

Hybrid Passive Copper 100GE QSFP28 to 4x25GE SFP28 GQS-4P28-P(A)XXC

Features

- ◆ Supporting 100 Gbps to 4 x 25 Gbps
- ◆ Support data rates : 25.78Gb/s (per channel)
- ◆ IEEE 802.3bj 100GEBASE-CR4 and P802.3by compliant
- ◆ Compatible to SFP28 MSA and QSFP28 MSA
- ◆ Compatible to SFF-8402, SFF-8432 and SFF8665
- ◆ Maximum aggregate data rate: 100 Gb/s (4x25Gb/s)
- ◆ High-Density QSFP28 38-PIN and 4x SFP28 20-PIN Connector
- ◆ Temperature Range: 0~ 70°C
- ◆ Copper link length up to 5m
- ◆ 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

- ◆ 100GE/25 Gigabit Ethernet
- ◆ Switches, Routers, and HBAs
- ◆ Data Centers

Product Description

The 100GE QSFP28 to 4x 25GE SFP28 Passive cable assemblies are high performance, cost effective for SFP28 and QSFP28 equipment interconnects . The Hybrid cables are compliant with SFF-8402 and SFF-8665 specifications. It is offer a low power consumption, short reach interconnect applications.

The cable each lane is capable of transmitting data at rates up to 25Gb/s, providing an aggregated rate of 100Gb/s.

Recommended Operating Conditions

| Parameter | Symbol | Min | Typical | Max | Unit |
|-----------------------------|------------------|------|---------|------|------|
| Storage Ambient Temperature | | -40 | | +85 | °C |
| Operating Case Temperature | T _c | 0 | | +70 | °C |
| Power Supply Voltage | V _{CC3} | 3.14 | 3.3 | 3.47 | V |

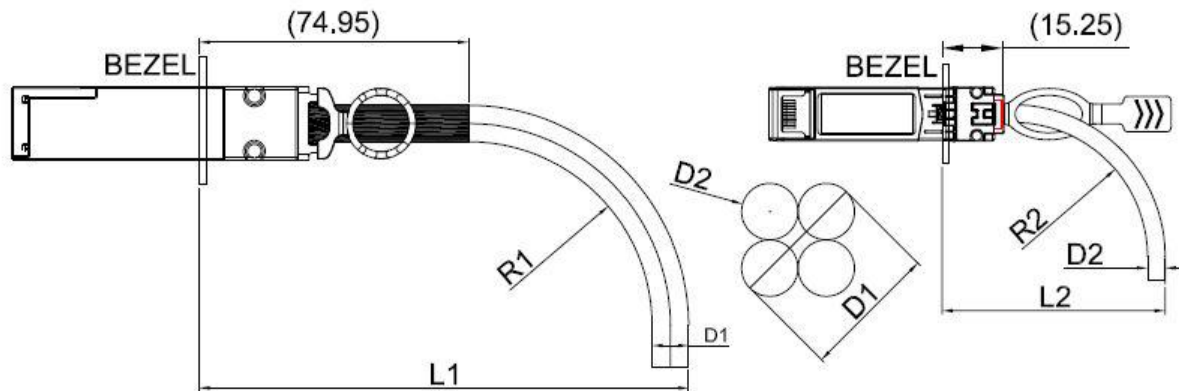
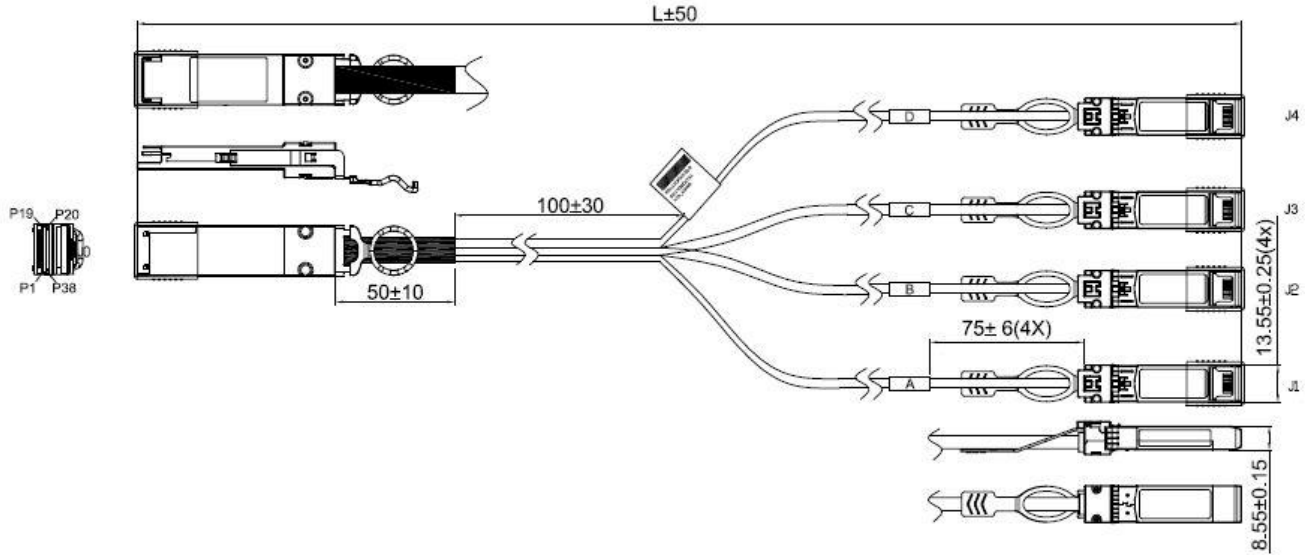
High Speed Characteristics

| Parameter | Symbol | Min | Typical | Max | Unit | Note |
|---|---------|-----|---------|-------|------|----------------------|
| Differential Impedance | RIN,P-P | 90 | | 110 | Ω | |
| Insertion loss | SDD21 | | | 22.48 | dB | At 12.8906 GHz |
| Differential Return Loss | SDD11 | | | See 1 | dB | At 0.05 to 4.1 GHz |
| | SDD22 | | | See 2 | dB | At 4.1 to 19 GHz |
| Common-mode to common-mode output return loss | SCC11 | 2 | | | dB | At 0.2 to 19 GHz |
| | SCC22 | | | | | |
| 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 | | | 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 Margin | COM | 3 | | | dB | |

Notes:

1. Reflection Coefficient given by equation $SDD11(dB) < 16.5 - 2 \times \text{SQRT}(f)$, 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 $SCD11(dB) < 22 - (20/25.78)*f$, with f in GHz
4. Reflection Coefficient given by equation $SCD11(dB) < 15 - (6/25.78)*f$, with f in GHz
5. Reflection Coefficient given by equation $SCD21(dB) < 27 - (29/22)*f$, with f in GHz

Mechanical Dimensions



| QSFP28 | | | |
|-------------|---------------|----------------------|---------------------|
| CABLE GAUGE | DIAMETER "D1" | MIN.BEND RADIUS "R1" | MIN.BEND SPACE "L1" |
| 30AWG | 10.9MM | 54.5MM | 140.35MM |
| 28AWG | 11.4MM | 57MM | 143.35MM |
| 26AWG | 12.6MM | 63MM | 150.55MM |
| 24AWG | 14.1MM | 70.5MM | 159.55MM |

| SFP28 | | | |
|-------------|---------------|----------------------|---------------------|
| CABLE GAUGE | DIAMETER "D2" | MIN.BEND RADIUS "R2" | MIN.BEND SPACE "L2" |
| 30AWG | 4.5MM | 22.5MM | 42.25MM |
| 28AWG | 4.7MM | 23.5MM | 43.45MM |
| 26AWG | 5.2MM | 26MM | 46.45MM |
| 24AWG | 5.8MM | 29MM | 50.05MM |

QSFP28 Pin Descriptions

| Pin | Logic | Symbol | Name/Description | Notes |
|-----|------------|---------|-------------------------------------|-------|
| 1 | | GND | Ground | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input | |
| 4 | | GND | Ground | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input | |
| 7 | | GND | Ground | 1 |
| 8 | LVTTL-I | ModSelL | Module Select | |
| 9 | LVTTL-I | ResetL | Module Reset | |
| 10 | | Vcc Rx | +3.3V Power Supply Receiver | 2 |
| 11 | LVC MOSI/O | SCL | 2-wire serial interface clock | |
| 12 | LVC MOSI/O | SDA | 2-wire serial interface data | |
| 13 | | GND | Ground | 1 |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output | |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | |
| 16 | | GND | Ground | 1 |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output | |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | |
| 19 | | GND | Ground | 1 |
| 20 | | GND | Ground | 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output | |
| 23 | | GND | Ground | 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output | |
| 26 | | GND | Ground | 1 |
| 27 | LVTTL-O | ModPrsL | Module Present | |
| 28 | LVTTL-O | IntL | Interrupt | |
| 29 | | Vcc Tx | +3.3V Power supply transmitter | 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 Data Input | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input | |
| 35 | | GND | Ground | 1 |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input | |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Input | |
| 38 | | GND | Ground | 1 |

Note 1: GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board 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 QSFP28 Module module in any combination. The connector pins are each rated for a maximum current of 500 mA.

SFP28 Pin Descriptions

| Pin | Logic | Symbol | Name/Description | Notes |
|-----|------------|----------|---------------------------------|-------|
| 1 | | VeeT | Transmitter Ground | |
| 2 | LV-TTL-O | TX_Fault | N/A | 1 |
| 3 | LV-TTL-I | TX_DIS | Transmitter Disable | 2 |
| 4 | LV-TTL-I/O | SDA | Tow Wire Serial Data | |
| 5 | LV-TTL-I | SCL | Tow Wire Serial Clock | |
| 6 | | MOD_DEF0 | Module present, connect to VeeT | |
| 7 | LV-TTL-I | RS0 | N/A | 1 |
| 8 | LV-TTL-O | LOS | LOS of Signal | 2 |
| 9 | LV-TTL-I | RS1 | N/A | 1 |
| 10 | | VeeR | Receiver Ground | |
| 11 | | VeeR | Receiver Ground | |
| 12 | CML-O | RD- | Receiver Data Inverted | |
| 13 | CML-O | RD+ | Receiver Data Non-Inverted | |
| 14 | | VeeR | Receiver Ground | |
| 15 | | VccR | Receiver Supply 3.3V | |
| 16 | | VccT | Transmitter Supply 3.3V | |
| 17 | | VeeT | Transmitter Ground | |
| 18 | CML-I | TD+ | Transmitter Data Non-Inverted | |
| 19 | CML_I | TD- | Transmitter Data Inverted | |
| 20 | | VeeT | Transmitter Ground | |

1. Signals not supported in SFP28 Copper pulled-down to VeeT with 30K ohms resistor
2. Passive cable assemblies do not support LOS and TX_DIS

Ordering information

| Part Number | GQS-4P28-P(A)XXC | | | | |
|------------------|------------------|----|----|----|----|
| Length (meter) | 1 | 2 | 3 | 4 | 5 |
| Wire gauge (AWG) | 30 | 30 | 26 | 26 | 26 |

Important Notice

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| Version | Date | Description |
|---------|-------------|---|
| V0 | Mar-2016 | New release |
| V1 | 26-Mar-2019 | Change copper link length from 'up to 3m' to 'up tp 5m' |