

## Q56-2Q56-200GB-AOC29M-C

MSA and TAA 200GBase-AOC QSFP56 to 2xQSFP56 DSP Active Optical Cable (850nm, MMF, 29m)

### Features:

- 200G QSFP56 Breakout to 2x 100G QSFP56 (Half-populated)
- Four-Channel Parallel Active Optical Cable
- Multi-rate capability: Up to 53.125Gbps PAM4 or 26.5625Gbps NRZ Per Channel
- Low Power Dissipation: 4.5W per Cable End
- Single 3.3V Power Supply
- 4x50G PAM4 Retimed 200GAUI-4 Electrical Interface (Half-populated on the 100G Ends)
- Operating Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



### Applications:

- 200GBase Ethernet
- InfiniBand HDR

### Product Description

This is an MSA compliant 200GBase-AOC QSFP56 to 2xQSFP56 active optical cable that operates over multi-mode fiber with a maximum reach of 29.0m (95.1ft). 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' 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.")



## General Specifications

Parameter	Symbol	Min	Typ.	Max.	Unit	Notes
Storage Temperature	Tstg	-40		85	°C	1
Operating Case Temperature	Tc	0		70	°C	
Supply Voltage	Vcc	-0.5		4.0	V	
Relative Humidity (Non-Condensing)		15		85	%	
Aggregate Data Rate			212.5		Gbps	
Pre-FEC Bit Error Ratio	BER			10 <sup>-6</sup>		2
Maximum Power Consumption per End				5 (Retimed Tx)	W	3
Data Rate Per Lane	DR	26.5625 ± 100ppm			Gbd	4

### Notes:

1. Assumes no mechanical load force on the unit. Ensuring no mechanical load force requires a cable bend radius of >70 mm on the rest of the cable.
2. Tested with a PRBS 2<sup>31</sup>-1 test pattern.
3. Maximum total power value is specified across the full temperature and voltage range.
4. Supports InfiniBand HDR.

## Electrical Specifications

Parameter	Symbol	Min	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			1.59	A	
Power Consumption	P			4.5	W	1
<b>Transmitter</b>						
AC Common Mode Input Voltage Tolerance (RMS)				20	mV	
Differential Input Return Loss		Equation 27 Below			dB	2
Differential to Common Mode Reflection		Equation 28 Below			dB	2
Eye Height Tolerance, with Tx CDR enabled				32	mV	3
Eye Width Tolerance, with Tx CDR enabled				0.2	UI	3
DC Common Mode Input Voltage Tolerance		-350		2850	mV	4
<b>Receiver</b>						
Bit Error Rate				9E-6		
AC Common-mode Output Voltage (RMS)				20	mV	
Differential Unsigned Output Voltage		450			mV	5
Near-end Eye Symmetry Mask Width		0.265			UI	6
Near-end Differential Eye Height		70			mV	
Far-end Eye Symmetry Mask Width		0.2			UI	

<b>Far-end Differential Eye Height</b>	30			mV	
<b>Far-end Pre-cursor ISI Ratio</b>	-7		4	%	
<b>Common Mode Output Return Loss</b>	-2			dB	
<b>Differential Output Return Loss</b>	Equation 27 Below			dB	
<b>Common Mode to Differential Reflection</b>	Equation 28 Below			dB	
<b>Differential Termination Mismatch</b>			10	%	
<b>Transition Time (20% to 80%)</b>	9.5			ps	7
<b>DC Common Mode Voltage (minimum)</b>	-350		2850	mV	4

**Notes:**

1. Maximum total power value is specified across the full temperature and voltage range.
2. Ref: InfiniBand Architecture Specification Volume 2 Release 1.4.
3. Ref: CEI-04 16.3.10.3.1.2.
4. Referred to Signal Ground.
5. Hit Ratio=5E-5 with 100Ω load.
6. Ref: 802.3 120E.4.2.
7. PRBS13Q, see 120E.3.1.5 for positions in the pattern.

**Equation 27**

$$(S_{DDxx}(f)) \leq \begin{cases} -11, & 0.05 \leq f < 26.5625/7.5 \\ -6.0 + 9.2 \cdot \log 10\left(\frac{15 \cdot f}{7 \cdot 26.5625}\right), & 26.5625/7.5 \leq f \leq 26.5 \end{cases}$$

**Equation 28**

$$(S_{CD11}, S_{DC22}(f)) \leq \begin{cases} -25 + 20\left(\frac{f}{26.5625}\right), & 0.05 \leq f < 26.5625/2 \\ -18 + 6\left(\frac{f}{26.5625}\right), & 26.5625/2 \leq f < 26.5 \end{cases}$$

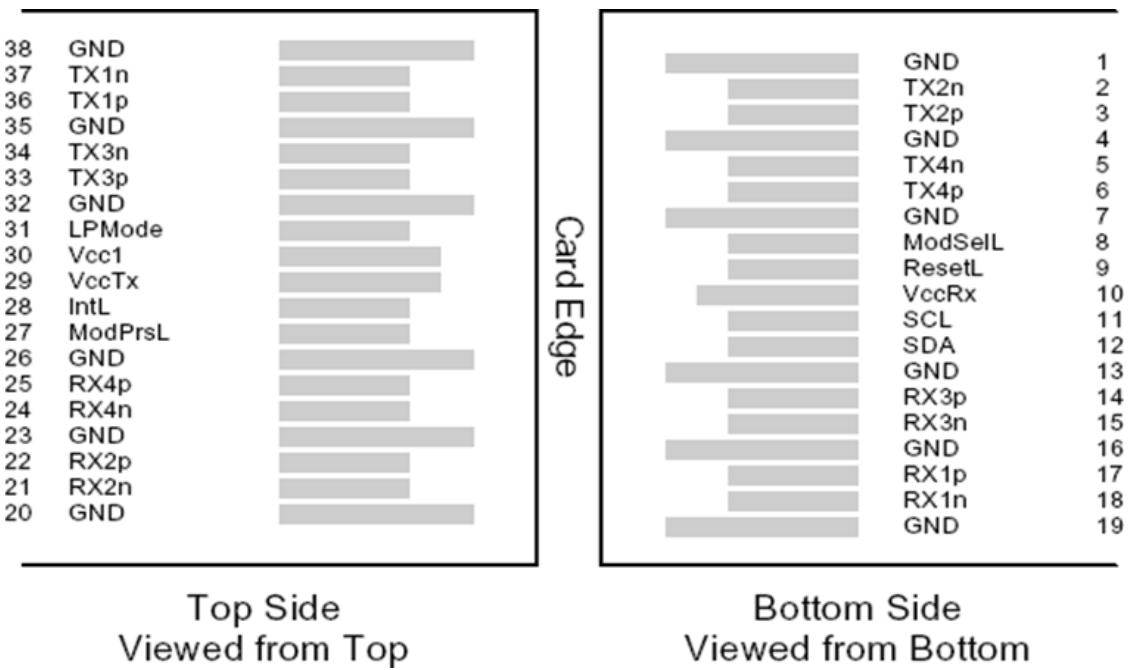
## Pin Descriptions

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

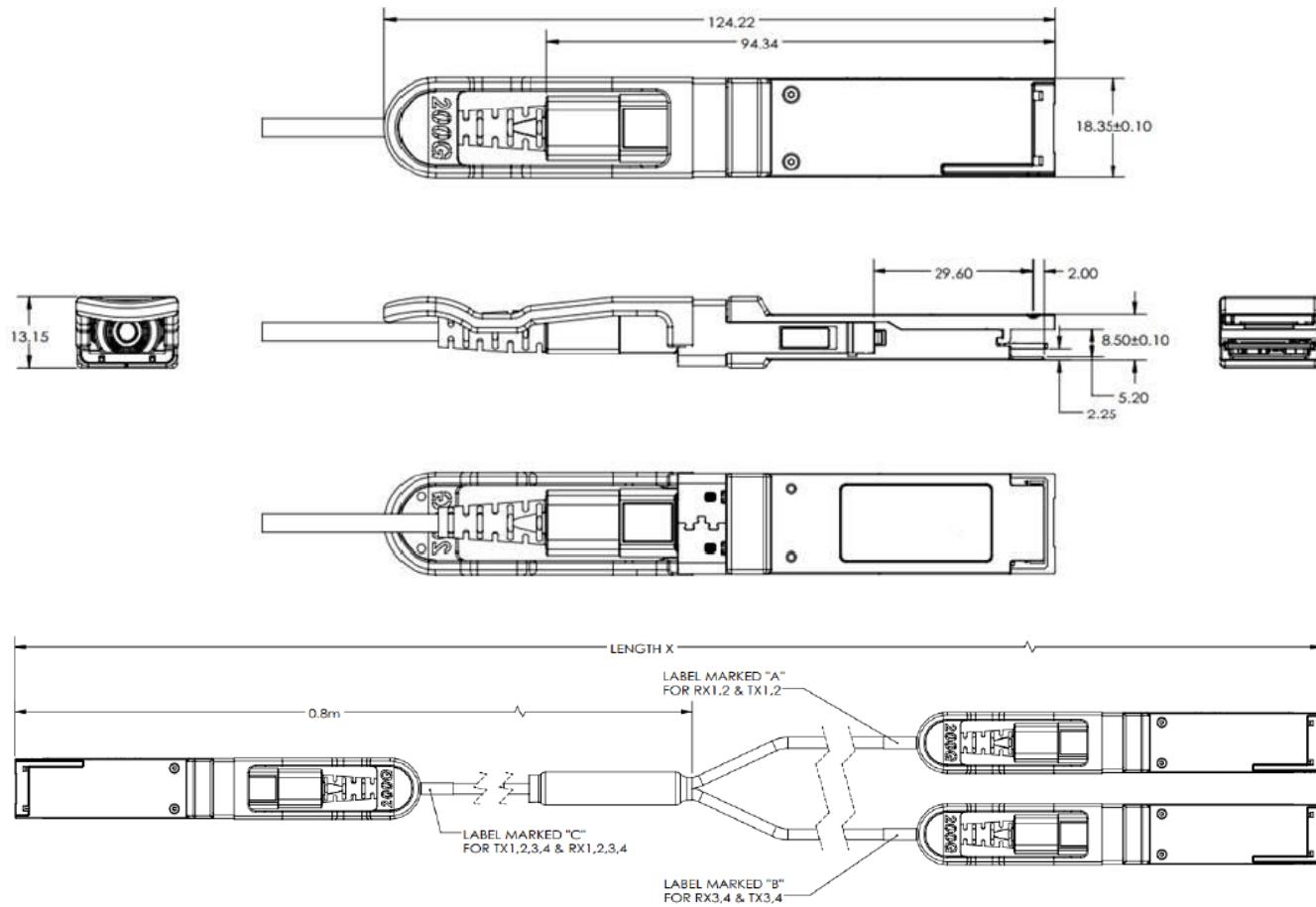
<b>36</b>	Tx1+	Transmitter Non-Inverted Data Input.	
<b>37</b>	Tx1-	Transmitter Inverted Data Input.	
<b>38</b>	GND	Module Ground.	1

**Notes:**

1. Circuit ground is internally isolated from chassis ground.



## Mechanical Specifications



## Active Optical Cable Dimensions

Mark "C"	Fiber	Mark "A"	Mark "B"
RX1	8	TX1	TX3
RX2	7	TX2	TX4
RX3	6	-	-
RX4	5	-	-
-	Fake Fiber	-	-
-	Fake Fiber	-	-
-	Fake Fiber	-	-
-	Fake Fiber	-	-
TX4	4	-	-
TX3	3	-	-
TX2	2	RX2	RX4
TX1	1	RX1	RX3

## About ProLabs

Our extensive experience comes as standard. For over 20 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 more than 100 optical switching and transport platforms.

## A 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 1.6T 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.

## The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. 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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