


SFP28 LWDM 20Km I-temp GSS-Sx(x)250-L2T

Features

- ✓ Hot-pluggable SFP28 form factor
- ✓ Supports CPRI wireless data rate
- ✓ Cooled DML transmitter and APD receiver
- ✓ Internal CDR circuits on both receiver and transmitter channels
- ✓ Maximum power dissipation: 2W
- ✓ Maximum link length: 20Km on SMF
- ✓ Duplex LC connector
- ✓ Operating case temperature range: -40 to +85°C
- ✓ Single 3.3V power supply
- ✓ RoHS compliant (lead free) 



Applications

- ✓ CPRI Option 10、eCPRI
- ✓ 25G Ethernet
- ✓ Support 10G CPRI option 8 by CDR bypass

Description

The Gigalight SFP28 LWDM 20km Transceiver is a “Limiting module”, designed for CPRI option10,25GBASE, link length up to 10km on G.652 SMF, link budget can reach 21.5dB.They are compliant with SFF-8431 Rev 4.1, SFF-8432 and SFF-8472 Rev 12.3.The transmitter section incorporates a DML laser, and the receiver section consists of a PIN photodiode integrated with TIA.

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 case temperature, laser bias current, transmitted optical power, and received optical power and module supply voltage.

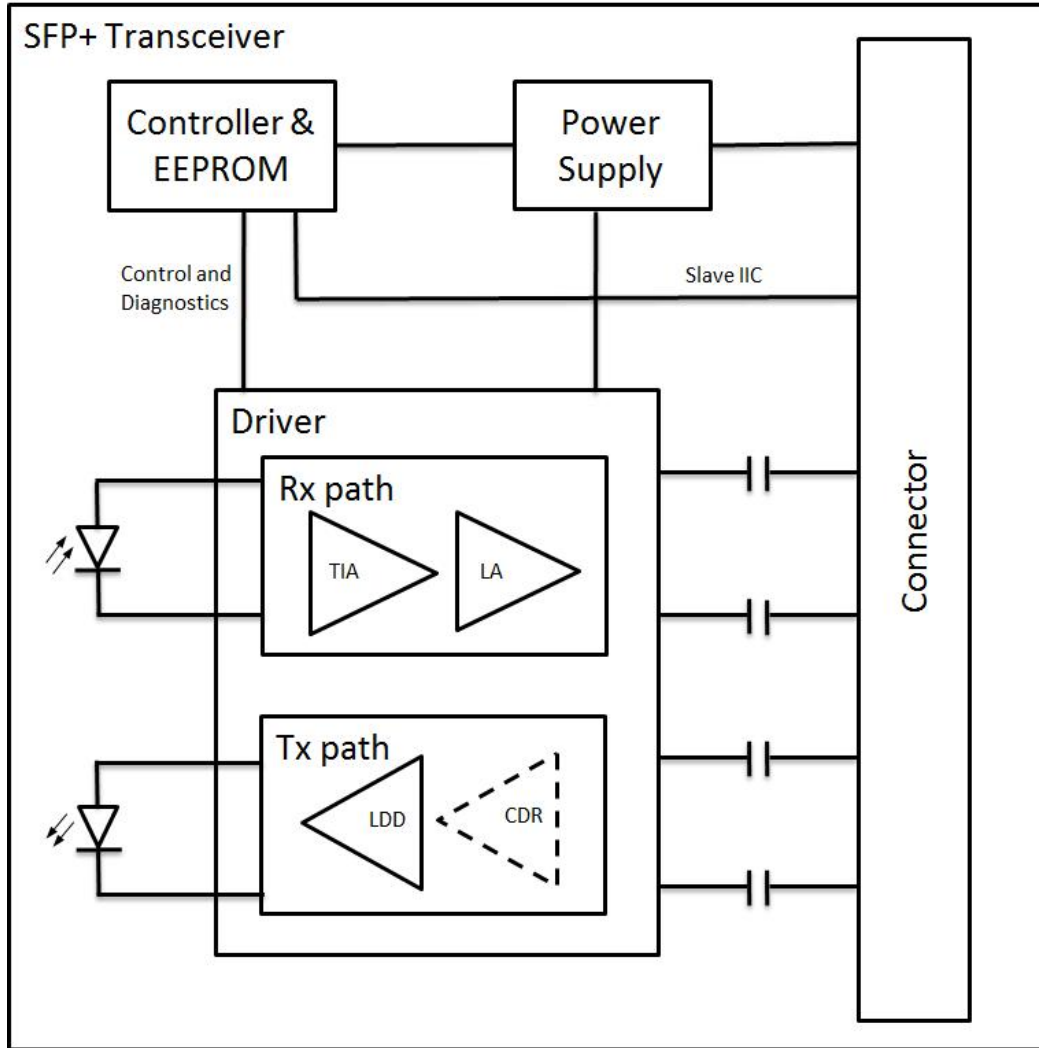


Figure 1. Module Block Diagram

The SFP28 is an Enhanced Small Form Factor Pluggable SFP28 transceivers, and can be contacted through I2C serial interface.

Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit |
|----------------------------------------------|--------|------|------|------|
| Supply Voltage | Vcc | -0.5 | +3.8 | V |
| Operating Case temperature | Top | -40 | +85 | °C |
| Operating Relative Humidity | RHop | 0 | 85 | % |
| Storage and Transportation Temperature | Tst | -40 | +85 | °C |
| Storage and Transportation Relative Humidity | - | 0 | 85 | % |
| Max Link Length | Lmax | | 20 | km |

Operating Conditions

| Parameter | Symbol | Min | Typical | Max | Unit |
|-----------------------------------------|--------|------|---------|------|------|
| Supply Voltage | Vcc | 3.13 | 3.3 | 3.47 | V |
| Supply current | Icc | - | 450 | - | mA |
| Operating Case temperature | Tca | -40 | - | +85 | °C |
| Module Power Dissipation ^[1] | Pm | - | - | 2 | W |
| ESD(High speed pins) ^[2] | - | - | - | 1000 | V |

Notes:

[1].Power consumption over -40~85°C case temperature and BOL

[2].Human body model per JEDEC JESD22-A114-B, compliant with INF-077i Rev.4.5 August 31, 2005

Transmitter Optical Specifications

| Parameter | Symbol | Min | Typical | Max | Unit |
|--------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------|----------|------|------|
| Laser Safety | Class I according to IEC60825 | | | | |
| Optical Wavelength | λ | 1269.23,1273.54,1277.89,1282.26, 1286.66,1291.10,1295.56,1300.05, 1304.58,1309.14,1313.73,1318.35 | | | nm |
| Data rate | BR | | 25.78125 | - | Gbps |
| Wavelength Deviation | $\Delta\lambda$ | -2.5 | | +2.5 | nm |
| Average Optical Power ^[1] | Pout | 2 | - | 7 | dBm |
| Optical Transmit Power (disabled) | Pout_off | - | - | -30 | dBm |
| Spectral Width (-20dB) | $\Delta\lambda_{20}$ | - | - | 1 | nm |
| Side Mode Suppression Ratio ^[2] | SMSR | 30 | - | - | dB |
| Extinction Ratio | ER | 4 | - | - | dB |

Notes:

[1].Average power measured at output over the operating temperature

[2].Ratio of the average output power in the dominant longitudinal mode to the power in the most significant side mode peak under full modulation condition

Laser Safety: All transceivers in this datasheet are Class I Laser products per FDA/CDRH and IEC-60825 standards. They must be operated under specified operating conditions.

Receiver Optical Specifications

| Parameter | Symbol | Min | Typical | Max | Unit | Note |
|----------------------------|-----------|------|---------------|------|------|------|
| Input Operating Wavelength | λ | 1260 | - | 1620 | nm | |
| Data rate | BR | | 25.78125 5 | - | Gbps | |

| | | | | | | |
|-------------------------|----------------------|-----|---|-----|-----|--|
| Maximum Input Power | RX-overload | | - | -4 | dBm | |
| Rx Damage threshold | | | | -3 | dBm | |
| Average Receive Power | Pavg | | | -4 | dBm | |
| Sensitivity(OMA) | Rsen1 ^[1] | - | - | -20 | dBm | |
| Sensitivity(OMA) | Rsen2 ^[2] | | | -20 | dBm | |
| Loss of Signal Asserted | LOS _A | -31 | - | - | dBm | |
| LOS De-Asserted | LOS _D | - | - | -21 | dBm | |
| LOS Hysteresis | LOS _H | 0.5 | - | | dB | |

Notes:

[1] Measured with PRBS 2³¹-1, BER <5E⁻⁵, 24.33Gbps.

[2] Measured with PRBS 2³¹-1, BER <5E⁻⁵, 25.78Gbps.

Transmitter Specifications – Electrical

| Parameter | Symbol | Min | Typical | Max | Unit |
|---------------------------------------|-----------------------|------|----------|---------|------|
| Data Rate | BR | | 25.78125 | - | Gbps |
| Input differential impedance | Rim | 80 | 100 | 120 | Ω |
| Differential data Input | VtxDIFF | - | - | 900 | mVpp |
| Transmit Disable Voltage | VD | 2.0 | - | Vcc+0.3 | V |
| Transmit Enable Voltage | Ven | -0.3 | - | +0.8 | V |
| Transmit Disable Assert Time | t _{off} | - | - | 100 | us |
| Tx Enable Assert Time | t _{on} | - | - | 2 | ms |
| Tx_Fault Assert Time for cooled SFP28 | Tx_f_on | - | - | 50 | ms |
| Tx_Fault Reset Time ^[1] | t _{reset} | 10 | - | - | us |
| Initialization Time for cooled SFP28 | t _{start_up} | - | - | 10 | s |

Notes:

[1] Time Tx_Disable must be held high to reset Tx_Fault

Receiver Specifications – Electrical

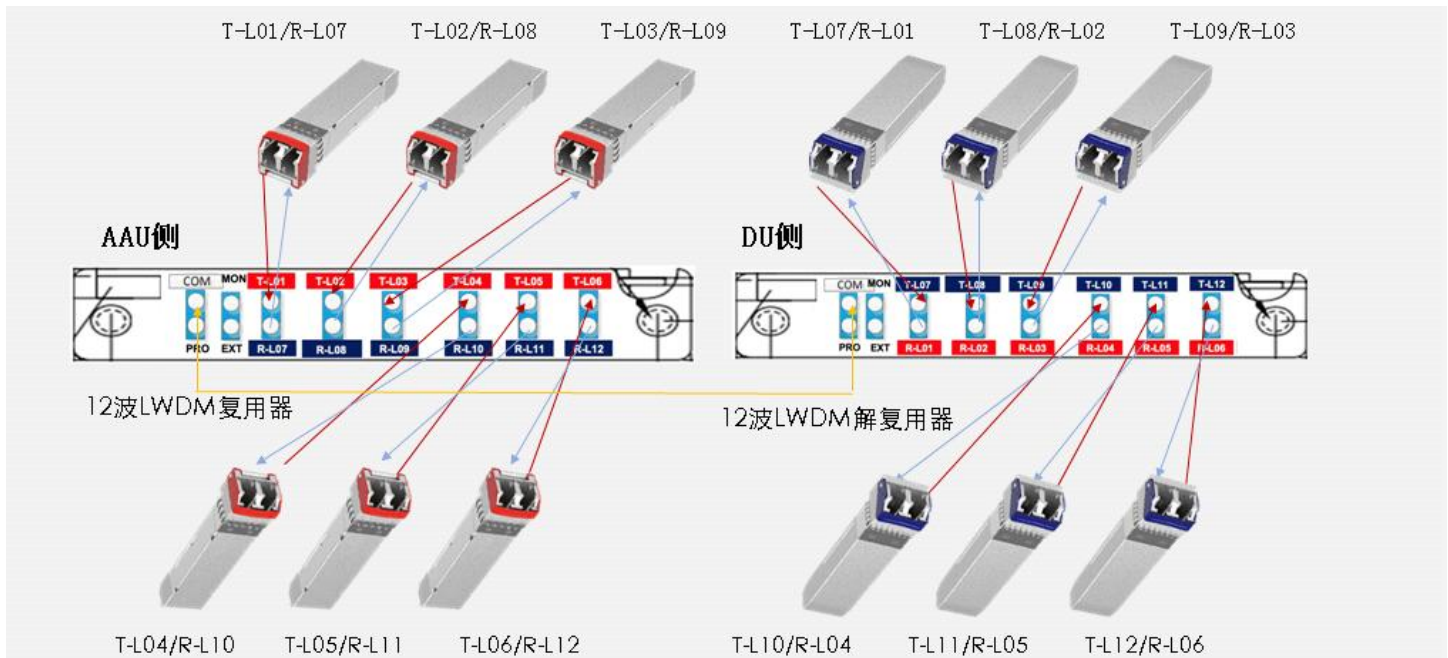
| Parameter | Symbol | Min | Typical | Max | Unit |
|-------------------------------|----------|-----|----------|-----|------|
| Data Rate | BR | - | 25.78125 | - | Gbps |
| Differential Output Impedance | Rout | 80 | 100 | 120 | Ω |
| Differential Output Swing | Vout P-P | - | - | 900 | mVpp |

| | | | | | |
|--------------------------------|--------------|-----|---|---------|----|
| Rise/Fall Time | Tr / Tf | 9.5 | - | - | ps |
| Loss of Signal –Asserted | VOH | 2 | - | Vcc+0.3 | V |
| Loss of Signal –Negated | VOL | 0 | - | +0.4 | V |
| LOS Assert/Deassert Time Delay | T_los on/off | - | - | 100/100 | us |

Digital Diagnostic Functions

| Parameter | Symbol | Min. | Max | Unit | Notes |
|----------------------------|-----------|------|-----|------|----------------------|
| Accuracy | | | | | |
| Transceiver Temperature | DMI_Temp | -3 | +3 | °C | |
| TX Output optical power | DMI_TX | -2 | +2 | dB | |
| RX Input optical power | DMI_RX | -2 | +2 | dB | |
| Transceiver Supply voltage | DMI_VCC | -3% | +3% | V | Full operating range |
| Bias current monitor | DMI_Ibias | -10% | 10% | mA | |

Support Wavelength(nm)



| | | | | | | | | | | | | |
|-----------------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|
| 中心波长 编号 | L01 | L02 | L03 | L04 | L05 | L06 | L07 | L08 | L09 | L10 | L11 | L12 |
| 标称中心 波长 (nm) | 1269.23 | 1273.54 | 1277.89 | 1282.26 | 1286.66 | 1291.1 | 1295.56 | 1300.05 | 1304.58 | 1309.14 | 1313.73 | 1318.35 |

CDR Rate Select control

The soft RS(0) select bit(A2h byte 110 bit3) and soft RS(1) select bit(A2h byte118 bit3) are CDR control bits that allow for the CDR Rate Select using the 2-wire interface. These bits and the corresponding rate select pins RS0 and RS1 are connected through a logical OR function so that the CDR is controlled when either the bit is “1” or the pin is “high”.

TABLE 10-2 RETIMER/CDR RATE SELECT LOGIC TABLE

| When byte 13d of A0h is set to 0Eh and bit 64.3 of A0h is set to 1 | | | |
|--------------------------------------------------------------------|---------------------------------|-----------------------|-------------------------|
| Logic OR of RS0 pin and RS0 bit | Logic OR of RS1 pin and RS1 bit | Receiver retimer/CDR | Transmitter retimer/CDR |
| Low/0 | Low/0 | Lock at low bit rate | Lock at low bit rate |
| Low/0 | High/1 | Lock at high bit rate | Bypass |
| High/1 | Low/0 | Bypass | Bypass |
| High/1 | High/1 | Lock at high bit rate | Lock at high bit rate |

Note: Low and high bit rates are defined in byte 13d of A0h.

Pin Descriptions

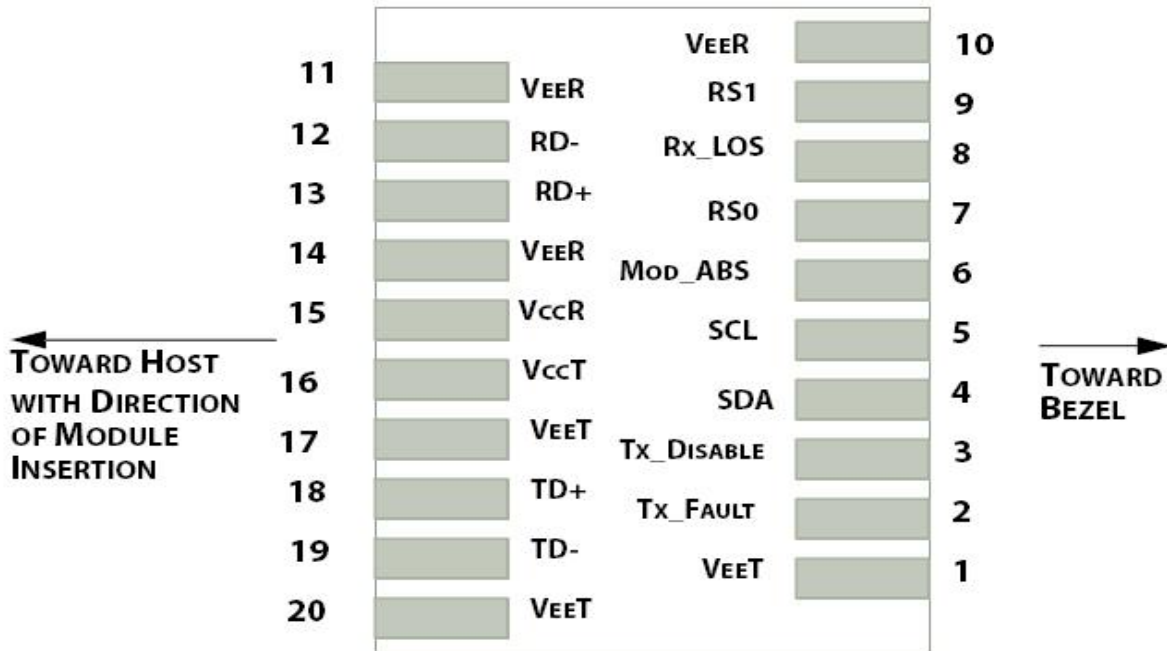


Figure2. Electrical Pin-out Details

| 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 | Rate Select 0 |
| 8 | RX_LOS [2] | Loss of Signal indication. Logic 0 indicates normal operation |
| 9 | RS1 | 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 pull up to VccT inside the module.

[4]Mod_ABS is connected to VeeT or VeeR in the SFP28 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.

Host Board SFP28 Connector Recommendations

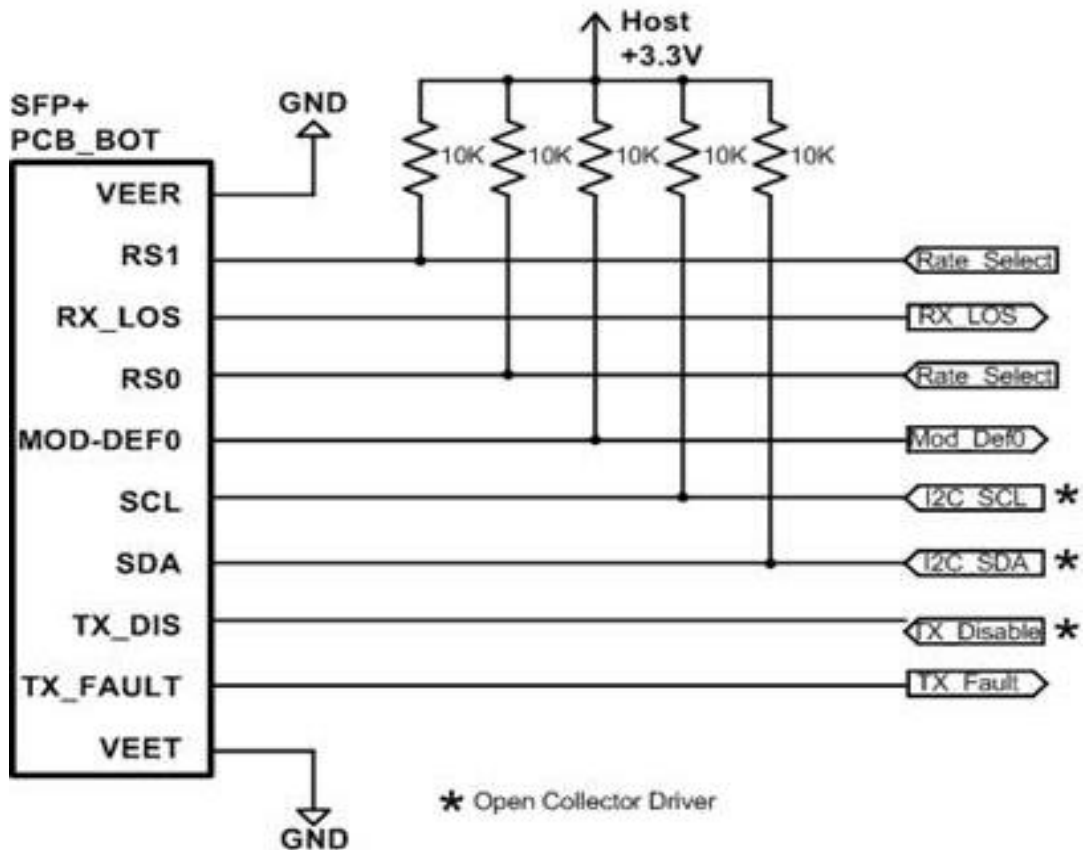
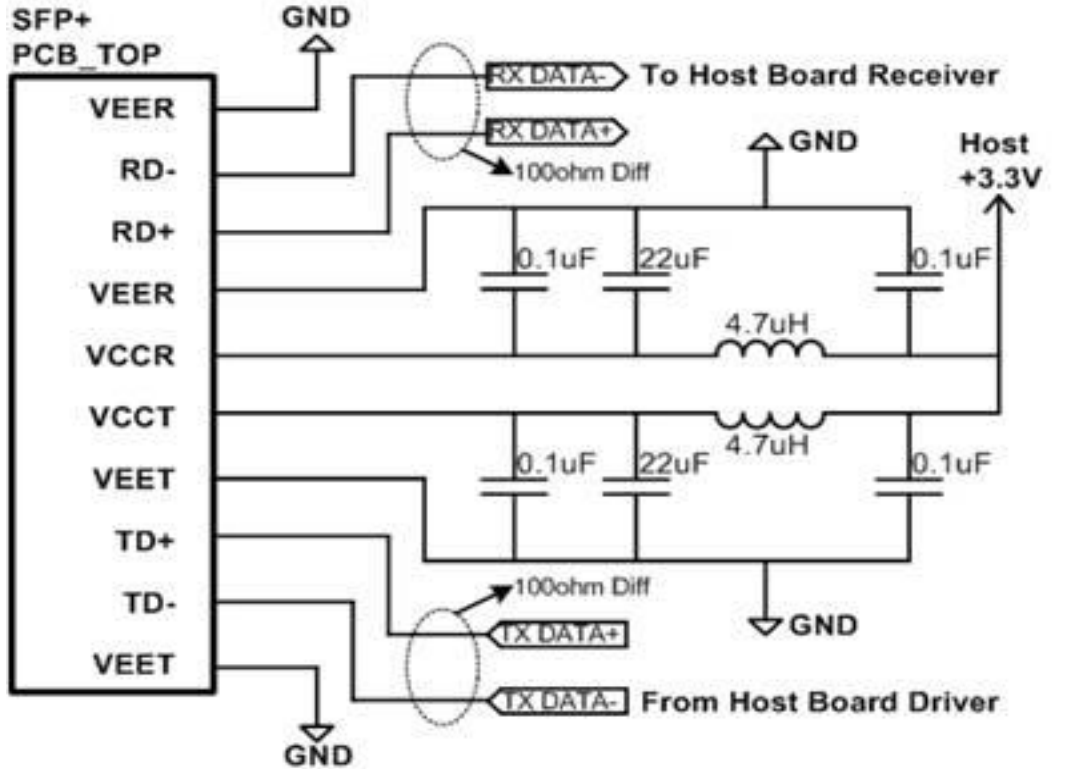


Figure3.Recommended Interface Circuit

Mechanical Dimensions

Gigalight GSS-Sx(x)250-L2T SFP28 Transceiver are compatible with the SFF-8432 specification for improved pluggable form factor, and shown here for reference purposes only.

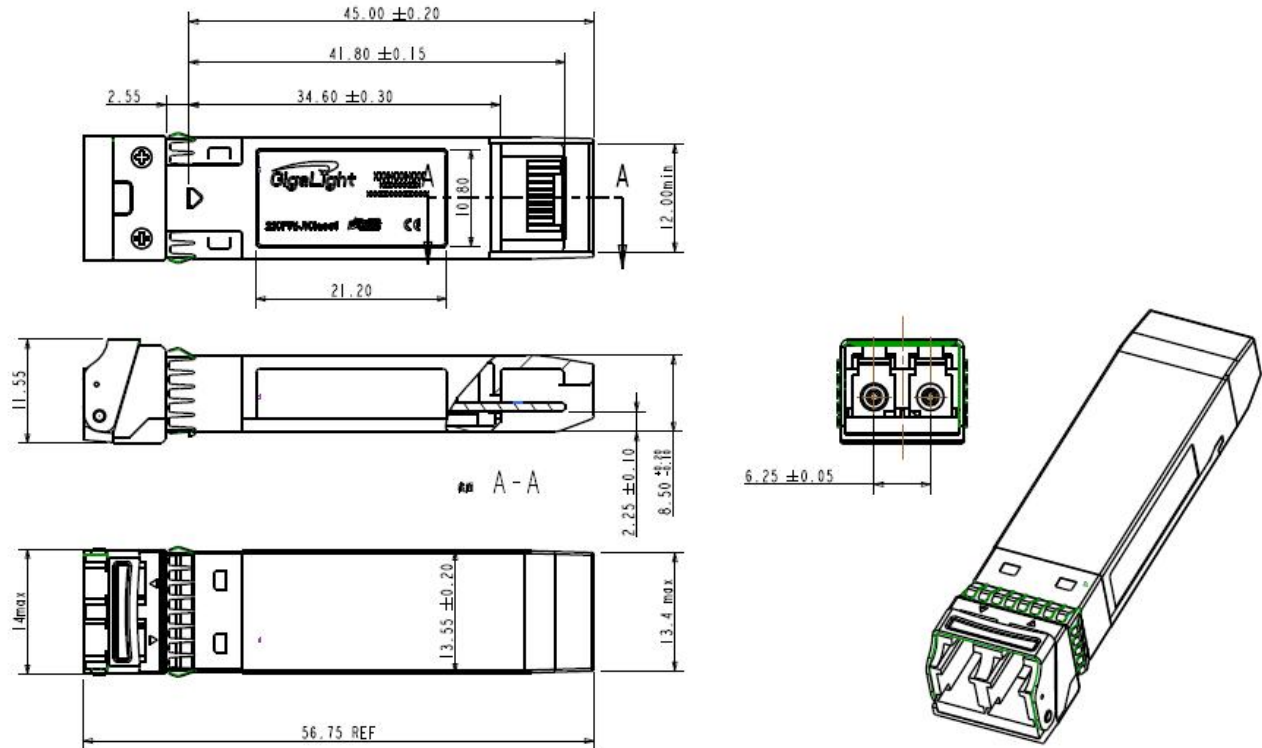


Figure4. Mechanical Specifications

Regulatory Compliance

GIGALIGHT SFP28 transceiver is designed to be Class I Laser safety compliant. They meet the requirements of the following standards:

| Feature | Standard |
|--------------------------|----------------------------------------------------------------------------------------------------------------------|
| Laser Safety | IEC 60825-1:2014 (3 rd Edition) IEC 60825-2:2004/AMD2:2010 EN 60825-1:2014 EN 60825-2:2004+A1+A2 |
| Electrical Safety | EN 62368-1: 2014 IEC 62368-1:2014 UL 62368-1:2014 |
| Environmental protection | Directive 2011/65/EU with amendment(EU)2015/863 |
| CE EMC | EN55032: 2015 EN55035: 2017 EN61000-3-2:2014 EN61000-3-3:2013 |

| | |
|-----|-----------------------------------------|
| FCC | FCC Part 15, Subpart B; ANSI C63.4-2014 |
|-----|-----------------------------------------|

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. IEEE802.3cc – 2017
4. "Diagnostic Monitoring Interface for Optical Transceivers" SFF-8472, Rev 10.3, Dec 1, 2007

CAUTION:

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Ordering information

| Part Number | Product Description |
|----------------|---------------------------------------------------|
| GSS-S11250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1269.23nm, red |
| GSS-S0250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1273.54nm, red |
| GSS-S1250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1277.89nm, red |
| GSS-S2250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1282.26nm, red |
| GSS-S3250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1286.66nm, red |
| GSS-S4250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1291.10nm, red |
| GSS-S5250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1295.56nm, blue |
| GSS-S6250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1300.05nm, blue |
| GSS-S7250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1304.58nm, blue |
| GSS-S8250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1309.14nm, blue |
| GSS-S9250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1313.73nm, blue |
| GSS-S10250-L2T | 25Gbps 20km LWDM SFP28,-40~+85°C, 1318.35nm, blue |

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by GIGALIGHT before they become applicable to any particular order or contract. In accordance with the GIGALIGHT policy of continuous improvement specifications may change without notice.

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Revision History

| Revision | Date | Description |
|----------|-------------|------------------|
| V0 | Aug-31-2021 | Advance Release. |