

### QDD-400GB-ADAC5M-C-PRO

Cisco® Compatible TAA 400GBase-CU QSFP-DD to QSFP-DD Direct Attach Cable (Active Twinax, 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 Cisco® Compatible 400GBase-CU QSFP-DD to QSFP-DD direct attach cable that operates over active copper with a maximum reach of 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	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

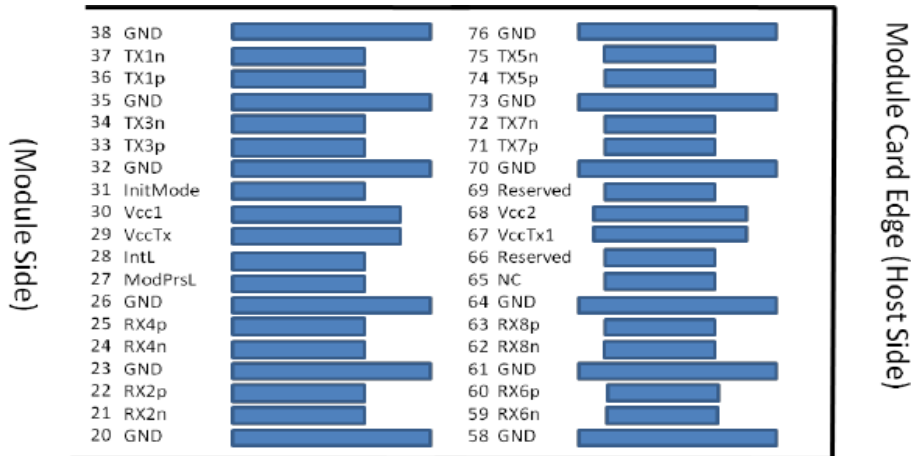
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Raw Cable Differential Impedance	Zca	90		110	Ω	
PCBA Differential Impedance	Zpcb	85		115	Ω	
Maximum Insertion Loss at 13.28GHz	SDD21	8		17.16	dB	
Other SI Performance		Compliant with IEEE802.3cd&bj				
Minimum COM	COM	3			dB	
BER with FEC				2.4x10 <sup>-4</sup>		

## Pin Descriptions

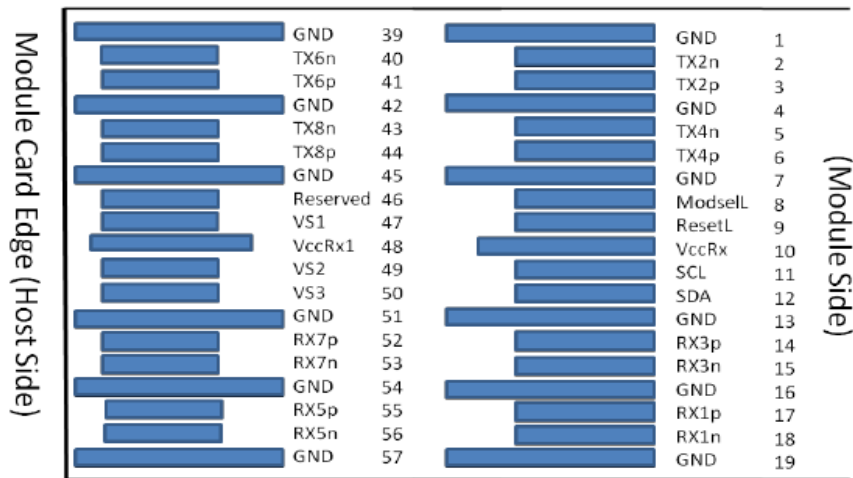
Pin	Logic	Symbol	Name/Description	Plug Sequence
1		GND	Module Ground.	1B
2	CML-I	Tx2-	Transmitter Inverted Data Input.	3B
3	CML-I	Tx2+	Transmitter Non-Inverted Data Input.	3B
4		GND	Module Ground.	1B
5	CML-I	Tx4-	Transmitter Inverted Data Input.	3B
6	CML-I	Tx4+	Transmitter Non-Inverted Data Input.	3B
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



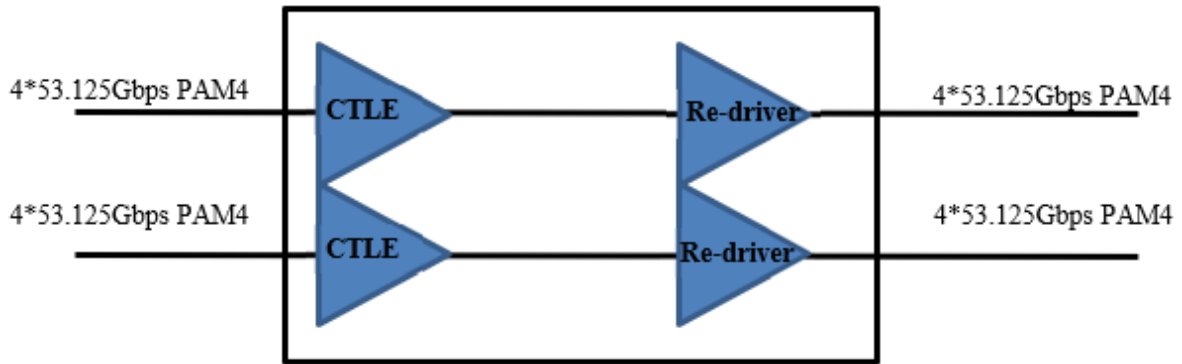
Bottom side viewed from bottom



### Bending Radius

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

### Block Diagram



### Wiring Table

**LOW SPEED SIGNALS P1**

PAD	SIGNAL
8	MODSELL
9	RESETL
10	VCCRFX
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**

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 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

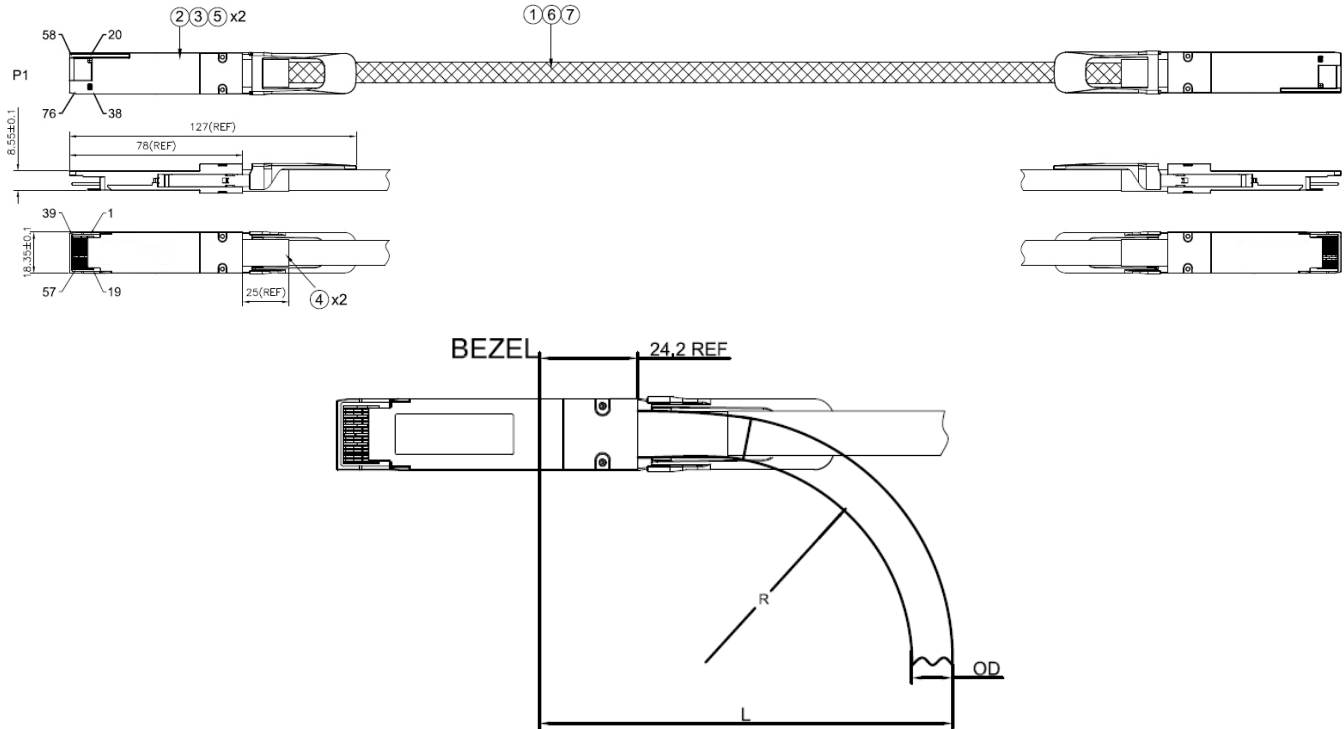
**LOW SPEED SIGNALS P2**

PAD	SIGNAL
8	MODSELL
9	RESETL
10	VCCRFX
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

**TOP VIEW**

**BOTTOM VIEW**

## 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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