

### **QSFPDD-400G-PDAC0-5M-C**

MSA and TAA 400GBase-CU QSFP-DD to QSFP-DD Direct Attach Cable (Passive Twinax, 0.5m)

#### **Features:**

- Compliant to QSFP-DD MSA Standards
- Compliant to IEEE802.3bs
- Operating Temperature: 0 to 70 Celsius
- Hot-Pluggable
- Built-In EEPROM Functions
- RoHS Compliant and Lead-Free



#### **Applications:**

- 400GBase Ethernet

#### **Product Description**

This is an industry standard 400GBase-CU QSFP-DD to QSFP-DD direct attach cable that operates over passive copper with a maximum reach of 0.5m (1.6ft). It has been programmed, uniquely serialized, and data-traffic and application tested to ensure it is 100% compliant and functional. This direct attach cable is TAA (Trade Agreements Act) compliant, and is built to comply with MSA (Multi-Source Agreement) standards. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")



## Absolute Maximum Ratings

| Parameter                  | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|--------|------|------|------|------|-------|
| Supply Voltage             | Vcc    | -0.3 | 3.3  | 3.6  | V    |       |
| Storage Temperature        | Tstg   | -40  |      | 85   | °C   |       |
| Operating Case Temperature | Tc     | 0    |      | 70   | °C   |       |
| Humidity                   | RH     | 5    |      | 85   | %    |       |
| Data Rate                  |        |      | 400  |      | Gbps |       |
| Wire Gauge                 |        |      | 30   |      | AWG  |       |

## Pin Descriptions

| Pin | Logic       | Symbol  | Name/Description                     | Plug Sequence |
|-----|-------------|---------|--------------------------------------|---------------|
| 1   |             | GND     | Module Ground.                       | 1B            |
| 2   | CML-I       | Tx2-    | Transmitter Inverted Data Input.     | 3B            |
| 3   | CML-I       | Tx2+    | Transmitter Non-Inverted Data Input. | 3B            |
| 4   |             | GND     | Module Ground.                       | 1B            |
| 5   | CML-I       | Tx4-    | Transmitter Inverted Data Input.     | 3B            |
| 6   | CML-I       | Tx4+    | Transmitter Non-Inverted Data Input. | 3B            |
| 7   |             | GND     | Module Ground.                       | 1B            |
| 8   | LVTTL-I     | ModSelL | Module Select.                       | 3B            |
| 9   | LVTTL-I     | ResetL  | Module Reset.                        | 3B            |
| 10  |             | VccRx   | +3.3V Receiver Power Supply.         | 2B            |
| 11  | LVC MOS-I/O | SCL     | 2-Wire Serial Interface Clock.       | 3B            |
| 12  | LVC MOS-I/O | SDA     | 2-Wire Serial Interface Data.        | 3B            |
| 13  |             | GND     | Module Ground.                       | 1B            |
| 14  | CML-O       | Rx3+    | Receiver Non-Inverted Data Output.   | 3B            |
| 15  | CML-O       | Rx3-    | Receiver Inverted Data Output.       | 3B            |
| 16  |             | GND     | Module Ground.                       | 1B            |
| 17  | CML-O       | Rx1+    | Receiver Non-Inverted Data Output.   | 3B            |
| 18  | CML-O       | Rx1-    | Receiver Inverted Data Output.       | 3B            |
| 19  |             | GND     | Module Ground.                       | 1B            |
| 20  |             | GND     | Module Ground.                       | 1B            |
| 21  | CML-O       | Rx2-    | Receiver Inverted Data Output.       | 3B            |
| 22  | CML-O       | Rx2+    | Receiver Non-Inverted Data Output.   | 3B            |
| 23  |             | GND     | Module Ground.                       | 1B            |
| 24  | CML-O       | Rx4-    | Receiver Inverted Data Output.       | 3B            |
| 25  | CML-O       | Rx4+    | Receiver Non-Inverted Data Output.   | 3B            |
| 26  |             | GND     | Module Ground.                       | 1B            |
| 27  | LVTTL-O     | ModPrsL | Module Present.                      | 3B            |
| 28  | LVTTL-O     | IntL    | Interrupt.                           | 3B            |
| 29  |             | VccTx   | +3.3V Transmitter Power Supply.      | 2B            |

|    |         |          |                                                                                      |    |
|----|---------|----------|--------------------------------------------------------------------------------------|----|
| 30 |         | Vcc1     | +3.3V Power Supply.                                                                  | 2B |
| 31 | LVTTL-I | InitMode | Initialization Mode. In legacy QSFP applications, the InitMode pad is called LPMode. | 3B |
| 32 |         | GND      | Module Ground.                                                                       | 1B |
| 33 | CML-I   | Tx3+     | Transmitter Non-Inverted Data Input.                                                 | 3B |
| 34 | CML-I   | Tx3-     | Transmitter Inverted Data Input.                                                     | 3B |
| 35 |         | GND      | Module Ground.                                                                       | 1B |
| 36 | CML-I   | Tx1+     | Transmitter Non-Inverted Data Input.                                                 | 3B |
| 37 | CML-I   | Tx1-     | Transmitter Inverted Data Input.                                                     | 3B |
| 38 |         | GND      | Module Ground.                                                                       | 1B |
| 39 |         | GND      | Module Ground.                                                                       | 1A |
| 40 | CML-I   | Tx6-     | Transmitter Inverted Data Input.                                                     | 3A |
| 41 | CML-I   | Tx6+     | Transmitter Non-Inverted Data Input.                                                 | 3A |
| 42 |         | GND      | Module Ground.                                                                       | 1A |
| 43 | CML-I   | Tx8-     | Transmitter Inverted Data Input.                                                     | 3A |
| 44 | CML-I   | Tx8+     | Transmitter Non-Inverted Data Input.                                                 | 3A |
| 45 |         | GND      | Module Ground.                                                                       | 1A |
| 46 |         | OPEN     |                                                                                      | 3A |
| 47 |         | OPEN     |                                                                                      | 3A |
| 48 |         | OPEN     |                                                                                      | 2A |
| 49 |         | OPEN     |                                                                                      | 3A |
| 50 |         | OPEN     |                                                                                      | 3A |
| 51 |         | GND      |                                                                                      | 1A |
| 52 | CML-O   | Rx7+     | Receiver Non-Inverted Data Output.                                                   | 3A |
| 53 | CML-O   | Rx7-     | Receiver Inverted Data Output.                                                       | 3A |
| 54 |         | GND      | Module Ground.                                                                       | 1A |
| 55 | CML-O   | Rx5+     | Receiver Non-Inverted Data Output.                                                   | 3A |
| 56 | CML-O   | Rx5-     | Receiver Inverted Data Output.                                                       | 3A |
| 57 |         | GND      | Module Ground.                                                                       | 1A |
| 58 |         | GND      | Module Ground.                                                                       | 1A |
| 59 | CML-O   | Rx6-     | Receiver Inverted Data Output.                                                       | 3A |
| 60 | CML-O   | Rx6+     | Receiver Non-Inverted Data Output.                                                   | 3A |
| 61 |         | GND      | Module Ground.                                                                       | 1A |
| 62 | CML-O   | Rx8-     | Receiver Inverted Data Output.                                                       | 3A |
| 63 | CML-O   | Rx8+     | Receiver Non-Inverted Data Output.                                                   | 3A |
| 64 |         | GND      | Module Ground.                                                                       | 1A |
| 65 |         | OPEN     | Not Connected.                                                                       | 3A |
| 66 |         | OPEN     | For Future Use.                                                                      | 3A |
| 67 |         | OPEN     | +3.3V Transmitter Power Supply.                                                      | 2A |
| 68 |         | OPEN     | +3.3V Power Supply.                                                                  | 2A |
| 69 |         | OPEN     | For Future Use.                                                                      | 3A |
| 70 |         | GND      | Module Ground.                                                                       | 1A |
| 71 | CML-I   | Tx7+     | Transmitter Non-Inverted Data Input.                                                 | 3A |
| 72 | CML-I   | Tx7-     | Transmitter Inverted Data Input.                                                     | 3A |

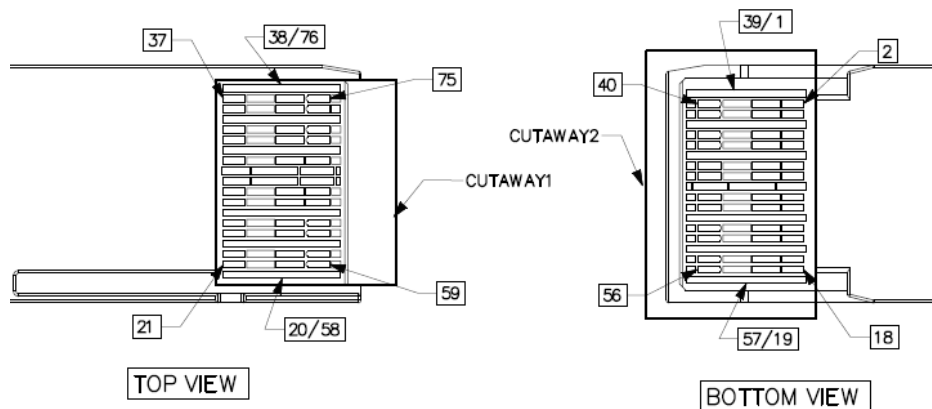
|    |       |      |                                      |    |
|----|-------|------|--------------------------------------|----|
| 73 |       | GND  | Module Ground.                       | 1A |
| 74 | CML-I | Tx5+ | Transmitter Non-Inverted Data Input. | 3A |
| 75 | CML-I | Tx5- | Transmitter Inverted Data Input.     | 3A |
| 76 |       | GND  | Module Ground.                       | 1A |

## Wiring Diagram

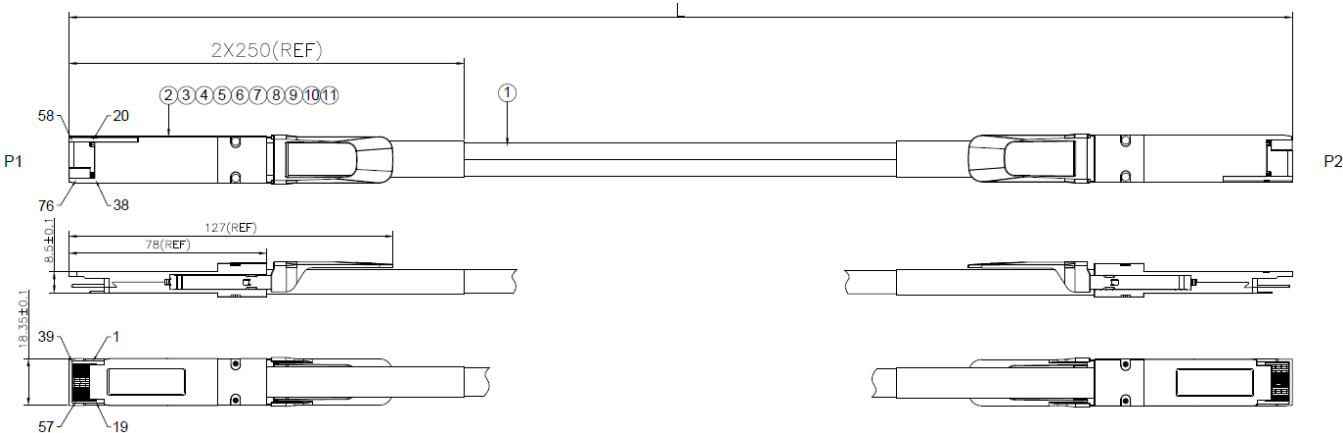
| LOW SPEED SIGNALS<br>P1 & P2 |           |
|------------------------------|-----------|
| PAD                          | SIGNAL    |
| 8                            | MODSELL   |
| 9                            | RESETL    |
| 10                           | VCCRX     |
| 11                           | SCL       |
| 12                           | SDA       |
| 27                           | MODPRSL   |
| 28                           | INTL      |
| 29                           | VCCTX     |
| 30                           | VCC1      |
| 31                           | INIT_MODE |
| 46                           | OPEN      |
| 47                           | OPEN      |
| 48                           | OPEN      |
| 49                           | OPEN      |
| 50                           | OPEN      |
| 65                           | OPEN      |
| 66                           | OPEN      |
| 67                           | OPEN      |
| 68                           | OPEN      |
| 69                           | OPEN      |

| WIRING DIAGRAM |        |   |        |        |
|----------------|--------|---|--------|--------|
| P1 END         |        |   | P2 END |        |
| Pad            | Signal |   | Pad    | Signal |
| 1              | GND    | — | 20     | GND    |
| 2              | TX2n   | → | 21     | RX2n   |
| 3              | TX2p   | → | 22     | RX2p   |
| 4              | GND    | — | 23     | GND    |
| 5              | TX4n   | → | 24     | RX4n   |
| 6              | TX4p   | → | 25     | RX4p   |
| 7              | GND    | — | 26     | GND    |
| 13             | GND    | — | 32     | GND    |
| 14             | RX3p   | ← | 33     | TX3p   |
| 15             | RX3n   | ← | 34     | TX3n   |
| 16             | GND    | — | 35     | GND    |
| 17             | RX1p   | ← | 36     | TX1p   |
| 18             | RX1n   | ← | 37     | TX1n   |
| 19             | GND    | — | 38     | GND    |
| 20             | GND    | — | 1      | GND    |
| 21             | RX2n   | ← | 2      | TX2n   |
| 22             | RX2p   | ← | 3      | TX2p   |
| 23             | GND    | — | 4      | GND    |
| 24             | RX4n   | ← | 5      | TX4n   |
| 25             | RX4p   | ← | 6      | TX4p   |
| 26             | GND    | — | 7      | GND    |
| 32             | GND    | — | 13     | GND    |
| 33             | TX3p   | → | 14     | RX3p   |
| 34             | TX3n   | → | 15     | RX3n   |
| 35             | GND    | — | 16     | GND    |
| 36             | TX1p   | → | 17     | RX1p   |
| 37             | TX1n   | → | 18     | RX1n   |
| 38             | GND    | — | 19     | GND    |

| WIRING DIAGRAM |        |   |        |        |
|----------------|--------|---|--------|--------|
| P1 END         |        |   | P2 END |        |
| Pad            | Signal |   | Pad    | Signal |
| 39             | GND    | — | 58     | GND    |
| 40             | TX6n   | → | 59     | RX6n   |
| 41             | TX6p   | → | 60     | RX6p   |
| 42             | GND    | — | 61     | GND    |
| 43             | TX8n   | → | 62     | RX8n   |
| 44             | TX8p   | → | 63     | RX8p   |
| 45             | GND    | — | 64     | GND    |
| 51             | GND    | — | 70     | GND    |
| 52             | RX7p   | ← | 71     | TX7p   |
| 53             | RX7n   | ← | 72     | TX7n   |
| 54             | GND    | — | 73     | GND    |
| 55             | RX5p   | ← | 74     | TX5p   |
| 56             | RX5n   | ← | 75     | TX5n   |
| 57             | GND    | — | 76     | GND    |
| 58             | GND    | — | 39     | GND    |
| 59             | RX6n   | ← | 40     | TX6n   |
| 60             | RX6p   | ← | 41     | TX6p   |
| 61             | GND    | — | 42     | GND    |
| 62             | RX8n   | ← | 43     | TX8n   |
| 63             | RX8p   | ← | 44     | TX8p   |
| 64             | GND    | — | 45     | GND    |
| 70             | GND    | — | 51     | GND    |
| 71             | TX7p   | → | 52     | RX7p   |
| 72             | TX7n   | → | 53     | RX7n   |
| 73             | GND    | — | 54     | GND    |
| 74             | TX5p   | → | 55     | RX5p   |
| 75             | TX5n   | → | 56     | RX5n   |
| 76             | GND    | — | 57     | GND    |



# Mechanical Specifications



| Item | Name                 | Description                           | Quantity |
|------|----------------------|---------------------------------------|----------|
| 1    | Raw Cable            | 8 Pairs, PVC Jacket, Black            | A/R      |
| 2    | PCBA                 | PCB, 76P, Au 30u" Minimum             | 2        |
| 3    | Top Shell            | Zinc Alloy, Plated Nickel Over Copper | 2        |
| 4    | Bottom Shell         | Zinc Alloy, Plated Nickel Over Copper | 2        |
| 5    | Pull Tab             | Pull Tab, TPV, Black                  | 2        |
| 6    | Rivet                | Aluminum Alloy                        | 4        |
| 7    | Spring               | Stainless Steel                       | 4        |
| 8    | Blackshell Label     | Blackshell Label                      | 2        |
| 9    | Inner Mold           | Hot-Melt Glue                         | A/R      |
| 10   | Copper Tape          | T=0.15MM                              | A/R      |
| 11   | Heat Shrinkable Tube | Black Tube                            | A/R      |

## Notes:

1. Raw cable impedance:  $100^{+10}_{-5}\Omega$ . Mated connector impedance:  $100^{+10}_{-15}\Omega$ . Rise time: 25ps (20-80%).
2. 100% conductor test. Test condition: voltage 5V. Insulation resistance: 10m $\Omega$ . Conduction resistance maximum: 3 $\Omega$ .
3. High-frequency test according to IEEE802.3cd standard.
4. All materials are RoHS complaint.

## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



## Contact Information

ProLabs US

Email: [sales@prolabs.com](mailto:sales@prolabs.com)

Telephone: 952-852-0252

ProLabs UK

Email: [salesupport@prolabs.com](mailto:salesupport@prolabs.com)

Telephone: +44 1285 719 600