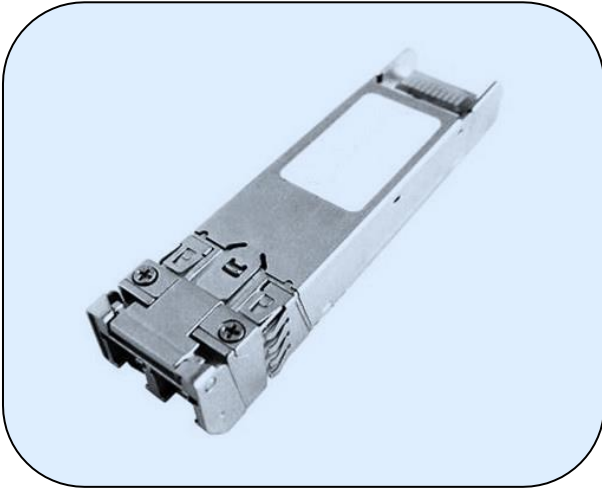# XTCxx8-40LY

8G FC 40 km CWDM SFP+ Transceiver
1470 nm ~1610 nm

Features

- Compliant with SFF-8431, SFF-8432 and IEE802.3ae
- CWDM EML transmitter from 1470 nm to 1610 nm
- PIN photodiode
- Operating case temperature: -5°C to 70°C
- Applicable for 40 km SMF connection
- Low Power Consumption
- All-metal housing for superior EMI performance
- Advanced firmware allow customer system encryption information to be stored in transceiver
- Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- RoHS compliant and lead free

Applications

- 8G Fiber Channel
- Other optical links

Description

XenOpt SFP+ CWDM 40 km Transceiver is a "Limiting module", designed for 2G/4G/8G Fiber-Channel applications.

The transceiver consists of two sections: The transmitter section incorporates an EML laser. The receiver section consists of a PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.

Absolute maximum rating

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	V_{CC}	0	3.6	V
Storage Temperature	T_C	-40	85	°C
Operating Case Temperature	T_C	-5	70	°C
Relative Humidity	RH	0	85	%
RX Input Average Power	Pmax	-	0	dBm

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Operating Conditions.

Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply Current	Icc	-	-	360	mA
Operating Case temperature	Tca	-5	-	70	°C
Module Power Dissipation	Pm	-	-	1.5	W

Digital Diagnostic Functions

Parameter	Symbol	Min.	Max	Unit	Notes
Accuracy					
Transceiver Temperature	DMI_Temp	-3	+3	degC	Over operating temp
TX Output optical power	DMI_TX	-3	+3	dB	
RX Input optical power	DMI_RX	-3	+3	dB	-7 dBm to -20 dBm range
Transceiver Supply	DMI_VCC	-0.08	+0.08	V	Full operating range
Bias current monitor	DMI_Ibias	-10%	%	mA	
Dynamic Range Accuracy					
Transceiver Temperature	DMI_Temp	-5	70	degC	
TX Output optical power	DMI_TX	-5	4	dBm	
RX Input optical power	DMI_RX	-20	-7	dBm	
Transceiver Supply	DMI_VCC	3.0	3.6	V	
Bias current monitor	DMI_Ibias	0	100	mA	

Optical Characteristics

Parameter	Symbol	Unit	Min	Max	Note
Transmitter					
Center wavelength	λ	nm	(λ -6.5)	(λ +6.5)	5
Side Mode Suppression Ratio	SMSR	dB	30		
Average launched power	Pave	dBm	-2	+3	1
Optical Modulation Amplitude (OMA)	Poma	dBm	-2.5		
Transmitter and dispersion penalty	TDP	dB		3.2	3,4
Average launch power of OFF transmitter	Poff	dBm		-30	
Extinction ratio	ER	dB	3.5		2
Relative Intensity Noise		dB/Hz		-128	
Optical Return Loss Tolerance	RIN	dB	12		
Receiver					
Center wavelength	λ	nm	1260	1600	
Receive overload	Pave	dBm		-8	
Receive sensitivity	Rsen	dBm		-14.4	3
Receiver Reflectance	Rrx	dB		-14	
LOS De-Assert	LOSd	dBm		-22	
LOS Assert	LOSa	dBm	-35		
LOS Hysteresis	LOSh	dB	0.5		

Notes
1. The optical power is launched into SMF
2. Measured with a PRBS 2^{31}-1 test pattern@10.3125 Gbps
3. Measured with a PRBS 2^{31}-1 test pattern@10.3125 Gbps BER≤10^{-12}
4. In G.652 and G.655 (NDSF)
5. The available transmitter center wavelengths (λ) are: 1271 nm, 1291 nm, 1311 nm… and 1451 nm

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Data Rate		0.6	10.3125	11.3	Gbps	
Power Consumption		-	1200	1500	mW	
Transmitter						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin, pp	180		700	mV	
Tx Fault	VoL	-0.3		0.4	V	
Data Dependent Input Jitter	DDJ			0.10	UI	
Data Input Total Jitter	TJ			0.28	UI	
Receiver						
Differential data output swing	Vout, pp	300		850	mV	2
Rx Output Rise and Fall Time	Tr/Tf	28		50	ps	3
Total Jitter	TJ			0.70	UI	
Deterministic Jitter	DJ			0.42	UI	

Notes

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Into 100 Ω differential termination.
3. 20 – 80%. Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's sequence in the PRBS 9 is an acceptable alternative. SFF-8431 Rev 3.0.
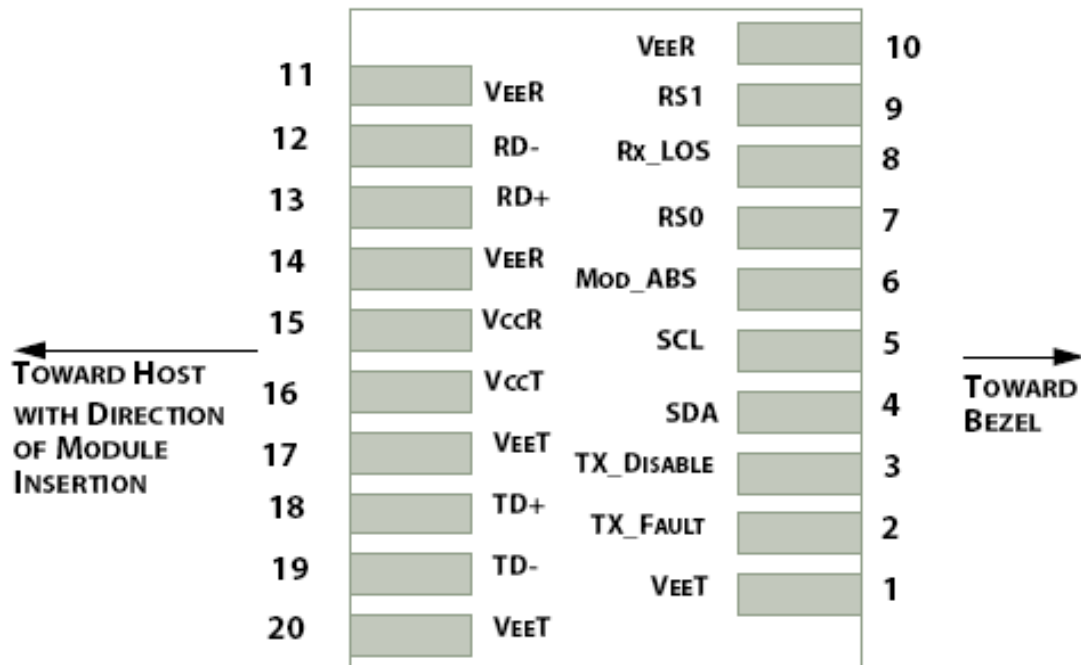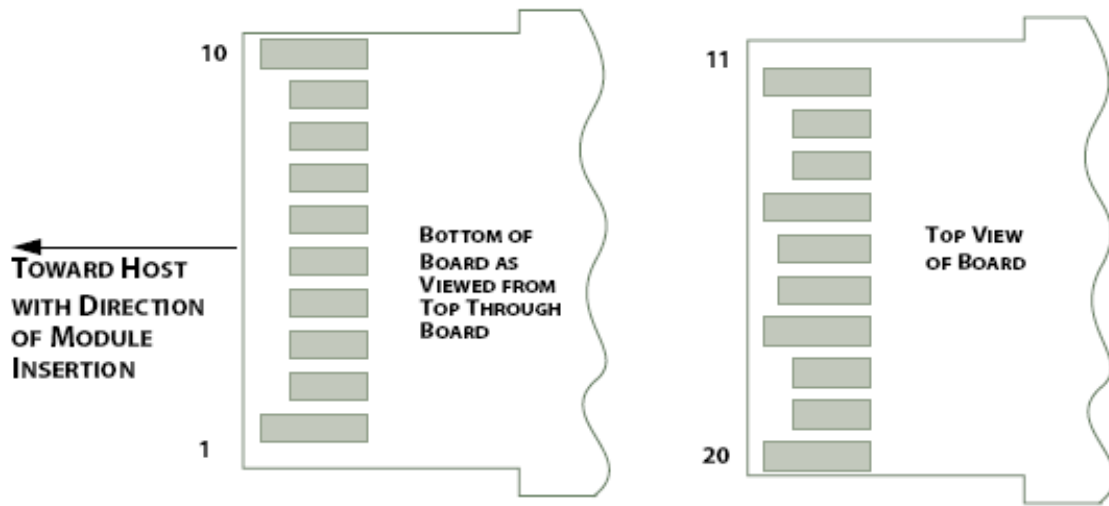

Figure 1. Interface to Host PCB

Figure 2. Module Contact Assignment

Pin Definition

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes

[1] Module circuit ground is isolated from module chassis ground within the module.

[2] Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

[3] Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

[4] Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod_ABS is asserted "High" when the SFP+ module is physically absent from a host slot.

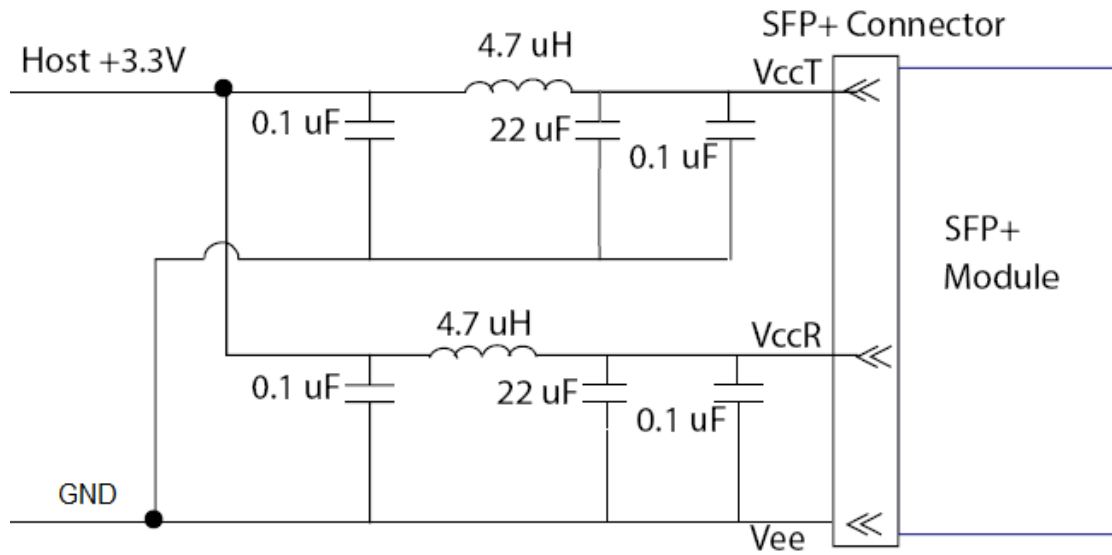[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.
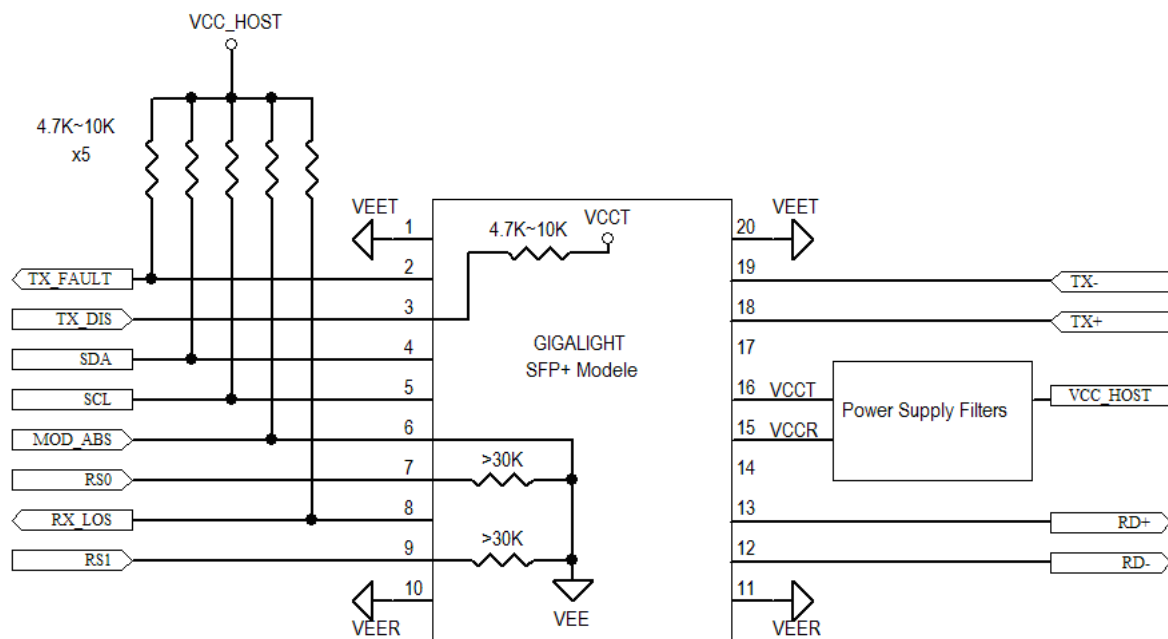
Figure 3. Host Board Power Supply Filters Circuit

Figure 4. Host-Module Interface
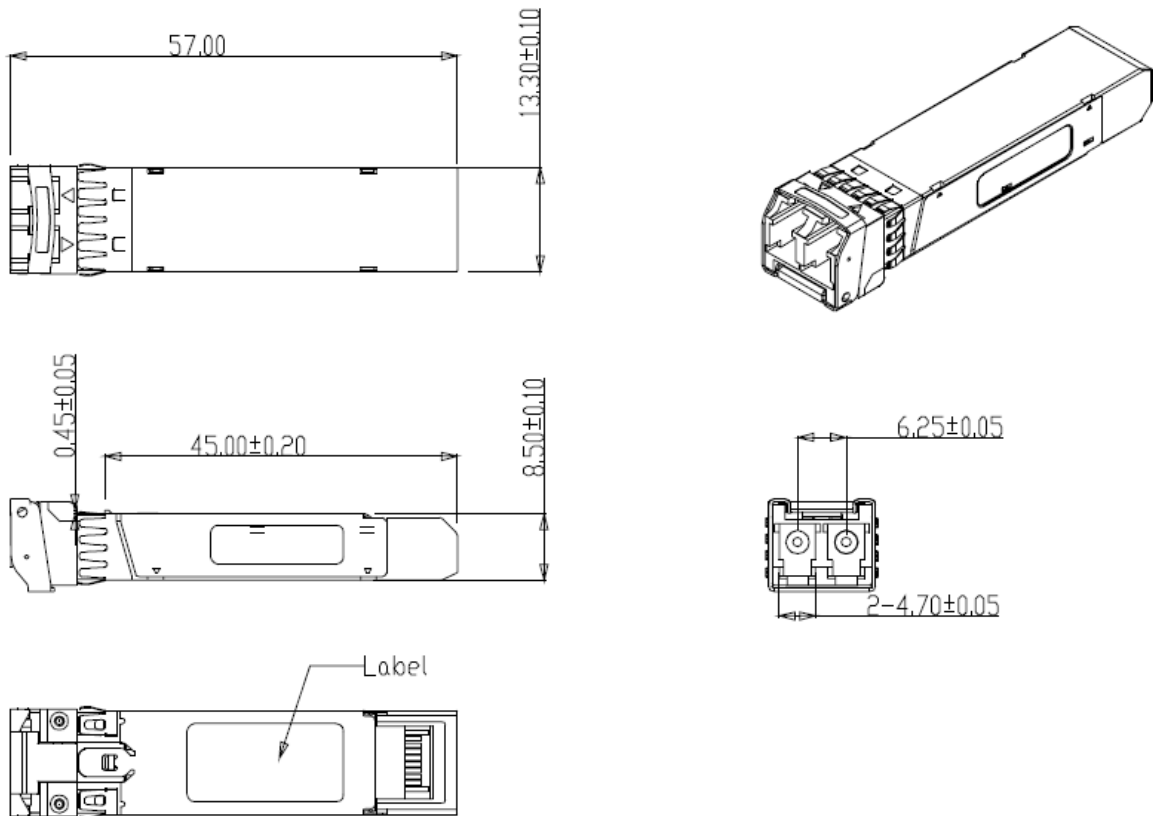
Mechanical Specifications

Figure 5. Mechanical Specifications

Regulatory Compliance

XenOpt SFP+ transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certificate/Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120292-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ1001008918/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003	WT10093759-D-E-E

XenOpt

Ordering information[1]

PN	Description
XTCxx8-40LY	SFP+, 8G FC, 40 km, DDM, -5°C ~ +70°C, xx: 47 – 1470 nm, 49 – 1490 nm, 51 –1510 nm, 53 – 1530 nm, 55 – 1550 nm, 57 – 1570 nm, 59 – 1590 nm, 61 – 1610 nm

Notes:

[1] Specification may change without notice. For accurate specification please contact XenOpt reseller before placing an order. The content of this document is subject to change without notice. Please specify any compatibility requirements at time of ordering. Standard MSA compatible pluggable components may not work or some function of these components may not be available in devices that require customized compatible devices. Pluggable components compatible with one type of communications equipment may not work in other type of communications equipment.

Important Notice

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