



# XTS318-10LY

## 8.5Gb/s SFP+ Fibre Channel Optical Transceiver



### Product Highlights

- Up to 8.5Gb/s bi-directional data links
- Hot Pluggable SFP+ footprint
- Built-in digital diagnostic functions
- 1310nm DFB laser transmitter
- Duplex LC connector
- Up to 10km on 9/125um SMF
- Single 3.3V power supply
- Operating case temperature: 0 to 70°C
- RoHS6 compliant (lead free) 100M to10GE

### Applications

- Tri Rate 2.125/4.25/8.5Gbs Fiber Channel

### Product description

XenOpt XTS318-10LY SFP+ transceivers are designed for use in Fiber Channel links up to 8.5 Gb/s data rate and up to 10 km link length. They are compliant with FCPI-4 Rev. 8.00 and SFF-8472 Rev 10.2, and compatible with SFF-8432 and applicable portions of SFF-8431 Rev. Xenya XTS318-10LY 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. 3.0. The product is RoHS compliant and lead-free per Directive 2002/95/EC.

### Absolute Maximum Ratings

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 Recommended Operating Conditions.

| Parameter                  | Symbol          | Min | Max  | Unit |
|----------------------------|-----------------|-----|------|------|
| Supply Voltage             | V <sub>CC</sub> | 0   | +3.8 | V    |
| Storage Temperature        | T <sub>c</sub>  | -40 | +85  | °C   |
| Operating Case Temperature | T <sub>c</sub>  | 0   | +70  | °C   |
| Relative Humidity          | RH              | 0   | 85   | %    |

### Operating Conditions

| Parameter                  | Symbol          | Min | Typical | Max | Unit |
|----------------------------|-----------------|-----|---------|-----|------|
| Supply Voltage             | V <sub>CC</sub> | 3.0 | 3.3     | 3.6 | V    |
| Supply current             | I <sub>CC</sub> |     | 200     | 300 | mA   |
| Operating Case Temperature | T <sub>C</sub>  | 0   | 25      | 70  | °C   |
| Module Power Dissipation   | P <sub>m</sub>  | -   | 0.7     | 1.1 | W    |

### Notes:

1. Supply current is shared between VCCTX and VCCRX.
2. In-rush is defined as current level above steady state current requirements.

### Low Speed Characteristics

| Parameter         | Symbol | Min       | Typical | Max          | Unit |
|-------------------|--------|-----------|---------|--------------|------|
| Power Consumption |        |           |         | 1            | W    |
| TX_Fault,RX_LOS   | VOL    | 0         |         | 0.4          | V    |
|                   | VOH    | Host_Vcc- |         | Host_Vcc+0.3 | V    |
| TX_DIS            | VIL    | -0.3      |         | 0.8          | V    |
|                   | VIH    | 2.0       |         | VCCT+0.3     | V    |
| RS0,RS1           | VIL    | -0.3      |         | 0.8          | V    |
|                   | VIH    | 2.0       |         | VCCT+0.3     | V    |

### Optical characteristics

| Parameter  | Symbol      | Min. | Typical | Max   | Unit    | Ref. |
|--|-------------|------|---------|-------|---------|------|
| <b>Transmitter</b>                               |             |      |         |       |         |      |
| Output Opt. Power,8.5 Gb/s                       | PO          | -8.4 |         | +0.5  | dBm     | 1    |
| Optical Wavelength                               | $\lambda$   | 1285 |         | 1345  | nm      | 2    |
| Side Mode Suppression Ratio                      | SMSRmin     | 30   |         |       | dB      | 2    |
| Optical Modulation Amplitude                     | OMA         | 290  |         |       | $\mu$ W | 2,3  |
| Transmitter and Dispersion Penalty,<br>8.5 Gb/s  | TDP         |      |         | 3.2   | dB      | 4    |
| <b>Receiver</b>                                  |             |      |         |       |         |      |
| Unstressed Receiver OMA Sensitivity,<br>8.5 Gb/s | RSENSr      |      |         | 0.042 | mW      | 5    |
| Average Received Power                           | RxMAX       |      |         | +0.5  | dBm     |      |
| Optical Center Wavelength                        | $\lambda_C$ | 1260 |         | 1360  | nm      |      |
| Return Loss                                      |             | 12   |         |       | dB      |      |
| LOS De-Assert                                    | LOSD        |      |         | -18   | dBm     |      |
| LOS Assert                                       | LOSA        | -30  |         |       | dBm     |      |
| LOS Hysteresis                                   |             | 0.5  |         |       | dB      |      |

#### Notes:

1. High Bandwidth Mode. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. Also specified to meet curves in FC-PI-4 Rev 8.001 Figures 21, 22, and 23, which allow trade-off between wavelength, spectral width and OMA.
3. Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
4. For 8.5 Gb/s operation, Jitter values for gamma T and gamma R are controlled by TDP and stressed receiver sensitivity.
5. Measured with conformance signals defined in FC-PI-4 Rev. 8.00 specifications. Value in OMA. Measured with PRBS 27-1 at 10-12 BER.

## Electrical characteristics

| Parameter                           | Symbol     | Min. | Typical | Max     | Unit     | Ref. |
|-------------------------------------|------------|------|---------|---------|----------|------|
| Supply Voltage                      | VCC        | 3.00 |         | 3.60    | V        | 1    |
| Supply Voltage                      | Icc        |      | 200     | 300     | mA       | 1    |
| <b>Transmitter</b>                  |            |      |         |         |          |      |
| Input differential impedance        | Rin        |      | 100     |         | $\Omega$ | 2    |
| Single ended data input swing       | Vin,pp     | 150  |         | 900     | mV       |      |
| Transmit Disable Voltage            | VD         | 2    |         | VCC     | V        |      |
| Transmit Enable Voltage             | VEN        | Vee  |         | Vee+0.8 | V        | 3    |
| <b>Receiver</b>                     |            |      |         |         |          |      |
| Single ended data output swing      | Vout,pp    | 300  |         | 800     | mV       | 4    |
| Data output rise/fall time,8.5 Gb/s | Tr,tf      |      |         | 60      | ps       | 5    |
| LOS Fault                           | VLOS fault | 2    |         | VCCHOST | V        | 6    |
| LOS Normal                          | VLOS norm  | Vee  |         | Vee+0.8 | V        | 6    |

**Notes:**

1. Module power consumption never exceeds 1W.
2. AC coupled.
3. Or open circuit.
4. Into 100 ohm differential termination.
5. 20 – 80 %.
6. LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

## General Specifications

| Parameter  | Symbol | Min.  | Typical | Max   | Unit   | Notes |
|--|--------|-------|---------|-------|--------|-------|
| Data Rate  | DR     | 2.125 |         | 8.5   | Gb/sec | 1     |
| Bit Error Rate                                     | BER    |       |         | 10-12 |        | 2     |
| Max. Supported Link Length on<br>9/125 $\mu$ m SMF | L      |       | 10      |       | Km     | 3     |

**Notes:**

1. 2x/4x/8x Fibre Channel compliant.
2. Tested with a PRBS 27-1 test pattern.
3. Distances are based on FC-PI-4 Rev. 8.001 and IEEE 802.3 standards.

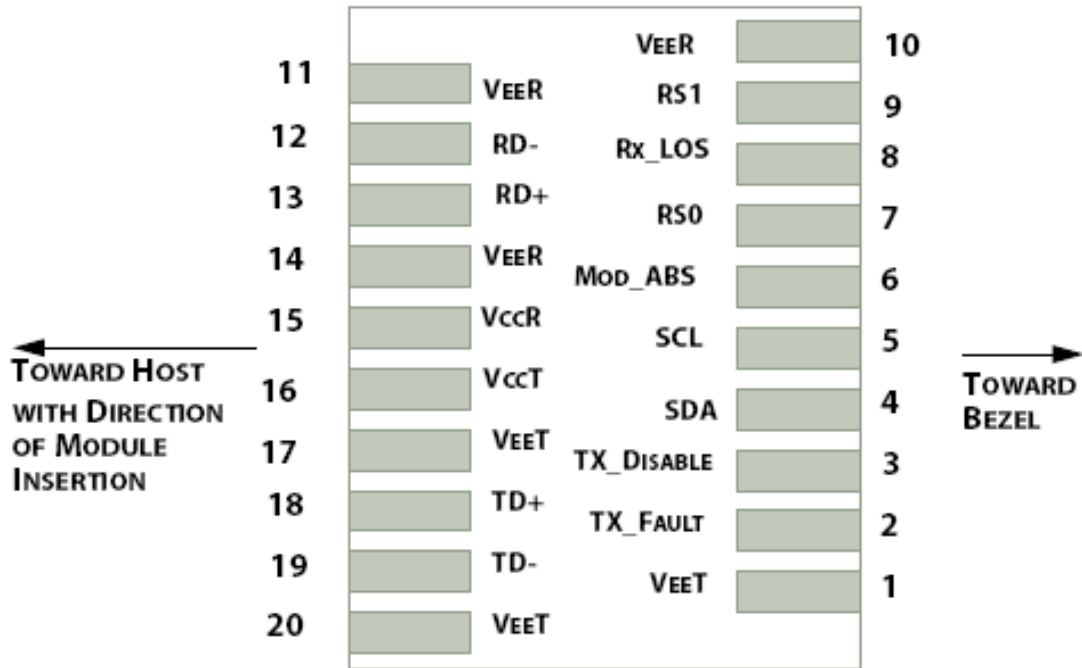


Figure 1: Interface to Host PCB

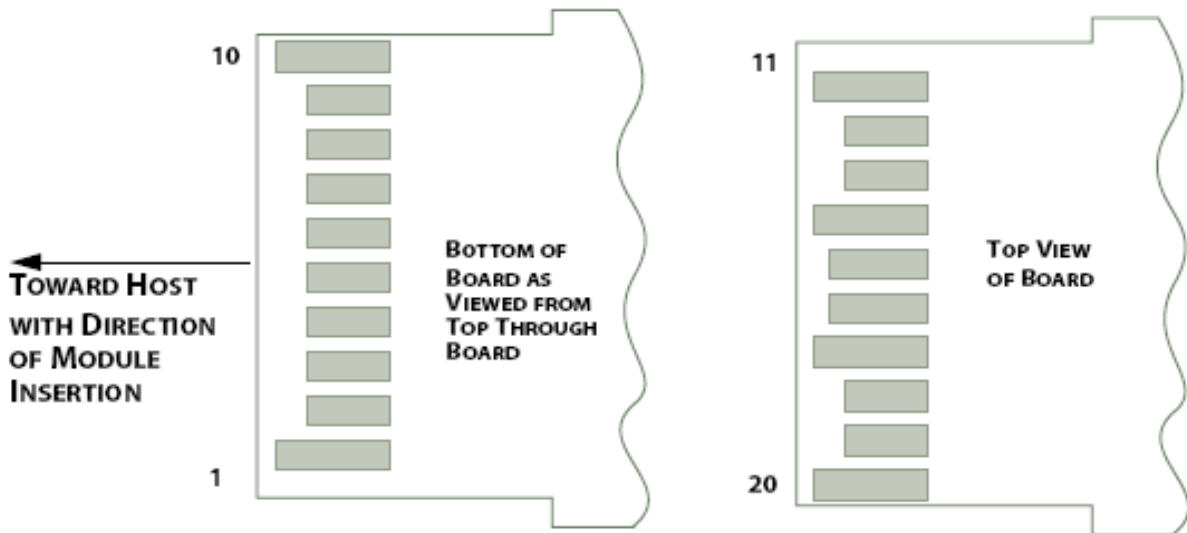


Figure 2: Module Contact Assignment

## 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 3.15V and 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.

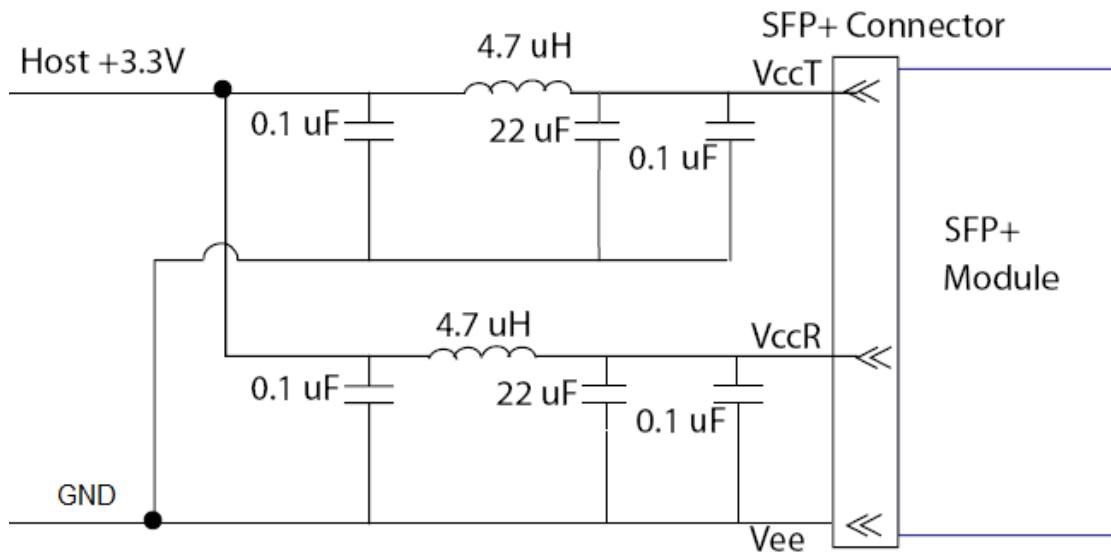


Figure3. Host Board Power Supply Filters Circuit

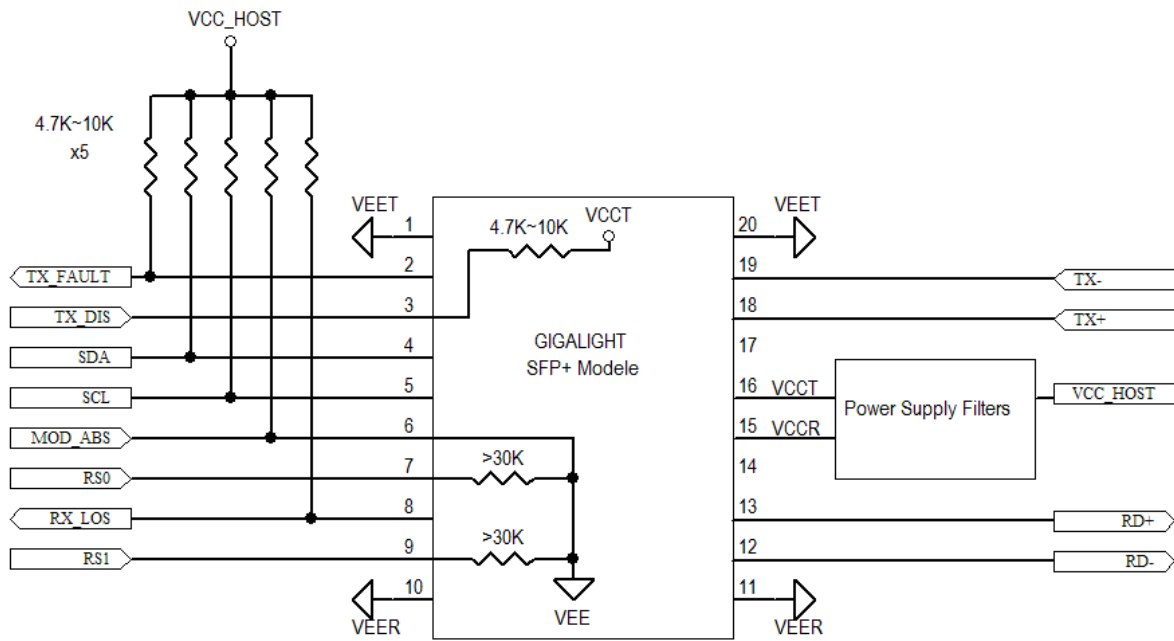


Figure4. Host-Module Interface

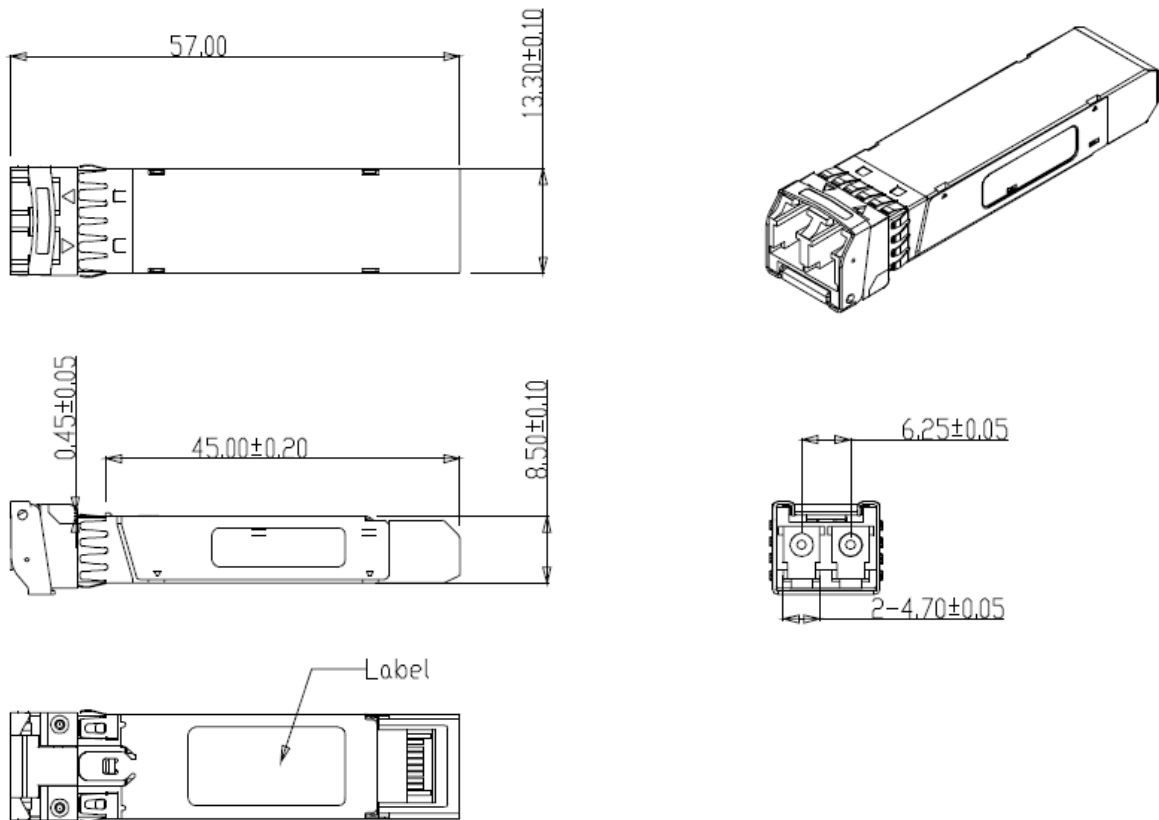


Figure5. Mechanical Specifications

**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 annd Laser Notice No. 50         | I 120292-000           |
| 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<br>EN 55024:1998+A1+A2:2003 | WT10093759-D-E-E       |

**Ordering information**

| Part Number | Product Description                               |
|-------------|---|
| XTS318-10LY | 1310nm, 2.125/4.25/8.5Gbs, SFP+ 10km, 0°C ~ +70°C |

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.

**References**

1. "Specifications for Enhanced Small Form Factor Pluggable Module SFP+", SFF-8431, Rev 4.1, July 6, 2009.
2. "Improved Pluggable Formfactor", SFF-8432, Rev 4.2, Apr 18, 2007
3. IEEE802.3ae – 2002
4. "Diagnostic Monitoring Interface for Optical Transceivers" SFF-8472, Rev 10.3, Dec 1, 2007

**Important Notice**

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