

OP-S10G31-20 10G SFP+LR Module, SM 1310nm 20km LC DDM

Features

- Support data rate up to 10.5Gb/s
- Uncooled 1310nm DFB laser transmitter and PIN photodetector
- Up to 20KM transmission on SMF
- Built-in digital diagnostic functions
- Single 3.3V power supply
- Hot-pluggable SFP footprint
- Duplex LC connector interface
- Low power consumption
- Compliant with SFP+ MSA and IEE803.ae
- Compliant with RoHS



Applications

- 10GBASE-LR at 10.3125Gbps
- 10GBASE-LW at 9.953Gbps
- Other Optical Links

Description

OPTINET SFP+LR transceiver is designed for 10G Ethernet serial optical data communication up to 20KM on SMF. The module transmitter section uses a 1310nm DFB laser and is a Class 1 laser compliant according to International Safety standard IEC 60825. The receiver section consists of a PIN photodiode integrated with a TIA. It is compliant with Multi-Sourcing Agreement (MSA) SFF-8431 and SFF-847.

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit |
|---------------------|--------|------|------|------|
| Storage Temperature | Ts | -40 | 85 | °C |
| Supply Voltage | Vcc | -0.5 | 4 | V |
| Operating Humidity | RH | 5 | 95 | % |
| Power Consumption | | | 1 | W |

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|----------------------------|--------|------|---------|------|------|
| Operating Case Temperature | Tc | 0 | | 70 | °C |



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| | | | | | |
|----------------------|-----|------|---------|------|------|
| Power Supply Voltage | Vcc | 3.15 | 3.3 | 3.45 | V |
| Power Supply Current | Icc | | | 290 | mA |
| Data Rate | - | | 10.3125 | | Gbps |

Optical Characteristics

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|------------------------------------|--------------------------------|------|---------|-------|------|
| Transmitter | | | | | |
| Centre Wavelength | λ_c | 1260 | 1310 | 1355 | nm |
| Average Output Power | Po | -5 | | 0 | dBm |
| Extinction Ratio | Er | 3.5 | | | dB |
| Spectral Width(RMS) | $\Delta\lambda$ | | | 1 | nm |
| Optical Modulation Amplitude | OMA | -5.2 | | | dBm |
| Transmitter and Dispersion Penalty | TDP | | | 3.2 | dB |
| Pout @TX-Disable Asserted | Poff | | | -35 | dBm |
| Output Optical Eye Mask | Compliant with IEEE 802.3-2008 | | | | |
| Receiver | | | | | |
| Center Wavelength | λ_c | 1260 | | 1355 | nm |
| Receiver Sensitivity | S | | | -13 | dBm |
| Receiver Sensitivity in OMA | SOMA | | | -12.6 | dBm |
| Receiver Overload | P _{in} | 0.5 | | | dBm |
| LOS De-Assert | LOS _D | | | -17 | dBm |
| LOS Assert | LOS _A | -30 | | | dBm |
| LOS Hysteresis | | 0.5 | | | dB |

Notes:

1. The optical power is launched into SMF
2. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps
3. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps, BER ≤ 1x10⁻¹²

Electrical Characteristics

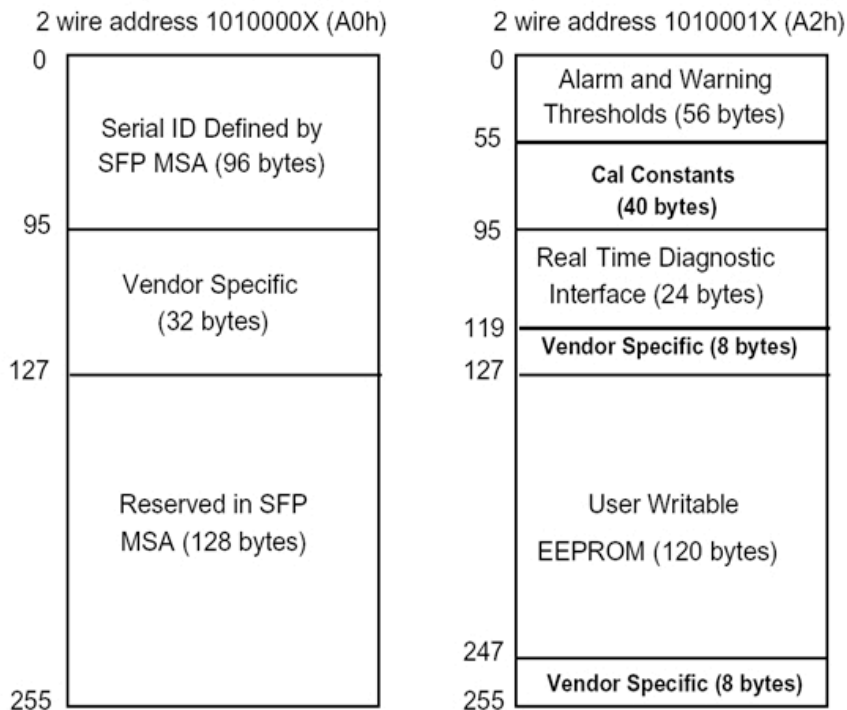
| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-------------------------------|-------------------|------|------|------|------|
| Transmitter | | | | | |
| Differential Data Input Swing | Vin | 180 | | 700 | mV |
| Input Differential Impedence | Zin | | 100 | | Ω |
| TX_Fault | Normal Operation | 0 | | 0.5 | V |
| | Transmitter Fault | 2 | | Vcc | V |

| | | | | | | |
|--------------------------------|------------------|------|-----|-----|---------|----|
| TX_Disable | Laser Enable | | 0 | | 0.8 | V |
| | Laser Disable | | 2 | | Vcc+0.3 | V |
| Receiver | | | | | | |
| Differential Data Output Swing | | Vout | 300 | | 850 | mV |
| Output Differential Impedence | | Zo | | 100 | | mV |
| Rx_LOS | Normal Operation | | 0 | | 0.5 | V |
| | Loss of Signal | | 2 | | Vcc | V |

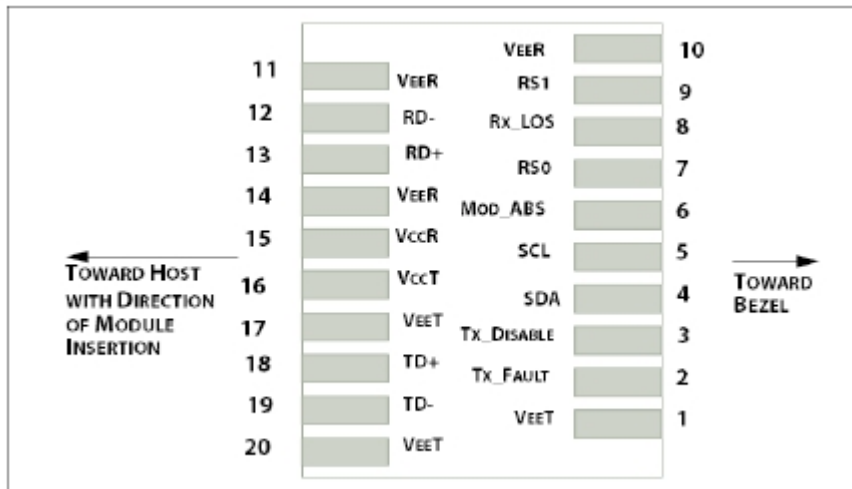
Digital Diagnostic Function

OPTINET SFP+LR transceiver supports the 2-wire serial communication protocol as defined in SFP MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, manufacturer, part no and other information.

Additionally, the digital diagnostic monitoring interface also defines another 256-byte memory map in EEPROM, which makes use of the 8bit address 1010001X (A2h). It allows real-time access to transceiver's working temperature, laser bias current, transmitted optical power, receiver sensitivity and supply voltage.



Pin Definitions

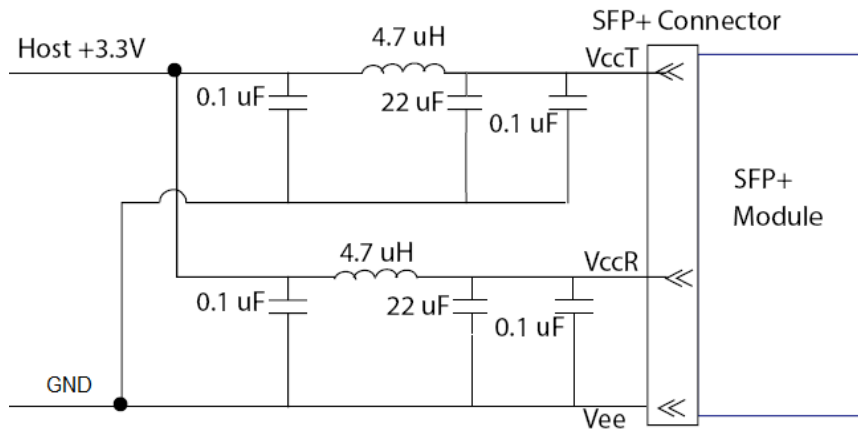


| Pin | Symbol | Name/Description |
|-----|------------|--|
| 1 | VeeT | Transmitter Ground |
| 2 | Tx_FAULT | Transmitter Fault |
| 3 | Tx_DISABLE | Transmitter Disable. Laser output disabled on high or open |
| 4 | SDA | 2-wire Serial Interface Data Line |
| 5 | SCL | 2-wire Serial Interface Clock Line |
| 6 | MOD_ABS | Module Absent, connected to VeeT or VeeR in the module |
| 7 | RS0 | Rate Select 0, not implement |
| 8 | RX_LOS | Receiver loss of signal |
| 9 | RS1 | Rate Select 1, not implement |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Receiver Inverted Data Output |
| 13 | RD+ | Receiver Non-Inverted Data Output |
| 14 | VeeR | Receiver Ground |
| 15 | VccR | Receiver Power Supply |
| 16 | VccT | Transmitter Power Supply |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmitter Non-Inverted Data Input |
| 19 | TD- | Transmitter Inverted Data Input |
| 20 | VeeT | Transmitter Ground |

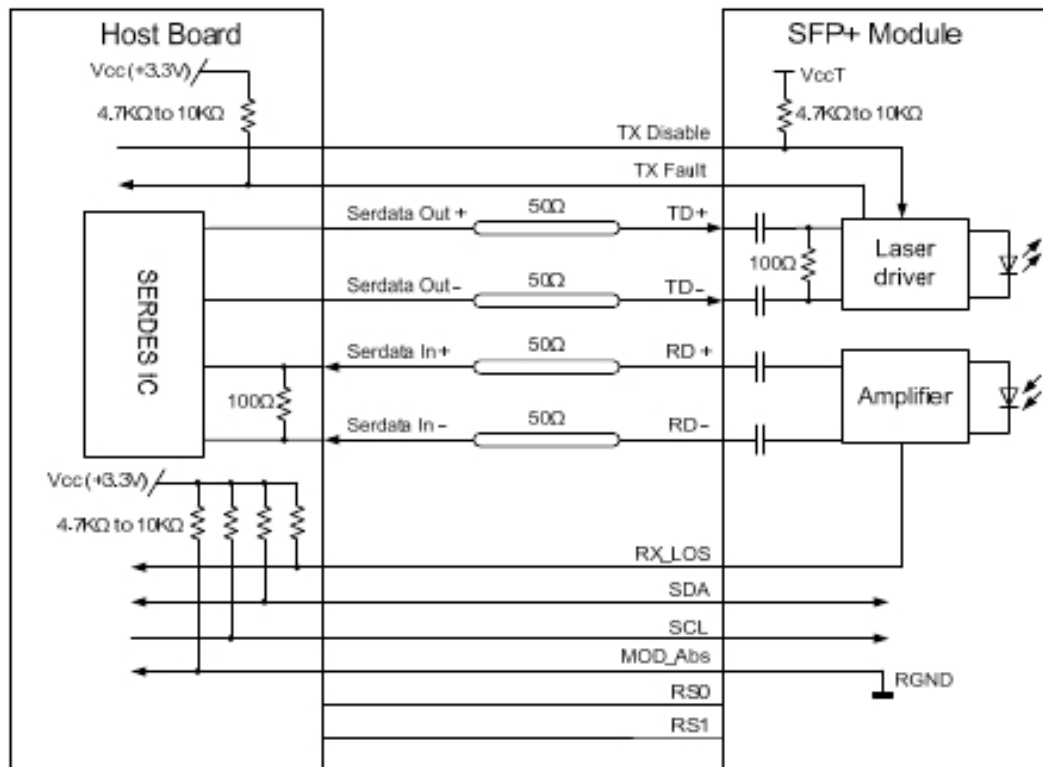
Notes:

1. The Module ground pins are isolated from the module case
2. The pins should be pulled up with 4.7k – 10kΩ to a voltage between 3.15V and 3.6V on host board
3. The pins is pulled to VccT with 4.7 kΩ to 10kΩ resistor in the module
4. The pins are pulled low to VccT with a > 30 kΩ resistors in the module

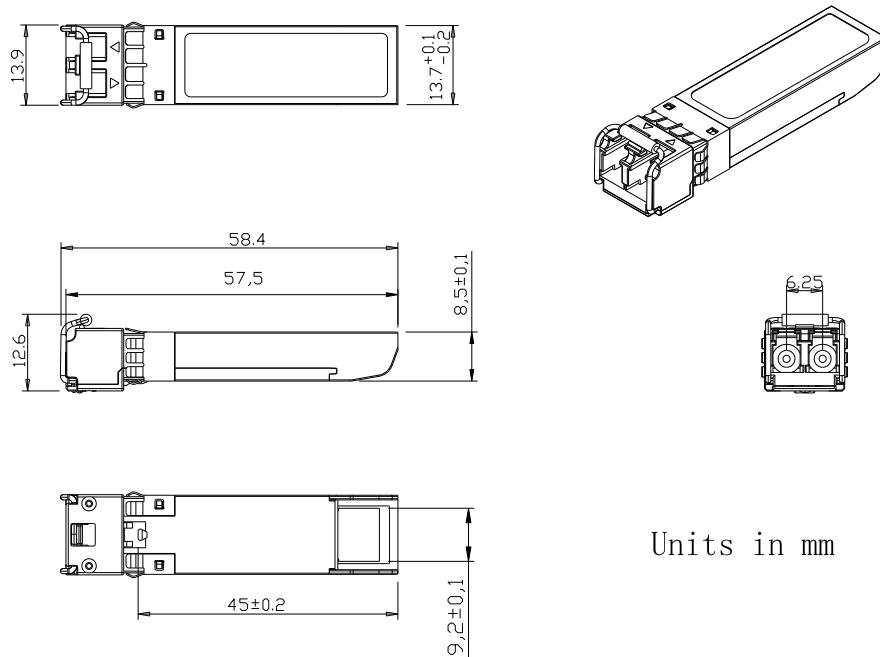
Recommended Host Board Power Supply Unit



Recommended Interface Circuit



Mechanical Diagram



Ordering Information

| Part No | Data Rate | Wavelength | Fiber | Reach | Temp | DDM |
|---------------|-----------|------------|-------|-------|----------|-----|
| OP-S10G31-20 | 10Gbps | 1310nm | SMF | 20KM | 0~70°C | YES |
| OP-S10G31-20E | 10Gbps | 1310nm | SMF | 20KM | -10~80°C | YES |
| OP-S10G31-20I | 10Gbps | 1310nm | SMF | 20KM | -40~85°C | YES |

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge(ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.