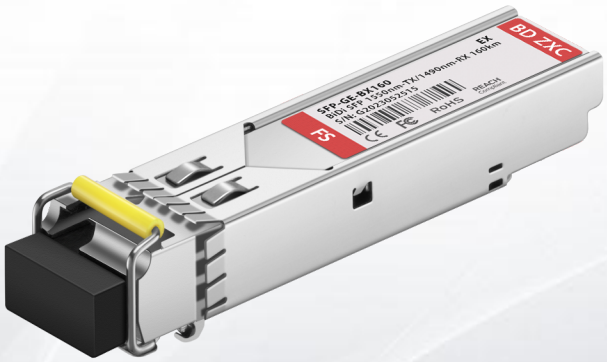
1000BASE-BX SFP 1550nmTX/1490nmRX 160km DOM Transceiver

SFP-GE-BX160



Application

- Switch to Switch Interface
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface

Features

- Operating data rate Up to 1.25Gb/s
- 1550nm DFB laser transmitter and APD photo- detector
- Up to 160km on 9/125μm SMF
- Hot-pluggable SFP footprint
- BIDI LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Support Digital Diagnostic Monitor interface
- Single +3.3V power supply
- Case operating temperature:
  Commercial: 0°C ~ 70°C
  Extended: -20°C ~ 85°C
  Industrial: -40°C ~ 85°C
- Compliant with SFF-8472

Description

FS.COM SFP-GE-BX160-D transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA),The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser and the APD photo-detector. The module data link up to 160km in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	T_S	-40	85	°C	
Power Supply Voltage	VCC	-0.3	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	THd	0		dBm	

II. Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Operating Case Temperature	T_S	0		70	°C	commercial
		-10		80		extended
		-40		85		industrial
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate				1.25	Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			160	km	9/125um

III.Pin Assignment and Pin Description

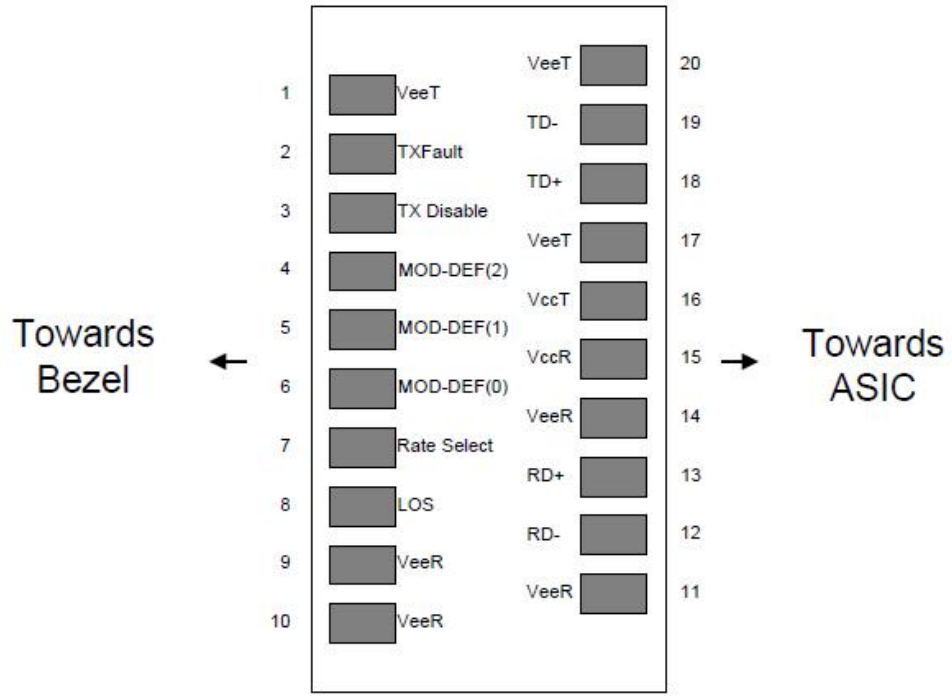


Figure 1. Pin out of Connector Block on Host Board

Pin	Name	Name/ Description	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TXFAULT	Transmitter Fault.	
3	TXDIS	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required.	4
8	LOS	Loss of Signal indication. Open Drain. Logic “0” indicates normal operation.	5
9	VEER	Receiver Ground (Common with Transmitter Ground)	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(CML). AC Coupled	
13	RD+	Receiver Non-inverted DATA out(CML). 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. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

3. Should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF (0) pulls line low to indicate module is plugged in.

4. This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:

1) Low (0 – 0.8V): Reduced Bandwidth

2) (>0.8, < 2.0V): Undefined

3) High (2.0 – 3.465V): Full Bandwidth

4) Open: Reduced Bandwidth

5. LOS is open collector output should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

IV. Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Power Consumption	P			0.95	W	commercial
				1.00		Industrial
Supply Current	Icc			280	mA	commercial
				300		Industrial
Transmitter						
Single-ended Input Voltage Tolerance	VCC	-0.3		4.0	V	
Differential Input Voltage Swing	Vin,pp	200		2400	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Transmit Disable Assert Time				5	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	Ven	Vee-0.3		0.8	0.8	
Receiver						
Differential Output Voltage Swing	Vout,pp	500		900	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	
Data output rise/fall time	Tr/Tf			100	ps	20% to 80%
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	
LOS De-assert Voltage	VlosL	Vee-0.3		0.8	V	

V. Optical Characteristics

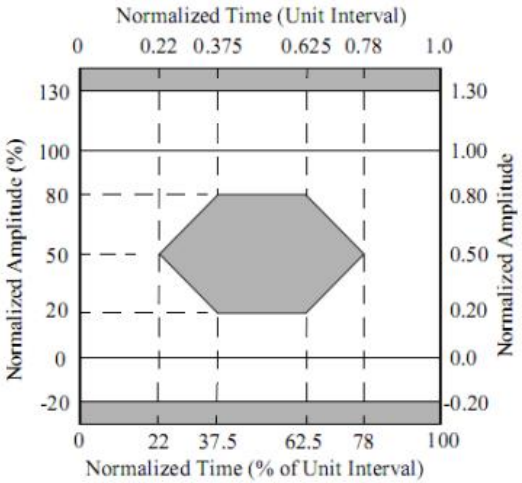
Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Transmitter						
Center Wavelength	λC	1530	1550	1570	nm	
Spectrum Bandwidth(RMS)	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	PAVG	1		6	dBm	1
Optical Extinction Ratio	ER	9			dB	
Transmitter Eye Mask	Compliant with 802.3z(class 1 laser safety)					2
Receiver						
Center Wavelength	λC	1470	1490	1510	nm	
Receiver Sensitivity (Average Power)	Sen.			-33	dBm	3
Input Saturation Power (overload)	Psat	-10			dBm	
LOS Assert	LOSA	-41			dB	4
LOS De-assert	LOSD			-34	dBm	4
LOS Hysteresis	LOSH	0.5	2	6	dBm	

Environment unless otherwise specified.

Notes:

1. Measure at 2^7-1 NRZ PRBS pattern

2. Transmitter eye mask definition.



3. Measured with Light source 1550nm, ER=9dB; BER =<10^-12 @PRBS=2^7-1 NRZ

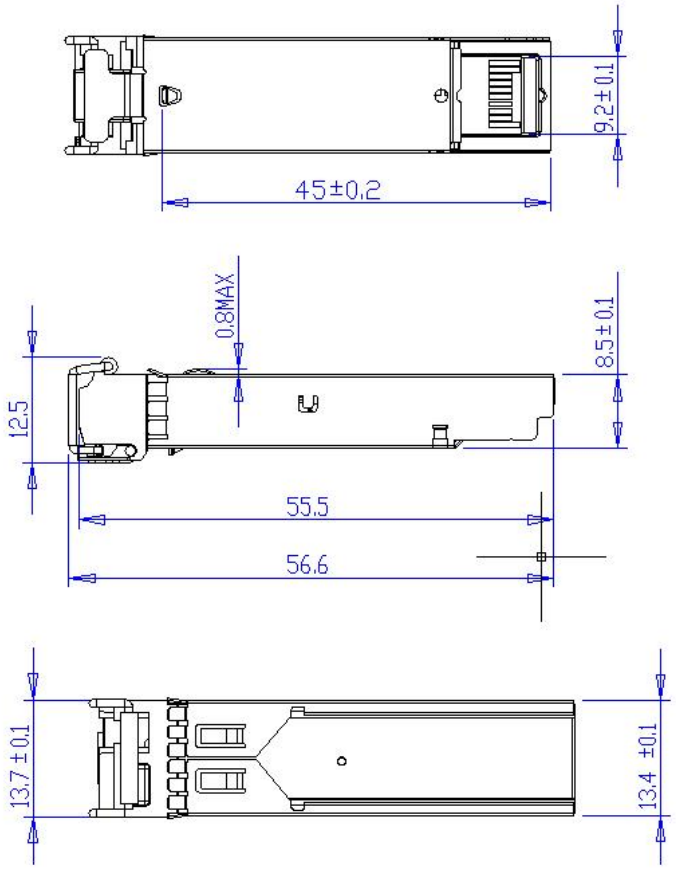
4. When LOS de-asserted, the RX data+/- output is High-level (fixed).

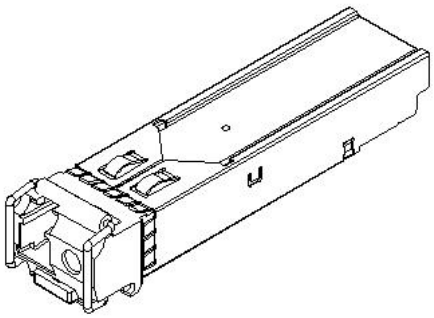
VI. Digital Diagnostic Functions

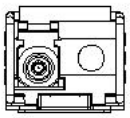
The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales staff.

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_ Temp	-3	3	degC	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	-0.15	0.15	V	Full operating range
RX power monitor absolute error	SMSR	-3	3	dB	
Bias current monitor	DMI_ bias	-10%	10%	mA	
TX power monitor absolute error	DMI_TX	-3	3	dB	

VII. Mechanical Dimensions







Units in mm

Test Center

FS. COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS. COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.

Cisco ASR 9000 Series(A9K-MPA- 1X40GE)


ARISTA 7050S-64(DCS-7050S-64)

Juniper MX960


Brocade ICX 7750-26Q

Extreme Networks X670V VIM-40G4X

Mellanox M3601Q

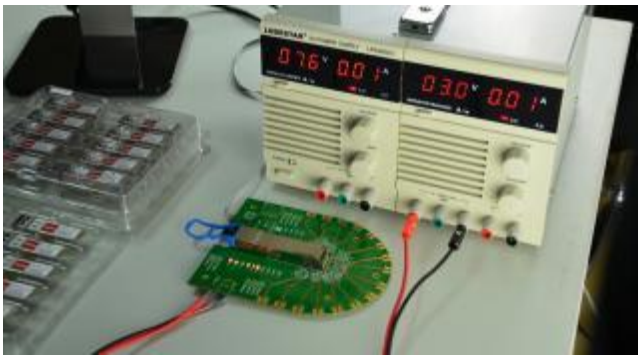

Dell N4032F

HP 5406R ZL2 V3(J9996A)

AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

FS. COM truly understands the value of compatibility and interoperability to each optics. Every module FS. COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities— professionally trained staff, advanced test facilities and comprehensive original- brand switches, to ensure our customers to receive the optics with superior quality.



Our smart data system allows effective product management and quality control according to the unique serial number, properly tracking the order, shipment and every part.

Our in- house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.

With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.

The last test assured step to ensure our products to be shipped with perfect package.

Order Information

Part Number	Description
SFP-GE-BX	SFP, BIDI, 1000Base, 1310TX/1490nmRX, SMF, 10km, LC simplex, DOM
SFP-GE-BX	SFP, BIDI, 1000Base, 1490TX/1310nmRX, SMF, 10km, LC simplex, DOM
SFP-GE-BX	SFP, BIDI, 1000Base, 1310TX/1550nmRX, SMF, 10km, LC simplex, DOM
SFP-GE-BX	SFP, BIDI, 1000Base, 1550TX/1310nmRX, SMF, 10km, LC simplex, DOM
SFP-GE-BX	SFP, BIDI, 1000Base, 1310TX/1490nmRX, SMF, 20km, LC simplex, DOM
SFP-GE-BX	SFP, BIDI, 1000Base, 1490TX/1310nmRX, SMF, 20km, LC simplex, DOM
SFP-GE-BX	SFP, BIDI, 1000Base, 1310TX/1550nmRX, SMF, 20km, LC simplex, DOM
SFP-GE-BX	SFP, BIDI, 1000Base, 1550TX/1310nmRX, SMF, 20km, LC simplex, DOM
SFP-GE-BX40	SFP, BIDI, 1000Base, 1310TX/1490nmRX, SMF, 40km, LC simplex, DOM
SFP-GE-BX40	SFP, BIDI, 1000Base, 1490TX/1310nmRX, SMF, 40km, LC simplex, DOM
SFP-GE-BX40	SFP, BIDI, 1000Base, 1310TX/1550nmRX, SMF, 40km, LC simplex, DOM
SFP-GE-BX40	SFP, BIDI, 1000Base, 1550TX/1310nmRX, SMF, 40km, LC simplex, DOM
SFP-GE-BX80	SFP, BIDI, 1000Base, 1490TX/1550nmRX, SMF, 80km, LC simplex, DOM
SFP-GE-BX80	SFP, BIDI, 1000Base, 1550TX/1490nmRX, SMF, 80km, LC simplex, DOM
SFP-GE-BX80	SFP, BIDI, 1000Base, 1490TX/1570nmRX, SMF, 80km, LC simplex, DOM
SFP-GE-BX80	SFP, BIDI, 1000Base, 1570TX/1490nmRX, SMF, 80km, LC simplex, DOM
SFP-GE-BX120	SFP, BIDI, 1000Base, 1490TX/1550nmRX, SMF, 120km, LC simplex, DOM
SFP-GE-BX120	SFP, BIDI, 1000Base, 1550TX/1490nmRX, SMF, 120km, LC simplex, DOM
SFP-GE-BX120	SFP, BIDI, 1000Base, 1510TX/1590nmRX, SMF, 120km, LC simplex, DOM
SFP-GE-BX120	SFP, BIDI, 1000Base, 1590TX/1510nmRX, SMF, 120km, LC simplex, DOM
SFP-GE-2BX	SFP, BIDI, 2-channel, 1000Base, 1550TX/1310nmRX, SMF, 20km,Dual LC, DOM
SFP-GE-2BX	SFP, BIDI, 2-channel, 1000Base, 1310TX/1550nmRX, SMF, 20km, Dual LC, DOM

Order Information

Part Number	Description
SFP- GE- BX160	SFP, BIDI, 1000Base, 1490TX/1550RX, SMF, 160km, LC simplex, DOM
SFP- GE- BX160	SFP, BIDI, 1000Base, 1550TX/1490RX, SMF, 160km, LC simplex, DOM
SFP- GE- BX160-I	SFP, BIDI, Industrial, 1000Base, 1490TX/1550RX, SMF, 160km, LC simplex, DOM
SFP- GE- BX160-I	SFP, BIDI, Industrial, 1000Base, 1550TX/1490RX, SMF, 160km, LC simplex, DOM

Note:

BIDI 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.