10Gbps 1310nm 1.4km SFP+ Optical Transceiver Module

S-FP1031L2K-xD

Features

- Hot Pluggable
- LC Duplex optical interface
- 1310nm FP transmitter, PIN receiver
- Low power consumption
- Applicable for 1.4km SMF connection
- All-metal housing for superior EMI performance
- Advanced firmware allow customer system encryption
- Information to be stored in transceiver
- Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- Operating Temperature:0 to +70°C
- -40 to +85°C
- RoHS compliant (lead free)

Applications

- 10GBASE-LR/LW
- Other optical links

Standards

- IEEE 802.3ae 10GBASE-LR/LW
- SFF-8431
- SFF-8472

Description

1310nm FP 10Gbps SFP+ transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 10km.

The SFP+ 1.4km module electrical interface is compliant to SFI electrical specifications. The transmitter input and receiver output impedance is 100 Ohms differential. Data lines are internally AC coupled. The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	Vcc	-0.5		4	V
Storage Temperature Range	Ts	-40		85	°C
Relative Humidity - Storage	RH_S	0		95	%
Relative Humidity - Operating	RH_O	0		85	%

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Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	Tc	0	-	70	°C
		-40	-	85	
Power Supply Voltage	V_{cc}	3.14	3.3	3.47	V
Supply Current	I_{cc}	-	-	300	mA
Data Rate	BR	-	10.3125	-	Gbps

Electrical Characteristics

Transmitter Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential Input Voltage Swing	V_{IN}	180	-	700	mV
Tx Differential Input Impendence	Z_{IN}	-	100	-	Ω
Transmitter Disable Voltage	V_{DIS}	2.0	-	V_{CC}+0.3	V
Transmitter Enable Voltage	V_{EN}	0	-	0.8	V
T_{FAULT} Logic High	V_{TFH}	2.4	-	V_{CC}	V
T_{FAULT} Logic Low	V_{TFL}	V_{EE}	-	V_{EE}+0.4	V
Receiver Electrical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Differential output Voltage Swing	V_{OUT}	300	-	850	mV
Rx Differential Output Impendence	Z_{OUT}	-	100	-	Ω
LOS Assert Voltage	V_{LOSA}	2.4	-	V_{CC}	V
LOS De-assert Voltage	V_{LOSD}	V_{EE}	-	V_{EE}+0.4	V

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Characteristics						
Laser Type			FP			
Center Wavelength Range	λ	1260	1310	1355	nm	
Spectral Width RMS	Δλ	-	-	4	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	

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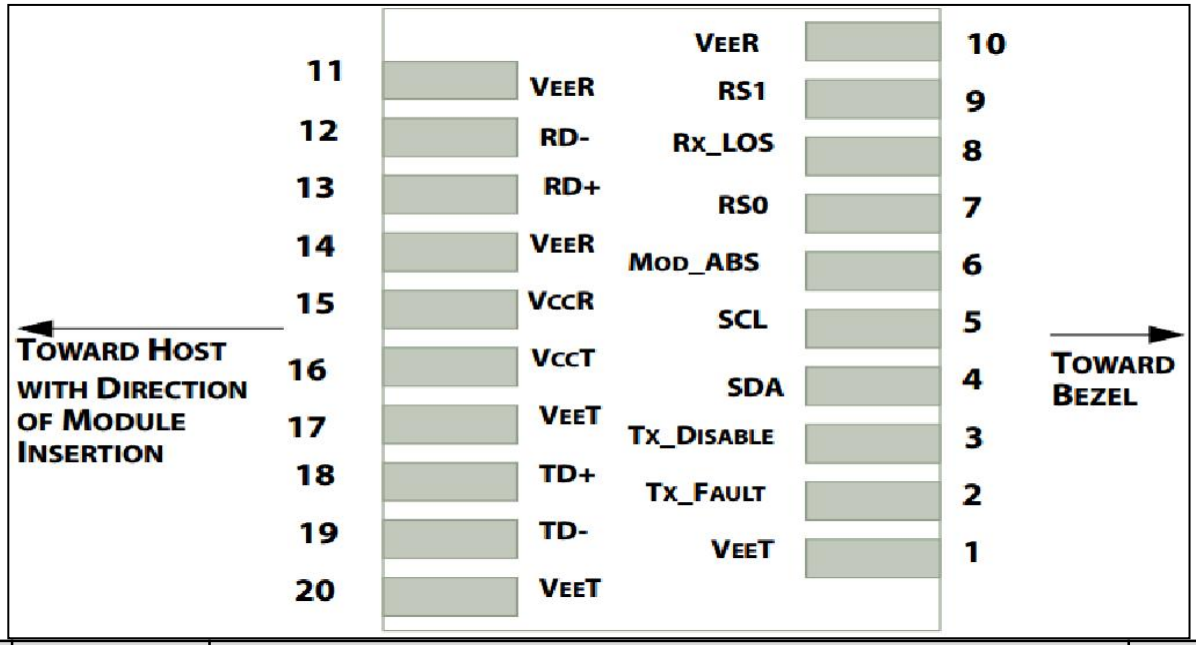
Launch Optical Power	Pout	-8.2	-	0.5	dBm	1
Extinction Ratio	ER	3.5	-	-	dB	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Eye Diagram	Complies with IEEE802.3ae eye masks when filtered					
Receiver Characteristics						
Receiver Type		PIN				
Operating Central Wavelength	λ	1260	-	1610	nm	
Receiver Sensitivity	Sen	-	-	-14.4	dBm	2
Receiver Overload	P_{SAT}	0.5	-	-	dBm	
Receiver Reflectance	RFL	-	-	-12	dB	
LOS Assert	LOSA	-30	-	-	dBm	
LOS De-Assert	LOSD	-	-	-17	dBm	
LOS Hysteresis	LOSH	0.5	3	5	dB	
Notes						
1. Average power figures are informative only, per IEEE 802.3ae. 2. Measured with 2^{31}-1 PRBS@10.3125Gbps,BER<10^{-12}						

Pin Definitions



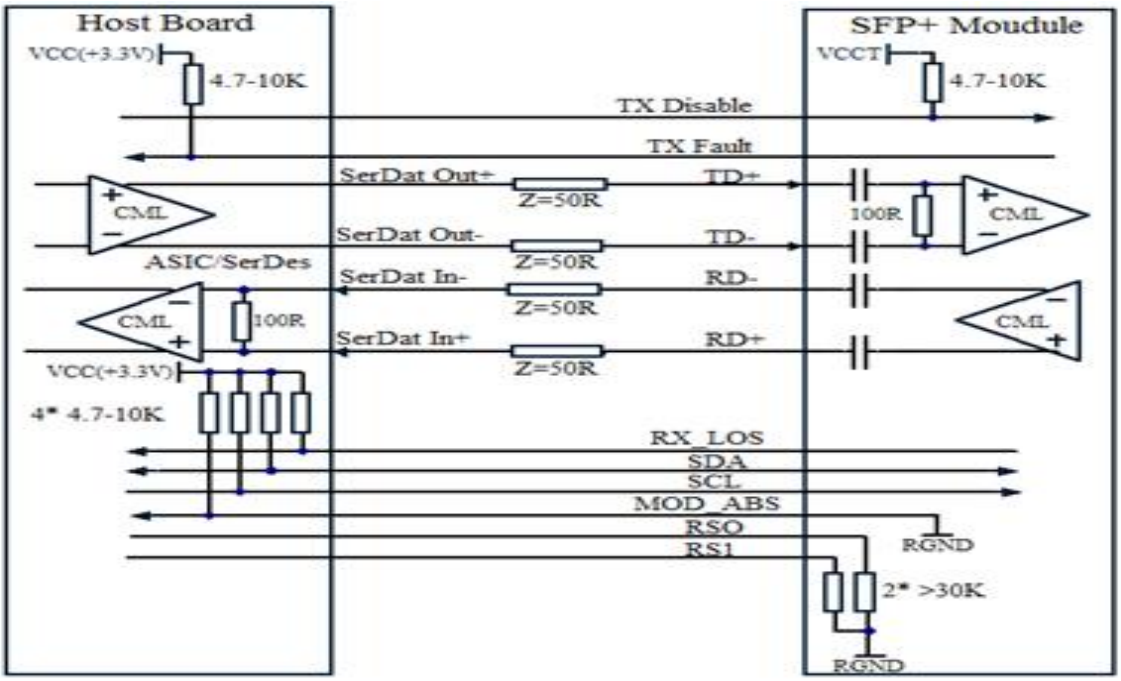
Pin	Symbol	Description	Notes
1	VEET	Transmitter Ground	1

2	TFAULT	Transmitter Fault	2
3	TDIS	Transmitter Disable. Laser output disabled on high or open	3
4	SDA	2-wire Serial Interface Data Line	2
5	SCL	2-wire Serial Interface Clock Line	2
6	MOD_ABS	Module Absent. Grounded within the module	
7	RS0	Rate Select 0. Not Used.	4
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation	2
9	RS1	Rate Select 1. Not Used.	4
10	VEER	Receiver Ground	1
11	VEER	Receiver Ground	1
12	RD-	Receiver Inverted DATA out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	VEER	Receiver Ground	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground	1

Notes

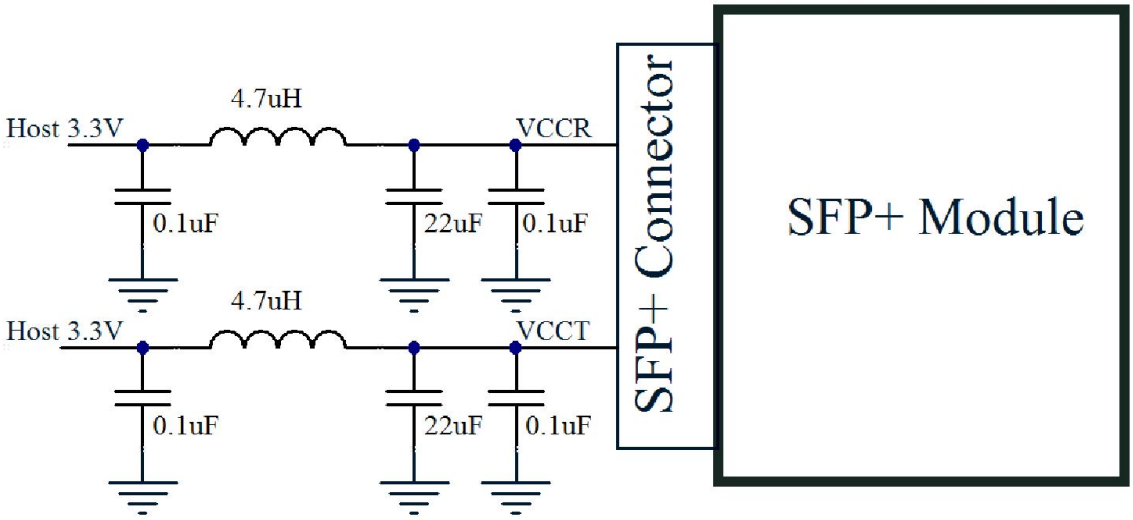
1. Circuit ground is internally isolated from chassis ground.
2. Shall be pulled up with 4.7k-10k Ohms to a voltage between 3.15V and 3.6V on the host board.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Internally pulled down per SFF-8431 Rev 4.1.

Recommended Interface Circuit



Recommended Host Board Supply Filtering Circuit

The Transceiver includes internal circuit components to filter power supply noise. Under some conditions of EMI and power supply noise, external power supply filtering may be necessary. If receiver sensitivity is found to be degraded by power supply noise, the filter network illustrated in the following figure may be used to improve performance. The values of the filter components are general recommendations and may be changed to suit a particular system environment. Shielded inductors are recommended.



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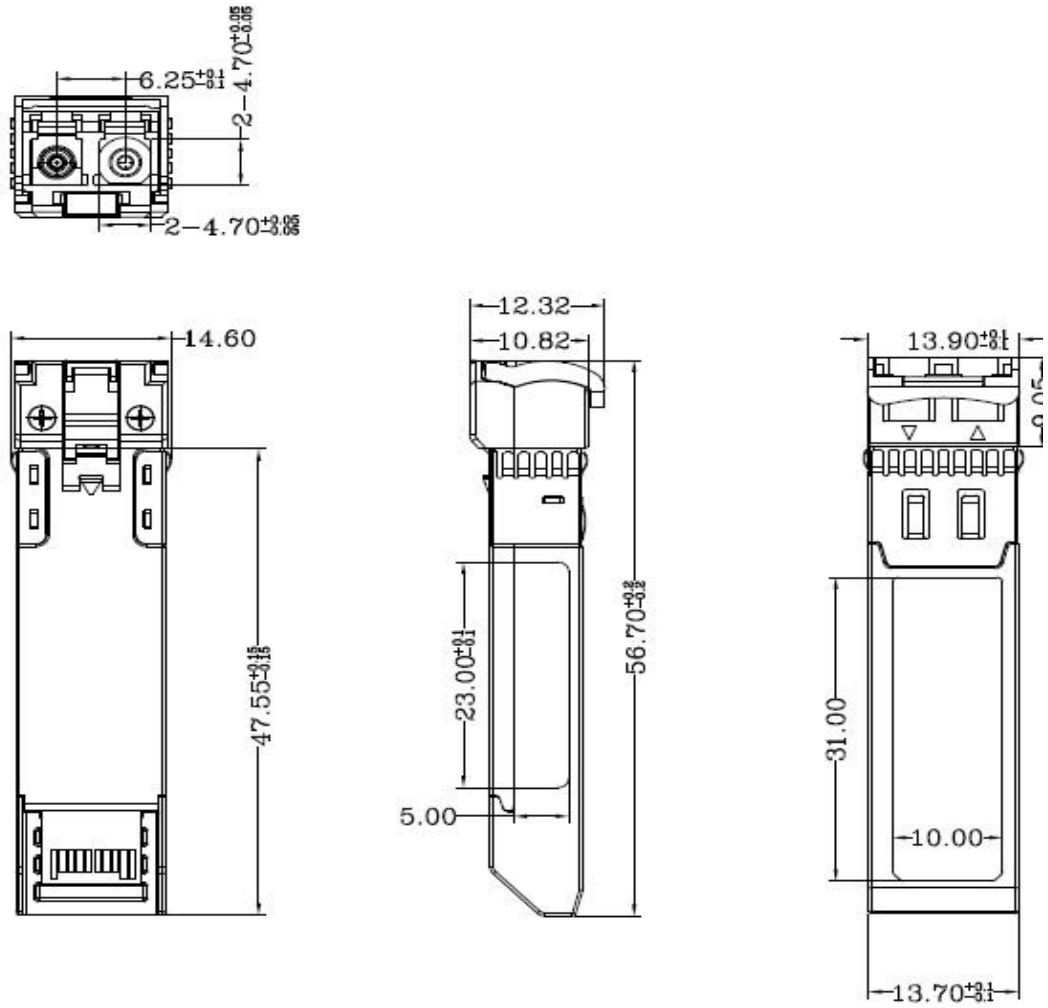
Mechanical Dimensions



Ordering information

Part Number	Product Description
S-FP1031L2K-CD	SFP+, 10.3125Gbps, 1310nm, SM, 1.4km, 0ºC~+70ºC, With DDM
S-FP1031L2K-ID	SFP+, 10.3125Gbps, 1310nm, SM, 1.4km, -40ºC~+85ºC, With DDM