

## Q56-2Q56-200GB-AOC1M-AO

MSA and TAA 200GBase-AOC QSFP56 to 2xQSFP56 DSP Active Optical Cable (850nm, MMF, 1m)

### Features

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



### Applications

- InfiniBand HDR
- 200GBase Ethernet

### 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 1.0m (3.3ft). 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.

AddOn'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.")



## 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 Hight 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   |       |

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

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

#### Equation 28

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

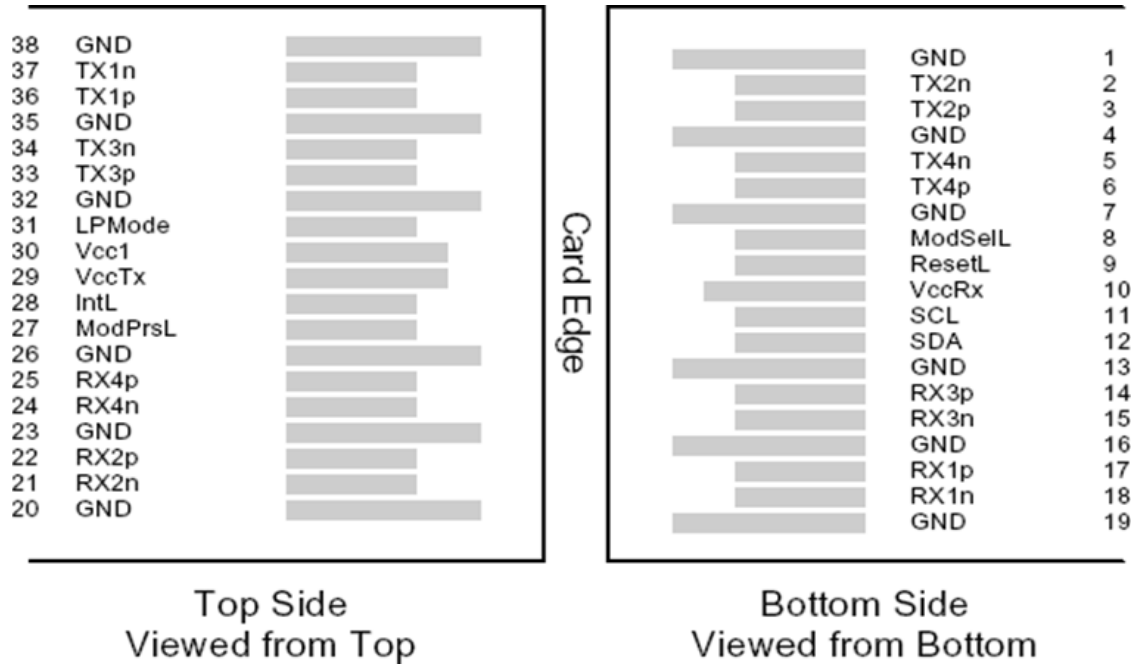
## Pin Descriptions

| 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 AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



## U.S. Headquarters

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

Telephone: +1 877.292.1701

Fax: 949.266.9273

## Europe Headquarters

Email: [salesupportemea@addonnetworks.com](mailto:salesupportemea@addonnetworks.com)

Telephone: +44 1285 842070