QSFPDD4-400G-AOC10M-C

MSA and TAA Compliant 400GBase-AOC QSFP-DD to QSFP-DD Active Optical Cable (850nm, MMF, 10m)

Features

- Multi-rate capabilities: Up to 400Gbps
- QSFP-DD Form Factor
- 10m Length
- Hot-Pluggable Active Cable
- 8x50Gbps PAM4 Modulation
- CMIS 3.1 Compliant I^2C Interface
- Operating Temperature: 0˚C to 70˚C
- Power: 10W Typical per Cable End
- ROHS-6 Compliant

Applications

- 50/200/400G Ethernet

Product Description

This is an MSA compliant 400GBase-AOC QSFP-DD to QSFP-DD active optical cable that operates over active fiber with a maximum reach of 10m. At a wavelength of 850nm, it has been programmed, uniquely serialized, and data-traffic and application tested to ensure it is 100% compliant and functional. This active optical 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' active optical cables 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
Supply Voltage	Vcc, Vcc2, VccTx, VccTx1, VccRx, VccRx1	-0.5		3.6	V
Storage Temperature	Tstg	-10		85	°C
Storage Humidity (Non-Condensing)	RH	5		85	%
Differential Maximum Input Voltage	VIN-diff-maxd			1600	mV

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	Vcc, Vcc2, VccTx, VccTx1, VccRx, VccRx1		3.3		V
Case Operating Temperature	Tc	0		70	°C
Module Total Power	PTOT		10		W
Operating Humidity	RH	5		85	%
Signaling Rate Per Lane	DR		53.125		Gbps

General Characteristics

Parameter	Symbol	Unit	Notes
Module Form Factor	QSFP-DD Type 1		QSFP-DD MSA Hardware Rev. 4.0
Number of Lanes	8 Tx, 8 Rx		
Maximum Aggregate Data Rate	425	Gbps	
Maximum Data Rate Per Lane	53.125	Gbps	
Protocols Supported	50GbE, 200GbE, 400GbE		
Electrical Interface and Pin-Out	8x50G PAM4, 8x25G NRZ 76-Pin Edge Connector		
Management Interface	Serial, I^2C-Based, 400KHz Maximum		CMIS Rev. 3.1 Compliant

Electrical and Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current Per Cable End	Icc				mA	
Power Dissipation Per Cable End	P_{DISS}		10		W	
Latency	TL		TBD		ms	
Bit Error Rate (Pre-FEC)	BER		< $1E^{-8}$	$5E^{-}$05		
Transmit High-Speed Electrical Specifications						
High-Speed Differential Termination Resistance	ZTERMio		100		Ω	
Differential Voltage	VIN_pp			1600	mVp-p	
Input Differential Return Loss	SDD11	Compliant to IEEE 802.3bs			dB	
Receive High-Speed Electrical Specifications						
Signaling Rate Per Lane			53.125		Gbps	
High-Speed Differential Termination Resistance	ZTERMio		100		Ω	
Differential Output Swing	VOUT_pp			900	mVp-p	
Output Rise/Fall Time (20-80%)				TBD	ps	
Low-Speed Electrical Specifications						
Output Logic - High (SCL, SDA)	VOH	Vcc-0.5		Vcc+0.3	V	
Output Logic - Low (SCL, SDA)	VOL	0		0.4	V	
Input Logic - High (SCL, SDA)	VIH	Vcc*0.7		Vcc+0.5	V	
Input Logic - Low (SCL, SDA)	VIL	-0.3		Vcc*0.3	V	
Output Logic - High (IntL)	VOH	Vcc-0.5		Vcc+0.3	V	
Output Logic - Low (ModPrsL, IntL)	VOL	0		0.4	V	
Input Logic - High (InitMode, Reset, ModSelL)	VIH	2		vcc+0.3	V	
Input Logic - Low (InitMode, Reset, ModSelL)	VIL	-0.3		0.8	V	

Pin Descriptions

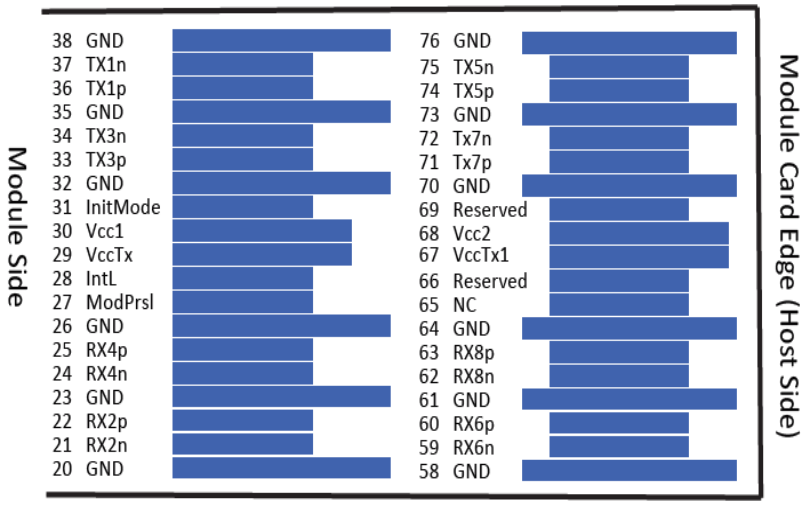
Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground.	1
2	CML-I	Tx2-	Transmitter Inverted Data Input.	
3	CML-I	Tx2+	Transmitter Non-Inverted Data Input.	
4		GND	Module Ground.	1
5	CML-I	Tx4-	Transmitter Inverted Data Input.	
6	CML-I	Tx4+	Transmitter Non-Inverted Data Input.	
7		GND	Module Ground.	1
8	LVTTL-I	ModSelL	Module Select.	
9	LVTTL-I	ResetL	Module Reset.	
10		VccRx	+3.3V Receiver Power Supply.	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	
13		GND	Module Ground.	1
14	CML-O	Rx3+	Receiver Non-Inverted Data Output.	
15	CML-O	Rx3-	Receiver Inverted Data Output.	
16		GND	Module Ground.	1
17	CML-O	Rx1+	Receiver Non-Inverted Data Output.	
18	CML-O	Rx1-	Receiver Inverted Data Output.	
19		GND	Module Ground.	1
20		GND	Module Ground.	1
21	CML-O	Rx2-	Receiver Inverted Data Output.	
22	CML-O	Rx2+	Receiver Non-Inverted Data Output.	
23		GND	Module Ground.	1
24	CML-O	Rx4-	Receiver Inverted Data Output.	
25	CML-O	Rx4+	Receiver Non-Inverted Data Output.	
26		GND	Module Ground.	1
27	LVTTL-O	ModPrsL	Module Present.	
28	LVTTL-O	IntL	Interrupt.	
29		VccTx	+3.3V Transmitter Power Supply.	2
30		Vcc1	+3.3V Power Supply.	2
31	LVTTL-I	InitMode	Initialization Mode.	
32		GND	Module Ground.	
33	CML-I	Tx3+	Transmitter Non-Inverted Data Input.	
34	CML-I	Tx3-	Transmitter Inverted Data Input.	
35		GND	Module Ground.	1
36	CML-I	Tx1+	Transmitter Non-Inverted Data Input.	
37	CML-I	Tx1-	Transmitter Inverted Data Input.	
38		GND	Module Ground.	1

Pin	Logic	Symbol	Name/Description	Notes
39		GND	Module Ground.	1
40	CML-I	Tx6-	Transmitter Inverted Data Input.	
41	CML-I	Tx6+	Transmitter Non-Inverted Data Input.	
42		GND	Module Ground.	1
43	CML-I	Tx8-	Transmitter Inverted Data Input.	
44	CML-I	Tx8+	Transmitter Non-Inverted Data Input.	
45		Reserved		
46		VS1	Module Vendor-Specific 1.	3
47		VccRx1	+3.3V Receiver Power Supply.	2
48		VS2	Module Vendor-Specific 2.	3
49		VS3	Module Vendor-Specific 3.	3
50		GND	Module Ground.	1
51	CML-O	Rx7+	Receiver Non-Inverted Data Output.	
52	CML-O	Rx7-	Receiver Inverted Data Output.	
53		GND	Module Ground.	1
54	CML-O	Rx5+	Receiver Non-Inverted Data Output.	
55	CML-O	Rx5-	Receiver Inverted Data Output.	
56		GND	Module Ground.	1
57		GND	Module Ground.	1
58	CML-O	Rx6-	Receiver Inverted Data Output.	
59	CML-O	Rx6+	Receiver Non-Inverted Data Output.	
60		GND	Module Ground.	1
61	CML-O	Rx8-	Receiver Inverted Data Output.	
62	CML-O	Rx8+	Receiver Non-Inverted Data Output.	
63		GND	Module Ground.	1
64		NC	No Connection.	1
65		Reserved		3
66		VccTx1	+3.3V Transmitter Power Supply.	2
67		Vcc2	+3.3V Power Supply.	2
68		Reserved		3
69		GND	Module Ground.	1
70	CML-I	Tx7+	Transmitter Non-Inverted Data Input.	
71	CML-I	Tx7-	Transmitter Inverted Data Input.	
72		GND	Module Ground.	1
73	CML-I	Tx5+	Transmitter Non-Inverted Data Input.	
74	CML-I	Tx5-	Transmitter Inverted Data Input.	
75		GND	Module Ground.	1
76		Reserved		

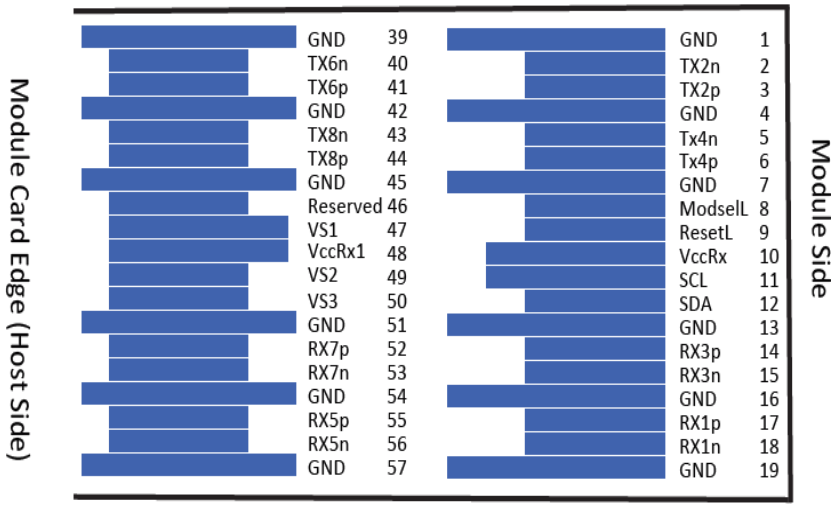
Notes:

1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common within the QSFP-DD module, and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 shall be applied concurrently.
3. All Vendor-Specific, Reserved, and No Connection pins may be terminated with 50Ω to ground on the host. Pad 65 (NC) shall be left unconnected within the module. Vendor-Specific and Reserved pads shall have an impedance to GND that is greater than 10kΩ and less than 100pF.

Electrical Pin-Out Details

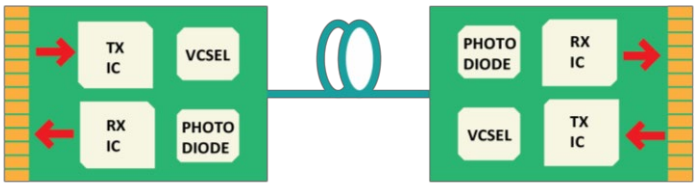


Top side viewed from top



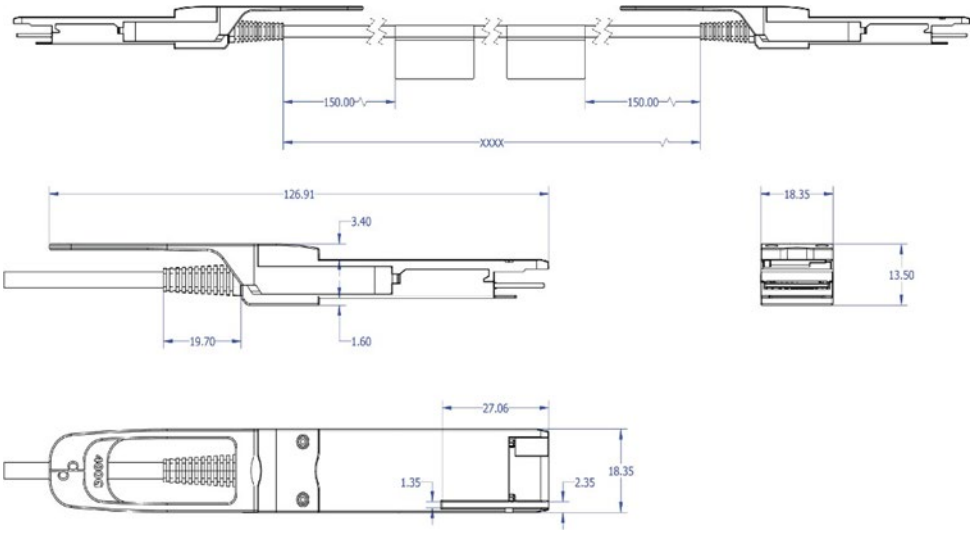
Bottom side viewed from bottom

Block Diagram



Mechanical Specifications

The 400G QSFP-DD AOC mechanical specifications are compliant with the QSFP-DD transceiver module specifications (as defined in QSFP-DD MSA), substituting the MPO receptacle with a fiber optics cable connecting both ends.



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.

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