

10G T1270/R1330nm 20km BIDI SFP+ Optical Transceiver Module

S-FB1023L20-xD

Features

- Hot Pluggable
- Single LC interface
- 1270nm DFB transmitter, PIN receiver
- Power consumption <1W
- Applicable for 20km SMF connection
- Single +3.3V power supply
- All-metal housing for superior EMI performance
- 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

10G 1270nm SFP+ BIDI transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 20km.

The SFP+ BIDI 20km 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.

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S-FB1023L20-xD

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	V _{CC}	-0.5		4	V
Storage Temperature Range	T _s	-40		85	°C
Relative Humidity - Storage	RH _s	0		95	%
Relative Humidity - Operating	RH _o	0		85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	T _c	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 Impedence	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 Impedence	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

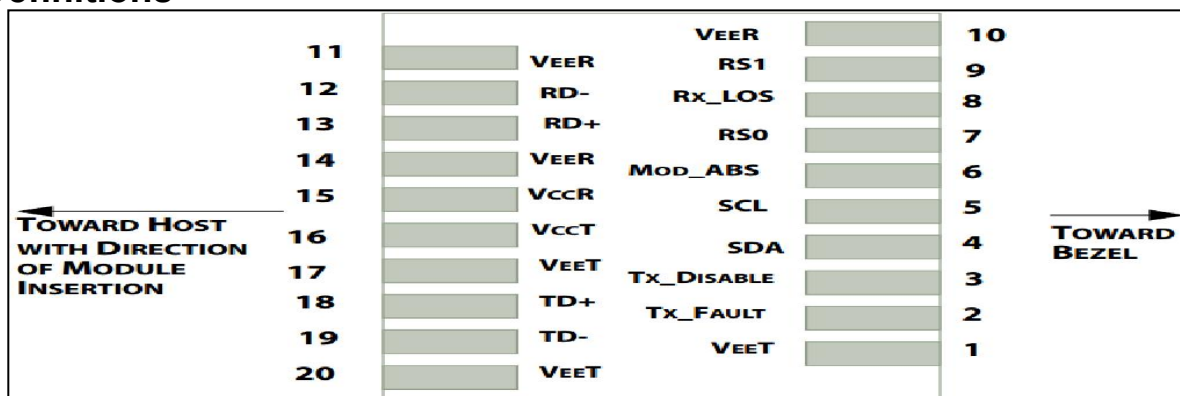
10G T1270/R1330nm 20km BIDI SFP+ Optical Transceiver Module

S-FB1023L20-xD

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Characteristics						
Laser Type		DFB				
Center Wavelength	λ	1260	1270	1280	nm	
Spectral Width@-20dB	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Launch Optical Power	P _{out}	-4.2	-	3	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				
Central Wavelength	λ	1320	1330	1340	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



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S-FB1023L20-xD

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

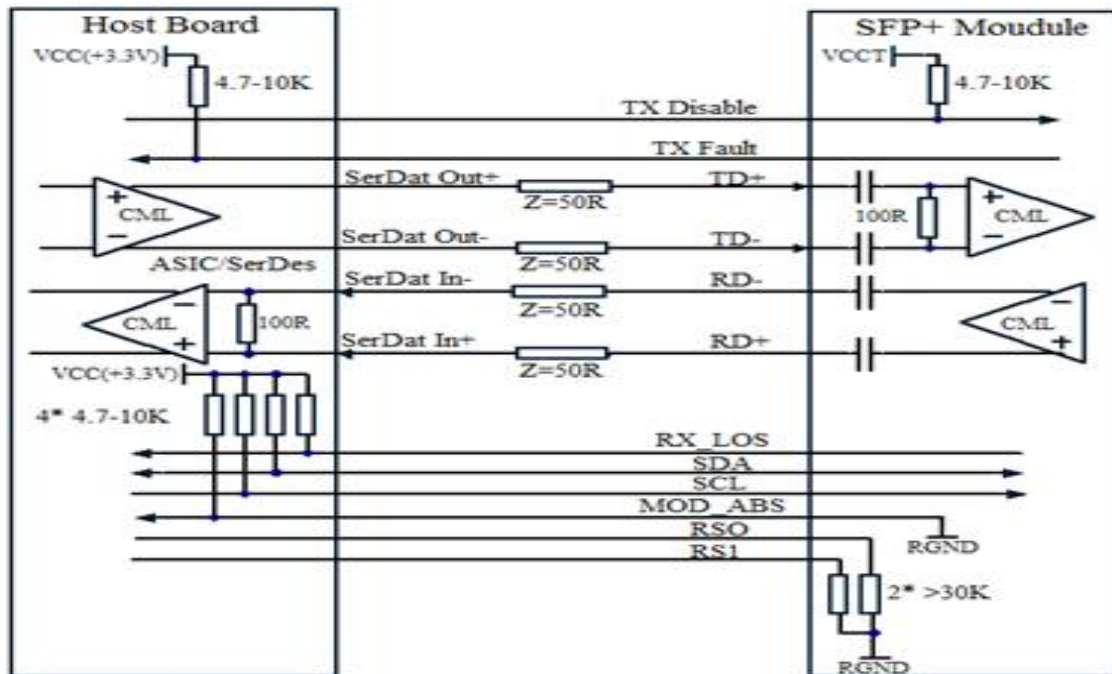
Notes

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.

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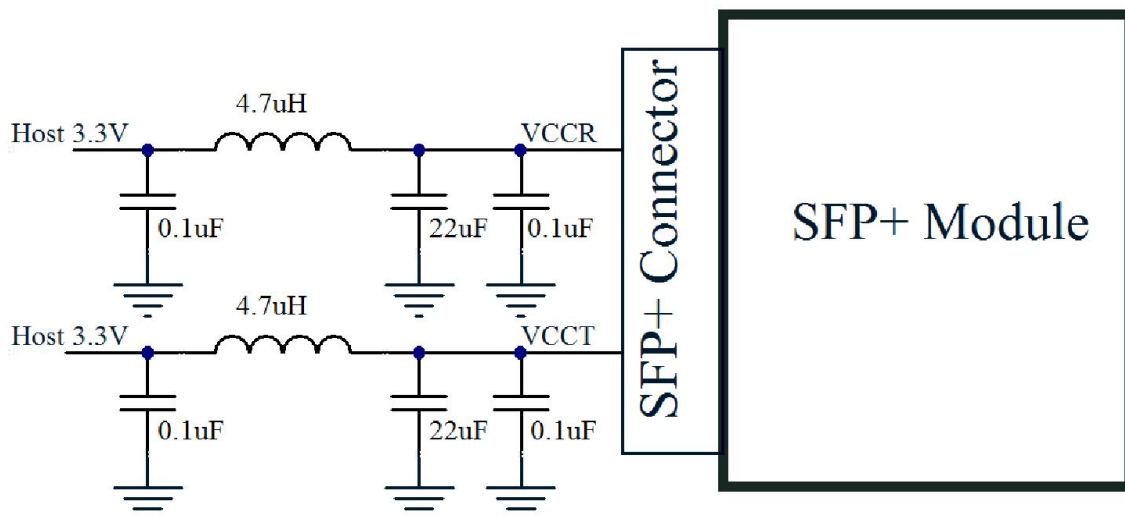
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Recommended Interface Circuit



Recommended Host Board Supply Filtering Circuit

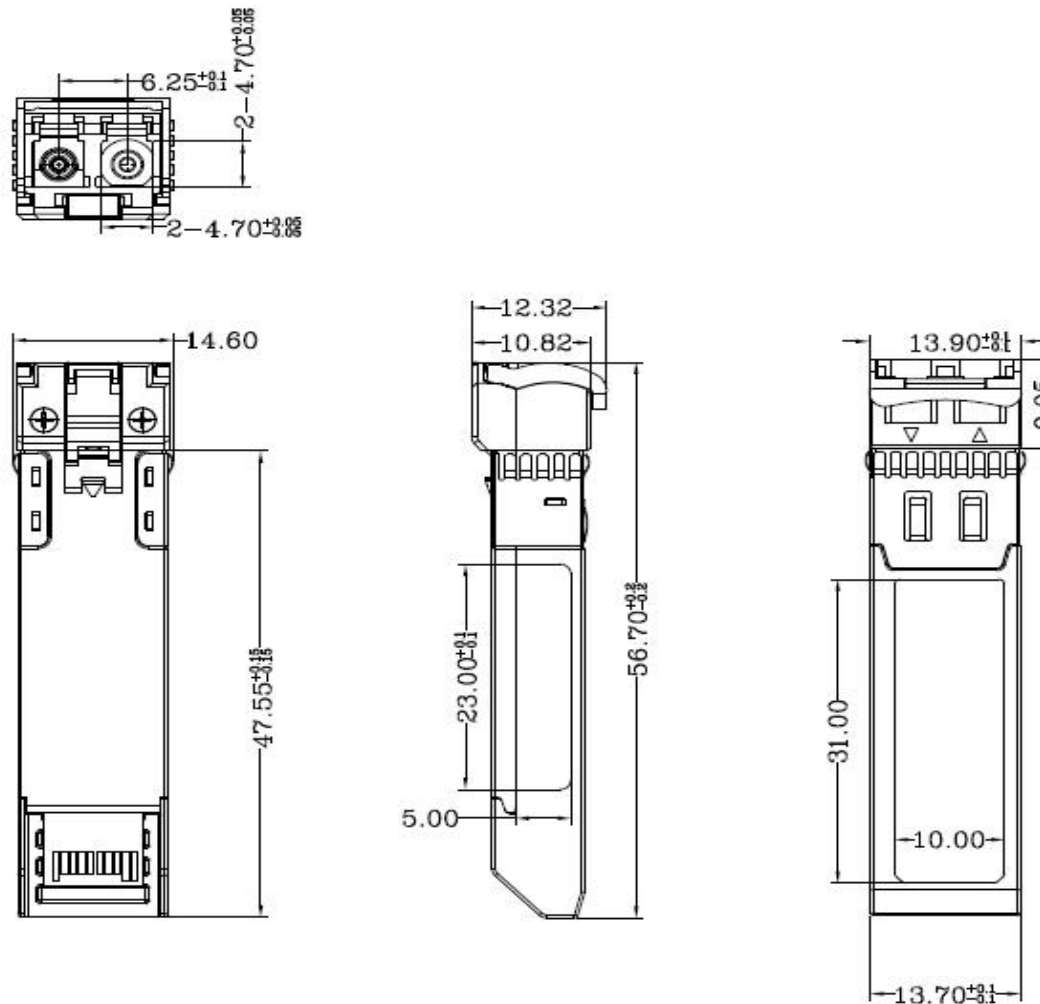
The Transceiver includes internal circuit components to filter power supply noise. Under some conditions of EMI and power supply noise, external power supply filtering may be necessary. If receiver sensitivity is found to be degraded by power supply noise, the filter network illustrated in the following 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-PF1023L20-CD	SFP+ BIDI Tx1270/Rx1330nm, 10.3125Gbps, SM, 20km, 0°C~+70°C, With DDM
S-PF1023L20-ID	SFP+ BIDI Tx1270/Rx1330nm, 10.3125Gbps, SM, 20km, -40°C~+85°C, With DDM