



10Gbps SFP+ BiDi Transceiver (Model: 10GSFP+)



Feature Highlights:

- Bit Rate at range of 9.95Gbps to 11.3Gbps
- Single LC for Bi-Directional (BiDi) Transmission
- Uncooled 1270nm or 1330nm **CWDM DFB** Laser
- Built-in 1270/1330 WDM Filter
- Hot-pluggable SFP+ footprint
- Maximum communication length up to 10km Single-mode Fiber
- Single 3.3V supply
- Power dissipation <2 Watt
- No Reference Clock required
- Built-in digital diagnostic functions
- Temperature range 0°C to 70°C
- Very low EMI and excellent ESD protection
- RoHS Compliant

Performance Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	0	+4	V		
Storage Temperature	Tc	-40	+85	C		
Operating Case Temperature	Tc	0	+70	C		
Relative Humidity	RH	5	95	%		
Supply Voltage	Vcc	3.14		3.46	V	
Supply Current	Icc			250	mA	
Transmitter						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin,pp	250		1600	mV	
Transmit Disable Voltage	VD	2		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	
Data Dependent Input Jitter	DDJ			0.10	UI	
Data Input Total Jitter	TJ			0.28	UI	
Receiver						
Differential data output swing	Vout,pp	300		850	mV	2
Data output rise time, fall time	tr	28			ps	3
LOS Fault	VLOS fault	2		VccHOST	V	4



LOS Normal	VLOS norm	Vee		Vee+0.8	V	4
Total Jitter	TJ			0.70	UI	
Deterministic Jitter	DJ			0.42	UI	

Notes:

1. Electrical Characteristics (TOP = 0 to 70 °C, VCC = 3.14 to 3.46 Volts),
2. Connected directly to TX data input pins, AC coupling from pins into laser driver
3. 2 Into 100Ω differential termination
4. 20 – 80 % . Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's in sequence in the PRBS^9 is an acceptable alternative. SFF-8431 Rev 2.1
5. 4. LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V
6. Exceeding the limits may damage the transceiver module permanently.

Optical Parameters

Parameter		Symbol	Min	Typ	Max	Unit	Ref.	
Transmitter								
Operating Date Rate		BR	9.95		11.3	Gb/s		
Bit Error Rate		BER			10 ⁻¹²			
Maximum Launch Power		P _{MAX}	-6		-1	dBm	1	
Optical Center		λ	1260	1270	1280	nm		
Wavelength			1320	1330	1340			
Optical Extinction Ratio		ER	3.5			dB		
Spectral Width		Δλ			1	nm		
Sidemode Supression ratio		SSRmin	30			dB		
Rise/Fall Time (20%~80%)		Tr/Tf			50	ps		
Average Launch power of OFF Transmitter		P _{OFF}			-30	dBm		
Tx Jitter		Txj	Compliant with each standard requirements					
Optical Eye Mask			IEEE802.3ae					2
Receiver								
Operating Date Rate		BR	9.95		11.3	Gb/s		
Receiver Sensitivity		Sen			-14	dBm	2	
Maximum Input Power		P _{MAX}	0			dBm	2	
Optical Center		λ _C	1320	1330	1340	nm		
Wavelength			1260	1270	1280			
Receiver Reflectance		R _{Rx}			-27	dB		
LOS De-Assert		LOS _D			-15	dBm		
LOS Assert		LOS _A	-30			dBm		
LOS Hysteresis		LOS _H	0.5		5	dB		

Notes:

1. TOP = 0 to 70°C
2. The optical power is launched into SMF.



3. Measured with a PRBS 231-1 test pattern @10.3125Gbps BER<10-12.

Digital Diagnostic Functions

The following digital diagnostic characteristics are defined with assumption of the recommended operating environments unless specified otherwise. It is compliant to SFF8472 Rev9.2 with internal calibration mode. For external calibration mode please contact our sales staff.

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	degC	Over operating temp
Laser power monitor absolute error	DMI_TX	-3	+3	dB	
RX power monitor absolute error	DMI_RX	-3	+3	dB	-3dBm to -12dBm
Supply voltage monitor absolute error	DMI_VCC	-0.08	+0.08	V	Full operating range
Bias current monitor	DMI_Ibias	-10%	10%	mA	

Pin Assignment

Pin	Symbol	Name/Description	Ref.
1	VeeT	Transmitter Ground (Common with Receiver 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	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	No connection required	
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	RS1	No connection required	
10	VeeR	Receiver Ground (Common with Transmitter Ground)	1
11	VeeR	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VeeR	Receiver Ground (Common with Transmitter Ground)	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Tfault is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias

current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.

3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. LOS is open collector output. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

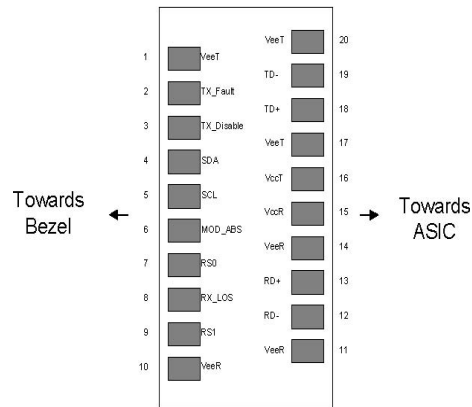
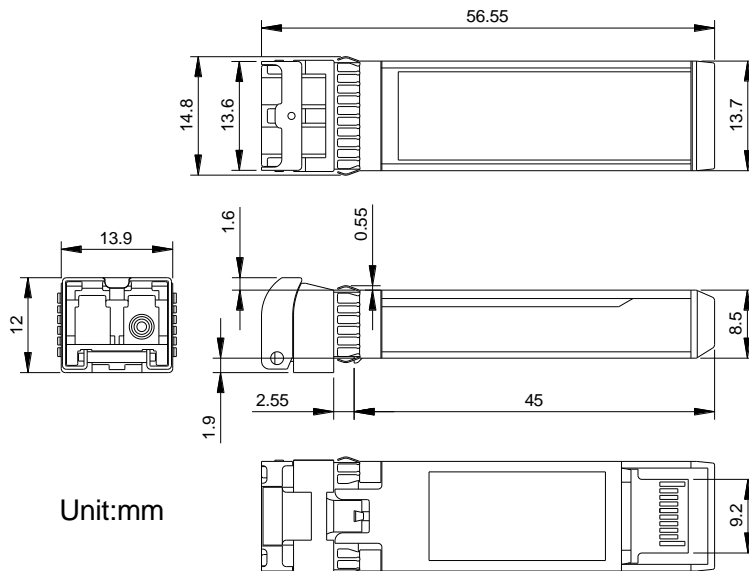
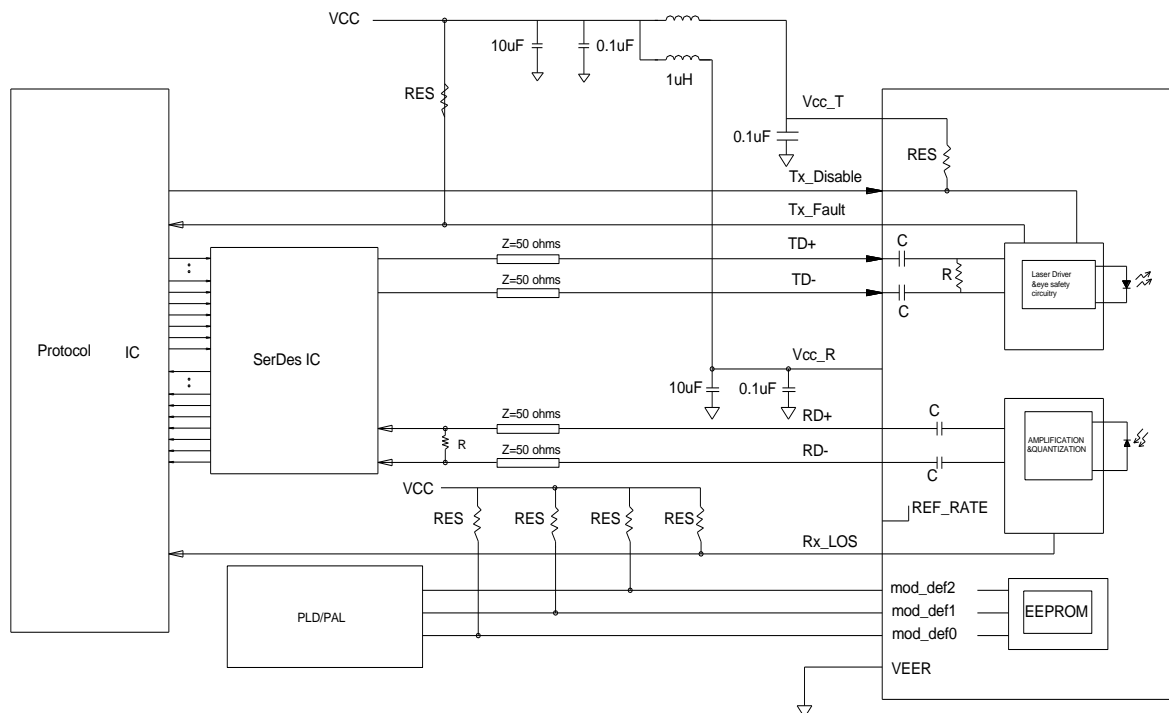


Diagram of Host Board Connector Block Pin Numbers and Names

Package Information



Recommended Circuit



NOTE: 4.7K ohms < RES < 10K ohms

ESD

This transceiver is specified as ESD threshold 1kV for high speed pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

LASER Safety

This is a Class 1 Laser Product according to IEC 60825-1:1993:+A1:1997+A2:2001. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (July 26, 2001).