



## OFAO2M04F000AED

Mellanox® MCA7J60-N004 Compatible 800GBase-CU OSFP112 to 2xOSFP112-RHS Direct Attach Cable (Active Twinax, 4m, Infiniband)

### Product Description

This is a Mellanox® compatible 800GBase-CU OSFP112 to 2xOSFP112-RHS direct attach cable that operates over active copper with a maximum reach of 4.0m (13.1ft). It has been programmed, uniquely serialized, and data-traffic and application tested to ensure it is 100% compliant and functional. This direct attach 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:

- OSFP Module Compliant to MSA Standards
- InfiniBand NDR Compatible
- Transmission Data Rate Up to PAM4 106.25Gbps Per Channel
- Enable Auto-Negotiation and Link Training
- Linear PAM4 Programmable Equalizer Optimized for 56GBaud Copper Link
- Low Power Consumption
- 3.3V Power Supply
- Supports Device Programming by MCU with I2C
- Operating Temperature Range: 0 to 70 Celsius
- Low Latency: 10ps
- RoHS Compliant and Lead-Free



### Applications:

- 800GBase Ethernet

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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   | °C   |
| Supply Voltage              | Vcc    | -0.3 | 3.3  | 3.6  | V    |
| Relative Operating Humidity | RH     | 5    |      | 85   | %    |
| Data Rate                   | DR     |      | 800  |      | Gbps |

## Physical Characteristics

| Parameter       | Symbol | Min.                                     | Typ. | Max. | Unit | Notes |
|-----------------|--------|------------------------------------------|------|------|------|-------|
| Length          | L      |                                          |      | 4    | M    |       |
| AWG             |        |                                          | 25   |      | AWG  |       |
| Jacket Material |        | Plastic Braided Mesh Technology Net, Red |      |      |      |       |

## Electrical Specifications

| Parameter                                   | Symbol      | Min.                                                                                                                         | Typ. | Max.     | Unit  | Notes |
|---------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------|------|----------|-------|-------|
| Power Supply Voltage                        | Vcc         | 3.1                                                                                                                          | 3.3  | 3.5      | V     |       |
| Input Amplitude                             |             | 800                                                                                                                          |      | 1200     | mVp-p |       |
| Input Low Voltage                           | VIL         | -0.3                                                                                                                         |      | 0.35*Vcc | V     |       |
| Input High Voltage                          | VIH         | 0.65*Vcc                                                                                                                     |      | Vcc+0.3  | V     |       |
| Output Logic Low                            | VOL         |                                                                                                                              |      | 0.25*Vcc | V     |       |
| I2C Master Mode Output Frequency            |             |                                                                                                                              | 400  |          | kHz   |       |
| 800G End Power Consumption                  |             |                                                                                                                              | 1.2  | 1.5      | W     |       |
| 400G End Power Consumption                  |             |                                                                                                                              | 0.6  | 0.7      | W     |       |
| Raw Cable Impedance                         | Zca         | 90                                                                                                                           | 100  | 110      | Ω     |       |
| Mated Connector Impedance                   | Zmated      | 85                                                                                                                           |      | 115      | Ω     |       |
| Maximum Insertion Loss @26.56GHz            | SDD21       | 11                                                                                                                           |      | 19.75    | dB    |       |
| Differential to Common-Mode Return Loss     | SDD11/22    | $RL_{cd}(f) \geq \begin{cases} 22 - 10(f/26.56) & 0.05 \leq f < 26.56 \\ 15 - 3(f/26.76) & 26.56 \leq f \leq 40 \end{cases}$ |      |          | dB    | 1     |
| Differential to Common-Mode Conversion Loss | SCD21-SDD21 | $Conversion\_loss(f) - \begin{cases} 10 & 0.05 \leq f < 12.89 \\ 14 - 0.3108f & 12.89 \leq f \leq 40 \end{cases}$            |      |          | dB    | 1     |
| Common-Mode to Common-Mode Return Loss      | SCC11/22    | $RL_{cc}(f) \geq 1.08$                                                                                                       |      |          | dB    | 1     |
| Minimum COM                                 | COM         | 3                                                                                                                            |      |          | dB    |       |

|                        |     |      |  |                      |    |  |
|------------------------|-----|------|--|----------------------|----|--|
| Minimum Cable Assembly | ERL | 8.25 |  |                      | dB |  |
| BER                    |     |      |  | $2.4 \times 10^{-4}$ |    |  |

**Notes:**

1. For  $0.05 \leq f \leq 40$ GHz, where f is the frequency in GHz.

**Pin Descriptions**

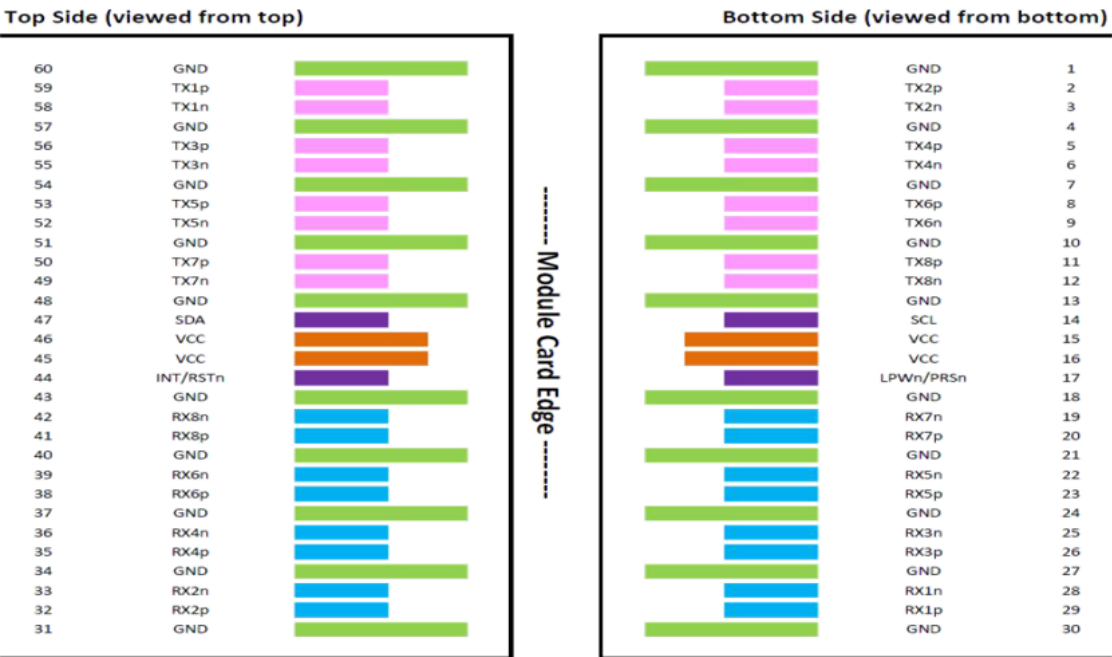
| Pin | Symbol    | Name/Description               | Logic       | Plug Sequence | Direction       | Notes |
|-----|-----------|--------------------------------|-------------|---------------|-----------------|-------|
| 1   | GND       | Module Ground.                 |             | 1             |                 |       |
| 2   | Tx2+      | Transmitter Data Non-Inverted. | CML-I       | 3             | Input from Host |       |
| 3   | Tx2-      | Transmitter Data Inverted.     | CML-I       | 3             | Input from Host |       |
| 4   | GND       | Module Ground.                 |             | 1             |                 |       |
| 5   | Tx4+      | Transmitter Data Non-Inverted. | CML-I       | 3             | Input from Host |       |
| 6   | Tx4-      | Transmitter Data Inverted.     | CML-I       | 3             | Input from Host |       |
| 7   | GND       | Module Ground.                 |             | 1             |                 |       |
| 8   | Tx6+      | Transmitter Data Non-Inverted. | CML-I       | 3             | Input from Host |       |
| 9   | Tx6-      | Transmitter Data Inverted.     | CML-I       | 3             | Input from Host |       |
| 10  | GND       | Module Ground.                 |             | 1             |                 |       |
| 11  | Tx8+      | Transmitter Data Non-Inverted. | CML-I       | 3             | Input from Host |       |
| 12  | Tx8-      | Transmitter Data Inverted.     | CML-I       | 3             | Input from Host |       |
| 13  | GND       | Module Ground.                 |             | 1             |                 |       |
| 14  | SCL       | 2-Wire Serial Interface Clock. | LVC MOS-I/O | 3             | Bi-Directional  | 1     |
| 15  | Vcc       | +3.3V Power.                   |             | 2             | Power from Host |       |
| 16  | Vcc       | +3.3V Power.                   |             | 2             | Power from Host |       |
| 17  | LPWn/PRSn | Low-Power Mode/Module Present. | Multi-Level | 3             | Bi-Directional  | 2     |
| 18  | GND       | Module Ground.                 |             | 1             |                 |       |
| 19  | Rx7-      | Receiver Data Inverted.        | CML-O       | 3             | Output to Host  |       |
| 20  | Rx7+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output to Host  |       |
| 21  | GND       | Module Ground.                 |             | 1             |                 |       |
| 22  | Rx5-      | Receiver Data Inverted.        | CML-O       | 3             | Output to Host  |       |
| 23  | Rx5+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output to Host  |       |
| 24  | GND       | Module Ground.                 |             | 1             |                 |       |
| 25  | Rx3-      | Receiver Data Inverted.        | CML-O       | 3             | Output to Host  |       |
| 26  | Rx3+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output to Host  |       |
| 27  | GND       | Module Ground.                 |             | 1             |                 |       |
| 28  | Rx1-      | Receiver Data Inverted.        | CML-O       | 3             | Output to Host  |       |
| 29  | Rx1+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output to Host  |       |

|    |          |                                |             |   |                 |   |
|----|----------|--------------------------------|-------------|---|-----------------|---|
| 30 | GND      | Module Ground.                 |             | 1 |                 |   |
| 31 | GND      | Module Ground.                 |             | 1 |                 |   |
| 32 | Rx2+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output to Host  |   |
| 33 | Rx2-     | Receiver Data Inverted.        | CML-O       | 3 | Output to Host  |   |
| 34 | GND      | Module Ground.                 |             | 1 |                 |   |
| 35 | Rx4+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output to Host  |   |
| 36 | Rx4-     | Receiver Data Inverted.        | CML-O       | 3 | Output to Host  |   |
| 37 | GND      | Module Ground.                 |             | 1 |                 |   |
| 38 | Rx6+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output to Host  |   |
| 39 | Rx6-     | Receiver Data Inverted.        | CML-O       | 3 | Output to Host  |   |
| 40 | GND      | Module Ground.                 |             | 1 |                 |   |
| 41 | Rx8+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output to Host  |   |
| 42 | Rx8-     | Receiver Data Inverted.        | CML-O       | 3 | Output to Host  |   |
| 43 | GND      | Module Ground.                 |             | 1 |                 |   |
| 44 | INT/RSTn | Module Interrupt/Module Reset. | Multi-Level | 3 | Bi-Directional  | 2 |
| 45 | Vcc      | +3.3V Power.                   |             | 2 | Power from Host |   |
| 46 | Vcc      | +3.3V Power.                   |             | 2 | Power from Host |   |
| 47 | SDA      | 2-Wire Serial Interface Data.  | LVC MOS-I/O | 3 | Bi-Directional  | 1 |
| 48 | GND      | Module Ground.                 |             | 1 |                 |   |
| 49 | Tx7-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 50 | Tx7+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 51 | GND      | Module Ground.                 |             | 1 |                 |   |
| 52 | Tx5-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 53 | Tx5+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 54 | GND      | Module Ground.                 |             | 1 |                 |   |
| 55 | Tx3-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 56 | Tx3+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 57 | GND      | Module Ground.                 |             | 1 |                 |   |
| 58 | Tx1-     | Transmitter Data Inverted.     | CML-I       | 3 | Input from Host |   |
| 59 | Tx1+     | Transmitter Data Non-Inverted. | CML-I       | 3 | Input from Host |   |
| 60 | GND      | Module Ground.                 |             | 1 |                 |   |

**Notes:**

1. Open-drain with pull-up resistor on the Host.
2. See “Pin Assignment” below for the required circuit.

Pin Assignments

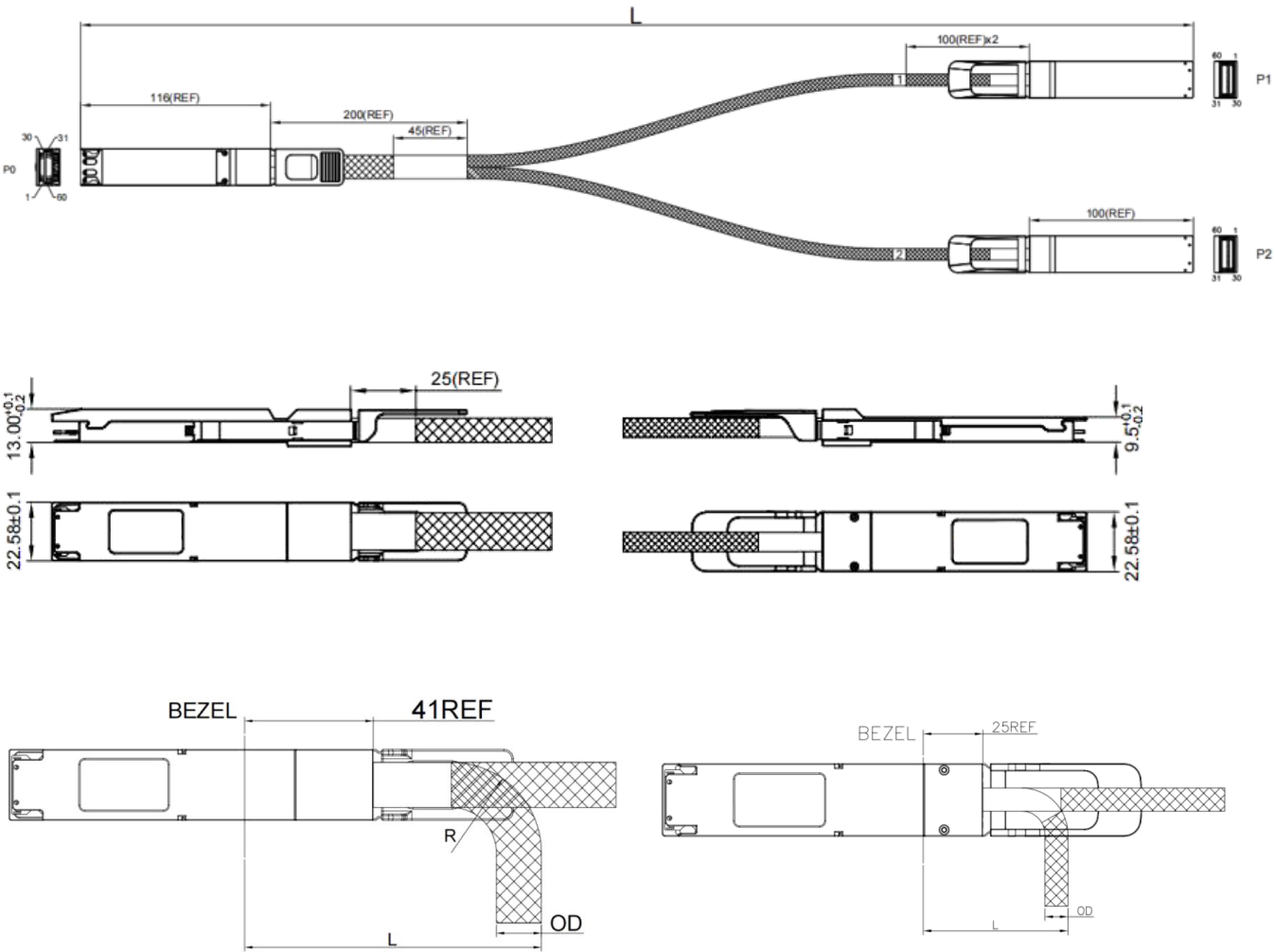


Wiring Diagram

| WIRING DIAGRAM                                                                    |      |   |                                                                                   |      |  |
|-----------------------------------------------------------------------------------|------|---|-----------------------------------------------------------------------------------|------|--|
| P0 END                                                                            |      |   | P1 END                                                                            |      |  |
| 58                                                                                | TX1n | → | 28                                                                                | RX1n |  |
| 59                                                                                | TX1p | → | 29                                                                                | RX1p |  |
| 28                                                                                | RX1n | ← | 58                                                                                | TX1n |  |
| 29                                                                                | RX1p | ← | 59                                                                                | TX1p |  |
| 2                                                                                 | TX2p | → | 32                                                                                | RX2p |  |
| 3                                                                                 | TX2n | → | 33                                                                                | RX2n |  |
| 32                                                                                | RX2p | ← | 2                                                                                 | TX2p |  |
| 33                                                                                | RX2n | ← | 3                                                                                 | TX2n |  |
| 55                                                                                | TX3n | → | 25                                                                                | RX3n |  |
| 56                                                                                | TX3p | → | 26                                                                                | RX3p |  |
| 25                                                                                | RX3n | ← | 55                                                                                | TX3n |  |
| 26                                                                                | RX3p | ← | 56                                                                                | TX3p |  |
| 5                                                                                 | TX4p | → | 35                                                                                | RX4p |  |
| 6                                                                                 | TX4n | → | 36                                                                                | RX4n |  |
| 35                                                                                | RX4p | ← | 5                                                                                 | TX4p |  |
| 36                                                                                | RX4n | ← | 6                                                                                 | TX4n |  |
| GND GROUP<br>1/4/7/10/13/18/<br>21/24/27/30/31/<br>34/37/40/43/48/<br>51/54/57/60 |      |   | GND GROUP<br>1/4/7/10/13/18/<br>21/24/27/30/31/<br>34/37/40/43/48/<br>51/54/57/60 |      |  |
| SHELL—SHIELDING—SHELL                                                             |      |   |                                                                                   |      |  |

| WIRING DIAGRAM                                                                    |      |   |                                                                                   |      |  |
|-----------------------------------------------------------------------------------|------|---|-----------------------------------------------------------------------------------|------|--|
| P0 END                                                                            |      |   | P2 END                                                                            |      |  |
| 52                                                                                | TX5n | → | 28                                                                                | RX1n |  |
| 53                                                                                | TX5p | → | 29                                                                                | RX1p |  |
| 22                                                                                | RX5n | ← | 58                                                                                | TX1n |  |
| 23                                                                                | RX5p | ← | 59                                                                                | TX1p |  |
| 8                                                                                 | TX6p | → | 32                                                                                | RX2p |  |
| 9                                                                                 | TX6n | → | 33                                                                                | RX2n |  |
| 38                                                                                | RX6p | ← | 2                                                                                 | TX2p |  |
| 39                                                                                | RX6n | ← | 3                                                                                 | TX2n |  |
| 49                                                                                | TX7n | → | 25                                                                                | RX3n |  |
| 50                                                                                | TX7p | → | 26                                                                                | RX3p |  |
| 19                                                                                | RX7n | ← | 55                                                                                | TX3n |  |
| 20                                                                                | RX7p | ← | 56                                                                                | TX3p |  |
| 11                                                                                | TX8p | → | 35                                                                                | RX4p |  |
| 12                                                                                | TX8n | → | 36                                                                                | RX4n |  |
| 41                                                                                | RX8p | ← | 5                                                                                 | TX4p |  |
| 42                                                                                | RX8n | ← | 6                                                                                 | TX4n |  |
| GND GROUP<br>1/4/7/10/13/18/<br>21/24/27/30/31/<br>34/37/40/43/48/<br>51/54/57/60 |      |   | GND GROUP<br>1/4/7/10/13/18/<br>21/24/27/30/31/<br>34/37/40/43/48/<br>51/54/57/60 |      |  |
| SHELL—SHIELDING—SHELL                                                             |      |   |                                                                                   |      |  |

Mechanical Specifications



Bending Radius

| 800G OSFP  |        |                    |                         | OSFP RHS   |       |                    |                         |
|------------|--------|--------------------|-------------------------|------------|-------|--------------------|-------------------------|
| Wire Gauge | OD     | Bend Radius<br>"R" | Min. Bend Radius<br>"L" | Wire Gauge | OD    | Bend Radius<br>"R" | Min. Bend Radius<br>"L" |
| 25AWG      | 12.1mm | 25mm               | 86mm                    | 25AWG      | 8.3mm | 17mm               | 65mm                    |

# 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.

