

## SFP-10GB-BX-U23-10-FT-OPC

Fortinet® Compatible TAA 10GBase-BX SFP+ Transceiver (SMF, 1270nmTx/1330nmRx, 10km, LC, DOM)

### Features

- SFF-8432 and SFF-8472 Compliance
- Simplex LC Connector
- Uncooled DFB transmitter and PIN receiver
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



### Applications:

- 10GBase-BX Ethernet
- 8x/10x Fibre Channel
- Access, Metro and Enterprise

### Product Description

This Fortinet® compatible SFP+ transceiver provides 10GBase-BX throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1270nmTx/1330nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Fortinet®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4.
- ESD to the LC Receptacle: compatible with IEC 61000-4-3.
- EMI/EMC: compatible with FCC Part 15 Subpart B Rules, EN55022:2010.
- Laser Eye Safety: compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1, 2.
- RoHS: compliant with EU RoHS 2.0 directive 2015/863/EU.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	V <sub>cc</sub>	-0.5		4.0	V	1
Storage Temperature	T <sub>stg</sub>	-40		85	°C	2
Operating Case Temperature	T <sub>c</sub>	0		70	°C	3
Data Rate	DR	9.83		11.3	Gbps	4
Bit Error Rate	BER			10 <sup>-12</sup>		
Supply Current	I <sub>cc</sub>		200	350	mA	1

## Notes:

1. For electrical power interface.
2. Ambient temperature.
3. Case temperature.
4. IEEE 802.3ae.

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V <sub>cc</sub>	3.14	3.3	3.46	V	
Power Dissipation	P <sub>DISS</sub>		0.65	1.2	W	
Transmitter						
Input Differential Impedance	R <sub>IN</sub>		100		Ω	
Differential Data Input Swing	V <sub>IN,pp</sub>	180		700	mV	
Transmit Disable Voltage	V <sub>D</sub>	2.0		V <sub>cc</sub>	V	
Transmit Enable Voltage	V <sub>EN</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.8	V	
Receiver						
Differential Data Output Swing	V <sub>out,pp</sub>	300		850	mV	
Data Output Rise Time/Fall Time (20-80%)	T <sub>r</sub> /T <sub>f</sub>	28			ps	
LOS Assert	LOSA	2		Host_V <sub>cc</sub>	V	
LOS De-Assert	LOSD	V <sub>ee</sub>		V <sub>ee</sub> +0.5	V	

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Output Optical Power	Ptx	-8.2		0.5	dBm	1
Optical Center Wavelength	λC	1260	1270	1280	nm	
Extinction Ratio	ER	3.5			dB	
Spectral Width (-20dB)	Δλ			0.6	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Dispersion Penalty	TDP			3.2	dB	
Launch Power of Off Transmitter	Poff			-30	dBm	1
Transmitter Jitter	According to IEEE 802.3ae Requirement					
Receiver						
Receiver Overload		0.5			dBm	
Optical Center Wavelength	λC	1320	1330	1340	nm	
Receiver Sensitivity	S			-14.4	dBm	2
Receiver Reflectance				-12	dB	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-17	dBm	
LOS Hysteresis	LOSH	0.5			dB	

### Notes:

1. Average.
2. Average. Measured with worst ER: BER<10<sup>-12</sup> and 2<sup>31</sup>-1 PRBS.

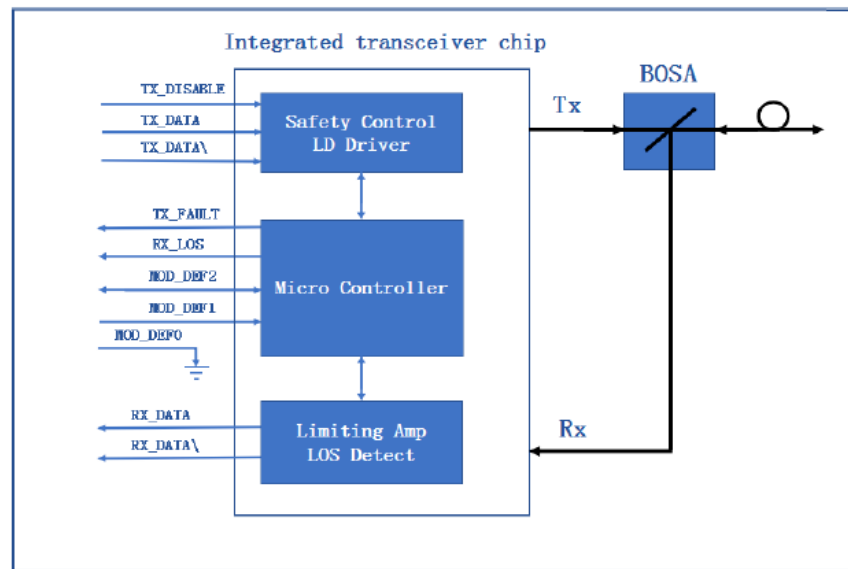
## Pin Descriptions

Pin	Symbol	Name/Descriptions	Notes
1	VeeT	Transmitter Ground. Common with receiver ground.	1
2	Tx_Fault	Transmitter Fault.	2
3	Tx_Disable	Transmitter Disable. Laser output disabled on "high" or "open."	3
4	SDA	2-Wire Serial Interface Data.	4
5	SCL	2-Wire Serial Interface Clock.	4
6	MOD_ABS	Module Absent. Grounded within the module.	4
7	RS0	No connection required.	
8	LOS	Loss of Signal indication. "Logic 0" indicates normal operation.	5
9	RS1	No connection required.	1
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:

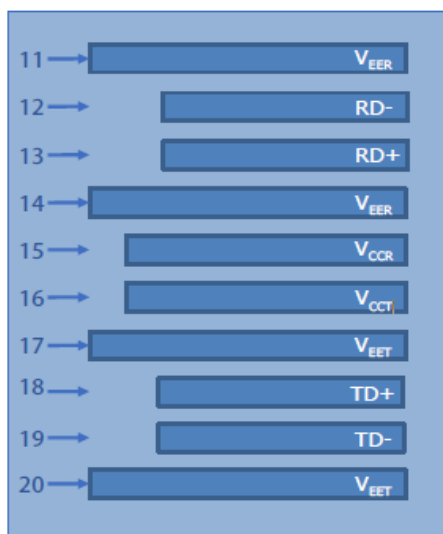
1. Circuit ground is isolated from the chassis ground.
2. Tx\_Fault is the open collector output and should be pulled up with 4.7k $\Omega$ -10k $\Omega$  on the host board to a voltage between 2V and Vcc+0.3V.
3. Disabled: TDIS>2V or open. Enabled TDIS<0.8V.
4. Should be pulled up with the 4.7k $\Omega$ -10k $\Omega$  on the host board to a voltage between 2V and Vcc+0.3V.
5. LOS is open collector output and should be pulled with 4.7k $\Omega$ -10k $\Omega$  on the host board to a voltage between 2V and Vcc+0.3V. The logic "0" indicates normal operation, and the logic "1" indicates that the receiver signal is lost.

## Transceiver Block Diagram

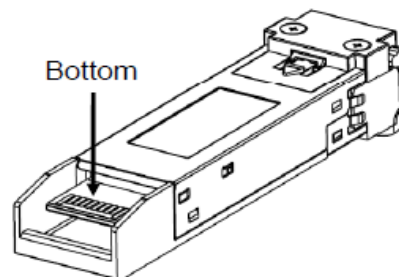
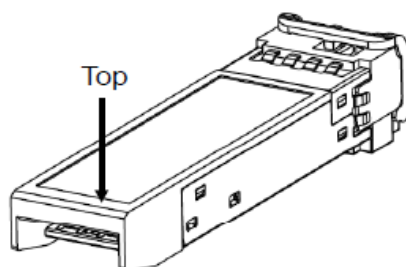
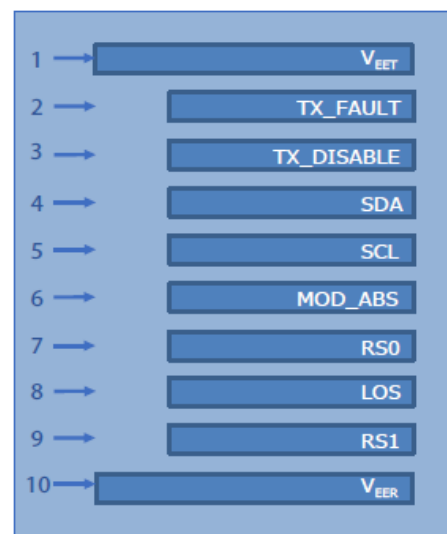


## Electical Pad Layout

Top view



Bottom view



Mechanical Specifications

