WAVESPLITTER™ TECHNOLOGIES, INC.

Data Sheet

10Gb/s SFP+ 1550nm 80km Optical Transceiver
P/N: WST-SFP+ZR-x

Features:

- Supports data rate up to 11.3Gb/s
- Duplex LC connector
- Hot pluggable SFP+ footprint
- Temperature-Stabilized EML transmitter, APD receiver
- Applicable for 80km G.652 SMF
- Low power consumption:
  Commercial < 1.5W
  Industrial < 1.8W
- Digital Diagnostic Monitor Interface
- Operating case temperature:
  Commercial: 0 to 70°C, WST-SFP+ZR-C
  Industrial: -40 to 85°C, WST-SFP+ZR-I

Applications:

- 10G Ethernet
- OTU2/2e
- 10G FC
- Other Optical Links

Standards:

- Compliant with SFP-8431
- Compliant with SFP-8432
- Compliant with SFP-8472
- Compliant with IEEE802.3ae

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	Vcc	-0.5	3.6	V	
Storage Temperature	TS	-40	85	°C	
Relative Humidity	RH		95	%	

All contents are Copyright © 1996 – 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate	DR		10.3125	11.3	Gb/s	
Supply Voltage	Vcc	3.13	3.3	3.47	V	
Operating Case Temp.	Top	0		70	°C	WST-SFP+ZR-C
		-40		85		WST-SFP+ZR-I

Electrical Characteristics ($T_{OP(I)}$ = 0 to 70 °C, VCC = 3.13 to 3.47 V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current	Icc			450	mA	WST-SFP+ZR-C
				540		WST-SFP+ZR-I
Power Consumption	P			1.5	W	WST-SFP+ZR-C
				1.8		WST-SFP+ZR-I
Transmitter						
Differential data input swing	VINPP	150		1200	mVpp	1
Input differential impedance	Rin	85	100	115	Ω	
Transmit Disable Voltage	VD	2		Vcc+0.3	V	
Transmit Enable Voltage	VEN	0		0.8		
Transmit FAULT Fault		2		Vcc+0.3	V	
Transmit FAULT Normal		0		0.8		
Receiver						
Differential data output swing	Vout,pp	350		700	mVpp	1
Output Impedance (Differential)	Rout	85	100	115	Ω	
LOS asserted	VLOS_F	2		Vcc+0.3	V	2
LOS de-asserted	VLOS_N	0		0.8		2
MOD_DEF (0:2) VoH		2.5			V	With Serial ID
MOD_DEF (0:2) VoL		0		0.5		With Serial ID

Notes:

1. CML logic, internally AC coupled.
2. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

All contents are Copyright © 1996 - 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary

Optical Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Operating Wavelength	λ	1530	1550	1565	nm	
RMS spectral width	Δλ			1	nm	
Ave. output power (Enabled)	PAVE	0		4	dBm	1
Side-Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	8.2			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Power of OFF Transmitter	Poff			-30	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	2
Output Optical Eye	Compliant with IEEE 0802.3ae					
Receiver						
Operating Wavelength	λ	1270		1610	nm	
Receiver Sensitivity	PSEN1			-23	dBm	3
Receiver Overload	Pmax	-6			dBm	
LOS Assert	Pa	-35			dBm	
LOS De-assert	Pd			-25	dBm	
LOS Hysteresis	Pd-Pa	0.5			dB	

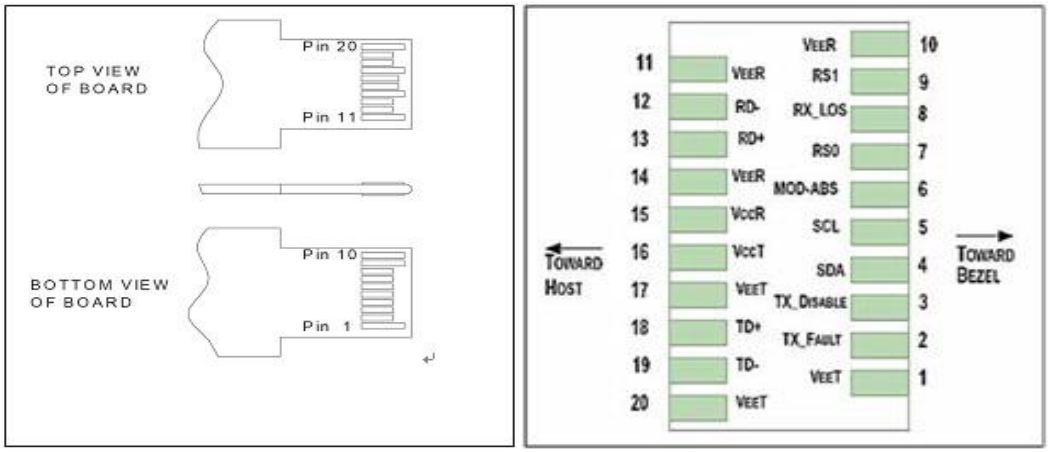
Notes:

1. Output is coupled into a 9/125um SMF.
2. 12dB reflection.
3. Measured with worst ER, BER less than 1E-12 and PRBS 2^{31}-1 at 10.3125Gbps.

.

All contents are Copyright © 1996 - 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary

Pin Assignment



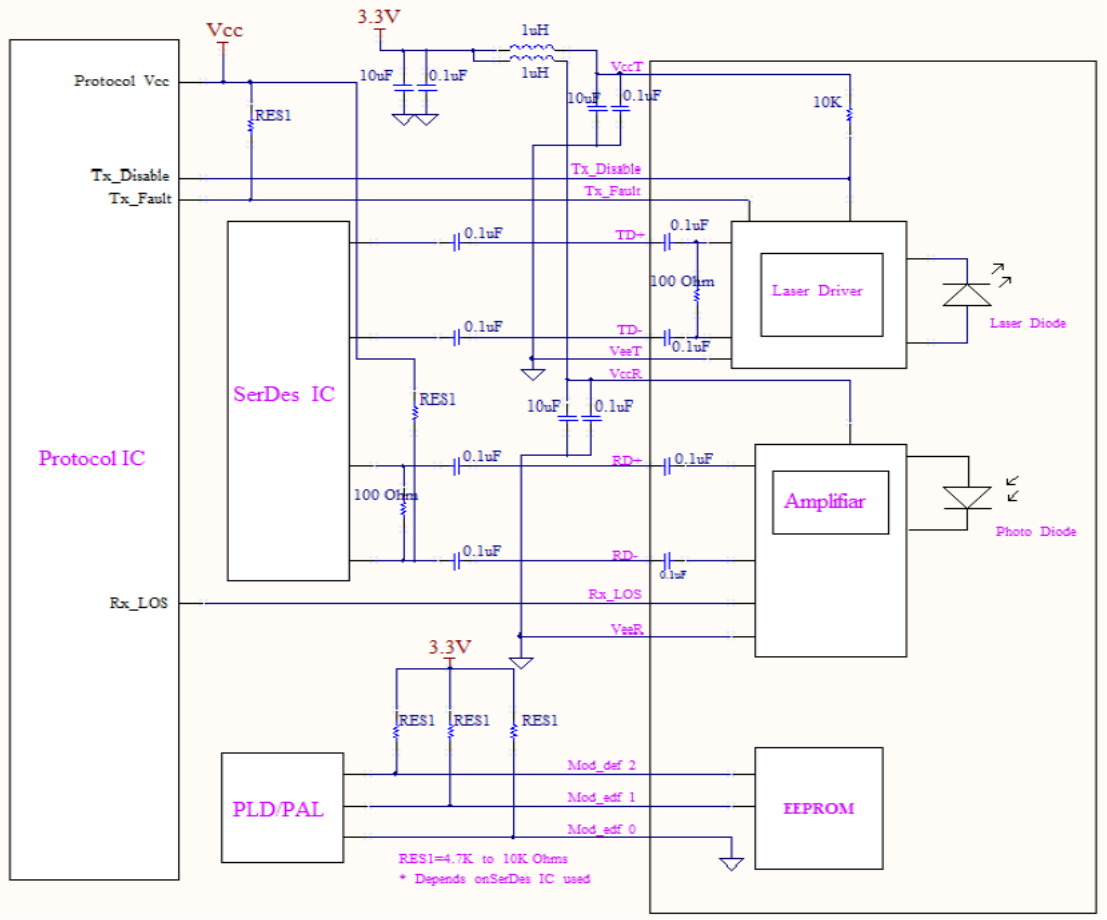
Pin	Symbol	Name/Description
1	VEET [1]	Module transmitter ground
2	Tx_FAULT [2]	Module transmitter fault
3	Tx_DIS [3]	Transmitter Disable; Turns off transmitter laser output
4	SDA [2]	2 wire serial interface data input/output (SDA)
5	SCL [2]	2 wire serial interface clock input (SCL)
6	MOD_ABS [4]	Module Absent, connect to VeeR or VeeT in the module
7	RS0 [5]	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s
8	RX_LOS [2]	Receiver Loss of Signal Indication
9	RS1 [5]	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s
10	VEER [1]	Module receiver ground
11	VEER [1]	Module receiver ground
12	RD-	Receiver inverted data out put
13	RD+	Receiver non-inverted data out put
14	VEER [1]	Module receiver ground
15	VCCR	Module receiver 3.3V supply
16	VCCT	Module transmitter 3.3V supply
17	VEET [1]	Module transmitter ground
18	TD+	Transmitter inverted data out put
19	TD-	Transmitter non-inverted data out put
20	VEET [1]	Module transmitter ground

All contents are Copyright © 1996 - 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary

Notes:

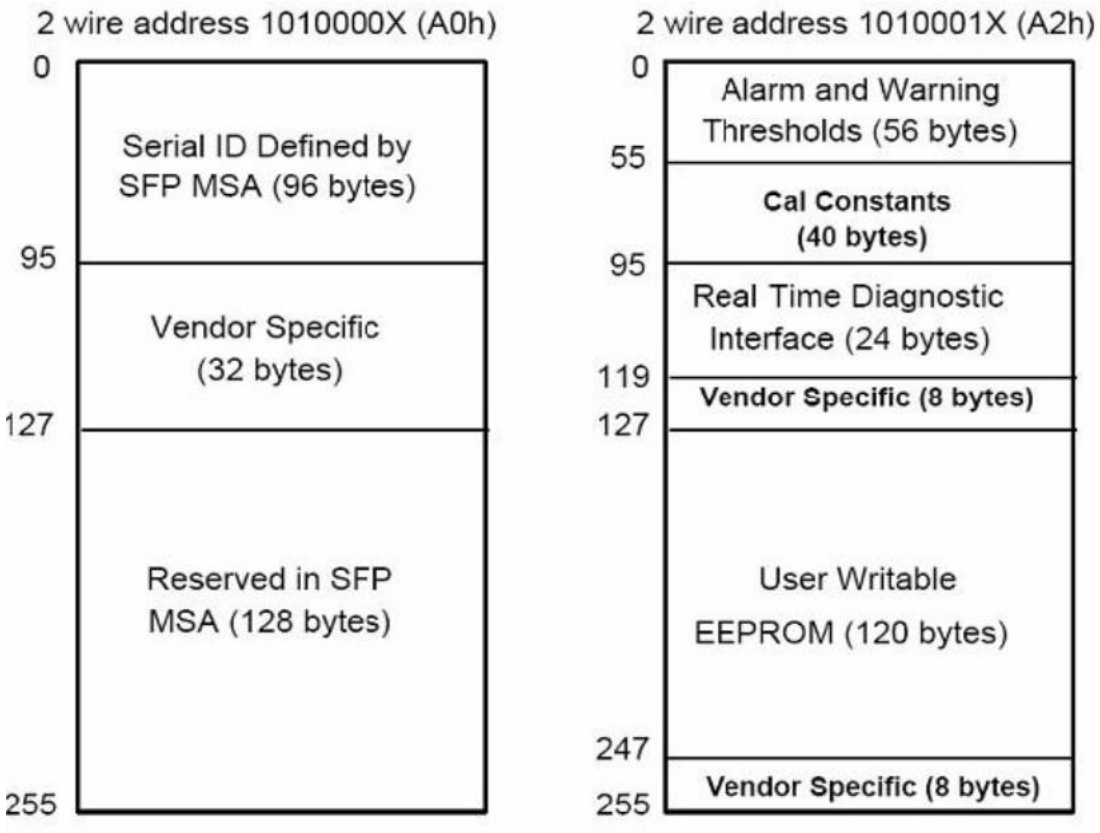
1. Module circuit ground is isolated from module chassis ground within the module.
2. Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.
3. Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.
4. Mod_ABS is connected to VeeT or 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.
5. RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

Recommended Typical Application Circuit



All contents are Copyright © 1996 - 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary

EEPROM Memory Map



Digital Diagnosti Specifications

WST-SFP+ZR-x transceivers can be used in host systems that require either internally or externally calibrated digital diagnostics.

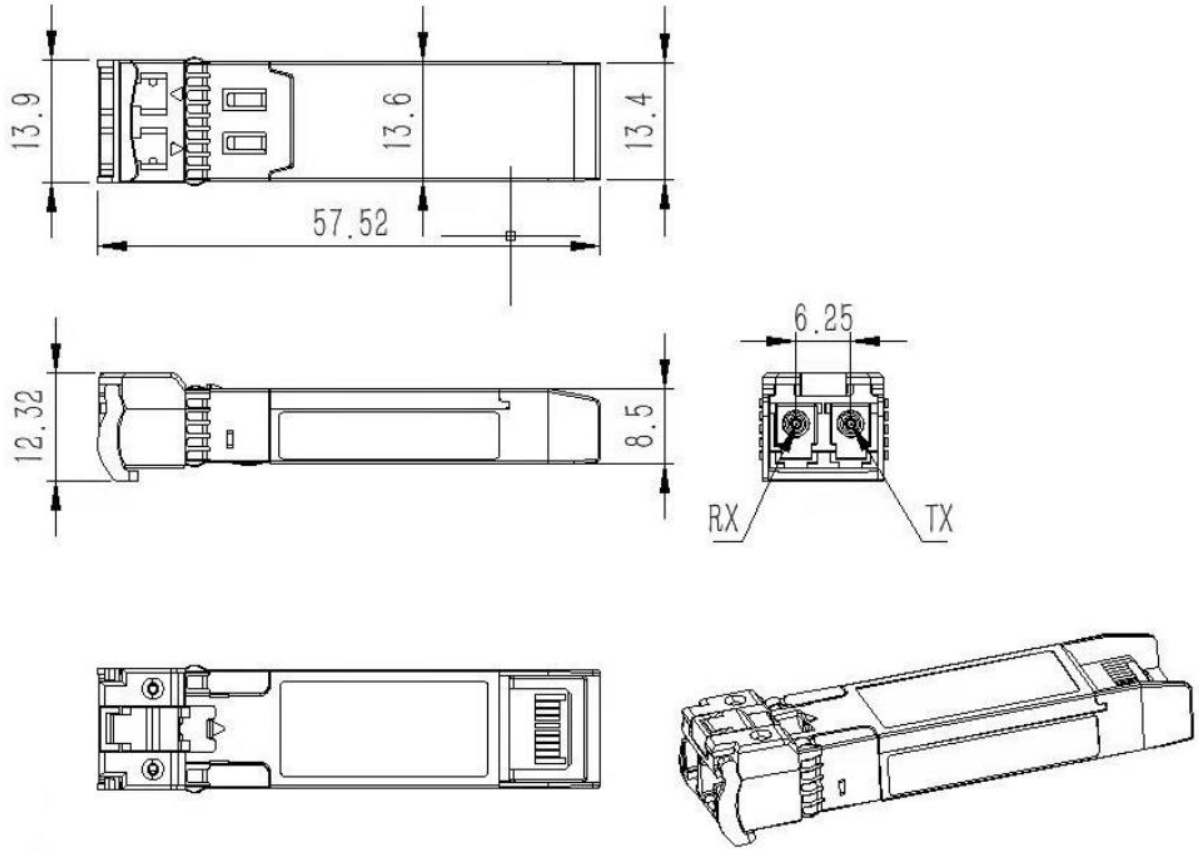
Parameter	Symbol	Units	Accuracy	Note
Transceiver temperature	DTemp-E	ºC	±5ºC	1
Transceiver supply voltage	DVoltage	V	±3%	
Transmitter bias current	DBias	mA	±10%	2
Transmitter output power	DTx-Power	dBm	±2dB	
Receiver average input power	DRx-Power	dBm	±3dB	

Notes:

1. Internally measured
2. The accuracy of the Tx bias current is 10% of the actual current from the laser driver to the laser

All contents are Copyright © 1996 - 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary

Mechanical Drawing



Unit: mm

All contents are Copyright © 1996 - 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary

Ordering Information

Part No	Specification									
	Package	Data rate	Laser	Optical Power	Detector	Max. Receive Sensitivity (OMA)	Temp	Reach	Other	Application Code
WST-SFP+ZR-C	SFP+	10.3125 Gb/s	1550nm EML	0~ +4 each	APD	-23 dBm each	0~70°C	80km	DDM RoHS	10GBASE ZR
WST-SFP+ZR-I	SFP+	10.3125 Gb/s	1550nm EML	0~ +4 each	APD	-23 dBm each	-40~85°C	80km	DDM RoHS	10GBASE ZR

Modification History

Revision	Date	Description	Originator	Review	Approved
V1.0	Jul-04-2023	New Issue	Shao Yu	Ken cheng	Wayne Liao

All contents are Copyright © 1996 - 2023 Wavesplitter Technologies, Inc. All rights reserved. Preliminary and Proprietary