

# 400G OSFP Passive Direct Attach Copper Cable

## Features

- Compatible with IEEE 802.3ck
- Supports aggregate data rates of 400Gbps(PAM4)
- Optimized construction to minimize insertion loss and crosstalk
- Pull-to-release slide latch design
- Flat Top to Flat Top
- Straight and break out assembly configurations available
- Customized cable braid termination limits EMI radiation
- Customizable EEPROM mapping for cable signature
- 26AWG and 30AWG cable
- 3.3V Power supply
- Temperature Range: 0~ 70 °C
- RoHS Compliant

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## Applications

- Switches, servers and routers
- Data Center networks

## Description

400G OSFP passive copper cable assembly feature eight differential copper pairs, providing four data transmission channels at speeds up to 100Gbps(PAM4) per channel, and meets 400G Ethernet requirements. Available in 26AWG and 30AWG wire gauges, this 400G copper cable assembly features low insertion loss and low crosstalk.

OSFP passive copper cable uses PAM4 signals for transmission, which doubles the rate. However, there are more stringent requirements for cable insertion loss. For detailed requirements, please see High Speed Characteristics.

## General Product Characteristics

| OSFP DAC Specifications |                          |
|-------------------------|--------------------------|
| Number of Lanes         | Tx4 & Rx4                |
| Channel Data Rate       | 106.25Gbps               |
| Operating Temperature   | 0°C to +70°C             |
| Storage Temperature     | -40°C to +85°C           |
| Supply Voltage          | 3.3 V nominal            |
| Electrical Interface    | 60 pins edge connector   |
| Management Interface    | Serial, I <sup>2</sup> C |

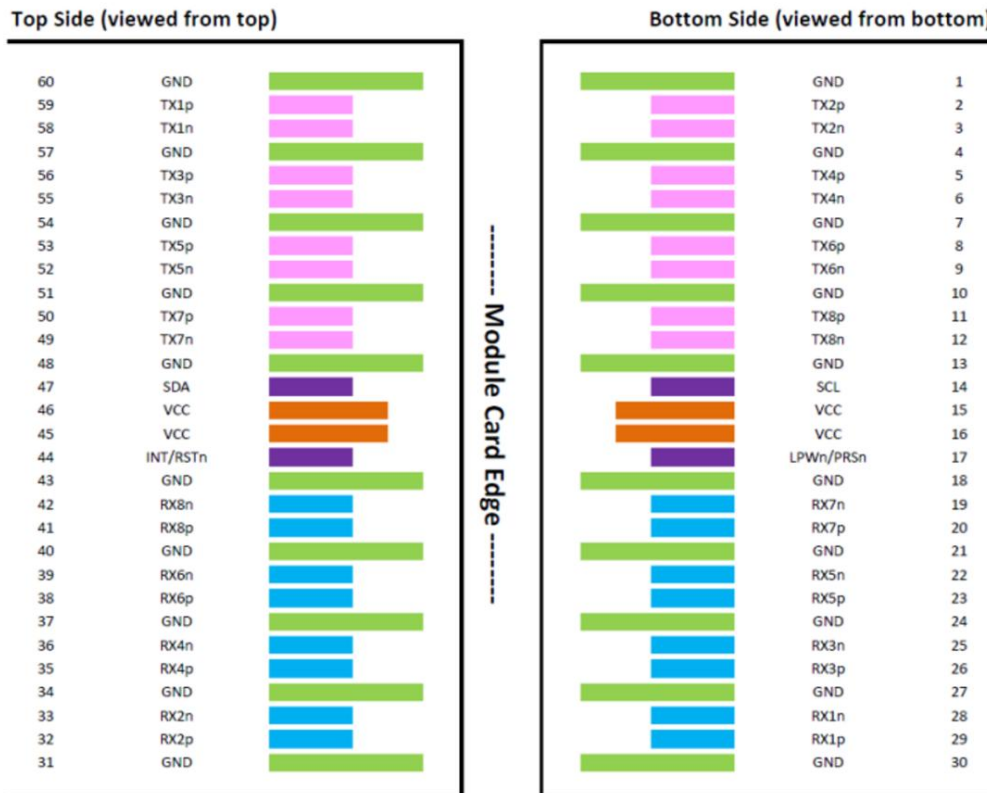
## High Speed Characteristics

| Table1-Absolute Maximum Specifications                                                     |        |        |         |       |      |                      |
|--------------------------------------------------------------------------------------------|--------|--------|---------|-------|------|----------------------|
| Parameter                                                                                  | Symbol | Min    | Typical | Max.  | Unit | Note                 |
| Differential Impedance                                                                     | TDR    | 90     | 100     | 110   | Ω    |                      |
| Insertion loss                                                                             | SDD21  | -19.75 |         |       | dB   | At 26.56 GHz         |
| Differential Return Loss                                                                   | SCD11  |        |         | See 1 | dB   | At 0.05 to 26.56GHz  |
|                                                                                            | SCD22  |        |         | See 2 | dB   | At 26.56 to 40 GHz   |
| Common-mode to common-mode output return loss                                              | SCD11  |        |         | -1.8  | dB   | At 0.2 to 40GHz      |
|                                                                                            | SCD22  |        |         |       |      |                      |
| Differential to common Mode                                                                | SCD11  |        |         | -10   | dB   | At 0.05 to 12.89 GHz |
| Conversion Loss                                                                            | SCD22  |        |         | See3  | dB   | At 12.89 to 40 GHz   |
| Notes:                                                                                     |        |        |         |       |      |                      |
| 1.Reflection Coefficient given by equation $SCD11(dB) < 22-10(f/26.56)$ , with f in GHz    |        |        |         |       |      |                      |
| 2.Reflection Coefficient given by equation $SCD11(dB) < 15-3(f/26.5)$ , with f in GHz      |        |        |         |       |      |                      |
| 3.Reflection Coefficient given by equation $SCD21-CDD21(dB) < 14-0.3108*f$ , with f in GHz |        |        |         |       |      |                      |

## Pin Descriptions

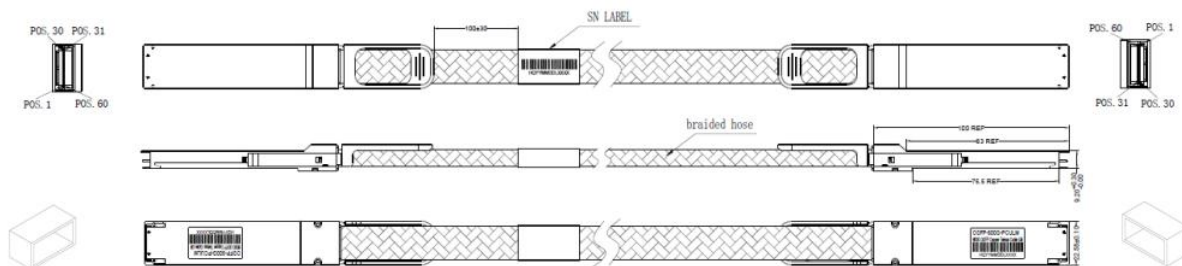
| Table2-Pin Description |        |             |     |        |             |
|------------------------|--------|-------------|-----|--------|-------------|
| Pin                    | Symbol | Description | Pin | Symbol | Description |
| 1                      | GND    | Ground      | 31  | GND    | Ground      |

|    |             |                                      |    |            |                                     |
|----|-------------|--------------------------------------|----|------------|-------------------------------------|
| 2  | Tx2p        | Transmitter Non-Inverted Data Input  | 32 | Rx2p       | Receiver Non-Inverted Data Output   |
| 3  | Tx2n        | Transmitter Inverted Data Input      | 33 | Rx2n       | Receiver Inverted Data Output       |
| 4  | GND         | Ground                               | 34 | GND        | Grounds                             |
| 5  | Tx4p        | Transmitter Non-Inverted Data Input  | 35 | Rx4p       | Receiver Non-Inverted Data Output   |
| 6  | Tx4n        | Transmitter Inverted Data Input      | 36 | Rx4n       | Receiver Inverted Data Output       |
| 7  | GND         | Ground                               | 37 | GND        | Ground                              |
| 8  | Tx6p        | Transmitter Non-Inverted Data Input  | 38 | Rx6p       | Receiver Non-Inverted Data Output   |
| 9  | Tx6n        | Transmitter Inverted Data Input      | 39 | Rx6n       | Receiver Inverted Data Output       |
| 10 | GND         | Ground                               | 40 | GND        | Ground                              |
| 11 | Tx8p        | Transmitter Non- Inverted Data input | 41 | Rx8p       | Receiver Non-Inverted Data Output   |
| 12 | Tx8n        | Transmitter Inverted Data Input      | 42 | Rx8n       | Receiver Inverted Data Output       |
| 13 | GND         | Ground                               | 43 | GND        | Ground                              |
| 14 | SCL         | 2-wire serial interface clock        | 44 | INT / RSTn | Module Interrupt / Module Reset     |
| 15 | VCC         | +3.3V Power                          | 45 | VCC        | +3.3V Power                         |
| 16 | VCC         | +3.3V Power                          | 46 | VCC        | +3.3V Power                         |
| 17 | LPWn / PRSn | Low- Power Mode / Module Present     | 47 | SDA        | 2-wire Serial interface data        |
| 18 | GND         | Ground                               | 48 | GND        | Ground                              |
| 19 | Rx7n        | Receiver Inverted Data Output        | 49 | Tx7n       | Transmitter Inverted Data Input     |
| 20 | Rx7p        | Receiver Non-Inverted Data Output    | 50 | Tx7p       | Transmitter Non-Inverted Data Input |
| 21 | GND         | Ground                               | 51 | GND        | Ground                              |
| 22 | Rx5n        | Receiver Inverted Data Output        | 52 | Tx5n       | Transmitter Inverted Data Input     |
| 23 | Rx5p        | Receiver Non-Inverted Data Output    | 53 | Tx5p       | Transmitter Non-Inverted Data Input |
| 24 | GND         | Ground                               | 54 | GND        | Ground                              |
| 25 | Rx3n        | Receiver Inverted Data Output        | 55 | Tx3n       | Transmitter Inverted Data Input     |
| 26 | Rx3p        | Receiver Non-Inverted Data Output    | 56 | Tx3p       | Transmitter Non-Inverted Data Input |
| 27 | GND         | Ground                               | 57 | GND        | Ground                              |
| 28 | Rx1n        | Receiver Inverted Data Output        | 58 | Tx1n       | Transmitter Inverted Data Input     |
| 29 | Rx1p        | Receiver Non-Inverted Data Output    | 59 | Tx1p       | Transmitter Non-Inverted Data Input |
| 30 | GND         | Ground                               | 60 | GND        | Ground                              |



## Mechanical Specifications

The connector is compatible with the SFF8024 specification.



## Regulatory Compliance

| OSFP DAC Specifications                              | Test Method                | Performance                         |
|------------------------------------------------------|----------------------------|-------------------------------------|
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD-883C Method 3015.7 | Class 1(>2000 Volts)                |
| Electromagnetic Interference(EMI)                    | FCC Class B                | Compliant with Standards            |
|                                                      | CENELEC EN55022 Class B    |                                     |
|                                                      | CISPR22 ITE Class B        |                                     |
| RF Immunity(RFI)                                     | IEC61000-4-3               | Typically Show no Measurable Effect |

|                  |                                                                       |                                             |
|------------------|-----------------------------------------------------------------------|---------------------------------------------|
|                  |                                                                       | from a 10V/m Field Swept from 80 to 1000MHz |
| RoHS Compliance  | RoHS Directive 2011/65/EU and it's Amendment Directives (EU) 2015/863 | RoHS (EU) 2015/863 compliant                |
| REACH Compliance | REACH Regulation (EC) No 1907/2006                                    | REACH (EC) No 1907/2006 compliant           |

## Length Information

| No. | Part Number     | OD     | Length    | AWG   | Tolerance     |
|-----|-----------------|--------|-----------|-------|---------------|
| 1   | OSFP-400G-CUAFH | 10MM   | 0.5 meter | 30AWG | +/-0.05 meter |
| 2   | OSFP-400G-CU1F  | 10MM   | 1 meter   | 30AWG | +/-0.05 meter |
| 3   | OSFP-400G-CUBFH | 12.5MM | 1.5 meter | 26AWG | +/-0.05 meter |
| 4   | OSFP-400G-CU2F  | 12.5MM | 2 meter   | 26AWG | +/-0.05 meter |
| 5   | OSFP-400G-CU3F  | 12.5MM | 3 meter   | 26AWG | +/-0.05 meter |

## Further Information:

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