

## SFP-10G-LR

10GBase SFP+  
1310nm  
10km Reach

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## Features

- Duplex LC connector
- Hot-pluggable SFP footprint
- Uncooled 1310nm DFB laser
- RoHS compliant and Lead Free
- Distance up to 10km on 9/125um SMF
- Metal enclosure for lower EMI
- Power dissipation <1.0W (0~70°C)
- Power dissipation <1.2W (-40~85°C)
- Commercial or industrial operating temperature
- SFP MSA SFF-8472 SFF-8431 SFF-8432 Compliant



## Applications

- 10GBASE-LR/LW 10G Ethernet

| Part number  | Product description                                      |
|--------------|--|
| SFP-10G-LR   | 10GBase SMF SFP+ 1310nm 10km 0°C to 70°C LC Duplex DDM   |
| SFP-10G-LR-I | 10GBase SMF SFP+ 1310nm 10km -40°C to 85°C LC Duplex DDM |

# PIN Description

| PIN | Symbol      | Name - Description   | Notes |
|-----|-------------|--|-------|
| 1   | VEET        | Transmitter Ground (Common with Receiver Ground)               |       |
| 2   | TFAULT      | Transmitter Fault. Not supported.                              | 1     |
| 3   | TDIS        | Transmitter Disable. Laser output disabled on high or open.    | 2     |
| 4   | MOD_DEF(2)  | Module Definition 2. Data line for Serial ID.                  | 1     |
| 5   | MOD_DEF(1)  | Module Definition 1. Clock line for Serial ID.                 | 1     |
| 6   | MOD_DEF(0)  | Module Definition 0. Grounded within the module.               | 1     |
| 7   | Rate Select | No connection required   |       |
| 8   | LOS         | Loss of Signal indication. Logic 0 indicates normal operation. | 3     |
| 9   | VEER        | Receiver Ground (Common with Transmitter Ground)               |       |
| 10  | VEER        | Receiver Ground (Common with Transmitter Ground)               |       |
| 11  | VEER        | Receiver Ground (Common with Transmitter Ground)               |       |
| 12  | RD-         | Receiver Inverted DATA out. AC Coupled                         | 4     |
| 13  | RD+         | Receiver Non-inverted DATA out. AC Coupled                     | 4     |
| 14  | VEER        | Receiver Ground (Common with Transmitter Ground)               |       |
| 15  | VCCR        | Receiver Power Supply  |       |
| 16  | VCCT        | Transmitter Power Supply                                       |       |
| 17  | VEET        | Transmitter Ground (Common with Receiver Ground)               |       |
| 18  | TD+         | Transmitter Non-Inverted DATA in. AC Coupled.                  | 5     |
| 19  | TD-         | Transmitter Inverted DATA in. AC Coupled.                      | 5     |
| 20  | VEET        | Transmitter Ground (Common with Receiver Ground)               |       |

Notes:

1. Open collector/drain output, which should be pulled up with a 4.7k $\Omega$  to 10k $\Omega$  resistor on the host board if intended for use. Pull up voltage should be between 2.0V to 3.6V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
2. Laser output disabled on Tx\_Disable >2.0V or open, enabled on Tx\_Disable <0.8V.
3. LOS is open collector output. Should be pulled up with 4.7k $\Omega$  to 10k $\Omega$  on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
4. RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  (differential) at the user SERDES.
5. TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100 $\Omega$  differential termination inside the module.

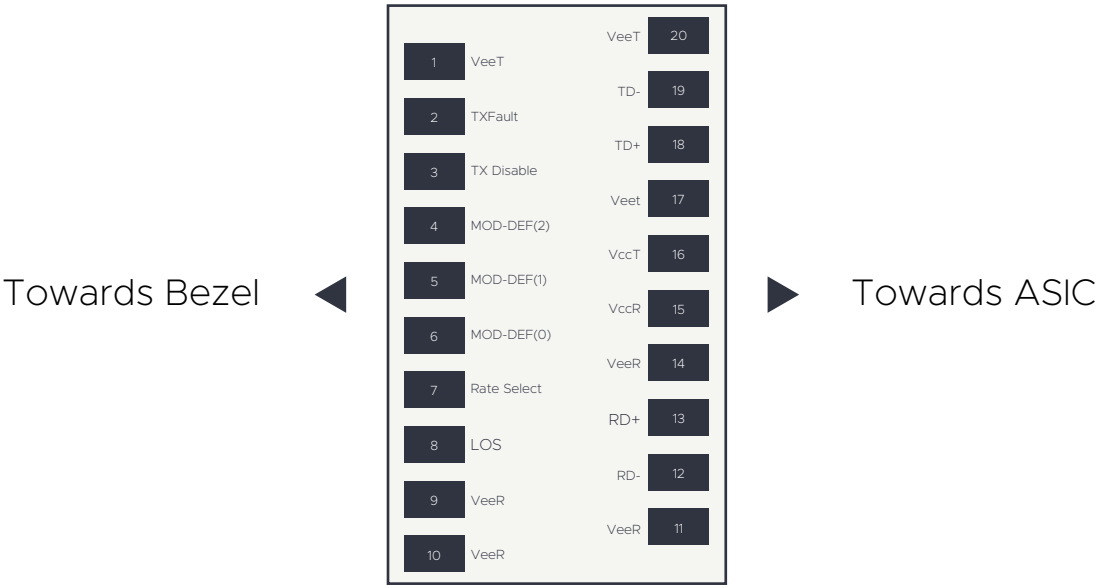


Figure 1. Diagram of host board connector block pin numbers and names

## Absolute Maximum Ratings

| Parameter              | Min  | Typ | Max | Unit | Notes |
|------------------------|------|-----|-----|------|-------|
| Maximum Supply Voltage | -0.3 | -   | 3.6 | V    | -     |
| Storage Temperature    | -40  | -   | +85 | °C   | -     |
| Relative Humidity      | 5    | -   | 95  | %    | 1     |

Notes:

1. Non-condensing.

## Recommend Operation Conditions

| Parameter                         | Min  | Typ | Max  | Unit | Notes |
|-----------------------------------|------|-----|------|------|-------|
| Power Supply Voltage              | 3.13 | 3.3 | 3.47 | V    | -     |
| Power Supply Current (com.)       | -    | -   | 300  | mA   | -     |
| Power Supply Current (ind.)       | -    | -   | 350  | mA   | -     |
| Case Operating Temperature (com.) | 0    | -   | +70  | °C   | -     |
| Case Operating Temperature (ind.) | -40  | -   | +85  | °C   | -     |

## Electrical Characteristics

| Parameter                      | Min     | Typ | Max     | Unit     | Notes |
|--------------------------------|---------|-----|---------|----------|-------|
| Transmitter                    |         |     |         |          |       |
| Input differential impedance   | -       | 100 | -       | $\Omega$ | 1     |
| Single ended data input swing  | 120     | -   | 850     | mV       | -     |
| TX Disable-High                | Vcc-0.8 | -   | Vcc     | V        | -     |
| TX Disable-Low                 | Vee     | -   | Vee+0.8 | V        | -     |
| TX Fault-High                  | Vcc-0.8 | -   | Vcc     | V        | -     |
| TX Fault-Low                   | Vee     | -   | Vee+0.8 | V        | -     |
| Receiver                       |         |     |         |          |       |
| Single ended data output swing | 300     | -   | 850     | mV       | 2     |
| Data output rise time          | 28      | -   | -       | ps       | 3     |
| Data output fall time          | 28      | -   | -       | ps       | 3     |
| LOS-High                       | Vcc-0.8 | -   | Vcc     | V        | -     |
| LOS-Low                        | Vee     | -   | Vee+0.8 | V        | -     |

Notes:

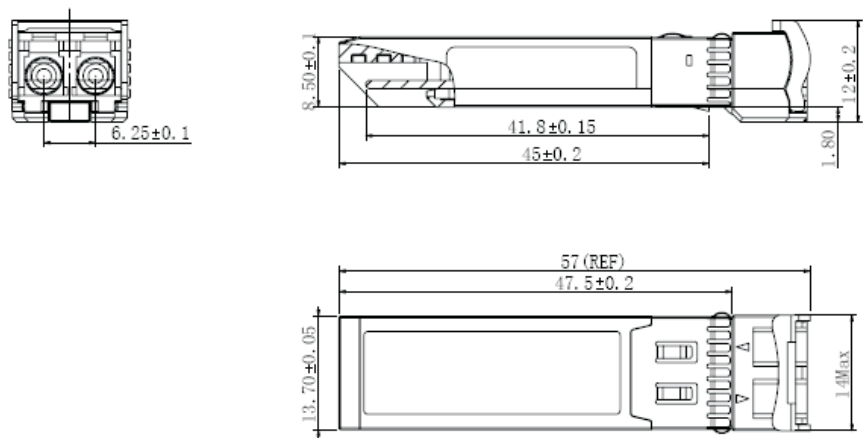
1. AC coupled
2. into 100 $\Omega$  differential termination
3. 20 - 80%

# Optical Characteristics

| Parameter                   | Min  | Typ     | Max   | Unit | Notes |
|-----------------------------|------|---------|-------|------|-------|
| Transmitter                 |      |         |       |      |       |
| Optical Center Wavelength   | 1260 | 1310    | 1360  | nm   | -     |
| Average Output Power        | -8.2 | -       | 0.5   | dBm  | -     |
| Optical Extinction Ratio    | 3.5  | -       | -     | dB   | -     |
| RMS Spectral Width (-20dB)  | -    | -       | 1.0   | nm   | -     |
| Side-Mode Suppression Ratio | 30   | -       | -     | dB   | -     |
| Data Rate                   | -    | 10.3125 | -     | Gb/s | -     |
| Receiver                    |      |         |       |      |       |
| Optical Center Wavelength   | 1260 | -       | 1580  | nm   | -     |
| Receiver Sensitivity        | -    | -       | -14.4 | dBm  | 1,2   |
| Damage Threshold            | 2.0  | -       | -     | dBm  | -     |
| LOS Assert                  | -30  | -       | -     | dBm  | -     |
| LOS De-Assert               | -    | -       | -17   | dBm  | -     |
| LOS Hysteresis              | 0.5  | -       | -     | dB   | -     |

- Notes:
1. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
  2. Measured with PRBS 2<sup>31</sup>-1 at 10<sup>-12</sup> BER.

# Mechanical Dimensions



units : mm

# Revision history

| Revision | Date       | Author | Description      |
|----------|------------|--------|------------------|
| V1.1     | 05-03-2020 | JGN    | Initial Document |

Note : Nexgen A/S reserves the right to change this document without notice.