

200Gb/s QSFP56 Direct AttachCable(OPQHTx)



Features:

- ✧ QSFP56 conforms to the Small Form Factor SFF8665
- ✧ 4-Channel Full-Duplex Passive Copper Cable Transceiver
- ✧ Support data rates : 50Gb/s PAM4 (per channel)
- ✧ Maximum aggregate data rate: 200Gb/s (4 x 50Gb/s)
- ✧ IEEE 802.3bj 200GEBASE-CR4
- ✧ Copper link x (x=1m,2m,3m)

- ✧ Power Supply :+3.3V
- ✧ Low crosstalk
- ✧ I2C based two-wire serial interface for EEPROM signature which can be customized
- ✧ Operating Temperature: 0~ 70 °C
- ✧ ROHS Compliant

Applications:

- ✧ 200 Gigabit Ethernet
- ✧ Fiber Channel over Ethernet
- ✧ Data storage and communication industry Switch / router / HBA
- ✧ Enterprise network SAN
- ✧ Data Center Network

Standards Compliance

- ✧ IEEE 802.3bj
- ✧ InfiniBand EDR
- ✧ QSFP56 MSA
- ✧ RoHS Compliant

● Ordering information

| PartNumber | ProductDescription | Wiregauge (AWG) |
|------------|-----------------------------|-----------------|
| OPQHT0.5 | 0.5meterQSFP56 PassiveCable | 30 |
| OPQHT1 | 1meterQSFP56 PassiveCable | 30 |
| OPQHT2 | 2meter QSFP56 PassiveCable | 26 |
| OPQHT3 | 3 meterQSFP56 PassiveCable | 26 |

● Description:

The 200GE QSFP56 cable assemblies are high performance, cost effective I/O solutions for LAN, HPC and SAN. The high speed cable assemblies meet and exceed 200 Gigabit Ethernet, InfiniBand EDR and temperature requirements for performance and reliability. The cables are compliant with SFF-8436 specifications and provide connectivity between devices using QSFP ports.

● Recommended Operating Environment:

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|----------------------------|------------------|------|---------|------|------|
| Storage Temperature | | -40 | | +85 | °C |
| Operating Case Temperature | T _c | 0 | | +70 | °C |
| Power Supply Voltage | V _{CC3} | 3.14 | 3.3 | 3.47 | V |
| Data Rate Per Lane | | 1 | | 50 | Gb/s |

● High Speed Characteristics

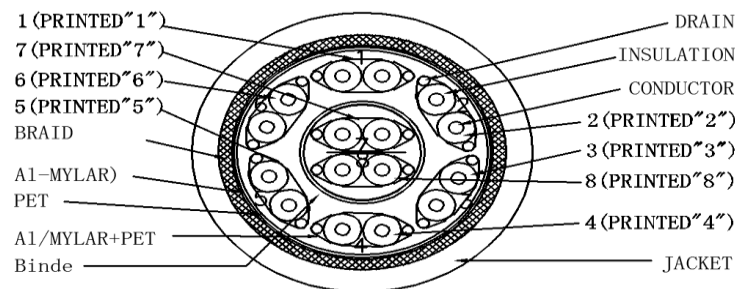
| Parameter | Symbol | Min | Typic | Max | Unit | Note |
|---|----------------|-------|-------|-------|------|----------------------|
| Differential | RIN,P-P | 9 | 200 | 110 | Ω | |
| Insertion loss | SDD21 | 8 | | 22.48 | dB | At 12.8906 GHz |
| Differential Return Loss | SDD11 | 12.45 | | See 1 | dB | At 0.05 to 4.1 GHz |
| | SDD22 | 3.12 | | See 2 | dB | At 4.1 to 19 GHz |
| Common-mode to common-mode output return loss | SCC11 SCC22 | 2 | | | dB | At 0.2 to 19 GHz |
| Differential to common-mode return | SCD11 | 12 | | See 3 | dB | At 0.01 to 12.89 GHz |
| | SCD22 | 10.5 | | See 4 | | At 12.89 to 19 GHz |
| Differential to common Mode Conversion Loss | SCD21-IL | 10 | | | dB | At 0.01 to 12.89 GHz |
| | | | | See 5 | | At 12.89 to 15.7 GHz |
| | | 6.3 | | | | At 15.7 to 19 GHz |
| Channel Operating | COM | 3 | | | dB | |

Notes:

1. Reflection Coefficient given by equation $SDD11(\text{dB}) < 16.5 - 2 \times \text{SQRT}(f)$, with f inGHz
2. Reflection Coefficient given by equation $SDD11(\text{dB}) < 10.66 - 14 \times \log_{10}(f/5.5)$, with f inGHz
3. Reflection Coefficient given by equation $SCD11(\text{dB}) < 22 - (20/50)*f$, with f inGHz
4. Reflection Coefficient given by equation $SCD11(\text{dB}) < 15 - (6/50)*f$, with f inGHz
5. Reflection Coefficient given by equation $SCD21(\text{dB}) < 27 - (29/22)*f$, with f inGHz

● Bulk Cable Characteristics

The structure of the cable is shown as the figure , the characteristics of the bulk cable are listed below.



- ✧ Voltage rating: 30V
- ✧ Temperature rating: 80°C;
- ✧ Impedance: Differential mode: 200 +10/-5 ohm @TDR;
- ✧ Insulation Resistance: 200M Ohms/KM min. AT 20°C;
- ✧ Dielectric Strength: AC 500V/1MINUTE;
- ✧ Delay Skew(INTRA-SKEW): 50ps/5m max;
- ✧ Signal Twin-ax pair cable: Solid Ag plated copper conductor;
- ✧ Braid shielding coverage 85% min.

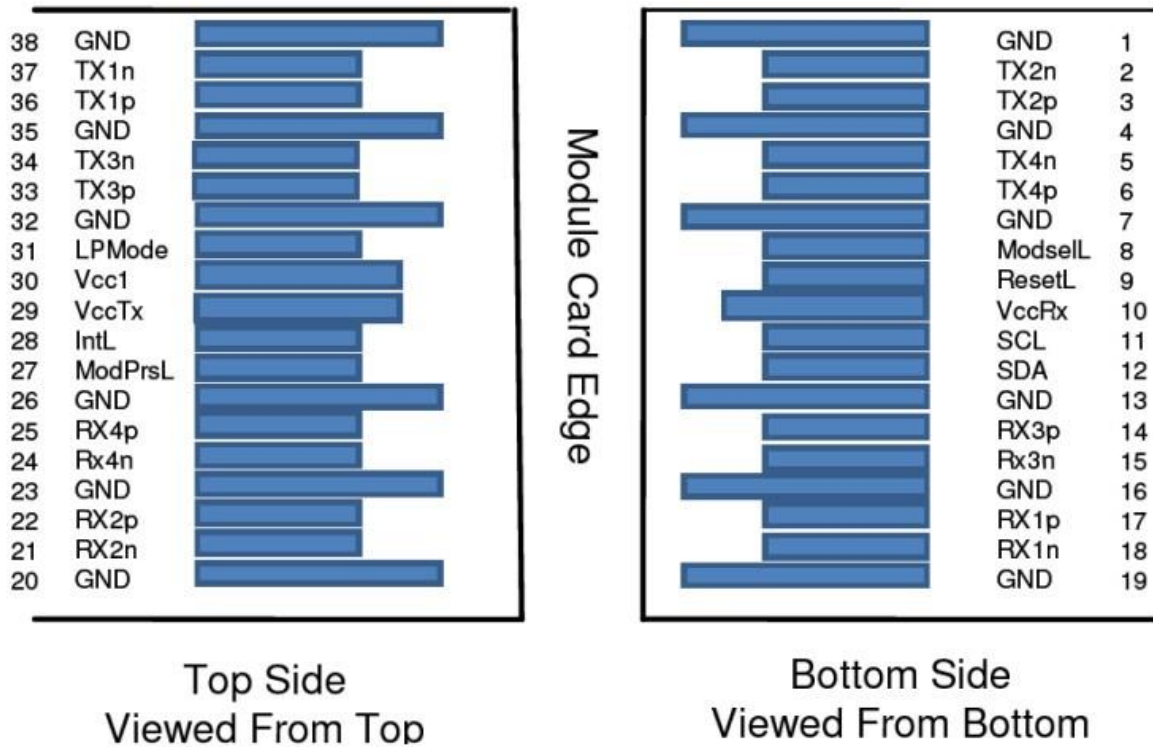
● Pin Descriptions

| Pin | Logic | Symbol | Name/Description | Notes |
|-----|---------|--------|---------------------------|-------|
| 1 | | GND | Ground | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted | |
| 4 | | GND | Ground | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted | |
| 7 | | GND | Ground | 1 |
| 8 | LVTTL-I | ModSel | Module Select | |
| 9 | LVTTL-I | ResetL | Module Reset | |
| 10 | | Vcc Rx | +3.3V Power Supply | 2 |
| 11 | LVC MOS | SCL | 2-wire serial interface | |
| 12 | LVC MOS | SDA | 2-wire serial interface | |
| 13 | | GND | Ground | 1 |
| 14 | CML-O | Rx3p | Receiver Non-Inverted | |
| 15 | CML-O | Rx3n | Receiver Inverted Data | |
| 16 | | GND | Ground | 1 |
| 17 | CML-O | Rx1p | Receiver Non-Inverted | |
| 18 | CML-O | Rx1n | Receiver Inverted Data | |
| 19 | | GND | Ground | 1 |
| 20 | | GND | Ground | 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data | |
| 22 | CML-O | Rx2p | Receiver Non-Inverted | |
| 23 | | GND | Ground | 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data | |
| 25 | CML-O | Rx4p | Receiver Non-Inverted | |
| 26 | | GND | Ground | 1 |
| 27 | LVTTL-O | ModPrs | Module Present | |
| 28 | LVTTL-O | IntL | Interrupt | |
| 29 | | Vcc Tx | +3.3V Power supply | 2 |
| 30 | | Vcc1 | +3.3V Power supply | 2 |

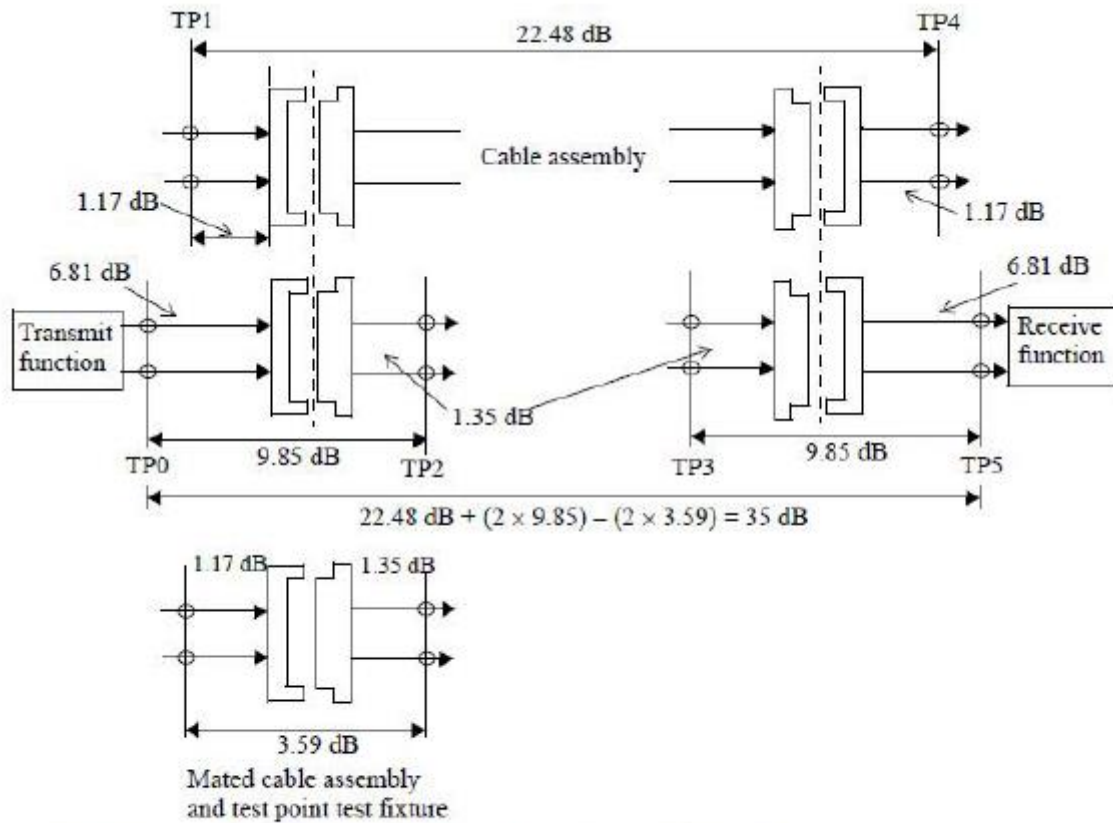
| | | | | |
|----|---------|---------|---------------------------|---|
| 31 | LVTTL-I | LPMMode | Low Power Mode | |
| 32 | | GND | Ground | 1 |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data | |
| 35 | | GND | Ground | 1 |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted | |
| 37 | CML-I | Tx1n | Transmitter Inverted Data | |
| 38 | | GND | Ground | 1 |

Note 1: GND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the hostboard signal-common ground plane.

Note 2: Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in Table 6. Recommended host board power supply filtering is shown in Figure 4. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP+ Module module in any combination. The connector pins are each rated for a maximum current of 500 mA.



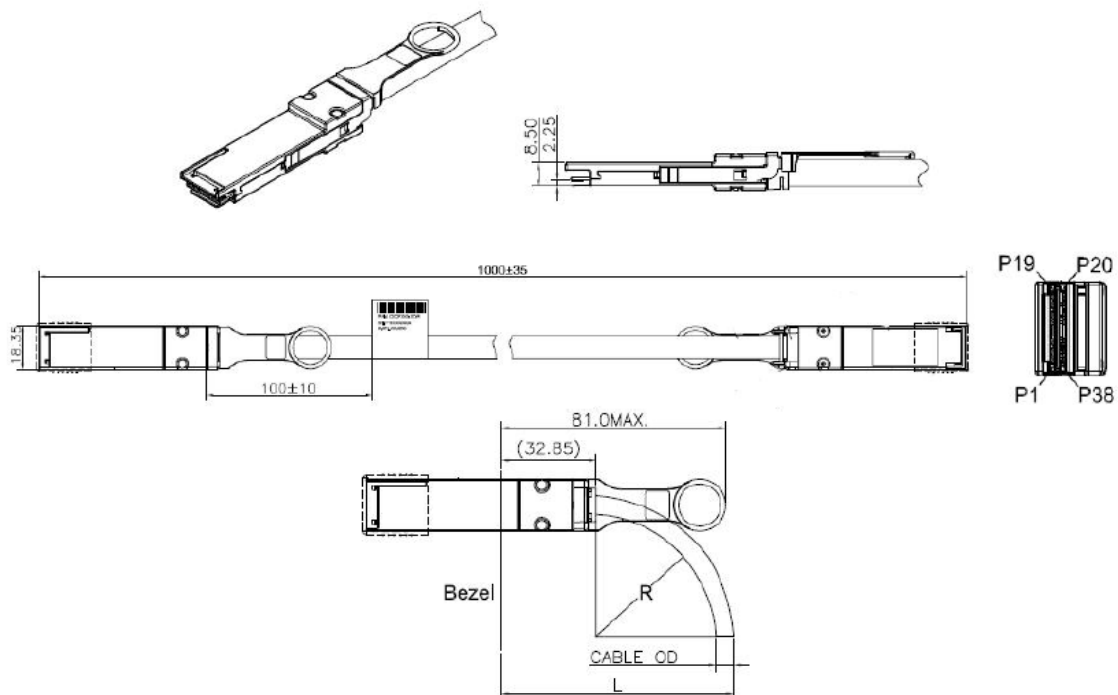
● Channel insertion loss budget



NOTE—The connector insertion loss is 1.07 dB for the mated test fixture. The host connector is allocated 0.62 dB of additional margin.

35dB Channel insertion loss budget at 12.8906 GHz

● Mechanical Dimensions:



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