

10G SFP+ ER 1550nm 40KM LC SMF Fiber Optic Transceiver



Applications

- 10GBASE-ER/EW 10G Ethernet

Features

- Hot-pluggable SFP+ footprint
- Up to 11.3Gpbs rates
- Single 3.3V power supply
- Maximum link length of 40km
- 1550nm EML transmitter, PIN photo-detector
- Duplex LC connector
- Power dissipation < 1.5W
- Built-in digital diagnostic functions
- Case 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-ER.
- RoHS Compliant.

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Description

10G SFP+ ER compatible SFP+ transceiver supports up to 40Km 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	1550nm	Max Data Rate	11.3 Gbps
Max Cable Distance	40km	Connector type	Duplex LC
Fiber cable Type	SMF		
Transmitter Type	EML	Receiver Type	PIN
Transmit Power	-1~4 dBm	Receiver sensitivity	- 16 dBm
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.
Storage Temperature	T _s	-40		85	°C	
Storage Ambient Humidity	HA	5		85	%	
Power Supply Voltage	VCC	-0.5		4	V	
Signal Input Voltage		-0.3		V _{cc} +0.3	V	
Receiver Damage Threshold		4			dBm	

2 Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Operating Case Temperature	T _{case}	0		70	°C	Note (1)
Ambient Humidity	HA	5		85	%	
Power Supply Voltage	VCC	3.14	3.3	3.46	V	
Power Supply Current	ICC			450	mA	
Power Supply Noise Rejection				100	mVp-p	100Hz to 1MHz
Transmission Distance				40	km	
Coupled fiber	Single mode fiber					ITU-T G.653

Note: -10 to 60degC with 1.5m/s airflow

3 Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Average Launched Power	PO	-1		4	dBm	Note (1)
Extinction Ratio	ER	8.2			dB	
Center Wavelength	λc	1530	1550	1565	nm	
Spectrum Band Width (RMS)	σ			1	nm	
SMSR		30			dB	
Transmitter OFF Output Power	POff			-30	dBm	
Transmitter and Dispersion Penalty	TDP			2	dB	
Output Eye Mask	Compliant with IEEE 0802.3ae					
Receiver						
Input Optical Wavelength	λ	1270		1610	nm	Note (2)
Receiver Sensitivity				-16	dBm	
Input Saturation Power (Overload)	Psat	0			dBm	
LOS Detect -Assert Power	PA	-28			dBm	
LOS Detect - Deassert Power	PD			-19	dBm	
LOS Detect Hysteresis	PHYS	0.5	1		dB	

Note:

1.Launched power (avg.) is power coupled into a single mode fiber with master connector. (Before of Life)

2.Measured with conformance test signal for BER = 10⁻¹².@10.3125Gbps, PRBS=2³¹-1,NRZ

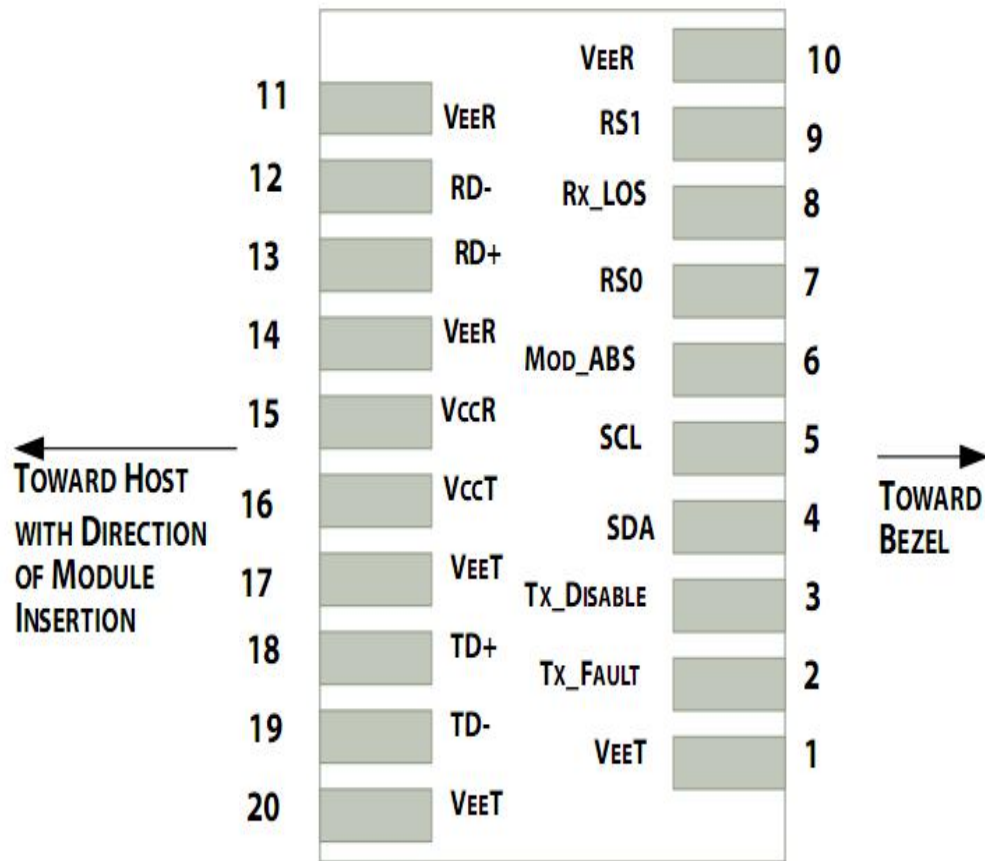
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4 Electrical Interface Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Differential line input Impedance	RIN		100		Ohm	
Differential Data Input Swing	VDT	300		700	mVp-p	
Transmit Disable Voltage	Vdis	2		Vcc	V	LVTTL
Transmit Enable Voltage	Ven	Vee		Vee+ 0.8	V	
Receiver						
Differential Data Output Swing	VDR	400		850	mVp-p	Note (1)
LOS Output Voltage-High	VLOSH	Vee		Vee+0.8	V	LVTTL
LOS Output Voltage-Low	VLOSL	2		VccHOST	V	

Note: Into 100Ω differential termination.

5 Pin Descriptions



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6 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.

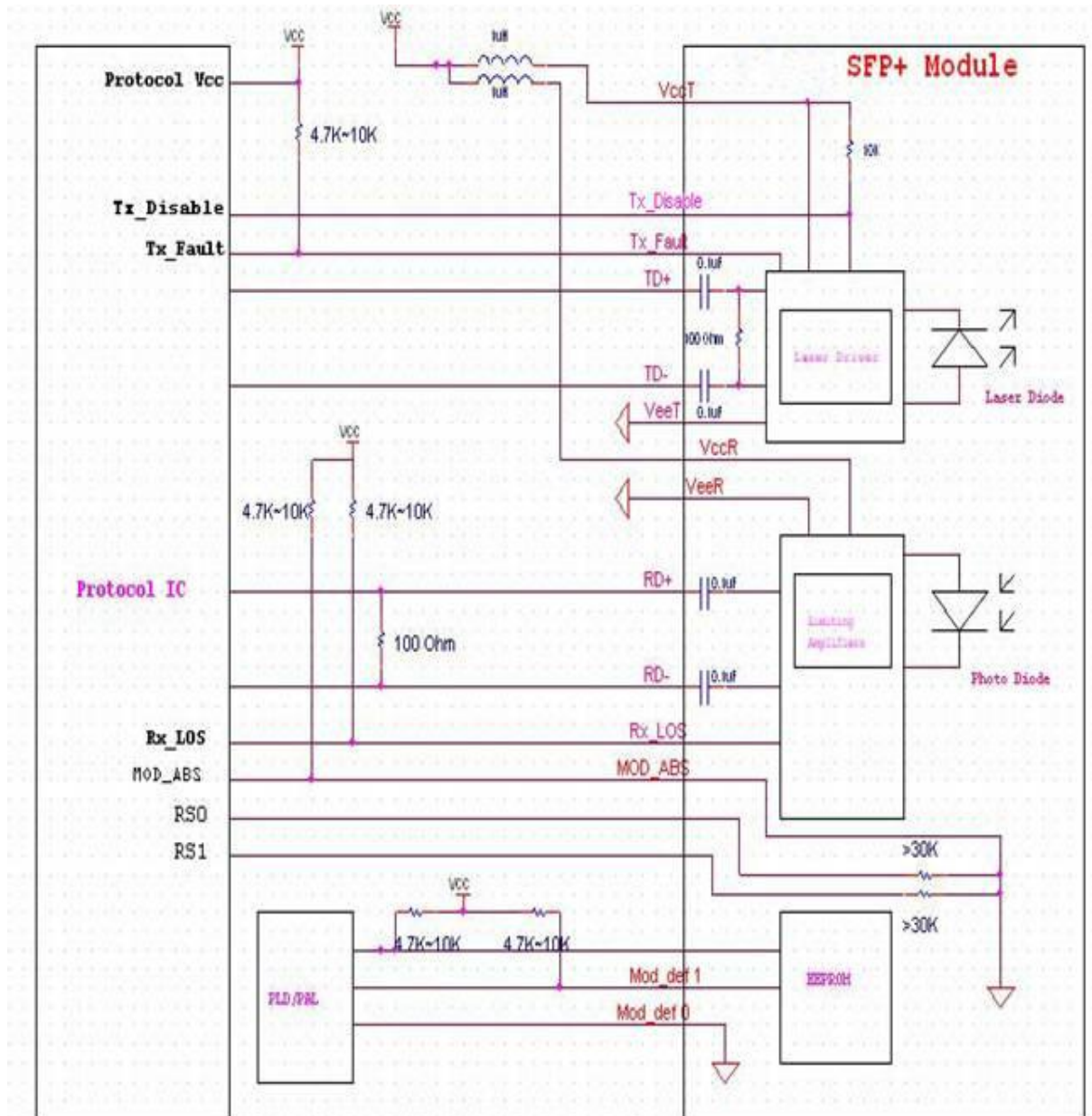
3.Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

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.

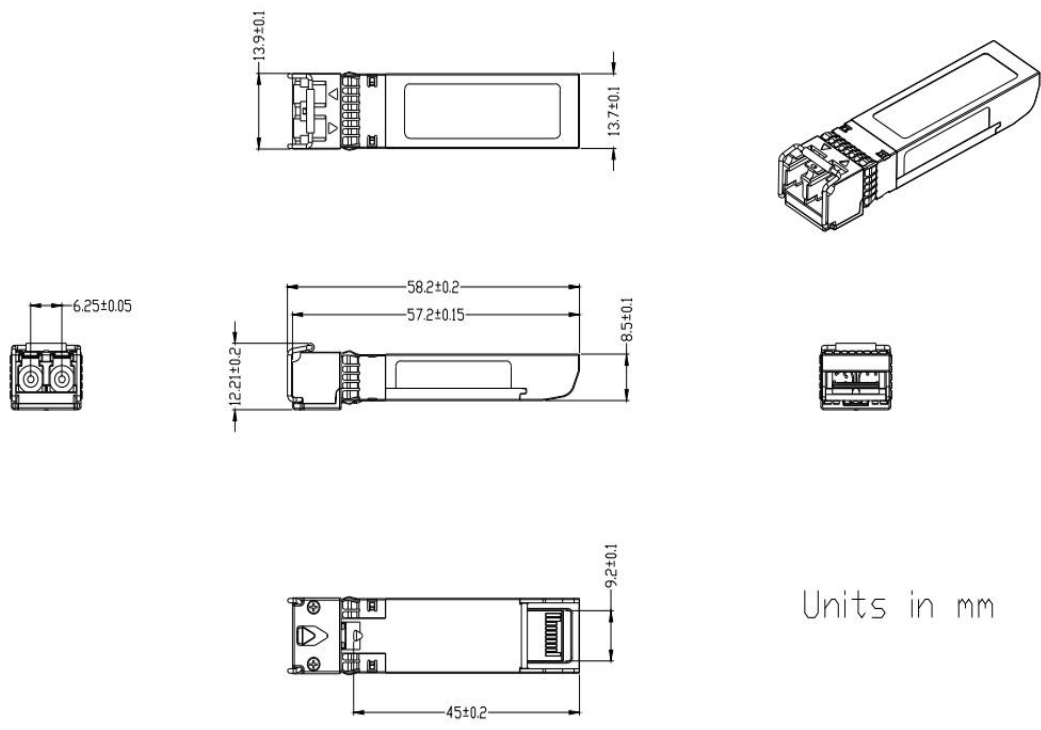
6.LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

7 Recommended Interface Circuit



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8 Outline Dimensions



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