

SFP-10G-ER-X-C

Cisco® SFP-10G-ER-X Compatible TAA 10GBase-ER SFP+ Transceiver (SMF, 1550nm, 40km, SFP+, DOM, -40 to 85C)

Features:

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



Applications:

- 10GBase-ER Ethernet
- 8x/10x Fibre Channel
- Access, Metro and Enterprise

Product Description

This Cisco® SFP-10G-ER-X compatible SFP+ transceiver provides 10GBase-ER throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1550nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Cisco® 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."



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Maximum Supply Voltage	V _{CC}	-0.5	4.0	V
Storage Temperature	T _S	-40	85	°C
Operating Case Temperature	T _C	-40	85	°C
Operating Humidity	RH	5	85	%
Receiver Power	R _{MAX}		-1	dBm
Maximum Bitrate	B _{max}		11.3	Gbps

Electrical Characteristics (TOP=25°C, V_{CC}=3.3Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V _{CC}	3.15	3.30	3.43	V	
Power Supply Current	I _{CC}			303	mA	
Power Consumption	P _{DISS}			1	W	
Transmitter						
Differential data input swing	V _{in,pp}	120		850	mV	
Input differential impedance	Z _{in}	80	100	120	Ω	
Receiver						
Differential data output swing	V _{out, pp}	300		850	mV	
Output differential impedance	Z _{in}	80	100	120	Ω	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Optical Power (average)	P _{AVE}	-4		4	dBm	1
Optical Modulation amplitude (OMA)	P _{OMA}	-2.1			dBm	
Transmitter and Dispersion Penalty	TDP			2	dB	
Optical Extinction Ratio	ER	8.2			dB	
Optical Wavelength	Tλ	1530	1550	1565	nm	
Insertion loss	IL		0.7			
Receiver						
Receiver Sensitivity (average)	R _{AVE}			-15.8	dBm	3
Receiver Sensitivity (OMA)	R _{OMA}			-14.1		2
Receiver overload	P _{max}	-1			dBm	4
Receiver wavelength	Rλ	1260		1565	nm	

Notes:

1. Coupled into a Single-mode fibre
2. Per IEEE 802.3ae specification
3. Average power, back-to-back, @10.31Gbps, BER 1E-12, PRBS 231-1. TDP not included.
4. Exceeding the Receiver overload can physically damage the module. Please use appropriate attenuation.

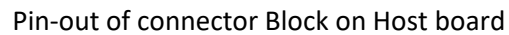
Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	TX Fault	Transmitter Fault. LVTTTL-O	2
3	TX Disable	Transmitter Disable. Laser output disabled on high or open. LVTT-I.	3
4	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O.	
5	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I.	
6	MOD_ABS	Module Absent, Connect to VeeT or VeeR in Module.	4
7	RS0	Rate Select 0. Not used	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-O.	2
9	RS1	Rate Select 1. Not used	5
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	Receiver Ground (Common with Transmitter Ground).	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O.	
14	VeeR	Receiver Ground (Common with Transmitter Ground).	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	Transmitter Ground (Common with Receiver Ground).	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I.	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-O.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

Notes:

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Vcc_Host with resistor in the range 4.7KΩ to 10KΩ. Pull ups can be connected to one or several power supplies, however the host board design shall ensure that no module contract has voltage exceeding module VccT/R +0.5.V.
3. Tx_Disable is an input contact with a 4.7KΩ to 10KΩ pull-up resistor to VccT inside module.
4. Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull the contract up to

5. Internally pulled down per SFF-8431

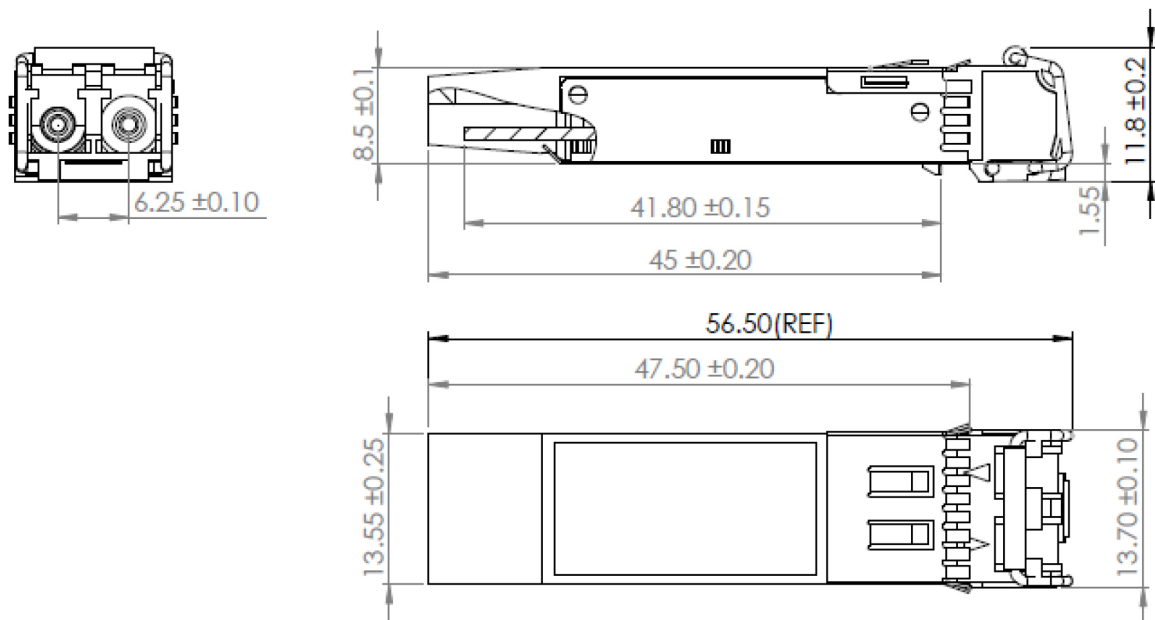


The schematic diagram illustrates the internal architecture and pin connections of the SerDes IC. Key components and connections include:

- LD Driver:** Connected to the Tx data lines (TD+, TD-) through a 100Ω resistor.
- POST Amp:** Connected to the Rx data lines (RD+, RD-) through a 100Ω resistor.
- EEPROM:** Connected to the MOD_ABS pin (pin 6) and the SCL/SDA pins (pins 5 and 4).
- Control Pins:**
 - Tx_DISABLE (pin 3) and Tx_FAULT (pin 2):** Connected to the Tx_DISABLE and Tx_FAULT pins of the Protocol IC.
 - LOS (pin 8):** Connected to the LOSS OF SIGNAL pin of the Protocol IC.
 - MOD_ABS (pin 6):** Connected to the MOD_ABS pin of the Protocol IC.
 - SCL (pin 5) and SDA (pin 4):** Connected to the SCL and SDA pins of the Protocol IC.
- Power Supply:**
 - VccT (pin 16) and VccR (pin 15):** Connected to the VccT and VccR pins of the Protocol IC.
 - VccT (pin 16) and VccR (pin 15):** Connected to the VccT and VccR pins of the Protocol IC.
- Data Lines:**
 - TD+ (pin 18) and TD- (pin 19):** Connected to the TD+ and TD- pins of the Protocol IC.
 - RD+ (pin 13) and RD- (pin 12):** Connected to the RD+ and RD- pins of the Protocol IC.
- Resistors and Capacitors:**
 - 10KΩ:** Connected to the Tx_DISABLE and Tx_FAULT pins.
 - 30KΩ:** Connected to the TX Rate Select and RX Rate Select pins.
 - 50KΩ:** Connected to the TX Rate Select and RX Rate Select pins.
 - 100KΩ:** Connected to the TX Rate Select and RX Rate Select pins.
 - 0.1μF, 22μF, 4.7μF:** Connected to the VccT and VccR pins.

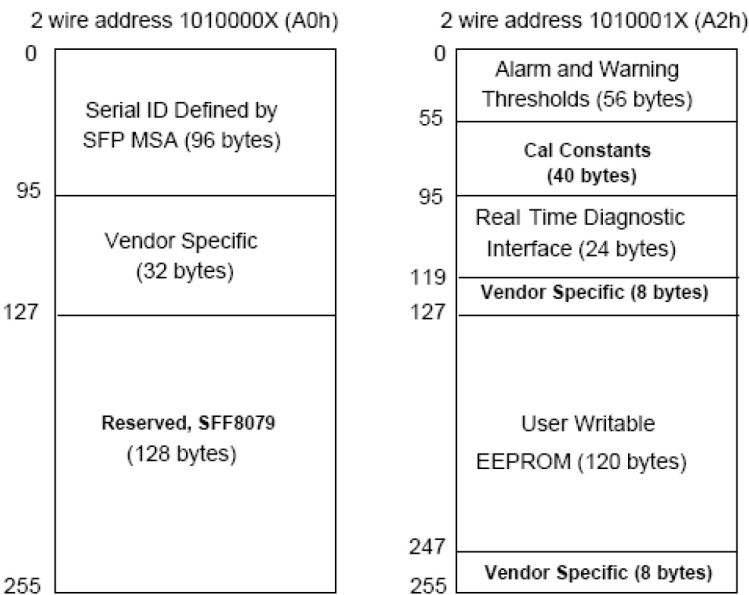
Mechanical Specifications

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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