**Preliminary DATA SHEET**

## CFORTH-QSFP28/4SFP28-CUxM
## QSFP28 to 4xSFP28 Passive Copper Cable Assembly

### CFORTH-QSFP28/4SFP28-CUxM Overview

CFORTH-QSFP28/4SFP28-CUxM QSFP28 to 4xSFP28 copper direct attach cables are suitable for very short distances and offer a highly cost-effective way to connect QSFP28 and SFP28 equipment. The direct attach assemblies support 4 lanes of 25Gbps. This interconnect system is fully compliant with QSFP28 MSA and SFP28 MSA.

### Product Features

- QSFP28 End: Compliant with QSFP28 MSA specifications
- SFP28 End: Compliant with SFP28 MSA specifications
- 4 independent duplex channels operating at 25Gbps
- AC coupled inputs and outputs
- 100 Ohm differential impedance
- All-metal housing for superior EMI performance
- Single power supply 3.3V, low power consumption
- RoHS Compliant
- Operating temperature range: 0℃ to 70℃.

### Applications

- 100Gigabit Ethernet
- Infiniband EDR
- Serial Data Transmission
- Networking
- Storage
- Fiber Channel

### Ordering Information

| Part Number | Description |
| --- | --- |
| CFORTH-QSFP28/4SFP28-CU1M | QSFP28 to 4 SFP28 Passive Direct Attach Copper Cable Assembly, 1 m |
| CFORTH-QSFP28/4SFP28-CU2M | QSFP28 to 4 SFP28 Passive Direct Attach Copper Cable Assembly, 2 m |
| CFORTH-QSFP28/4SFP28-CU3M | QSFP28 to 4 SFP28 Passive Direct Attach Copper Cable Assembly, 3 m |

## General Specifications

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Bit Error Rate | BER | | | $10^{-12}$ | | |
| Operating Temperature | $T_{OP}$ | 0 | | 70 | ℃ | 1 |
| Storage Temperature | $T_{STO}$ | − 40 | | 85 | ℃ | 2 |
| Input Voltage | $V_{CC}$ | 3.14 | 3.3 | 3.46 | V | |
| Maximum Voltage | $V_{MAX}$ | − 0.5 | | 4 | V | 3 |

**Notes:**

1. Case temperature

2. Ambient temperature

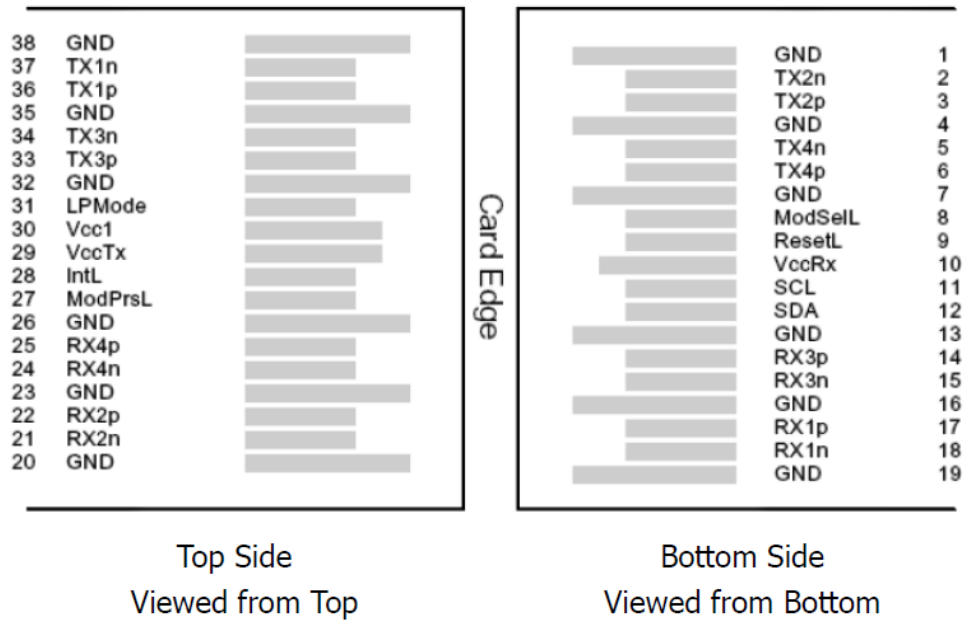3. For electrical power interface

## Cable Mechanical Specifications

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Wire Gauge | | 30AWG | | 26AWG | | |
| Cable Impedance | Z | 95 | 100 | 105 | Ohm | |

## Dimensions
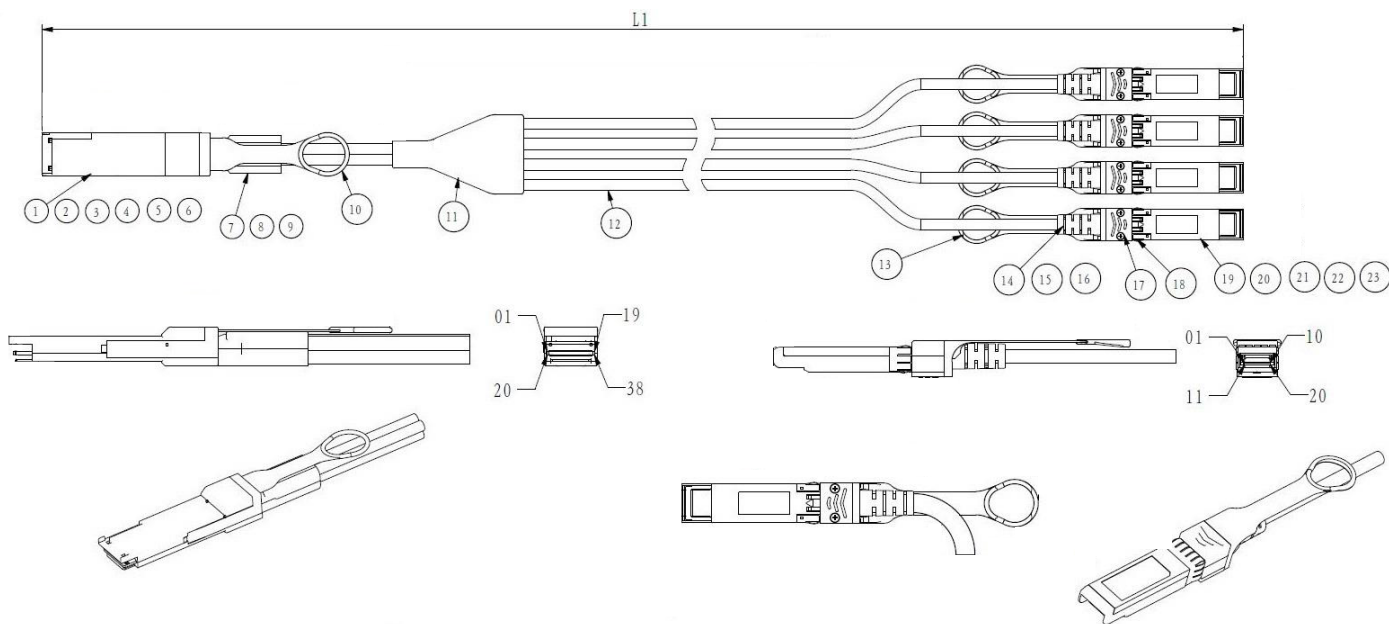


| ITEM | NAME | DESCRIPTION | Q'TY |
|------|------|-------------|------|
| 1 | BOTTOM SHELL FOR QSFP | Zn ALLOY,PLATED Ni OVER Cu | 1 |
| 2 | TOP SHELL FOR QSFP | Zn ALLOY,PLATED Ni OVER Cu | 1 |
| 3 | PCB ASSEMBLY FOR QSFP | QSFP PCB,38P,Au 30u"Min | 1 |
| 4 | SPRING FOR QSFP | HANDED ROTATION,SWPB | 2 |
| 5 | PULL ROD FOR QSFP | Zn ALLOY,PLATED Ni OVER Cu | 1 |
| 6 | SCREW FOR QSFP | MILD STEEL | 4 |
| 7 | PLASTIC BOOT FOR QSFP | PC AND ABS,BLACK | 1 |
| 8 | COPPER RING FOR QSFP | COPPER,PLATED Ni | 1 |
| 9 | ALUMINUM RING FOR QSFP | ALUMINIUM ALLOY | 1 |
| 10 | PULL TAB FOR QSFP | PA66, BLUE 300C | 1 |
| 11 | PLASTIC SPLITTER | PC AND ABS,BLACK | 1 |
| 12 | RAW CABLE | 2PAIRS, BLACK,ROTHS2.0 | 4 |
| 13 | PULL TAB FOR SFP | PA66, BLUE 300C | 4 |
| 14 | PLASTIC BOOT FOR SFP | PVC, BLACK | 4 |
| 15 | COPPER RING FOR SFP | COPPER,PLATED Ni | 4 |
| 16 | ALUMINUM RING FOR SFP | ALUMINIUM ALLOY | 4 |
| 17 | SCREW FOR SFP | MILD STEEL | 8 |
| 18 | GROUNDING SPRINGS | SUS303 | 4 |
| 19 | BOTTOM SHELL FOR SFP | Zn ALLOY,PLATED Ni OVER Cu | 4 |
| 20 | TOP SHELL FOR SFP | Zn ALLOY,PLATED Ni OVER Cu | 4 |
| 21 | PCB ASSEMBLY FOR SFP | SFP PCB,20P,Au 30u"Min | 4 |
| 22 | SPRING FOR SFP | HANDED ROTATION,SWPB | 8 |
| 23 | PULL ROD FOR SFP | SUS316 | 8 |

## Electrical Pad Layout (QSFP28 END)

| | |
|---|---|
| 38 GND | GND 1 |
| 37 TX1n | TX2n 2 |
| 36 TX1p | TX2p 3 |
| 35 GND | GND 4 |
| 34 TX3n | TX4n 5 |
| 33 TX3p | TX4p 6 |
| 32 GND | GND 7 |
| 31 LPMode | ModSelL 8 |
| 30 Vcc1 | ResetL 9 |
| 29 VccTx | VccRx 10 |
| 28 IntL | SCL 11 |
| 27 ModPrsL | SDA 12 |
| 26 GND | GND 13 |
| 25 RX4p | RX3p 14 |
| 24 RX4n | RX3n 15 |
| 23 GND | GND 16 |
| 22 RX2p | RX1p 17 |
| 21 RX2n | RX1n 18 |
| 20 GND | GND 19 |

Card Edge

Top Side
Viewed from Top

Bottom Side
Viewed from Bottom

## Electrical Pad Layout (SFP28 END)

| | |
|---|---|
| | VEER 10 |
| 11 VEER | RS1 9 |
| 12 RD- | RX_LOS 8 |
| 13 RD+ | RS0 7 |
| 14 VEER | MOD_ABS 6 |
| 15 VccR | SCL 5 |
| 16 VccT | SDA 4 |
| 17 VEET | TX_DISABLE 3 |
| 18 TD+ | TX_FAULT 2 |
| 19 TD- | VEET 1 |
| 20 VEET | |

TOWARD HOST WITH DIRECTION OF MODULE INSERTION

TOWARD BEZEL
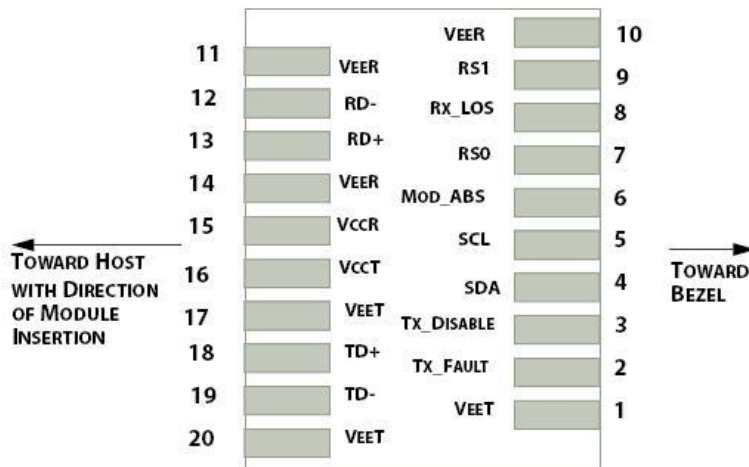
## Pin Assignment (QSFP28 END)

| PIN # | Symbol | Description | Remarks |
|-------|--------|-------------|---------|
| 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 | $V_{cc}$ 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 | Receiver Inverted Data Output |
| 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 | $V_{cc}$ TX | +3.3V Power Supply transmitter |
| 30 | $V_{cc1}$ | +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 Assignment (SFP28 END)**

| PIN # | Symbol | Description | Remarks |
|---|---|---|---|
| 1 | $V_{EET}$ | Transmitter ground (common with receiver ground) | |
| 2 | $T_{FAULT}$ | Transmitter Fault. | |
| 3 | $T_{DIS}$ | Transmitter Disable. Laser output disable on high or open | |
| 4 | SDA | Data line for serial ID | |
| 5 | SCL | Clock line for serial ID | |
| 6 | MOD_ABS | Module Absent. Grounded within the module | |
| 7 | RS0 | No connection required | |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation | |
| 9 | RS1 | No connection required | |
| 10 | $V_{EER}$ | Receiver ground (common with transmitter ground) | |
| 11 | $V_{EER}$ | Receiver ground (common with transmitter ground) | |
| 12 | RD− | Receiver Inverted DATA out. AC coupled | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC coupled | |
| 14 | $V_{EER}$ | Receiver ground (common with transmitter ground) | |
| 15 | $V_{CCR}$ | Receiver power supply | |
| 16 | $V_{CCT}$ | Transmitter power supply | |
| 17 | $V_{EET}$ | Transmitter ground (common with receiver ground) | |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC coupled | |
| 19 | TD− | Transmitter Inverted DATA in. AC coupled | |
| 20 | $V_{EET}$ | Transmitter ground (common with receiver ground) | |

**References**

1. IEEE standard 802.3bj. IEEE Standard Department, 2008.