10G SFP+ CWDM 10KM LC SMF Fiber Optic Transceiver

Zion Code and Description

Zion Code	Zion Description
7213110	10G SFP+ CWDM 10KM LC SMF Fiber Optic Transceiver

Applications

- 10GBASE-LR/LW &10G Ethernet
- 10G SONET/SDH, OTU2/2e and 10G FC

Features

- Up to 11.3Gbps Data Links
- Up to 10km transmission on SMF
- Power dissipation < 1.5W
- Uncooled CWDM DFB Laser and PIN receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Case operating temperature range: 0°C to 70°C

STANDARD

- Compliant to 802.3ae 10GBASE-LR/LW
- Compliant to SFF-8431
- RoHS Compliant

Main product parameters

Form Factor	SFP+	Vendor Name	Zion Communication
Wavelength	1270nm--1610nm	Max Cable Distance	10KM
Fiber cable Type	SMF	Connector type	Duplex LC
Transimitter Type	DFB CWDM	Max Data Rate	10 Gbps
Transmit Power	-8.2~0.5 dBm	Receiver Type	PIN
DOM	Supported	Receiver sensitivity	＜- 14.4 dBm
		Operating Temp.	0°C to 70°C (32°F to 158°F)

Zion Communication's Hot 10G transceiver types

Zion Code	Zion Description
7213010	10G SFP+ SR 850nm 300M LC MMF Fiber Optic Transceiver
7213020	10G SFP+ LR 1310nm 10KM LC SMF Fiber Optic Transceiver
7213030	10G SFP+ ER 1550nm 40KM LC SMF Fiber Optic Transceiver
7213040	10G SFP+ ZR 1550nm 80KM LC SMF Fiber Optic Transceiver
7213050	10G SFP+ BIDI LR 1270/1330nm 10KM LC SMF Fiber Optic Transceiver
7213060	10G SFP+ BIDI LR 1270/1330nm 20KM LC SMF Fiber Optic Transceiver
7213070	10G SFP+ BIDI ER 1270/1330nm 40KM LC SMF Fiber Optic Transceiver
7213080	10G SFP+ BIDI ER 1270/1330nm 60KM LC SMF Fiber Optic Transceiver
7213090	10G SFP+ BIDI ZR 1490/1550nm 80KM LC SMF Fiber Optic Transceiver
7213110	10G SFP+ CWDM 10KM LC SMF Fiber Optic Transceiver
7213120	10G SFP+ CWDM 20KM LC SMF Fiber Optic Transceiver
7213130	10G SFP+ CWDM 40KM LC SMF Fiber Optic Transceiver
7213140	10G SFP+ CWDM 80KM LC SMF Fiber Optic Transceiver
7213210	10G SFP+ DWDM 40KM LC SMF Fiber Optic Transceiver
7213220	10G SFP+ DWDM 80KM LC SMF Fiber Optic Transceiver

Product selection

Wavelength	xx	Clasp Color Code	Wavelength	xx	Clasp Color Code
1270 nm	27	Gray	1370 nm	37	Green
1290 nm	29	Gray	1390 nm	39	Yellow
1310 nm	31	Gray	1410 nm	41	Orange
1330 nm	33	Purple	1430 nm	43	Red
1350 nm	35	Blue	1450 nm	45	Brown
1470 nm	47	Gray	1550 nm	55	Yellow
1490 nm	49	Purple	1570 nm	57	Orange
1510 nm	51	Blue	1590 nm	59	Red
1510 nm	53	Green	1610 nm	61	Brown

Detailed product specifications

1 Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Storage Temperature	Ts	-40		85	℃	
Relative Humidity	RH	5		95	%	
Power Supply Voltage	VCC	-0.3		4	V	
Signal Input Voltage		Vcc-0.3		Vcc+0.3	V	

2 Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Case Operating Temperature	Tcase	0		70	℃	
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC			450	mA	
Data Rate	BR		10.3125	11.3	Gbps	
Transmission Distance	TD			10	km	
Coupled fiber	Single mode fiber					9/125um

3 Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Output Opt. Power	POUT	-6		-0.5	dBm	1
Optical Wavelength	λc	λ-6.5		λ+6.5	nm	2
Spectral Width (-20dB)	σ			1	nm	
Optical Extinction Ratio	ER	3.5			dB	
Side mode Suppression ratio	SMSR	30			dB	
Output Eye Mask	Compliant with IEEE 802.3ae					
Receiver						
Receiver Sensitivity	Psen			-14.4	dBm	3
Input Saturation Power (Overload)	PSAT	0.5			dBm	
Input Optical Wavelength	λIN	1270		1610	nm	
LOS Assert	LOSA	-30			dBm	
LOS De-assert	LOSD			-17	dB	
LOS -Hysteresis	PHys	0.5			dB	

Note:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. λ"is:1270,1290,1310,1330,1350,1370,1390,1410,1430,1450, 1470,1490,1510,1530,1550,1570,1590,1610，please the "product selection" .
3. Measured with a PRBS 2^{31}-1 test pattern, @10.325Gb/s, BER<10^{-12} .

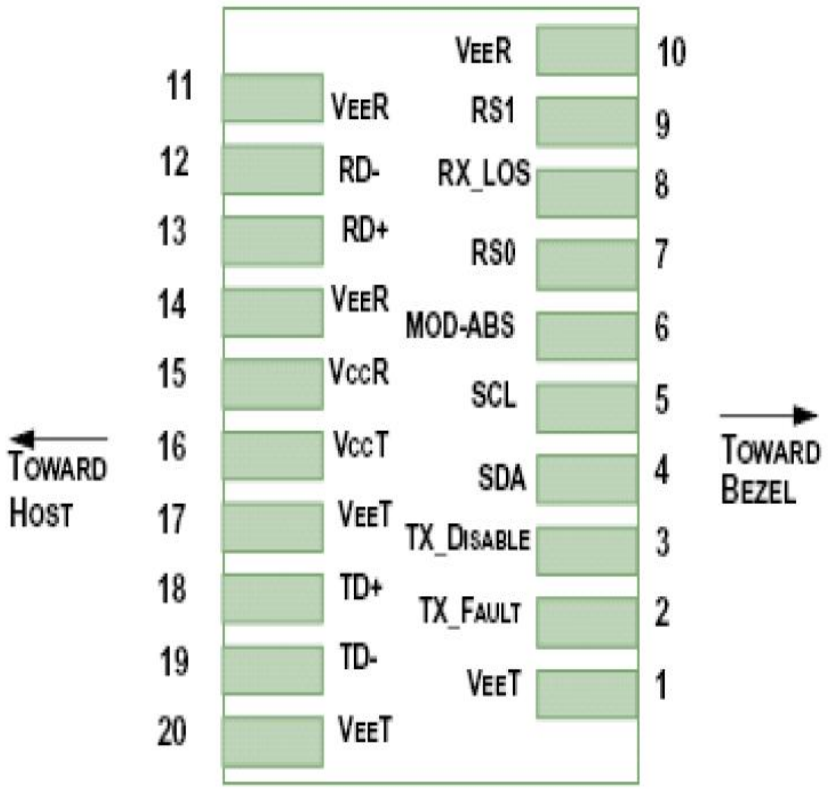
4 Electrical Interface Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			450	mA	
Transmitter						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin,pp	180		1200	mV	
Transmit Disable Voltage	VD	Vcc–1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2
Transmit Disable Assert Time				10	us	
Receiver						
Differential data output swing	Vout,pp	300		850	mV	3
Data output rise time	tr	30			ps	4
Data output fall time	tf	30			ps	4
LOS Fault	VLOS fault	Vcc–1.3		VccHOST	V	5
LOS Normal	VLOS norm	Vee		Vee+0.8	V	5

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Input 100 ohms differential termination.
4. These are unfiltered 20-80% values
5. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected

5 Pin Descriptions



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 Digital Diagnostic Functions

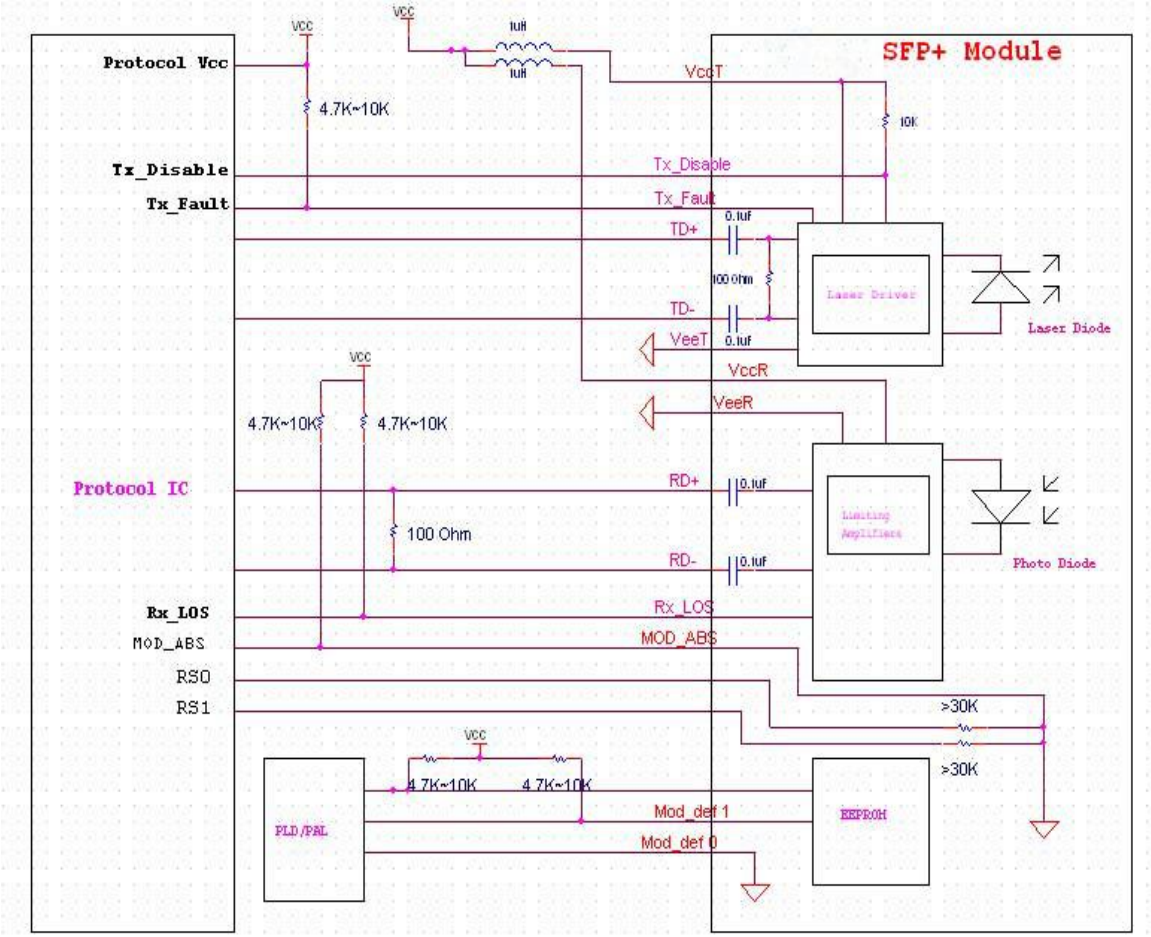
10G SFP+ CWDM 10KM LC SMF Fiber Optic Transceiver support the 2-wire serial communication protocol as defined in the SFP+MSA.The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, ZION 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.

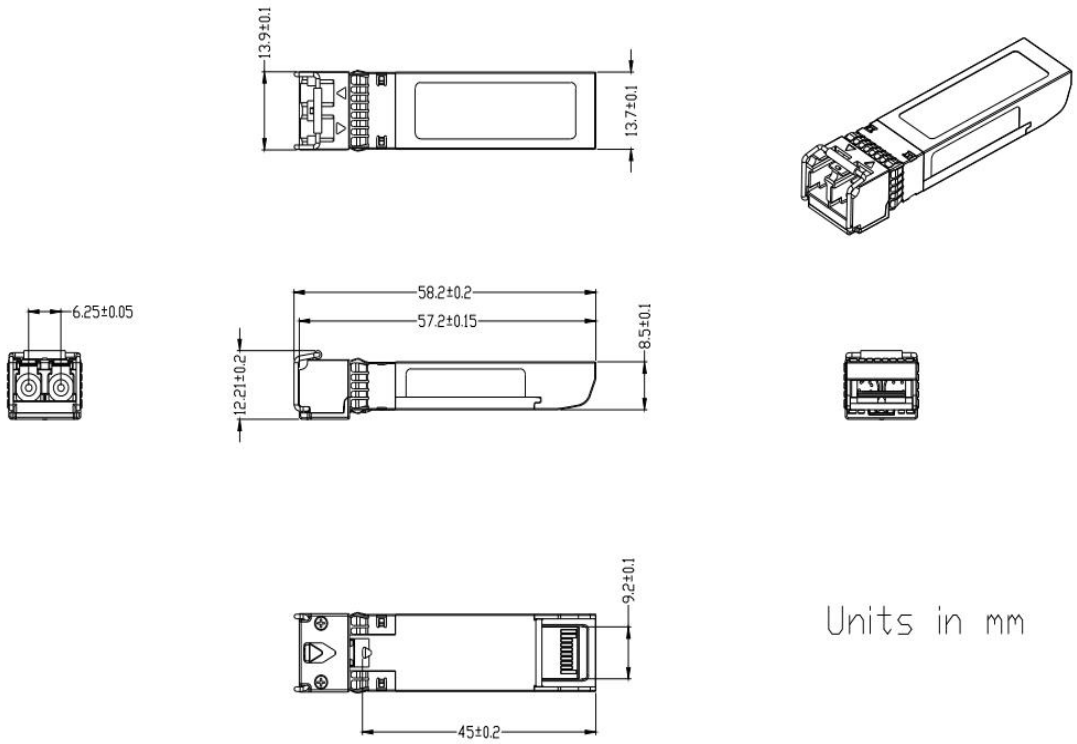
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. 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

8 Host - Transceiver Interface Block Diagram



9 Outline Dimensions

Comply to SFF-8432 rev. 5.0, the improved Pluggable form factor specification.



10 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