

TSQSS-PC2HG-xxM

## 200G QSFP56 to 4×50G SFP56 Direct Attach Cable

### Description

QSFP56 Direct Attach Cables are compliant with the SFF-8665 specifications. SFP56 Direct Attach Cables are compliant with SFF-8432 and SFF-8402 specifications. Various choices of wire gauge are available from 30 to 26 AWG with various choices of cable length (up to 3 m).

### Features

- QSFP56 and 4X SFP56 breakout form factor
- 26-30AWG support up to 3m length max
- Maximum aggregate data rate: 200Gb/s
- Compatible to SFF-8665 and SFF-8432
- Single 3.3V power supply
- Temperature Range: 0 °C to 70 °C
- RoHS Compliant



### Applications

- Switches, servers and routers
- Data Center networks
- Storage area networks
- High performance computing
- Telecommunication and wireless infrastructure
- Medical diagnostics and networking
- Test and measurement equipment
- 200G Ethernet (IEEE 802.3cd)

### Recommended Operation Condition

| Parameters                           | Symbol  | Min.  | Max.     | Unit |
|--------------------------------------|---------|-------|----------|------|
| Operating Case Temperature           | Topc    | 0     | 70       | degC |
| Storage Temperature                  | Tst     | -40   | 85       | degC |
| Relative Humidity (non-condensation) | RS      | 35    | 60       | %    |
| Supply Voltage                       | Vcc3    | 3.135 | 3.465    | V    |
| Voltage on LVTTTL Input              | Vilvttl | -0.3  | Vcc3+0.2 | V    |
| Power Supply Current                 | Icc3    | -     | 15       | mA   |

|                         |    |   |      |   |
|-------------------------|----|---|------|---|
| Total Power Consumption | Pd | - | 0.05 | W |
|-------------------------|----|---|------|---|

**Notes:**

Stress or conditions exceed the above range may cause permanent damage to the device.

This is a stress rating only and functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not applied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## High Speed Characteristics

| Parameter                                   | Symbol   | Min.   | Typical | Max.  | Unit     | Notes                |
|---------------------------------------------|----------|--------|---------|-------|----------|----------------------|
| Differential Impedance                      | TDR      | 90     | 100     | 110   | $\Omega$ | -                    |
| Insertion Loss                              | SDD21    | -16.06 | -       | -     | dB       | At 13.28 GHz         |
| Differential Input Return Loss              | SDD11    | -      | -       | See 1 | dB       | At 0.05 to 4.1 GHz   |
|                                             | SDD22    | -      | -       | See 2 |          | At 4.1 to 19 GHz     |
| Common Mode Output Return Loss              | SCC11    | -      | -       | -2    | dB       | At 0.2 to 19 GHz     |
| Differential to Common-mode Return Loss     | SCD11    | -      | -       | See 3 | dB       | At 0.01 to 12.89 GHz |
|                                             | SCD22    | -      | -       | 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    |

**Notes:**

[1] Reflection Coefficient given by equation  $SDD11(dB) < -16.5 + 2 \times \sqrt{f}$ , with f in GHz

[2] Reflection Coefficient given by equation  $SDD11(dB) < -10.66 + 14 \times \log_{10}(f/5.5)$ , with f in GHz

[3] Reflection Coefficient given by equation  $SCD11(dB) < -22 + (20/25.78) \times f$ , with f in GHz

[4] Reflection Coefficient given by equation  $SCD11(dB) < -15 + (6/25.78) \times f$ , with f in GHz

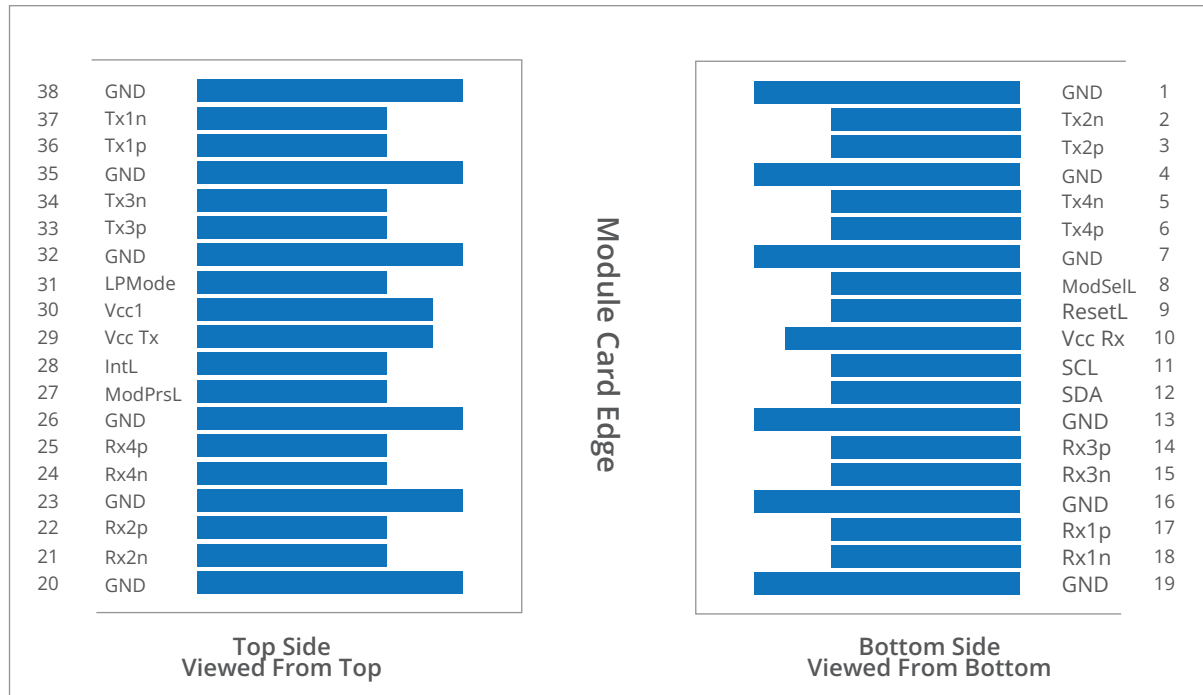
[5] Reflection Coefficient given by equation  $SCD21(dB) < -27 + (29/22) \times f$ , with f in GHz

## QSFP56 Pin Definition

| Pin | Symbol  | Name/Description                    |
|-----|---------|-------------------------------------|
| 1   | GND     | Ground                              |
| 2   | Tx2n    | Transmitter Inverted Data Input     |
| 3   | Tx2p    | Transmitter Non-Inverted Data Input |
| 4   | GND     | Ground                              |
| 5   | Tx4n    | Transmitter Inverted Data Input     |
| 6   | Tx4p    | Transmitter Non-Inverted Data Input |
| 7   | GND     | Ground                              |
| 8   | ModSelL | Module Select                       |
| 9   | ResetL  | Module Reset                        |
| 10  | Vcc Rx  | +3.3V Power supply receiver         |
| 11  | SCL     | 2-wire serial interface clock       |
| 12  | SDA     | 2-wire serial interface data        |
| 13  | GND     | Ground                              |
| 14  | Rx3p    | Receiver Non-Inverted Data Output   |

|    |         |                                          |
|----|---------|------------------------------------------|
| 15 | Rx3n    | Receiver Inverted Data Output            |
| 16 | GND     | Ground                                   |
| 17 | Rx1p    | Receiver Non-Inverted Data Output        |
| 18 | Rx1n    | Transmitter Inverted DATA in. AC Coupled |
| 19 | GND     | Ground                                   |
| 20 | GND     | Ground                                   |
| 21 | Rx2n    | Receiver Inverted Data Output            |
| 22 | Rx2p    | Receiver Non-Inverted Data Output        |
| 23 | GND     | Ground                                   |
| 24 | Rx4n    | Receiver Inverted Data Output            |
| 25 | Rx4p    | Receiver Non-Inverted Data Output        |
| 26 | GND     | Ground                                   |
| 27 | ModPrsL | Module Present                           |
| 28 | IntL    | Interrupt                                |
| 29 | Vcc Tx  | +3.3V Power supply transmitter           |
| 30 | Vcc1    | +3.3V Power Supply                       |
| 31 | LPMODE  | Low Power Mode                           |
| 32 | GND     | Ground                                   |
| 33 | Tx3p    | Transmitter Non-Inverted Data Input      |
| 34 | Tx3n    | Transmitter Inverted Data Input          |
| 35 | GND     | Ground                                   |
| 36 | Tx1p    | Transmitter Non-Inverted Data Input      |
| 37 | Tx1n    | Transmitter Inverted Data Input          |
| 38 | GND     | Ground                                   |

## Pin Definition



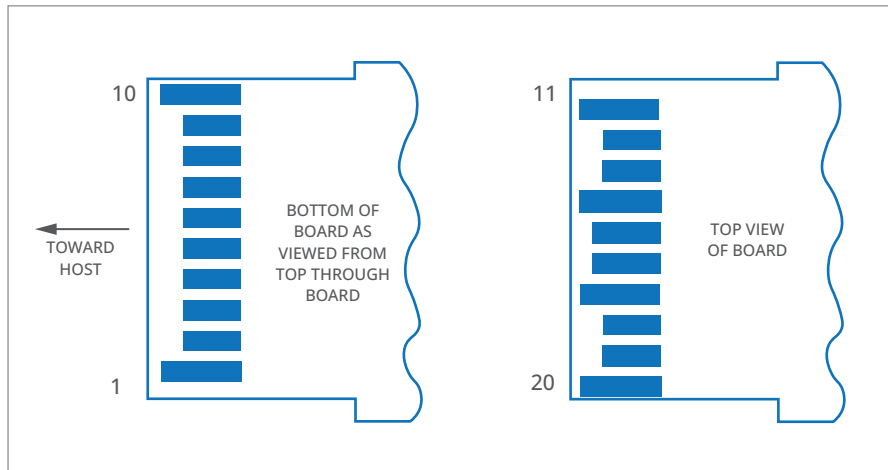
## SFP56 Pin Descriptions

| Pin | Symbol       | Name/Description                                              |
|-----|--------------|---------------------------------------------------------------|
| 1   | VeeT [1]     | Transmitter Ground                                            |
| 2   | Tx_FAULT [2] | Not used                                                      |
| 3   | Tx_DIS [3]   | Not used                                                      |
| 4   | SDA [2]      | 2-wire Serial Interface Data Line                             |
| 5   | SCL [2]      | 2-wire Serial Interface Clock Line                            |
| 6   | MOD_ABS [4]  | Module Absent. Grounded within the module                     |
| 7   | RS0 [5]      | Not used                                                      |
| 8   | RX_LOS [2]   | Loss of Signal indication. Logic 0 indicates normal operation |
| 9   | RS1 [5]      | Not used                                                      |
| 10  | VeeR [1]     | Receiver Ground                                               |
| 11  | VeeR [1]     | Receiver Ground                                               |
| 12  | RD-          | Receiver Inverted DATA out. AC Coupled                        |
| 13  | RD+          | Receiver DATA out. AC Coupled                                 |
| 14  | VeeR [1]     | Receiver Ground                                               |
| 15  | VccR         | Receiver Power Supply                                         |
| 16  | VccT         | Transmitter Power Supply                                      |
| 17  | VeeT [1]     | Transmitter Ground                                            |
| 18  | TD+          | Transmitter DATA in. AC Coupled                               |
| 19  | TD-          | Transmitter Inverted DATA in. AC Coupled                      |

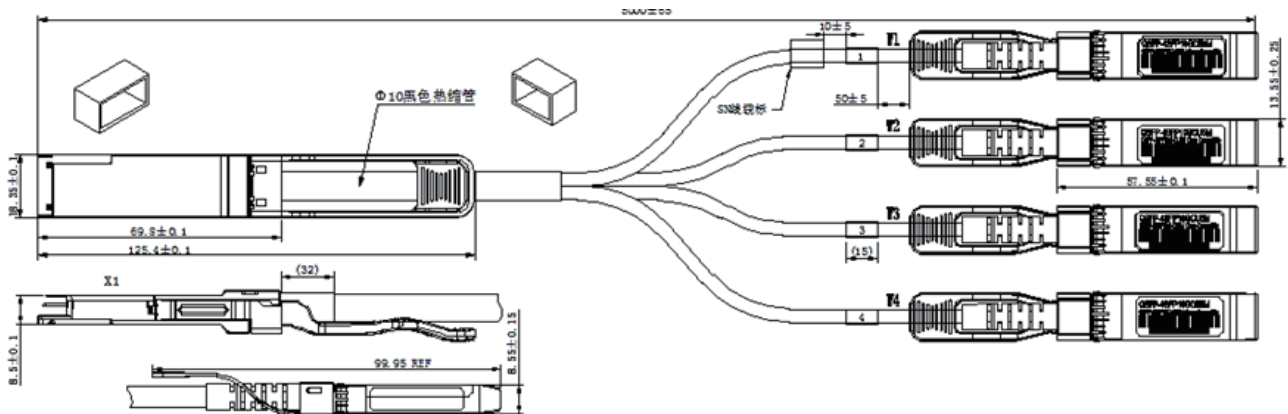
|    |          |                    |
|----|----------|--------------------|
| 20 | VeeT [1] | Transmitter Ground |
|----|----------|--------------------|

**Notes:**

- [1] Module circuit ground is isolated from module chassis ground within the module.  
 [2] Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.  
 [3] Tx\_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.  
 [4] Mod\_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc\_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod\_ABS is asserted "High" when the SFP+ module is physically absent from a host slot.  
 [5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

**Mechanical Dimensions**

The connector is compatible with the SFF-8432 specification.

**Ordering Information**

200G QSFP56 4x50G SFP56 Copper Breakout Cable Assemblies, Passive.

| P/N             | Length | Data Rate | AWG | Length Tolerance |
|-----------------|--------|-----------|-----|------------------|
| TSQSS-PC2HG-01M | 1 m    | 200G      | 30  | +3.5/-3.5 cm     |
| TSQSS-PC2HG-02M | 2 m    | 200G      | 30  | +3.5/-3.5 cm     |
| TSQSS-PC2HG-03M | 3 m    | 200G      | 30  | +4/-4 cm         |