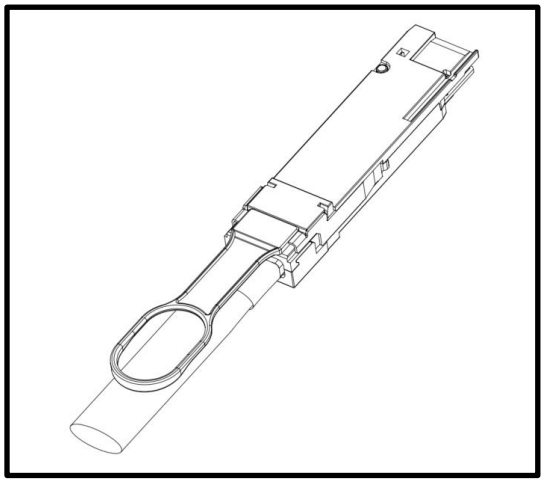
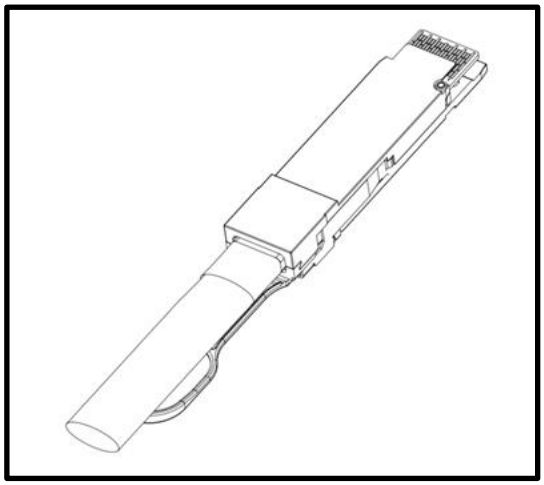
Product Specifications | May 2023
78-5102-0417-1, Rev A

3M™ 400G QSFP DD Direct Attach Copper Cable Assemblies, 9V Series





Scope

This document summarizes test methods, test conditions, and product performance requirements for 3M™ 400G QSFP DD Direct Attach Copper Cable Assemblies. 9V Series.

Reference Documents

Note: Unless otherwise specified, latest edition of the reference documents applies. In the event of conflict between requirements of the references and 3M specification, 3M specification shall take precedence. Commercial standards, specifications and report

EIA-364
QSFP DD MSA
IEEE 802.3cd

3M™ 400G Direct Attach Copper Cable Assemblies, 9V Series		
Literature Code	**Series**	**Document Title**
78-9102-8512-7	9V	Customer Drawing, 3M™ 400G QSFP DD Direct Attach Copper Cable Assemblies, Custom
78-5100-2744-0	9V	Customer Drawing, 3M™ 400G QSFP DD Direct Attach Copper Cable Assemblies, General Market

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Performance Testing

Unless otherwise specified, all tests shall be performed on QSFP DD headers mated to QSFP DD sockets with 3M Twinax cable at conditions per EIA-364. Unless otherwise specified, all values and limits are typical of those obtained by qualification testing of the subject product. All specifications are subject to revision and change without notice from 3M.

Ratings

3M™ 400G QSFP DD Direct Attach Copper Cable Assemblies, 9V Series	
Feature	**Value**
Impedance	100ohms
Operating Temperature	0°C to 70°C
Storage Temperature	-20°C to 85°C
Humidity	0% to 80% RH
Halogen Free – VW1 cable only	VW1 cable option only. Does not include connector ends. UL has tested cables to be Halogen Free per UL Style 22429. UL file E42769.

Materials

3M™ 400G QSFP DD Direct Attach Copper Cable Assemblies, 9V Series		
	Component	**Material**
Connector	**Shell**	Die Cast Zinc
Connector	**Pull Tab**	Thermoplastic
Connector	**Latch**	Stainless Steel
Connector	**Spring**	Stainless Steel
Connector	**Paddle Card**	Halogen Free PCB with 0.73um (30u”) Au over 1.27um (50u”) Ni min mating pad finish.
Cable	**Primary Cable**	100 Ohm differential PO insulators
Cable	**EMI Shield**	Aluminum Foil laminate
Cable	**Jacket**	Braided Sleeve Halogen Free material.

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Regulatory Compliance

For regulatory information, visit 3M.com/regs or contact your 3M representative. See customer drawings for regulatory specifics on each connector.

Electrical

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

3M™ 400G QSFP DD, Direct Attach Copper Cable Assemblies, 9V Series				
Description or Parameter	**Units**	**Values and Limits**	**Requirement or Conditions**	**Test Standard or Method**
Dielectric Withstanding Voltage	V DC	100	Subject a voltage of 100 VDC for 1 minute at sea level between adjacent contacts of mated and unmated connector assemblies.	EIA-364-20, A-D
Insulation Resistance	Megaohms	>1000	Measured between adjacent and opposing contacts with 100 V applied for 1 minute.	EIA-364-21
Low Level Contact Resistance (LLCR)	Millohms	$\triangle R \leq 20$	Subject a voltage of 20 mV max open circuit at a current not exceeding of 100 mA max on mated connector assemblies.	EIA-364-23C

Mechanical

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

3M™ 400G QSFP DD, Direct Attach Copper Cable Assemblies, 9V Series				
Description or Parameter	**Units**	**Values and Limits**	**Requirement or Conditions**	**Test Standard or Method**
QSFP DD Mating force	Newtons	90N Max.	Refer to QSFP DD MSA. Tested without latch feature	EIA-364-13
QSFP DD Un-mating force	Newtons	50N Max.	Refer to QSFP DD MSA. Tested without latch feature	EIA-364-13
Housing Latch Test	Newtons	90N Min.	Refer to QDFP DD MSA. Tested with latch feature	EIA-364-98
Mechanical Shock	G Sec Pulse	30 11ms half sine	Mated connectors shall exhibit no damage. No significant change in SI performance.	EIA-364-27C Method H
Vibration	Gn Acc (m/s^2)	10 98.1	Test II (10-500Hz, gn=10, 98.1m/s^2); Test VII with condition B (random vibration 0.005g^2/Hz, rms g=1.55); 15min/axis, all directions. No significant change in SI performance.	EIA-364-28 Test II, Test VII condition B
Durability (preconditioning)	mA	△R ≤ 20	Perform 50 unplug/plug cycles. Pass LLCR.	EIA-364-09
Durability	mA	△R ≤ 20	Perform 300 unplug/plug cycles. Pass LLCR.	EIA-364-09
Reseating	NA	Nil	Perform 3 unplug/plug cycles.	EIA-364-09
Cable Pull Out Test	Pounds	50 75	No interruption to continuity	EIA-364-38 Conditions A & B
Cable Flex Test	cycles	500	Circular cable – Method 1, Flat cable – Method 1 and Method 2 as applicable. Bend 90 deg, 60 deg and 45 deg. (no interruption to continuity)	EIA-364-41 MIL-STD-1344
Cable Mechanical Clamp Test	Pounds	30	Clamp cable bundle with 1 inch square clamp (no SI impact)	Custom
Impact of Bend and Loops Test	Coils Bend Radii	4 0.125 inch	Loop cable 4 times around progressively smaller mandrels until SI failure occurs. (3” OD, 2” OD, 1” OD, 0.5” OD) Min bend radius with no SI impact.	Custom

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Environmental

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Description or Parameter	**Units**	**Values and Limits**	**Requirement or Conditions**	**Test Standard or Method**
Temperature Life (Thermal Aging)	Degrees C Hours	85, -55 168 @ 85 168 @ -55	No physical abnormalities. No significant change in Signal Integrity.	EIA-364-17C Method A & C
Thermal Shock	Degrees C Cycles Min (dwell)	-55 & 85 25 5	No physical abnormalities. No significant change in Signal Integrity.	EIA-364-32A Condition I
Humidity Test	Degrees C % RH Hours	40 90 to 95 168	Steady State Humidity Test. No significant change in Signal integrity	EIA-364-31 Method II

Qualification Test Groups and Sequenced Tests

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

3M™ 400G QSFP DD, Direct Attach Copper Cable Assemblies, 9V Series							
		Test Group					
	EIA 364 TP No.	**1**	**2**	**3**	**4**	**5**	**6**
Test Description		**Test Sequence**					
Visual	18	1,9	1,8	1, 7	1, 5	1,3	1,6
Signal Integrity		2,8		2,6	2,4		
Mechanical Vibration	28	7					
Mechanical Shock	27	6					
Thermal Shock	32	5					
Humidity Test (Steady State)	31	4					
Temperature Life	17C	3					
Low Level Contact Resistance	23C		2,4,7				
Durability (preconditioning)	09		3				
Durability (full)	09		5				
Mating Force	13			3			
Unmating Force	13			4			
Housing Latch Test	98						5
Reseating	09		6				
Insulation Resistance	21						4
Dielectric Withstand Voltage	20						3
Cable Pullout	38					2	
Cable Flex	41						2
Mechanical Clamp				5			
Bend and Loop					3		

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