

### **QDD-400GB-ADAC3-5M-AR-PRO**

Arista Networks® Compatible TAA 400GBase-CU QSFP-DD to QSFP-DD Direct Attach Cable (Active Twinax, 3.5m)

#### **Features**

- Module Compliant to QSFP-DD MSA
- Low Power Consumption, Meeting 1.5W Module LP Mode
- Transmission Data Rate up to PAM4 53.125Gbps Per Channel
- Low Latency
- Supports Device Programming by MCU with I2C
- Enables a Transparent ACC Solution Meeting all IEEE 200GBASE-CR4 Auto-Negotiation and Link Training
- Operating Temperature: 0 to 70 Celsius
- Operates from a Single 3.3V Power Supply with an Integrated Power On Reset (POR)
- RoHS Compliant and Lead-Free



#### **Applications:**

- 400GBase Ethernet

#### **Product Description**

This is a Arista Networks® Compatible 400GBase-CU QSFP-DD to QSFP-DD direct attach cable that operates over active copper with a maximum reach of 3.5m. It has been programmed, uniquely serialized, and data-traffic and application tested to ensure it is 100% compliant and functional. We stand behind the quality of our products and proudly offer a limited lifetime warranty. This cable is TAA (Trade Agreements Act) compliant and is built to comply with MSA (Multi-Source Agreement) standards.

Proline's 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 |       |

### Physical Characteristics

| Parameter       | Symbol | Min.                         | Typ. | Max. | Unit | Notes |
|-----------------|--------|------------------------------|------|------|------|-------|
| Length          | L      |                              |      | 3.5  | M    |       |
| AWG             |        |                              | 28   |      | AWG  |       |
| Jacket Material |        | Plastic Braided Mesh, Orange |      |      |      |       |

### Electrical Characteristics

| Parameter                        | Symbol | Min.      | Typ. | Max.      | Unit  | Notes |
|----------------------------------|--------|-----------|------|-----------|-------|-------|
| Input Amplitude                  |        | 800       |      | 1200      | mVp-p |       |
| Control Logic Input Low Voltage  | VIL    | -0.3      |      | 0.35*Vcc  | V     |       |
| Control Logic Input High Voltage | VIH    | 0.65* Vcc |      | Vcc+0.3   | V     |       |
| Control Logic Input Low Current  | IIL    | -100      |      | +100      | uA    |       |
| Control Logic Input High Current | IIH    | -100      |      | +100      | uA    |       |
| Output Logic Low                 | VOL    |           |      | 0.25* Vcc | V     |       |
| I2C Master Mode Output Frequency |        |           |      | 400       | kHz   |       |

### High-Speed Specifications

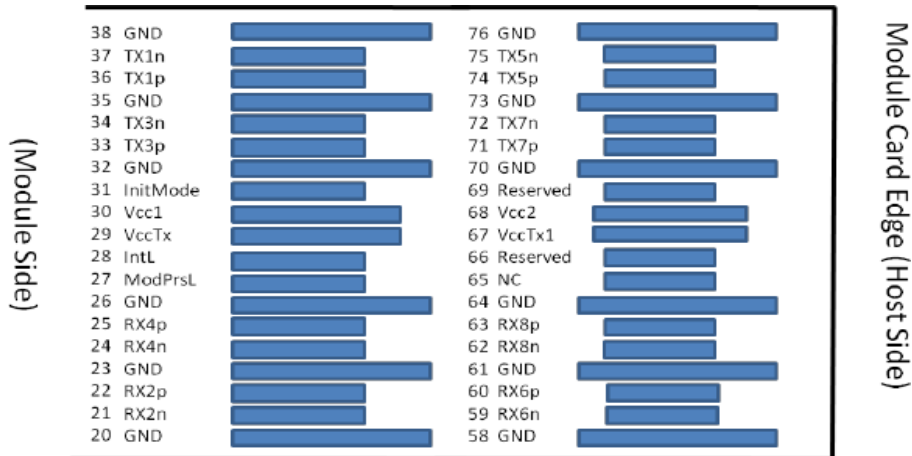
| Parameter                          | Symbol | Min.                          | Typ. | Max.                 | Unit | Notes |
|------------------------------------|--------|-------------------------------|------|----------------------|------|-------|
| Raw Cable Differential Impedance   | Zca    | 90                            |      | 110                  | Ω    |       |
| PCBA Differential Impedance        | Zpcba  | 85                            |      | 115                  | Ω    |       |
| Maximum Insertion Loss at 13.28GHz | SDD21  | 8                             |      | 17.16                | dB   |       |
| Other SI Performance               |        | Compliant with IEEE802.3cd&bj |      |                      |      |       |
| Minimum COM                        | COM    | 3                             |      |                      | dB   |       |
| BER with FEC                       |        |                               |      | 2.4x10 <sup>-4</sup> |      |       |

## Pin Descriptions

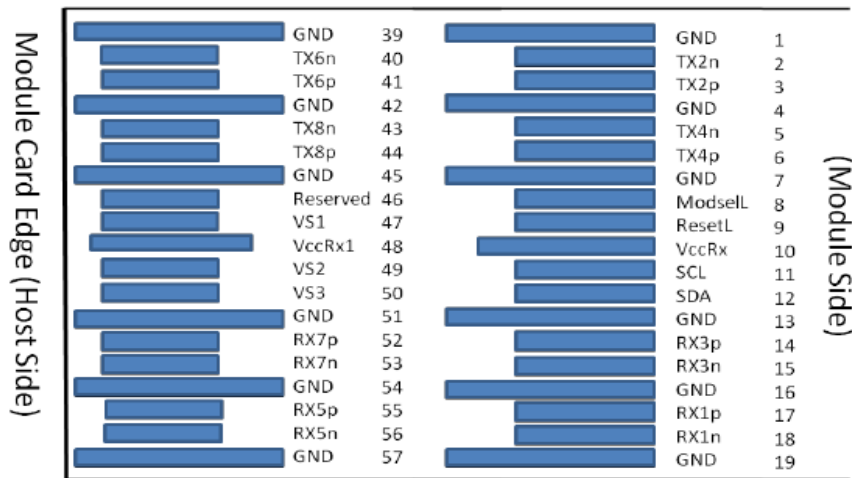
| Pin | Logic       | Symbol   | Name/Description   | Plug Sequence |
|-----|-------------|----------|--|---------------|
| 1   |             | GND      | Module Ground.   | 1B            |
| 2   | CML-I       | Tx2-     | Transmitter Inverted Data Input.   | 3B            |
| 3   | CML-I       | Tx2+     | 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 |       | Reserved | For Future Use.                      | 3A |
| 47 |       | VS1      | Module Vendor-Specific 1.            | 3A |
| 48 |       | VccRx1   | +3.3V Receiver Power Supply.         | 2A |
| 49 |       | VS2      | Module Vendor-Specific 2.            | 3A |
| 50 |       | VS3      | Module Vendor-Specific 3.            | 3A |
| 51 |       | GND      | Module Ground.                       | 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 |
| 64 |       | NC       | Not Connected.                       | 3A |
| 66 |       | Reserved | For Future Use.                      | 3A |
| 67 |       | VccTx1   | +3.3V Transmitter Power Supply.      | 2A |
| 68 |       | Vcc2     | +3.3V Power Supply.                  | 2A |
| 69 |       | Reserved | 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 |

### Electrical Pin-Out Details



Top side viewed from top



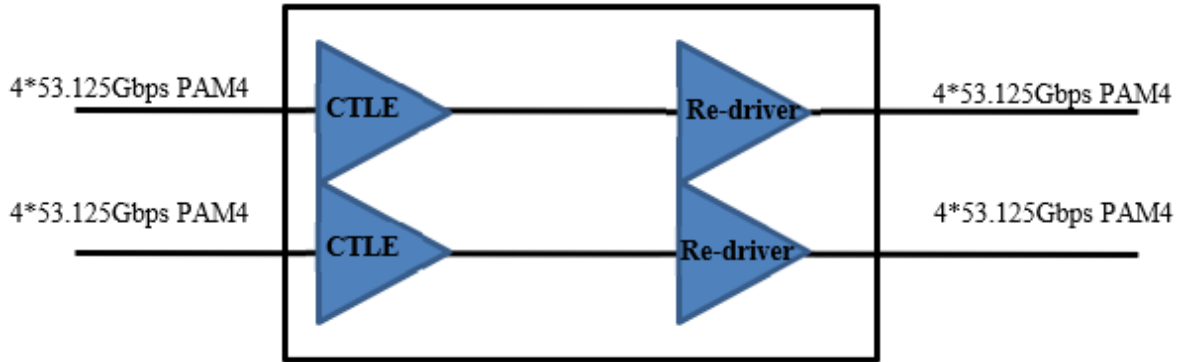
Bottom side viewed from bottom



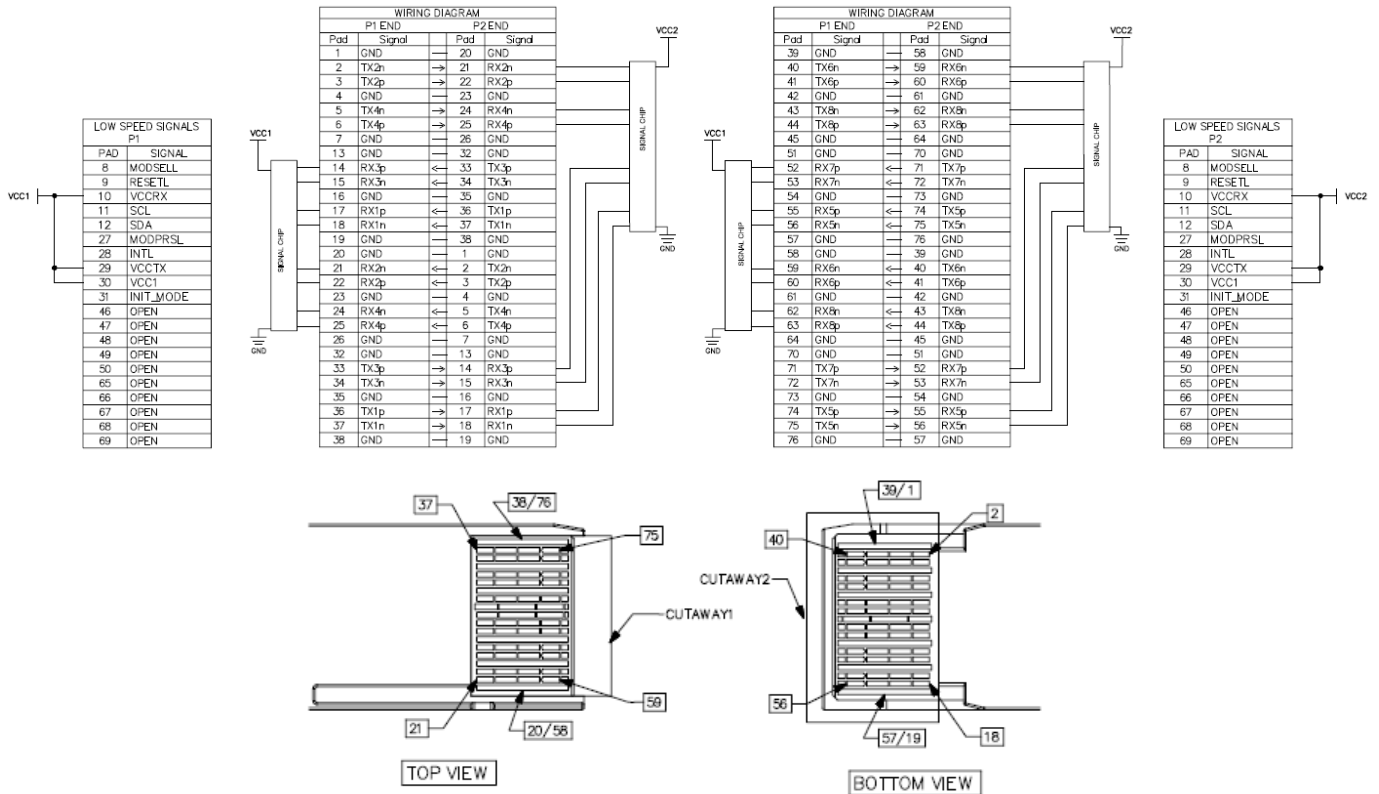
### Bending Radius

| Wire Gauge | OD (Ref) | Minimum Bend Radius | Bend Space |
|------------|----------|---------------------|------------|
| 28AWG      | 10.2mm   | 20.4mm              | 65mm       |

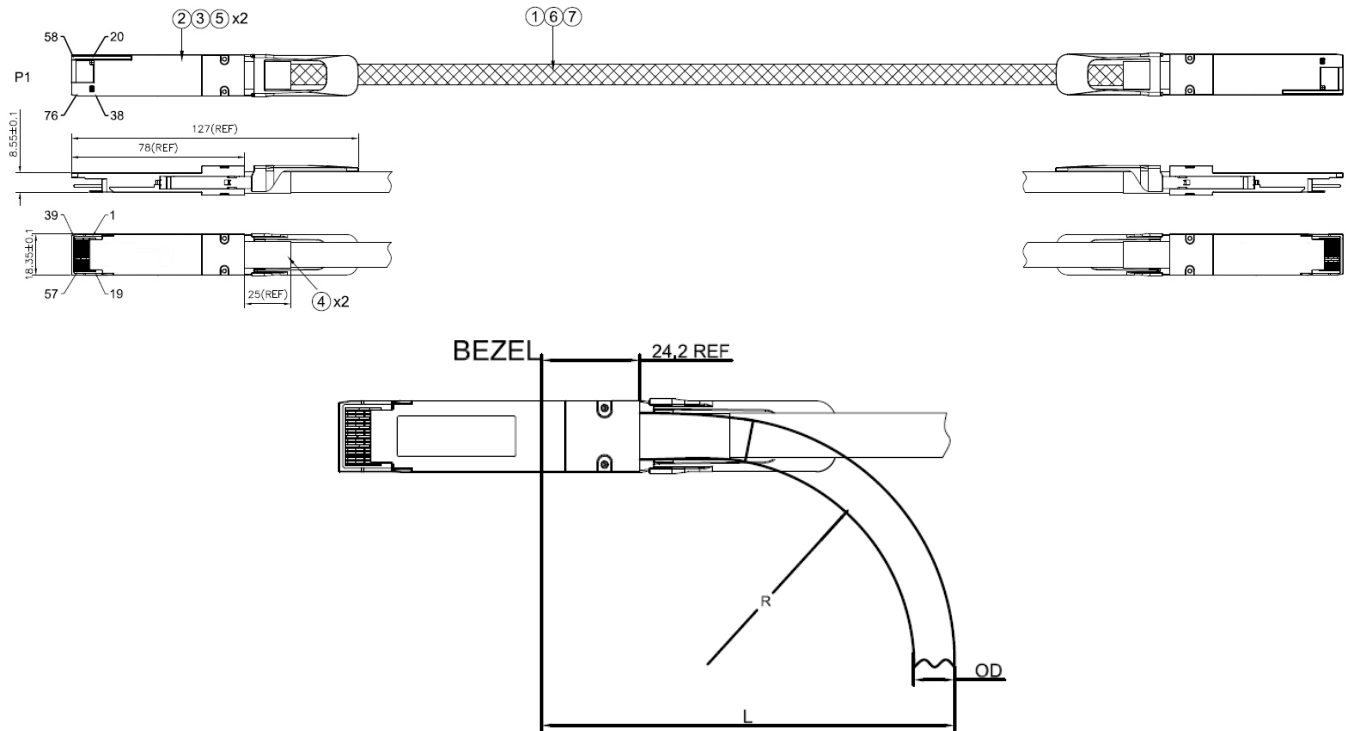
## Block Diagram



## Wiring Table



## Mechanical Specifications



| Item | Name                   | Description  | Quantity |
|------|------------------------|--|----------|
| 1    | Raw Cable              | SAS Cable, 56G, RoHS 2.0   | A/R      |
| 2    | PCBA                   | QSFP-DD PCBA with Signal Chip, 76 P, Gold 30u" Minimum                   | 2        |
| 3    | QSFP-DD Conn. Assembly | Zinc Alloy, Plated Nickel Over Copper + Stainless Steel Latch + Pull Tab | 2        |
| 4    | Heat Shrink Tube       | Black  | A/R      |
| 5    | Back Shell Label       | Black Shell Label, 29.5*10mm   | 2        |
| 6    | Plastic Braided Mesh   | Pet, Orange  | A/R      |
| 7    | Braid Shield           | Copper, Braid  | A/R      |

### Notes:

- Raw cable impedance:  $100 \pm 10 \Omega$ .  
Mated connector impedance:  $100 \pm 15 \Omega$ .  
Rise time: 25ps (20-80%).
- High-frequency test according to IEEE802.3cd standard.
- All material must comply with RoHS 2.0.

**About Us:**

Proline Options is one of North America's leading providers of transceivers and high speed cabling. With a reputation for quality, tested products that cover the connectivity spectrum, Proline Options has a solution for you regardless of the specification.

At Proline Options, every product is tested in its intended application - never batch or spec tested only. We run bandwidth, distance and IOS network tests. We have documented an impressive 0.03% failure rate over the last 10 years. To continue this rate of success we invest millions annually in our own on-site testing lab.



Tel: 855.933.3223

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

Email: [techsupport@prolineoptions.com](mailto:techsupport@prolineoptions.com)

Web: <https://www.prolineoptions.com>