SFP 1310nm 2.5Gbps LX 20km Transceiver

SFP Series

- Up to 2.5Gb/s Data Links
- 1310nm DFB laser transmitter
- Up to 20km on 9/125pm SMF
- Monitoring Interface Compliant with SFF-8472
- Single +3.3V power supply
- Power consumption 1.5 W
- RoHS compliant and Lead Free

The SFP 2.5Gb/s 1310nm LX transceiver is a compact, high-performance optical module designed for up to 20 km transmission over single-mode fiber (SMF). Supporting data rates up to 2.5 Gb/s, it is ideal for telecom and enterprise applications such as SDH/STM-16, SONET OC-48, and Fiber Channel links. The hot-pluggable SFP form factor ensures easy deployment and flexibility across a wide range of networking platforms.

The module utilizes a reliable 1310 nm DFB laser transmitter and a high-sensitivity receiver, providing stable optical performance for medium-reach applications. The optical interface features a duplex LC connector, while the module operates on a standard +3.3V power supply. With low power consumption typically below 1.5W, it offers an efficient and cost-effective solution for 2.5G optical communication.

Fully compliant with SFF-8472 digital diagnostic monitoring (DDM), the transceiver enables real-time monitoring of key operating parameters including temperature, voltage, and optical power. Designed for robust operation, it supports both commercial (0°C to 70°C) and industrial (-40°C to 85°C) temperature ranges, and is RoHS compliant and lead-free, making it suitable for carrier-grade and industrial networking environments.

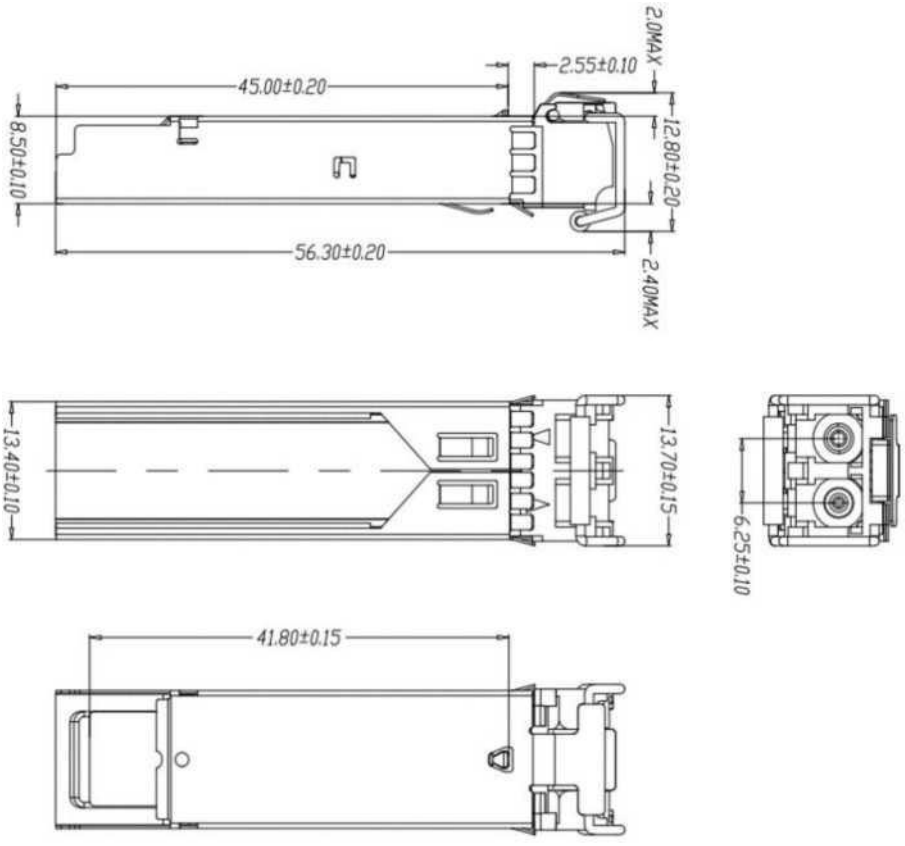
Key Features

- Up to 2.5Gb/s Data Links
- Hot-Pluggable
- 1310nm DFB laser transmitter
- Duplex LC connector
- Up to 20 km on 9/125pm SMF
- Single +3.3V Power Supply
- Monitoring Interface Compliant with SFF-8472
- Low power consumption <1.5W typically
- Operating temperature range:

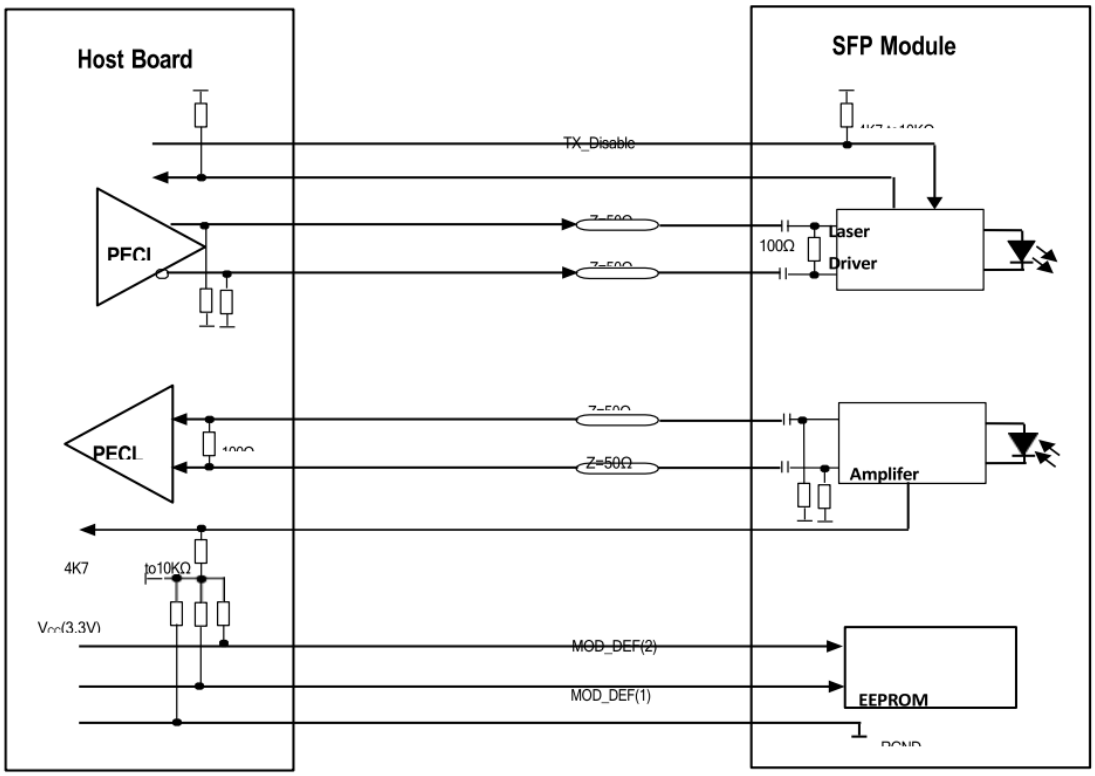
  Commercial: 0°C to 70°C

  Industrial: -40°C to 85°C
- RoHS compliant and Lead Free

Outline Dimensions



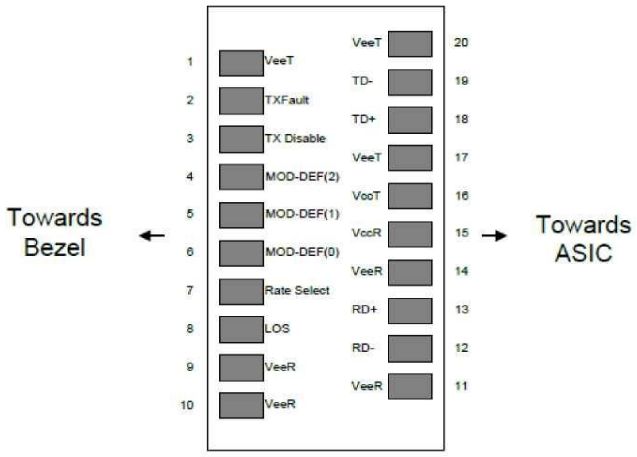
Recommend Circuit Schematic



Digital Diagnostic Functions

Data Address	Parameter	Accuracy	Unit	Calibration
96-97	Transceiver Internal Temperature	±3.0	°C	internal
98-99	VCC3 Internal Supply Voltage	±5	V	internal
100-101	Laser Bias Current	±10	%	internal
102-103	Tx Output Power	±3.0	dBm	internal
104-105	Rx Input Power	±3.0	dBm	internal

Pin Assignment



Pin	Symbol	Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	
3	TX Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	Rate Select	Not Connected	3	4
8	LOS	Loss of Signal	3	5
9	VeeR	Receiver Ground	1	1
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground		1
12	RD-	Inv. Received Data Out	3	6
13	RD+	Received Data Out	3	6
14	VeeR	Receiver Ground	3	1
15	VccR	Receiver Power	2	1
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	6
19	TD-	Inv. Transmit In	3	6
20	VeeT	Transmitter Ground	1	

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k - 10 kohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF(0) pulls line low to indicate module is plugged in.
4. Rate select is not used.
5. LOS is open collector output. Should be pulled up with 4.7k - 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
6. AC Coupled.

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_s	-40	+85	°C
Maximum Supply Voltage	V_{cc}	-0.5	4.0	V
Operating Relative Humidity	RH	0	85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	T_c	0		+70	°C	SFP-2G-LP-31-20
		-40		+85	°C	SFP-2G-LP-31-20A

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Center Wavelength	λ_c	1290	1310	1330	nm	1
Spectral Width(-20dB)	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Output Power	P_{out}	-9		-3	dBm	2
Optical Rise/Fall Time	tr / tf			260	ps	3
Extinction Ratio	ER	8.2			dB	
Total Generated Transmitter Jitter (Peak to Peak)	J_{TXp-p}			0.07	UI	4
Total Generated Transmitter Jitter (rms)	J_{TXrms}			0.007	UI	4
Eye Mask for Optical Output	Compliant with IEEE802.3 (class 1 laser safety)					
Receiver						
Optical Input Wavelength	λ_c	1100		1600	nm	
Optical Input Power	P_{in}	-24		-1	dBm	5,6
Receiver Overload	P_{ol}	-3			dBm	5,6
RX Sensitivity	Sen			-24	dBm	5,6
Receiver Reflectance		12			dB	
RX_LOS Assert	LOS_A	-40			dBm	
RX_LOS Deassert	LOS_D			-25	dBm	
RX_LOS Hysteresis	LOS_H	0.5	2	6	dB	
General Characteristics						
Data Rate	BR		2500	2700	Mb/s	
Bit Error Rate	BER			10^{-12}		
Max. Supported Link Length on 9/125μm SMF@2.5G	LMAX			20	km	7,8
Total System Budget	LB	16			dB	7,8

Note:

1. Also specified to meet curves in FC-PI 13.0 Figures 18 and 19, which allow trade-off between wavelength

spectral widths.

2. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
3. Unfiltered 20-80%. Complies with IEEE 802.3 (Gig. E), FC 1xand 2x eye masks when filtered.
4. Measured with DJ-free data input signal. In actual application,output DJ will be the sum of input DJ and .DJ.
5. Measured with conformance signals defined in FC-PI 13.0 specifications.
6. Measured with PRBS 2^{23-1} at 10^{-12} BER.
7. Dispersion limited per FC-PI Rev.13.
8. Attenuation of 0.25dB/km is used for the link length calculations. Distances are indicative only. Please refer to the Optical Specifications in Table IV to calculate a more accurate link budget based on specific conditions in your application.

Electrical Characteristics (Top = Tc, Vcc = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V_{cc}	3.14	3.30	3.47	V	
Supply Current	I_{cc}			300	mA	
Inrush Current	I_{surge}			I_{cc}+30	mA	
Maximum Power	P_{max}			1.0	W	
Transmitter						
Input Differential Impedance	R_{in}	90	100	110		
Single Ended Data Input Swing	$V_{in\ PP}$	200		1200	mVp-p	
Transmit Disable Voltage	V_D	V_{cc}-1.3		V_{cc}	V	1
Transmit Enable Voltage	V_{EN}	V_{ee}		V_{ee}+0.8	V	
Transmit Disable Assert Time	$T_{dessert}$			10	us	
Receiver						
Single Ended Data Output Swing	$V_{out,pp}$	300		1000	mv	2
Data Output Rise Time	t_r			260	ps	
Data Output Fall Time	t_f			260	ps	
LOS Fault	$V_{losfault}$	V_{cc}-0.5		V_{CC_host}	V	3
LOS Normal	$V_{los\ norm}$	V_{ee}		V_{ee}+0.5	V	3
Power Supply Rejection	PSR	100			mVpp	
Total Generated Transmitter Jitter(Peak to Peak)	J_{RXp-p}			0.07	UI	
Total Generated Transmitter Jitter(Rms)	J_{RXrms}			0.007	UI	

Note:

1. Or open circuit.
2. Into 100 ohm differential termination.
3. LOS is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Ordering Information

Product Name	Product Description
SFP-2G-LP-31-20	SFP Plug-in, 2.5Gbps, 20km, TX=1310/RX wide, on two single mode fibres, LC/PC
SFP-2G-LP-31-20A	SFP Plug-in, 2.5Gbps, 20km, TX=1310/RX wide, on two single mode fibres, LC/PC, -40 to +85°C

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