10GBASE-BX SFP+ 1550nmTX/1490nmRX 80km DOM Transceiver Module

SFP-10G-BX80

Features

- Compliant to SFP+ MSA
- Fully ROHS Compliant
- Operating Data Rate up to 11.3Gbps
- 1490nm/1550nm Cooled EML DFB Laser
- High Sensitivity APD Photodiode and TIA
- LC Duplex Connector
- Hot Pluggable 20pin Connector
- Low Power Consumption <1.8w
- -40 to 85℃ Operating Wide Temperature Range
- Single +3.3v±5% Power Supply
- Digital Monitoring SFF-8472 Rev 10.2 Compliant
- Real Time Monitoring Of:

  Transmitted Optical Power

  Received Optical Power

  Laser Bias

  Current Temperature

Application

- 10GBASE-ZR/ZW
- 10G Fiber Channel

Description

The 1490nm/1550nm cooled EML laser based 10Gigabit SFP+ Transceiver is designed to transmit and receive serial optical data over single mode optical fiber with 80Km.

They are compliant with SFF-8431,SFF-8432, 10GFC Rev 4.0, and 10GBASE-ZR/ZW . The transmitter converts serial CML electrical data into serial optical data compliant with the IEEE 802.3ae standard. The receiver converts serial optical data into serial CML electrical data. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Product Specifications

I. Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Unit	Min.	Max.
Storage Temperature	T_S	℃	-40	85
Relative Humidity	RH	%	0	95

II. Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Unit	Min.	Typical	Max.
Operating Case Temperature Range	T_C	℃	-40		85
Power Supply Voltage	V_{CC}	V	3.14	3.3	3.46
Bit Rate	BR	Gb/s			11.3
Bit Error Ratio	BER				10^{-12}
Max Supported Link Length	L	Km			80

III. Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Unit	Min	Typ	Max	Note
Transmitter						
Center Wavelength	λ	nm	1540	1550	1560	
	λ	nm	1480	1490	1500	
Side ModeSuppression Ratio	SMSR	dB	30			
Spectral Width(-20dB)	Δλ	nm			1	
Optical Output Power	Pav	dBm	0		5	
Extinction Ratio	ER	dB	8.2			
Average Launch Power of OFF Transmitter	P_{OFF}	dBm			-30	
Relative Intensity Noise	RIN	dB/Hz			-128	
Receiver						
Center Wavelength	λ	nm	1480	1490	1500	
	λ	nm	1540	1550	1560	
Receiver Sensitivity@10.3125Gb/s	RSENSE	dBm			-23	1
Receiver Sensitivity at 1600ps/nm @10.3125Gb/s	RSENSE	dBm			-20	1.2
Overload		dBm	-7			
Optical Return Loss		dB	27		-	
LOS Assert	LOS_A	dBm	-35			
LOS De-Assert LOS	LOS_D	dBm			-25	

Parameter	Symbol	Unit	Min	Typ	Max	Note
LOS Hysteresis		dB	0.5		6	

Notes:

1. Measured at 1490nm/1550nm, ER>8.2dBm, PRBS 231-1 and BER better than or equal to 10- 12.
2. loopback using 80km fiber (SMF-28).

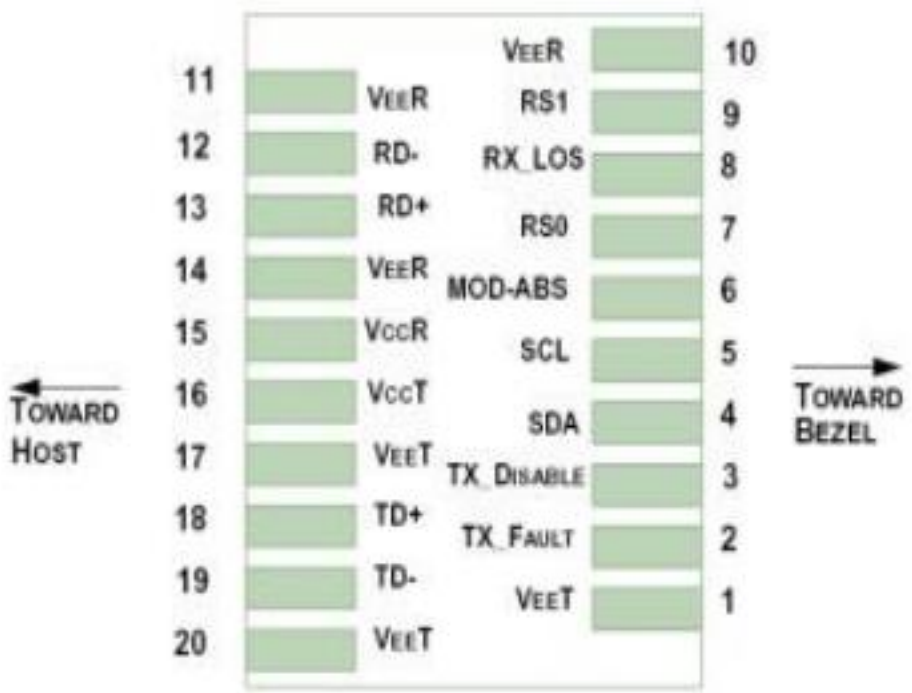
IV. Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Unit	Min.	Typical	Max.
Supply Voltage	V_{CC}	V	3.14		3.46
Powerconsumption	Por	W			1.8
Transmitter					
Input Differential Impedance	R_{IN}	Ω	80	100	120
Differential Data Input	V_{IN}	mVp-p	180		700
Transmit Disable Voltage	V_{DIS}	V	2		V_{CCHOST}
Transmit Enable Voltage	V_{EN}	V	V_{EE}		V_{EE}+0.8
Transmit Fault Assert Voltage	V_{FA}	V	2		V_{CCHOST}
Transmit Fault De-Assert Voltage	V_{FDA}	V	V_{EE}		V_{EE}+0.4
Receiver					
Differential Data Output	V_{OD}	mVp-p	300		850
Output Rise Time	t_{RISE}	pS	25		

Parameter	Symbol	Unit	Min.	Typical	Max.
Output Fall Time	t_{FALL}	pS	25		
LOS Fault	V_{LOSFT}	V	2		V_{CCHOST}
LOS Normal	V_{LOSNR}	V	V_{EE}		V_{EE}+0.4

V. Pin Assignment and Pin Description



Pin	Symbol	Name	Description
1,17,20	VeeT	Transmitter Signal Ground	These pins should be connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out(OC)	Logic"1" Output= LaserFault (Laser off before t_fault) Logic"0" Output = Normal Operation This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor.
3	TX Disable	Transmitter Disable In (LVTTL)	Logic "1" Input (or no connection) = Laser off Logic "0" Input = Laser on This pin is internally pulled up to VccT with a 10 kΩ resistor.
4	SDA		
5	SCL	Module Definition Identifiers	Serial ID with SFF 8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
6	MOD-ABS		
7	RS0	Receiver Rate Select (LVTTL)	These pins have an internal 30kΩ pull-down to ground. A signal on either of these pins will not affect module performance.
9	RS1	Transmitter Rate Select (LVTTL)	
8	LOS	Loss of Signal Out (OC)	Sufficient optical signal for potential BER < 1x10- 12 = Logic "0" Insufficient optical signal for potential BER < 1x10- 12 = Logic "1" This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor.
10,11,14	VeeR	Receiver Signal Ground	These pins should be connected to signal ground on the host board.
12	VeeR	Receiver Negative DATA Out(CML)	Light on = Logic "0" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor..
13	RD-	Receiver Positive DATA Out(CML)	Light on = Logic "1" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor.
15	RD+	Receiver Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3.Recommended power supply filter.
16	VeeR	Transmitter Power Supply	This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3.Recommended power supply filter.
18	TD+	Transmitter Positive DATA In (CML)	Logic "1" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor.
19	TD-	Transmitter Negative DATA In (CML)	Logic "0" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor.

VI. Package Outline

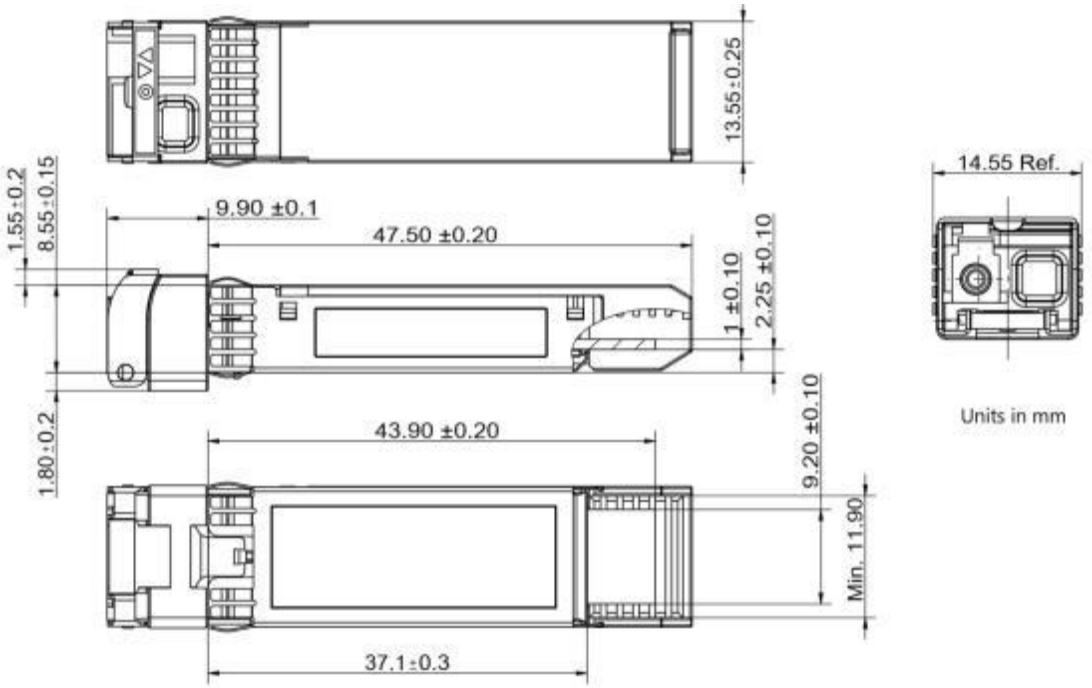


Figure1. Package Outline

VII. Recommended Circuit Schematic

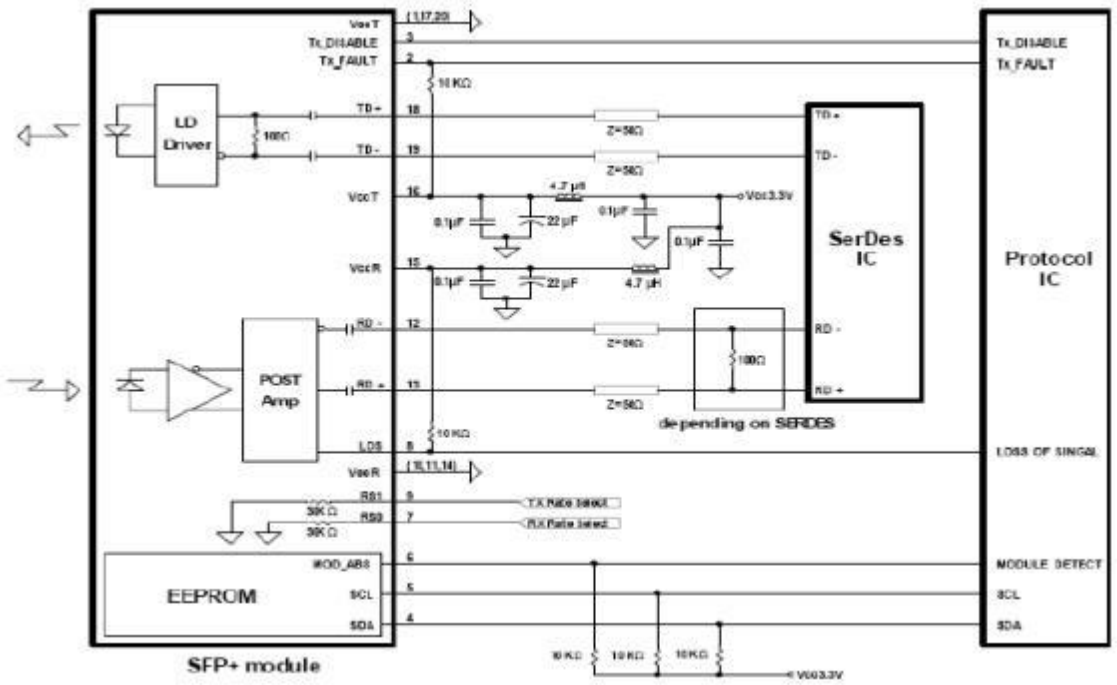


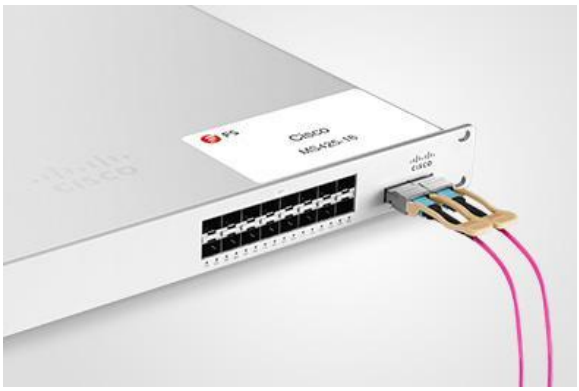
Figure2. Typical Application Circuit

Test Center

I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.

Cisco Catalyst C9500-24Y4C



Cisco MS425-16

Brocade VDX 6940-144S

Dell EMC Networking Z9100-ON

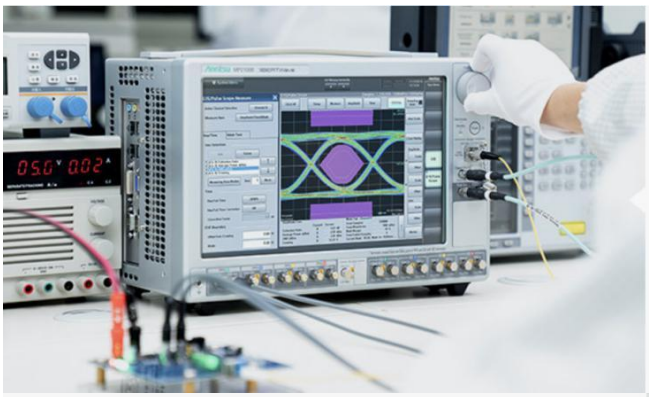
Force⑩tm S60-44T

HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.

II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: Jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C

3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI

4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width

Order Information

Part Number	Description
SFP- 10G-BX	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 10km, LC, DOM
SFP- 10G-BX	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 10km, LC, D
SFP- 10G-BX	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 20km, LC, DOM
SFP- 10G-BX	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 20km, LC, DOM
SFP- 10G-BX40	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 40km, LC, DOM
SFP- 10G-BX40	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 40km, LC, DOM
SFP- 10G-BX60	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 60km, LC, DOM
SFP- 10G-BX60	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 60km, LC, DOM
SFP- 10G-BX80	SFP+, BIDI, 10GBase, 1490TX/ 1550nmRX, SMF, 80km, LC, DOM
SFP- 10G-BX80	SFP+, BIDI, 10GBase, 1550TX/ 1490nmRX, SMF, 80km, LC, DOM
SFP- 10G-BX100	SFP+, BIDI, 10GBase, 1490TX/ 1550nmRX, SMF, 100km, LC, DOM
SFP- 10G-BX100	SFP+, BIDI, 10GBase, 1550TX/ 1490nmRX, SMF, 100km, LC, DOM
SFP- 10G-BX-I	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 10km, LC, Industrial, DOM
SFP- 10G-BX-I	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 10km, LC, Industrial, DOM
SFP- 10G-BX-I	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 20km, LC, Industrial, DOM
SFP- 10G-BX-I	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 20km, LC, Industrial, DOM
SFP- 10G-BX40-I	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 40km, LC, Industrial, DOM
SFP- 10G-BX40-I	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 40km, LC, Industrial, DOM

Order Information

Part Number	Description
SFP- 10G-BX60-I	SFP+, BIDI, 10GBase, 1270TX/ 1330nmRX, SMF, 60km, LC, Industrial, DOM
SFP- 10G-BX60-I	SFP+, BIDI, 10GBase, 1330TX/ 1270nmRX, SMF, 60km, LC, Industrial, DOM
SFP- 10G-BX80-I	SFP+, BIDI, 10GBase, 1490TX/ 1550nmRX, SMF, 80km, LC, Industrial, DOM
SFP- 10G-BX80-I	SFP+, BIDI, 10GBase, 1550TX/ 1490nmRX, SMF, 80km, LC, Industrial, DOM

Note:

10G SFP+ transceiver module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.