FiberStore

Datasheet

1.25Gbps Bi-Directional SFP Single-Mode 3km Optical Transceiver
BXSFP-1G34-3-xx
BXSFP-1G43-3-xx

Features

- Support 1.25Gbps Data Links
- A type: 1310nm FP TX /1490nm RX
  B type: 1490nm FP TX /1310nm RX
- Up to 3km with 9/125 μm SMF
- Single 3.3V Power Supply and TTL Logic Interface
- Hot-Pluggable SFP Footprint Simplex SC/LC Connector Interface
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- Compliant with SFP MSA Specification
- Compliant with Digital Diagnostic Monitor Interface SFF-8472
- Operating case temperature
  Standard : 0°C to +70°C
  Extended: -20°C to +85°C
  Industrial: -40°C to +85°C

Applications

- Fiber Channel Links
- WDM Gigabit Ethernet Links
- Other Optical Links
- FTTX Application

Description

The SFP BIDI transceivers are small form factor pluggable module for Gigabit Ethernet 1000BASE-BX and Fiber Channel single fiber applications by using 1310nm/1490nm transmitter and 1490nm/1310nm receiver. It is with the SFP 20-pin connector to allow hot plug capability.

The transmitter section uses 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 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	Tc	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					1.25	Gbps

Table 3 - Optical and Electrical Characteristics

(BXSFP-1G34-3-xx, 1310nm FP and PIN, 3km)

Parameter	Symbol	Min	Typical	Max	Unit	Notes
9μm Core Diameter SMF	L		3		km	
Data Rate			1.25		Gbps	
Transmitter						
Centre Wavelength	λc	1270	1310	1350	nm	
Spectral Width (RMS)	Δλ			4	nm	
Average Output Power*note1	Pout	-14		-8	dBm	
Extinction Ratio@1250Mbps	ER	6			dB	
Rise/Fall Time (20%~80%)	tr/tf			0.26	ns	
Total Jitter	TJ			260	ps	
Output Optical Eye*note2	Compliant with IEEE 802.3z*note4					
TX_Disable Assert Time	t_off			10	us	
Pout@TX Disable Asserted	Pout			-45	dBm	
Receiver						
Center Wavelength	λc	1450	1490	1530	nm	

Receiver Sensitivity*note3@1250Mbps	Pmin			-22	dBm	
Receiver Overload	Pmax	-3			dBm	
LOS De-Assert@1250Mbps	LOSD			-23	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis*note5		0.5			dB	

Notes:

Note1: Output is coupled into a 9/125 μ m single-mode fiber.

Note2: Filtered, measured with a PRBS 2^7-1.

Note3: Measured at all data rates specified in Data Rate table with ER=9 dB, 2^7-1 PRBS data pattern, BER <1E-12.

Note4: Eye Pattern Mask

Note5: LOS Hysteresis

(BXSFP-1G43-3-xx, 1490nm FP and PIN, 3km)

Parameter	Symbol	Min	Typical	Max	Unit	Notes
9μm Core Diameter SMF	L		3		km	
Data Rate				1250	Mbps	
Transmitter						
Centre Wavelength	λc	1450	1490	1530	nm	
Spectral Width (RMS)	Δλ			4	nm	
Average Output Power*note1	Pout	-14		-8	dBm	
Extinction Ratio@1250Mbps	ER	6			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Rise/Fall Time (20%~80%)	tr/tf			260	ps	
Output Optical Eye*note2	Compliant with IEEE 802.3ah-2004*note4					
TX_Disable Assert Time	t_off			10	us	
Pout@TX Disable Asserted	Pout			-45	dBm	
Receiver						
Center Wavelength	λc	1260		1600	nm	
Receiver Sensitivity*note3@1250Mbps	Pmin			-22	dBm	
Receiver Overload	Pmax	-3			dBm	
Return Loss		12			dB	
Optical Path Penalty				1	dB	
LOS De-Assertt@1250Mbps	LOSD			-23	dBm	
LOS De-Assert@100Mbps				-23	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis*note5		0.5			dB	

Notes:

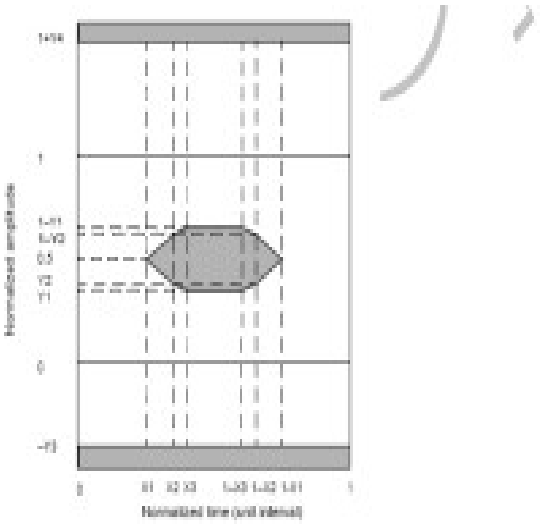
Note1: Output is coupled into a 9/125 μ m single-mode fiber.

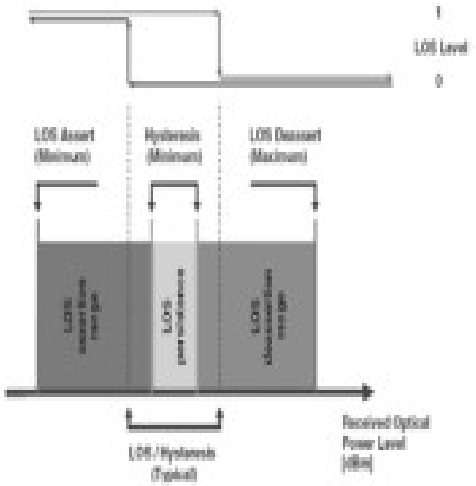
Note2: Filtered, measured with a PRBS 2^7-1.

Note3: Measured at all data rates specified in Data Rate table with ER=9 dB, 2^7-1 PRBS data pattern, BER <1E-12.

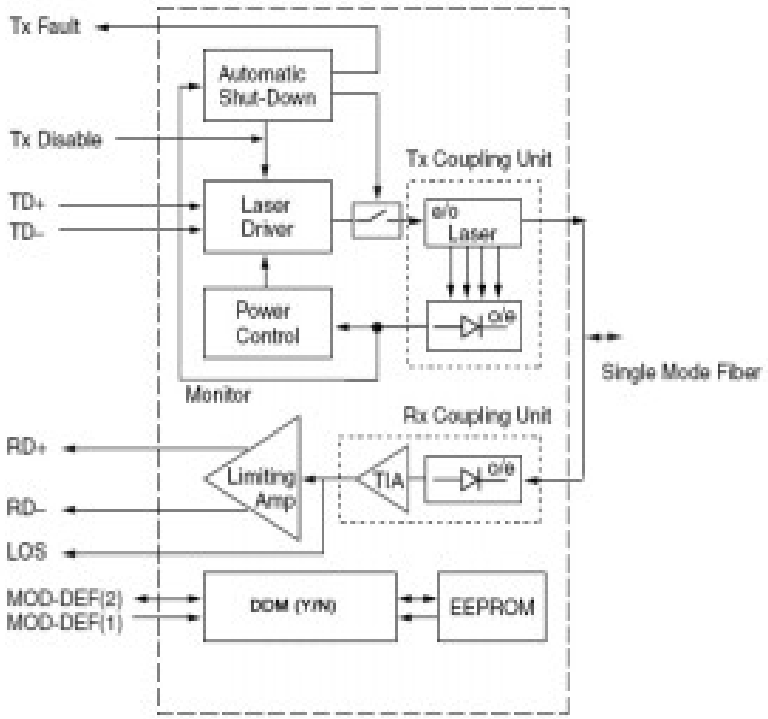
Note4: Eye Pattern Mask

Note5: LOS Hysteresis





Functional Description of Transceiver



SFP Transceiver Electrical Pad Layout

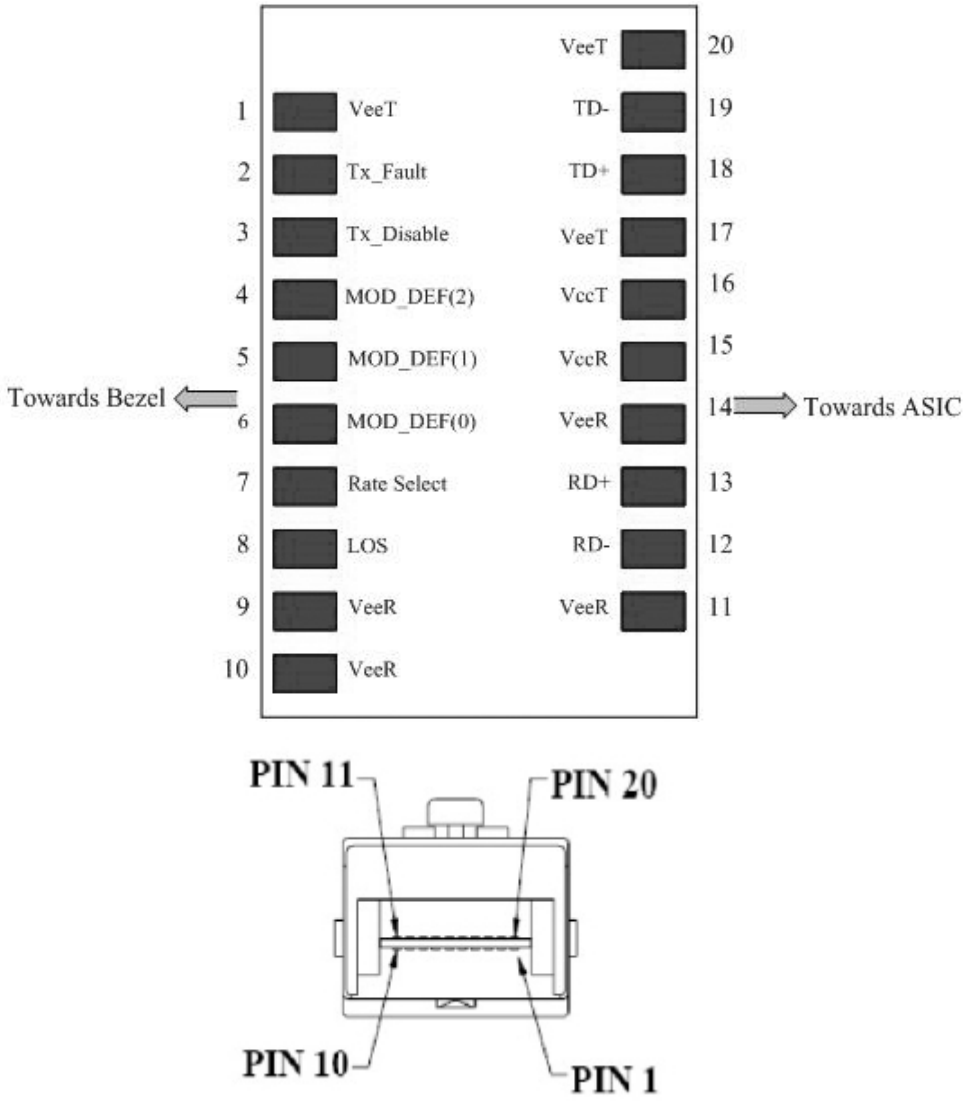


Table 4- Pin Function Definitions

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	6)
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 – 10K resistor on the host board. The pull-up voltage shall be VccT or VccR. 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.

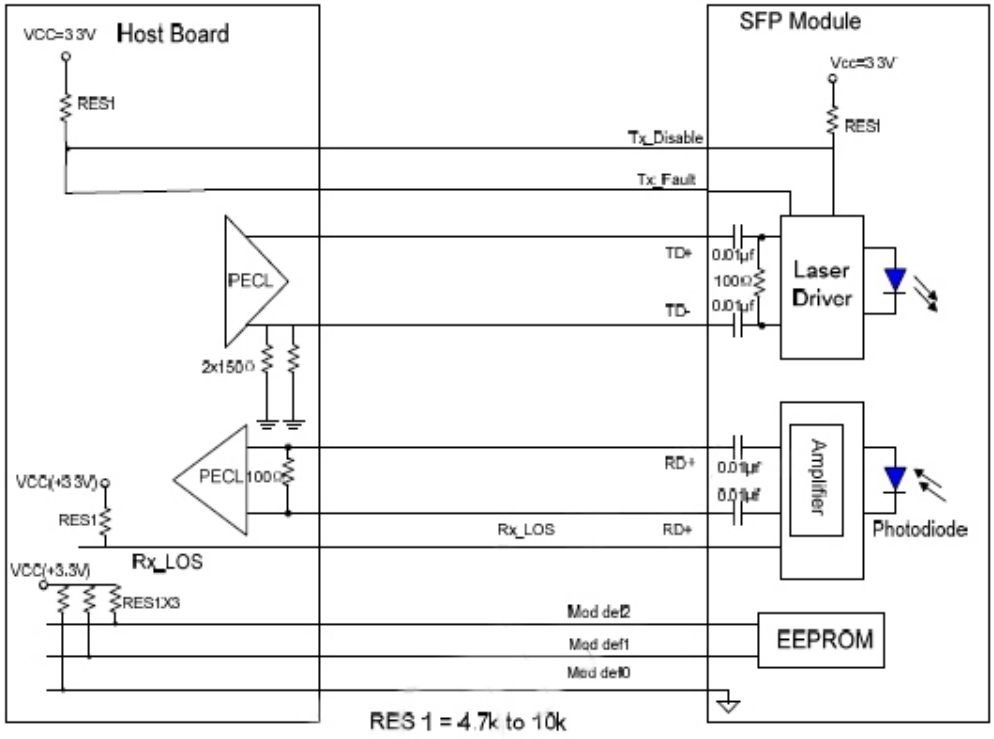
5) VeeR and VeeT may be internally connected within the SFP module.

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.

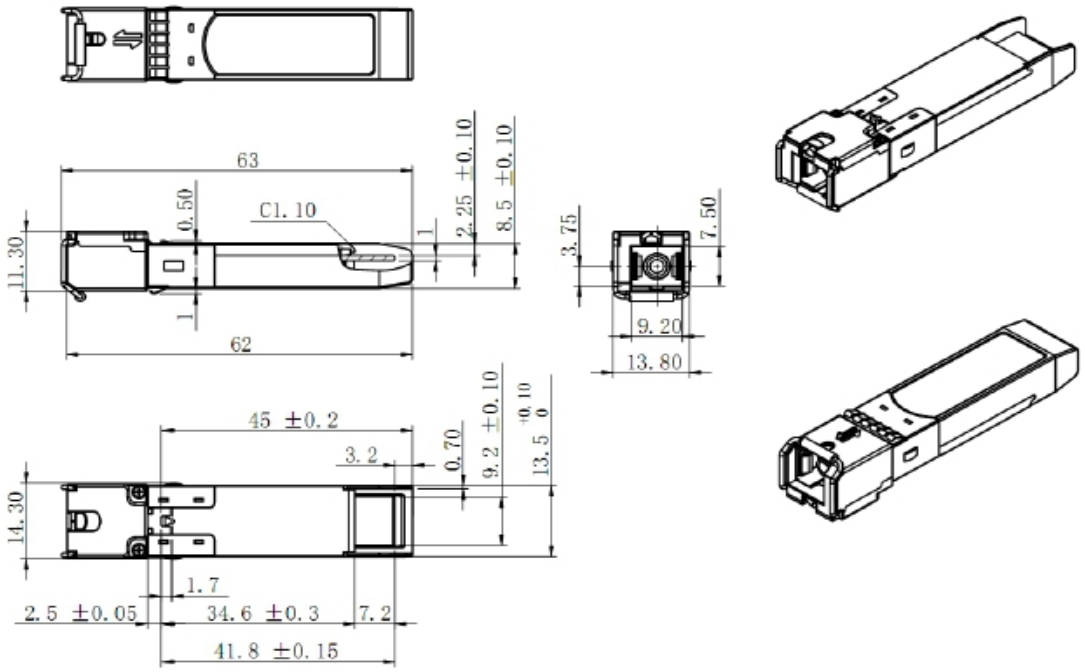
7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ± 5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain 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.

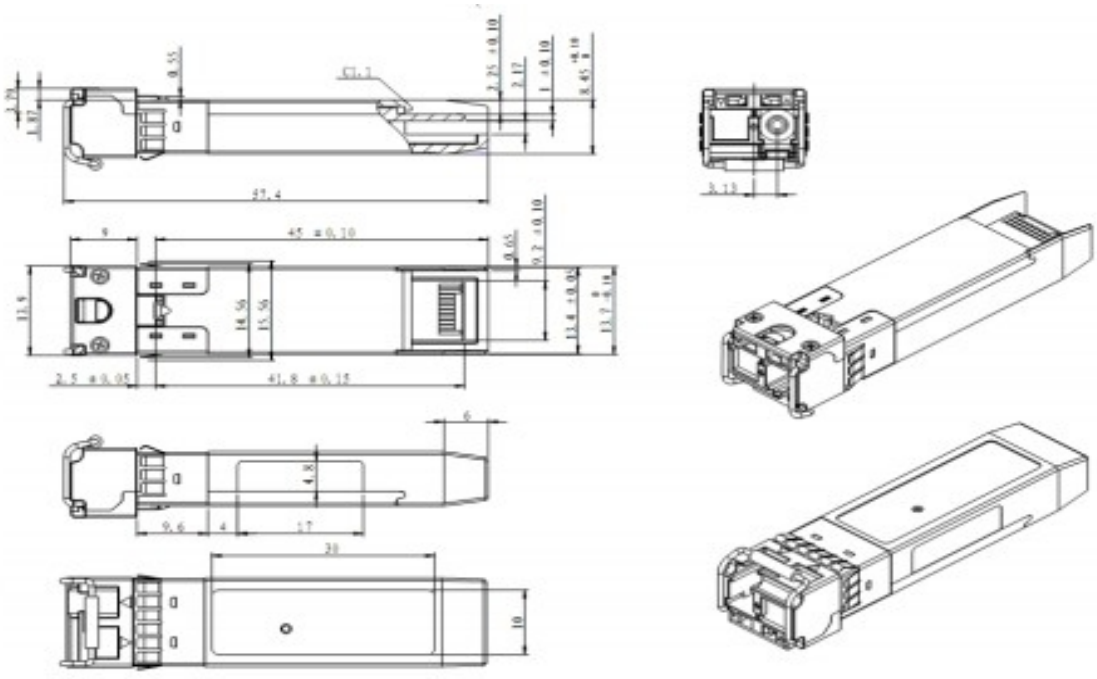
Recommend Circuit Schematic



Mechanical Specifications



SC



LC

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 (Gbps)	Wavelength (nm)	Connector Type	Transmission Distance (km)	Operating case temperature (°C)	Digital Diagnostics
BXSFP-1G34-3-xx	0.1~1.25	1310/1490	LC/SC	3	0 to +70	No
BXSFP-1G43-3-xx	0.1~1.25	1490/1310	LC/SC	3	0 to +70	No
BXSFP-1G34-3D-xx	0.1~1.25	1310/1490	LC/SC	3	0 to +70	Yes
BXSFP-1G43-3D-xx	0.1~1.25	1490/1310	LC/SC	3	0 to +70	Yes
BXSFP-1G34-3E-xx	0.1~1.25	1310/1490	LC/SC	3	-20 to +85	No
BXSFP-1G43-3E-xx	0.1~1.25	1490/1310	LC/SC	3	-20 to +85	No
BXSFP-1G34-3ED-xx	0.1~1.25	1310/1490	LC/SC	3	-20 to +85	Ye
BXSFP-1G43-3ED-xx	0.1~1.25	1490/1310	LC/SC	3	-20 to +85	Yes
BXSFP-1G34-3I-xx	0.1~1.25	1310/1490	LC/SC	3	-40 to +85	No
BXSFP-1G43-3I-xx	0.1~1.25	1490/1310	LC/SC	3	-40 to +85	No
BXSFP-1G34-3ID-xx	0.1~1.25	1310/1490	LC/SC	3	-40 to +85	Yes
BXSFP-1G43-3ID-xx	0.1~1.25	1490/1310	LC/SC	3	-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.)

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