



### **QSFP56-100GB-PDAC1-5M-MX-OPC**

Mellanox® Compatible TAA 100GBase-CU QSFP56 to QSFP56 Direct Attach Cable (Passive Twinax, 1.5m)

#### **Features**

- Compliant with SFF-8636
- Compliant with IEEE802.3bj & IEEE802.3cd
- Support I2C two line strong interface, easy to control
- Hot-pluggable
- Operating Temperature: -20 to 75 Celsius
- Low Crosstalk
- Low power
- RoHS Compliant and Lead-Free



#### **Applications:**

- 100GBase Ethernet

#### **Product Description**

This is a Mellanox® compatible 100GBase-CU QSFP56 to QSFP56 direct attach cable that operates over passive copper with a maximum reach of 1.5m (4.9ft). 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.

## Electrical Characteristics

| Parameter                                                                                   |               | Requirement                                                                                                                                                                                                                                                                                                                                                       |        |        |        |        | Test Condition                                                                                                            |                |
|---------------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|---------------------------------------------------------------------------------------------------------------------------|----------------|
| Differential Impedance                                                                      |               |                                                                                                                                                                                                                                                                                                                                                                   |        |        |        |        |                                                                                                                           |                |
| Cable Impedance                                                                             |               | 105+5/-10Ω                                                                                                                                                                                                                                                                                                                                                        |        |        |        |        | Rise time of 25ps<br>(20% ~ 80%).                                                                                         |                |
| Paddle Card Impedance                                                                       |               | 100±10Ω                                                                                                                                                                                                                                                                                                                                                           |        |        |        |        |                                                                                                                           |                |
| Cable Termination Impedance                                                                 |               | 100±15Ω                                                                                                                                                                                                                                                                                                                                                           |        |        |        |        |                                                                                                                           |                |
| Differential (Input/Output)<br>Return Loss SDD11/SDD22                                      |               | $\text{Return\_loss}(f) \geq \left\{ \begin{array}{ll} 16.5-2\sqrt{f} & 0.05 \leq f < 4.1 \\ 10.66-14\log_{10}(f/5.5) & 4.1 \leq f \leq 19 \end{array} \right\}$<br>Where f is the frequency in GHz<br>Return loss(f) is the return loss at frequency f                                                                                                           |        |        |        |        | 10MHz≤f ≤19GHz                                                                                                            |                |
| Differential to common mode<br>(Input/Output) Return loss<br>SCD11/SCD22                    |               | $\text{Return loss}(f) \geq \left\{ \begin{array}{ll} 22-(20/25.78)f & 0.01 \leq f < 12.89 \\ 15-(6/25.78)f & 12.89 \leq f \leq 19 \end{array} \right\}$<br>Where f is the frequency in GHz<br>Return loss(f) is the Differential to common-mode return loss at frequency f                                                                                       |        |        |        |        | 10MHz≤f ≤19GHz                                                                                                            |                |
| Common mode to common-<br>mode (Input/Output) Return<br>loss SCC11/ SCD22                   |               | Return loss (f)≥ 2dB      0.2≤f≤19<br>Where f is the frequency in GHz Return loss (f) is the common-mode to common-mode return loss at frequency f                                                                                                                                                                                                                |        |        |        |        | 10MHz≤f ≤19GHz                                                                                                            |                |
| Low Level Contact Resistance                                                                |               | 70 milliohms Max. From initial.                                                                                                                                                                                                                                                                                                                                   |        |        |        |        | EIA-634-23: Apply a maximum voltage of 20mV and current of 100 mA.                                                        |                |
| Insulation Resistance                                                                       |               | 10 Mohm (Min)                                                                                                                                                                                                                                                                                                                                                     |        |        |        |        | EIA364-21:AC 300V 1minute                                                                                                 |                |
| Dielectric Withstanding Voltage                                                             |               | NO disruptive discharge                                                                                                                                                                                                                                                                                                                                           |        |        |        |        | EIA-364-20: Apply a voltage o f 300 VDC for 1 minute between adjacent terminals and between adjacent terminals and ground |                |
| Differential Insertion Loss Max. For TPa to TPb Excluding Test fixture                      |               |                                                                                                                                                                                                                                                                                                                                                                   |        |        |        |        |                                                                                                                           |                |
| Differential<br>Insertion Loss<br>(SDD21 Max)                                               | F AWG         | 1.25GHz                                                                                                                                                                                                                                                                                                                                                           | 2.5GHz | 5.0GHz | 7.0GHz | 10Ghz  | 12.89Ghz                                                                                                                  | 10MHz≤f ≤19GHz |
|                                                                                             | 30(1m) Max.   | 4.5dB                                                                                                                                                                                                                                                                                                                                                             | 5.4dB  | 6.3dB  | 7.5dB  | 8.5dB  | 10.5dB                                                                                                                    |                |
|                                                                                             | 30/28(3m)Max. | 7.5dB                                                                                                                                                                                                                                                                                                                                                             | 9.5dB  | 12.2dB | 14.8dB | 18.0dB | 21.5dB                                                                                                                    |                |
|                                                                                             | 26(3m) Max.   | 5.7dB                                                                                                                                                                                                                                                                                                                                                             | 7.2dB  | 9.9 dB | 11.9dB | 14.1dB | 16.5dB                                                                                                                    |                |
|                                                                                             | 26/25(5m)Max. | 7.8dB                                                                                                                                                                                                                                                                                                                                                             | 10.0dB | 13.5dB | 16.0dB | 19.0dB | 22.0dB                                                                                                                    |                |
| Insertion Loss Deviation                                                                    |               | -0.176*f - 0.7 ≤ ILD ≤ 0.176* f + 0.7                                                                                                                                                                                                                                                                                                                             |        |        |        |        | 50MHz≤f ≤19GHz                                                                                                            |                |
| Differential to common mode<br>conversion Loss-Differential<br>Insertion Loss (SCD21-SDD21) |               | $\text{Conversion loss}(f) - \text{IL}(f) \geq \left\{ \begin{array}{ll} 10 & 0.01 \leq f < 12.89 \\ 27-(29/22)f & 12.89 \leq f < 15.7 \\ 6.3 & 15.7 \leq f \leq 19 \end{array} \right\}$<br>Where f is the frequency in GHz Conversion_loss (f) is the cable assembly differential to common-mode conversion loss<br>IL (f) is the cable assembly insertion loss |        |        |        |        | 10MHz≤f ≤19GHz                                                                                                            |                |

|                                                       |                 |                |
|-------------------------------------------------------|-----------------|----------------|
| <b>MDNEXT (multiple disturber near-end crosswalk)</b> | ≥26dB @12.89GHz | 10MHz≤f ≤19GHz |
| <b>Intra Skew</b>                                     | 15ps/m          | 10MHz≤f ≤19GHz |

## Environment Performance

| Parameter                          | Requirement                                                        | Test Condition                                                                  |
|------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Operating Temperature Range</b> | -20°C to +75°C                                                     | Cable operating temperature range                                               |
| <b>Storage Temperature Range</b>   | -40°C to +80°C                                                     | Cable storage temperature range in packed condition                             |
| <b>Thermal Cycling Non-Powered</b> | No evidence of physical damage                                     | EIA-364-32D, Method A, -25 to 90C, 100 cycles, 15 min, dwells                   |
| <b>Salt Spraying</b>               | 48 hours salt spraying after shell corrosive area less than 5%     | EIA-364-26                                                                      |
| <b>Mixed Flowing Gas</b>           | Pass electrical tests per 3.1 after stressing (Fpr connector only) | EIA-364-35 Class II, 14 days.                                                   |
| <b>Temp. Life</b>                  | No evidence of physical damage                                     | EIA-364-17C w/RH, Damp heat 90°C at 85% RH for 500 hours then return to ambient |
| <b>Cable Cold Bend</b>             | 4H No evidence of physical damage                                  | Condition: -20°C ±2°C, mandrel diameter is 6 times the cable diameter.          |

## Mechanical and Physical Characteristics

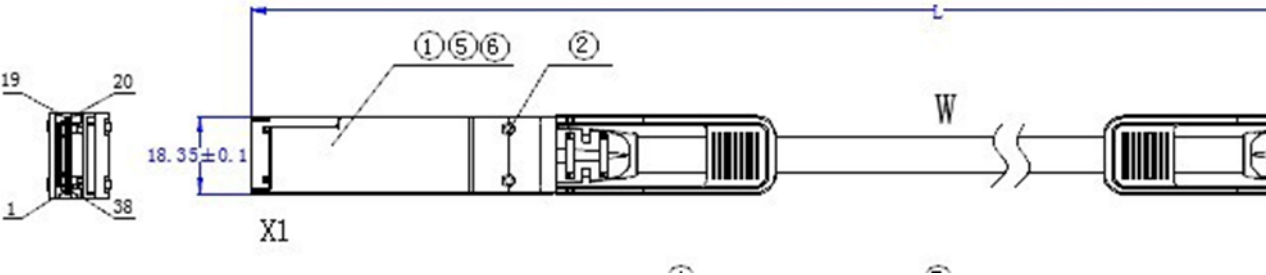
| Parameter                           | Requirement                                   | Test Condition                                                                                                                                                                                               |
|-------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Vibration</b>                    | Pass electrical tests per 3.1 after stressing | Clamp & vibrate per EIA-364-28E, TC-VII, test condition letter – D, 15 minutes in X, Y & Z axis                                                                                                              |
| <b>Cable Flex</b>                   | No evidence of physical damage                | Flex cable 180° for 20 cycles (±90° from nominal position) at 12 cycles per minute with a 1.0kg load applied to the cable jacket. Flex in the boot area 90° in each direction from vertical. Per EIA-364-41C |
| <b>Cable Plug Retention in Cage</b> | 90N Min. No evidence of physical damage       | Force to be applied axially with no damage to cage. Per SFF 8661 Rev 2.1<br>Pull on cable jacket approximately 1 ft behind cable plug. No functional damage to cable plug below 90N. Per SFF-8432 Rev 5.0    |
| <b>Cable Retention in Plug</b>      | 90N Min. No evidence of physical damage       | Cable plug is fixtured with the bulk cable hanging vertically. A 90N axial load is applied (gradually) to the cable jacket and held for 1 minute. Per EIA-364-38B                                            |
| <b>Mechanical Shock</b>             | Pass electrical tests Per 3.1 after stressing | Clamp and shock per EIA-364-27B, TC- G,3 times in 6 directions, 100g, 6ms.                                                                                                                                   |
| <b>Cable Plug Insertion</b>         | 40N Max (QSFP28)                              | Per SFF8661 Rev 2.1                                                                                                                                                                                          |
| <b>Cable plug Extraction</b>        | 30N Max (QSFP28)                              | Place axial load on de-latch to de-latch plug.Per SFF8661                                                                                                                                                    |

|                   |                                           |                                                                                                                                          |
|-------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                                           | Rev 2.1                                                                                                                                  |
| <b>Durability</b> | 50 cycles, No evidence of physical damage | EIA-364-09, perform plug &unplug cycles:Plug and receptacle mate rate: 250times/hour. 50times for QSFP28/SFP28 module (CONNECTOR TO PCB) |

**Wiring Diagram**

| X1                                        | X2                                         | Remarks | X1                                   | X2                                   | Remarks                   |
|-------------------------------------------|--------------------------------------------|---------|--------------------------------------|--------------------------------------|---------------------------|
| 18 (RX1-)                                 | 37(TX1-)                                   | Pair    | 37(TX1-)                             | 18 (RX1-)                            | Pair                      |
| 17 (RX1+)                                 | 36 (TX1+)                                  |         | 36 (TX1+)                            | 17 (RX1+)                            |                           |
| 15 (RX3-)                                 | 34 (TX3-)                                  | Pair    | 34 (TX3-)                            | 15 (RX3-)                            | Pair                      |
| 14 (RX3+)                                 | 33 (TX3+)                                  |         | 33 (TX3+)                            | 14 (RX3+)                            |                           |
| 6 (TX4+)                                  | 25 (RX4+)                                  | Pair    | 25 (RX4+)                            | 6 (TX4+)                             | Pair                      |
| 5 (TX4-)                                  | 24 (RX4-)                                  |         | 24 (RX4-)                            | 5 (TX4-)                             |                           |
| 3 (TX2+)                                  | 22 (RX2+)                                  | Pair    | 22 (RX2+)                            | 3 (TX2+)                             | Pair                      |
| 2 (TX2-)                                  | 21 (RX2-)                                  |         | 21 (RX2-)                            | 2 (TX2-)                             |                           |
| 1, 4, 7, 13, 16, 19, 20, 23, 26, 32,35,38 | 1, 4, 7, 13, 16, 19,20, 23, 26, 32, 35, 38 | GND     | 8, 9, 10, 11, 12, 27, 28, 29, 30, 31 | 8, 9, 10, 11, 12, 27, 28, 29, 30, 31 | EEPROM point at both ends |

**Mechanical Specifications**



UNIT: mm

## **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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