

## DAC-QSFP-4SFP10G-xM

### 40GBase QSFP+ to 4x 10GBase SFP+ Direct Attach Cable

Copper, Passive, 0.5m to 7m Lengths

#### FEATURES

- Protocol agnostic support of 40GbE, QDR InfiniBand, SAS & Fibre Channel
- 10Gbps transfer rate per SFP+ channel (40Gbps aggregate)
- Compliant with SFF-8436 / SFF-8431
- 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 metres
- 30AWG to 24AWG cable sizes available
- RoHS compliant

#### APPLICATIONS

- Switches / Routers / HBAs / SAN, NIC cards
- Server & Storage Devices
- Data Centre Networking
- Fibre Channel
- InfiniBand QDR/DDR
- 10G/40G Ethernet

#### DESCRIPTION

QSFP+ to 4x SFP+ Passive Direct Attach Copper Cable is a cost-effective, high-speed interconnect solution that allows cables to connect QSFP+ and SFP+ switches and network devices without the need to upgrade an entire data centre or storage array. It enables customers to interconnect between 40G and 10G devices (NIC / HBA / CNA, switch devices, and servers).

## WIRING DIAGRAM

wire	Starting signal	Starting	End	End signal	wire	Starting signal	Starting	End	End signal
W1	RX1+	X1. 17	X2. 18	TX1+	W3	RX3+	X1. 14	X4. 18	TX3+
	RX1-	X1. 18	X2. 19	TX1-		RX3-	X1. 15	X4. 19	TX3-
	GND	X1. 19	X2. 20	GND		GND	X1. 16	X4. 20	GND
	TX1+	X1. 36	X2. 13	RX1+		TX3+	X1. 33	X4. 13	RX3+
	TX1-	X1. 37	X2. 12	RX1-		TX3-	X1. 34	X4. 12	RX3-
	GND	X1. 38	X2. 14	GND		GND	X1. 35	X4. 14	GND
W2	GND	X1. 20	X3. 20	GND	W4	GND	X1. 23	X5. 20	GND
	RX2-	X1. 21	X3. 19	TX2-		RX4-	X1. 24	X5. 19	TX4-
	RX2+	X1. 22	X3. 18	TX2+		RX4+	X1. 25	X5. 18	TX4+
	GND	X1. 1	X3. 14	GND		GND	X1. 4	X5. 14	GND
	TX2-	X1. 2	X3. 12	RX2-		TX4-	X1. 5	X5. 12	RX4-
	TX2+	X1. 3	X3. 13	RX2+		TX4+	X1. 6	X5. 13	RX4+

## ELECTRICAL CHARACTERISTICS

ITEM		REQUIREMENT				TEST CONDITION	
Differential Impedance	Cable Impedance	105+5/-5Ω				Rise time of 35ps (20% - 80%).	
	Paddle Card Impedance	100±10Ω					
	Cable Termination Impedance	100±15Ω					
Differential (Input/Output) Return loss $S_{DD11}/S_{DD22}$		$Return\_loss(f) \geq \begin{matrix} 10\sqrt{f} & 0.01 \leq f < 4.1 \\ 6.3-13\log_{10}(f/5.5) & 4.1 \leq f \leq 11.1 \end{matrix}$ Where f is the frequency in GHz Return loss (f) is the return loss at frequency f				0.01GHz≤f≤11.1GHz SFF-8431 Rev 4.1	
Differential Insertion Loss ( $S_{DD21}$ Max.)		(Differential InsertionLoss Max. For TPa to TPb Excluding Test fixture)				10MHz≤f≤19GHz	
		F AWG	0.6GHz	1.25GHz	2.5GHz	5.0GHz	10MHz≤f≤5GHz
		30AWG (1m) Max.	2dB	3dB	4.5dB	7.5dB	
		30 AWG (2m) Max.	4dB	5dB	7dB	10dB	
		28AWG (3m) Max.	4dB	5.5dB	7.5 dB	12dB	
		26AWG(5m) Max.	5.5dB	7dB	10dB	16.0dB	
24AWG (7m&10m) Max.	6.5dB	10dB	14dB	21dB			
MDNEXT (multiple disturber near-end crosstalk)		≥26dB				10MHz≤f≤5GHz	
Insertion Loss Deviation		-0.7-0.2*10 <sup>-3</sup> f ≤ ILD ≤ 0.7+0.2*10 <sup>-3</sup> f (f is the frequency in MHz)				10MHz≤f≤5GHz	
Low Level Contact Resistance		70milliohms 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 1 minute		

**CONTINUED**

<b>Dielectric Withstanding Voltage</b>	DC 500V 1 minute disruptive discharge.	EIA-364-20: Apply a voltage of 500 VDC for 1minute between adjacent terminals and between adjacent terminals and ground.
--	--	--

**ENVIRONMENTAL CHARACTERISTICS**

<b>ITEM</b>	<b>REQUIREMENT</b>	<b>TEST CONDITON</b>
<b>Operating Temperature Range</b>	-20°C to +75°C	Cable operating temperature range.
<b>Storage Temperature Range (in packed condition)</b>	-25°C to +65°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 90C, 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>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. Per EIA-364-41C
<b>Cable Plug Retention in Cage</b>	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
<b>Cable Retention in Plug</b>	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
<b>Mechanical Shock</b>	Pass electrical tests 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>	40N Max. (QSFP+) 18N Max. (SFP+)	Per SFF8432 Rev 5.0.
<b>Cable plug Extraction</b>	30N Max. (QSFP28) 12.5N Max. (SFP28)	Measure without the aid of any cage kick-out springs. Place axial load on de-latch to de-latch plug. 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: 250 times/hour. 50 times for QSFP28/SFP28 module (CONNECTOR TO PCB)

# MECHANICAL DIMENSIONS (UNITS: mm)

