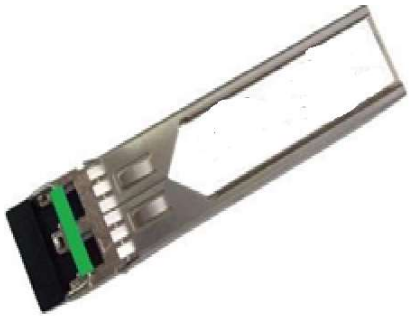
Data Sheet

1.25Gb/s 1550nm Single-mode ZX 80km SFP Transceiver P/N: WST-SFP-ZX-C



Features:

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

Applications:

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

Description

Wavesplitter WST-SFP-ZX-C 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.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40		85	ºC	
Relative Humidity	RH	5		95	%	
Power Supply Voltage	VCC	-0.5		4	V	
Signal Input Voltage		-0.3		Vcc+0.3	V	
Receiver Damage Threshold		5			dBm	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0		70	ºC	WST-SFP-ZX-C
		-10		80		WST-SFP-ZX-E
		-40		85		WST-SFP-ZX-I
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Power Supply Current	ICC			300	mA	
Data Rate			1250		Mbps	
Transmission Distance				80	KM	
Coupled Fiber	Single mode fiber					9/125um SMF

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Total Supply Current	ICC			A	mA	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	VTxFH	2		Vcc+0.3	V	
Transmitter Fault Input-Low	VTxFL	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	

Notes:

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

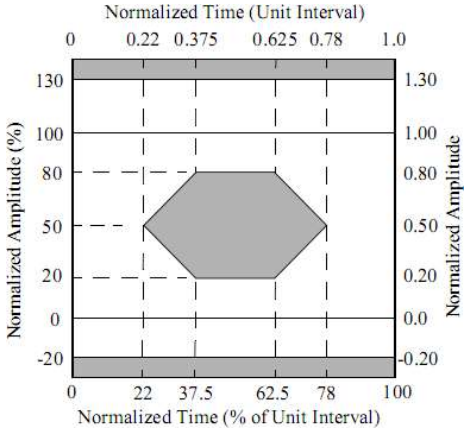
Specification of Transmitter

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	POUT	0		5	dBm	Note (1)
Extinction Ratio	ER	9			dB	
Center Wavelength	λC	1530	1550	1570	nm	DFB Laser
Side Mode Suppression Ratio	SMSR	30			dB	
Spectrum Bandwidth(-20dB)	σ			1	nm	
Transmitter OFF Output Power	POff			-45	dBm	
Differential Line Input Impedance	RIN	90	100	110	Ohm	
Output Eye Mask	Compliant with IEEE802.3 z (class 1 laser safety)					Note (2)

Note

1 Measure at 2^7-1 NRZ PRBS pattern.

2 Transmitter eye mask definition.



Specification of Receiver

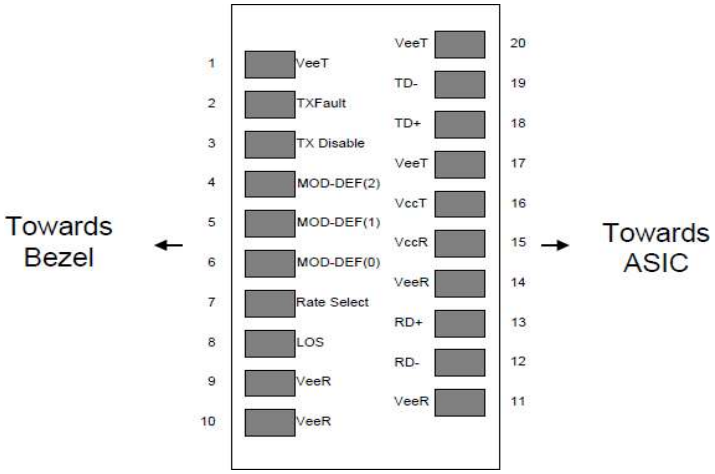
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Input Optical Wavelength	λIN	1270		1610	nm	PIN-TIA
Receiver Sensitivity	PIN			-26	dBm	Note (1)
Input Saturation Power (Overload)	PSAT	-3			dBm	
LOS De-assert	LOSD			-27	dBm	
LOS Assert	LOSA	-38			dBm	Note (2)
LOS Hysteresis		0.5	2	6	dB	

Notes:

1 Measured with Light source 1550nm, ER=9dB; BER =<10^-12 @PRBS=2^7-1 NRZ. Note (2):

2 When LOS de-asserted, the RX data+/- output is High-level (fixed)

Pin Assignment



Pin out of Connector Block on Host Board

Pin	Symbl	Name/Description	NOTE
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAUT	Transmitter Fault.	
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	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

Notes:

1 Circuit ground is internally isolated from chassis ground.

2 Laser output disabled on T_{DIS} >2.0V or open, enabled on T_{DIS} <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.

Digital Diagnostic Functions

Wavesplitter WST-SFP-ZX-C transceivers 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.

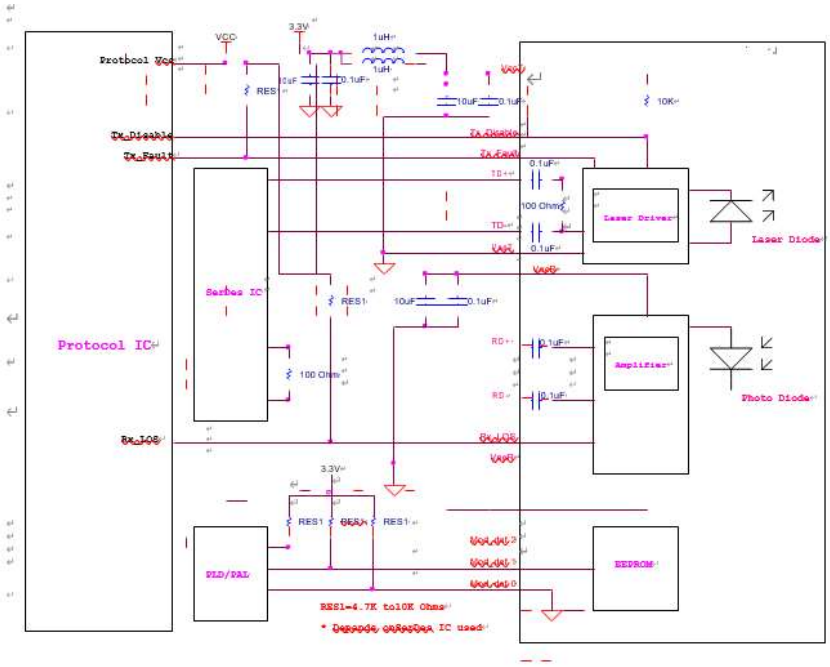
Additionally, Wavesplitter SFP transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage .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.

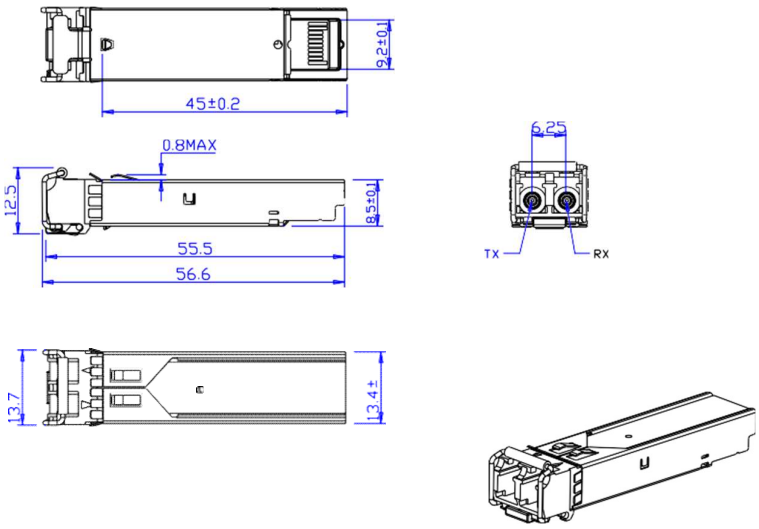
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host.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

Recommended Host - Transceiver Interface Block Diagram



Mechanical Drawing



Unit: mm

Ordering Information

Part No	Specification									
	Package	Data rate per Lane	Laser	Optical Power	Detector	Max. Receive Sensitivity (OMA)	Temp	Reach	Other	Application code
WST-SFP-ZX-C	SFP	1250 Mbps each Channel	1550nm SFP	0 ~ +5 dBm each Channel	PIN	-26 dBm each Channel	0~70°C	80km	DDM RoHS	1.25G Ethernet
WST-SFP-ZX-E	SFP	1250 Mbps each Channel	1550nm SFP	0 ~ +5 dBm each Channel	PIN	-26dBm each Channel	-10~80°C	80km	DDM RoHS	1.25G Ethernet
WST-SFP-ZX-I	SFP	1250 Mbps each Channel	1550nm SFP	0 ~ +5 dBm each Channel	PIN	-26 dBm each Channel	-40~85°C	80km	DDM RoHS	1.25G Ethernet

Modification History

Revision	Date	Description	Originator	Review	Approved
V1.0	25-Sep-2020	New Issue	Elma Yueh	Wayne Liao	Wayne Liao

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