SFP-25GBASE-ZR-PRO

MSA and TAA Compliant 25GBase-ZR SFP28 Rate Selectable Transceiver (SMF, 1300nm, 80km, DOM, 0 to 70C, LC)

Features

- MSA SFF-8472 Compliance
- Single-mode Fiber
- Duplex LC Connector
- 25GbE applications with FEC on host side
- EML Class 1 laser (IEC 60825) on transmitter side
- Single 3.3V power supply
- Hot Pluggable
- Built-in dual CDR
- RoHS Compliant and Lead Free
- Commercial Temperature 0 to 70 Celsius

Applications:

- 25GBase-ER Ethernet

Product Description

This MSA Compliant SFP28 transceiver provides 25GBase-ZR throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1300nm via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Proline's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products.

Rev. 022824

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.465	V	
Supply Voltage	Vcc	-0.5	4.0	V	
Power Supply Current	Icc		722	mA	
Storage Temperature	Tstg	-40	85	°C	
Operating Case Temperature	Tc	0	70	°C	
Operating Relative Humidity	RH	0	85	%	1

Notes:

1. Non-condensing.
2. Exceeding any one of these values may destroy the device permanently.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
CML Differential Inputs	VIN			900	mVp-p	1
Input Differential Impedance	ZIN	90		110	Ω	
Tx_Disable Input Voltage – High		2		Vcc+0.3	V	
Tx_Disable Input Voltage – Low		-0.3		0.8	V	
Receiver						
CML Differential Outputs	VOUT	300		900	mVp-p	2
Output Differential Impedance	ZOUT	90		110	Ω	
Rx_LOS Output Voltage – High		2.4		Vcc+0.3	V	
Rx_LOS Output Voltage – Low		-0.3		0.8	V	

Notes:

1. AC coupled inputs.
2. AC coupled outputs.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Signaling Speed	BRAVE		25.78		Gbps	
Center Wavelength	λC	1299.02	1300.05	1301.09	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Side-Mode Suppression Ratio	SMSR	30				
Average Output Power @ 25.78Gbps	POUT	2		7	dBm	
Optical Modulation Amplitude	POMA	3.7		8.8	dBm	
Average Launch Power of Off Transmitter	Poff			-30	dBm	
Extinction Ratio	ER	8			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	
Relative Intensity Noise	RIN			-130	dB/Hz	
Transmitter Reflectance				-26	dB	
Transmitter Eye Mask Definition: (X1, X2, X3, Y1, Y2, Y3)		(0.31, 0.40, 0.45, 0.34, 0.38, 0.40)				1
Receiver						
Signaling Speed	BRAVE		25.78		Gbps	
Center Wavelength	λC	1299.02	1300.05	1301.09	nm	
Receiver Sensitivity (OMA)	Rx_SENS			-26.5	dBm	2
Receiver Sensitivity After 80km Fiber Propagation (OMA)	Rx_SENS			-25.5	dBm	2
Damage Threshold	Pdamage	-5			dBm	
Receiver Overload	Pmax	-6			dBm	3
Receiver Reflectance				-26	dB	
LOS De-Assert	LOSD			-29.5	dBm	
LOS Assert	LOSA	-40		-32.5	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Hit ratio $5E^{-5}$ hits per sample.
2. Measured with data rate at 25.78Gbps, BER<$5E^{-5}$, and PRBS 2^{31}-1. Link attenuation needs to be less than the worst case specified for IEC 60793-2-50 type B1.1, type B1.3, or type B6_a single-mode fiber.
3. The module is targeted for long reach applications with high-power transmitters. Please ensure at least 10dB optical attenuation for optical loopback test.

Pin Descriptions

Pin	Symbol	Name/Description	Plug Sequence	Notes
1	VeeT	Transmitter Ground	1	5
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	3	2
4	SDA	Module Definition 2. 2-Wire Serial Interface Data.	3	
5	SCL	Module Definition 1. 2-Wire Serial Interface Clock.	3	
6	MOD_ABS	Module Definition 0.	3	3
7	RS0	Rx Rate Select. LVTTL. Rate Select 0. Optionally controls the SFP28 module receiver. This pin is pulled low to the VeeT with a >30K resistor.	3	
8	Rx_LOS	Loss of Signal.	3	4
9	RS1	Tx Rate Select. LVTTL. Rate Select 1. Optionally controls the SFP28 module transmitter. This pin is pulled low to the VeeT with a >30K resistor.	1	
10	VeeR	Receiver Ground.	1	5
11	VeeR	Receiver Ground.	1	5
12	RD-	Inverted Received Data Out.	3	6
13	RD+	Received Data Out.	3	6
14	VeeR	Receiver Ground.	1	5
15	VccR	Receiver Power. 3.3V±5%.	2	7
16	VccT	Transmitter Power. 3.3V±5%.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmit Data In.	3	8
19	TD-	Inverted Transmit Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

Notes:

1. Tx_Fault is an open collector/drain output which should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage between 2.4V and VccT/R+0.3V. When “high,” output indicates a laser fault of some kind. “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.4V.
2. Tx_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:

   Low (-0.3V-0.8V): Transmitter On.

   (>0.8V, <2.0V): Undefined.

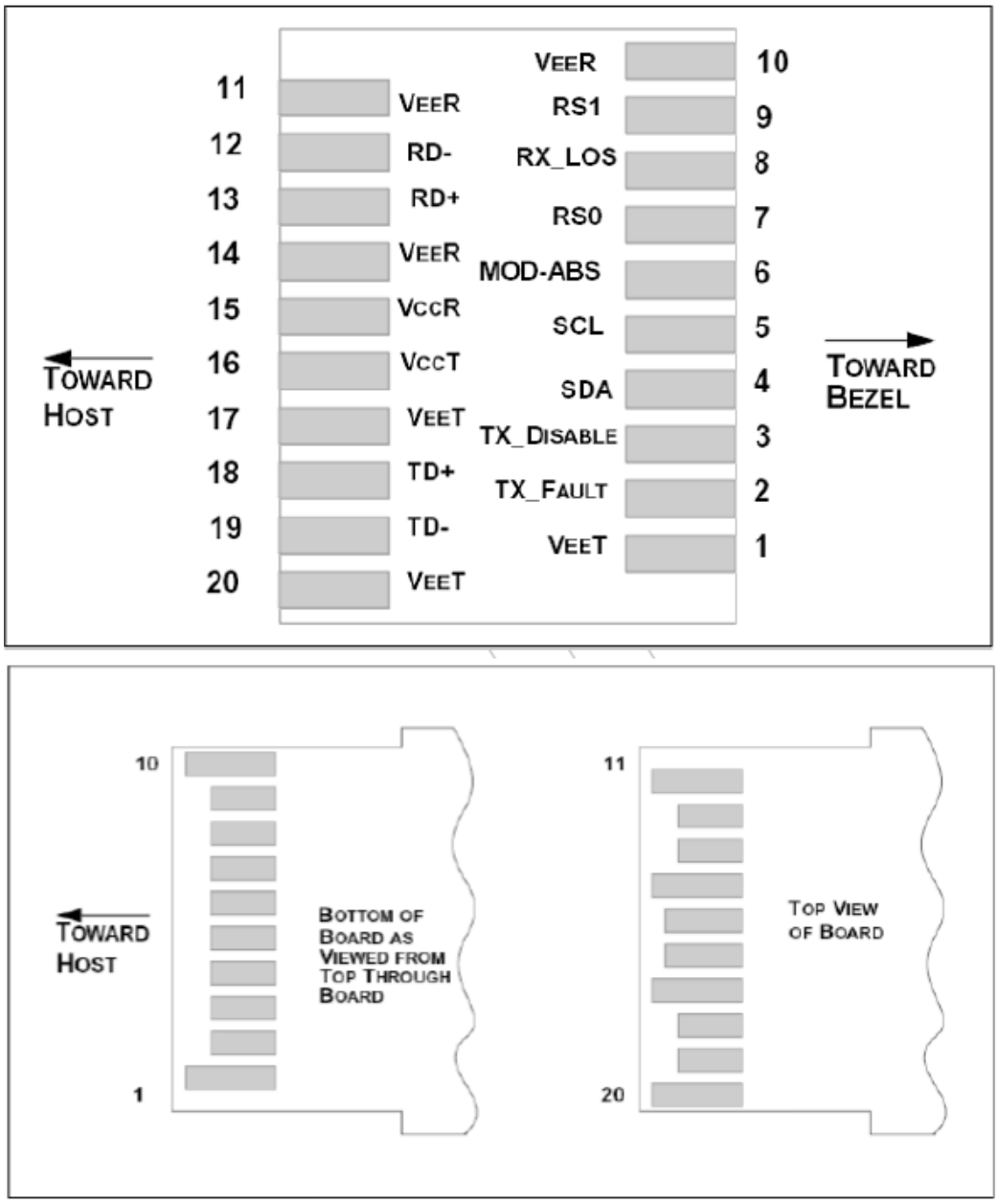
   High (2.0V-VccT/R+0.3V): Transmitter Disabled.

   Open: Transmitter Disabled.
3. Module Absent. Connected to the VeeT or VeeR in the module.
4. Rx_LOS (Loss of Signal) is an open collector/drain output which should be pulled up with a 4.7kΩ to 10kΩ resistor. Pull-up voltage is between 2.4V and VccT/R+0.3V. When “high,” this output indicates that the received optical power is below the worst-case receiver sensitivity (as defined by the standard in

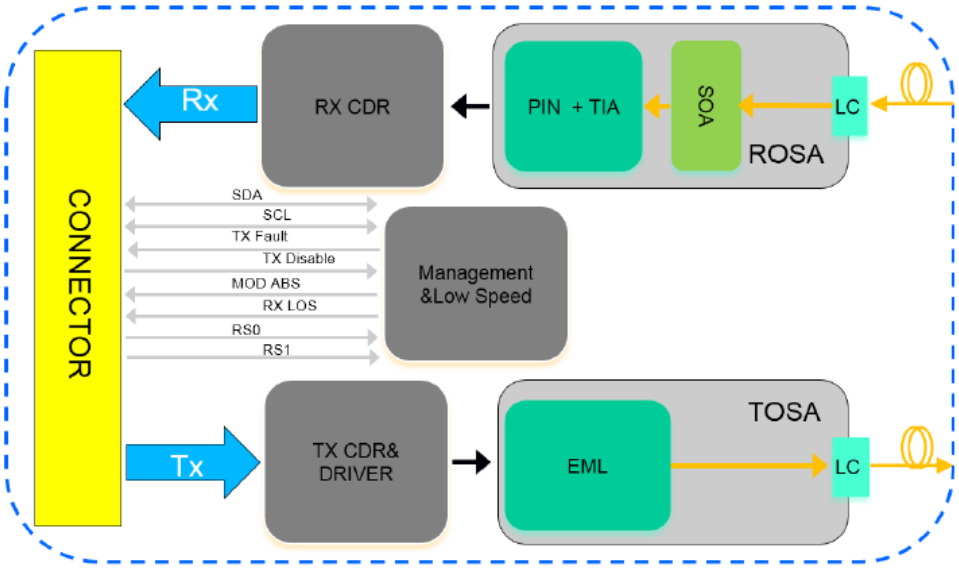
use). “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.4V.

5. VeeR and VeeT may be internally connected within the SFP28 module.
6. RD-/+. These are the differential receiver outputs. They are AC coupled 100Ω, differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 150mV and 500mV differential when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP+ connector pin. Maximum supply current is 500mA per PIN. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP28 input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP28 transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP28 transceiver module.
8. TD-/+. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept swings of maximum 450mV single-ended, though it is recommended that values that are less than 900mV differential swing be used for best EMI performance.

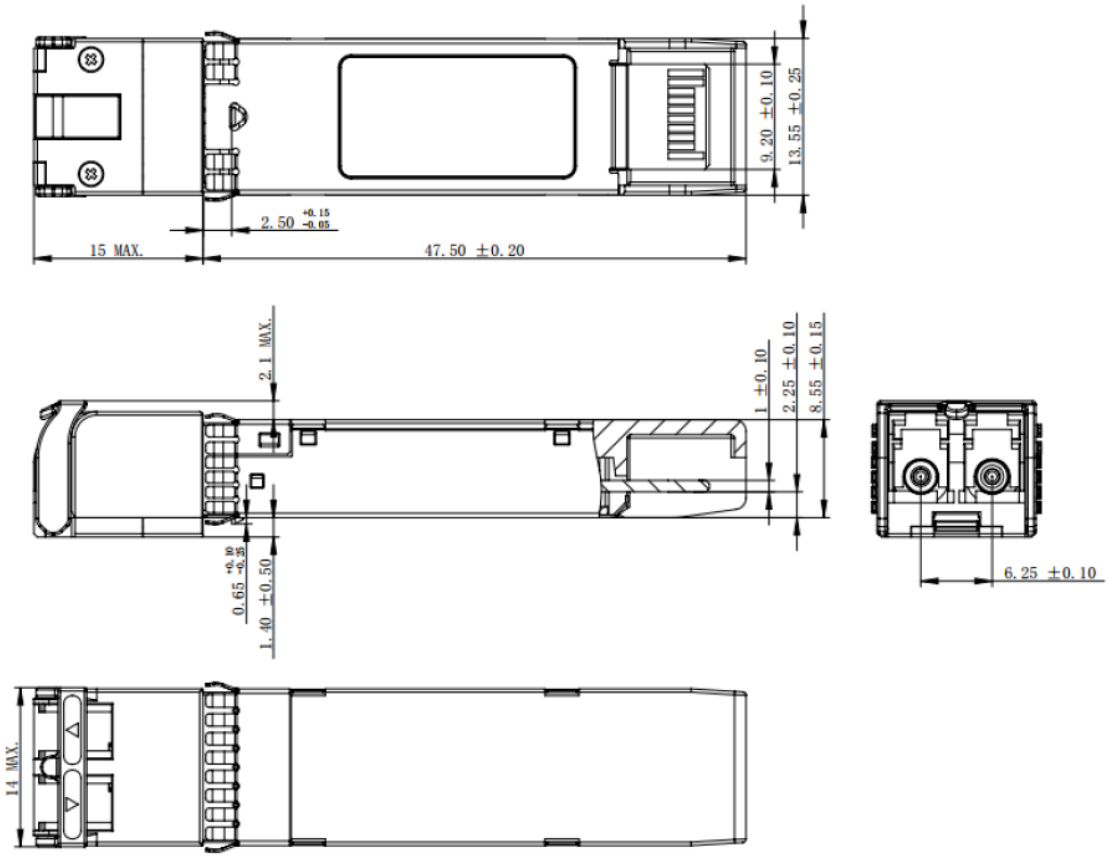
SFP28 Transceiver Electrical Pad Layout



Functional Block Diagram



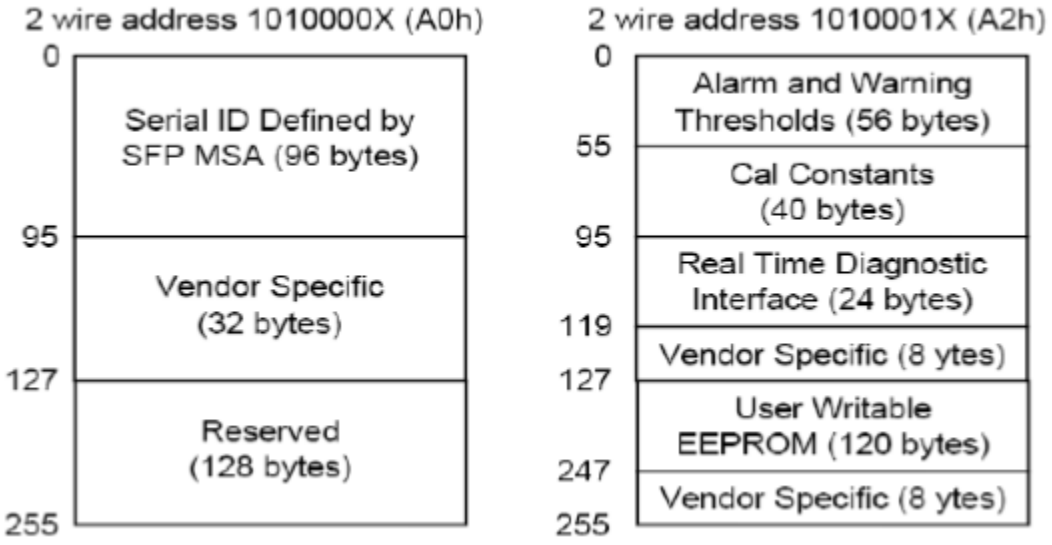
Mechanical Specifications



EEPROM Information

The serial interface uses the 2-wire serial CMOS EEPROM protocol. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not writing protected within the SFP28 transceiver. The negative edge clocks data from the SFP28 transceiver. The serial data signal (SDA) 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.

The module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring, and temperature monitoring all are implemented. If the module is defined as external calibrated, the diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2H. The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 12.4.



About Us:

Proline Options is one of North America's leading providers of transceivers and high speed cabling. With a reputation for quality, tested products that cover the connectivity spectrum, Proline Options has a solution for you regardless of the specification.

At Proline Options, every product is tested in its intended application - never batch or spec tested only. We run bandwidth, distance and IOS network tests. We have documented an impressive 0.03% failure rate over the last 10 years. To continue this rate of success we invest millions annually in our own on-site testing lab.

Tel: 855.933.3223
Email: sales@prolineoptions.com
Email: techsupport@prolineoptions.com
Web: https://www.prolineoptions.com