


10G CWDM SFP+ 1270-1330nm 40km Optical Transceiver GCP-xx192-04C

Features

- ◆ Compliant with SFF-8431,SFF-8432 and IEE802.3ae
- ◆ CWDM DFB transmitter from 1270nm to 1330nm
- ◆ APD photodiode
- ◆ Operating case temperature: 0 to 70 °C
- ◆ Low power consumption
- ◆ Applicable for 40km SMF connection
- ◆ 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
- ◆ RoHS6 compliant (lead free) 



Applications

- ◆ 10G Ethernet
- ◆ 10G Fibre Channel

Product description

The Gigalight CWDM SFP+ transceiver is a “Limiting module” designed for 10G Ethernet and 10G Fibre Channel applications. The transceiver consists of two sections: The transmitter section incorporates a DFB laser. And the receiver section consists of a APD 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 | 0 | +70 | °C |
| Relative Humidity | RH | 0 | 85 | % |
| RX Input Average Power | P _{max} | - | 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 Recommended Operating Conditions.

Operating Conditions

| Parameter | Symbol | Min | Typical | Max | Unit |
|----------------------------|-----------------|------|---------|------|------|
| Supply Voltage | V _{cc} | 3.13 | 3.3 | 3.47 | V |
| Supply current[1] | I _{cc} | - | - | 360 | mA |
| Operating Case temperature | T _{ca} | -5 | - | 70 | °C |
| Module Power Dissipation | P _m | - | - | 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 | -7dBm to -20dBm range |
| Transceiver Supply voltage | DMI_VCC | -0.08 | +0.08 | V | Full operating range |
| Bias current monitor | DMI_Ibias | -10% | 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 voltage | 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 | ($\lambda - 6.5$) | ($\lambda + 6.5$) | 5 |
| Side Mode Suppression Ratio | SMSR | dB | 30 | | |
| Average launched power | Pave | dBm | -4 | +2 | 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 | | -20 | 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@10.3125Gbps | | | | | |
| 3. Measured with a PRBS 2 ³¹ -1 test pattern@10.3125Gbps BER≤10 ⁻¹² | | | | | |
| 4. In G.652 and G.655(NDSF) | | | | | |
| 5. The available transmitter center wavelengths (λ) are: 1271nm, 1291nm, 1311nm... and 1451nm as specified in the "Product Selection" section on page 1. | | | | | |

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 100Ω 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.

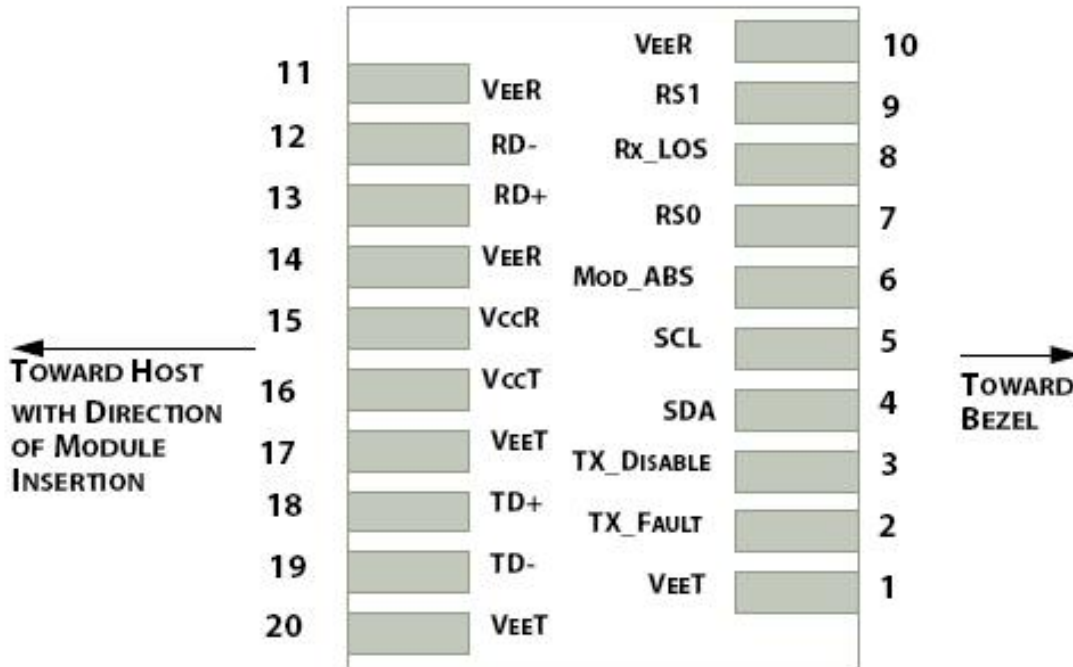


Figure 1: Interface to Host PCB

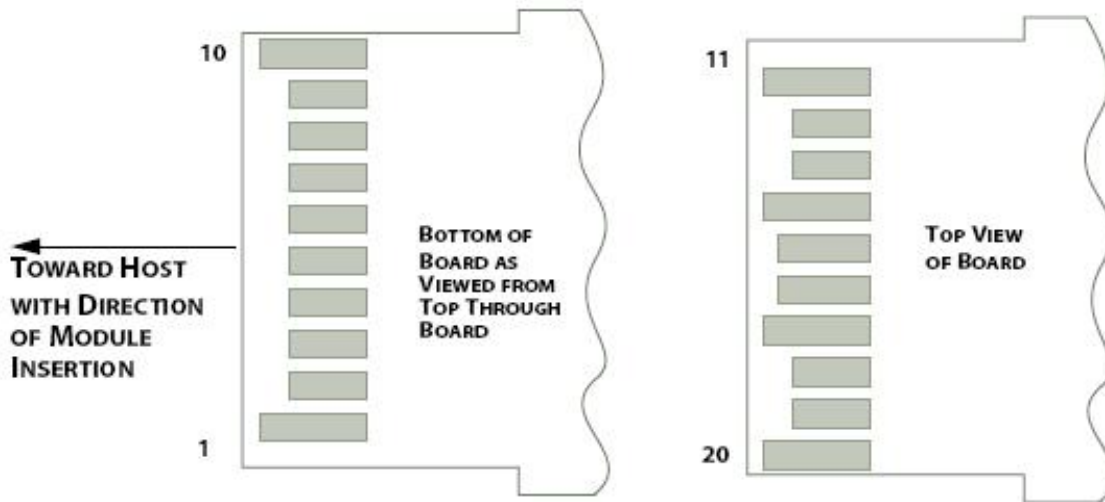


Figure 2: Module Contact Assignment

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 3.15V 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.

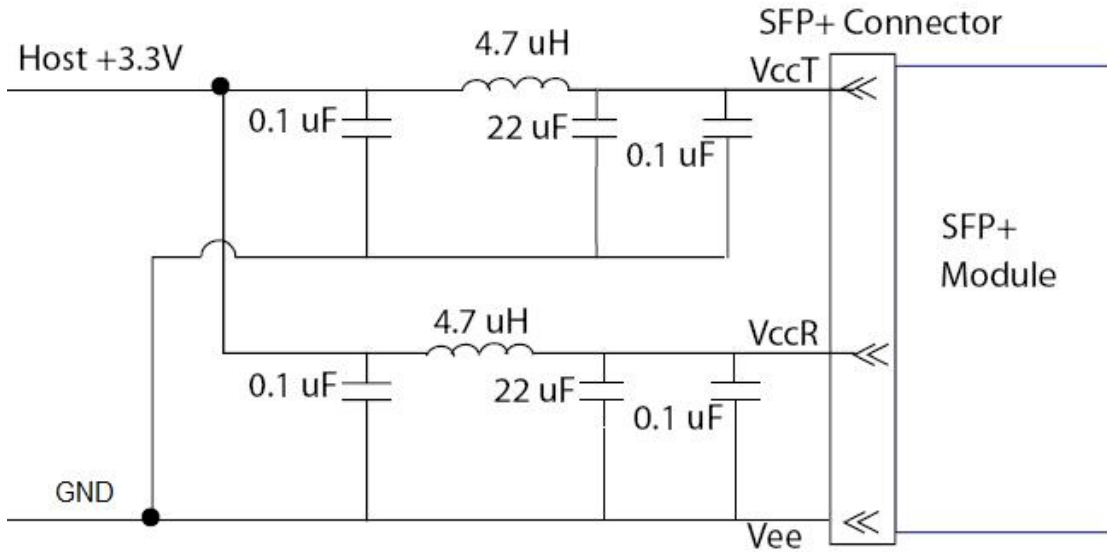


Figure3. Host Board Power Supply Filters Circuit

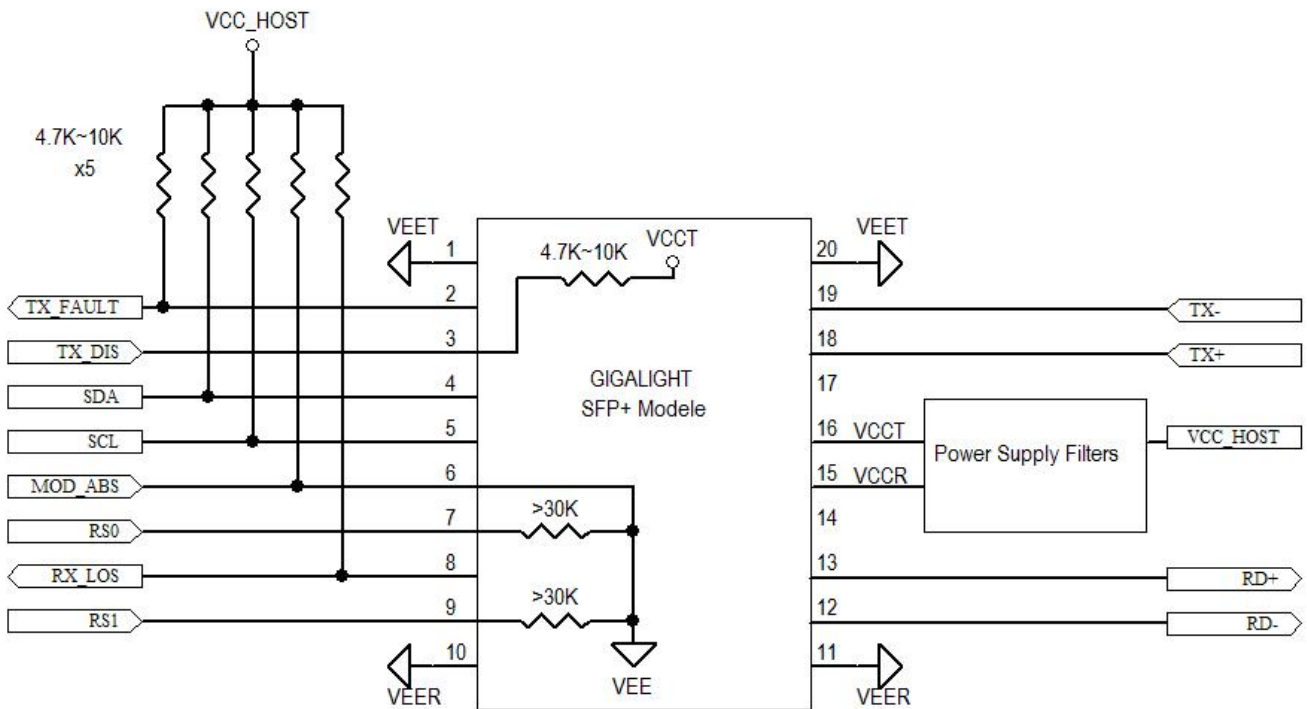


Figure4. Host-Module Interface

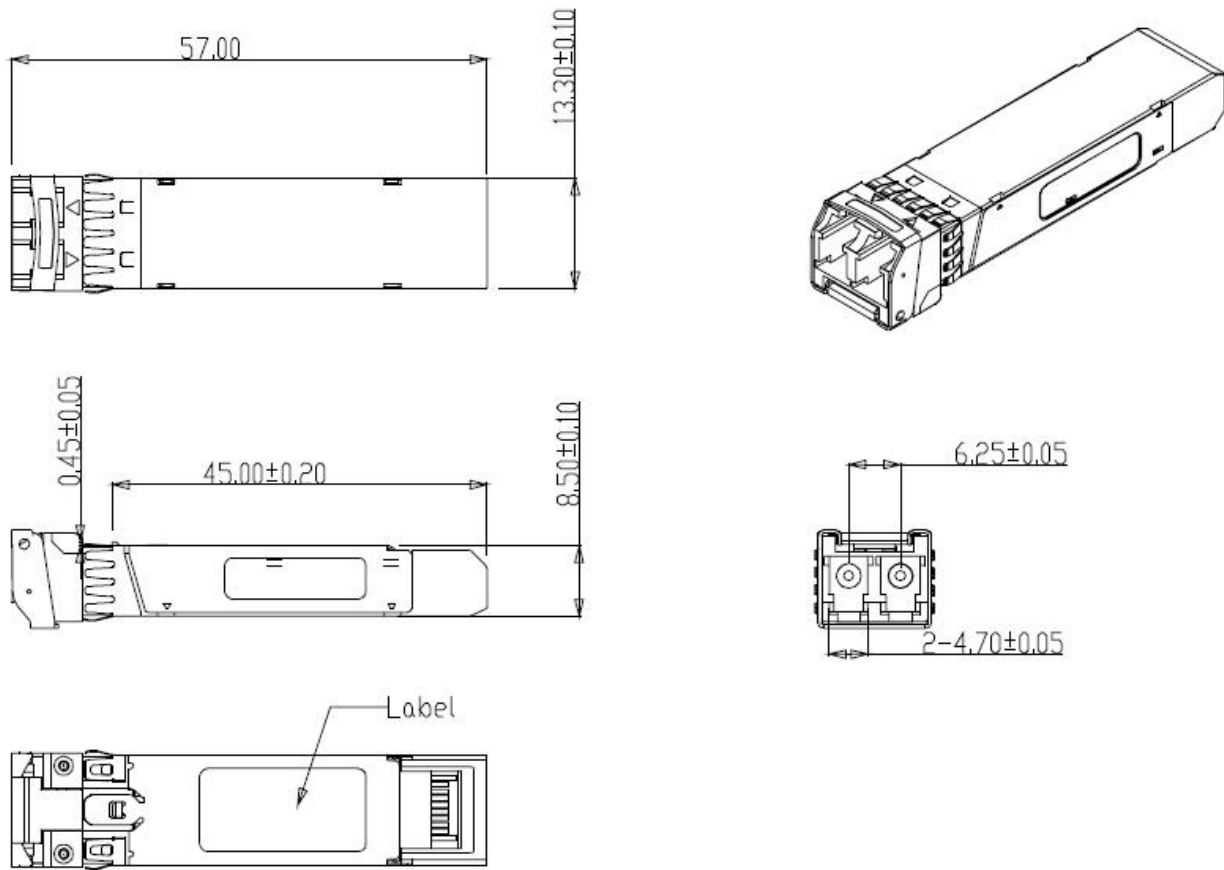


Figure5. Mechanical Specifications

Regulatory Compliance

GIGALIGHT 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 | 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 |

Ordering information

| Part Number | Product Description |
|---------------|--|
| GCP-xx192-04C | CWDM SFP+, 11.3Gb/s, 1270-1330nm with 20nm Spacing, 40km, SMF, Duplex LC xx=27-33 |

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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