For each Golden pin should below 5 secs
Hand Soldering	350 ±10	< 15	For each Fix pin should below 15 secs

Dimensions (unit: mm)



Pin Assignment



Pin	Signal Name	Description
1	GND	Ground
2	TX+	Transmit Data in, ac coupled
3	TX-	Transmit Data in Bar, ac coupled
4	GND	Ground
5	TX_DISABLE	Transmit Disable
6	V _{CC}	3.3V Power Supply
7	MOD_DEF (2)	SDA Serial Data Signal
8	MOD_DEF (1)	SCL Serial Clock Signal
9	GND	Ground
10	RX-	Receive Data out Bar, ac coupled
11	RX+	Receive Data out, ac coupled
12	GND	Ground

Additional Notes

- Avoid eye or skin exposure to laser radiations.
- The device is sensitive to electro-static discharge (ESD). The device should be handled with ESD proof tools. To assemble the device on PCB, proper grounding is required to prevent ESD.
- Specifications are subject to change without notice.



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