FiberStore

Datasheet

622Mbps Bi-Directional SFP Single-Mode 15km Optical Transceiver
BXSFP-6M35-15-xx
BXSFP-6M53-15-xx

Features

- Support 622Mbps Data Links
- A type: 1310nm FP Tx/1550nmRx
  B type: 1550nm DFB TX / 1310nm RX
- 15km with 9/125 µm SMF
- Single 3.3V Power Supply and TTL Logic Interface
- Hot-Pluggable SFP Footprint SC/LC Connector Interface
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- Compliant with SFP MSA
- Operating case temperature
  Standard : 0°C to +70°C
  Extended: -20°C to +85°C
  Industrial: -40°C to +85°C

Applications

- SONET OC-12 / SDH STM-4
- WDM Fast Ethernet Links

Description

The SFP BIDI transceivers are small form factor pluggable module for OC-3/STM-1 OC-12/STM-4 SONET/SDH and Fibre Channel single fiber communications by using 1310nm/1550nm transmitter and 1550nm/1310nm receiver. It is with the SFP 20-pin connector to allow hot plug capability.

The transmitter section uses a multiple quantum well A type/B type laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated B type/ A type detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

The SFP BIDI transceivers are designed to be compliant with SFF-8472 SFP Multi-source Agreement (MSA).

Specifications

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.6	V
Storage Temperature	Ts	-40	+85	℃
Operating Relative Humidity	-		95	%

Table 2 - Recommended Operating Conditions

Parameter		Symbol		Min	Typical	Max	Unit
Operating Case Temperature		TA	Standard	0		+70	℃
			Extended	-20		+85	
			Industrial	-40		+85	
Power Supply Voltage		Vcc		3.15	3.3	3.45	V
Power Supply Current		Icc				300	mA
Date Rate	OC-12/STM-4				622		Mbps

Table 3 - Optical and Electrical Characteristics

(BXSFP-6M35-15-xx, 1310nm FP and PIN, 15km)

Parameter	Symbol	Min	Typical	Max	Unit	Notes
9μm Core Diameter SMF	L		15		km	
Data Rate			622		Mbps	
Transmitter						
Centre Wavelength	λc	1260	1310	1360	nm	
Spectral Width (RMS)	Δλ			4	nm	
Average Output Power*note1	Pout	-15		-8	dBm	
Extinction Ratio*note2	ER	8.2			dB	
Rise/Fall Time (20%~80%)	tr/tf			1.2	ns	
Output Optical Eye*note2	IUT-T G.957 Compliant*note4					
TX_Disable Assert Time	t_off			10	us	
Pout@TX Disable Asserted	Pout			-45	dBm	
Receiver						
Center Wavelength	λc	1500	1550	1580	nm	
Receiver Sensitivity*note3	Pmin			-28	dBm	
Receiver Overload	Pmax	-3			dBm	

LOS De-Assert	LOSD			-29	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis*note5		0.5			dB	

Notes:

Note1: Output power is power coupled into a 9/125μm single-mode fiber.

Note2: Filtered, measured with a PRBS 2^{23}-1 test pattern @622Mbps.

Note3: Minimum average optical power measured at BER less than 1E-10, with a 2^{23}-1 PRBS and ER=9 dB.

Note4: Eye pattern mask.

Note5: LOS Hysteresis.

(BXSFP-6M53-15-xx, 1550nm DFB and PIN, 15km)

Parameter	Symbol	Min	Typical	Max	Unit	Notes
9μm Core Diameter SMF	L		15		km	
Data Rate			622		Mbps	
Transmitter						
Centre Wavelength	λc	1480	1550	1580	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Average Output Power*note1	Pout	-15		-8	dBm	
Extinction Ratio*note2	ER	8.2			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Rise/Fall Time (20%~80%)	tr/tf			1.2	ns	
Output Optical Eye*note2	IUT-T G.957 Compliant*note4					
TX_Disable Assert Time	t_off			10	us	
Receiver						
Center Wavelength	λc	1260		1600	nm	
Receiver Sensitivity*note3	Pmin			-28	dBm	
Receiver Overload	Pmax	-3			dBm	
Return Loss		12			dB	
Optical Path Penalty				1	dB	
LOS De-Assert	LOSD			-29	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis*note5		0.5			dB	

Notes:

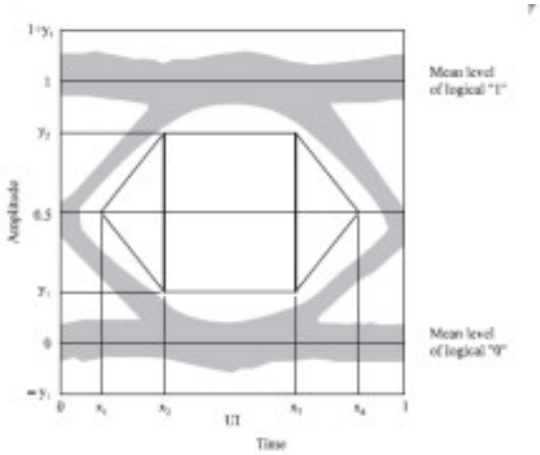
Note1: Output power is power coupled into a 9/125μm single-mode fiber.

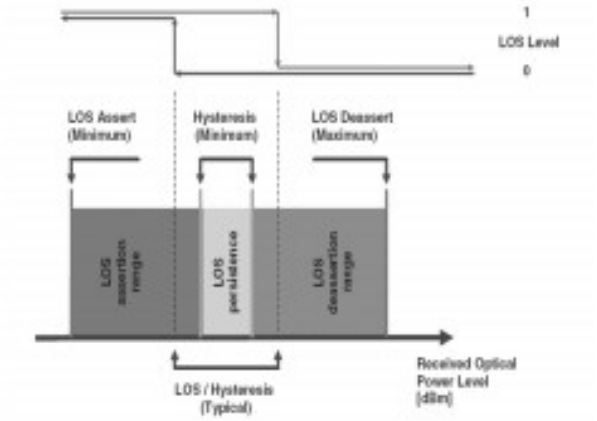
Note2: Filtered, measured with a PRBS 2^{23}-1 test pattern @622Mbps.

Note3: Minimum average optical power measured at BER less than 1E-10, with a 2^{23}-1 PRBS and ER=9 dB.

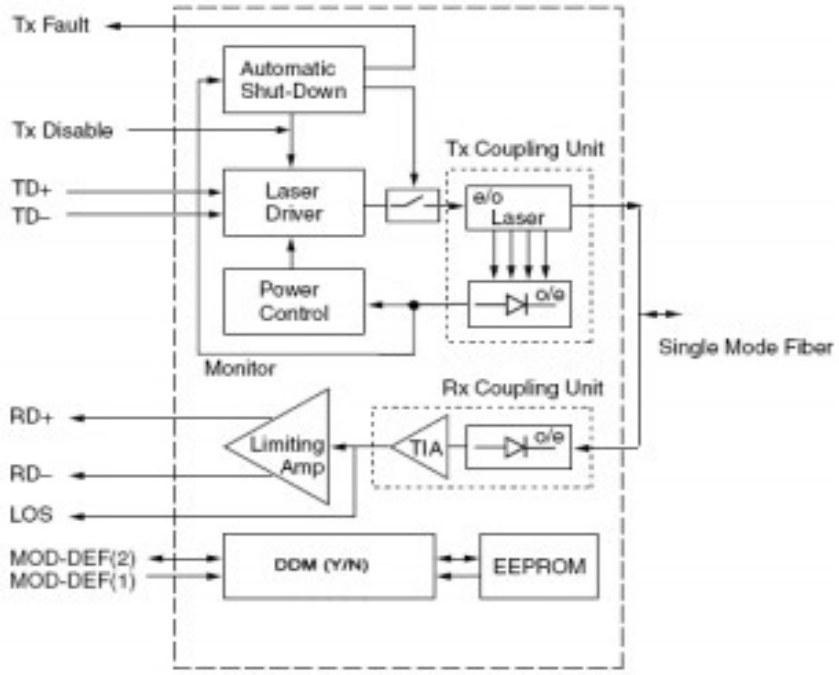
Note4: Eye pattern mask

Note5: LOS Hysteresis

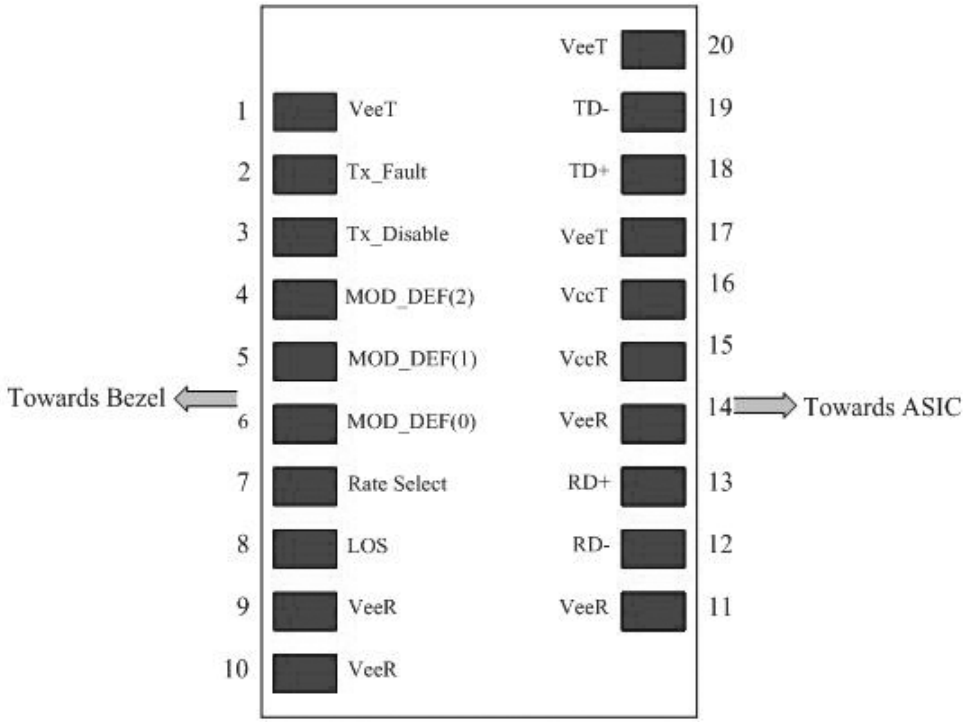




Functional Description of Transceiver



SFP Transceiver Electrical Pad Layout



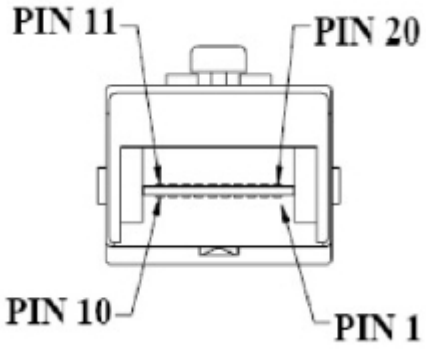


Table 4- Pin Function Definitions

Pin Num.	Name	Function	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	5)
2	TX FAULT	Transmitter Fault Indication	3	1)
3	TX DISABLE	Transmitter Disable	3	2) Module disables on high or open
4	MOD_DEF(2)	Module Definition 2	3	3) Data line for Serial ID.
5	MOD_DEF(1)	Module Definition 1	3	3) Clock line for Serial ID.
6	MOD_DEF(0)	Module Definition 0	3	3) Grounded within the module.
7	Rate Select	Not Connect	3	Function not available
8	LOS	Loss of Signal	3	4)
9	V_{EER}	Receiver ground	1	5)
10	V_{EER}	Receiver ground	1	5)
11	V_{EER}	Receiver ground	1	5)
12	RD-	Inv. Received Data Out	3	6)
13	RD+	Received Data Out	3	7)
14	V_{EER}	Receiver ground	1	5)
15	V_{CCR}	Receiver Power	2	7) 3.3 ± 5%
16	V_{CCT}	Transmitter Power	2	7) 3.3 ± 5%
17	V_{EET}	Transmitter Ground	1	5)
18	TD+	Transmit Data In	3	8)
19	TD-	Inv. Transmit Data In	3	8)
20	V_{EET}	Transmitter Ground	1	5)

Notes:

1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2) TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:

   Low (0 to 0.8V): Transmitter on

   (>0.8V, < 2.0V): Undefined

   High (2.0 to 3.465V): Transmitter Disabled

   Open: Transmitter Disabled

3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KΩ resistor on the host board. The pull-up voltage shall be VccT or VccR (see Section IV for further details). Mod-Def 0 is grounded by the module to indicate that the module is present. Mod-Def 1 is the clock line of two wire serial interface for serial ID. Mod-Def 2 is the data line of two wire serial interface for serial ID.

4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

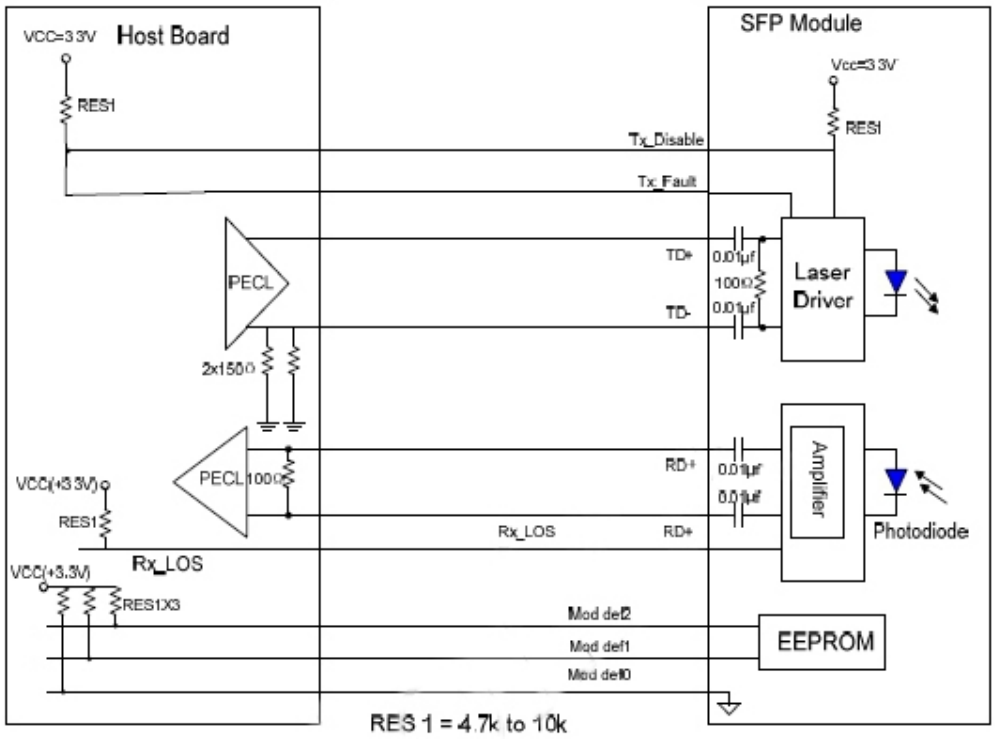
5) VeeR and VeeT may be internally connected within the SFP module.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000mV differential (185 – 1000mV single ended) when properly terminated.

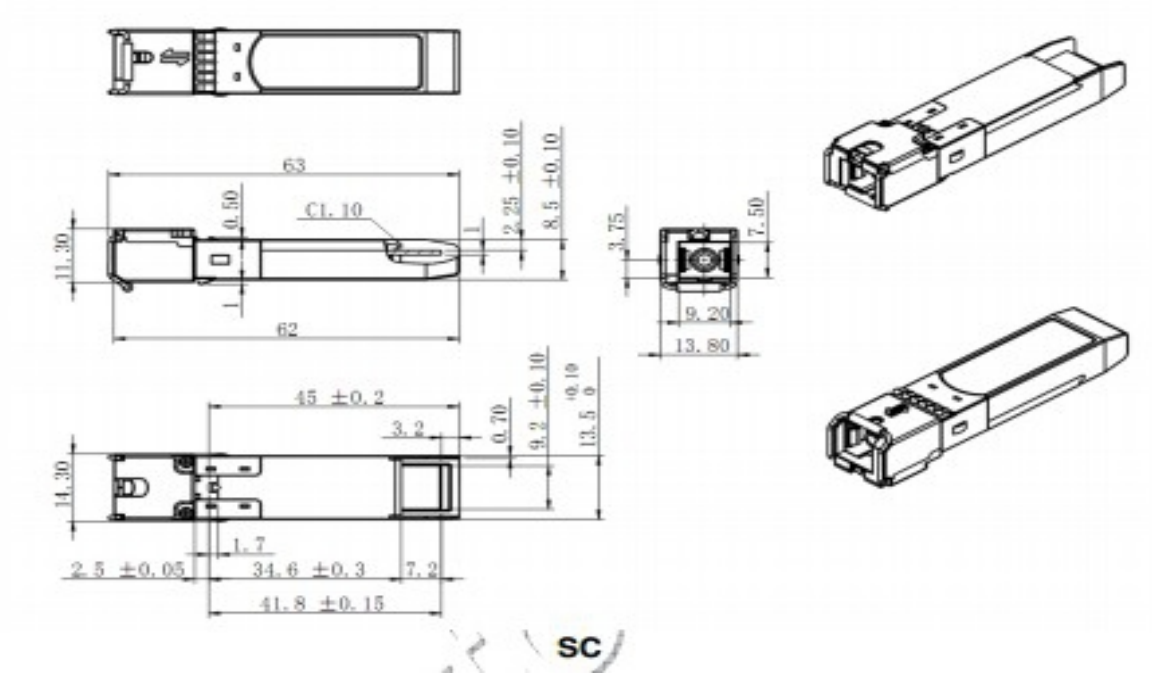
7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ± 5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.

8) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 – 2400mV (250 – 1200mV single-ended), though it is recommended that values between 500 and 1200mV differential (250 – 600mV single-ended) be used for best EMI performance.

Recommend Circuit Schematic



Mechanical Specifications



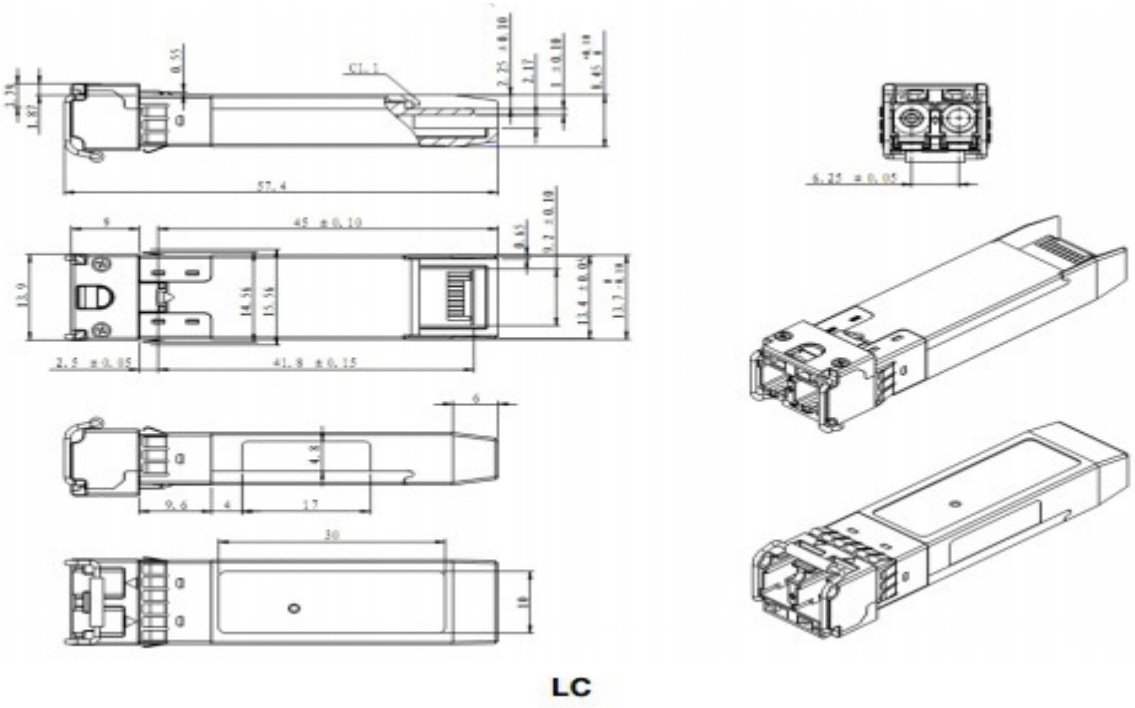


Table 5 - Laser Emission Data

Wavelength	1310nm
Total output power (as defined by FDA: 7mm aperture at 20cm distance)	<0.195mW
Total output power (as defined by IEC: 7mm aperture at 10cm distance)	<15.6mW
Beam divergence	12.5°
Wavelength	**1550nm**
Total output power (as defined by FDA: 7mm aperture at 20cm distance)	<0.79mW
Total output power (as defined by IEC: 7mm aperture at 10cm distance)	<10mW
Beam divergence	12.5°

Laser Emission

Ordering Information

Part No.	Data Rate (Mbps)	Wavelength (nm)	Connector Type	Transmission Distance (km)	Operating case temperature (°C)	Digital Diagnostics
BXSFP-6M35-15-xx	622	1310/1550	LC/SC	15	0 to +70	No
BXSFP-6M53-15-xx	622	1550/1310	LC/SC	15	0 to +70	No
BXSFP-6M35-15D-xx	622	1310/1550	LC/SC	15	0 to +70	Yes
BXSFP-6M53-15D-xx	622	1550/1310	LC/SC	15	0 to +70	Yes
BXSFP-6M35-15E-xx	622	1310/1550	LC/SC	15	-20 to +85	No
BXSFP-6M53-15E-xx	622	1550/1310	LC/SC	15	-20 to +85	No
BXSFP-6M35-15ED-xx	622	1310/1550	LC/SC	15	-20 to +85	Yes
BXSFP-6M53-15ED-xx	622	1550/1310	LC/SC	15	-20 to +85	Yes
BXSFP-6M35-15I-xx	622	1310/1550	LC/SC	15	-40 to +85	No
BXSFP-6M53-15I-xx	622	1550/1310	LC/SC	15	-40 to +85	No
BXSFP-6M35-15ID-xx	622	1310/1550	LC/SC	15	-40 to +85	Yes
BXSFP-6M53-15ID-xx	622	1550/1310	LC/SC	15	-40 to +85	Yes

Notes:

X means LC or SC connector.

xx means compatible brand. (For example: CO= Cisco, JU=Juniper, FD=Foundry, EX=Extreme, NE=Netgear.)

FiberStore U.S.
X205 4181 129th Place SE, Bellevue
98006, WA,
United States
Tel: +1 (206) 453 0158
Fax: +1 (425) 505 2761

FiberStore Hong Kong
1220 Tung Chun Commercial Centre,
438-444 Shanghai Street, Kowloon,
HongKong
Tel: (852) 8120 3582
Fax: (852) 8120 3582

FiberStore China
5D Intelligent Tower,
Fumin Road Futian,
Shenzhen 518045, GuangDong,
China
Tel: +86 (755) 8300 3611
Fax: +86 (755) 8326 9395

Addresses, phone number and fax number also have been listed at www.fiberstore.com. Please e-mail us at sales@fiberstore.com or call us for assistance.