WAVESPLITTER™ TECHNOLOGIES, INC.

Data Sheet

25Gb/s SFP28 1270nm/1310nm BIDI 40km Transceiver
P/N: WST-S28-BX4A-xx

Features:

- Up to 25.78Gbps Data Links
- Up to 40km transmission on SMF
- 1270nm/1310nm DFB Laser and APD receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP28 footprint with LC connector
- Specifications compliant with SFF 8472, 8431, 8432, and 8402
- Single 3.3V power supply
- Power dissipation < 1.5 W
- Case operating temperature

  Commercial: 0°C to +70°C, WST-S28-BX4-xC

  Industrial: -40°C to +85°C, WST-S28-BX4-xI
- RoHS Compliant

Applications:

- 25GBASE-ER
- eCPRI and CPRI

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T_s	-40	-	85	ºC	
Relative Humidity	R_H	5	-	95	%	
Power Supply Voltage	V_{CC}	-0.3	-	4	V	
Signal Input Voltage	V_{SI}	Vcc-0.3	-	Vcc+0.3	V	
Rx Damage Threshold	PR_{dmg}	-3			dBm	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0	-	70	ºC	WST-S28-BX4A-xC
		-40		85	ºC	WST-S28-BX4A-xI
Power Supply Voltage	V_{CC}	3.14	3.3	3.47	V	
Power Supply Current	I_{CC}	-		420	mA	WST-S28-BX4A-xC
		-		450	mA	WST-S28-BX4A-xI
Data Rate	BR		25.78		Gbps	TX Rate/RX Rate
Transmission Distance	TD			40	km	
Coupled fiber	Single mode fiber					9/125um SMF

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Input differential impedance	Rin		100		Ω	1
Single ended data input swing	Vin,pp	180		700	mV	
Transmitter Fault Output-High	V_{FaultH}	2	-	Vcc+0.3	V	
Transmitter Fault Output-Low	V_{FaultL}	0	-	0.8	V	
Transmitter Disable Voltage- High	V_{DisH}	2	-	Vcc+0.3	V	
Transmitter Disable Voltage- low	V_{DisL}	0	-	0.8	V	
Receiver						
Differential data output swing	Vout,pp	300		850	mV	2
LOS Output Voltage-High	V_{LOSH}	2	-	Vcc+0.3	V	
LOS Output Voltage-Low	V_{LOSL}	0	-	0.8	V	

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Into 100 ohms differential termination.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Average Launched Power	P_O	0		6	dBm	
Average Launched Power(Laser Off)	P_{off}	-	-	-30	dBm	
Center Wavelength Range	Λ_C	1260	-	1280	nm	1270Tx/1310Rx
		1300		1320	nm	1310Tx/1270Rx
Spectrum Bandwidth(-20dB)	$\Delta\lambda$	-	-	1	nm	
Side-Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	3.5		-	dB	Note (1)
Output Eye Mask	{0.31,0.4,0.45,0.34,0.38,0.4}					
Receiver						
Center Wavelength Range	λ_C	1300		1320	nm	1270Tx/1310Rx
		1260	-	1280	nm	1310Rx/1270Tx
Input Saturation Power (Overload)		-6			dBm	
Receiver Sensitivity (Average power)	P_{sen}	-	-	-17.5	dBm	Note (2)
Los Of Signal Assert	P_A	-35	-	-	dBm	
Los Of Signal De-assert	P_D	-	-	-19	dBm	
LOS -Hysteresis	P_{Hys}	0.5	2	6	dB	

Notes:

1. Measured with a PRBS 2^{31}-1 test pattern, @25.78Gb/s.
2. Measured with Light source 1270nm/1310nm ER=3.5dB; BER =<5X10-5 @PRBS=2^{31}-1 NRZ.

Pin Assignment

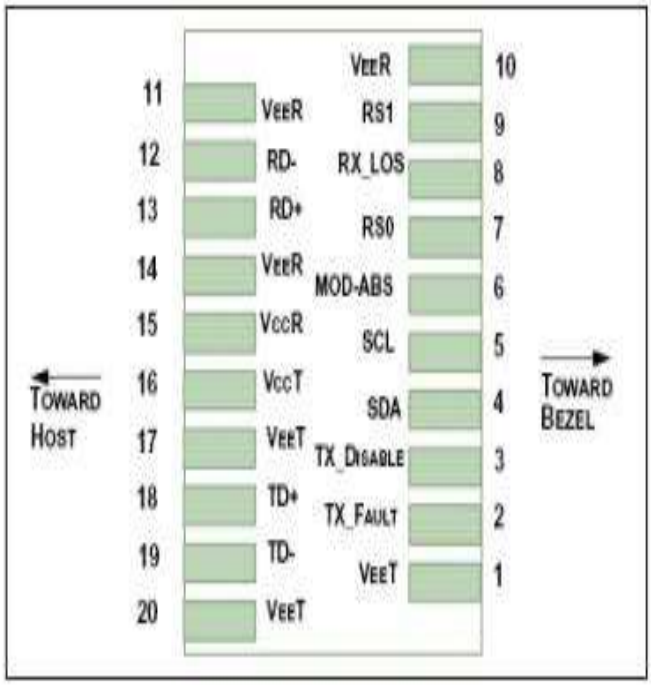


Diagram of Host Board Connector Block Pin Numbers and Name

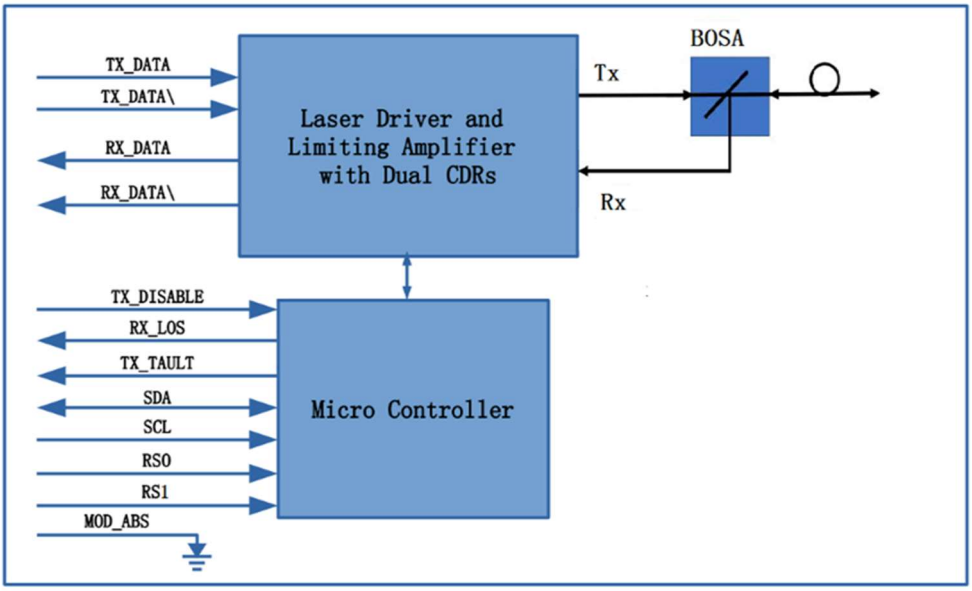
Pin	Symbol	Name/Description	NOTE
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0, internal pull down	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	Rate Select 1, internal pull down	5
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

Pin	Symbol	Name/Description	NOTE
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

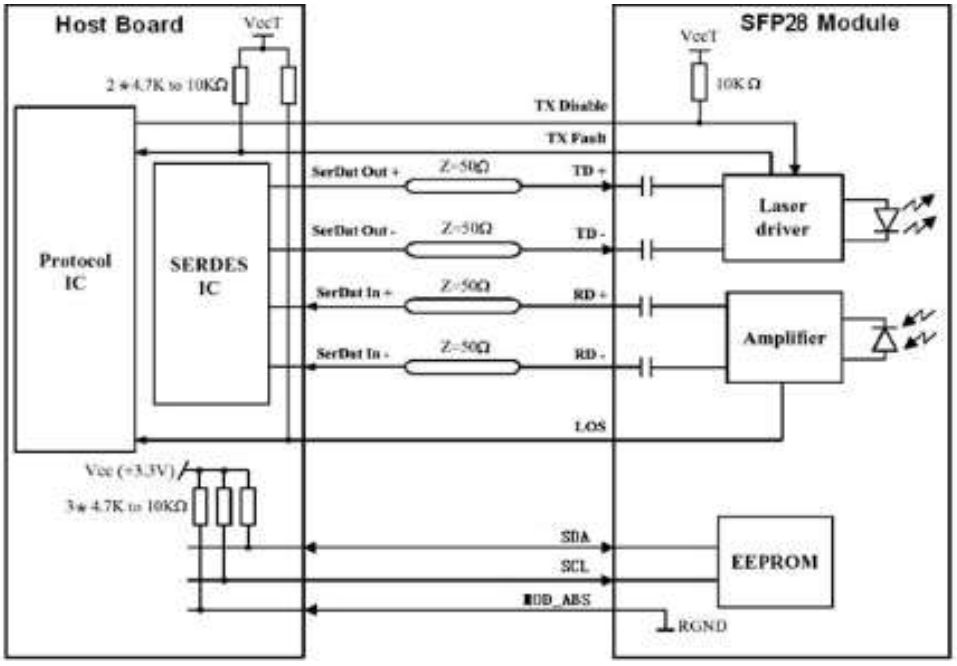
Notes:

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 T_{DIS}>2.0V or open, enabled on T_{DIS}<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. Rate select can also be set through the 2-wire bus in accordance with SFF-8472. Rx Rate Select is set at Bit 3, Byte 110, Address A2h. Tx Rate Select is set at Bit 3, Byte 118, Address A2h.
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.

Recommended Host - Transceiver Interface Block Diagram



Recommended Typical Application Circuit

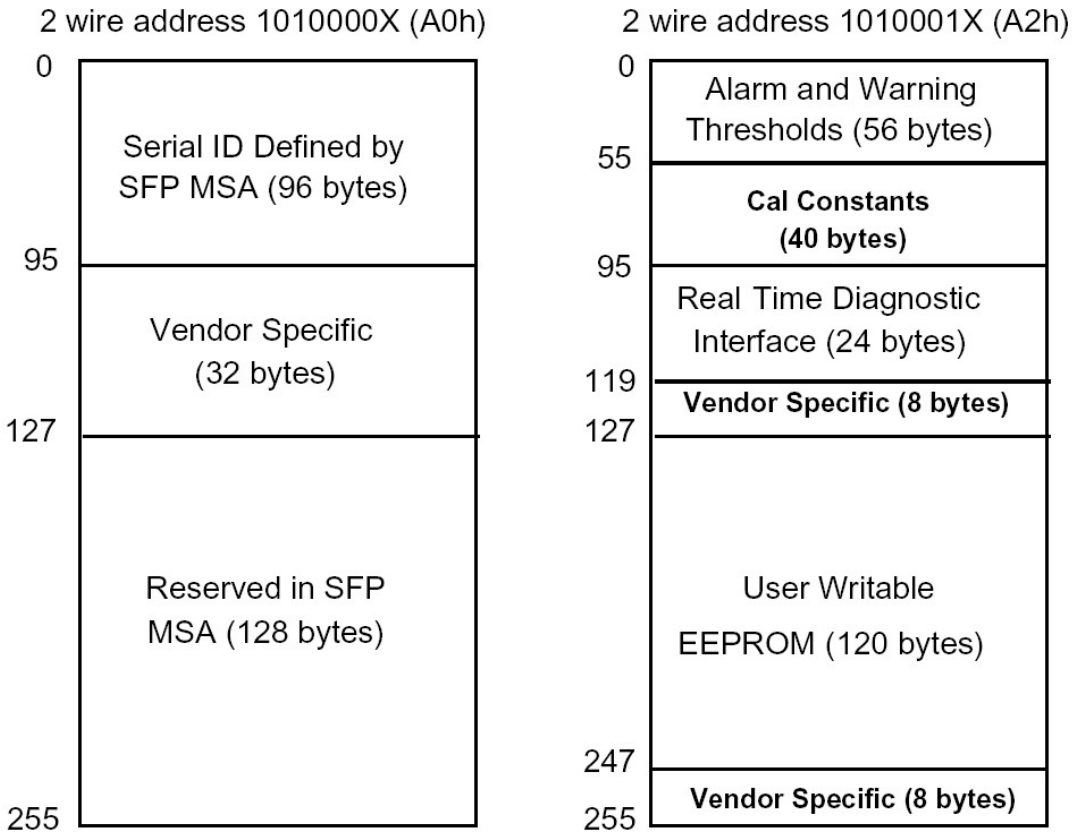


Digital Diagnostic Memory Map (Compliant with SFF-8472)

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following (For further information, please refer to SFF-8472).

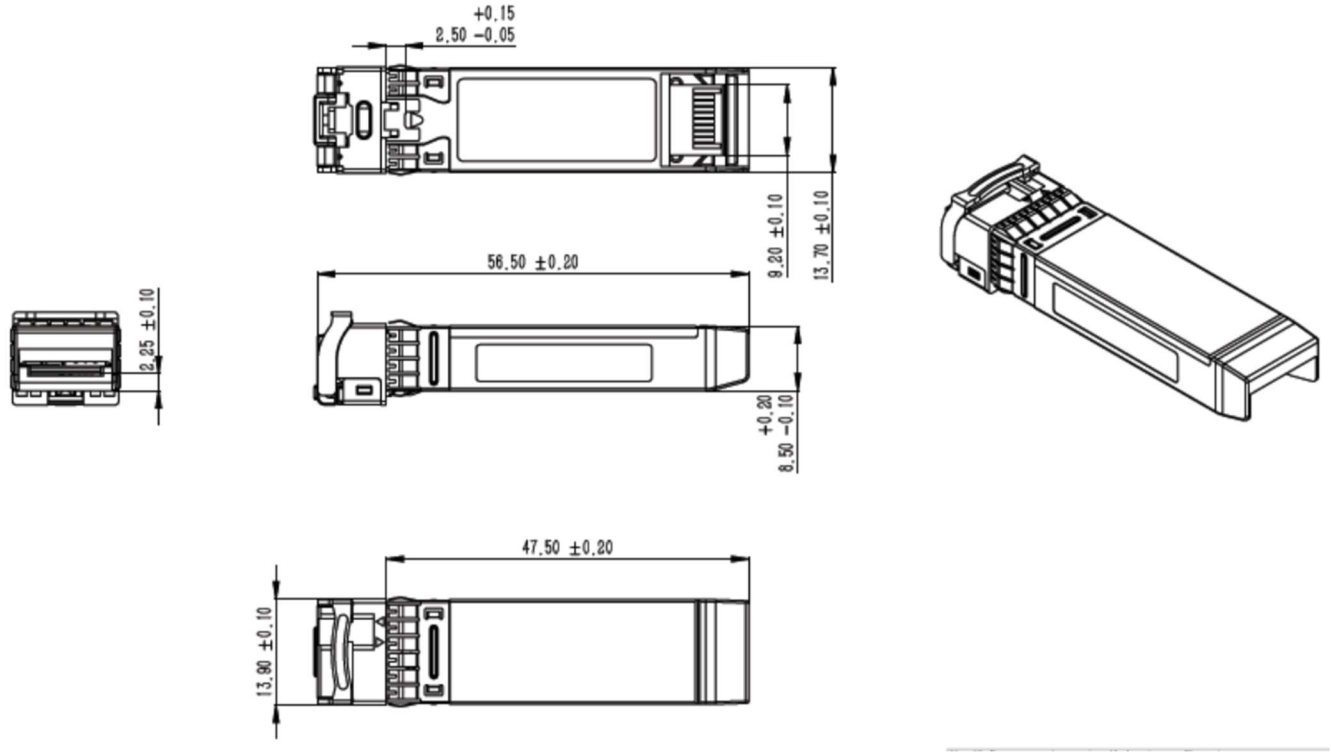


Digital Diagnostic Functions/ Diagnostic Monitoring Interface (DDM/DDMI)

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales stuff.

Parameter	Symbol	Min.	Max.	Unit
Temperature Monitor Absolute Error	DMI_Temp	-3	3	°C
Laser Power Monitor Absolute Error	DMI_TX	-3	3	dB
RX Power Monitor Absolute Error	DMI_RX	-3	3	dB
Supply Voltage Monitor Absolute Error	DMI_VCC	-3%	3%	V
Bias Current Monitor Absolute Error	DMI_Ibias	-10%	10%	mA

Mechanical Drawing



Unit: mm

Ordering Information

Part No	Specification									
	Package	Data rate	Laser	Tx Optical Power	Detector	Max. Rx OMA Sensitivity	Temp	Reach	Other	Application code
WST-S28-BX4A-UC	SFP28	25.78 Gbps	1270nm DFB	0~ +6 dBm	PIN	-17.5 dBm	-0~70°C	40km	DDM RoHS	eCPRI &25G Ethernet
WST-S28-BX4A-DC	SFP28	25.78 Gbps	1310nm DFB	0~ +6 dBm	PIN	-17.5 dBm	-0~70°C	40km	DDM RoHS	eCPRI &25G Ethernet
WST-S28-BX4A-UI	SFP28	25.78 Gbps	1270nm DFB	0~ +6 dBm	PIN	-17.5 dBm	-40~85°C	40km	DDM RoHS	eCPRI &25G Ethernet
WST-S28-BX4A-DI	SFP28	25.78 Gbps	1310nm DFB	0~ +6 dBm	PIN	-17.5 dBm	-40~85°C	40km	DDM RoHS	eCPRI &25G Ethernet

Modification History

Revision	Date	Description	Originator	Review	Approved
V1.0	06-Nov-2020	New Issue	Elma Yueh	Wayne Liao	Wayne Liao

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