10G SFP+ BIDI ER 1270/1330nm 40KM LC SMF Fiber Optic Transceiver

Zion Code and Description

Zion Code	Zion Description
7213070	10G SFP+ BIDI ER 1270/1330nm 40KM LC SMF Fiber Optic Transceiver

Applications

- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps
- Other optical link

Features

- Supports 9.95 to 10.3Gb/s bit rates
- Simplex LC Connector
- Hot pluggable SFP+ footprint
- Uncooled 1270nm DFB transmitter, 1330nm PIN photo-detector
- Uncooled 1330nm DFB transmitter, 1270nm PIN photo-detector
- Applicable for 40km SMF connection
- Low power consumption, < 1.2W
- Digital Diagnostic Monitor Interface
- Optical interface compliant to IEEE 802.3ae 10GBASE-ER
- Electrical interface compliant to SFF-8431
- Operating case temperature: Commerical:0 to 70 °C
  Industrial:-40 to 80 °C

STANDARD

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

Descriptions

7213070 10G SFP+ BIDI ER 1270/1330nm 40KM LC SMF Fiber Optic Transceiver is small form factor pluggable module for optical data communications such as 10GBASE-ER defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability. The 7213070 module is designed for single mode fiber and operates at a nominal wavelength of 1270nm or 1330nm; The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825.The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. The transceiver designs are optimized for high perform - ance and cost effective to supply customers the best solutions for telecommunication.

Main product parameters

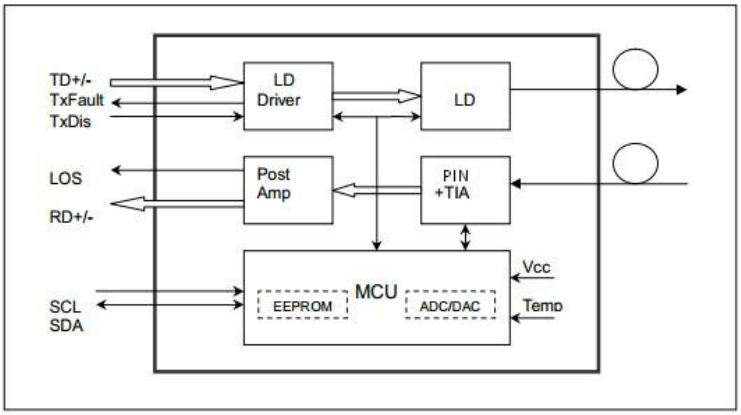
Form Factor	SFP+	Vendor Name	Zion Communication
Wavelength	1270nm/1330nm	Max Data Rate	10.3125 Gbps
Max Cable Distance	40km	Connector type	Duplex LC
Fiber cable Type	SMF		
Transimitter Type	DFB BIDI	Receiver Type	PIN
Transmit Power	0~5 dBm	Receiver sensitivity	＜-15 dBm
DDM	Supported	Operating Temp.	0°C 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

Detailed product specifications

Functional Diagram



1 Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Supply Voltage	VCC	-0.5		4	V	
Storage Temperature	Ts	-40		85	°C	
Relative Humidity	RH	0		85	%	

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the transceiver.

2 General Operating Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate	DR	9.95		10.3125	Gb/s	
Supply Voltage	VCC	3.13	3.3	3.47	V	
Supply Current	Icc5			330	mA	
Operating Case Temp	Tc	0		70	°C	
	TI	-40		80		

3 Electrical Characteristics (TOP(C) = 0 to 70 °C, TOP(I) =-40 to 80 °C,VCC = 3.13 to 3.47 V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Differential data input swing	VIN,PP	180		700	mVpp	1
Transmit Disable Voltage	VD	VCC-0.8		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+0.8		
Input differential impedance	Rin		100		Ω	
Receiver						
Differential data output swing	Vout,pp	300		850	mVpp	2
Output rise time and fall time	Tr, Tf	28			ps	3
LOS asserted	VLOS_F	VCC-0.8		Vcc	V	4
LOS de-asserted	VLOS_N	Vee		Vee+0.8	V	4

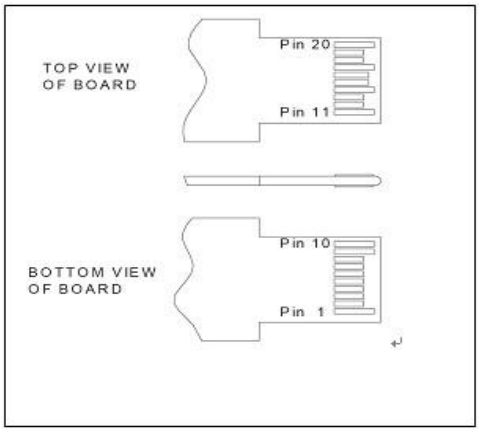
Notes:
1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Into 100Ω differential termination.
3. 20 – 80%. Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's sequence in the PRBS 9 is an acceptable alternative.
4. LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1.

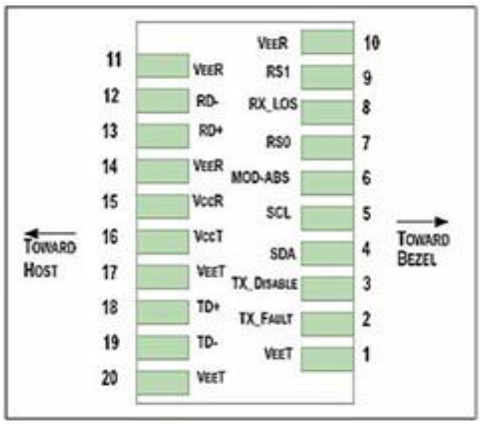
4 Optical Characteristics (TOP(C) = 0 to 70 °C, TOP(I) =-40 to 80 °C, VCC = 3.13 to 3.47 V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Operating Wavelength	λ	1260	1270	1280	nm	
		1320	1330	1340		
Ave. output power (Enabled)	PAVE	0		4	dBm	1
Side-Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	5			dB	
RMS spectral width	Δλ			1	nm	
Rise/Fall time (20%~80%)	Tr/Tf			50	ps	
Dispersion penalty	TDP			3.2	dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Output Optical Eye	Compliant with IEEE 0802.3ae					
Receiver						
Operating Wavelength	λ	1320	1330	1340	nm	
		1260	1270	1280		
Receiver Sensitivity(ER=4.5)	PSEN1			-15	dBm	2
Receiver Sensitivity(ER=6)	PSEN2			-16	dBm	2
Average Receive Power	PAVE			0.5	dBm	
Receiver Reflectance	Rrx			-12	dB	
LOS Assert	Pa	-30			dBm	
LOS De-assert	Pd			-17	dBm	
LOS Hysteresis	Pd-Pa	0.5			dB	

Notes:
1. Average power figures are informative only, per IEEE 802.3ae.
2. Measured with worst ER; BER<10-12; 231 – 1 PRBS.

5 Pin Defintion And Functions





6 Transceiver Block Diagram

Pin	Symbol	Name/Description	Note
1	VEET [1]	Transmitter Ground	
2	Tx_FAULT [2]	Transmitter Fault	
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open	
4	SDA [2]	2-wire Serial Interface Data Line	
5	SCL [2]	2-wire Serial Interface Clock Line	
6	MOD_ABS [4]	Module Absent. Grounded within the module	
7	RS0	Rate Select 0	
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation	
9	RS1 [5]	Rate Select 1	
10	VEER [1]	Receiver Ground	
11	VEER [1]	Receiver Ground	
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver DATA out. AC Coupled	
14	VEER [1]	Receiver Ground	
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET [1]	Transmitter Ground	
18	TD+	Transmitter DATA in. AC Coupled	
19	TD-	Transmitter Inverted DATA in. AC Coupled	
20	VEET [1]	Transmitter Ground	

Note:
1.Module circuit ground is isolated from module chassis ground within the module.
2.should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.
3.Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.
4.Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to10 kΩ.Mod_ABS is asserted "High" when the SFP+ module is physically absent from a host slot.

7 Serial Interface for ID and DDM

The 7213070 10G SFP+ BIDI ER 1270/1330nm 40KM 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, This SFP+ transceivers provide an 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), so the originally monitoring interface makes use of the 8 bit address(A2h), so the originally defined serial ID memory map remains unchanged. The structure of the memory map is shown in Table1

2 wire address 1010000X (**A0h**)	
Address	**Information**
0~95	Serial ID Defined by SFP MSA (96 bytes)
96~127	Vendor Specific (32 bytes)
128~255	Reserved,SFF8079 (128 bytes)

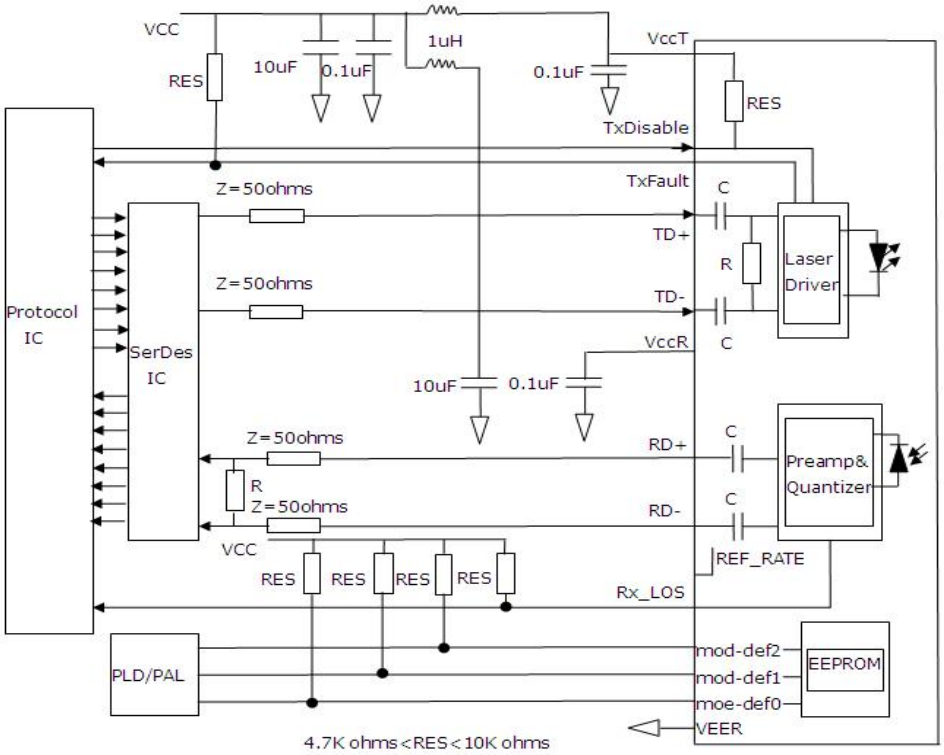
2 wire address 1010001X (**A2h**)	
Address	**Information**
0~55	Alarm and Warning Thresholds (56 bytes)
56~95	Calibration Constants (40 bytes)
96~119	Real Time Diagnostic Interface (24 bytes)
120~127	Vender Specific (8 bytes)
128~247	User Writable EEPROM (120 bytes)
248~255	Vender Specific (8 bytes)

8 Digital Diagnostic Specifications

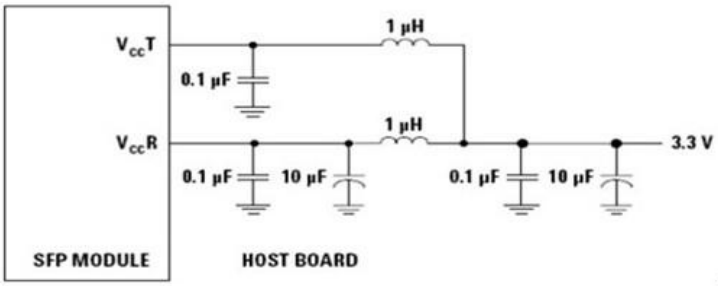
Parameter	Symbol	Units	Min.	Max.	Accuracy	Note
Transceiver temperature	DTemp-E	ºC	-45	90	±5ºC	1,2
Transceiver supply voltage	DVoltage	V	2.8	4	±3%	
Transmitter bias current	DBias	mA	0	127	±10%	3
Transmitter output power	DTx-Power	dBm	-2	6	±2dB	
Receiver average input power	DRx-Power	dBm	-20	1	±2dB	

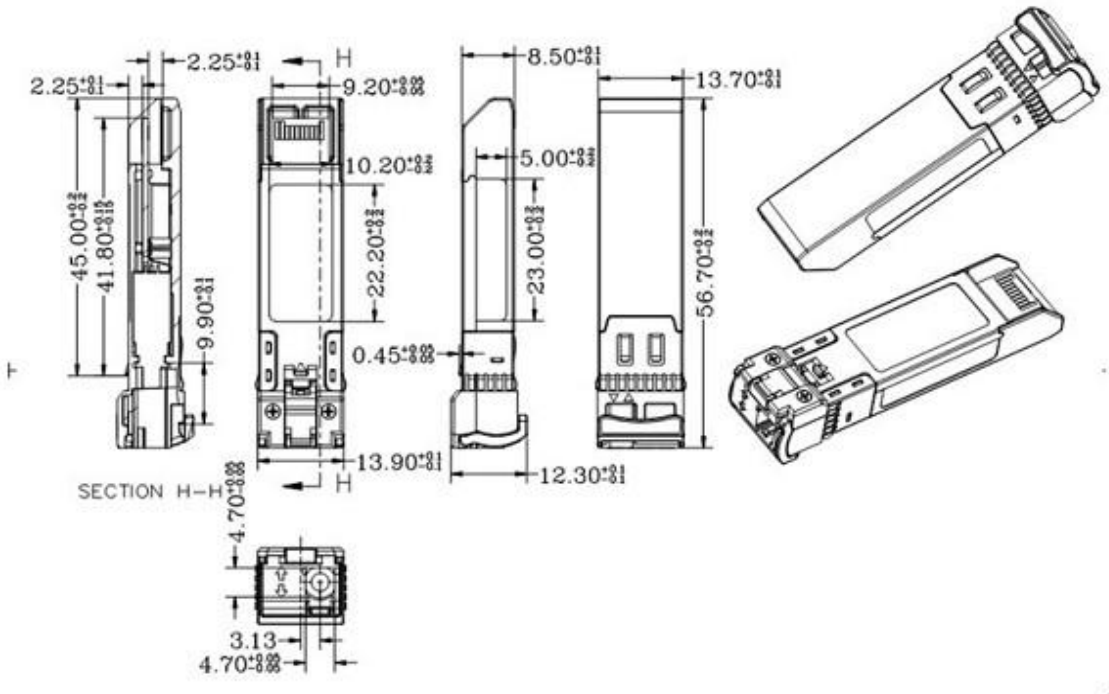
Notes:
1.When Operating temp.=0~70 ºC,the range will be min=-5,Max=+75
2. Internally measured
3. The accuracy of the Tx bias current is 10% of the actual current from the laser driver to the laser

9 Typical Interface Circuit



10 Recommended power supply filter



Note:
Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value

11 Package Dimensions