


## 16GFC 1310nm SFP+ Transceiver GPP-3114G-LRC

### Features

- ✓ Hot-pluggable SFP+ form factor
- ✓ Supports 14Gbps data rate
- ✓ Maximum link length of 10km
- ✓ 1310nm DFB laser and PIN photo-detector
- ✓ Duplex LC receptacle
- ✓ Single 3.3V power supply
- ✓ Power dissipation < 1.5W
- ✓ RoHS compliant and lead free 
- ✓ Commercial case temperature range: 0°C to 70°C



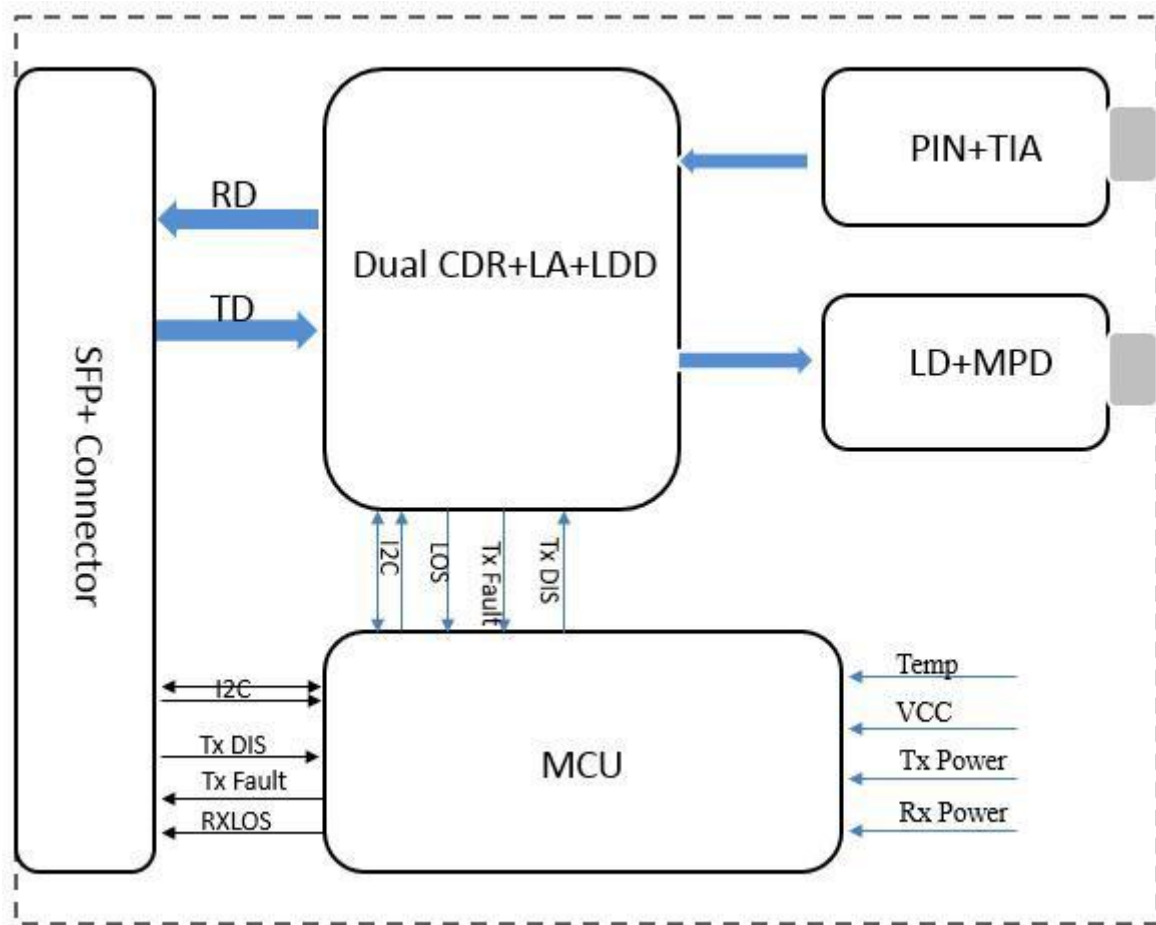
### Applications

- ✓ 16GFC

### Description

The Gigalight Technologies GPP-3114G-LRC is a single-Channel, Pluggable, Fiber-Optic SFP+ for 16G Fiber Channel Applications. It is a high performance module for short-range data communication and interconnect applications which operate at 14.025 Gbps up to 10km. This module is designed to operate over single mode fiber systems using a nominal wavelength of 1310nm. The electrical interface uses a 20 contact edge type connector. The optical interface uses duplex LC receptacle. This module incorporates Gigalight Technologies proven circuit and technology to provide reliable long life, high performance, and consistent service.

## Block Diagram



## Absolute Maximum Ratings

| Parameter           | Symbol | Min | Max | Unit |
|---------------------|--------|-----|-----|------|
| Supply Voltage      | Vcc    | 0   | 3.6 | V    |
| Storage Temperature | Ts     | -40 | +85 | °C   |
| Operating Humidity  | -      | 5   | 85  | %    |

## Recommended Operating Conditions

| Parameter                  | Symbol | Min  | Typical | Max  | Unit |
|----------------------------|--------|------|---------|------|------|
| Operating Case Temperature | Tc     | 0    |         | +70  | °C   |
| Power Supply Voltage       | Vcc    | 3.13 | 3.3     | 3.47 | V    |
| Power Supply Current       | Icc    |      |         | 350  | mA   |

## Electrical Specifications

| Parameter                              | Symbol           | Min                  | Typical | Max             | Unit  |
|--|------------------|----------------------|---------|-----------------|-------|
| Differential Input Impedance           | Zin              | 90                   | 100     | 110             | ohm   |
| Differential Output Impedance          | Zout             | 90                   | 100     | 110             | ohm   |
| Differential Input Voltage Amplitude1  | $\Delta V_{in}$  | 300                  |         | 1100            | mVp-p |
| Differential Output Voltage Amplitude2 | $\Delta V_{out}$ | 500                  |         | 800             | mVp-p |
| Input Logic Level High                 | V <sub>IH</sub>  | 2.0                  |         | V <sub>cc</sub> | V     |
| Input Logic Level Low                  | V <sub>IL</sub>  | 0                    |         | 0.8             | V     |
| Output Logic Level High                | V <sub>OH</sub>  | V <sub>cc</sub> -0.5 |         | V <sub>cc</sub> | V     |
| Output Logic Level Low                 | V <sub>OL</sub>  | 0                    |         | 0.4             | V     |

### Note:

- 1.Differential input voltage amplitude is measured between TxnP and TxnN.
- 2.Differential output voltage amplitude is measured between RxnP and RxnN.

## Optical Characteristics

| Parameter              | Symbol            | Min                                | Typical | Max   | Unit | Notes |
|------------------------|-------------------|------------------------------------|---------|-------|------|-------|
| <b>Transmitter</b>     |                   |                                    |         |       |      |       |
| Data rate              | BR                |                                    | 14.025  |       | Gbps |       |
| Centre Wavelength      | $\lambda_c$       | 1295                               | 1310    | 1325  | nm   |       |
| Spectral Width (-20dB) | $\sigma$          |                                    |         | 1     | nm   |       |
| Side Mode Suppression  | SMSR              | 30                                 |         |       | dB   |       |
| Average Output Power   | P <sub>avg</sub>  | -7                                 |         | 2     | dBm  |       |
| Optical Modulation     | OMA               | -4                                 |         | 2.2   | dBm  |       |
| Extinction Ratio       | ER                | 3                                  |         |       | dB   |       |
| Eye Mask Coordinates   |                   | {0.31, 0.4, 0.45, 0.34, 0.38, 0.4} |         |       |      |       |
| <b>Receiver</b>        |                   |                                    |         |       |      |       |
| Data rate              | BR                |                                    | 14.025  |       | Gbps |       |
| Centre Wavelength      | $\lambda_c$       | 1295                               | 1310    | 1325  | nm   |       |
| Average Power at       |                   | -13.3                              |         | 2     | dBm  |       |
| Receive reference(max) |                   |                                    |         | -26   | dB   |       |
| Receiver Sensitivity   | P <sub>sens</sub> | -                                  | -       | -12   | dBm  | 1     |
| Stessed receiver       |                   |                                    |         | -9.5  | dBm  | 1     |
| LOS De-Assert          | LOSD              |                                    |         | -13.5 | dBm  |       |
| LOS Assert             | LOSA              | -30                                |         |       | dBm  |       |
| LOS Hysteresis         |                   | 0.5                                |         |       | Db   |       |

### Notes1:

- 1.Measured with a PRBS 231-1 test pattern @14.025Gbps,BER≤10-12.

## Timing and Electrical

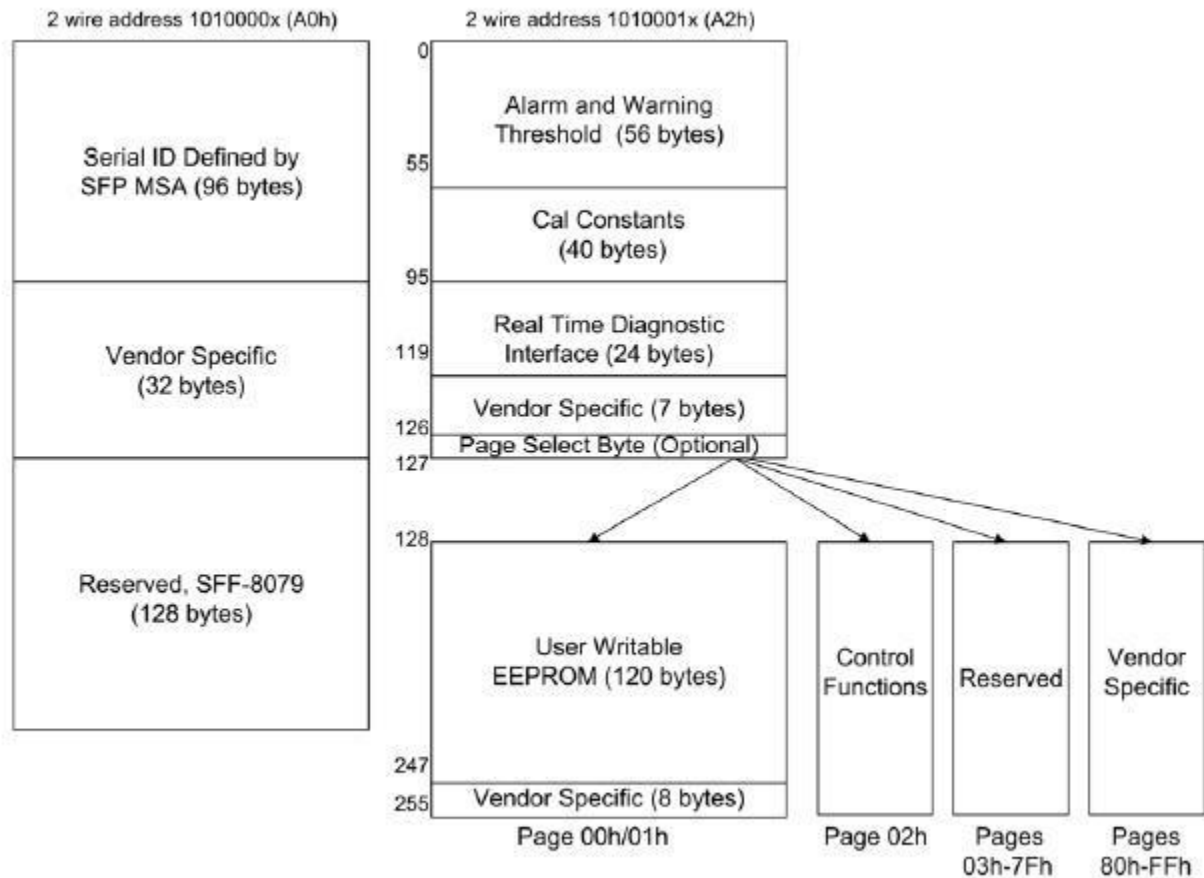
| Parameter   | Symbol                | Min. | Max. | Unit | Conditions   |
|---|-----------------------|------|------|------|--|
| Tx_Disable assert time  | t_off                 |      | 100  | μs   | Rising edge of Tx_Disable to fall of output signal below 10% of nominal  |
| Tx_Disable negate time  | t_on                  |      | 2    | ms   | Falling edge of Tx_Disable to rise of output signal above 90% of nominal. This only applies in normal operation, not during start up or fault recovery.  |
| Time to initialize 2-wire interface   | t_2w_start_up         |      | 300  | ms   | From power on or hot plug after the supply meeting <a href="#">Table 8</a> .   |
| Time to initialize  | t_start_up            |      | 300  | ms   | From power supplies meeting <a href="#">Table 8</a> or hot plug or Tx disable negated during power up, or Tx_Fault recovery, until non-cooled power level I part (or non-cooled power level II part already enabled at power level II for Tx_Fault recovery) is fully operational.   |
| Time to initialize cooled module and time to power up a cooled module to Power Level II | t_start_up_cooled     |      | 90   | s    | From power supplies meeting <a href="#">Table 8</a> or hot plug, or Tx disable negated during power up or Tx_Fault recovery, until cooled power level I part (or cooled power level II part during fault recovery) is fully operational. Also, from stop bit low-to-high SDA transition enabling Power Level II until cooled module is fully operational |
| Time to Power Up to Level II  | t_power_level2        |      | 300  | ms   | From stop bit low-to-high SDA transition enabling power level II until non-cooled module is fully operational  |
| Time to Power Down from Level II  | t_power_down          |      | 300  | ms   | From stop bit low-to-high SDA transition disabling power level II until module is within power level I requirements  |
| Tx_Fault assert   | Tx_Fault_on           |      | 1    | ms   | From occurrence of fault to assertion of Tx_Fault  |
| Tx_Fault assert for cooled module   | Tx_Fault_on_cooled    |      | 50   | ms   | From occurrence of fault to assertion of Tx_Fault  |
| Tx_Fault Reset  | t_reset               | 10   |      | μs   | Time Tx_Disable must be held high to reset Tx_Fault  |
| RS0, RS1 rate select timing for FC  | t_RS0_FC,<br>t_RS1_FC |      | 500  | μs   | From assertion till stable output  |
| RS0, RS1 rate select timing non FC  | t_RS0, t_RS1          |      | 24   | ms   | From assertion till stable output  |
| Rx_LOS assert delay   | t_los_on              |      | 100  | μs   | From occurrence of loss of signal to assertion of Rx_LOS   |
| Rx_LOS negate delay   | t_los_off             |      | 100  | μs   | From occurrence of presence of signal to negation of Rx_LOS  |

## Memory Organization

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

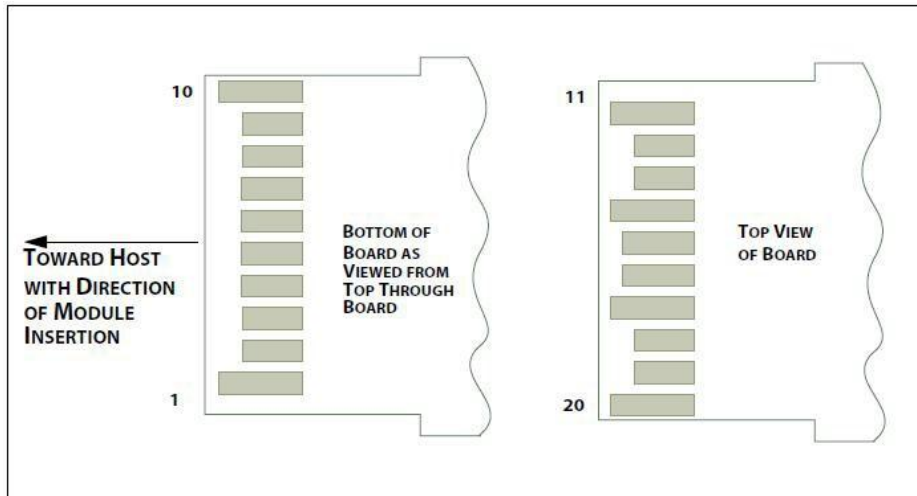
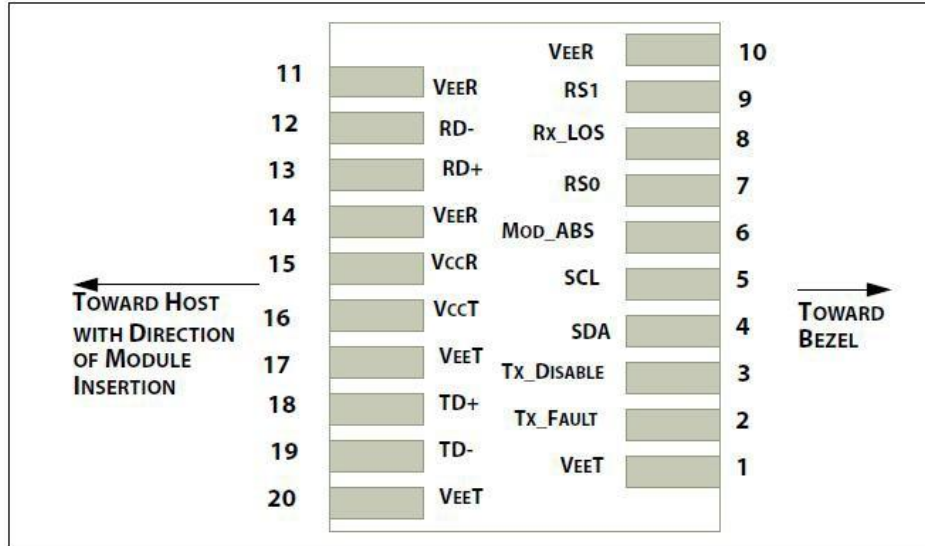
The memory map specific data field defines as following.

**Two-wire Interface Fields**



**TWO-WIRE INTERFACE FIELDS**

## Pin Definitions



## Pin Descriptions

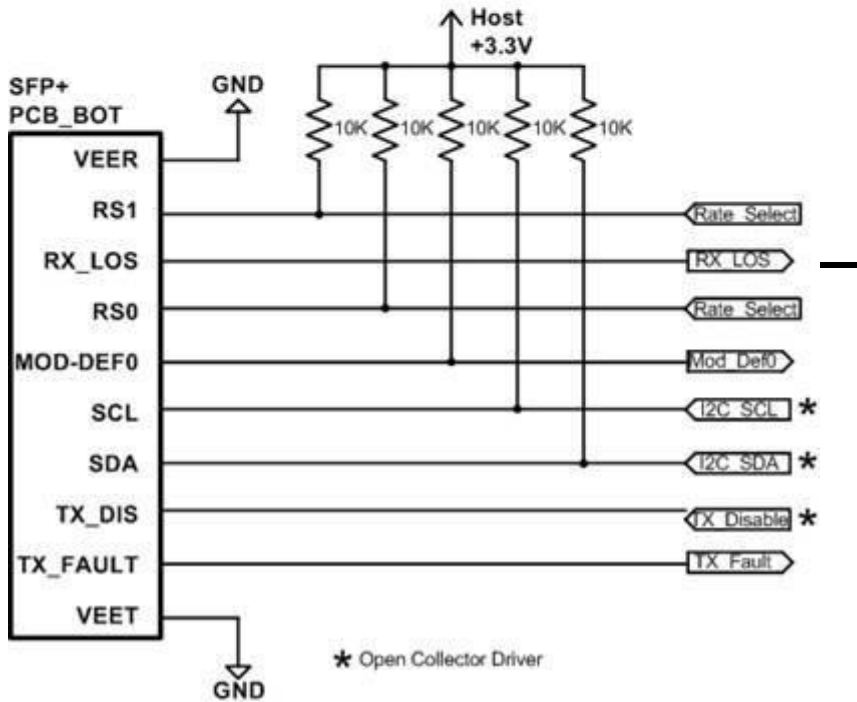
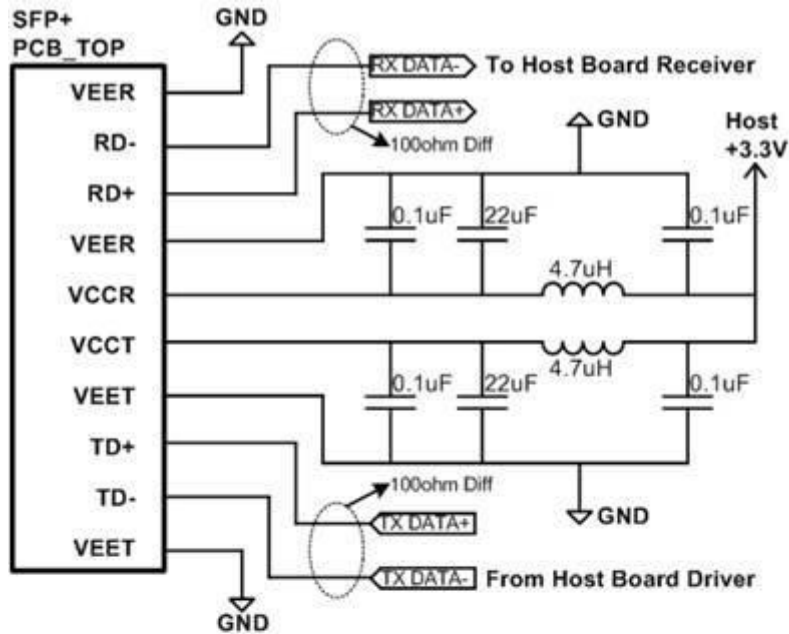
| PIN | Logic     | Symbol   | Name / Description                               | Note |
|-----|-----------|----------|--|------|
| 1   |           | VeeT     | Module Transmitter Ground                        | 1    |
| 2   | LVTTL-O   | TX Fault | Module Transmitter Fault                         | 2    |
| 3   | LVTTL-I   | TX Dis   | Transmitter Disable; Turns off transmitter laser |      |
| 4   | LVTTL-I/O | SDA      | 2-Wire Serial Interface Data Line                | 2    |
| 5   | LVTTL-I   | SCL      | 2-Wire Serial Interface Clock                    | 2    |
| 6   |           | MOD ABS  | Module Definition, Grounded in the module        |      |
| 7   | LVTTL-I   | RS0      | Receiver Rate Select                             |      |
| 8   | LVTTL-O   | RX LOS   | Receiver Loss of Signal Indication Active LOW    |      |
| 9   | LVTTL-I   | RS1      | Transmitter Rate Select (not used)               |      |
| 10  |           | VeeR     | Module Receiver Ground                           | 1    |
| 11  |           | VeeR     | Module Receiver Ground                           | 1    |
| 12  | CML-O     | RD-      | Receiver Inverted Data Output                    |      |
| 13  | CML-O     | RD+      | Receiver Data Output                             |      |
| 14  |           | VeeR     | Module Receiver Ground                           | 1    |
| 15  |           | VccR     | Module Receiver 3.3 V Supply                     |      |
| 16  |           | VccT     | Module Receiver 3.3 V Supply                     |      |
| 17  |           | VeeT     | Module Transmitter Ground                        | 1    |
| 18  | CML-I     | TD+      | Transmitter Non-Inverted Data Input              |      |
| 19  | CML-I     | TD-      | Transmitter Inverted Data Input                  |      |
| 20  |           | VeeT     | Module Transmitter Ground                        | 1    |

### Notes:

1. Module ground pins GND are isolated from the module case.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

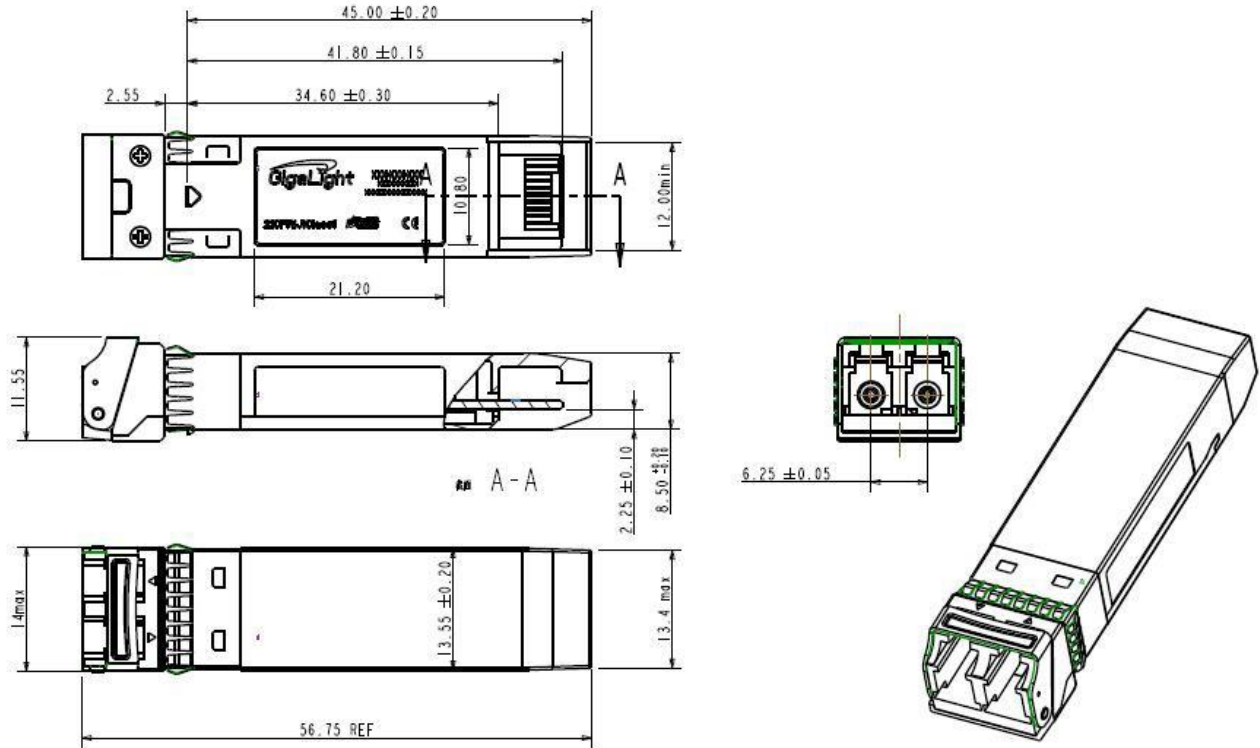


### Recommended Interface Circuit





## Mechanical Dimensions



## Regulatory Compliance

Gigalight GPP-3114G-LRC transceivers are Class 1 Laser Products. They meet the requirements of the following standards.

| Feature                  | Standard  |
|--------------------------|---|
| Laser Safety             | IEC 60825-1:2014 (3 <sup>rd</sup> Edition)<br>IEC 60825-2:2021<br>EN 60825-1:2014+A11:2021<br>EN 60825-2:2004+A1+A2 |
| Electrical Safety        | EN 62368-1:2014/AC:2017<br>IEC 62368-1:2014<br>UL 62368-1:2014  |
| Environmental protection | Directive 2011/65/EU with amendment(EU)2015/863   |
| CE EMC                   | EN55032: 2015<br>EN55035: 2017<br>EN61000-3-2:2014<br>EN61000-3-3:2013  |
| FCC                      | FCC Part 15, Subpart B<br>ANSI C63.4-2014   |

## References

1. SFP+ MSA
2. Ethernet IEEE802.3cc
3. Directive 2011/65/EU of the European Parliament and of the Council, “on the restriction of the use of certain hazardous substances in electrical and electronic equipment,” July 1, 2011.

### 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                    |
|---------------|--|
| GPP-3114G-LRC | 16GFC, 1310nm; SFP+, 10km, 0°C ~ +70°C |

Email: sales@gigalight.com.cn



<http://www.gigalight.com.cn>

### Revision History

| Revision | Date         | Description      |
|----------|--------------|------------------|
| V0       | Jul -21-2023 | Advance Release. |