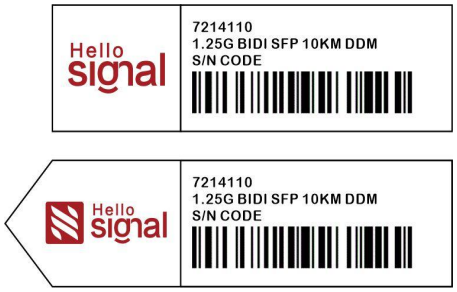
1.25G BIDI SFP TX1310/RX1550nm (TX1550/RX1310nm) 10KM LC SMF Fiber Optic Transceiver



Zion Code and Description

Zion Code	Zion Description
7214110	1.25G BIDI SFP TX1310/RX1550nm(TX1550/RX1310nm) 10KM LC SMF Fiber Optic Transceiver

Applications

- Switch to Switch Interface
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

Features

- Up to 1.25Gb/s data links
- FP laser transmitter for SFBL351G10DC
  DFB laser transmitter for SFBL531G10DC
- PIN photo-detector
- Up to 10km on 9/125μm SMF
- Hot-pluggable SFP footprint
- BIDI LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- Support Digital Diagnostic Monitoring interface
- Compliant with SFF-8472
- Case operating temperature
  Commercial: 0°C to +70°C
  Extended: -10°C to +80°C
  Industrial: -40°C to +85°C

Description

1.25G BIDI SFP TX1310/RX1550nm(TX1550/RX1310nm) 10KM LC SMF Fiber Optic Transceiver Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser and the PIN photo-detector .The module data link up to 80KM in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Main product parameters

Form Factor	SFP	Vendor Name	Zion Communication
Wavelength 1	TX1310/RX1550nm	Wavelength 2	TX1550/RX1310nm
Max Cable Distance	10km	Max Data Rate	1.25 Gbps
Fiber cable Type	SMF	Connector type	Duplex LC
Transimitter Type	FP/DFB	Receiver Type	PIN
Transmit Power	-9~ -3 dBm	Receiver sensitivity	＜-21 dBm
DDM	Supported	Operating Temp.	0°C to 70°C (32°F to 158°F)

Zion Communication's Hot 1.25G transceiver types

Zion Code	Zion Description
7214010	1.25G SFP SX 850nm 550M LC MMF Fiber Optic Transceiver
7214020	1.25G SFP LX 1310nm 10KM LC SMF Fiber Optic Transceiver
7214030	1.25G SFP LX/LH 1310nm 20KM LC SMF Fiber Optic Transceiver
7214040	1.25G SFP EX 1310nm 40KM LC SMF Fiber Optic Transceiver
7214050	1.25G SFP EX 1550nm 40KM LC SMF Fiber Optic Transceiver
7214060	1.25G SFP ZX 1550nm 80KM LC SMF Fiber Optic Transceiver
7214070	1.25G SFP ZX 1550nm 120KM LC SMF Fiber Optic Transceiver
7214080	1.25G SFP ZX 1550nm 160KM LC SMF Fiber Optic Transceiver
7214110	1.25G BIDI SFP TX1310/RX1550nm(TX1550/RX1310nm) 10KM LC SMF Fiber Optic Transceiver
7214120	1.25G BIDI SFP TX1310/RX1550nm(TX1550/RX1310nm) 20KM LC SMF Fiber Optic Transceiver
7214130	1.25G BIDI SFP TX1310/RX1550nm(TX1550/RX1310nm) 40KM LC SMF Fiber Optic Transceiver
7214140	1.25G BIDI SFP TX1490/RX1550nm(TX1550/RX1490nm) 80KM LC SMF Fiber Optic Transceiver
7214150	1.25G BIDI SFP TX1490/RX1550nm(TX1550/RX1490nm) 120KM LC SMF Fiber Optic Transceiver
7214210	1.25G CWDM SFP 20KM LC SMF Fiber Optic Transceiver
7214220	1.25G CWDM SFP 40KM LC SMF Fiber Optic Transceiver
7214230	1.25G CWDM SFP 80KM LC SMF Fiber Optic Transceiver
7214240	1.25G CWDM SFP 120KM LC SMF Fiber Optic Transceiver
7214250	1.25G CWDM SFP 160KM LC SMF Fiber Optic Transceiver
7214310	1.25G DWDM SFP 40KM LC SMF Fiber Optic Transceiver
7214320	1.25G DWDM SFP 80KM LC SMF Fiber Optic Transceiver
7214330	1.25G DWDM SFP 120KM LC SMF Fiber Optic Transceiver

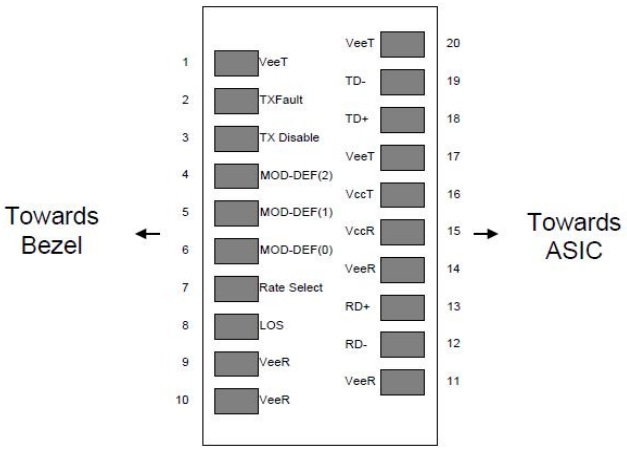
Detailed product specifications

1 Pin Descriptions

Pin	Symbol	Name/Description	NOTE
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	VEER	Receiver Ground (Common with Transmitter Ground)	1
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	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	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	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	VEET	Transmitter Ground (Common with Receiver Ground)	1

Note:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF (0) pulls line low to indicate module is plugged in.
4. This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:
   Low (0 – 0.8V): Reduced Bandwidth
   (>0.8, < 2.0V): Undefined
   High (2.0 – 3.465V): Full Bandwidth
   Open: Reduced Bandwidth
5. LOS is open collector output should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



2 Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Storage Temperature	Ts	-40		85	°C	
Storage Ambient Humidity	HA	5		95	%	
Power Supply Voltage	VCC	-0.5		4	V	
Signal Input Voltage		-0.3		Vcc+0.3	V	
Receiver Damage Threshold		5			dBm	

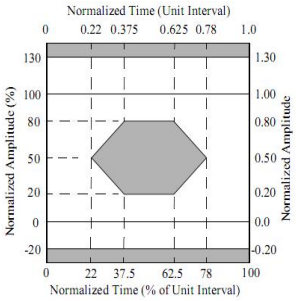
3 Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Case Operating Temperature	Tcase	0		70	°C	SFBL35(53)1G10DC
		-10		80		SFBL35(53)1G10DE
		-40		85		SFBL35(53)1G10DI
Ambient Humidity	HA	5		70	%	Non-condensing
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Power Supply Current	ICC			280	mA	
Power Supply Noise Rejection				100	mVp-p	100Hz to 1MHz
Data Rate			1.25/1.25		Gbps	TX Rate/RX Rate
Transmission Distance				10	KM	
Coupled Fiber	Single mode fiber					9/125um SMF

4 Specification of Transmitter

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Average Output Power	POUT	-9		5	dBm	
Extinction Ratio	ER	9			dB	
Center Wavelength	λC	1270	1310	1360	nm	SFBL351G10DC
		1530	1550	1570		SFBL531G10DC
Spectrum Width (RMS)	σ			3.5	nm	FP Laser (TX:1310nm)
Side Mode Suppression Ratio	SMSR	30			dB	DFB Laser (TX:1550nm)
Spectrum Bandwidth(-20dB)	σ			1	nm	
Transmitter OFF Output Power	POff			-45	dBm	
Differential Line Input Impedance	RIN	90	100	110	Ohm	
Jitter P-P	tJ			128	ps	Note (1)
Output Eye Mask	Compliant with IEEE802.3 z (class 1 laser safety)					Note (2)

Note (1): Measure at 2^7-1 NRZ PRBS pattern
Note (2): Transmitter eye mask definition



5 Specification of Receiver

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Input Optical Wavelength	λIN	1530	1550	1570	nm	SFBL351G10DC
		1270	1310	1360		SFBL531G10DC
Receiver Sensitivity	P_{IN}			-20	dBm	Note (1)
Input Saturation Power (Overload)	P_{SAT}	-3			dBm	
Los Of Signal Assert	P_A	-38			dBm	
Los Of Signal De-assert	P_D			-22	dBm	Note (2)
LOS Hysteresis	P_A-P_D	0.5	2	6	dB	

Note (1): Measured with Light source 1550nm(1310nm), ER=9dB; BER =<10^-12 @PRBS=2^7-1 NRZ
Note (2): When LOS de-asserted, the RX data+/- output is High-level (fixed)

6 Electrical Interface Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Ref.
Transmitter						
Total Supply Current	ICC			A	mV	Note (1)
Transmitter Disable Input-High	VDISH	2		Vcc+0.3	V	
Transmitter Disable Input-Low	VDISL	0		0.8	V	
Transmitter Fault Input-High	VDISL	2		Vcc+0.3	V	
Transmitter Fault Input-Low	VTxFH	0		0.8	V	
Receiver						
Total Supply Current	ICC			B	mA	Note (1)
LOSS Output Voltage-High	VLOSH	2		Vcc+0.3	V	LVTTL
LOSS Output Voltage-Low	VLOSL	0		0.8	V	

Note (1): A (TX) + B (RX) = 280mA (Not include termination circuit)

7 Digital Diagnostic Functions

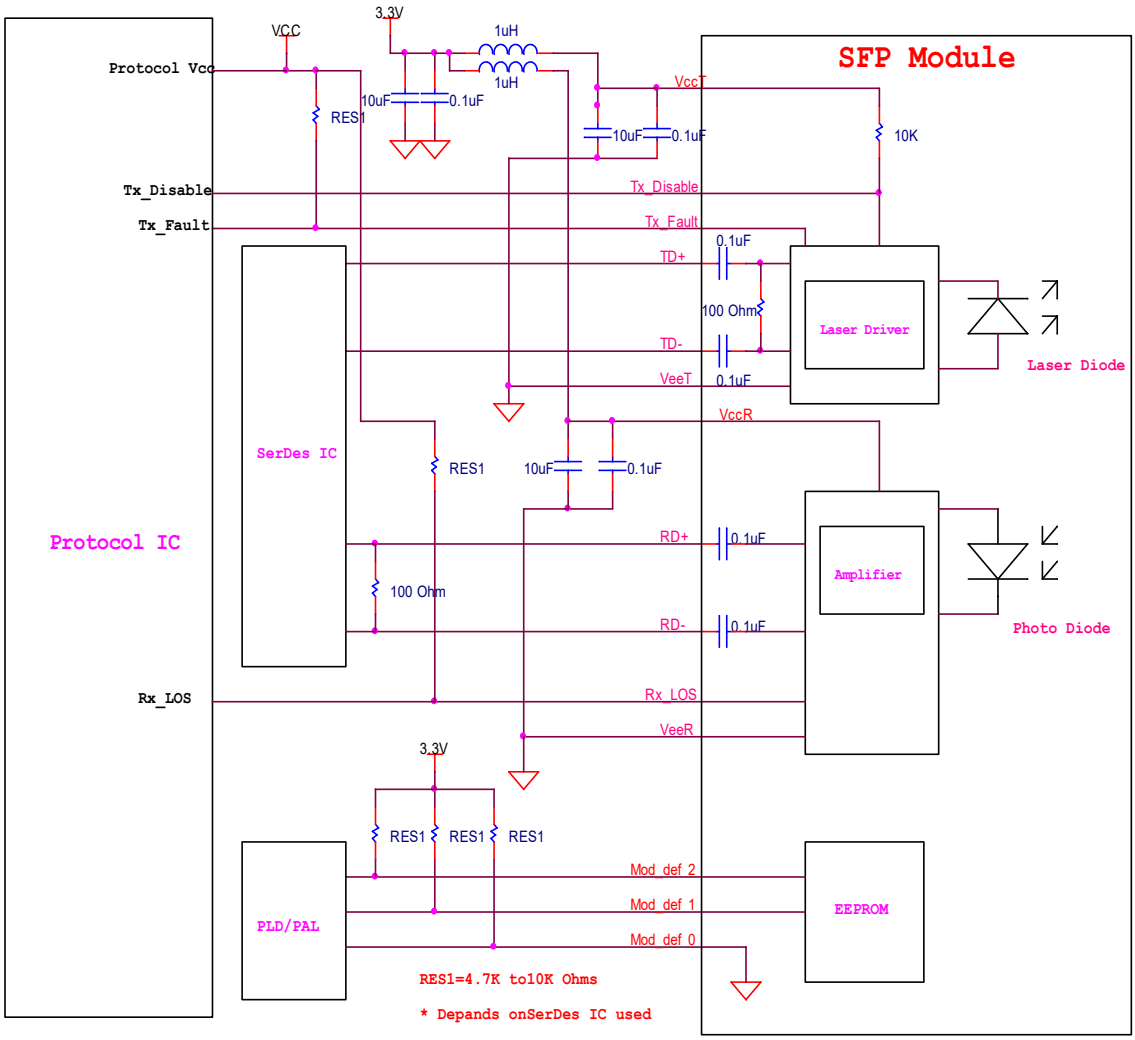
1.25G BIDI SFP TX1310/RX1550nm(TX1550/RX1310nm) 10KM LC SMF Fiber Optic Transceiver support the 2-wire serial communication protocol as defined in the SFP MSA. It is very closely related to the E2PROM defined in the GBIC standard, with the same electrical specifications. The standard SFP serial ID provides 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.

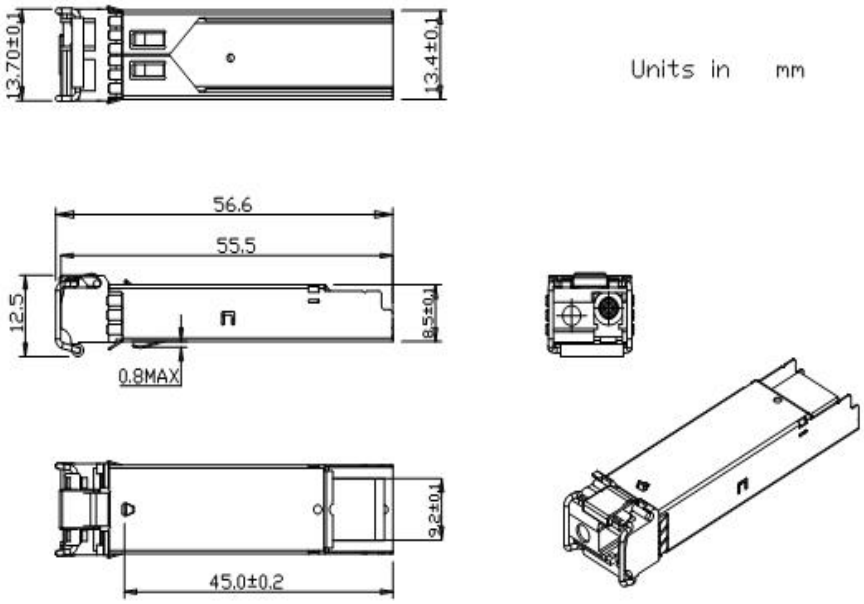
The SFP MSA defines a 256-byte memory map in E2PROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged. The interface is identical to, and is thus fully backward compatible with both the GBIC Specification and the SFP Multi Source Agreement.

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. Digital diagnostics for the SFBL35(53)1G10DC are Internally calibrated by default.

8 Recommend Circuit Schematic



9 Mechanical Specifications (Unit: mm)



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