

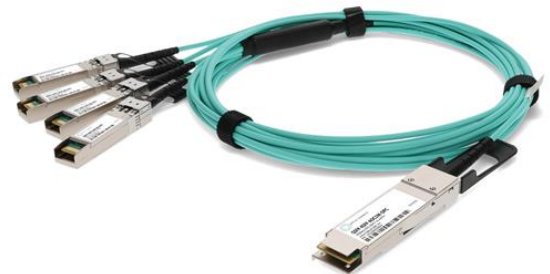


### **QSFP-4SFP-AOC1M-OPC**

MSA and TAA Compliant 40GBase-AOC QSFP+ to 4xSFP+ Active Optical Cable (850nm, MMF, 1m)

#### **Features**

- Compliant to Standard SFF-8436 for QSFP+ and Standard SFF-8431 for SFP+
- High-Speed/High-Density: Supports up to 4x100Gbps Bi-Directional Operation
- Reliable VCSEL and PIN Photonic Devices
- I2C Standard Management Interface
- Excellent High-Speed Signal Integrity
- Operating Case Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free



#### **Applications:**

- 10G/40G Ethernet
- Proprietary High-Speed/High-Density Data
- High Performance Computing, Server and Data Storage

#### **Product Description**

This is an MSA compliant 40GBase-AOC QSFP+ to 4xSFP+ active optical cable that operates over multi-mode fiber with a maximum reach of 1.0m (3.3ft). 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 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 | Notes |
|------------------------|--------|------|------|------|------|-------|
| Storage Temperature    | Tstg   | -40  |      | 85   | °C   |       |
| Operating Temperature  | Tc     | 0    | 25   | 70   | °C   |       |
| Relative Humidity      | RH     | 5    |      | 85   |      |       |
| Maximum Supply Voltage | Vcc    | 0    |      | 3.6  | V    |       |

### Electrical Specifications

| Parameter                                                             | Symbol | Min.  | Typ. | Max.   | Unit | Notes |
|-----------------------------------------------------------------------|--------|-------|------|--------|------|-------|
| Power Supply Voltage                                                  | Vcc    | 3.135 | 3.3  | 3.465  | V    |       |
| Data Rate per Channel                                                 |        |       |      | 4*10.3 | Gbps |       |
| Low Speed Output: Transmitter Fault (Tx_Fault)/Loss of Signal (LOS)   | VhH    | 2.0   |      | Vcc    | V    | 1     |
|                                                                       | VhL    | 0     |      | 0.8    | V    | 1     |
| Low Speed Input: Transmitter Disable (Tx_Disable), Mh5_D9C1, Mh5_D9C2 | VlH    | 2.0   |      | Vcc    | V    | 2     |
|                                                                       | VlL    | 0     |      | 0.8    | V    | 2     |
| Clock Rate - I2C                                                      | f      |       |      | 400    | kHz  | 3     |
| Module Turn On Time                                                   |        |       |      | 2000   | ms   | 4     |

### Notes:

1. For all control input pins: LPMode, Reset, and ModSelL.
2. For all status output pins: ModPrsL and IntL.
3. For the management interface.
4. Time from module power on/insertion/ResetL de-assert to module fully functional.

## Optical Characteristics

| Parameter                                     | Symbol  | Min. | Typ.   | Max. | Unit | Notes |
|-----------------------------------------------|---------|------|--------|------|------|-------|
| <b>Transmitter</b>                            |         |      |        |      |      |       |
| Reference Differential Input Impedance        | Zd      |      | 100    |      | Ω    | 1     |
| Optical Return Loss Tolerance                 |         |      |        | 12   | dB   |       |
| Differential Data Input Swing                 | VIN,pp  | 180  |        | 1200 | mV   |       |
| Differential Data Input Threshold             |         |      | 50     |      | mV   | 2     |
| <b>Receiver</b>                               |         |      |        |      |      |       |
| Reference Differential Input Impedance        | Zd      |      | 100    |      | Ω    | 1     |
| Differential Data Output Swing                | VOUT,pp | 0    |        | 800  | mV   |       |
| Pre-Emphasis Pulse Amplitude Percentage       |         | 0    |        |      | %    | 3     |
|                                               |         | 10   |        |      | %    |       |
|                                               |         | 20   |        |      | %    |       |
|                                               |         | 40   |        |      | %    |       |
| Pre-Emphasis Pulse Duration                   |         |      | 30     |      | ps   |       |
| Signal Speed                                  |         |      | 4*10.3 |      | Gbps |       |
| Differential Data Output Swing                |         | 150  |        | 850  | mV   |       |
| Differential Data Output Swing When Squelched |         |      |        | 50   | mV   |       |
| Rise/Fall Time                                |         | 24   |        |      | ps   |       |

### Notes:

1. AC coupled inside the AOC module.
2. Input swing to trigger Tx\_Squelch.
3. User-selectable. Percentage is the ratio of pre-emphasis amplitude to output swing.

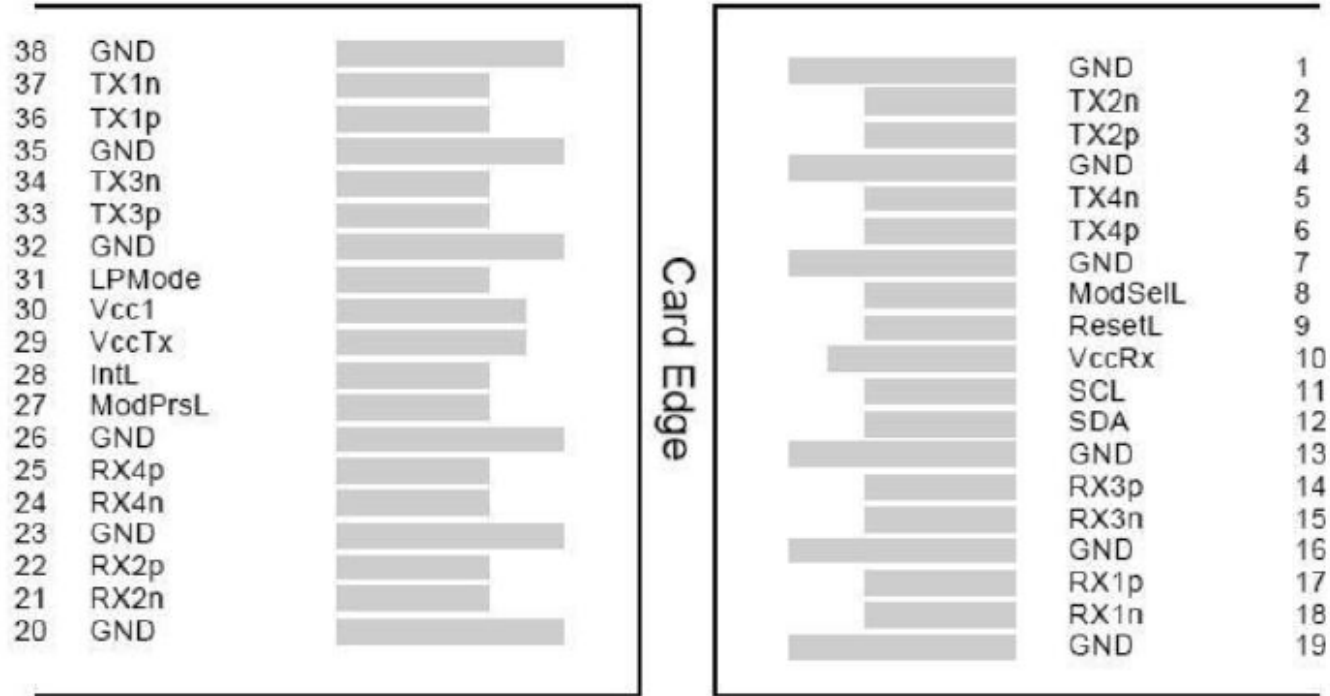
## Pin Descriptions (QSFP+ End)

| Pin | Symbol  | Name/Description                                  | Notes |
|-----|---------|---------------------------------------------------|-------|
| 1   | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 2   | Tx2-    | Transmitter Inverted Data Input.                  |       |
| 3   | Tx2+    | Transmitter Non-Inverted Data Input.              |       |
| 4   | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 5   | Tx4-    | Transmitter Inverted Data Input.                  |       |
| 6   | Tx4+    | Transmitter Non-Inverted Data Input.              |       |
| 7   | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 8   | ModSelL | Module Select.                                    | 2     |
| 9   | ResetL  | Module Reset.                                     | 2     |
| 10  | VccRx   | +3.3V Receiver Power Supply.                      |       |
| 11  | SCL     | 2-Wire Serial Interface Clock.                    | 2     |
| 12  | SDA     | 2-Wire Serial Interface Data.                     | 2     |
| 13  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 14  | Rx3+    | Receiver Non-Inverted Data Output.                |       |
| 15  | Rx3-    | Receiver Inverted Data Output.                    |       |
| 16  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 17  | Rx1+    | Receiver Non-Inverted Data Output.                |       |
| 18  | Rx1-    | Receiver Inverted Data Output.                    |       |
| 19  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 20  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 21  | Rx2-    | Receiver Inverted Data Output.                    |       |
| 22  | Rx2+    | Receiver Non-Inverted Data Output.                |       |
| 23  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 24  | Rx4-    | Receiver Inverted Data Output.                    | 1     |
| 25  | Rx4+    | Receiver Non-Inverted Data Output.                |       |
| 26  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 27  | ModPrs1 | Module Present.                                   |       |
| 28  | IntL    | Interrupt.                                        | 2     |
| 29  | VccTx   | +3.3V Transmitter Power Supply.                   |       |
| 30  | Vcc1    | +3.3V Power Supply.                               |       |
| 31  | LPMode  | Low-Power Mode.                                   | 2     |
| 32  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 33  | Tx3+    | Transmitter Non-Inverted Data Input.              |       |
| 34  | Tx3-    | Transmitter Inverted Data Input.                  |       |
| 35  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 36  | Tx1+    | Transmitter Non-Inverted Data Input.              |       |
| 37  | Tx1-    | Transmitter Inverted Data Input.                  |       |
| 38  | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |

**Notes:**

- 1. The module signal grounds are isolated from the module case.
- 2. This is an open collector/drain output that, on the host board, requires a 4.7kΩ to 10kΩ pull-up resistor to the Host\_Vcc.

**Electrical Pin-Out Details (QSFP+ End)**



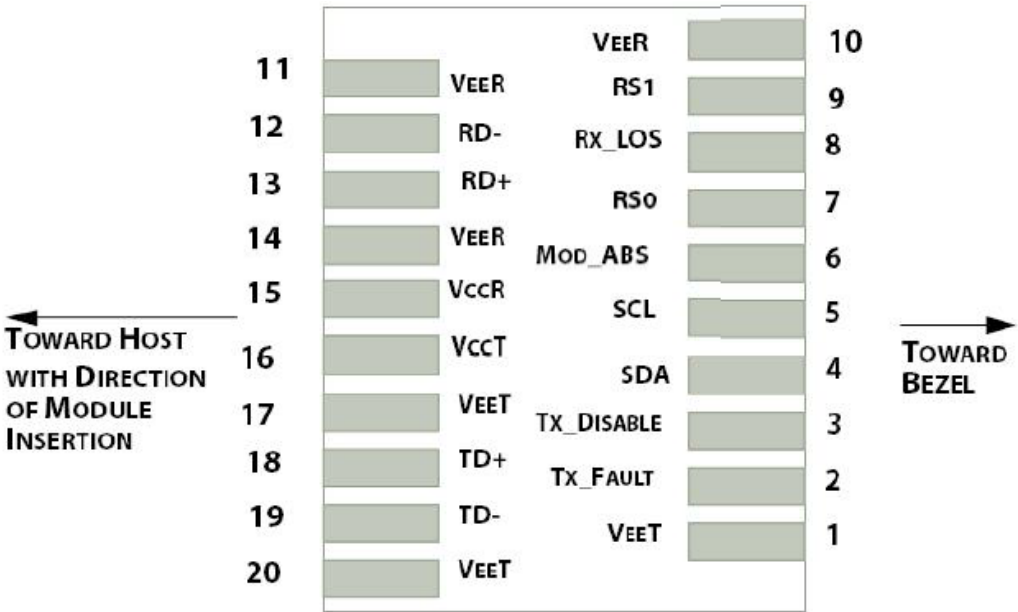
### Pin Descriptions (SFP+ End)

| Pin | Symbol     | Name/Description                                                          | Notes |
|-----|------------|---------------------------------------------------------------------------|-------|
| 1   | VeeT       | Transmitter Ground.                                                       | 1     |
| 2   | Tx_Fault   | Transmitter Fault. LVTTTL-O. “High” indicates a fault condition.          | 2     |
| 3   | Tx_Disable | Transmitter Disable. LVTTTL-I. “High” or “open” disables the transmitter. | 3     |
| 4   | SDA        | 2-Wire Serial Interface Data. LVCMOS-I/O. MOD_DEF2.                       | 4     |
| 5   | SCL        | 2-Wire Serial Interface Clock. LVCMOS-I/O. MOD_DEF1.                      | 4     |
| 6   | MOD_ABS    | Module Absent. Output. Connected to the VeeT or VeeR in the module.       | 5     |
| 7   | RS0        | Rate Select 0. Not used. Presents high input impedance.                   |       |
| 8   | Rx_LOS     | Receiver Loss of Signal. LVTTTL-O.                                        | 2     |
| 9   | RS1        | Rate Select 1. Not used. Presents high input impedance.                   |       |
| 10  | VeeR       | Receiver Ground.                                                          | 1     |
| 11  | VeeR       | Receiver Ground.                                                          | 1     |
| 12  | RD-        | Inverse Received Data Out. CML-O.                                         |       |
| 13  | RD+        | Receiver Data Out. CML-O.                                                 |       |
| 14  | VeeR       | Receiver Ground.                                                          |       |
| 15  | VccR       | +3.3V Receiver Power.                                                     |       |
| 16  | VccT       | +3.3V Transmitter Power.                                                  |       |
| 17  | VeeT       | Transmitter Ground.                                                       | 1     |
| 18  | TD+        | Transmitter Data In. CML-I.                                               |       |
| 19  | TD-        | Inverse Transmitter Data In. CML-I.                                       |       |
| 20  | VeeT       | Transmitter Ground.                                                       | 1     |

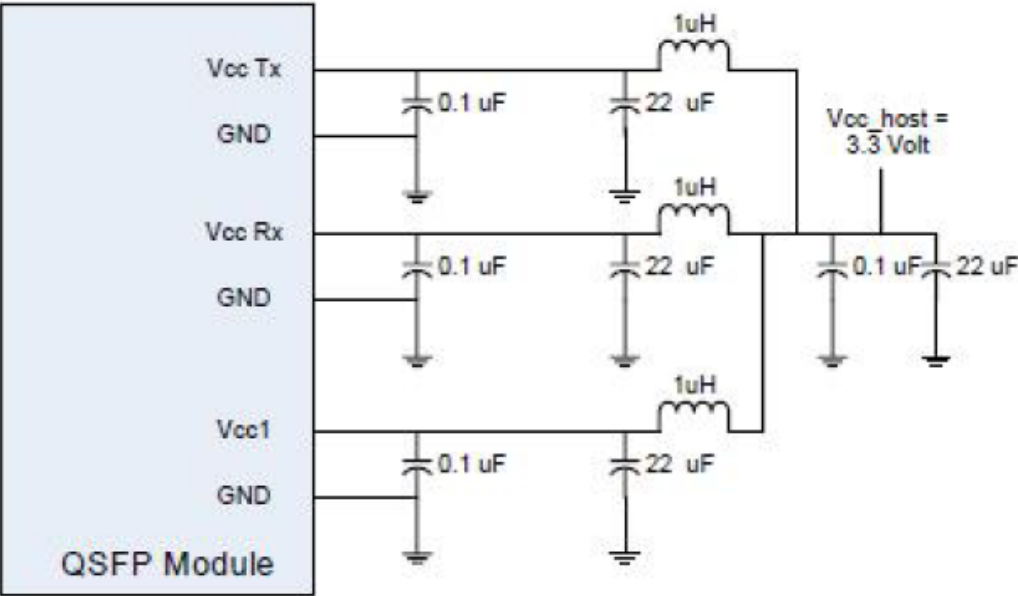
### Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the Host\_Vcc.
3. This input is internally biased high with a 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the VccT.
4. 2-wire serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that, on the host board, requires a 4.7k $\Omega$  to 10k $\Omega$  pull-up resistor to the Host\_Vcc.

Electrical Pin-Out Details (SFP+ End)



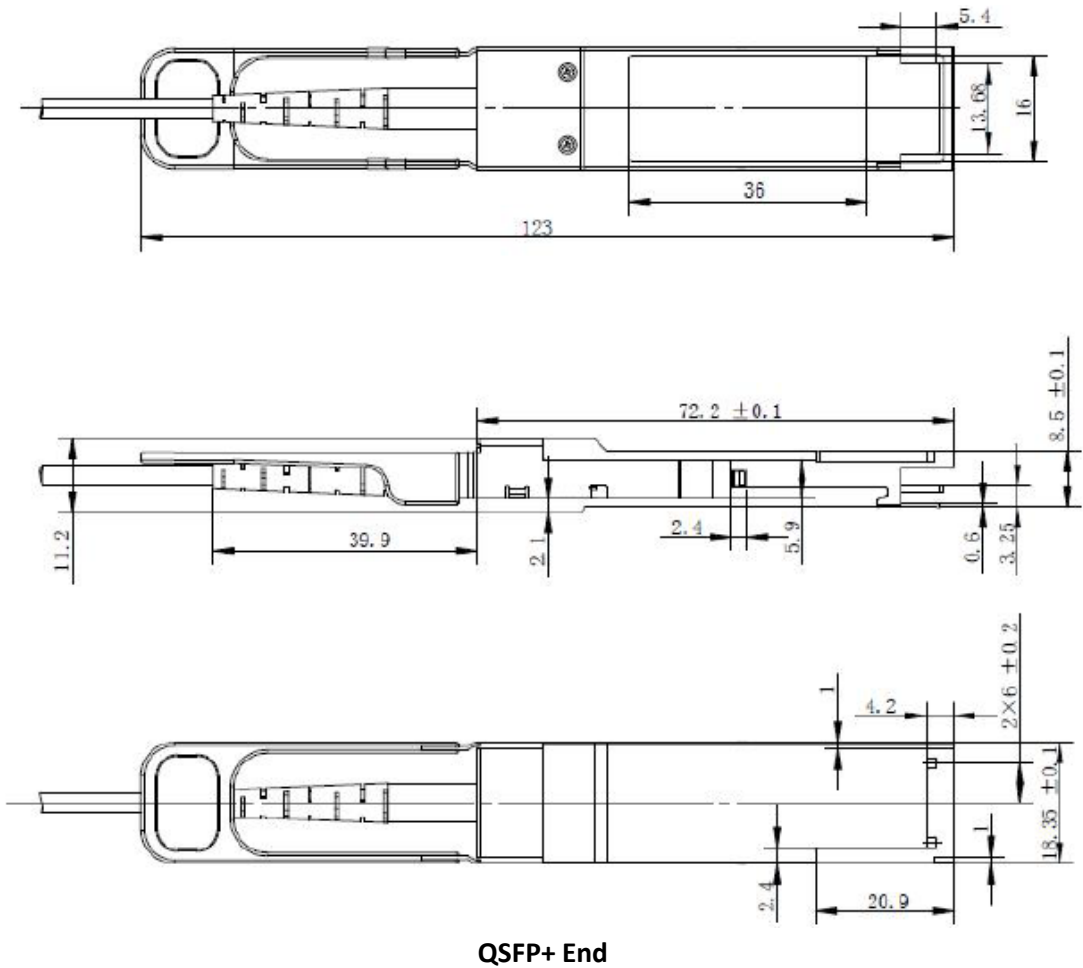
Application Interface Circuit

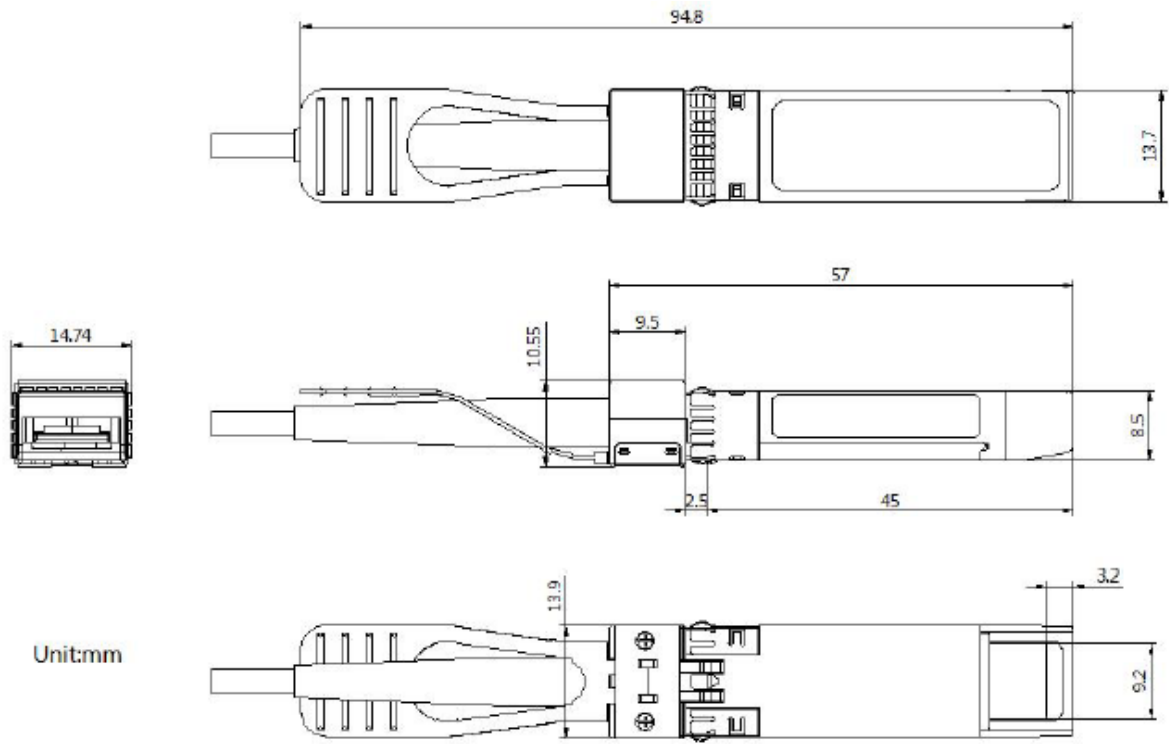


Active Optical Cable Specifications

| Parameter                                   | Symbol | Min.       | Typ. | Max.        | Unit   |
|---------------------------------------------|--------|------------|------|-------------|--------|
| AOC Cable Length ( $L1 \leq 5m$ )           | L1     | $L - 0.06$ | L    | $L + 0.06$  | M      |
| AOC Cable Length ( $L1 > 5m$ )              | L1     | $L * 95\%$ | L    | $L * 105\%$ | M      |
| AOC Cable Length of Branch ( $L2 \leq 3m$ ) | L2     | $L - 0.06$ | L    | $L + 0.06$  | M      |
| Module Retention                            |        | 90         |      | 170         | N      |
| Module Insertion                            |        | 0          |      | 18          | N      |
| Module Extraction                           |        | 0          |      | 25          | N      |
| Cable Pull Strength - Apply Load at 0°      |        | 25         |      |             | N      |
| Cable Pull Strength - Apply Load at 90°     |        | 20         |      |             | N      |
| Cable Bending Radius                        |        | 30         |      |             | mm     |
| Insertion/Removal Cycles                    |        | 50         |      |             | cycles |

Mechanical Specifications





**SFP+ End**

## **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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