# QSFP-40G-DAC-PxM

40G QSFP+ to QSFP+ DAC Passive Copper Cable (PCC), 0.5~7 meters

## Features

- QSFP conforms to the Small Form Factor SFF-8436
- 4-Channel Full-Duplex Passive Copper Cable
- Operates 1G to 10.3125 Gbps data rate per channel(per channel)
- Maximum aggregate data rate: 40 Gb/s (4 x 10Gb/s)
- Available in lengths of 0.5m(1.6ft) to 7m (23ft)
- High-Density QSFP 38-PIN Connector
- Low power consumption: 0.02 W (typ.)
- I2C based two-wire serial interface for EEPROM signature
- Single 3.3V power supply
- 24AWG to 30AWG cable available
- Operating temperature range: 0 to 70°C
- RoHS Compliant and Lead-Free

## Applications

- 40 Gigabit Ethernet links
- Fiber Channel over Ethernet
- Data storage and communication industry
- Switches, servers,routers and HBA
- Enterprise network
- SAN (Storage area networks)
- Data center cabling infrastructure
- High density connections between networking equipment

## Description

Optcore's QSFP-40G-DAC-PxM direct attach copper cable assembly (also known as DAC) is suitable for very short distances. It offers a highly cost-effective way to establish a 40 Gigabit link connectivity between devices using QSFP ports. The QSFP+ DAC cable is designed for 40Gb/s high-speed interconnecting networking applications such as high-performance computing (HPC), enterprise networking including top-of-rack switching, and network storage markets.

The 40G QSFP+ DAC fully complies with QSFP+ Multi-Source Agreement (MSA) standards SFF-8436 and IEEE 802.3ba 40GBASE-CR4. It is developed specifically as a cost-effective and lower-power alternative to QSFP+ optical transceivers and QSFP+ active optical fiber (QSFP+ AOC).

## Ordering information

| Part Number | Data Rate | Cable Length | Wire Gauge | | |
|---|---|---|---|---|---|
| QSFP-40G-DAC-P05M | 40Gbps | 0.5 m | / | / | AWG30 |
| QSFP-40G-DAC-P1M | 40Gbps | 1 m | / | / | AWG30 |

| | | | | | |
|---|---|---|---|---|---|
| QSFP-40G-DAC-P2M | 40Gbps | 2 m | / | / | AWG30 |
| QSFP-40G-DAC-P3M | 40Gbps | 3 m | / | / | AWG30 |
| QSFP-40G-DAC-P4M | 40Gbps | 4 m | / | AWG26 | / |
| QSFP-40G-DAC-P5M | 40Gbps | 5 m | / | AWG26 | / |
| QSFP-40G-DAC-P6M | 40Gbps | 6 m | AWG24 | / | / |
| QSFP-40G-DAC-P7M | 40Gbps | 7 m | AWG24 | / | / |

**Notes:**

1. Customized 40G QSFP DAC cables are available in various lengths.
2. The Wire Gauge is available in AWG24, AWG26, AWG28, and AWG30 for customized need.

## Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit | Notes |
|---|---|---|---|---|---|
| Maximum Supply Voltage | Vcc | -0.5 | 4.0 | V | |
| Storage Temperature | $T_S$ | -40 | 85 | °C | |
| Operating Humidity | RH | 5 | 95 | % | |

## Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| Power Supply Voltage | Vcc | 3.13 | 3.3 | 3.47 | V | |
| Power Dissipation | PD | | | 0.1 | W | |
| Case Operating Temperature | Tc | 0 | | 70 | °C | |
| Data Rate Per Lane | | | | 10.3125 | Gbps | |
| Bit Error Rate | BER | | | $10^{-12}$ | | |

## High Speed Characteristics

| Parameter | Symbol | Min | Typical | Max | Unit | Note |
|---|---|---|---|---|---|---|
| Differential Impedance | TDR | 90 | 100 | 110 | Ω | |
| Insertion loss | SDD21 | -17.04 | | | dB | At 5.15625 GHz |
| Differential Return Loss | SDD11<br>SDD22 | | | See 1 | dB | At 0.05 to 4.1 GHz |
| | | | | See 2 | dB | At 4.1 to 11.1 GHz |
| Differential to common-mode return loss | SCD11<br>SCD22 | | | -10 | dB | At 0.2 to 11.1 GHz |
| Common-mode to common-mode output return loss | SCC11<br>SCC22 | -3 | | | dB | At 0.01 to 11.1 GHz |

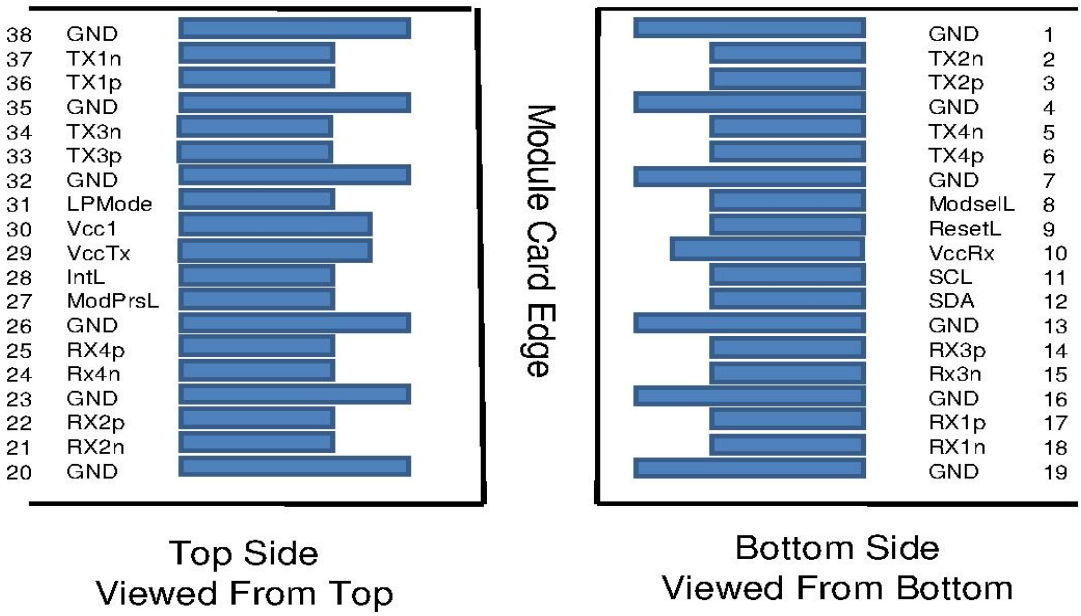
Notes:
1. Reflection Coefficient given by equation SDD11(dB) < -12 + 2 × SQRT(f ), with f in GHz
2. Reflection Coefficient given by equation SDD11(dB) < -6.3 + 13 × log10(f/5.5), with f in GHz

## Cable Specifications

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Cable Diameter | DIA | | 6.0 | | mm | AWG 24 |
| | | | 5.4 | | mm | AWG 26 |
| | | | 4.7 | | mm | AWG 28 |
| | | | 4.2 | | mm | AWG 30 |
| Bend Radius | | 5x Cable Diameter | | | mm | |
| Cable Jacket Type | | PVC | | | | |
| Cable Impedance | Z | 90 | 100 | 110 | Ω | |

## Electrical Pad Layout



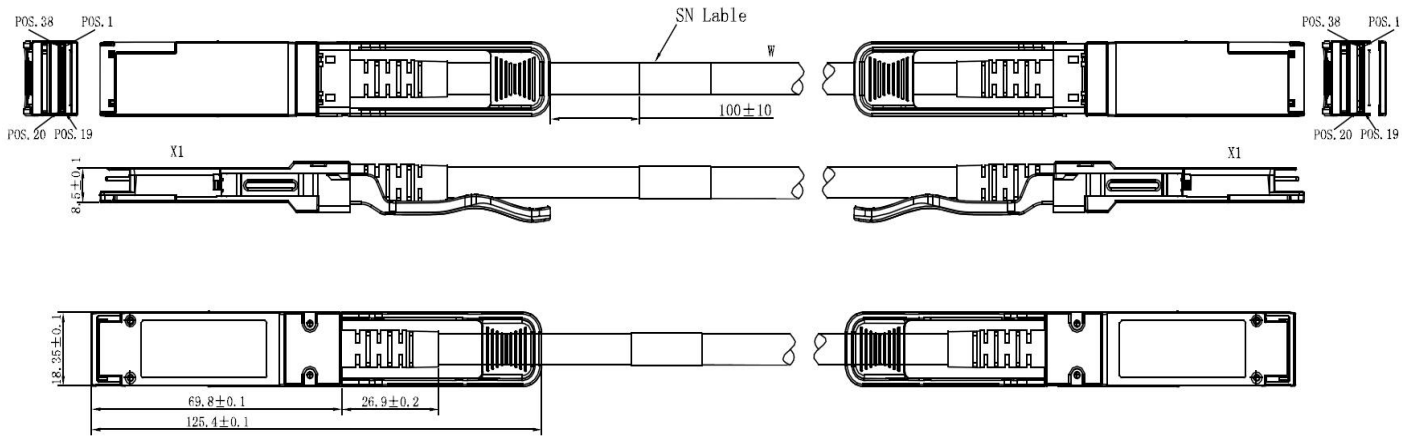

## Pin Definitions

| Pin | Logic | Symbol | Description |
|---|---|---|---|
| 1 | | GND | Ground |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input |
| 4 | | GND | Ground |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input |
| 7 | | GND | Ground |
| 8 | LVTTL-I | ModSelL | Module Select |
| 9 | LVTTL-I | ResetL | Module Reset |
| 10 | | Vcc Rx | +3.3V Power Supply Receiver |
| 11 | LVCMOS-I/O | SCL | 2-wire serial interface clock |
| 12 | LVCMOS-I/O | SDA | 2-wire serial interface data |
| 13 | | GND | Ground |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output |

| | | | |
|---|---|---|---|
| 16 | | GND | Ground |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output |
| 19 | | GND | Ground |
| 20 | | GND | Ground |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output |
| 23 | | GND | Ground |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output |
| 26 | | GND | Ground |
| 27 | LVTTL-O | ModPrsL | Module Present |
| 28 | LVTTL-O | IntL | Interrupt |
| 29 | | Vcc Tx | +3.3V Power supply transmitter |
| 30 | | Vcc1 | +3.3V Power supply |
| 31 | LVTTL-I | LPMode | Low Power Mode |
| 32 | | GND | Ground |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input |
| 35 | | GND | Ground |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Input |
| 38 | | GND | Ground |

## Mechanical Dimensions

The connector is compatible with the SFF-8436 specification.



## ⚠Warnings

***Process plug***

The transceiver optics is supplied with a dust cover. This plug protects the transceiver optics during standard manufacturing processes by preventing contamination from air borne particles.It is recommended that the dust cover remain in the transceiver whenever an optical fiber connector is not inserted.

***Handling Precautions***

The transceiver optics is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

***Laser Safety***

The transceiver optics is a Class 1 laser product per international standard IEC 60825-1. Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

For more product information, visit us on the web at www.optcore.net