ALISTAR LIGHTX

SFP+ Series

SFP+

SFP-10G-ZR-BX-U/SFP-10G-ZR-BX-D

Module SFP+ 10GBASE-BX 1SM WDM LC 80KM
TX1490/RX1550nm / Tx1550/Rx1490nm DDM

- Up to 11.1Gbps Data Links
- Up to 80km transmission on SMF
- 1490nm EML laser and APD receiver for SFP-10G-ZR-BX-U
  1550nm EML laser and APD receiver for SFP-10G-ZR-BX-D
- 2-wire interface with integrated Digital Diagnostic monitoring
  - EEPROM with Serial ID Functionality
- Hot-pluggable SFP+ footprint
- Compliant with SFP+ MSA with LC connector
- Single + 3.3V Power Supply
- Commercial/Industrial case
  operating temperature range: -10°C to 70°C /-40°C to 85°C
- Low power dissipation：
- ESPBxx92-3LCD80: 1.5W power dissipation
  for Commercial temperature
- ESPBxx92-3LID80: 1.6W power dissipation
  for Industrial temperature

Applications

- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps
- Other Optical Links

Standard

- SFP+ MSA Compliant
- SFF-8472 reversion 9.5 compliant
- IEEE802.3-2005 compliant
- Telcordia GR-468-CORE compliant
- FCC 47 CFR Part 15,Class B compliant
- FDA 21 CFR 1040.10 and 1040.11,class1 compliant
- RoHS compliant

Product Description

SFP-10G-ZR-BX-U/D is hot pluggable 3.3V Small-Form-Factor transceiver module. It designed expressly for high-speed communication applications that require rates up to 11.1 GB/s, it designed to be compliant with SFF-8472 SFP+ MSA. The module data link is up to 80km in 9/125um single mode fiber.

Ordering information

Product part Number	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range（Tcase）(℃)	
SFP-10G-ZR-BX-U	10.3125	Single mode fiber	1490 TX/1550 RX	80	-10~70	Commercial
SFP-10G-ZR-BX-D	10.3125	Single mode fiber	1550 TX/1490 RX	80	-10~70	Commercial

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	ºC	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	V_{CC}	-0.3	-	4	V	
Signal Input Voltage		Vcc-0.3	-	Vcc+0.3	V	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Average Launched Power	PO	0	-	5	dBm	SFP-10G-ZR-BX-U
		-1	-	3	dBm	SFP-10G-ZR-BX-D
Average Launched Power(Laser Off)	Poff	-	-	-30	dBm	Note (1)
Center Wavelength Range	λC	λ-7.5	λ	λ+7.5	nm	Note (2)
Side mode suppression ratio	SMSR	30	-	-	dB	
Spectrum Bandwidth(-20dB)	σ	-	-	0.3	nm	

Extinction Ratio	ER	8.2		-	dB	Note (3)
Output Eye Mask	Compliant with IEEE 802.3ae					Note (3)
Receiver						
Input Optical Wavelength	λIN	1480	1490	1500	nm	SFP-10G-ZR-BX-U
		1540	1550	1560	nm	SFP-10G-ZR-BX-D
Receiver Sensitivity	Psen	-	-	-24	dBm	Note (4)
Input Saturation Power (Overload)	PSAT	-9	-	-	dBm	Note (4)
LOS Assert	LOSA	-38	-	-	dBm	
LOS De-assert	LOSD	-	-	-26	dBm	
LOS -Hysteresis	PHys	0.5	-	6	dB	

Note:

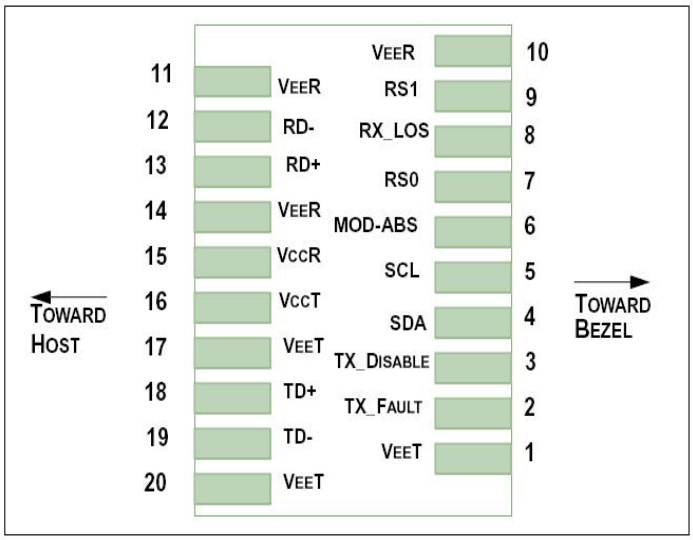
1) The optical power is launched into SMF

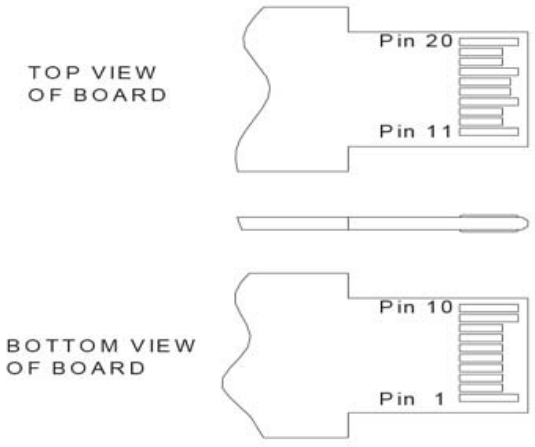
2) λ is wavelength of room temperature

3) Measured with RPBS 2^31-1 test pattern @10.3125Gbs

4) Measured with RPBS 2^31-1 test pattern @10.3125Gbs BER=<10^-12

Pin Assignment





Pin out of Connector Block on Host Board

Pin	Symbol	Name/Description	NOTE.
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4

5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	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	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	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	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1) Circuit ground is internally isolated from chassis ground.
2) T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3) Laser output disabled on T_{DIS}>2.0V or open, enabled on T_{DIS}<0.8V.
4) Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5) Internally pulled down per SFF-8431 Rev 4.1.
6) LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Electrical Interface Characteristics

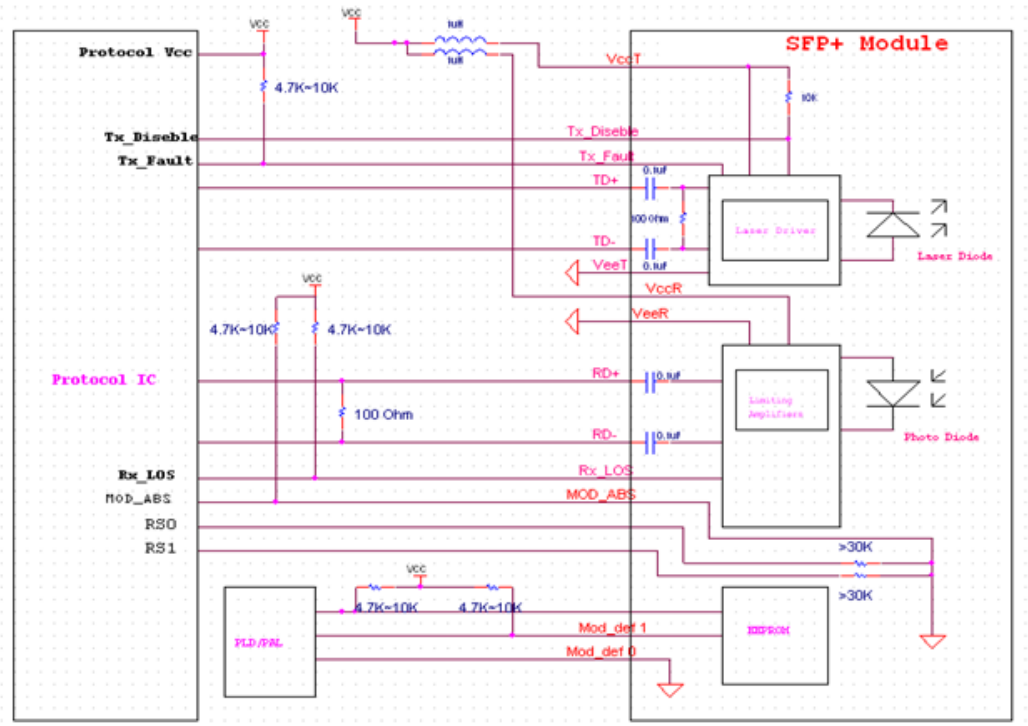
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Total power supply current	Icc	-		450	mA	Commercial
				490	mA	Industrial
Transmitter						
Differential Data Input Voltage	VDT	180	-	1200	mVp-p	
Differential line input Impedance	RIN	80	100	120	Ohm	
Transmitter Fault Output-High	VFaultH	2.4	-	Vcc	V	
Transmitter Fault Output-Low	VFaultL	-0.3	-	0.8	V	

Transmitter Disable Voltage- High	VDisH	2	-	Vcc+0.3	V	
Transmitter Disable Voltage- low	VDisL	-0.3	-	0.8	V	
Receiver						
Differential Data Output Voltage	VDR	300	-	850	mVp-p	
Differential line Output Impedance	ROUT	80	100	120	Ohm	
Receiver LOS Pull up Resistor	RLOS	4.7	-	10	KOhm	
Data Output Rise/Fall time	tr/tf	24	-		ps	
LOS Assert Level	VLOS fault	Vcc–1.3		VccHOST	V	
LOS De-assert Level	VLOS norm	Vee		Vee+0.8	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	-10	-	70	ºC	Commercial
		-40		85	ºC	Industrial
Power Supply Voltage	V_{CC}	3.14	3.3	3.47	V	
Power Supply Current	I_{CC}	-		450	mA	Commercial
				490	mA	Industrial
Data Rate	BR		10.3125		Gbps	
Transmission Distance	TD		-	80	km	
Coupled fiber	Single mode fiber					9/125um SMF

Typical Interface Circuit



Digital Diagnostic Functions

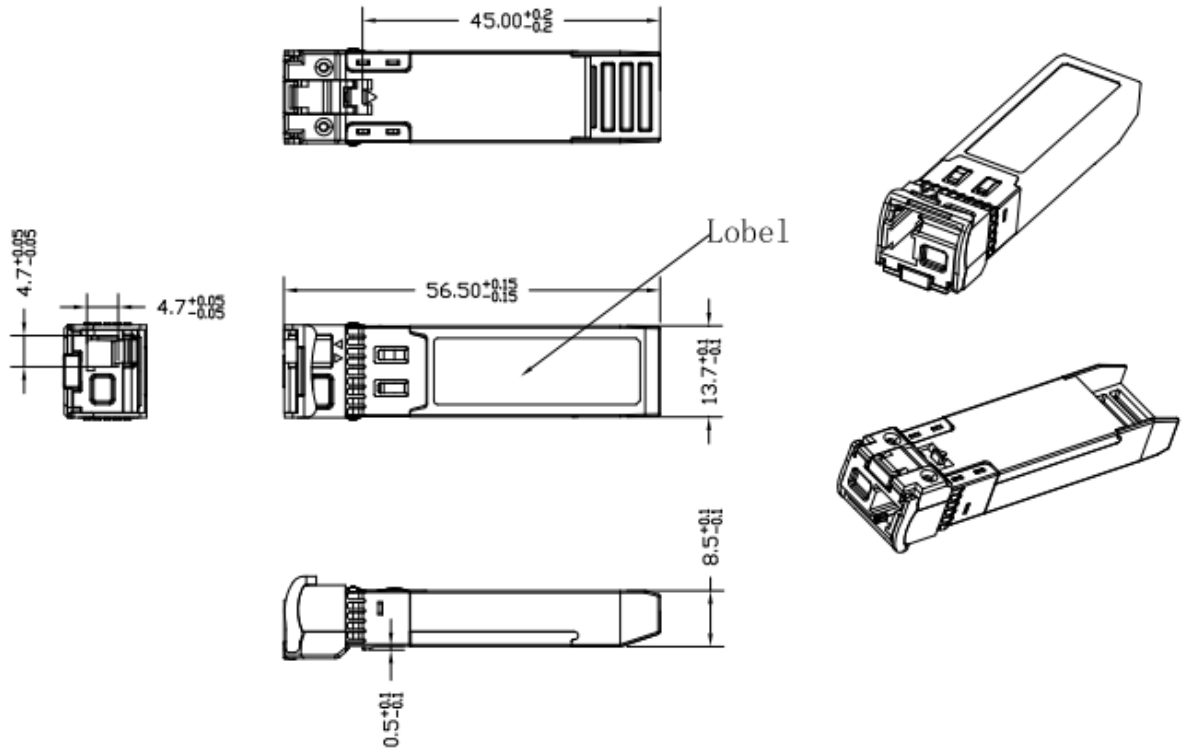
LIGHTX SFP-10G-ZR-BX-U/D transceivers support the 2-wire serial communication protocol as defined in the SFP+MSA.
The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, LIGHX SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP+ MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h).The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

Package Dimensions



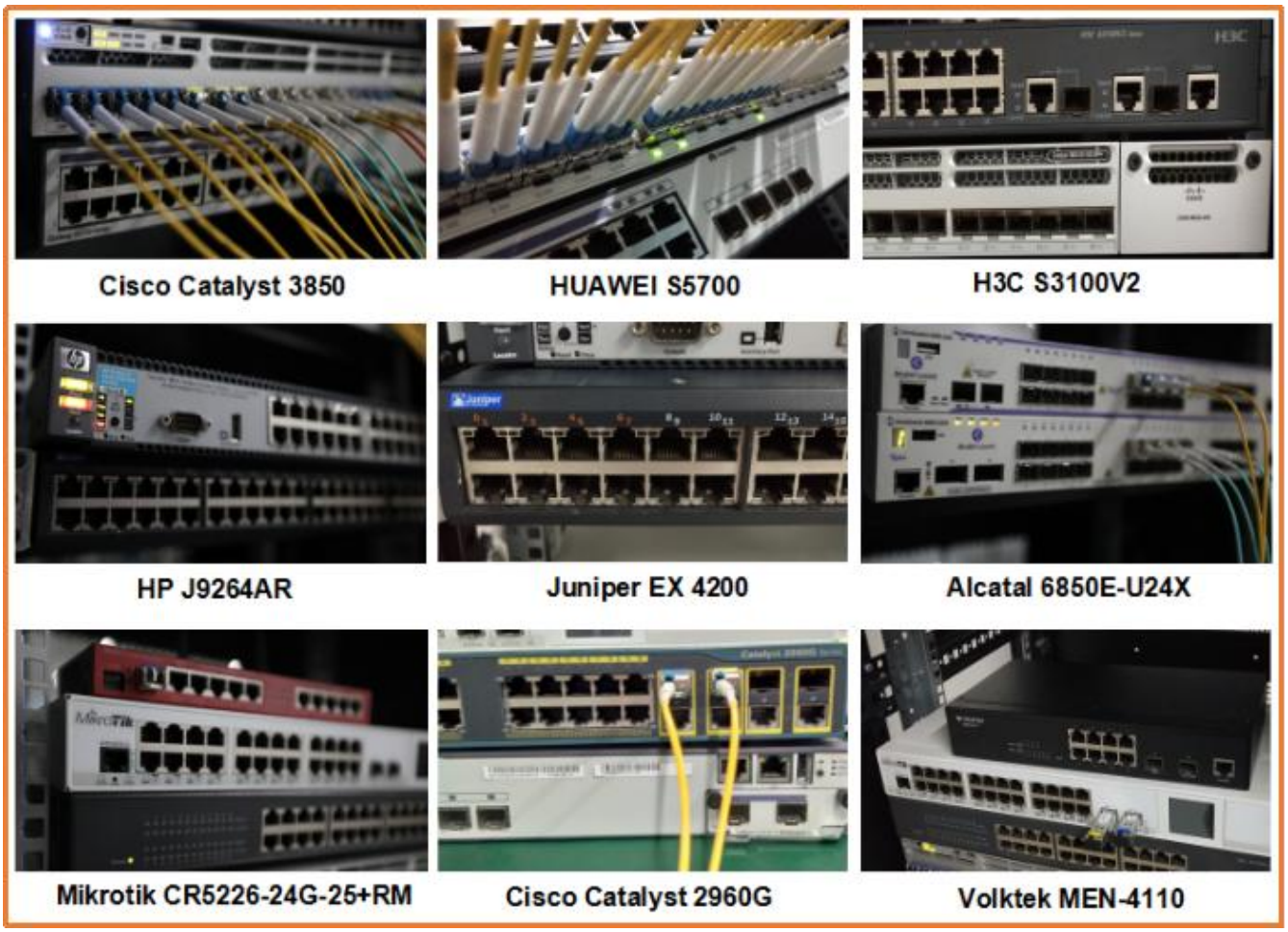
Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge（ESD）	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950, UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

Compatibility Test

In order to ensure the product compatibility, our products will be tested on the switch before shipment. Our modules can compatible with many mainstream brand switches, such as Cisco, Juniper, Extreme, Brocade, IBM, H3C, HP, Huawei, D-Link, Mikrotik, ZTE, TP-Link...

Our test equipment: VOLKTEK MEN-4110, HP 2530-8G, CRS226-24G-25+RM, Catalyst 2960G Series, Catalyst 3850 XS 10G SFP+, Catalyst 3750-E Series, HUAWEI S5700Series, H3C S3100V2 Series, Juniper-EX4200, etc.



Product Production Process

Quality Assurance

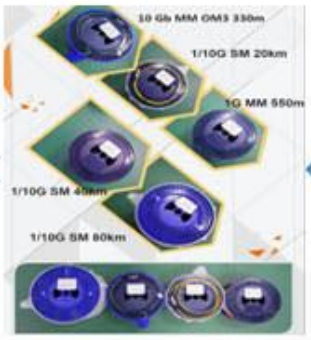
Continuous introduction of new equipment, produced by strict standards, strict quality inspection, to guarantee the high quality standard of each product.

Standardized Production Line

Professional Welding

Assembling

Cleaning end face



Distance Testing

Aging Testing

Product Initial Test

Switch Testing

Product Final Test

Packaging

LIGHTX provides two kinds of packaging, 10pcs/Tray and individual package.

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