SFP-32GBASE-LW-C

MSA and TAA 32GBase-LW FC SFP+ Transceiver (SMF, 1310nm, 10km, LC, DOM)

Features:

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free

Applications:

- 32GBase Fibre Channel
- Access and Enterprise

Product Description

This MSA Compliant SFP+ transceiver provides 32GBase-LW Fibre Channel throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm 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.

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."

Rev. 081123

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	Vcc	-0.5	4.0	V
Storage Temperature	TS	-40	85	°C
Operating Case Temperature	Tc	0	70	°C
Operating Humidity (Non-Condensing)	RH	5	85	%
Maximum Bitrate	B_{max}	8.5	28.05	Gbps
Bit Error Rate	BER		10^{-12} 10^{-6}	

Electrical Characteristics (T_A, VCC = 3.15 to 3.46 Volts)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.15		3.46	V	
Power Supply Current		Icc			400	mA	1
Power Consumption		P_{DISS}			1.5	W	
Transmitter							
Differential data input swing	**28.05Gbps**	Vin,pp	250		900	mV	
	14.025Gbps & 8.5Gbps	Vin,pp	180		700	mV	
Input differential impedance		Zin		100		Ω	2
Inner Eye Height		EH6	50			mV	3
Transmit Disable Voltage		VD	2		Vcc	V	4
Transmit Enable Voltage		VEN	Vee		Vee+0.8	V	
Receiver							
Single ended data output swing		Vout, pp	185		425	mV	5
Output differential impedance		Zin		100		Ω	
LOS Fault		VLOS fault	2		VccHOST	V	6
LOS Normal		VLOS norm	Vee		Vee+0.8	V	6
Power Supply Rejection		PSR	100			mVpp	7

Notes:

1. With established link, the total power dissipation shall not exceed 1.3W.
2. Connected directly to TX data input pins. AC coupling from pins into CDR, BER contour 10^{-6}, per FC-PI 6 and FC-MSQS-2.
3. Inner eye height (EH6) for high loss case
4. Or open circuit.
5. Into 100 ohms differential termination.
6. LOS is an open collector output. Should be pulled up with 4.7k – 10kohms on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.
7. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Optical Power (average)	**28.05Gbps/ 14.025Gbps**	P_{OUT}	-5		+2.0	dBm	1,2
	8.5Gbps	P_{OUT}	-8.4		+2.0	dBm	1
Optical Modulation amplitude (OMA)	**28.05Gbps**	OMA	631 (-2.0)		(+3)	μW(dBm)	
	14.025Gbps	OMA	631 (-2.0)		(+3)	μW(dBm)	
	8.5Gbps	OMA	290 (-5.4)		(+3)	μW(dBm)	
Optical Extinction Ratio	**28.05Gbps**	ER	4			dB	
	14.025Gbps/ 8.5Gbps	ER	3.5			dB	
Optical Wavelength		λ	1295		1325	nm	
Spectral Width (-20dB)		σ			1	nm	
Side Mode Suppression Ratio			30			dB	
Transmitter Dispersion Penalty	**28.05Gbps**	TDP			2.7	dB	
	14.025Gbps	TDP			4.4	dB	
	8.5Gbps	TDP			3.2	dB	
Relative Intensity Noise	**28.05Gbps/ 14.025Gbps**	RIN			-130	dB/Hz	
	8.5Gbps	RIN			-128	dB/Hz	
Receiver							
Average Receiver Power		RxMAX			2	dBm	
Unstressed Receiver Sensitivity (OMA)	**28.05Gbps**	RxSENS			-11.4	dBm	3
	14.025Gbps	RxSENS			-12.0	dBm	3
	8.5Gbps	RxSENS			-13.8)	dBm	3
Optical Return Loss	**28.05Gbps**		26			dB	
	14.025Gbps/ 8.5Gbps		12			dB	
LOS De-Assert		LOS_D			-17	dBm	
LOS Assert		LOS_A	-30			dBm	
LOS Hysteresis			0.5			dB	

Notes:

1. Class 1 Laser Safety limit per FDA/CDRH, and EN (IEC) 60825 laser safety standards.
2. 3200-SM-LC-L OMA in dBm shall also exceed -5.0 TDP.
3. For 32GFC with FEC, receiver sensitivity is defined at 10^{-6} BER level, not 10^{-12} BER level.

Pin Descriptions

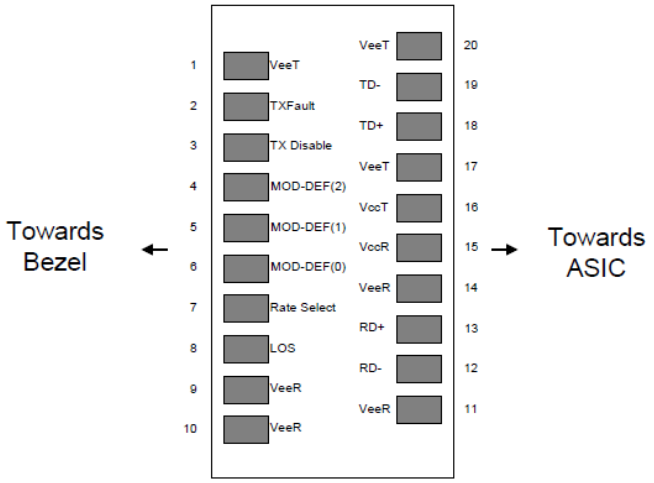
Pin	Symbol	Name/Descriptions	Ref.
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line (MOD-DEF2)	4
5	SCA	2-wire Serial Interface Clock (MOD-DEF1)	4
6	MOD_ABS	Module Absent, connected to V_{EET} or V_{EER}	4
7	RS0	Rx Rate Select: Open or Low = 8.5 or 14.025 Gb/s Fibre Channel (Low Bandwidth) High = 28.05 Gb/s Fibre Channel (High Bandwidth)	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	Tx Rate Select: Open or Low = 8.5 or 14.025 Gb/s Fibre Channel (Low Bandwidth) High = 28.05 Gb/s Fibre Channel (High Bandwidth)	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
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. T_{FAULT} 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 4.7k – 10kohms on 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 v. 12.1c. 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

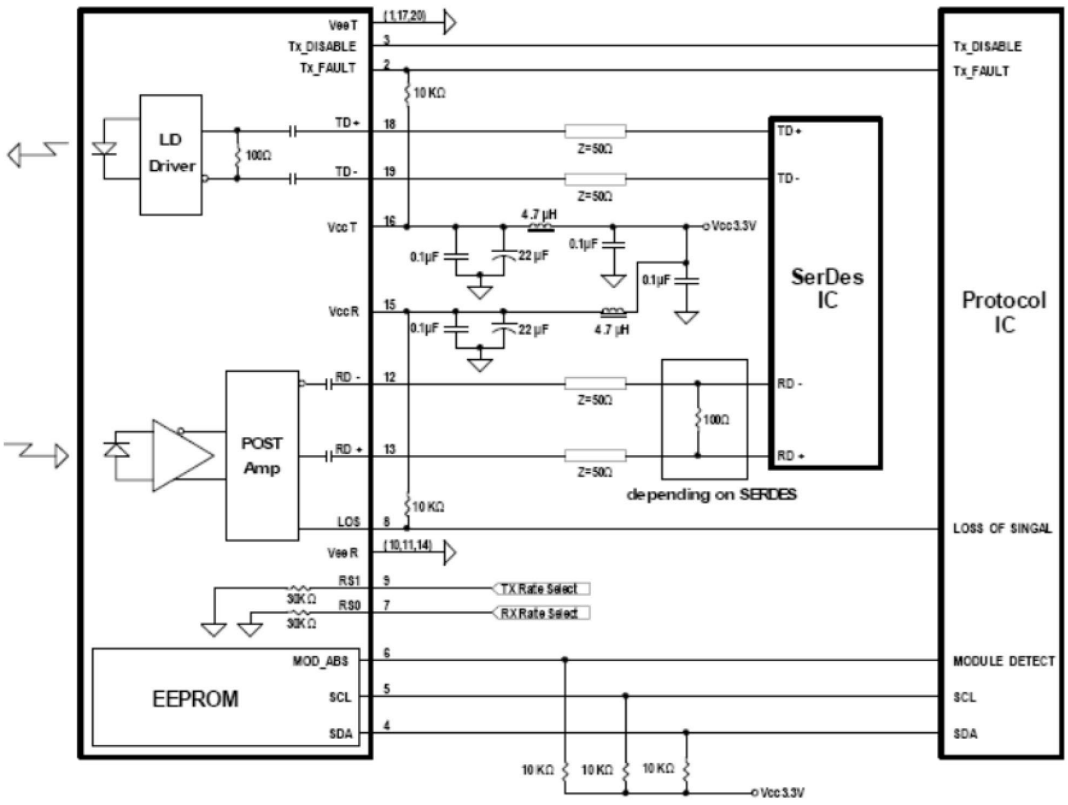
"1" selects maximum bandwidth operation. Rate select is the logic OR of the input state of Rate Select Pin and 2-wire bus.

6. 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.



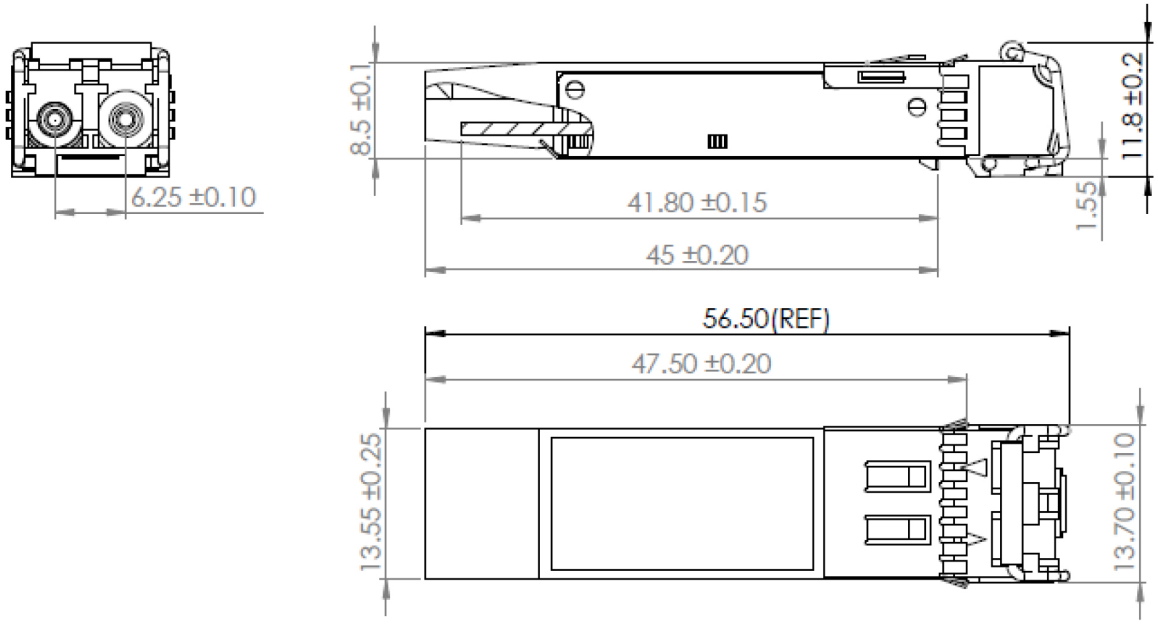
Pin-out of connector Block on Host board

Recommended Circuit Schematic



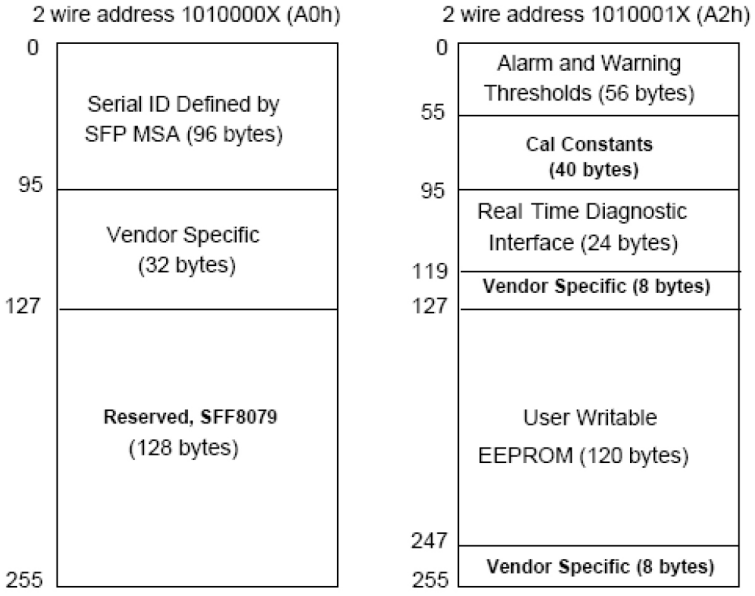
Mechanical Specifications

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



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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