

## OSFPRHS-400GB-P1M-NDR-MX-AO

Mellanox® Compatible TAA 400GBase-CU OSFP-RHS to OSFP-RHS Direct Attach Cable (Passive Twinax, 1m, NDR)

### Features

- OSFP-RHS Module Compliant to OSFP MSA
- Enable 400Gbps to 400Gbps Transmission (4x100G, CH1-CH4)
- Transmission Data Rate Up to PAM4 106.25Gbps Per Channel
- Operating Temperature Range: 0 to 70 Celsius
- RoHS Compliant and Lead-Free
- Built-In EEPROM Functions



### Applications

- 400GBase Ethernet

### Product Description

This is a Mellanox® Compatible 400GBase-CU OSFP-RHS to OSFP-RHS direct attach cable that operates over passive copper with a maximum reach of 1m. 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.

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 |
|-----------------------------|--------|------|------|------|------|
| Storage Temperature         | Tstg   | -40  |      | 85   | °C   |
| Operating Case Temperature  | Tc     | 0    |      | 70   | °C   |
| Supply Voltage              | Vcc    | 3.13 | 3.3  | 3.47 | V    |
| Relative Operating Humidity | RH     | 5    |      | 85   | %    |
| Data Rate                   | DR     |      | 400  |      | Gbps |

## Physical Characteristics

| Parameter       | Symbol | Min.   | Typ. | Max. | Unit | Notes |
|-----------------|--------|--|------|------|------|-------|
| Length          | L      |  |      | 1    | M    |       |
| AWG             |        |  | 28   |      | AWG  |       |
| Jacket Material |        | Plastic Braided Mesh Technology Net, Silver Gray |      |      |      |       |

## Electrical Specifications

| Parameter                                   | Symbol      | Min.   | Typ. | Max.  | Unit | Notes |
|---|-------------|--|------|-------|------|-------|
| Resistance                                  | Rcon        |  |      | 3     | Ω    |       |
| Insulation Resistance                       | Rins        |  |      | 10    | MΩ   |       |
| Raw Cable Impedance                         | Zca         | 95   |      | 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 | SCD11/22    | $Conversion\_loss(f) - \begin{cases} 10 & 0.05 \leq f < 12.89 \\ 14 - 0.3108f & 12.89 \leq f \leq 40 \end{cases}$            |      |       | dB   | 1     |
| Common-Mode to Common-Mode Return Loss      | SCD21-SDD21 | $RL_{cc}(f) \geq 1.08$   |      |       | dB   | 1     |
| Minimum COM                                 | COM         | 3  |      |       | dB   |       |

### Notes:

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

## Pin Descriptions

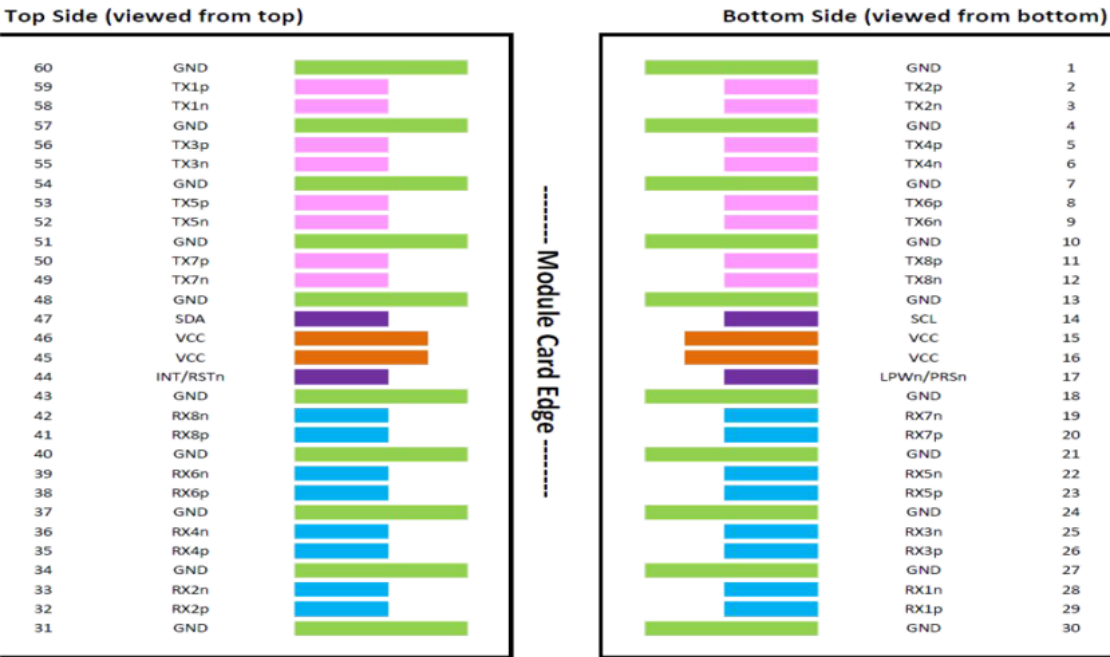
| Pin | Symbol    | Name/Description               | Logic       | Plug Sequence | Direction        | Notes |
|-----|-----------|--------------------------------|-------------|---------------|------------------|-------|
| 1   | GND       | Module Ground.                 |             | 1             |                  |       |
| 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 from Host |       |
| 20  | Rx7+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output from Host |       |
| 21  | GND       | Module Ground.                 |             | 1             |                  |       |
| 22  | Rx5-      | Receiver Data Inverted.        | CML-O       | 3             | Output from Host |       |
| 23  | Rx5+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output from Host |       |
| 24  | GND       | Module Ground.                 |             | 1             |                  |       |
| 25  | Rx3-      | Receiver Data Inverted.        | CML-O       | 3             | Output from Host |       |
| 26  | Rx3+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output from Host |       |
| 27  | GND       | Module Ground.                 |             | 1             |                  |       |
| 28  | Rx1-      | Receiver Data Inverted.        | CML-O       | 3             | Output from Host |       |
| 29  | Rx1+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output from Host |       |
| 30  | GND       | Module Ground.                 |             | 1             |                  |       |
| 31  | GND       | Module Ground.                 |             | 1             |                  |       |
| 32  | Rx2+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output from Host |       |
| 33  | Rx2-      | Receiver Data Inverted.        | CML-O       | 3             | Output from Host |       |
| 34  | GND       | Module Ground.                 |             | 1             |                  |       |
| 35  | Rx4+      | Receiver Data Non-Inverted.    | CML-O       | 3             | Output from Host |       |

|    |          |                                |             |   |                  |   |
|----|----------|--------------------------------|-------------|---|------------------|---|
| 36 | Rx4-     | Receiver Data Inverted.        | CML-O       | 3 | Output from Host |   |
| 37 | GND      | Module Ground.                 |             | 1 |                  |   |
| 38 | Rx6+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output from Host |   |
| 39 | Rx6-     | Receiver Data Inverted.        | CML-O       | 3 | Output from Host |   |
| 40 | GND      | Module Ground.                 |             | 1 |                  |   |
| 41 | Rx8+     | Receiver Data Non-Inverted.    | CML-O       | 3 | Output from Host |   |
| 42 | Rx8-     | Receiver Data Inverted.        | CML-O       | 3 | Output from 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 |                  |   |

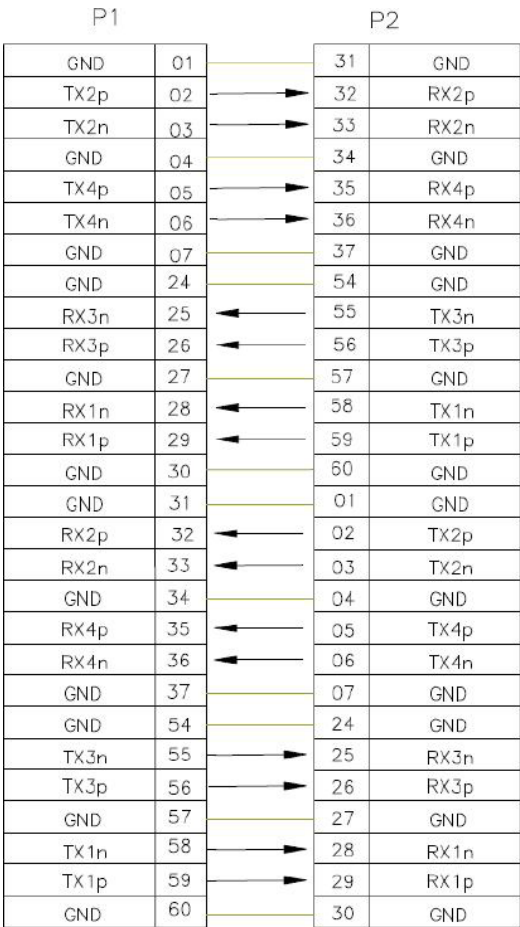
**Notes:**

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

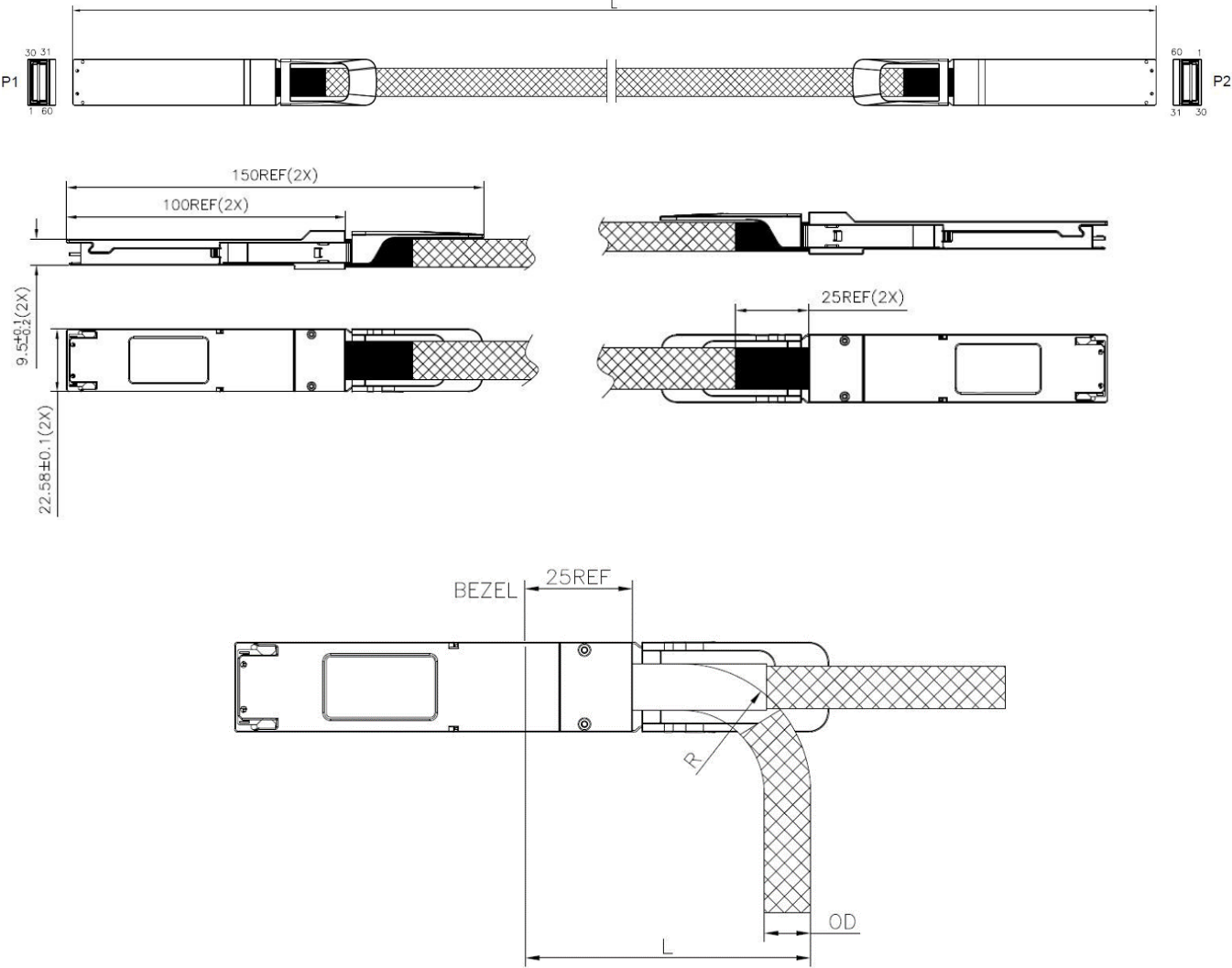
Pin Assignment



Wiring Diagram



Mechanical Specifications



Bending Radius

| Wire Gauge | OD (Ref.) | Bend Radius "R" | Min. Bend Radius "L" |
|------------|-----------|-----------------|----------------------|
| 28AWG      | 7.0mm     | 14mm            | 60mm                 |

## 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.



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