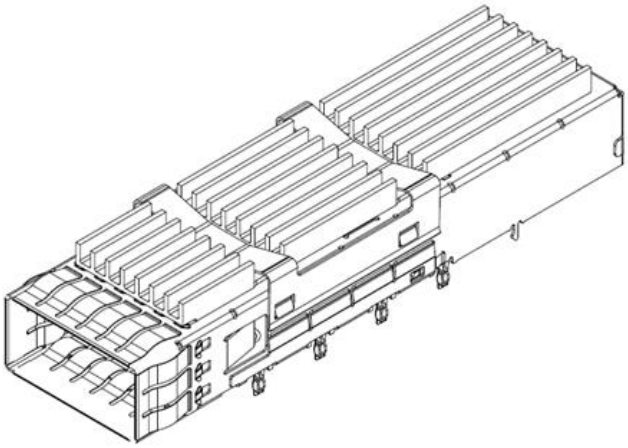
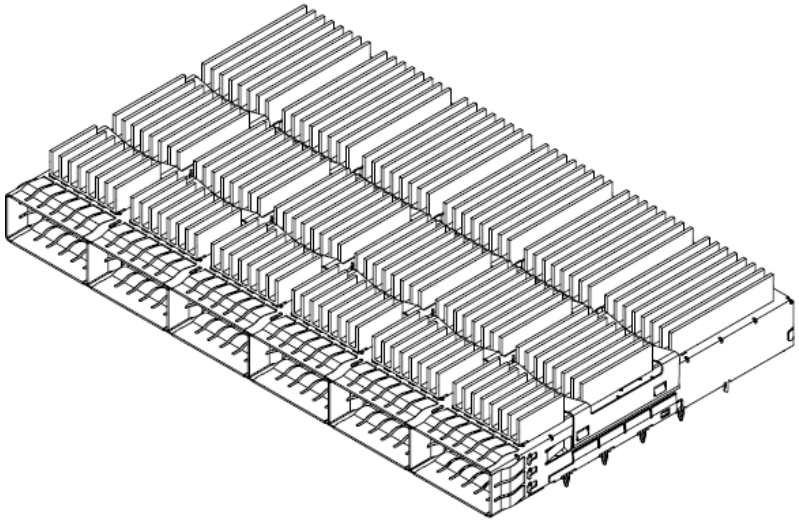
molex

PRODUCT SPECIFICATION

QSFP-DD SINGLE PORT (1X1) SHEET METAL SPRING-FINGER CAGE



THROUGH
QSFP-DD MULTI PORT (1X6) SHEET METAL SPRING-FINGER CAGE



REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
C1	ECM No: **646714** DATE: **10/08/2020**	**PRODUCT SPECIFICATION QSFP-DD 1x1-1x6 CAGES**	**1** of **11**

DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
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1.0 SCOPE

This Product Specification covers the QSFP-DD (Quad Small Form Factor Pluggable Double Density) 1x1 through 1x6 sheet metal spring-finger cage assemblies. The cage is connected to the host pc board by press-fit compliant legs. This product definition will cover mechanical, thermal, and EMI performance.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER(S)

Product Name: QSFP-DD
Cage Series: 203143 (1x1), 203152 (1x2), 203369 (1x3), 203370 (1x4), 203371 (1x5) and 203372 (1x6).
Part Numbers: 203143XXXX (1x1), 203152XXXX (1x2), 203369XXXX (1x3), 203370XXXX (1x4), 203371XXXX (1x5), and 203372XXXX (1x6)

2.2 ASSEMLBY DESCRIPTION

2.2.1 Single port – Cage base attached to cage top with laser welded dovetail (hidden under panel EMI spring fingers). Panel EMI fingers attached with folded tabs. Heat sinks are captured by Heat sink clip attached with latch tabs

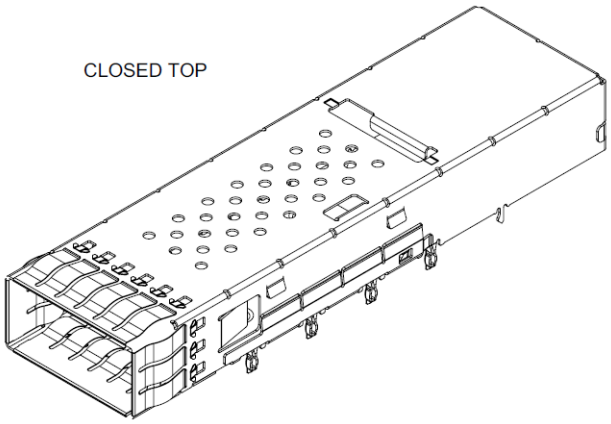
2.2.2 Multi-port – Cage base attached to cage top with laser welded dovetail (hidden under panel EMI spring fingers) and low profile tabs from the inner walls. Inner walls have a tab resistance welded to the rear wall of cage top. Inner wall EMI fingers are laser welded together around inner wall. Panel EMI fingers attached with folded tabs. Heat sinks are captured by Heat sink clip attached with latch hooks and latch tabs.

2.3 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

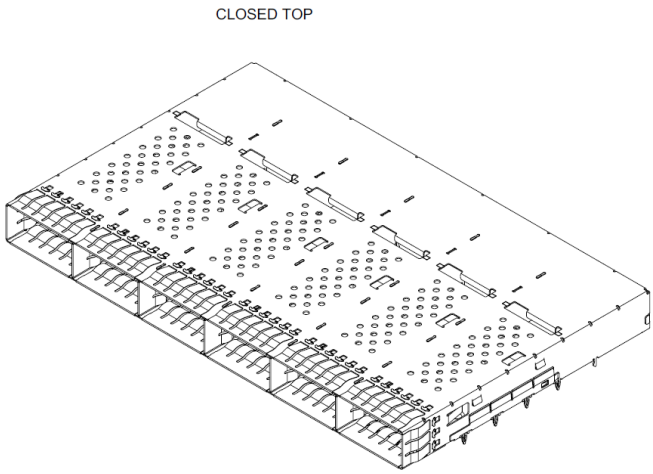
For information on single port cages refer to SD 2031431201 and 2031432201.
For information on 2 port cages refer to SD 2031521201 and 2031522201.
For information on 3 port cages refer to SD 2033691201 and 2033692201.
For information on 4 port cages refer to SD 2033701201 and 2033702201.
For information on 5 port cages refer to SD 2033711201 and 2033712201.
For information on 6 port cages refer to SD 2033721201 and 2033722201.

2.4 PRODUCT DIAMGRAMS

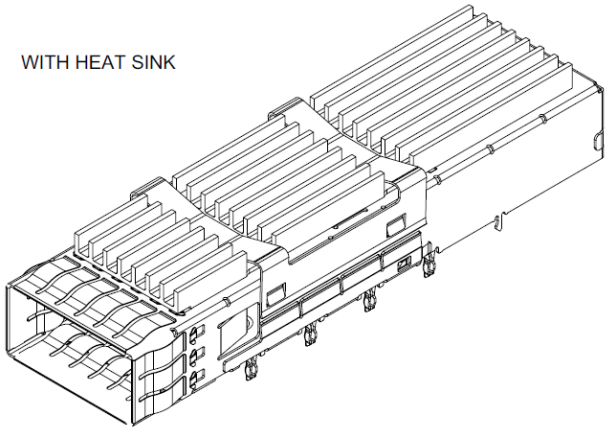
QSFP-DD Single Port Cage Assembly
Shown with optional closed top



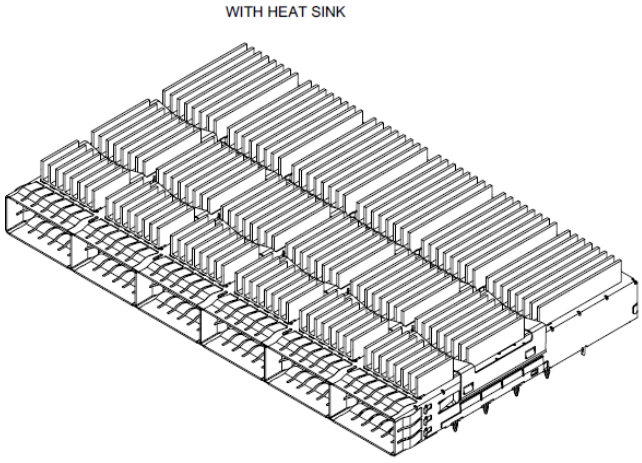
QSFP-DD 1x6 Cage Assembly
Shown with optional closed top



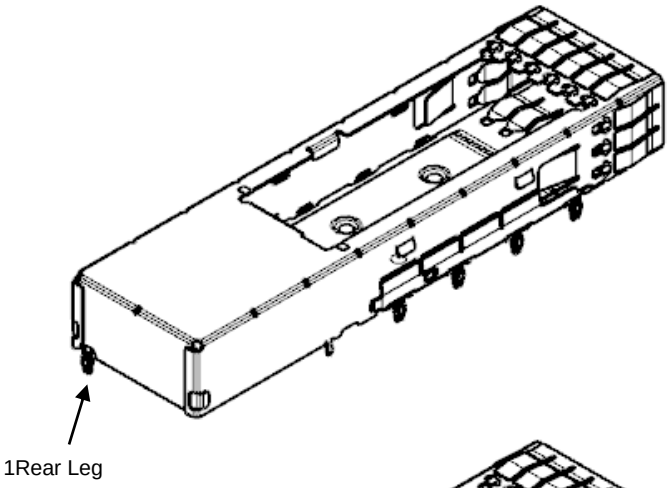
QSFP-DD Single Port Cage Assembly
Shown with optional heat sink

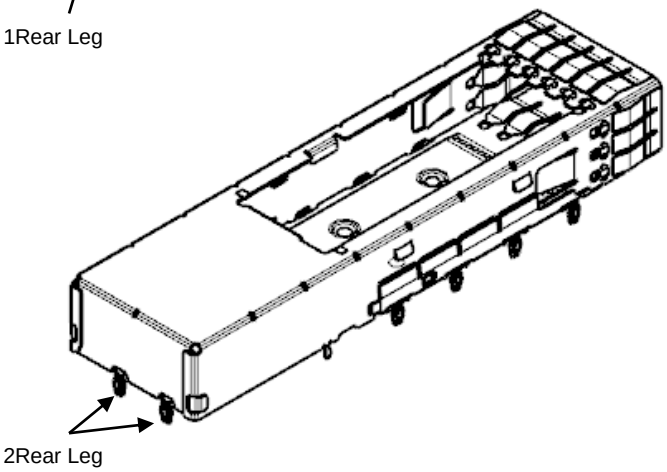


QSFP-DD 1x6 Cage Assembly
Shown with optional heat sink

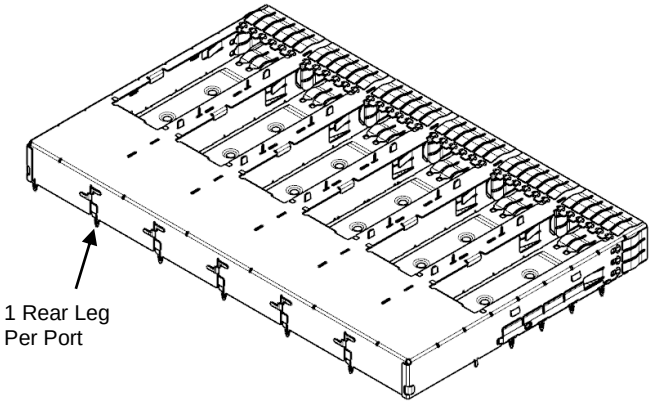


QSFP-DD Single Port Cage Assembly
Shown with optional rear press-fit legs

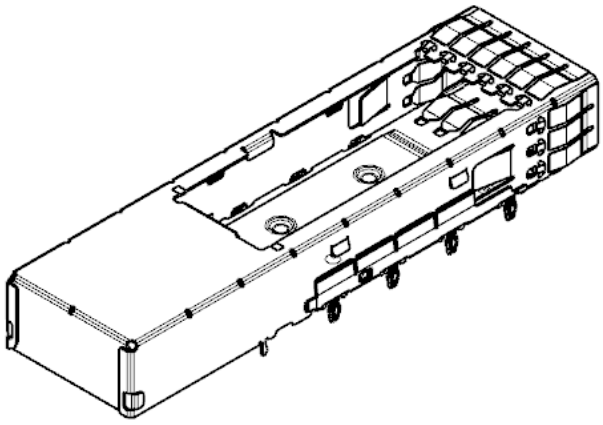




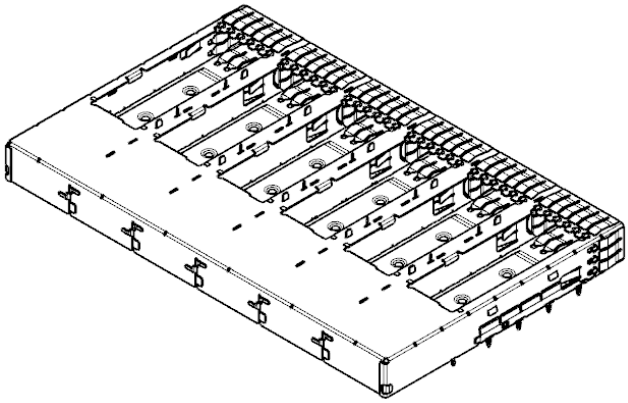
QSFP-DD 1x6 Cage Assembly
Shown with optional rear press-fit legs



Shown without optional rear press-fit legs



Shown without optional rear press-fit legs



3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

3.1 MOLEX DOCUMENTS

WI-HP-7-2774 Cosmetic Specification Molex HPC / HPA

3.2 INDUSTRY DOCUMENTS

QSFP-DD MSA Specification – QSFP-DD supports up to 400 Gb/s Cage (Style A)

4.0 RATINGS

4.1 VOLTAGE

120 Volts AC

4.2 CURRENT

0.5 Amps Max.

4.3 TEMPERATURE

Operating: - 40°C to + 85°C
Non-operating: - 55°C to + 105°C

5.0 PERFORMANCE

5.1 MECHANICAL PERFORMANCE

	DESCRIPTION	TEST CONDITION	REQUIREMENT	RESULT
1	Random Vibration	EIA-364-28, Test Condition VII, Condition Letter D. Subject mated specimens to 3.13 G's RMS between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes.	No components of cage assembly come apart, off, or loose.	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
2	Mechanical Shock	EIA-364-27, Condition H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.	No components of cage assembly come apart, off, or loose.	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
3	Module Insertion	EIA-364-13 Measure force necessary to insert module into cage at a maximum rate of 25.4 mm per minute.	90N Max per QSFP-DD MSA	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
4	Module Extraction	EIA-364-13 Measure force necessary to extract module from cage at a maximum rate of 25.4 mm per minute.	50N Max per QSFP-DD MSA	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
5	Latch Retention (Latch Strength)	EIA-364-98 Apply axial load to cable assembly plugged into cage at a maximum rate of 130N per minute, then holding for 10sec.	No damage to cage latch below 125N Min per QSFP-DD MSA	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
6	Cage-Latch Intermateability	Perform test using a variety of modules from various vendors. Insert and latch module into a single port. De-latch module using de-latch pull tab and remove straight out of port. Repeat for 130 cycles using the same module in the same port. (*Sample size depends on number of available vendor modules.)	No failures in the ability of the module to latch or de-latch in the cage port.	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS

**See noted test summaries for complete test data*.

(MECHANICAL PERFORMANCE CONT'D)

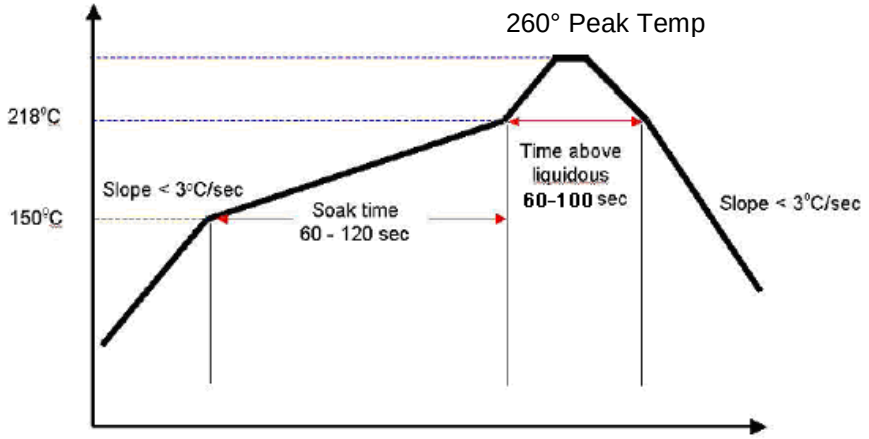
	DESCRIPTION	TEST CONDITION	REQUIREMENT	RESULT
7	Cage Insertion Force from PCB	Cage at a maximum rate of 50.0 mm per minute.	Force to be applied in a vertical direction, no damage to cage	**1X1** 167.82 MIN. 440.30 MAX. **1X2** 204.95 MIN. 538.88 MAX. **1X3** 399.67 MIN. 908.71 MAX. **1X4** 458.16 MIN. 1071.99 MAX. **1X5** 686.10 MIN 1793.29 MAX **1X6** 644.50 MIN 1368.12 MAX
8	Cage Extraction Force from PCB	Cage at a maximum rate of 50.0 mm per minute.	114 N Min for 1x1 cage, Force to be applied in a vertical direction, no damage to cage	**1X1** 118.37 MIN. 240.17 MAX. **1X2** 100.94 MIN. 284.53 MAX. **1X3** 132.21 MIN. 459.03 MAX. **1X4** 220.50 MIN. 496.87 MAX. **1X5** 237.59 MIN. 508.07 MAX. **1X6** 218.13 MIN. 466.14 MAX.

5.2 THERMAL PERFORMANCE

	DESCRIPTION	TEST CONDITION	REQUIREMENT	RESULT
10	Temperature Life/ Aging	EIA-364-17, Method A, Test Condition 4 Subject mated specimens to 105°C for 240 Hours	Show no physical damage and meet cosmetic spec WI-HP-7-2774	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
11	Humidity/ Temperature Cycling	EIA-364-31, Method III Cycle between 25ºC ±3ºC at 80% RH and 65ºC ±3ºC at 95% RH.	Show no physical damage and meet cosmetic spec WI-HP-7-2774	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
12	Thermal Shock	EIA-364-32, Test Condition VII Subject specimens to 5 cycles between -55 and 105°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures	Show no physical damage and meet cosmetic spec WI-HP-7-2774	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS
13	Resistance to Solder Heat (Note 1.)	EIA-364-56 Subject to 4 cycles of convection solder reflow process	Show no physical damage and meet cosmetic spec WI-HP-7-2774	1X1 PASS 1X2 PASS 1X3 PASS 1X4 PASS 1X5 PASS 1X6 PASS

Note 1. No include those thermal sensitive components of light pipe, light pipe holder, soldering heat sink & heat pipe.

Recommended Reflow Curve



Temperature vs. Time

5.3 EMI PERFORMANCE

	DESCRIPTION	Test Condition
14	EMI Shielding	IEC 61000-4-21 (All Ports Populated)

Ganged Cage	Frequency Range (GHz)	Limit (dB)
1x1 QSFP-DD	3-6	17
	6-40	27-0.353*F
1x2 QSFP-DD	2 - 30	20
	30 - 40	15
1x3 QSFP-DD	2 - 30	20
	30 - 40	15
1x4 QSFP-DD	1 - 10	25
	10 – 30	20
	30 - 40	17
1x5 QSFP-DD	1 – 30	25
	30 - 40	18
1x6 QSFP-DD	1 – 14	25
	14 – 40	18

*See RTS – 2031431201 for 1x1
RTS – 2031521201 for 1x2
RTS – 2033691201 for 1x3
RTS – 2033701201 for 1x4
RTS – 2033711201 for 1x5
RTS – 2033721201 for 1x6
Complete EMI test data.

6.0 TEST PLAN

	Group Number	A	B	C	D	E
	Visual / Dimension Inspection	1,3,5,7	1,3,4,6,8	1,4	1,3,5,7	1,3
1	**Random Vibration**	2				
2	**Mechanical Shock**	4				
3	**Module Insertion**		4			
4	**Module Extraction**		5			
5	**Latch Retention (Latch Strength)**		7			
***6**	**Cage-Latch Intermateability**	6				
7	**Cage Press-Fit Insertion Force**			2		
8	**Cage Extraction Force**			3		
9	**Temp Life/Aging**				2	
10	**Humidity/Temp Cycling**				4	
11	**Thermal Shock**				6	
12	**Resistance to Solder Heat**		2			
13	**EMI Shielding**					2

*Sample size depends on number of available vendor modules.
*See RTS – 2031430001 for group A
RTS – 2031430002 for group B
RTS – 2031430003 for group C
RTS – 2031430004 for group D complete test data.

7.0 PACKAGING

7.1 Cages shall be packaged in trays to protect against damage during handling, transit and storage

Revision	Date	Description
A	2018/04/13	INITIAL RELEASED
B	2018/06/28	UPDATED “TBD”
B1	2018/11/28	REVISED THE TYPE OF DOCUMENT FROM RPS TO PS
C	2019/05/09	ADDED 1X1~1X6 SD XXXXX-2201 ON SHEET 2.
C1	2020/09/30	ADDED NOTE OF ITEM “RESISTANCE TO SOLDER HEAT”