

XFP-10GLR-192SRL-LEG  
CISCO 10GBASE-LR XFP SMF  
1550NM 10KM REACH LC DOM



## **XFP-10GLR-192SRL-LEG**

10Gbs XFP Transceiver

### **Features**

- Duplex LC connector
- Support hot-pluggable
- Metal with lower EMI
- Excellent ESD protection
- XFP MSA Compliant
- Distance up to 10km for single mode fiber
- +3.3V power supply and power dissipation <3.5W
- GR-253-CORE compliant
- RoHS Compliant and Lead-Free
- Compliant with IEEE 802.3ae
- Compliant with XFP MSA
- Digital diagnostic compatible with SFF-847 Rev11.0

### **Applications**

- 10GBASE-LR/LW
- 10G Fibre Channel
- Other optical link

### **Product Description**

Legrand's XFP-10GLR-192SRL-LEG transceivers are compatible with the XFP Multi-Sourcing Agreement (MSA). The XFP transceivers are high performance, cost effective modules supporting dual data-rate of 10Gbps and support distance up to 10km with SMF.

Legrand's XFP transceivers are RoHS compliant and lead-free

### **Regulatory Compliance**

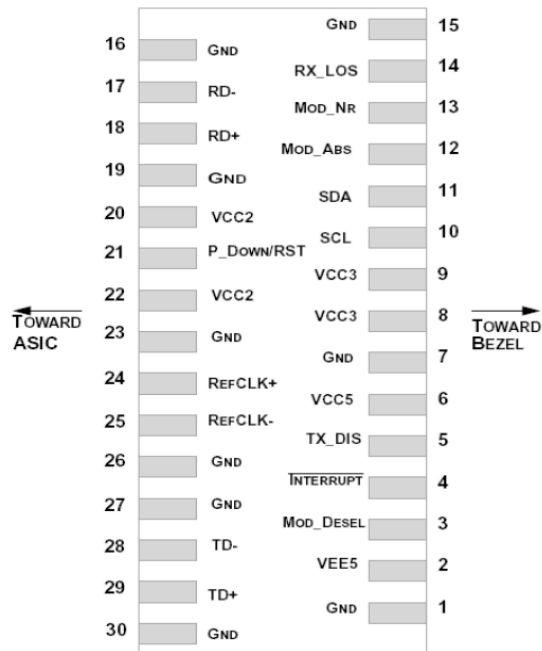
- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.7.
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2.
- Immunity compatible with IEC 61000-4-3.
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B.
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2.
- RoHS compliant with 2002/95/EC 4.1&4.2 2005/747/EC.

## Pin Descriptions

| Pin | Symbol     | Name/Descriptions                                                                                                                                                  | Ref. |
|-----|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1   | GND        | Module Ground                                                                                                                                                      |      |
| 2   | Vee5       | (not required)                                                                                                                                                     |      |
| 3   | MOD_DESEL  | Module De-select; When Held low allows the module to respond to 2-wire serial interface. LVTTTL-I                                                                  |      |
| 4   | /INTERRUPT | Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface. LVTTTL-O                                                | 2    |
| 5   | TX_DIS     | Transmitter Disable. Logic1 indicates laser output disabled, LVTTTL-I                                                                                              |      |
| 6   | VCC5       | +5V Power Supply (Not required)                                                                                                                                    |      |
| 7   | GND        | Module Ground                                                                                                                                                      | 1    |
| 8   | VCC3       | +3.3V Power Supply                                                                                                                                                 |      |
| 9   | VCC3       | +3.3V Power Supply                                                                                                                                                 |      |
| 10  | SCL        | 2-Wire Serial Interface Clock. LVTTTL-I                                                                                                                            | 2    |
| 11  | SDA        | 2-Wire Serial Interface Data Line. LVTTTL-I/O                                                                                                                      | 2    |
| 12  | MOD_Abs    | Indicates Module is not present. Grounded in the Module. LVTTTL-O                                                                                                  | 2    |
| 13  | MOD_NR     | Module Not Ready; Indicating Module Operational Fault. Open-collector. LVTTTL-O                                                                                    | 2    |
| 14  | RX_LOS     | Loss of Signal indication. Logic 1 indicates loss of Signal. Open-collector. LVTTTL-O                                                                              | 2    |
| 15  | GND        | Module Ground                                                                                                                                                      | 1    |
| 16  | GND        | Module Ground                                                                                                                                                      | 1    |
| 17  | RD-        | Receiver Inverted Data Output. CML-O                                                                                                                               |      |
| 18  | RD+        | Receiver Non-Inverted Data Output. CML-O                                                                                                                           |      |
| 19  | GND        | Module Ground                                                                                                                                                      | 1    |
| 20  | VCC2       | +1.8V Power Supply (Not required).                                                                                                                                 | 3    |
| 21  | P_DOWN/RST | Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. LVTTTL-I |      |
|     |            | Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. LVTTTL-I                      |      |
| 22  | VCC2       | +1.8V Power Supply (Not required)                                                                                                                                  | 3    |
| 23  | GND        | Module Ground                                                                                                                                                      | 1    |
| 24  | REFCLK+    | Reference Clock (Not required)                                                                                                                                     |      |
| 25  | REFCLK-    | Reference Clock (Not required)                                                                                                                                     |      |
| 26  | GND        | Module Ground                                                                                                                                                      | 1    |
| 27  | GND        | Module Ground                                                                                                                                                      | 1    |
| 28  | TD-        | Transmitter Inverted Data Input. CML-I                                                                                                                             |      |
| 29  | TD+        | Transmitter Non-Inverted Data Input. CML-I                                                                                                                         |      |
| 30  | GND        | Module Ground                                                                                                                                                      | 1    |

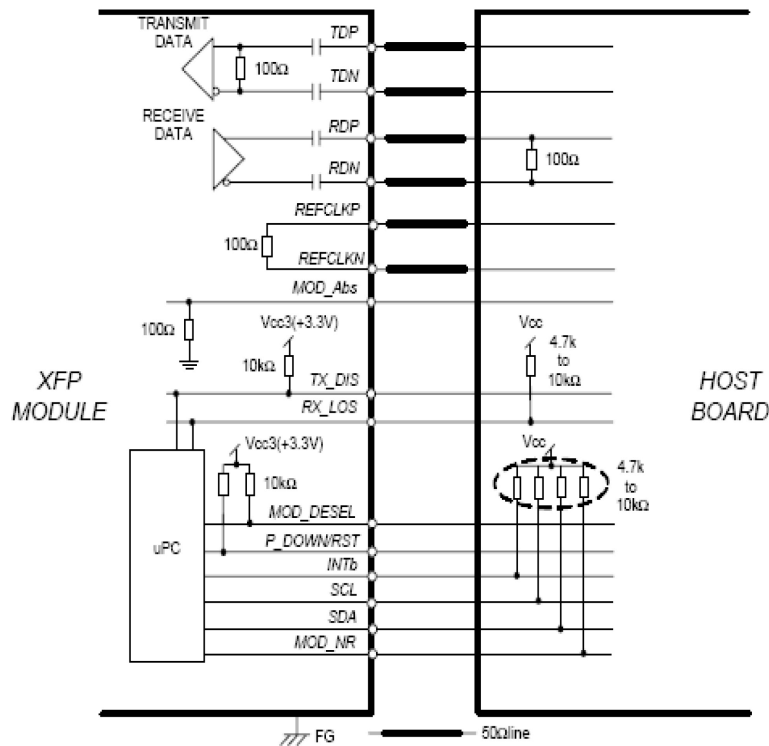
**Notes:**

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Open collector; should be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.6V on the host board.
3. The pins are open within module.



Pin-out of connector Block on Host board

# Recommend Circuit Schematic



# Absolute Maximum Ratings

| Parameter              | Symbol | Min. | Max. | Unit |
|------------------------|--------|------|------|------|
| Maximum Supply Voltage | Vcc3   | -0.5 | 4.0  | V    |
| Storage Temperature    | TS     | -40  | 85   | °C   |
| Operating Humidity     | RH     | 5    | 95   | %    |

# Recommended Operating Conditions

| Parameter                               | Symbol | Min. | Typ. | Max. | Unit |
|-----------------------------------------|--------|------|------|------|------|
| Power Supply Voltage                    | Vcc3   | 3.13 | 3.30 | 3.47 | V    |
| Power Supply Current                    | Icc3   |      |      | 650  | mA   |
| Case Operating Temperature – Commercial | Tc     | -5   |      | 70   | °C   |
| Case Operating Temperature – Industrial | Tc     | -40  |      | 85   | °C   |
| Data Rate                               |        | 9.95 | 10.3 | 10.5 | Gbps |
| 50/125µm MMF (OM3)                      | Lmax   |      |      | 10   | km   |

## Electrical Characteristics

| Parameter                      | Symbol                | Min.                 | Typ. | Max.                 | Unit | Notes |
|--------------------------------|-----------------------|----------------------|------|----------------------|------|-------|
| Transmitter                    |                       |                      |      |                      |      |       |
| Differential data input swing  | V <sub>in</sub> , pp  | 120                  | 600  | 850                  | mV   |       |
| Input differential impedance   | Z <sub>in</sub>       | 90                   | 100  | 110                  | Ω    |       |
| Receiver                       |                       |                      |      |                      |      |       |
| Differential data output swing | V <sub>out</sub> , pp | 300                  | 600  | 850                  | mV   |       |
| Output Differential Impedance  | Z <sub>in</sub>       | 90                   | 100  | 110                  | Ω    |       |
| Transceiver                    |                       |                      |      |                      |      |       |
| Ref-clk Input Swing            | Ref, pp               | 400                  |      | 2400                 | mV   |       |
| TX Disable-High                |                       | 2.0                  |      | V <sub>cc</sub> +0.3 | V    |       |
| TX Disable-Low                 |                       | V <sub>ee</sub> -0.3 |      | 0.8                  | V    |       |
| LOS-High                       |                       | 2.0                  |      | V <sub>cc</sub> +0.3 | V    |       |
| LOS-Low                        |                       | V <sub>ee</sub> -0.3 |      | 0.8                  | V    |       |
| MOD_DESEL-High                 |                       | 2.0                  |      | V <sub>cc</sub> +0.3 | V    |       |
| MOD_DESEL-Low                  |                       | V <sub>ee</sub> -0.3 |      | 0.8                  | V    |       |
| MOD_INT-High                   |                       | 2.0                  |      | V <sub>cc</sub> +0.3 | V    |       |
| MOD_INT-Low                    |                       | V <sub>ee</sub> -0.3 |      | 0.8                  | V    |       |
| MOD_NR-High                    |                       | 2.0                  |      | V <sub>cc</sub> +0.3 | V    |       |
| MOD_NR-Low                     |                       | V <sub>ee</sub> -0.3 |      | 0.8                  | V    |       |
| P_DOWN/RST-High                |                       | 2.0                  |      | V <sub>cc</sub> +0.3 | V    |       |
| P_DOWN/RST-Low                 |                       | V <sub>ee</sub> -0.3 |      | 0.8                  | V    |       |

## Optical Characteristics

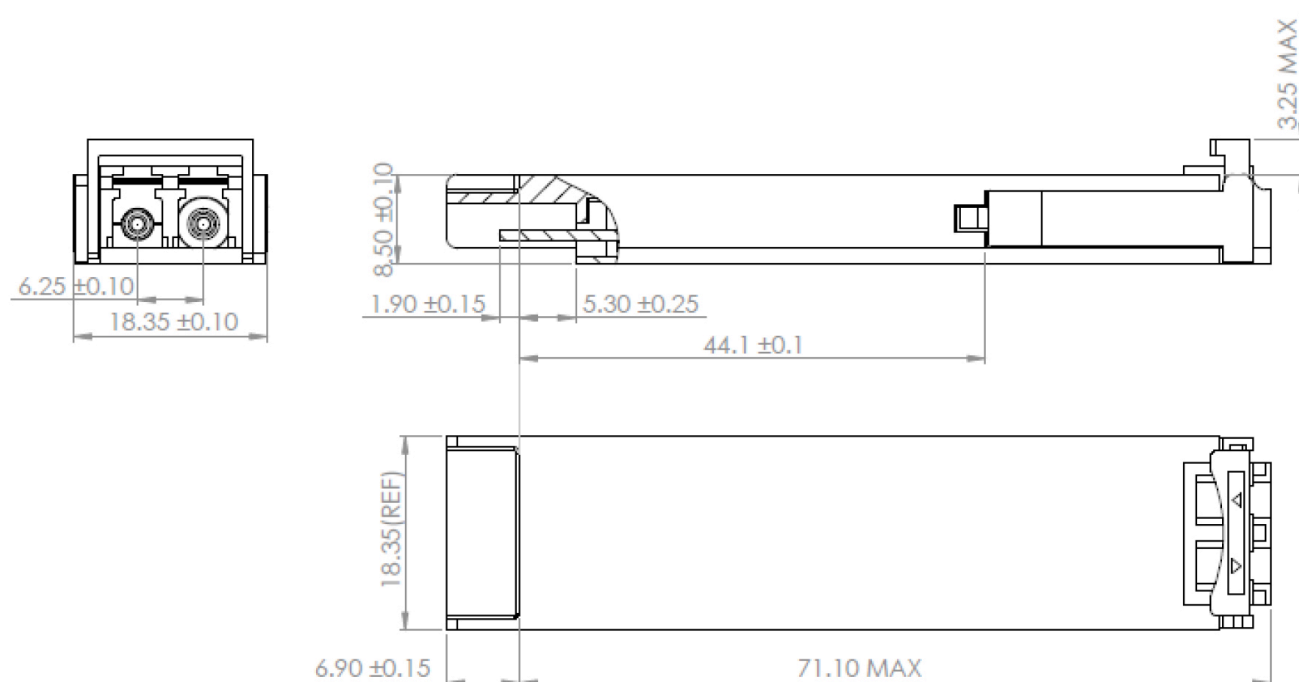
| Parameter                          | Symbol           | Min. | Typ. | Max. | Unit | Notes |
|------------------------------------|------------------|------|------|------|------|-------|
| Transmitter                        |                  |      |      |      |      |       |
| Output Opt. Power                  | AOP              | -6   |      | 0.5  | dBm  | 1     |
| Optical Modulation Amplitude       | P(OMA)           | -5.2 | -2   |      | dBm  |       |
| Extinction Ratio                   | ER               | 3.5  |      |      | dB   |       |
| Transmitter and Dispersion Penalty | TDP              |      |      | 3.2  | dB   |       |
| Average Launch power of OFF TX     | P <sub>off</sub> |      |      | -30  | dBm  |       |
| Side Mode Suppression Ratio        | SMSR             | 30   |      |      | dB   |       |

|                               |                  |      |      |       |       |   |
|-------------------------------|------------------|------|------|-------|-------|---|
| Optical Wavelength            | $\lambda$        | 1260 | 1310 | 1355  | nm    |   |
| Side Mode Suppression Ratio   | SMSR             | 30   |      |       | dB    |   |
| Optical Return Loss Tolerance | ORLT             |      |      | 12    | dB    |   |
| Relative Intensity Noise      | RIN              |      |      | -128  | dB/Hz |   |
| Transmitter Reflectance       |                  |      |      | -12   | dB    |   |
| Eye Diagram                   | IEEE802.3ae-2005 |      |      |       |       |   |
| Receiver                      |                  |      |      |       |       |   |
| Overload                      |                  | 0.5  |      |       | dBm   |   |
| Receiver Reflectance          |                  |      |      | -12   | dB    |   |
| Optical Center Wavelength     | $\lambda_C$      | 1260 |      | 1610  | nm    |   |
| LOS De-Assert                 | LOSD             |      |      | -15   | dBm   | 1 |
| LOS Assert                    | LOSA             | -30  |      |       | dBm   |   |
| LOS Hysteresis                |                  | 0.5  |      | 5     | dB    |   |
| Receiver Sensitivity          | PIN              |      |      | -14.4 | dBm   | 1 |

#### Notes:

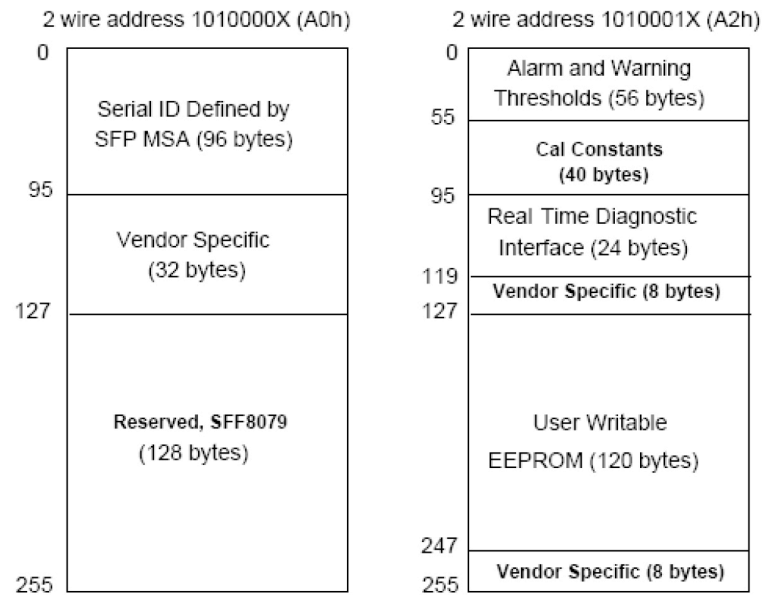
1. BER  $\leq$  10-12@PRBS231-1 at 10.3125Gb/s.

#### Mechanical Specifications



### EEPROM Information

EEPROM memory map specific data field description is as below:



### Digital Diagnostic Monitoring Interface

The digital diagnostic monitoring interface also defines another 256-byte memory map in EEPROM, which makes use of the 8 bi address 1010001X (A2h). The monitoring specification of this product is described in this table.

| Parameter    | Range           | Accuracy | Calibration |
|--------------|-----------------|----------|-------------|
| Temperature  | -5 to +85°C     | ±3°C     | Internal    |
|              | -40 to +95°C    | ±3°C     |             |
| Voltage      | 2.97V to 3.63V  | ±3%      | Internal    |
| Bias Current | 0mA to 100mA    | ±10%     | Internal    |
| TX Power     | -6 to +0.5dBm   | ±2dB     | Internal    |
| RX Power     | -14.4 to 0.5dBm | ±2dB     | Internal    |