

10Gbps SFP+ 40km CWDM Optical Transceiver

Product Features

- Support multi protocol from 8.5Gb/s to 11.3Gb/s
 - Hot pluggable
 - Compliant with SFF 8472 and IEEE802.3ae
 - Transmission distance of 40km over single mode fiber
 - 100GHz ITU Grid, C Band
 - CWDM EML transmitter
 - Duplex LC connector
 - 2-wire interface for management and diagnostic monitor
 - Single Power 3.3V supply voltages
 - Temperature range 0 °C to 70°C
 - Power dissipation: <1.5W
 - RoHS Compliant
- ## Applications
- 10GBASE-ER/EW Ethernet
 - 10G Fiber channel
 - SONET OC-192/SDH STM-64
 - CWDM Networks

The AC-E-SFPPC40-xx-yy is Small Form Factor 10Gb/s (SFP+) transceivers which are compliant with the current SFP+ Multi-Source Agreement (MSA) Specification. The high performance cooled CWDM EML transmitter and high sensitivity APD receiver provide superior performance for Ethernet applications up to 40km optical links.

The SFP+ Module compliant with SFF-8431, SFF-8432 and IEEE 802.3ae. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Ordering Information

Part Number	Description
AC-E-SFPPC40-xx-yy	SFP+ 10G CWDM 40km optical transceiver with full real-time digital diagnostic monitoring

Notes:

1. 'xx' = '47/49/51/53/55/57/59/61'. '47' means the wavelength of 1471nm.

Regulatory Compliance

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Part 15 Class B	Compatible with standards
	EN 55022:2010, Class B	
Electromagnetic susceptibility (EMS)	EN 55024:2010	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11	Compatible with Class I laser product
	EN60950, EN (IEC) 60825-1,2	

Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Operating Case Temperature	TOP	0	70	°C	
Power Supply Voltage	V _{CC}	-0.5	4	V	
Relative Humidity (non-condensation)	RH	0	85	%	

Optical Characteristics

All parameters are specified under the recommended operating conditions unless otherwise specified..

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ	$\lambda-6.5$	λ	$\lambda+6.5$	nm	
Average Optical Power	P _{avg}	-1		+4	dBm	1
Extinction Ratio	ER	8.2			dB	
Spectrum Width(-20dB)				0.3	nm	
Relative Intensity Noise	Rin			-128	dB/Hz	
Optical Return Loss Tolerance		20			dB	

Receiver

Center Wavelength	λ_r	1260		1620	nm	
Receiver Sensitivity (OMA)	Sen			-16	dBm	2
Los Assert	LOSA	-35		-	dBm	
Los De-assert	LOSD			-17	dBm	
Los Hysteresis	LOSH	0.5			dB	
Overload	Sat	0			dBm	5

Notes:

1. Average power figures are informative only, per IEEE802.3ae.
2. Conditions of stressed receiver tests per IEEE802.3ae. CSRS testing requires the host board to be SFF-8431 compliant.
3. Receiver overload specified in OMA and under the worst comprehensive stressed condition.

Electrical Characteristics

All parameters are specified under the recommended operating conditions unless otherwise specified..

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current	Icc			455	mA	
Power Consumption	P			1.5	W	

Transmitter

Input differential impedance	Rin		100		Ω	1
Tx Input Single Ended DC Voltage Tolerance (Ref VeeT)	V	-0.3		4	V	
Differential input voltage swing	Vin,pp	180		700	mV	2
Transmit Disable Voltage	VD	2		Vcc	V	3
Transmit Enable Voltage	VEN	Vee		Vee+0.8	V	

Receiver

Single Ended Output Voltage Tolerance	V	-0.3		4	V	
Rx Output Diff Voltage	Vo	300		850	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	4
LOS Fault	VLOS fault	2		VccHOST	V	5
LOS Normal	VLOS norm	Vee		Vee+0.8	V	5

Notes:

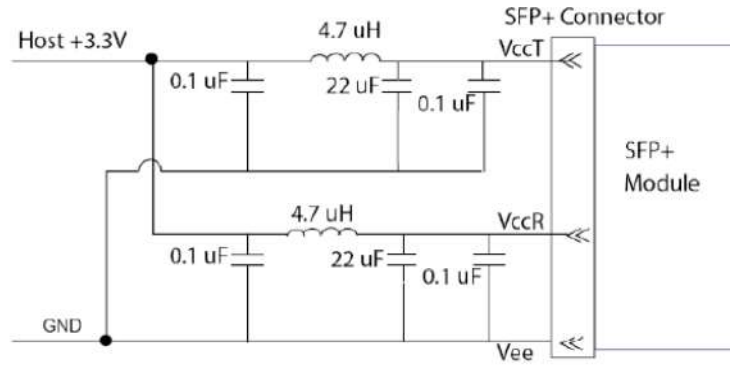
1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Per SFF-8431 Rev 3.0
3. Into 100 ohms differential termination.
4. 20%~80%
5. LOS is an open collector output. Should be pulled up with $4.7k\ \Omega$ - $10k\ \Omega$ on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.

Digital Diagnostic Functions

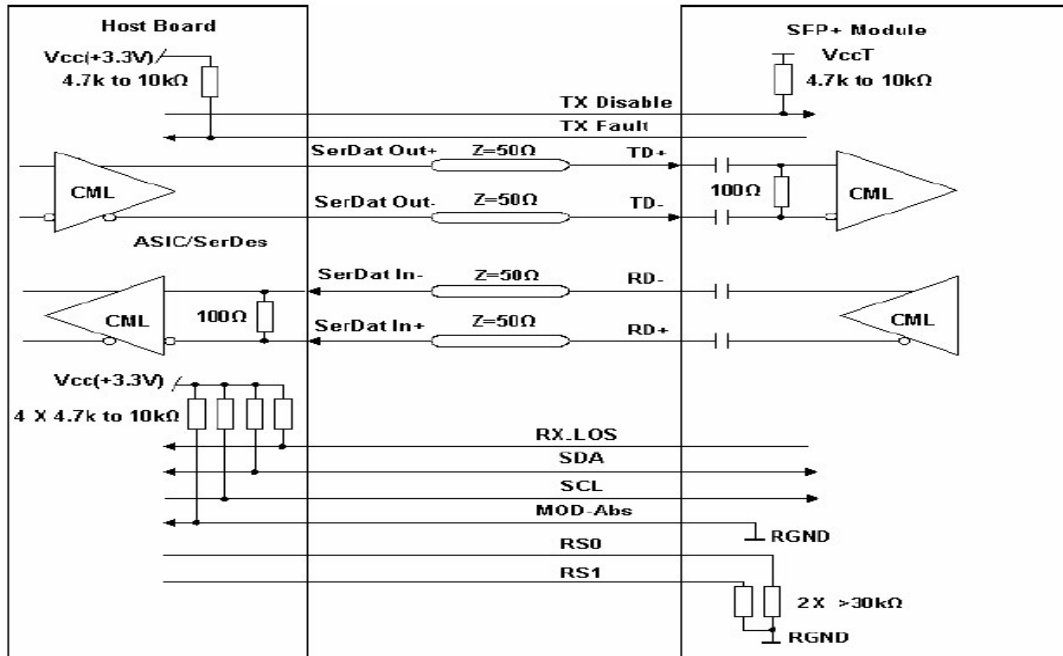
Digital diagnostics monitoring function is available via a 2-wire serial interface provides user to contact with module. It is compliant to SFF8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales stuff.

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	°C	
Supply voltage monitor absolute error	DMI_VCC	-5%	+5%	V	
TX power monitor absolute error	DMI_RX	-3	+3	dB	
RX power monitor absolute error	DMI_RX	-3	+3	dB	
Bias current monitor	DMI_Ibias	-10%	+10%	mA	

Recommended Circuit

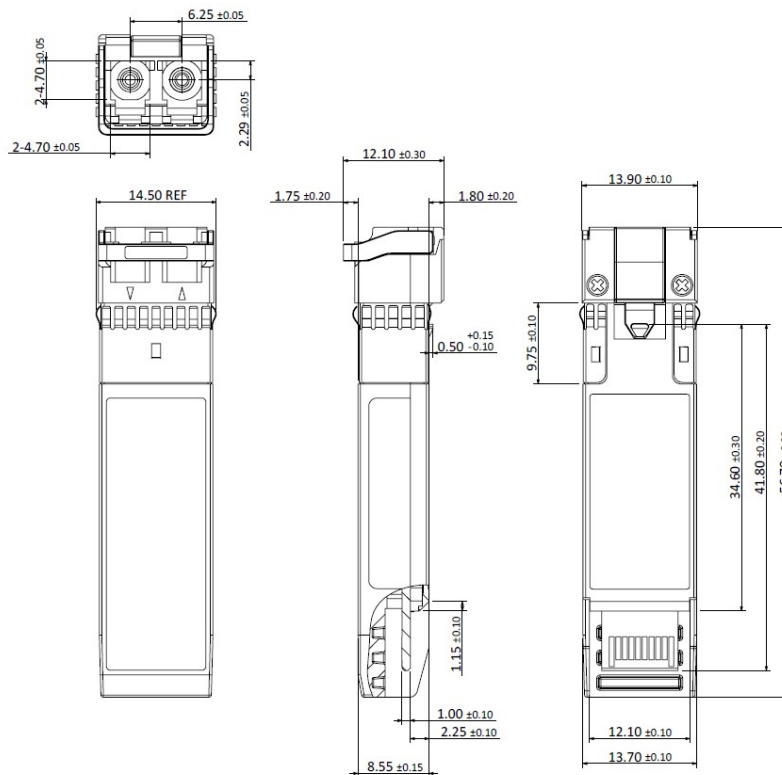


Recommended Host Board Power Supply Circuit



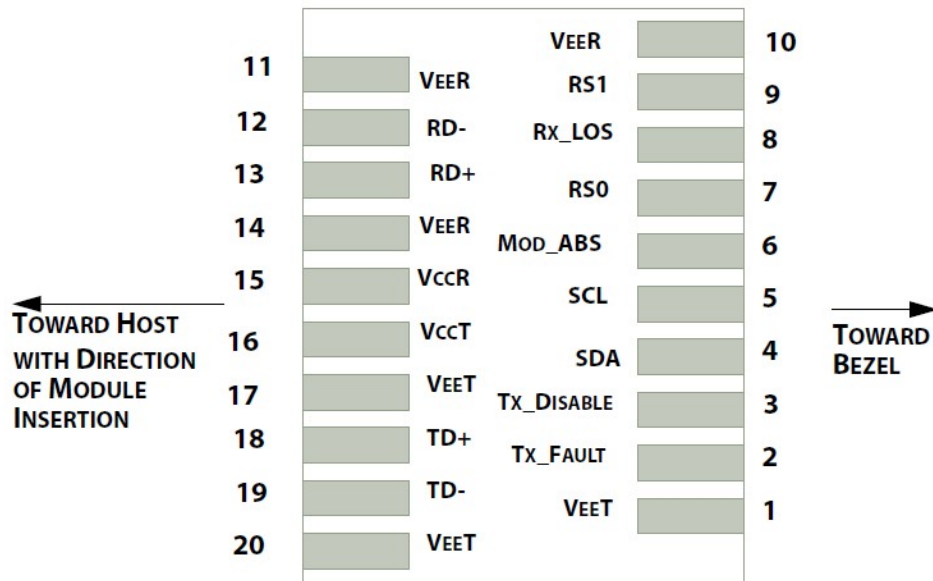
Recommended High-speed Interface Circuit

Mechanical Dimensions



(Unit: mm [inch])

Pin Assignment and Description



Pin Assignment

PIN #	Symbol	Description	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	

8	LOS	Receiver Loss of Signal Indication	4
9	RS1	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter inverted data out put	
19	TD-	Transmitter non-inverted data out put	
20	VeeT	Module transmitter ground	1

Notes:

1. The module ground pins shall be isolated from the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.
3. This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
4. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.