

160-9460-005-C

Ciena 160-9460-005 Compatible TAA Compliant 100GBase-AOC QSFP28 to QSFP28 OTU4 Active Optical Cable (850nm, MMF, 5m)

Features:

- Compliant to standard SFF-8636 QSFP28 active optical modules
- Compliant to 100GE/OTU4
- Automatic power down while broken cable is detected to improve eye safety
- Supports up to 4x28 Gbps bi-directional operation
- Low power consumption: less than 2.5W
- Reliable VCSEL and PIN photonic devices
- I2C standard management interface
- Excellent high speed signal integrity
- Operating case temperature: 0 to 70 Celsius
- RoHS Complaint and Lead-Free



Applications:

- 100GBase Ethernet
- Proprietary high speed, high density data
- High performance computing, server and data storage

Product Description

This is a Ciena® 160-9460-005 Compatible 112GBase-AOC QSFP28 to QSFP28 active optical cable that operates over active fiber 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.

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."



Absolute Maximum Ratings

| Parameter | Symbol | Min | Typ. | Max. | Unit |
|----------------------------|--------|-----|---------|---------|------|
| Supply Voltage | Vcc | 0 | | 3.6 | V |
| Relative Humidity | RH | 5 | | 85 | % |
| Storage Temperature | Tstg | -40 | | 85 | °C |
| Operating Case Temperature | Tc | 0 | 25 | 70 | °C |
| Data Rate per Channel | | | 4*25.78 | 4*27.95 | Gbps |

Electrical Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|---------------------|--------|-------|-----|-------|------|-------|
| Supply Voltage | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Supply Current | Icc | | | 750 | mA | |
| Power Dissipation | PD | | | 2500 | mW | |
| Clock Rate-I2C | f | | | 400 | kHz | 1 |
| Module Turn-on time | | | | 2000 | ms | 2 |

Notes:

1. For management interface.
2. Time from module power-on / insertion/ ResetL de-assert to module full functional.

Optical Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|---|---------|-----|---------|---------|------|-------|
| Transmitter | | | | | | |
| Reference Differential Input Impedance | Zd | | 100 | | Ω | 1 |
| Optical Return Loss Tolerance | | | | 12 | dB | |
| Differential Data Input Swing | Vin_pp | 180 | | 1200 | mV | |
| Differential Data Input Threshold | | | 50 | | mV | 2 |
| Receiver | | | | | | |
| Reference Differential Input Impedance | Zd | | 100 | | Ω | 3 |
| Differential Data Output Swing | Vout_pp | 0 | | 800 | mV | |
| Pre-emphasis Pulse Amplitude | | 0 | | | % | 4 |
| Percentage | | 10 | | | % | |
| | | 20 | | | % | |
| | | 40 | | | % | |
| Pre-emphasis Pulse Duration | | | 30 | | ps | |
| Signal Speed | | | 4*25.78 | 4*27.95 | Gbps | 5 |
| Differential Data Output Swing | | 300 | | 850 | mV | |
| Differential Data Output Swing When Squelched | | | | 50 | mV | |
| Rise / Fall Time (20% to 80%) | | 24 | | | ps | |
| Receiver Overload (Pavg) | POL | 2.5 | | | dBm | |
| Damage Threshold | POL | 3.4 | | | dBm | |

Notes:

1. AC coupled inside AOC module.
2. Input swing to trigger TX-squelch.
3. AC coupled inside AOC module.
4. User selectable. Percentage is the ratio of pre-emphasis amplitude to output swing. Users could change by writing to page 3 address 237, default value is "10."
5. BER is 5.0E-5.

Pin Descriptions

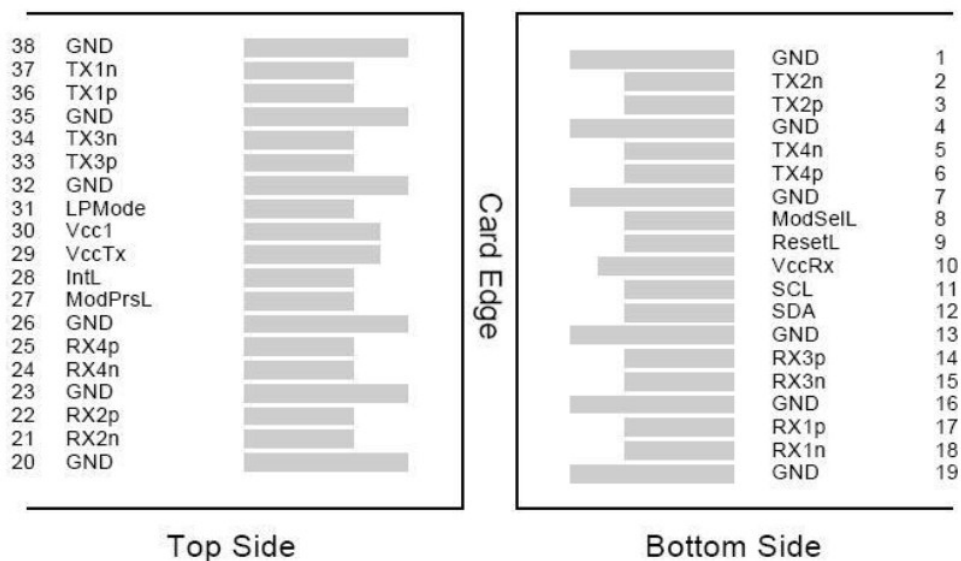
| Pin | Symbol | Description | Notes |
|-----|---------|--|-------|
| 1 | GND | Transmitter Ground. Common with Receiver Ground. | 1 |
| 2 | Tx2- | Transmitter Inverted Data Input. | |
| 3 | Tx2+ | Transmitter Non-Inverted Data output. | |
| 4 | GND | Transmitter Ground. Common with Receiver Ground.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

| | | | |
|----|------|--|---|
| 35 | GND | Transmitter Ground. Common with Receiver Ground. | 1 |
| 36 | Tx1+ | Transmitter Non-Inverted Data Input. | |
| 37 | Tx1- | Transmitter Inverted Data Output. | |
| 38 | GND | Transmitter Ground. Common with Receiver Ground. | 1 |

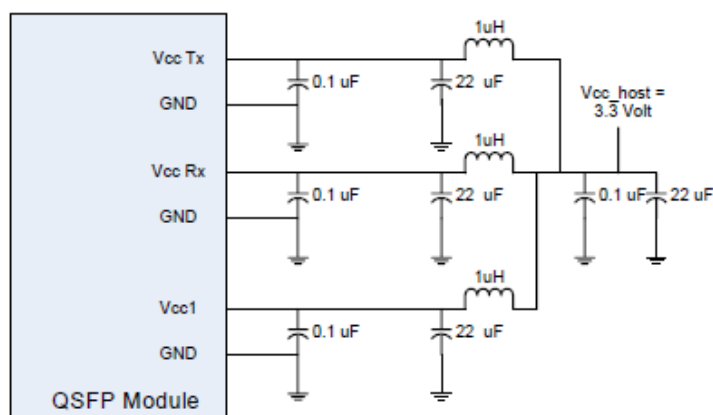
Note:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7kΩ to 10kΩ pull-up resistor to VccHost.

Electrical Pin-Out Details

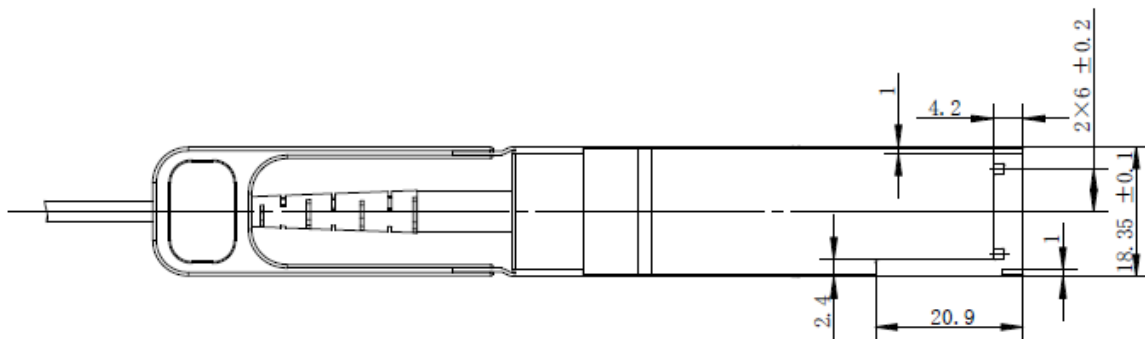
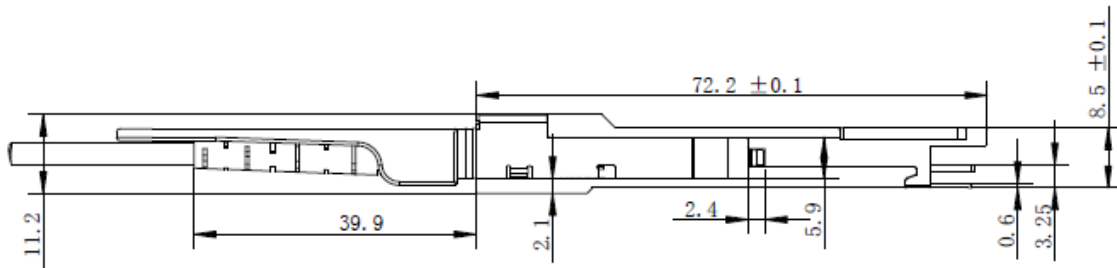
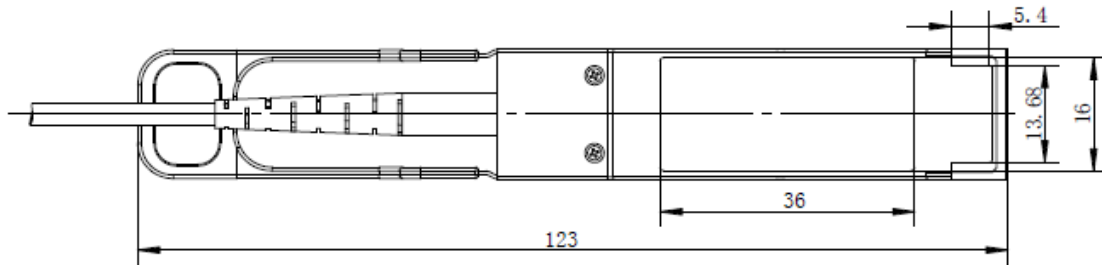


Recommended Application Interface Circuit



Mechanical Specifications

| Parameter | Symbol | Min | Typ | Max | Unit | Notes |
|---|--------|------------|-----|------------|--------|-------|
| AOC cable length (L ≤ 5m) | L | L-0.06 | L | L+0.06 | M | |
| AOC cable length (L > 5m) | L | L-(L*1.1%) | L | L+(L*1.1%) | M | |
| Module Retention | | 90 | | 170 | N | |
| Module Insertion | | 0 | | 18 | N | |
| Module Extraction | | 0 | | 25 | N | |
| Cable Pull Strength – Apply Load at 0° | | 44 | | | N | |
| Cable Pull Strength – Apply Load at 90° | | 33 | | | N | |
| Clearance Out of IO Bezel | | 75 | | | nm | |
| Cable Bending Radius | | 3 | | | cm | |
| Insertion / Removal Cycles | | 50 | | | Cycles | |



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.



Contact Information

ProLabs US

Email: sales@prolabs.com

Telephone: 952-852-0252

ProLabs UK

Email: salesupport@prolabs.com

Telephone: +44 1285 719 600