

10G SFP+ Active Optical Cable

Specification

1 Description

10G SFP active optical cable (AOC) components are supported by active circuits and have a longer distance than standard passive or active SFP+ copper cables. They are designed for high-speed, short-range data links via fiber optic lines. The SFP+AOC cable provides a high-performance enhanced small form factor pluggable (SFP+) interface, which is a cost-effective solution for data center/storage and all short-range data applications.

10G SFP active optical cable can be used as an alternative to SFP+ passive and active copper cables, while providing improved signal integrity, longer distances, superior electromagnetic immunity and better bit error rate performance.

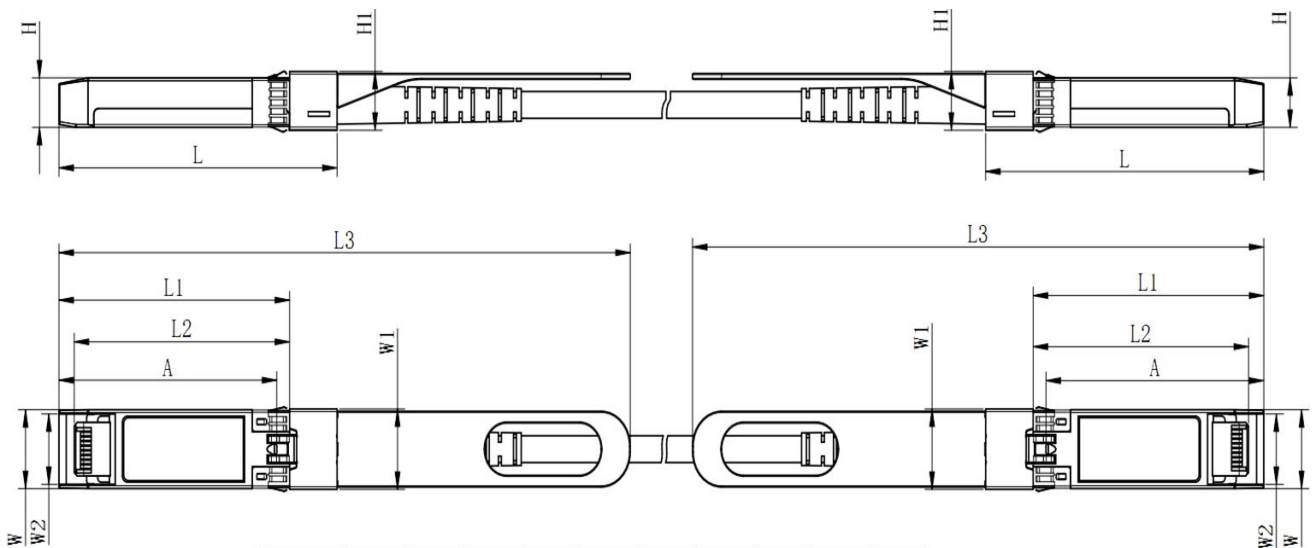
2 Product Features

- Electrical interface compliant to SFF-8431
- 850nm VCSEL laser and PIN photo-detector
- Digital diagnostics functions are available via the I2C interface
- RoHS compliant
- Hot Pluggable
- Temperature: 0°C to +70°C

3 Applications

- 10 Gigabit Ethernet
- InfiniBand QDR, SDR, DDR
- Servers, switches, storage and host card adapters

4 Outline drawing

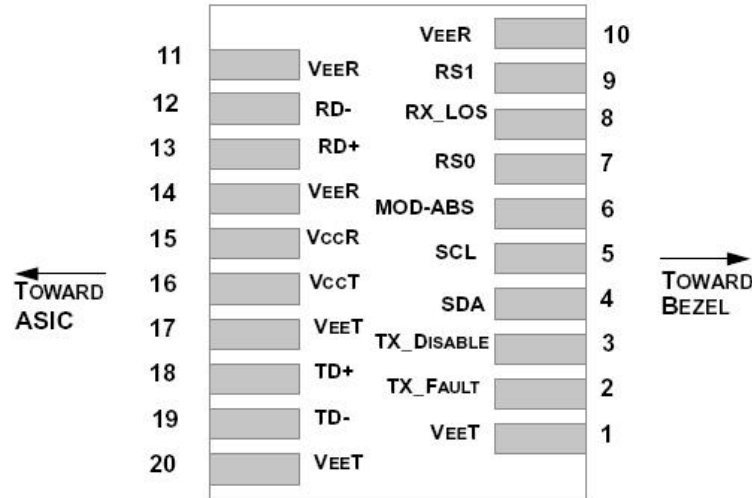


| | L | L1 | L2 | L3 | W | W1 | W2 | H | HI | A |
|---------|------|------|-------|-------|-------|------|------|-----|------|-------|
| MAX | 57.6 | 47.7 | 44.55 | 119.9 | 13.8 | 14.0 | 12.3 | 8.7 | 10.3 | 45.25 |
| Typical | 57.4 | 47.5 | 44.35 | 117.9 | 13.55 | 13.8 | 12.1 | 8.5 | 10.1 | 45 |
| MIN | 57.2 | 47.3 | 44.15 | 115.9 | 13.3 | 13.6 | 11.9 | 8.4 | 9.9 | 44.65 |

| Parameter | Value | Units |
|---------------------|------------------------|----------|
| Diameter | 3 | mm |
| Minimum bend radius | 30 | mm |
| Length tolerance | Length < 1 m: | +5 /-0 |
| | 1 m ≤ length ≤ 4.5 m: | +15 / -0 |
| | 5 m ≤ length ≤ 14.5 m: | +30 / -0 |
| | Length ≥ 15.0 m | +2% / -0 |
| Cable color | Aqua(OM3);Orange(OM2) | |

5 Wiring Diagram

5.1 pin



5.2 pin description

| Pin | Symbol | Name/Description | Notes |
|-----|-------------------|---|-------|
| 1 | VEET | Module Transmitter Ground | 1 |
| 2 | TX_FAULT | Module Transmitter Fault | 2 |
| 3 | TX_DISABLE | Transmitter Disable; Turns off transmitter laser output | 3 |
| 4 | SDA | 2-Wire Serial Interface Data Line (MOD-DEF2) | |
| 5 | SCL | 2-Wire Serial Interface Clock (MOD-DEF1) | |
| 6 | MOD_ABS | Module Absent, connected to V _{EE} T or V _{EE} R in the module | 2 |
| 7 | RS0 | Rate Select 0, optionally controls SFP+ module receiver | |
| 8 | RX_LOS | Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as NOT Signal Detect) | 2 |
| 9 | RS1 | Rate Select 1, optionally controls SFP+ module transmitter | |
| 10 | V _{EE} R | Module Receiver Ground | 1 |
| 11 | V _{EE} R | Module Receiver Ground | 1 |
| 12 | RD- | Receiver Inverted Data Output | |
| 13 | RD+ | Receiver Non-Inverted Data Output | |
| 14 | V _{EE} R | Module Receiver Ground | 1 |
| 15 | V _{CC} R | Module Receiver 3.3 V Supply | |
| 16 | V _{CC} T | Module Transmitter 3.3 V Supply | |
| 17 | V _{EE} T | Module Transmitter Ground | 1 |
| 18 | TD+ | Transmitter Non-Inverted Data Input | |
| 19 | TD- | Transmitter Inverted Data Input | |
| 20 | V _{EE} T | Module Transmitter Ground | 1 |

6. Recommended Operating Conditions

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|----------------------------|-----------------|------|---------|------|------|-------|
| Operating Case Temperature | T _C | 0 | - | +70 | °C | |
| Power Supply Voltage | V _{CC} | 3.14 | 3.3 | 3.47 | V | |
| Power Supply Current | I _{CC} | - | - | 150 | mA | |
| Power Dissipation | P _d | - | - | 0.6 | W | |
| Bit Rate | BR | - | 10.3125 | - | Gbps | |
| Fiber Bend Radius | R _b | 3 | - | - | cm | |

7. Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Units | Notes |
|-------------------------------|---------------------|-----------------|------|------|----------------------|-------|
| Transmitter | | | | | | |
| Differential Data Input Swing | V _{in,P-P} | 200 | - | 1600 | mV _{PP} | |
| Input Differential Impedance | Z _{IN} | 90 | 100 | 110 | Ω | |
| Tx_Fault | Normal Operation | V _{OL} | 0 | - | 0.8 | V |
| | Transmitter Fault | V _{OH} | 2.0 | - | V _{CC} | V |
| Tx_Disable | Normal Operation | V _{IL} | 0 | - | 0.8 | V |
| | Laser Disable | V _{IH} | 2.0 | - | V _{CC} +0.3 | V |
| Receiver | | | | | | |
| Differential Data Output | V _{out} | 370 | - | 1600 | mV | |
| Output Differential Impedance | Z _D | 90 | 100 | 110 | Ω | |
| Rx_LOS | Normal Operation | V _{OL} | 0 | - | 0.8 | V |
| | Lose Signal | V _{oH} | 2.0 | - | V _{CC} | V |

8. Optical Characteristics

| Parameter | Symbol | Unit | Min | Typ | Max | Notes |
|--|------------------|------|-------|---------|------|-------|
| Optical transmitter Characteristics | | | | | | |
| Data Rate | DR | Gbps | 9.953 | 10.3125 | 11.3 | |
| Center Wavelength Range | λ _c | nm | 820 | 850 | 880 | |
| Laser Off Power | P _{off} | dBm | - | - | -45 | |

| Launch Optical Power | P ₀ | dBm | -6.0 | | | 1 |
|---------------------------------------|-----------------|------|-------|---------|------|---|
| Extinction Ratio | ER | dB | 3 | - | - | |
| (rms) Spectral Width(RMS) | RMS | nm | - | | 0.45 | |
| Optical Receiver Characteristics | | | | | | |
| Data Rate | DR | Gbps | 9.953 | 10.3125 | 11.3 | |
| Bit Error Rate | BER | dBm | - | - | E-12 | 2 |
| Overload Input Optical Power | P _{IN} | dBm | 2.4 | - | - | 2 |
| Center Wavelength Range | λ_c | nm | 820 | - | 880 | |
| Receiver Sensitivity in Average Power | Sen | dBm | - | - | -9.9 | 3 |
| Los Assert | LosA | dBm | -26 | - | - | |
| Los De-Assert | LosD | dBm | - | - | -12 | |
| Los Hysteresis | LosH | dB | 0.5 | - | - | |

9. Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|---------------------------|--------------------|------|---------|------|------|-------|
| Supply Voltage | V _{CC3} | -0.5 | - | +3.6 | V | |
| Storage Temperature | T _s | -40 | - | +85 | °C | |
| Operating Humidity | RH | +5 | - | +85 | % | 1 |
| Receiver Damage Threshold | P R _{dmg} | +3.4 | - | - | dBm | |