



## MFA1A00-E015-SKY

Mellanox® MFA1A00-E015 Compatible 100GBase-AOC QSFP28 Active Optical Cable (850nm, MMF, 15m)

### Product Description

This is a Mellanox® MFA1A00-E015 compatible 100GBase-AOC QSFP28 active optical cable that operates over multi-mode fiber with a maximum reach of 15.0m (49.2ft). 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:

- QSFP28 MSA compliant
- Supports 103.1Gbps aggregate bit rate
- Four independent full-duplex channels
- 4x25G electrical interface (OIF CEI-28G-VSR)
- Single 3.3V power supply
- Operating case temperature: 0 to 70 Celsius
- RoHS Compliant and Lead Free
- Maximum power consumption 2.5W each terminal



### Applications:

- 100GBase Ethernet
- InfiniBand EDR

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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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## General Specifications

| Parameter                          | Symbol | Min. | Typ. | Max. | Unit |
|------------------------------------|--------|------|------|------|------|
| Storage Temperature                | Tstg   | -40  |      | 85   | °C   |
| Operating Case Temperature         | Tc     | 0    |      | 70   |      |
| Power Supply Voltage               | Vcc    | -0.5 |      | 3.6  | V    |
| Relative Humidity (Non-Condensing) | RH     | 0    |      | 85   | %    |

## Electrical Characteristics

| Parameter                                                                         | Test Point | Min.                                | Typ.     | Max.                           | Unit | Notes   |
|-----------------------------------------------------------------------------------|------------|-------------------------------------|----------|--------------------------------|------|---------|
| Power Consumption                                                                 |            |                                     |          | 2.5                            | W    | 1       |
| Supply Current                                                                    | Icc        |                                     |          | 757                            | mA   | 1       |
| Power Supply Voltage                                                              | Vcc        | 3.135                               | 3.3      | 3.465                          | V    |         |
| Data Rate Per Lane                                                                |            |                                     | 25.78125 |                                | Gbps |         |
| Data Rate Accuracy                                                                |            | -100                                |          | 100                            | ppm  |         |
| Control Input Voltage - High                                                      |            | 2                                   |          | Vcc                            | V    |         |
| Control Input Voltage - Low                                                       |            | 0                                   |          | 0.8                            | V    |         |
| Transmitter (Per Lane)                                                            |            |                                     |          |                                |      |         |
| Overload Differential Voltage                                                     | TP1a       | 900                                 |          |                                | mV   |         |
| Common-Mode Voltage (Vcm)                                                         | TP1        | -350                                |          | 2825                           | mV   | 2       |
| Differential Termination Resistance Mismatch                                      | TP1        |                                     |          | 10                             | %    | At 1MHz |
| Differential Return Loss (SDD11)                                                  | TP1        |                                     |          | See CEI-28G0VSR Equation 13-19 | dB   |         |
| Common-Mode to Differential Conversion and Differential to Common-Mode Conversion | TP1        |                                     |          | See CEI-28G-VSR Equation 13-20 | dB   |         |
| Stressed Input Test                                                               | TP1a       | See CEI-28G-VSR Section 13.3.11.2.1 |          |                                |      |         |
| Receiver (Per Lane)                                                               |            |                                     |          |                                |      |         |
| Differential Voltage (Pk-Pk)                                                      | TP4        |                                     |          | 900                            | mV   |         |
| Common-Mode Voltage (Vcm)                                                         | TP4        | -350                                |          | 2850                           | mV   | 2       |
| Common-Mode Noise (RMS)                                                           | TP4        |                                     |          | 17.5                           | mV   |         |
| Differential Termination Resistance Mismatch                                      | TP4        |                                     |          | 10                             | %    | At 1MHz |

|                                                                                           |     |      |  |                                |    |   |
|-------------------------------------------------------------------------------------------|-----|------|--|--------------------------------|----|---|
| Differential Return Loss (SDD22)                                                          | TP4 |      |  | See CEI-28G-VSR Equation 13-19 | dB |   |
| Common-Mode to Differential Conversion and Differential to Common-Mode Conversion (SCC22) | TP4 |      |  | -2                             | dB | 3 |
| Transition Time (20-80%)                                                                  | TP4 | 9.5  |  |                                | ps |   |
| Vertical Eye Closure (VEC)                                                                | TP4 |      |  | 5.5                            | dB |   |
| Eye Width at 10 <sup>-15</sup> Probability (EW15)                                         | TP4 | 0.57 |  |                                | UI |   |
| Eye Height at 10 <sup>-15</sup> Probability (EH15)                                        | TP4 | 0.57 |  |                                | UI |   |

#### Notes:

1. Per terminal.
2. Vcm is generated by the host. Specification includes the effects of ground offset voltage.
3. From 250MHz to 30GHz.

#### 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.                       | 2     |
| 9   | LVTTL-I     | ResetL  | Module Reset.                        | 2     |
| 10  |             | VccRx   | +3.3V Receiver Power Supply.         |       |
| 11  | LVC MOS-I   | SCL     | 2-Wire Serial Interface Clock.       | 2     |
| 12  | LVC MOS-I/O | SDA     | 2-Wire Serial Interface Data.        | 2     |
| 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. Internally pulled down to the GND.      |   |
| 28 | LVTTL-O | IntL    | Interrupt output should be pulled up on the host board. | 2 |
| 29 |         | VccTx   | +3.3V Transmitter Power Supply.                         |   |
| 30 |         | Vcc1    | +3.3V Power Supply.                                     |   |
| 31 | LVTTL-I | LPMODE  | Low-Power Mode.                                         | 2 |
| 32 |         | GND     | Module Ground.                                          | 1 |
| 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 |

#### Notes:

1. The module circuit ground is isolated from the module chassis ground within the module.
2. Open collector. Should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 3.15V and 3.6V.

#### Electrical Pin-Out Details



Recommended Power Supply Filter



Block Diagram



Mechanical Specifications



# 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.

