

### **SFP-25GBASE-ESR-FT-C**

Fortinet® Compatible TAA 25GBase-SR SFP28 Transceiver (MMF, 850nm, 400m, LC, DOM)

#### **Features:**

- SFF-8402 and SFF-8472 Compliance
- Duplex LC Connector
- Multi-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



#### **Applications:**

- 25GBase Ethernet

#### **Product Description**

This Fortinet® SFP28 transceiver provides 25GBase-SR throughput up to 400m over multi-mode fiber (MMF) using a wavelength of 850nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Fortinet® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. 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.

ProLabs' 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."



## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

## Absolute Maximum Ratings

Parameter	Symbol	Min.		Max.	Unit
Maximum Supply Voltage	V <sub>CC</sub>	-0.5		4.0	V
Storage Temperature	T <sub>S</sub>	-40		85	°C
Operating Case Temperature	T <sub>C</sub>	0	25	70	°C
Operating Humidity	RH	5		85	%
Receiver Power	R <sub>MAX</sub>			2.5	dBm
Data Rate		10.3	25.78		Gbps

## Electrical Characteristics (TOP=25°C, V<sub>CC</sub>=3.3Volts)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		V <sub>CC</sub>	3.135	3.3	3.465	V	
Power Supply Current		I <sub>CC</sub>			290	mA	
Power Consumption		P <sub>DISS</sub>			1000	mW	
Transmitter							
Differential data input swing		V <sub>in,p-p</sub>	180		700	mVp-p	
Input differential impedance		Z <sub>in</sub>		100		Ω	
TX_FAULT	Transmitter Fault	V <sub>OH</sub>	2.0		V <sub>CC</sub>	V	TX_FAULT
	Normal Operation	V <sub>OL</sub>	0		0.8	V	
TX_DISABLE	Transmitter Disable	V <sub>IH</sub>	2.0		V <sub>CC</sub>	V	TX_DISABLE
	Transmitter Enable	V <sub>IL</sub>	0		0.8	V	
Receiver							
Output Differential Impedance		Z <sub>O</sub>		100		Ω	
Differential Data Output Swing		V <sub>OUT, P-P</sub>	300		850	mVp-p	1
Data Output Rise Time, Fall Time		t <sub>r</sub> , t <sub>f</sub>		30		ps	2
RX_LOS	Loss of signal (LOS)	V <sub>OH</sub>	2.0		V <sub>CC</sub>	V	RX_LOS
	Normal Operation	V <sub>OL</sub>	0		0.8	V	

**Notes:**

1. Internally AC coupled, but requires a external 100Ω differential load termination.
2. 20–80%.
3. LOS is an open collector output. Should be pulled up with 4.7KΩ on the host board.

**Optical Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Launch Optical Power	P <sub>o</sub>	-7.6		+2.4	dBm	1
Extinction Ratio	ER	2			dB	
Center Wavelength Range	λ <sub>c</sub>	840	850	860	nm	
Transmitter Dispersion Penalty @25.78Gb/s	TWDP			4.3	dB	
Spectral Width (RMS) @25.78Gb/s	Δλ			0.6	nm	
Optical Return Loss Tolerance	ORLT			12	dB	
P <sub>out</sub> @TX-Disable Asserted	P <sub>off</sub>			-30	dBm	1
<b>Receiver</b>						
Center Wavelength	λ <sub>c</sub>	840	850	860	nm	
Receiver Sensitivity (P <sub>avg</sub> )	S			-10.3	dBm	2
Receiver Sensitivity (P <sub>avg</sub> )	S			-11.0	dBm	3
Receiver Overload (P <sub>avg</sub> )	P <sub>OL</sub>	2.5			dBm	
Optical Return Loss	ORL	12			dB	
LOS De-Assert	LOS <sub>D</sub>			-11	dBm	
LOS Assert	LOS <sub>A</sub>	-30			dBm	
LOS Hysteresis		0.5			dB	

**Notes:**

1. 50/125μm fiber with NA = 0.2.
2. Measured with PRBS 2<sup>31</sup>-1 at 5e-5 BER @25.78Gb/s.
3. Measured with PRBS 2<sup>31</sup>-1 at 5e-5 BER @10.3Gb/s.

## Pin Descriptions

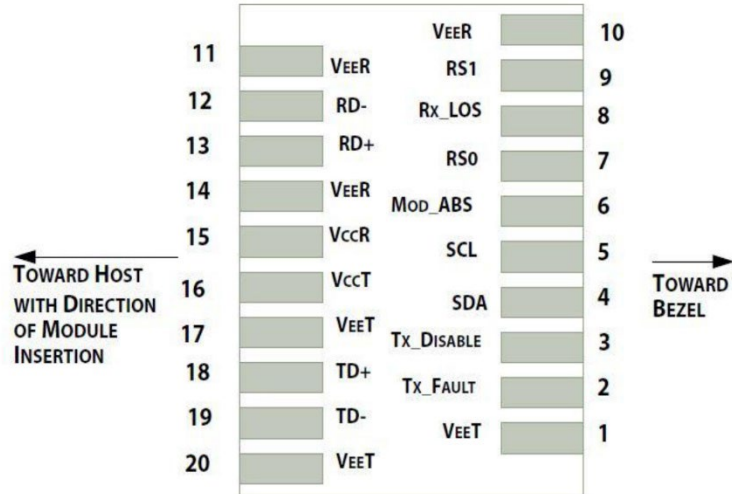
Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault (LVTTTL-O) - High indicates a fault condition	2
3	TX_Disable	Transmitter Disable (LVTTTL-I) – High or open disables the transmitter	3
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	4
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	4
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module	5
7	RS0	Rate Select 0 – Not used, Presents high input impedance	6
8	RX_LOS	Receiver Loss of Signal (LVTTTL-O)	2
9	RS1	Rate Select 1 – Not used, Presents high input impedance	6
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inverse Received Data out (CML-O), AC Coupled	
13	RD+	Received Data out (CML-O), AC Coupled	
14	VeeR	Receiver Ground	
15	VccR	Receiver Power - +3.3V	
16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Data In (CML-I), AC Coupled	
19	TD-	Inverse Transmitter Data In (CML-I), AC Coupled	
20	VeeT	Transmitter Ground	1

## Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.
3. This input is internally biased high with a 4.7KΩ to 10KΩ pull-up resistor to VccT.
4. Two-Wire Serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.
6. Rate select can also be set through the 2-wire bus in accordance with SFF-8472 v. 10.2, Rx Rate Select is set at Bit 3, Byte 110,

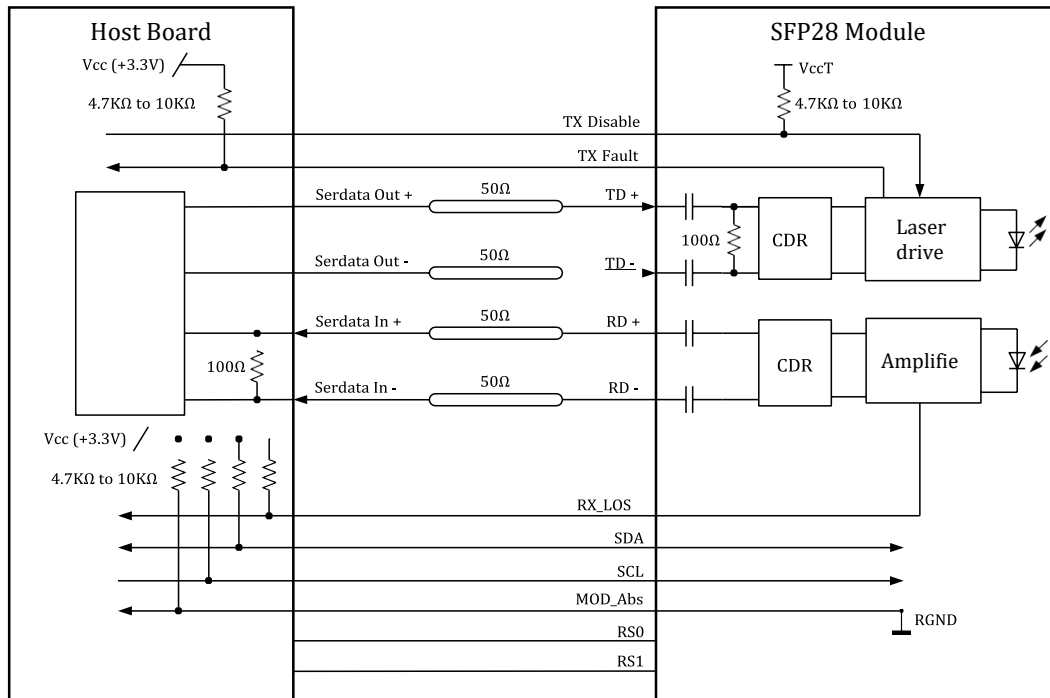
Address A2h. Tx Rate Select is set at Bit 3, Byte 118, Address A2h.

Note: writing a “1” selects maximum bandwidth operation. Rate select is the logic OR of the input state of Rate Select Pin and 2-wire bus.

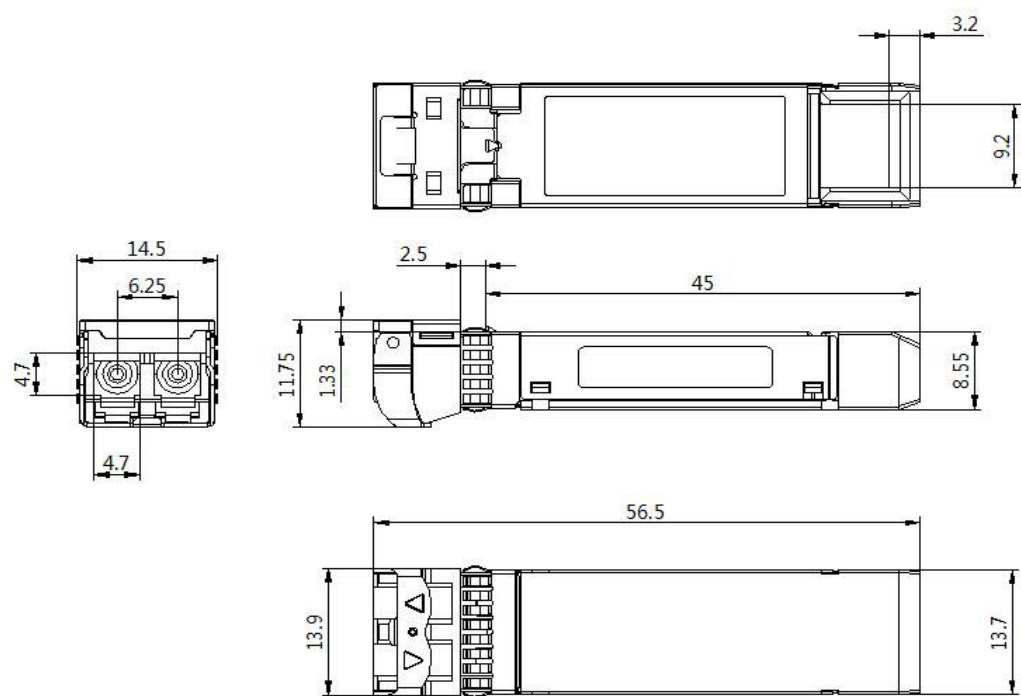


Pin-out of connector Block on Host board

### Recommended Application Interface Block Diagram

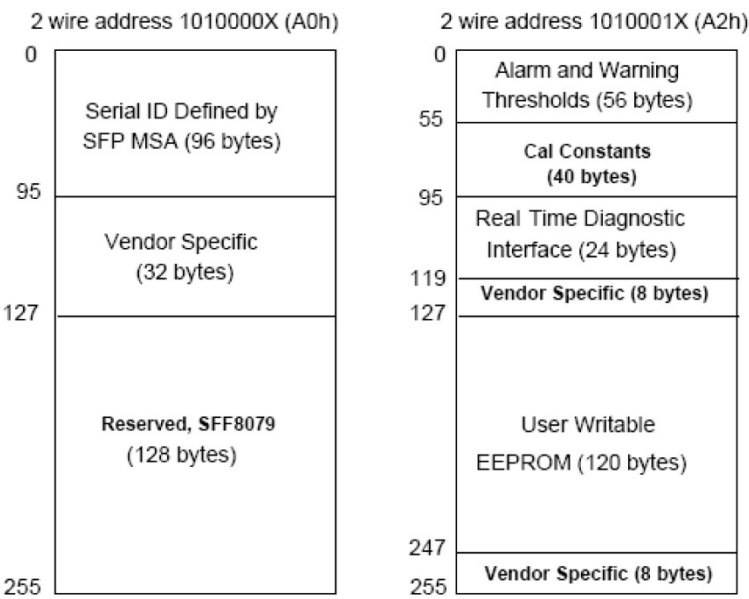


Mechanical Specifications



EEPROM Information

EEPROM memory map specific data field description is as below:



## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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