

QDD-400GB-ADAC5-5M-PRO

MSA and TAA 400GBase-CU QSFP-DD to QSFP-DD Direct Attach Cable (Active Twinax, 5.5m)

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 MSA Compliant 400GBase-CU QSFP-DD to QSFP-DD direct attach cable that operates over active copper with a maximum reach of 5.5m. 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 | | | 5.5 | 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

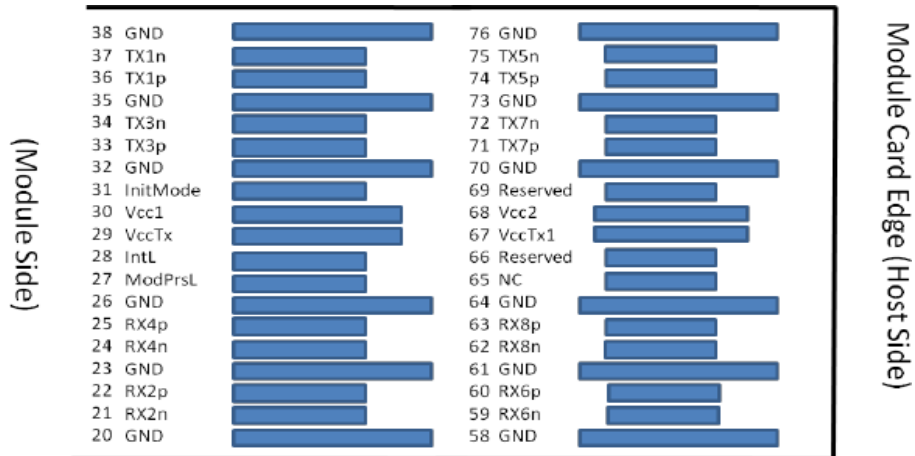
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|------------------------------------|--------|-------------------------------|------|----------------------|------|-------|
| Raw Cable Differential Impedance | Zca | 90 | | 110 | Ω | |
| PCBA Differential Impedance | Zpcba | 85 | | 115 | Ω | |
| 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 ⁻⁴ | | |

Pin Descriptions

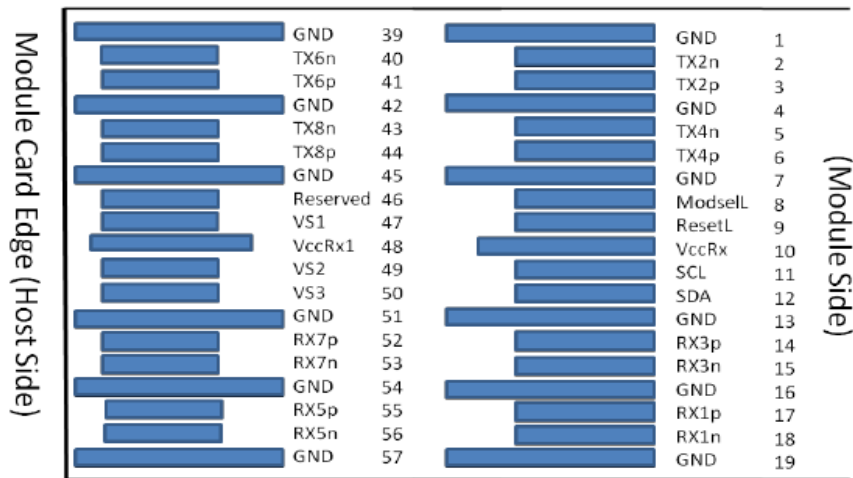
| Pin | Logic | Symbol | Name/Description | Plug Sequence |
|-----|-------------|----------|--|---------------|
| 1 | | GND | Module Ground. | 1B |
| 2 | CML-I | Tx2- | Transmitter Inverted Data Input. | 3B |
| 3 | CML-I | Tx2+ | Transmitter Non-Inverted Data Input. | 3B |
| 4 | | GND | Module Ground. | 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



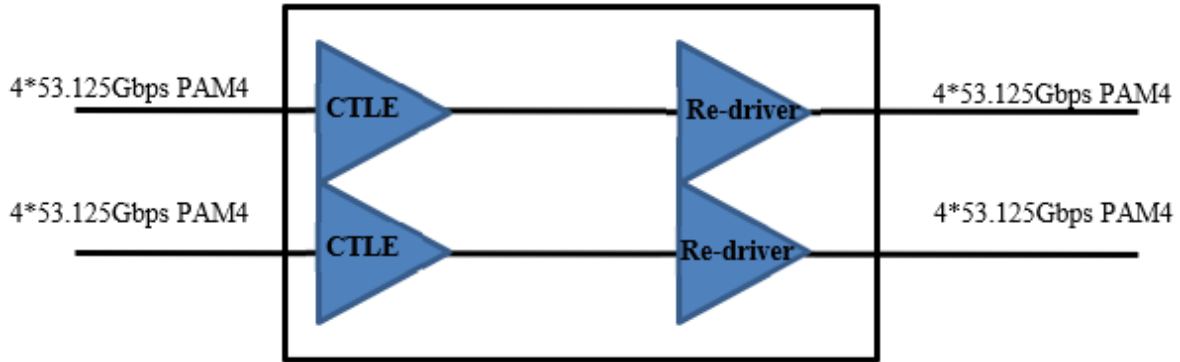
Bottom side viewed from bottom



Bending Radius

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

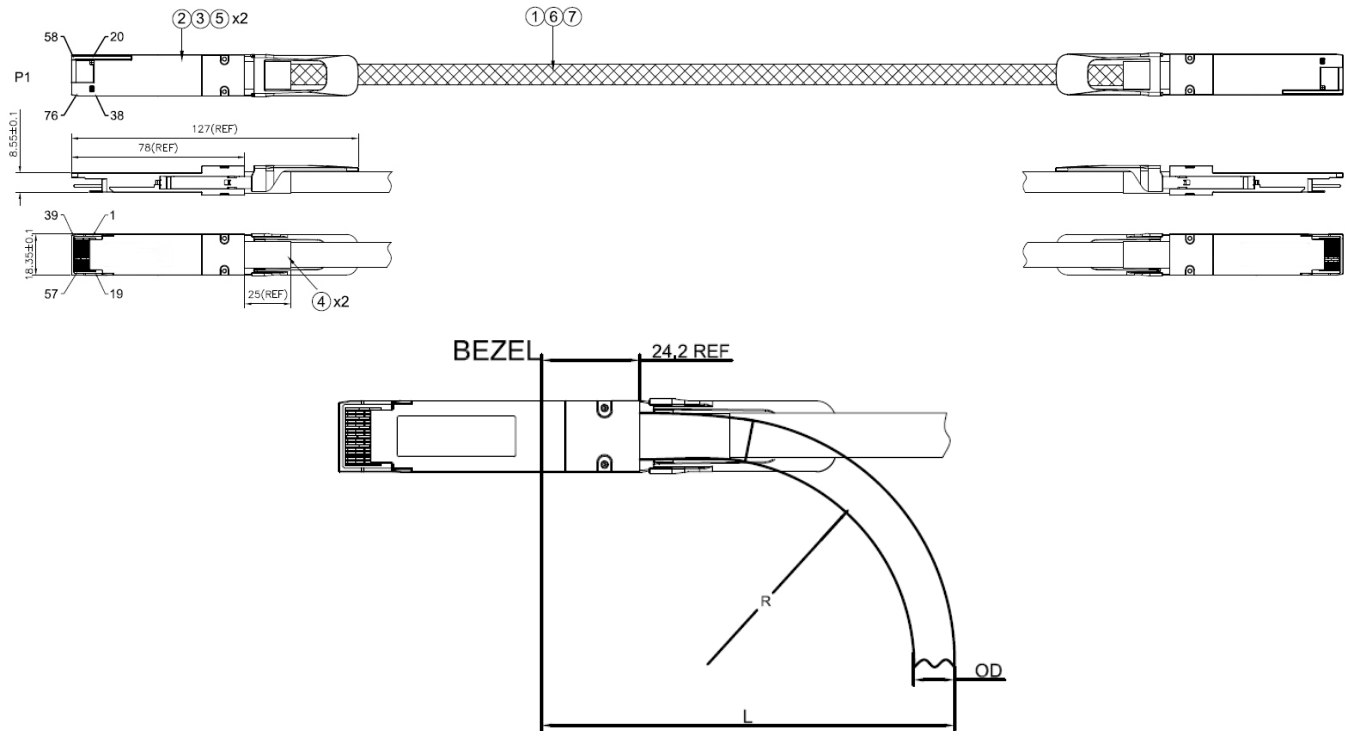
Block Diagram



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.



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