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Technical Datasheet

DAC-QSFP40G-xM

40GBase QSFP+ Direct Attach Cable

Copper, Passive, 1m to 7m Lengths

FEATURES

- Hot-plug swappable
- 3X Port Density over SFP / SFP+
- Optimized NEXT & Return Loss
- Low cost and low power solution compared to fibre optical cable
- Compliant with QSFP+ MSA and SFF-8436
- Compliant with IEEE 802.3ba/ InfiniBand QDR specifications
- Enhanced EMI/EMC performance
- Supports serial ID functionality through EEPROM
- Passive cable assembly supports distances up to 7 meters
- 30AWG to 24AWG cable sizes available
- RoHS compliant and Halogen-Free option available

APPLICATIONS

- Switches / Routers / HBAs/SAN, NIC cards
- Server & Storage Devices
- Data Centre Networking
- High Performance Compute
- Fibre Channel
- InfiniBand QDR/DDR
- 40G Ethernet

DESCRIPTION

QSFP+ (Quad Small Form factor Pluggable) Direct Copper Cable assemblies are designed for InfiniBand 10 Gigabit Ethernet and 40 Gigabit Ethernet applications. These cables provide four channels of data in one pluggable interface. Each channel is capable of transferring data at 10Gbps and supports a total of 40Gbps data rate. And meet all IBTA, QSFP MSA and SFF-8436, and InfiniBand QDR specification requirements. Compared with fibre optic cable assemblies, QSFP+ direct copper cable provides a cost-effective solution in data centre short reach interconnect applications.

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WIRING DIAGRAM

X1	X2	REMARKS
18(RX1-)	37(TX1-)	pair
17(RX1+)	36(TX1+)	
15(RX3-)	34(TX3-)	pair
14(RX3+)	33(TX3+)	
6 (TX4+)	25(RX4+)	pair
5 (TX4-)	24(RX4-)	
3 (TX2+)	22(RX2+)	pair
2 (TX2-)	21(RX2-)	
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

X1	X2	REMARKS
37(TX1-)	18(RX1-)	pair
36(TX1+)	17(RX1+)	
34(TX3-)	15(RX3-)	pair
33(TX3+)	14(RX3+)	
25(RX4+)	6 (TX4+)	pair
24(RX4-)	5 (TX4-)	
22(RX2+)	3 (TX2+)	pair
21(RX2-)	2 (TX2-)	
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

ELECTRICAL CHARACTERISTICS

<table>
<tr><th colspan="2">ITEM</th><th colspan="5">REQUIREMENT</th><th>TEST CONDITION</th></tr>
<tr><td rowspan="3">Differential Impedance</td><td>Cable Impedance</td><td colspan="5">100±5Ω</td><td rowspan="3">Rise time of 35ps (20% - 80%).</td></tr>
<tr><td>Paddle Card Impedance</td><td colspan="5">100±10Ω</td></tr>
<tr><td>Cable Termination Impedance</td><td colspan="5">100±15Ω</td></tr>
<tr><td colspan="2">Differential (Input/Output) Return loss S_{DD11}/S_{DD22}</td><td colspan="5">≤-10dB</td><td>10MHz≤f≤5GHz</td></tr>
<tr><td colspan="2" rowspan="5">Differential Insertion Loss (S_{DD21} Max.)</td><td colspan="5">Differential InsertionLoss Max. For TPa to TPb Excluding Test fixture</td><td rowspan="5">10MHz≤f ≤19GHz</td></tr>
<tr><td>F / AWG</td><td>600Mhz</td><td>1.25Ghz</td><td>2.5Ghz</td><td>5.0Ghz</td></tr>
<tr><td>30(1m)</td><td>≥-3.0dB</td><td>≥-4.0dB</td><td>≥-5.5dB</td><td>≥-8.0dB</td></tr>
<tr><td>28(3m)</td><td>≥-5.0dB</td><td>≥-6.5dB</td><td>≥-9.5dB</td><td>≥-14.0dB</td></tr>
<tr><td>26(5m)</td><td>≥-6.0dB</td><td>≥-8.0dB</td><td>≥-11.0dB</td><td>≥-16.0dB</td></tr>
<tr><td colspan="2">Insertion Loss Deviation</td><td colspan="5">$-0.7-0.2*10^{-3}f \leq ILD \leq 0.7+0.2*10^{-3}f$
(f is the frequency in MHz)</td><td>10MHz≤f≤5GHz</td></tr>
<tr><td colspan="2">MDNEXT (multiple disturber near-end crosstalk)</td><td colspan="5">≥26dB</td><td>10MHz≤f≤5GHz</td></tr>
<tr><td colspan="2">Low Level Contact Resistance</td><td colspan="5">80Mohms Max. From initial.</td><td>EIA-364-23: Apply a maximum voltage of 20mV And a current of 100 mA.</td></tr>
<tr><td colspan="2">Insulation Resistance</td><td colspan="5">10Mohm (Min.)</td><td>EIA364-21: AC 300V 1minute</td></tr>
<tr><td colspan="2">Dielectric Withstanding Voltage</td><td colspan="5">NO disruptive discharge.</td><td>EIA-364-20: Apply a voltage of 300 VDC for 1minute between adjacent terminals And between adjacent terminals and ground.</td></tr>
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ENVIRONMENTAL PERFORMANCE

ITEM	REQUIREMENT	TEST CONDITON
Operating Temperature Range	-20°C to +75°C	Cable operating temperature range.
Storage Temperature Range (in packed condition)	-20°C to +55°C	Cable storage temperature range in packed condition.
Thermal Cycling Non-Powered	No evidence of physical damage	EIA-364-32D, Method A, -25 to 90°C, 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 CHARACHTERISTICS

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 (±90° from nominal position) at 12 cycles per minute with a 1.0kg load applied to the cable jacket. Flex in the boot area 90º in each direction from vertical. Per EIA-364-41C
Cable Plug Retention in Cage	90N Min. 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. Per SFF-8432 Rev 5.0
Cable Retention in Plug	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
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.	Per SFF-8436 Rev 5.4.1.
Cable plug Extraction	30N Max.	Place axial load on de-latch to de-latch plug. Per SFF-8436 Rev 5.4.1.
Durability	50 cycles, No evidence of physical damage	EIA-364-09, perform plug & unplug cycles: Plug and receptacle mate rate: 250times/hour. 50 times for module (CONNECTOR TO PCB)

MECHANICAL DIMENSIONS (UNITS: mm)