



### **OSFP-QDD-400GB-AR-PDAC0-5M-OPC**

Arista Networks® Compatible TAA 400GBase-CU OSFP to QSFP-DD Direct Attach Cable (Passive Twinax, 0.5m)

#### **Features**

- OSFP Module Compliant to OSFP MSA
- QSFP-DD Module Compliant to QSFP-DD MSA
- Transmission Data Rate up to 53.125Gbps Per Channel
- Enable 400Gbps Transmission
- Built-In EEPROM Functions
- Operating Temperature Range: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



#### **Applications:**

- 400GBase

#### **Product Description**

This is an Arista Networks® compatible 400GBase-CU OSFP to QSFP-DD direct attach cable that operates over passive copper with a maximum reach of 50.0cm (1.6ft). 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 TAA (Trade Agreements Act) compliant, and 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.

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

## Absolute Maximum Ratings

| Parameter                  | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|--------|------|------|------|------|
| Supply Voltage             | Vcc    | 3.13 | 3.3  | 3.47 | V    |
| Storage Temperature        | Tstg   | -40  |      | 85   | °C   |
| Operating Case Temperature | Tc     | 0    |      | 70   | °C   |
| Relative Humidity          | RH     | 5    |      | 85   | %    |
| Data Rate                  |        |      | 400  |      | Gbps |

## Electrical Specifications

| Parameter                                   | Symbol      | Min.                                                                                                                                                                  | Typ. | Max.  | Unit       |
|---------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|------------|
| Resistance                                  | Rcon        |                                                                                                                                                                       |      | 3     | $\Omega$   |
| Insulation Resistance                       | Rins        |                                                                                                                                                                       |      | 10    | M $\Omega$ |
| Raw Cable Impedance                         | Zca         | 95                                                                                                                                                                    | 100  | 110   | $\Omega$   |
| Mated Connector Impedance                   | Zmated      | 85                                                                                                                                                                    | 100  | 110   | $\Omega$   |
| Insertion Loss @13.28GHz                    | SDD21       | 8                                                                                                                                                                     |      | 17.16 | dB         |
| Return Loss                                 | SDD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} 16.5-2\sqrt{f} & 0.05 \leq f < 4.1 \\ 10.66-14\log_{10}(f/5.5) & 4.1 \leq f \leq 19 \end{cases}$                           |      |       | dB         |
| Differential to Common-Mode Return Loss     | SCD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} 22-(20/25.78)f & 0.01 \leq f < 12.89 \\ 15-(6/25.78)f & 12.89 \leq f \leq 19 \end{cases}$                                  |      |       | dB         |
| Differential to Common-Mode Conversion Loss | SCD21-SDD21 | $\text{Conversion\_loss}(f) - \text{IL}(f) \geq \begin{cases} 10 & 0.01 \leq f < 12.89 \\ 27-(29/22)f & 12.89 \leq f < 15.7 \\ 6.3 & 15.7 \leq f \leq 19 \end{cases}$ |      |       | dB         |
| Minimum COM                                 | COM         | 3                                                                                                                                                                     |      |       | dB         |

## Physical Characteristics

| Parameter       | Symbol | Min.                              | Typ. | Max. | Unit |
|-----------------|--------|-----------------------------------|------|------|------|
| Length          | L      |                                   | 0.5  |      | M    |
| Wire Gauge      |        |                                   | 30   |      | AWG  |
| Jacket Material |        | Plastic Braided Mesh, Silver Gray |      |      |      |

## Pin Descriptions for OSFP

| 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 assignments below for the required circuit.

#### Electrical Pin-Out Details - OSFP

Top Side (viewed from top)

|    |          |
|----|----------|
| 60 | GND      |
| 59 | TX1p     |
| 58 | TX1n     |
| 57 | GND      |
| 56 | TX3p     |
| 55 | TX3n     |
| 54 | GND      |
| 53 | TX5p     |
| 52 | TX5n     |
| 51 | GND      |
| 50 | TX7p     |
| 49 | TX7n     |
| 48 | GND      |
| 47 | SDA      |
| 46 | VCC      |
| 45 | VCC      |
| 44 | INT/RSTn |
| 43 | GND      |
| 42 | RX8n     |
| 41 | RX8p     |
| 40 | GND      |
| 39 | RX6n     |
| 38 | RX6p     |
| 37 | GND      |
| 36 | RX4n     |
| 35 | RX4p     |
| 34 | GND      |
| 33 | RX2n     |
| 32 | RX2p     |
| 31 | GND      |

----- Module Card Edge -----

Bottom Side (viewed from bottom)

|  |           |    |
|--|-----------|----|
|  | GND       | 1  |
|  | TX2p      | 2  |
|  | TX2n      | 3  |
|  | GND       | 4  |
|  | TX4p      | 5  |
|  | TX4n      | 6  |
|  | GND       | 7  |
|  | TX6p      | 8  |
|  | TX6n      | 9  |
|  | GND       | 10 |
|  | TX8p      | 11 |
|  | TX8n      | 12 |
|  | GND       | 13 |
|  | SCL       | 14 |
|  | VCC       | 15 |
|  | VCC       | 16 |
|  | LPWn/PRSn | 17 |
|  | GND       | 18 |
|  | RX7n      | 19 |
|  | RX7p      | 20 |
|  | GND       | 21 |
|  | RX5n      | 22 |
|  | RX5p      | 23 |
|  | GND       | 24 |
|  | RX3n      | 25 |
|  | RX3p      | 26 |
|  | GND       | 27 |
|  | RX1n      | 28 |
|  | RX1p      | 29 |
|  | GND       | 30 |

## Pin Descriptions for QSFP-DD

| Pin | Logic       | Symbol        | Name/Description                     | Plug Sequence | Notes |
|-----|-------------|---------------|--------------------------------------|---------------|-------|
| 1   |             | GND           | Module Ground.                       | 1B            | 1     |
| 2   | CML-I       | Tx2-          | Transmitter Inverted Data Input.     | 3B            |       |
| 3   | CML-I       | Tx2+          | Transmitter Non-Inverted Data Input. | 3B            |       |
| 4   |             | GND           | Module Ground.                       | 1B            | 1     |
| 5   | CML-I       | Tx4-          | Transmitter Inverted Data Input.     | 3B            |       |
| 6   | CML-I       | Tx4+          | Transmitter Non-Inverted Data Input. | 3B            |       |
| 7   |             | GND           | Module Ground.                       | 1B            | 1     |
| 8   | LVTTL-I     | ModSelL       | Module Select.                       | 3B            |       |
| 9   | LVTTL-I     | ResetL        | Module Reset.                        | 3B            |       |
| 10  |             | VccRx         | +3.3V Receiver Power Supply.         | 2B            | 2     |
| 11  | LVC MOS-I/O | SCL           | 2-Wire Serial Interface Clock.       | 3B            |       |
| 12  | LVC MOS-I/O | SDA           | 2-Wire Serial Interface Data.        | 3B            |       |
| 13  |             | GND           | Module Ground.                       | 1B            | 1     |
| 14  | CML-O       | Rx3+          | Receiver Non-Inverted Data Output.   | 3B            |       |
| 15  | CML-O       | Rx3-          | Receiver Inverted Data Output.       | 3B            |       |
| 16  |             | GND           | Module Ground.                       | 1B            | 1     |
| 17  | CML-O       | Rx1+          | Receiver Non-Inverted Data Output.   | 3B            |       |
| 18  | CML-O       | Rx1-          | Receiver Inverted Data Output.       | 3B            |       |
| 19  |             | GND           | Module Ground.                       | 1B            | 1     |
| 20  |             | GND           | Module Ground.                       | 1B            | 1     |
| 21  | CML-O       | Rx2-          | Receiver Inverted Data Output.       | 3B            |       |
| 22  | CML-O       | Rx2+          | Receiver Non-Inverted Data Output.   | 3B            |       |
| 23  |             | GND           | Module Ground.                       | 1B            | 1     |
| 24  | CML-O       | Rx4-          | Receiver Inverted Data Output.       | 3B            |       |
| 25  | CML-O       | Rx4+          | Receiver Non-Inverted Data Output.   | 3B            |       |
| 26  |             | GND           | Module Ground.                       | 1B            | 1     |
| 27  | LVTTL-O     | ModPrsL       | Module Present.                      | 3B            |       |
| 28  | LVTTL-O     | IntL/RxLOS    | Interrupt/Optional RxLOS.            | 3B            |       |
| 29  |             | VccTx         | +3.3V Transmitter Power Supply.      | 2B            | 2     |
| 30  |             | Vcc1          | +3.3V Power Supply.                  | 2B            | 2     |
| 31  | LVTTL-I     | LPMode/Tx_Dis | Low-Power Mode/Optional Tx_Disable.  | 3B            |       |
| 32  |             | GND           | Module Ground.                       | 1B            | 1     |
| 33  | CML-I       | Tx3+          | Transmitter Non-Inverted Data Input. | 3B            |       |
| 34  | CML-I       | Tx3-          | Transmitter Inverted Data Input.     | 3B            |       |
| 35  |             | GND           | Module Ground.                       | 1B            | 1     |
| 36  | CML-I       | Tx1+          | Transmitter Non-Inverted Data Input. | 3B            |       |
| 37  | CML-I       | Tx1-          | Transmitter Inverted Data Input.     | 3B            |       |
| 38  |             | GND           | Module Ground.                       | 1B            | 1     |
| 39  |             | GND           | Module Ground.                       | 1A            | 1     |
| 40  | CML-I       | Tx6-          | Transmitter Inverted Data Input.     | 3A            |       |

|    |               |            |                                          |    |   |
|----|---------------|------------|------------------------------------------|----|---|
| 41 | CML-I         | Tx6+       | Transmitter Non-Inverted Data Input.     | 3A |   |
| 42 |               | GND        | Module Ground.                           | 1A | 1 |
| 43 | CML-I         | Tx8-       | Transmitter Inverted Data Input.         | 3A |   |
| 44 | CML-I         | Tx8+       | Transmitter Non-Inverted Data Input.     | 3A |   |
| 45 |               | GND        | Module Ground.                           | 1A | 1 |
| 46 | LVC MOS/CML-I | P/VS4      | Programmable/Vendor-Specific 4.          | 3A | 5 |
| 47 | LVC MOS/CML-I | P/VS1      | Programmable/Vendor-Specific 1.          | 3A | 5 |
| 48 |               | VccRx1     | +3.3V Receiver Power Supply.             | 2A | 2 |
| 49 | LVC MOS/CML-O | P/VS2      | Programmable/Vendor-Specific 2.          | 3A | 5 |
| 50 | LVC MOS/CML-O | P/VS3      | Programmable/Vendor-Specific 3.          | 3A | 5 |
| 51 |               | GND        | Module Ground.                           | 1A | 1 |
| 52 | CML-O         | Rx7+       | Receiver Non-Inverted Data Output.       | 3A |   |
| 53 | CML-O         | Rx7-       | Receiver Inverted Data Output.           | 3A |   |
| 54 |               | GND        | Module Ground.                           | 1A | 1 |
| 55 | CML-O         | Rx5+       | Receiver Non-Inverted Data Output.       | 3A |   |
| 56 | CML-O         | Rx5-       | Receiver Inverted Data Output.           | 3A |   |
| 57 |               | GND        | Module Ground.                           | 1A | 1 |
| 58 |               | GND        | Module Ground.                           | 1A | 1 |
| 59 | CML-O         | Rx6-       | Receiver Inverted Data Output.           | 3A |   |
| 60 | CML-O         | Rx6+       | Receiver Non-Inverted Data Output.       | 3A |   |
| 61 |               | GND        | Module Ground.                           | 1A | 1 |
| 62 | CML-O         | Rx8-       | Receiver Inverted Data Output.           | 3A |   |
| 63 | CML-O         | Rx8+       | Receiver Non-Inverted Data Output.       | 3A |   |
| 64 |               | GND        | Module Ground.                           | 1A | 1 |
| 65 |               | NC         | Not Connected.                           | 3A | 3 |
| 66 |               | Reserved   | For Future Use.                          | 3A | 3 |
| 67 |               | VccTx1     | +3.3V Power Supply.                      | 2A | 2 |
| 68 |               | Vcc2       | +3.3V Power Supply.                      | 2A | 2 |
| 69 | LVC MOS-I     | ePPS/Clock | 1PPS PTP Clock or Reference Clock Input. | 3A | 6 |
| 70 |               | GND        | Module Ground.                           | 1A | 1 |
| 71 | CML-I         | Tx7+       | Transmitter Non-Inverted Data Input.     | 3A |   |
| 72 | CML-I         | Tx7-       | Transmitter Inverted Data Input.         | 3A |   |
| 73 |               | GND        | Module Ground.                           | 1A | 1 |
| 74 | CML-I         | Tx5+       | Transmitter Non-Inverted Data Input.     | 3A |   |
| 75 | CML-I         | Tx5-       | Transmitter Inverted Data Input.         | 3A |   |
| 76 |               | GND        | Module Ground.                           | 1A | 1 |

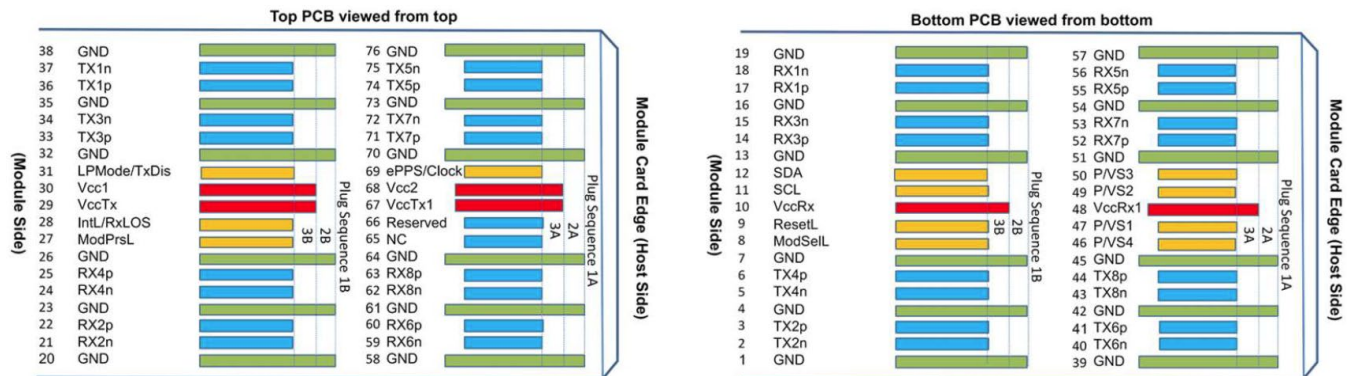
#### Notes:

1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common within the QSFP-DD module, and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 shall be applied concurrently. For power classes 4 and above the module differential loading of input voltage pads must not result in exceeding contact current limits.

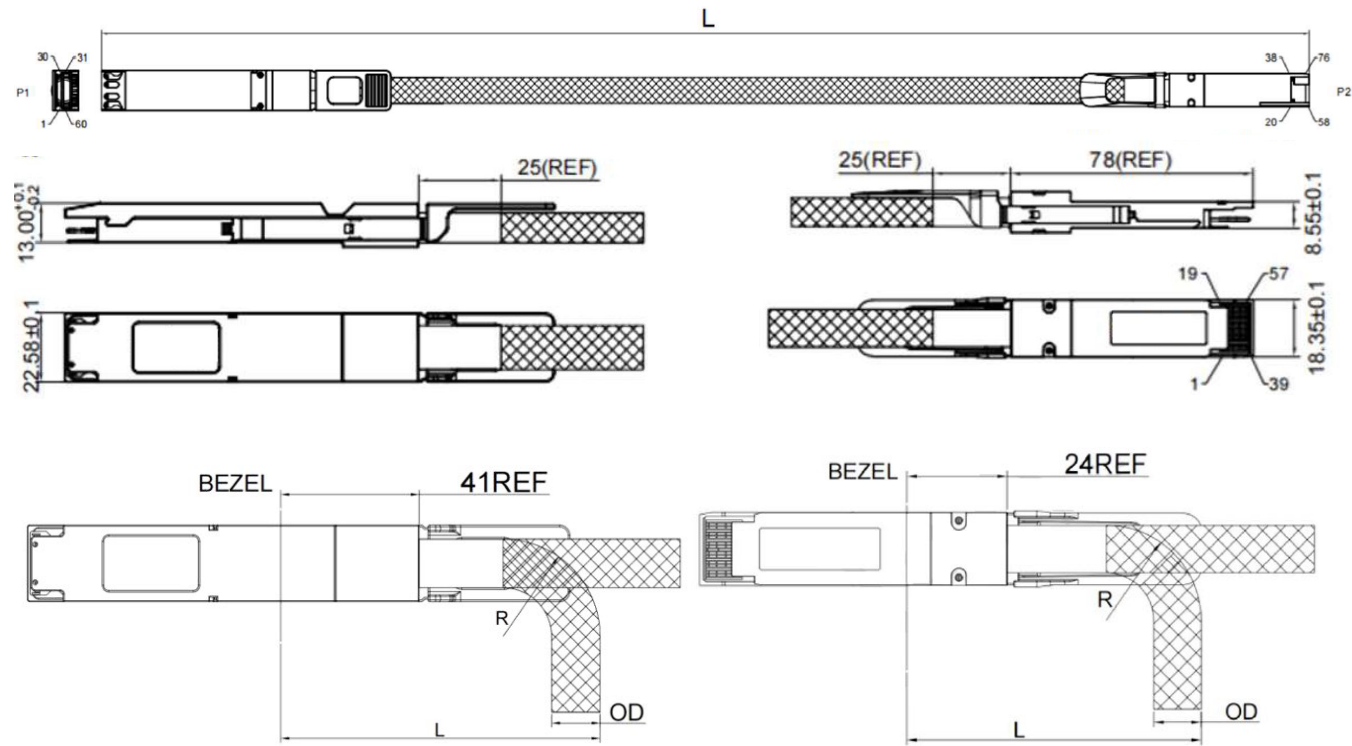
Each connector Vcc contact is rated for a maximum current of 1500mA.

3. Reserved and Not Connected pads recommended to be terminated with 10kΩ to ground on the host. Pad 65 (Not Connected) shall be left unconnected within the module.
4. Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 1A, 2A, 3A, 1B, 2B, and 3B. Contact sequence A will make, then break contact with additional QSFP-DD pads. Sequence 1A, 1B will then occur simultaneously, followed by 2A, 2B, followed by 3A, 3B.
5. Full definitions of the P/VSx signals are currently under development. On new designs not used, P/VSx signals are recommended to be terminated on the host with 10kΩ.
6. ePPS/Clock, if not used, is recommended to be terminated with 50Ω to ground on the host.

## Electrical Pin-Out Details – QSFP-DD



Mechanical Specifications



| OSFP  |       |                 |                      | QSFP-DD |       |                 |                      |
|-------|-------|-----------------|----------------------|---------|-------|-----------------|----------------------|
| Gauge | OD    | Bend Radius "R" | Min. Bend Radius "L" | Gauge   | OD    | Bend Radius "R" | Min. Bend Radius "L" |
| 30AWG | 9.5MM | 19MM            | 70MM                 | 30AWG   | 9.5MM | 19MM            | 64MM                 |



## **OptioConnect**

### **Innovation for the Future of High-Speed Networking**

#### **Who We Are**

OptioConnect is reshaping the landscape of communication and high-speed networking through intelligent technology. With a core focus on cutting edge technology, we deliver smarter fiber optic solutions for enterprise networks, data centers, and next-gen telecom infrastructures.

#### **What We Do**

At OptioConnect, we fuse advanced engineering with intelligent automation to drive the future of networking. Our AI-integrated solutions are designed to optimize performance and streamline operations with:

- Superior Performance
- Network and traffic optimization
- Intelligent energy management
- Seamless OEM compatibility
- Scalable cost-efficiency

#### **Smarter Networks by Design**

Innovation isn't just a goal—it's our process. We embed AI and machine learning across our R&D and product lines, enabling adaptive performance, automated tuning, and faster deployment cycles. The result? Networks that don't just work—they learn, evolve, and outperform.

#### **Our Team**

Our engineers, data scientists, and network architects bring decades of experience and a future-focused mindset. We provide hands-on support with intelligent insights that turn complex challenges into simple solutions.

#### **Our Mission**

To deliver AI-enhanced connectivity that reduces cost, increases speed, and maximizes efficiency—empowering our partners to operate at the forefront of a rapidly evolving digital world.

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Discover how OptioConnect's intelligent infrastructure solutions can power your network's next leap forward.

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