

## DAC-SFP25G-xM

### 25GBase SFP28 Direct Attach Cable

Copper, Passive, 1m to 5m Lengths

#### FEATURES

- Single channel data rate of 25Gbps
- Compliant with SFP+ MSA and SFF-8432 compliant
- Compliant with IEEE 802.3 and FCoE
- Enhanced EMI / EMC performance
- Support serial ID function through EEPROM
- Supports cable customization up to 5 meters
- 30AWG to 26AWG cable available
- RoHS and halogen-free options

#### APPLICATIONS

- Switch / Router / HBA
- Servers and storage devices
- Data centre network
- Base station / BBU / RRU
- Fibre Channel
- 25Gbps Ethernet

#### DESCRIPTION

SFP28 direct attach cables are low-cost, efficient, high-speed interconnect solutions with a single channel maximum transmission rate of 25Gbps. It is suitable for stacking and connection of short-distance switch equipment.

## WIRING DIAGRAM

| Starting                               | End                                    | Remark                       |
|--|--|------------------------------|
| X1. 12                                 | X2. 19                                 | Pair                         |
| X1. 13                                 | X2. 18                                 |                              |
| X1. 18                                 | X2. 13                                 | Pair                         |
| X1. 19                                 | X2. 12                                 |                              |
| X1:1, 2, 6<br>8, 10, 11, 14,<br>17, 20 | X2:1, 2, 6<br>8, 10, 11, 14,<br>17, 20 | Drain wire                   |
| X1:1, 4, 5<br>15, 16                   | X1:1, 4, 5<br>15, 16                   | EEPROM point<br>at both ends |

## ELECTRICAL CHARACTERISTICS

| ITEM   |                             | REQUIREMENT  |         |        |        |        |        |          | TEST<br>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) Return loss SDD11/SDD22                |                             | Return_loss(f)≥ $\frac{16.5-2\sqrt{f}}{10.66-14\log_{10}(f/5.5)}$ $0.05\leq f < 4.1$<br>$4.1\leq f\leq 19$<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 (Input/Output) Return loss SCD11/SCD22 |                             | Return_loss(f)≥ $\frac{22-(20/25.78)f}{15-(6/25.78)f}$ $0.01\leq f < 12.89$<br>$12.89\leq f\leq 19$<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-mode (Input/Output) Return loss SCC11/SCC22  |                             | Return_loss(f)≥2dB $0.2\leq f\leq 19$<br>Where f is the frequency in GHz<br>Return_loss(f) is the common-mode to common-mode return loss at frequency f  |         |        |        |        |        |          | 10MHz≤f ≤19GHz                   |
| Differential Insertion Loss (SDD21 Max.)                           |                             | (Differential Insertion Loss Max. For TPa to TPb Excluding Test fixture)   |         |        |        |        |        |          | 10MHz≤f ≤19GHz                   |
|  |                             | F AWG  | 1.25GHz | 2.5GHz | 5.0GHz | 7.0GHz | 10GHz  | 12.89GHz |                                  |
|  |                             | 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   |                                  |

## CONTINUED

|   |   |  |
|---|---|--|
| <b>Differential to common-mode Conversion Loss-Differential Insertion Loss (<math>S_{CD21}-S_{DD21}</math>)</b> | $\text{Conversion\_loss}(f) - \text{IL}(f) \geq \left\{ \begin{array}{ll} 10 & 0.01 \leq f < 12.89 \\ 27-(29/22)f & 12.89 \leq f < 15.7 \\ 6.3 & 15.7 \leq f \leq 19 \end{array} \right\}$ <p>Where f is the frequency in GHz<br/> Conversion_loss(f) is the cable assembly differential to common-mode conversion loss<br/> IL(f) is the cable assembly insertion loss</p> | $10\text{MHz} \leq f \leq 19\text{GHz}$  |
| <b>MDNEXT (multiple disturber near-end crosstalk)</b>   | $\geq 26\text{dB @} 12.89\text{GHz}$  | $10\text{MHz} \leq f \leq 19\text{GHz}$  |
| <b>Intra Skew</b>   | 15ps/m  | $10\text{MHz} \leq f \leq 19\text{GHz}$  |
| <b>Low Level Contact Resistance</b>   | 70milliohms Max. From initial.  | EIA-364-23: Apply a maximum voltage of 20mV<br>And a current of 100 mA.  |
| <b>Insulation Resistance</b>  | 10Mohm (Min.)   | EIA364-21:AC 300V 1minute  |
| <b>Dielectric Withstanding Voltage</b>  | 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  |
|--|---|--|
| <b>Operating Temperature Range</b>                     | -20°C to +75°C  | Cable operating temperature range.   |
| <b>Storage Temperature Range (in packed condition)</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 90°C, 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. (For connector only) | EIA-364-35 Class II, 14 days.  |
| <b>Temperature 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 & PHYSICAL CHARACTERISTICS

| ITEM                                | REQUIREMENT                                       | TEST CONDITON  |
|-------------------------------------|---|--|
| <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>Twist</b>                        | No evidence of physical damage                    | Twist cable 180° ( $\pm 90^\circ$ from nominal position) for 100 cycles at 30 cycles per minute with a 0.5kg load applied to the cable jacket.<br>Clamp position: 300mm  |
| <b>Cable Flex</b>                   | 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.<br>Per EIA-364-41C |
| <b>Cable Plug Retention in Cage</b> | 90N Min.<br>No evidence of physical damage        | Force to be applied axially with no damage to cage. Per SFF 8661 Rev 2.1 Pull on cable jacket approximately 1 ft behind cable plug. No functional damage to cable plug below 90N.<br>Per SFF-8432 Rev 5.0                  |
| <b>Cable Retention in Plug</b>      | 90N Min.<br>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.<br>Per EIA-364-38B   |
| <b>Mechanical Shock</b>             | Pass electrical tests<br>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>         | 18N Max.(SFP28)                                   | Per SFF-8432 Rev 5.0   |
| <b>Cable plug Extraction</b>        | 12.5N Max. (SFP28)                                | Measure without the aid of any cage kick-out springs. Place axial load on de-latch to de-latch plug.<br>Per SFF-8432 Rev 5.0   |
| <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)   |

## MECHANICAL DIMENSIONS (UNITS: mm)

