

DAC-OSFP-400G-CR8-xM

400GBase OSFP112 Direct Attach Cable

Copper, Passive, 0.5m to 2m Lengths, Commercial Temperature

FEATURES

- Compliant with CMIS5.0
- OSFP MSA Ethernet Compliance with IEEE802.3ck
- Support 112G (PAM4) electrical data rates/channel
- Support I2C two-line string interface, easy to control
- Support for hot plugging
- Low crosstalk/Low power
- Maximum Link Length: up to 2m
- ROHS Compliant
- Commercial Operating Temperature Range: 0°C to 70°C

APPLICATIONS

- 400G Ethernet SWITCH/Router
- Data storage and communication industry data centre, cloud server
- NVIDIA ConnectX-7 series VPI network card

DESCRIPTION

DAC-OSFP-400G-CR8-xM 400G OSFP112 Passive Direct Attach Copper Twinax Cable is designed for use in 400G Ethernet. OSFP112 is the module and cage/connector system based on current OSFP, targeting 112Gbps per lane speed in a 4x lane OSFP system enabling the OSFP 400G interconnect ecosystem. This will greatly help legacy OSFP users upgrade the link bandwidth to 400G per port with lower cost and shorter transition time.

WIRING DIAGRAM

| P1 | | | P2 | |
|------|----|---|----|------|
| GND | 1 | | 11 | GND |
| TX2+ | 2 | ↔ | 12 | RX2+ |
| TX2- | 3 | ↔ | 13 | RX2- |
| GND | 4 | | 14 | GND |
| TX4+ | 5 | ↔ | 15 | RX4+ |
| TX4- | 6 | ↔ | 16 | RX4- |
| GND | 7 | | 17 | GND |
| GND | 24 | | 14 | GND |
| RX3- | 25 | ↔ | 15 | TX3- |
| RX3+ | 26 | ↔ | 16 | TX3+ |
| GND | 27 | | 17 | GND |
| RX1- | 28 | ↔ | 18 | TX1- |
| RX1+ | 29 | ↔ | 19 | TX1+ |
| GND | 30 | | 20 | GND |

| P1 | | | P2 | |
|------|----|---|----|------|
| GND | 31 | | 1 | GND |
| RX2+ | 32 | ↔ | 2 | TX2+ |
| RX2- | 33 | ↔ | 3 | TX2- |
| GND | 34 | | 4 | GND |
| RX4+ | 35 | ↔ | 5 | TX4+ |
| RX4- | 36 | ↔ | 6 | TX4- |
| GND | 37 | | 7 | GND |
| GND | 34 | | 24 | GND |
| TX3+ | 35 | ↔ | 25 | RX3- |
| TX3- | 36 | ↔ | 26 | RX3+ |
| GND | 37 | | 27 | GND |
| TX1- | 38 | ↔ | 28 | RX1- |
| TX1+ | 39 | ↔ | 29 | RX1+ |
| GND | 40 | | 30 | GND |

ELECTRICAL CHARACTERISTICS

| ITEM | | REQUIREMENT | TEST CONDITION |
|--|-----------------------------|---|--------------------------------|
| Differential Impedance | Cable Impedance | 100±5Ω | Rise time of 25ps (20% - 80%). |
| | Paddle Card Impedance | 100±10Ω | |
| | Cable Termination Impedance | 100±10Ω | |
| Differential (Input/Output) Return loss S_{DD11}/S_{DD22} | | $16.5-2\sqrt{f}$ $0.05 \leq f < 4.1$ $10.66-14\log_{10}(f/5.5)$ $4.1 \leq f \leq 19$ Where f is the frequency in GHz Return loss (f) is the return loss at frequency f | 10MHz≤f ≤40GHz |
| Differential to common-mode (Input/Output) Return loss S_{CD11}/S_{CD22} | | $22-10(f/26.56)$ $0.05 \leq f < 26.56$ $15-3(f/26.56)$ $26.56 \leq f \leq 40$ Where f is the frequency in GHz Return_loss(f) is the Differential to common-mode return loss at frequency f | 50MHz≤f ≤40GHz |
| Common-mode to Common-mode (Input/Output) Return loss S_{CC11}/S_{CC22} | | $Return_loss(f) \geq 1.8\text{dB}$ $0.05 \leq f \leq 40$ Where f is the frequency in GHz Return_loss(f) is the common-mode to common-mode return loss at frequency f | 50MHz≤f ≤40GHz |
| Differential Insertion Loss (S_{DD21} Max.) | | (Differential InsertionLoss Max. For TPa to TPb Excluding Test fixture) $Return_loss(f) \geq -19.75\text{dB}$ $0.05 \leq f \leq 26.56$ Where f is the frequency in GHz Insertion Loss (f) is the differential insertion loss at frequency f | 50MHz≤f ≤40GHz |
| Insertion Loss Deviation | | $-0.176*f - 0.7 \leq \text{ILD} \leq 0.176*f + 0.7$ | 50MHz≤f ≤26.56GHz |

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| | | |
|--|---|---|
| Differential to common-mode Conversion Loss-Differential Insertion Loss (S_{CD21}-S_{DD21}) | $\text{Conversion_loss}(f) - \text{IL}(f) \geq \begin{cases} 10 & 0.05 \leq f < 12.89 \\ 14-0.3108 & 12.89 \leq f < 40 \end{cases}$ <p>Where f is the frequency in GHz Conversion_loss(f) is the cable assembly differential to common-mode conversion loss IL(f) is the cable assembly insertion loss</p> | $10\text{MHz} \leq f \leq 19\text{GHz}$ |
| MDNEXT (multiple disturber near-end crosstalk) | $\geq 35\text{dB @}26.5\text{GHz}$ | $10\text{MHz} \leq f \leq 26.5\text{GHz}$ |
| Intra Skew | 10ps/m | $10\text{MHz} \leq f \leq 26.5\text{GHz}$ |
| Low Level Contact Resistance | 20milliohms Max. From initial. | EIA-364-23: Apply a maximum voltage of 20mV and a current of 100mA. |
| Insulation Resistance | 10Mohm (Min.) | EIA364-21: AC 300V for 1 minute |
| Dielectric Withstanding Voltage | NO disruptive discharge. | EIA-364-20: Apply a voltage of 300 VDC for 1minute between adjacent terminals and between adjacent terminals and ground |

ENVIRONMENTAL CHARACTERISTICS

| ITEM | REQUIREMENT | TEST CONDITON |
|--|---|--|
| Operating Temperature Range | 0°C to +70°C | Cable operating temperature range. |
| Storage Temperature Range (in packed condition) | -40°C to +80°C | Cable storage temperature range in packed condition. |
| Thermal Cycling Non-Powered | No evidence of physical damage | EIA-364-32D, Method A, -25 to 90C, 100 cycles, 15 min. dwells |
| Salt Spraying | 48 hours salt spraying after shell corrosive area less than 5%. | EIA-364-26 |
| Mixed Flowing Gas | Pass electrical tests per 3.1 after stressing. (For connector only) | EIA-364-35 Class II, 14 days. |
| Temperature Life | No evidence of physical damage | EIA-364-17C w/ RH, Damp heat 90°C at 85% RH for 500 hours then return to ambient |
| Cable Cold Bend | 4H, No evidence of physical damage | Condition: -20°C±2°C, mandrel diameter is 6 times the cable diameter. |

MECHANICAL & PHYSICAL CHARACTERISTICS

| ITEM | REQUIREMENT | TEST CONDITON |
|-------------------------------------|---|---|
| Vibration | 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. |
| Cable Flex | No evidence of physical damage | Flex cable 180° for 20 cycles ($\pm 90^\circ$ 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 |
| Cable Plug Retention in Cage | 125 N Min. No evidence of physical damage | No functional damage to module, connector, or cage with latching mechanism activated. Per OSFP_Specification_Rev5_0 5.0 |
| Cable Retention in Plug | 90N Min. No evidence of physical damage | Cable plug is fixture 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 |
| Mechanical Shock | Pass electrical tests Per 3.1 after stressing. | Clamp and shock per EIA-364-27B, TC-G,3 times in 6 directions, 100g, 6ms. |
| Cable Plug Insertion | 40N Max.(55N) | Per OSFP_Specification_Rev5_0 5.0 Module to be inserted into connector and cage with latch mechanism engaged. (55N if the cage has riding heatsink) |
| Cable plug Extraction | 30N Max. (45N) | Per OSFP_Specification_Rev5_0 5.0 Module to be removed from connector and cage with latching mechanism disengaged. (45N if the cage has riding heatsink) |
| Durability | 50 cycles No evidence of physical damage | Per OSFP_Specification_Rev5_0 5.0, Number of cycles for an individual module, to be tested with cage, connector, and module, latches may be locked out during testing |

MECHANICAL DIMENSIONS (UNITS: mm)

