



## DAOQQM05C10D79D

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

### Product Description

This is a Ciena 160-9460-005 compatible 100GBase-AOC QSFP28 to QSFP28 OTU4 active optical cable that operates over multi-mode fiber with a maximum reach of 5.0m (16.4ft). 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 built to comply with MSA (Multi-Source Agreement) standards. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

### Features:

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



### Applications:

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

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*For your product safety, please read the following information carefully before any manipulation of the transceiver:*



#### **ESD**

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



#### **LASER SAFETY**

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

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### 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 |
|-----------------------------------------------|---------|-----|---------|---------|------|-------|
| <b>Transmitter</b>                            |         |     |         |         |      |       |
| 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     |
| <b>Receiver</b>                               |         |     |         |         |      |       |
| 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

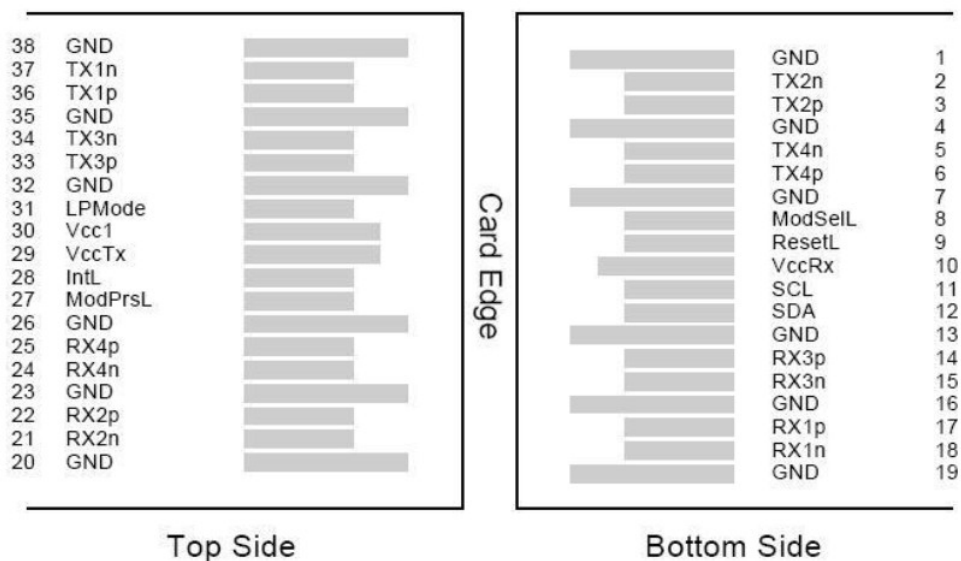
| Pin | Symbol  | Description                                      | Notes |
|-----|---------|--------------------------------------------------|-------|
| 1   | GND     | Transmitter Ground. Common with Receiver Ground. | 1     |
| 2   | Tx2-    | Transmitter Inverted Data Input.                 |       |
| 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 |

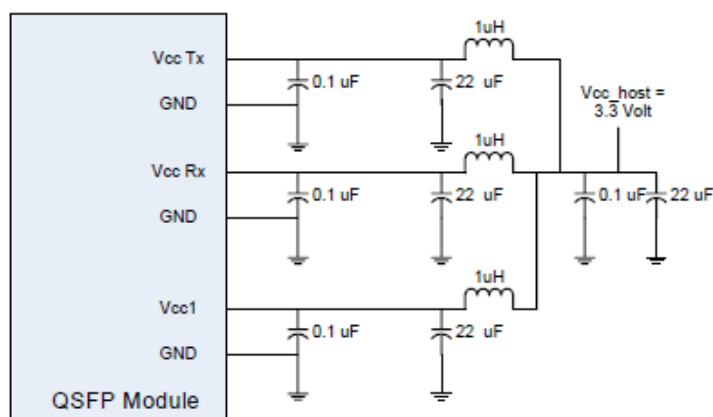
**Note:**

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**

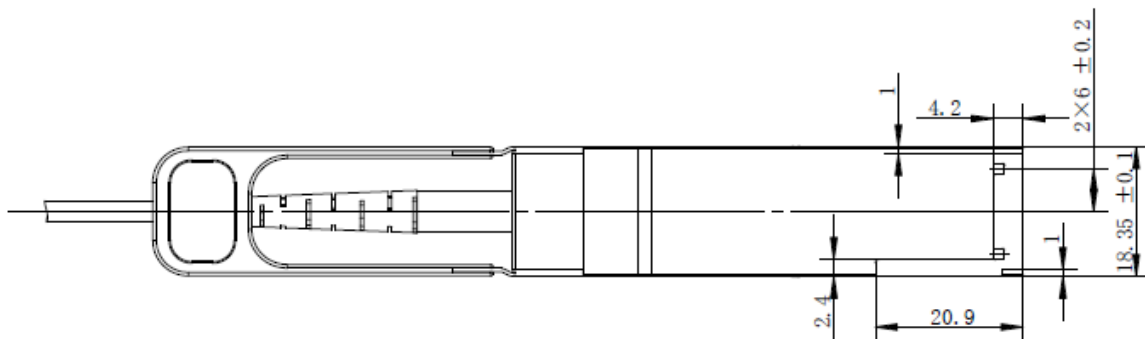
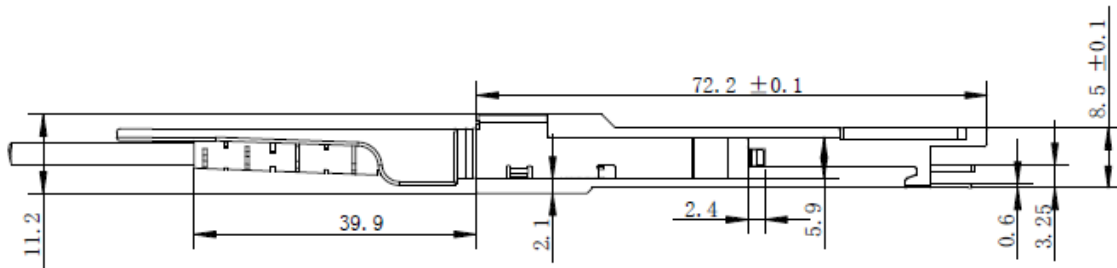
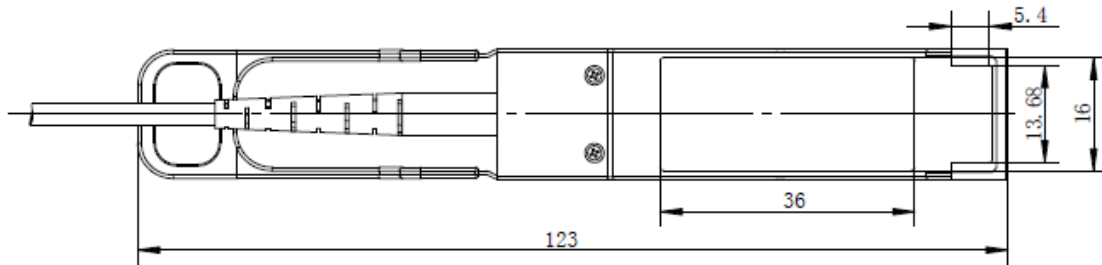


**Recommended Application Interface Circuit**



## 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 Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

