



### **OSFP-2QSFP56-PDAC1M-OPC**

MSA and TAA 400GBase-CU OSFP to 2xQSFP56 Direct Attach Cable Direct Attach Cable (Passive Twinax, 1m)

#### **Features**

- OSFP MSA and QSFP MSA Compliant
- Infiniband HDR Compatible
- Transmission Data Rate Up to 53.125Gbps Per Channel
- Enable 400Gbps to 2x200Gbps Transmission
- Operating Temperature Range: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



#### **Applications:**

- 400GBase Ethernet

#### **Product Description**

This is an MSA Compliant compatible 400GBase-CU OSFP to 2xQSFP56 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. 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    | Ω    |
| Insulation Resistance                       | Rins        |                                                                                                                                                                       |      | 10   | MΩ   |
| Raw Cable Impedance                         | Zca         | 95                                                                                                                                                                    | 100  | 110  | Ω    |
| Mated Connector Impedance                   | Zmated      | 85                                                                                                                                                                    | 100  | 110  | Ω    |
| Insertion Loss @13.28GHz                    | SDD21       | 6                                                                                                                                                                     |      | 14   | dB   |
| Return Loss                                 | SDD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} 11 & 0.05 \leq f < 26.5625/7.5 \\ 6.0-9.2 \lg(15f/5.5*7 \ 26.5625) & 26.5625/7.5 \leq f \leq 26.5 \end{cases}$             |      |      | dB   |
| Differential to Common-Mode Return Loss     | SCD11/22    | $\text{Return\_loss}(f) \geq \begin{cases} -25+(20/26.5625)f & 0.05 \leq f < 26.5625/2 \\ -18+(6/26.5625) & 26.5625 \leq f \leq 26.5625 \end{cases}$                  |      |      | 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      |                                   | 1    |      | M    |
| Wire Gauge      |        |                                   | 30   |      | AWG  |
| Jacket Material |        | Plastic Braided Mesh, Silver Gray |      |      |      |

## Pin Descriptions (OSFP End)

| 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 (QSFP End)

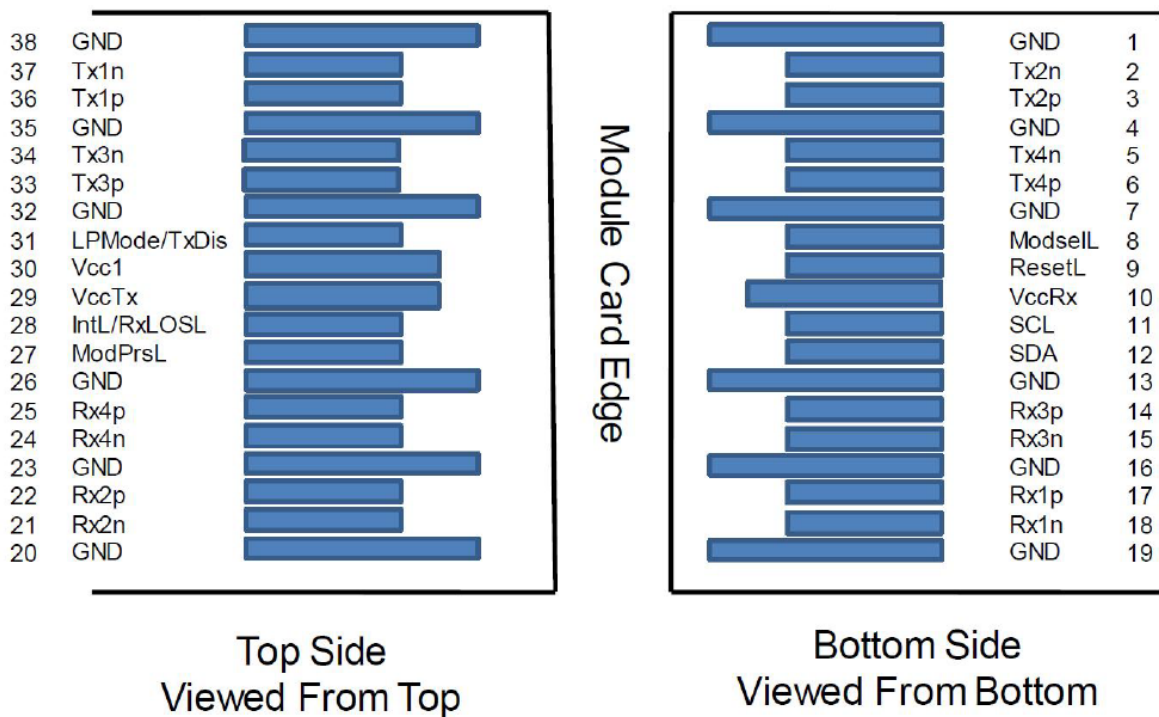
| Pin | Logic       | Symbol  | Name/Description                     | Plug Sequence | Notes |
|-----|-------------|---------|--------------------------------------|---------------|-------|
| 1   |             | GND     | Module Ground.                       | 1             | 1     |
| 2   | CML-I  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

|    |       |      |                                      |   |   |
|----|-------|------|--------------------------------------|---|---|
| 35 |       | GND  | Module Ground.                       | 1 | 1 |
| 36 | CML-I | Tx1+ | Transmitter Non-Inverted Data Input. | 3 |   |
| 37 | CML-I | Tx1- | Transmitter Inverted Data Input.     | 3 |   |
| 38 |       | GND  | Module Ground.                       | 1 | 1 |

#### Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP 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, Vcc1, and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. VccRx, Vcc1, and VccTx may be internally connected within the QSFP transceiver module in any combination. The connector pins are each rated for a maximum current of 500mA.

#### Electrical Pin-Out Details - QSFP



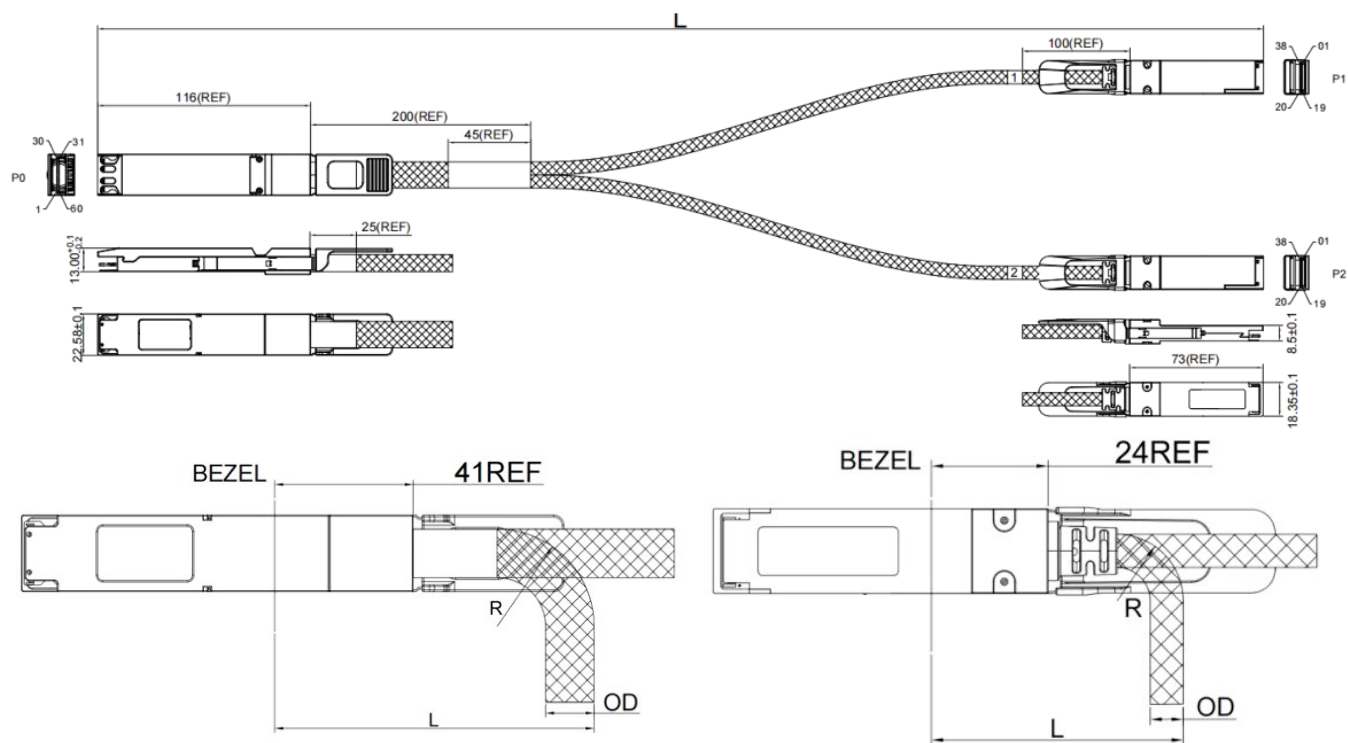
Wiring Table

WIRING TABLE

| P0    |      |        | P1    |    |
|-------|------|--------|-------|----|
|       | GND  |        | GND   |    |
| 58    | TX1n | →      | RX1n  | 18 |
| 59    | TX1p | →      | RX1p  | 17 |
|       | GND  |        | GND   |    |
| 29    | RX1p | ←      | TX1p  | 36 |
| 28    | RX1n | ←      | TX1n  | 37 |
|       | GND  |        | GND   |    |
| 03    | TX2n | →      | RX2n  | 21 |
| 02    | TX2p | →      | RX2p  | 22 |
|       | GND  |        | GND   |    |
| 32    | RX2p | ←      | TX2p  | 03 |
| 33    | RX2n | ←      | TX2n  | 02 |
|       | GND  |        | GND   |    |
| 55    | TX3n | →      | RX3n  | 15 |
| 56    | TX3p | →      | RX3p  | 14 |
|       | GND  |        | GND   |    |
| 26    | RX3p | ←      | TX3p  | 33 |
| 25    | RX3n | ←      | TX3n  | 34 |
|       | GND  |        | GND   |    |
| 06    | TX4n | →      | RX4n  | 24 |
| 05    | TX4p | →      | RX4p  | 25 |
|       | GND  |        | GND   |    |
| 35    | RX4p | ←      | TX4p  | 06 |
| 36    | RX4n | ←      | TX4n  | 05 |
|       | GND  |        | GND   |    |
| SHELL |      | SHEILD | SHELL |    |

| P0    |      |        | P2    |    |
|-------|------|--------|-------|----|
|       | GND  |        | GND   |    |
| 52    | TX5n | →      | RX1n  | 18 |
| 53    | TX5p | →      | RX1p  | 17 |
|       | GND  |        | GND   |    |
| 23    | RX5p | ←      | TX1p  | 36 |
| 22    | RX5n | ←      | TX1n  | 37 |
|       | GND  |        | GND   |    |
| 09    | TX6n | →      | RX2n  | 21 |
| 08    | TX6p | →      | RX2p  | 22 |
|       | GND  |        | GND   |    |
| 38    | RX6p | ←      | TX2p  | 03 |
| 39    | RX6n | ←      | TX2n  | 02 |
|       | GND  |        | GND   |    |
| 49    | TX7n | →      | RX3n  | 15 |
| 50    | TX7p | →      | RX3p  | 14 |
|       | GND  |        | GND   |    |
| 20    | RX7p | ←      | TX3p  | 33 |
| 19    | RX7n | ←      | TX3n  | 34 |
|       | GND  |        | GND   |    |
| 12    | TX8n | →      | RX4n  | 24 |
| 11    | TX8p | →      | RX4p  | 25 |
|       | GND  |        | GND   |    |
| 41    | RX8p | ←      | TX4p  | 06 |
| 42    | RX8n | ←      | TX4n  | 05 |
|       | GND  |        | GND   |    |
| SHELL |      | SHEILD | SHELL |    |

Mechanical Specifications



| OSFP  |       |                 |                      | QSFP  |       |                 |                      |
|-------|-------|-----------------|----------------------|-------|-------|-----------------|----------------------|
| Gauge | OD    | Bend Radius "R" | Min. Bend Radius "L" | Gauge | OD    | Bend Radius "R" | Min. Bend Radius "L" |
| 30AWG | 9.5MM | 19MM            | 80MM                 | 30AWG | 5.7MM | 12MM            | 46MM                 |

## **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.

#### **Let's Connect**

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

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