

10G SFP+ LR 1310nm 10KM LC SMF Fiber Optic Transceiver



Applications

- 10GBASE-LR/LW 10G Ethernet

Features

- Up to 11.1Gbps Data Links
- 1310nm DFB transmitter, PIN photo-detector
- Up to 10km transmission on SM
- Duplex LC connector
- Metal enclosure, for lower EMI
- Electrical interface compliant to SFF-8431
- Compliant with SFP+ MSA with LC connector
- 2-wire interface for management
- Specifications compliant with SFF 8472
- Single 3.3V power supply
- Power dissipation < 1.2W
- Case operating temperature range: Commercial: 0°C to +70°C Industrial: -40°C to +85°C

STANDARD

- Compliant with SFF-8472 SFP+ MSA.
- Compliant to SFP+ SFF-8431 and SFF-8432.
- Compliant to 802.3ae 10GBASE-LR.
- RoHS Compliant.

10G SFP+ LR 10KM Transceiver

Description

7213020 10G SFP+ LR compatible SFP+ transceiver supports up to 10Km link lengths over SMF via an LC duplex connector. Digital diagnostics monitoring is available via a 2-wire serial interface, as specified in SFF-8472. Each SFP+ transceiver module is individually tested to be used on a series of Cisco switches, routers, servers, network interface card (NICs) etc. Featuring low power consumption, high speed, this 10G SFP+ transceiver is ideal for data center, enterprise wiring closet, service provider transport application, Radio & Baseband Unit, etc

Main product parameters

Form Factor	SFP+	Vendor Name	Zion Communication
Wavelength	1310nm	Max Data Rate	10.3125 Gbps
Max Cable Distance	10km	Connector type	Duplex LC
Fiber cable Type	SMF	Bit Error Ratio (BER)	1E-12
Transmitter Type	DFB	Receiver Type	PIN
Transmit Power	-8.2~0.5 dBm	Receiver sensitivity	- 14.4 dBm
Power Consumption	≤1 W	Extinction Ratio	> 3.5 dB
DDM	Supported	Operating Temp.	0°C to 70°C (32°F to 158°F)

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Detailed product specifications

1 Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Maximum Supply Voltage	VCC	-0.5		4.7	V	
Storage Temperature	T _s	-40		85	°C	
Case Operating Temperature	T _{case}	-5		70	°C	

2 Electrical Characteristics (T_{case} = -5 to 70°C, VCC = 3.14 to 3.46Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Supply Voltage	V _{cc}	3.14	3.3	3.46	V	
Supply Current	I _{cc}			300	mA	
Transmitter						
Input differential impedance	R _{in}		100		Ω	1
Single ended data input swing	V _{in,pp}	180		700	mV	
Transmit Disable Voltage	V _D	V _{cc} -1.3		V _{cc}	V	
Transmit Enable Voltage	V _{EN}	V _{ee}		V _{ee} + 0.8	V	2
Transmit Disable Assert Time				10	us	
Receiver						
Differential data output swing	V _{out,pp}	300		850	mV	3
Data output rise time	t _r	28			ps	4
Data output fall time	t _r	28			ps	4
LOS Fault	V _{LOS fault}	V _{cc} -1.3		V _{cc} HOST	V	5
LOS Normal	V _{LOS norm}	V _{ee}		V _{ee} +0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
 2. Or open circuit.
 3. Into 100 ohms differential termination.
 4. These are unfiltered 20-80% values
 5. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
 6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to recommended power supply filtering network.
- specified value applied through the

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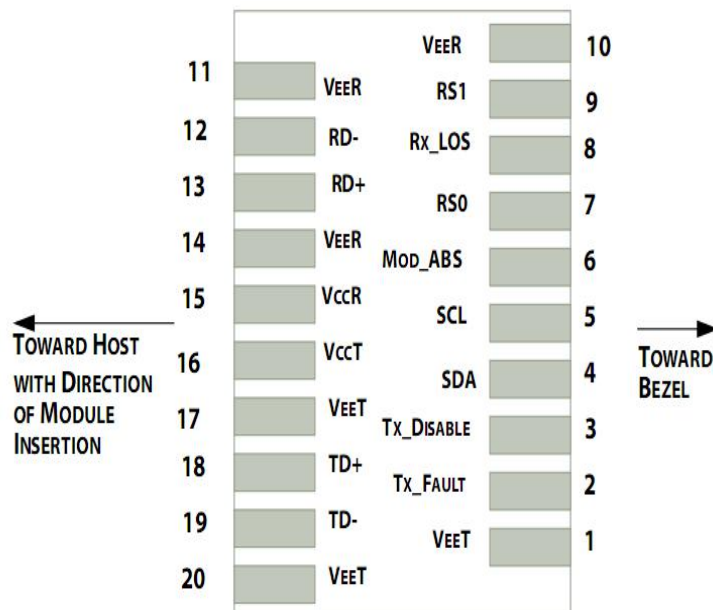
3 Optical Characteristics (Tcase = -5 to70°C, VCC = 3.14 to 3.46 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Output Opt. Pwr	POUT	-6		-0.5	dBm	1
Optical Wavelength	λ	1260	1310	1355	nm	
Spectral Width (-20dB)	σ			1	nm	
Side mode suppression ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3.5			dB	
Output Eye Mask	Compliant with IEEE 0802.3ae					
Receiver						
Rx Sensitivity	RSENS			-14.4	dBm	2
Input Saturation Power (Overload)	Psat	0.5			dBm	
Wavelength Range	λC	1270		1610	nm	
LOS De-Assert	LOSD			-17	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5	1		dB	

Notes:

- 1.Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
- 2.With worst-case extinction ratio. Measured with a PRBS 2³¹-1 test pattern, @10.325Gb/s, BER<10⁻¹².

4 Pin Descriptions



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5 Transceiver Block Diagram

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

Note:

1.Circuit ground is internally isolated from chassis ground.

2.TFAULT 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 TDIS >2.0V or open, enabled on TDIS <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.

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6 Digital Diagnostic Functions

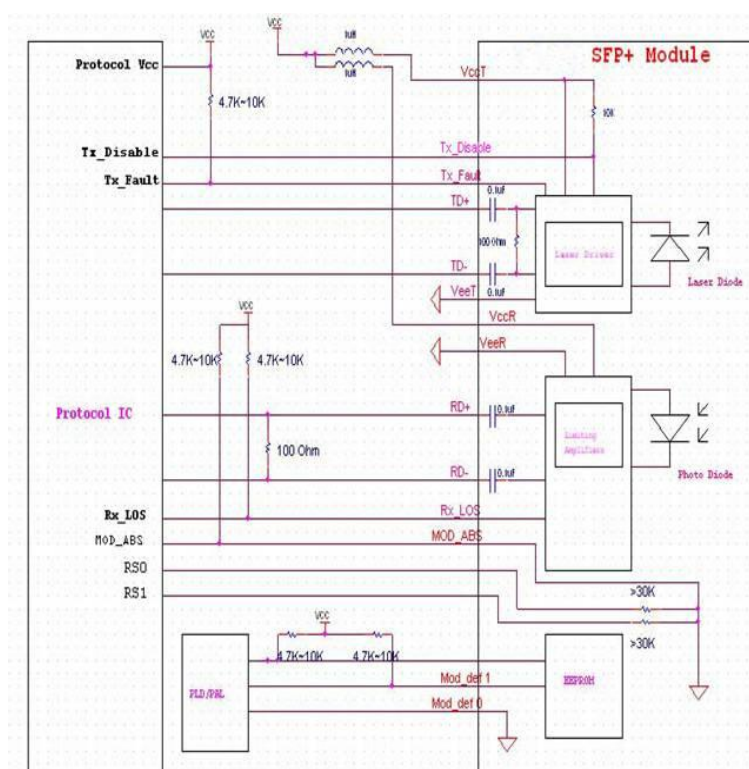
SFSL311T10DC transceivers support the 2-wire serial communication protocol as defined in the SFP MSA1. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, Fiberate 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, 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.

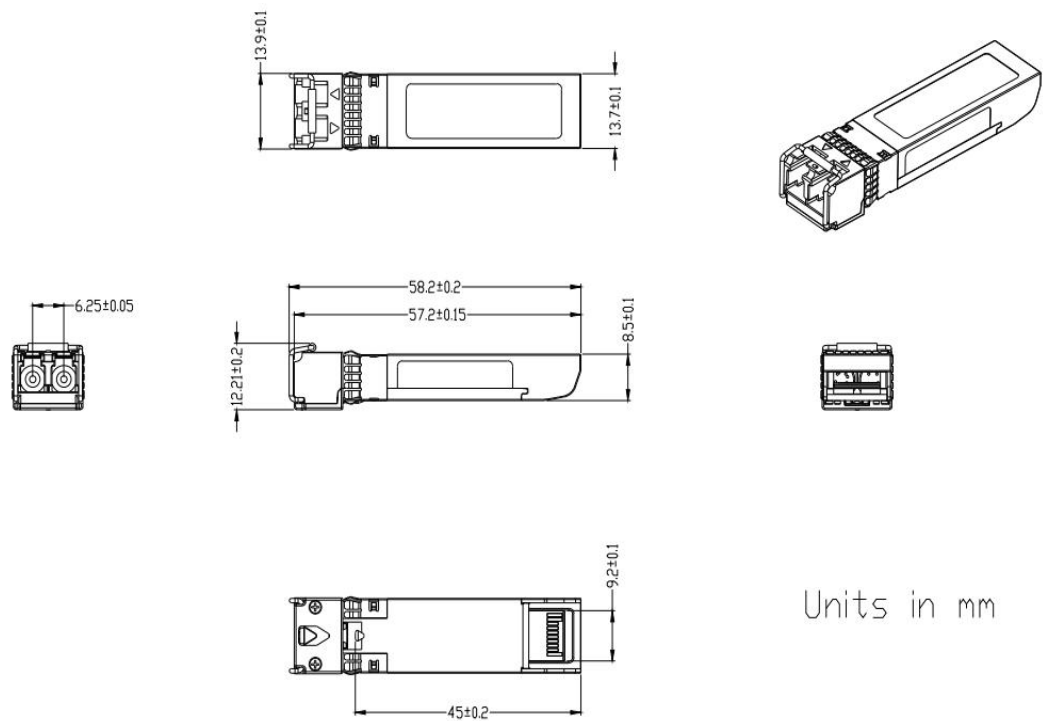
7 Host - Transceiver Interface Block Diagram



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8 Outline Dimensions

Comply to SFF-8432 rev5.0, the improved Pluggable form factor specification.



9 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