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PRODUCT NAME OR PRODUCT REFERENCE Product Picture 1 QSFP CAGE			
Prepared by: Bok Zeng	Check by: Hongji Chen	Approved by: Hongji Chen	
Date: 06/15/23	Date: 06/15/23	Date: 06/15/23	



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2 / 8**1 SCOPE**

This specification defines the performance, tests, quality and reliability requirements of the **QSFP Cage** product.

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the specification applies. In the event of conflict between requirements of this specification and product drawing, product drawing shall take precedence.

2.1 Industry standards**2.1.1 QSFP MSA****2.1.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.****3 MECHANIC DIMENSIONS****3.1 Dimensions:**

Refer to engineering drawing

4 REQUIREMENTS**4.1 Qualification**

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein. Unless otherwise specified, all measurements shall be performed within the following lab conditions:

a. Temperature: 25°C±10°C.

b. Relative Humidity: 20% to 80%

c. Atmospheric Pressure: 650mm to 800mm of Hg (86 ~106Kpa)

4.2 Materials

a. Cage: Stainless Steel or Copper Alloy

b. EMI Spring: Stainless Steel or Copper Alloy

4.3 Finish

Plated finished for qualification components shall be meet the cage's application.

4.4 Workmanship

Cage shall be uniform in quality and shall be free from burrs, scratches, cracks, voids, chips, blisters, sharp edges, and other defects that will that may impair performance.

5 RATING

5.1 Operating temperature : -55°C TO +85°C

5.2 Storage temperature : -55°C TO +85°C

6 MECHANICAL CHARACTERISTICS

6.1 Durability

Mating and un-mating with applicable module, Durability tested in accordance with EIA-364-09.

The following details shall apply:

- Number of Cycles: 100 cycles.
- Test Speed 25.4 mm per minute.

6.2 Mating/un-mating Force

The force to mate a cage and module shall not exceed 60 Newtons per contact. The unmating force shall not exceed 30 Newtons per contact. The following details shall apply:

- Test Speed 25.4 mm per minute.
- Utilize free floating fixtures.
- Reference EIA-364-13.

6.3 Transceiver Retention Force

Pull the cage and module that match each other while the locking mechanism is still in action. The axis of action is the normal direction of the connector.

- Test Speed 25.4 mm per minute.
- Test force: 90 N Min.
- No functional damage and meet visual requirements.

6.4 Latch Strength of Cage

Measure force necessary to remove module from cage assembly with latches enabled.

- Test Speed 25.4 mm per minute.
- Test force: 125 N Min.
- Reference EIA-364-98.

6.5 Strength of stop on cage

After the optical module is fully inserted, a force is applied to the stop structure

- No functional damage and meet visual requirements.
- Test force: 100N

6.6_ Press-fit Insertion Force

Insertion Force Per Pin under the minimum crimp aperture of IMSn surface treatment

- a. Test Speed 25.4 mm per minute.
- b. Single PIN press-fit insertion force:

Stainless steel :

1.05mm diameter :Max 50N

0.95mm diameter :Max 40N

0.85mm diameter :Max 35N

Bronze :

1.05mm diameter :Max 40N

0.95mm diameter :Max 30N

0.85mm diameter :Max 25N

Copper-Nickel Alloy :

1.05mm diameter :Max 30N

0.95mm diameter :Max 25N

0.85mm diameter :Max 20N

Total press-fit insertion force:

Maximum force allowed in a single PIN * number of pins

6.7_ Extraction Force

Retention Force per pin under the maximum crimp aperture of OSP surface treatment

- a. Test Speed 25.4 mm per minute.
- b. single PIN extraction force

Stainless steel :

1.05mm diameter :Min. 8N/Pin

0.95mm diameter :Min. 6N/Pin

0.85mm diameter :Min. 5N/Pin

Bronze and Copper-Nickel Alloy :

1.05mm diameter :Min. 8N/Pin

0.95mm diameter :Min. 6N/Pin

0.85mm diameter :Min. 4N/Pin

Total extraction force:

Minimum force allowed in a single PIN * number of pins

6.8_ Shearing Force

Measurement method: use the device that can export the insertion force curves to test the overall retention force. Note that the FHS must be within the maximum and minimum value range. Thickness of PTH copper is between 20 and 50 μ m. Roughness of PTH copper, $R_z < 30 \mu$ m. Maximum FHS PCB holes are plated by OSP, Minimum

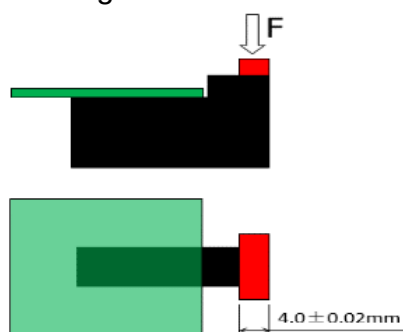
FHS PCB holes are plated by ImmSn. The pressfit surface must be consistent with the drill surface of the PCB (the surface where the connector silkscreen is located). Output the mechanical curve and read the peak value.

a. Test Speed 25.4 mm per minute.

b. Test force:

压接光口 类型	规格	X*1	X*2	X*3	X*4	X*6	X*8	X*12
单层 Cage (不含连接器)	Cage 引脚数	≥11pin	≥11pin	≥20pin	≥20pin	≥33pin	≥45pin	≥65pin
	侧推力	≥35N	≥35N	≥60N	≥60N	≥75N	≥135N	≥170N
双层 Cage+连接器	Cage 引脚数	≥13pin	≥21pin	≥29pin	≥37pin	≥53pin	≥69pin	≥101pin
	侧推力	≥40N	≥60N	≥80N	≥100N	≥140N	≥170N	≥170N

c. Test diagram:



6.9_ Cage installing to Panel force

Test the mounting force of the panel and cage under the Minimum panel opening.

a. Test Speed 25.4 mm per minute.

b. Test force:

1*1 port: 14N Max	2*1 port: 23N Max
1*2 port: 25N Max	2*2 port: 32N Max
1*3 port: 34N Max	2*3 port: 42N Max
1*4 port: 45N Max	2*4 port: 52N Max
1*5 port: 53N Max	2*5 port: 62N Max
1*6 port: 65N Max	2*6 port: 72N Max

6.10_ Mechanical Vibration

Frequency: 20-500Hz, g's: 3.10G,

Duration: 15 minutes in each of three mutually perpendicular directions.

a. No functional damage and meet visual requirements.

b. Reference EIA-364-28.

6.11_ Mechanical Shock

Peak Value: 30G,

Duration: 11mSec.

Waveform: Half Sine

No. of Shocks/Direction:3 shocks/3 axes (18 total).

- a. No functional damage and meet visual requirements.
- b. Reference EIA-364-27.

7 ENVIRONMENTAL CHARACTERISTICS

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the mechanical requirements per paragraphs 6.0 as specified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

7.1_ Thermal Shock EIA-364-32.

- a. Number of Cycles - 10 Cycles
- b. Temperature Range - Between -55 and 85 °C
- c. Time at Each Temperature - 30 minutes
- d. Transfer Time - 5 minutes, maximum

7.2_ Humidity- Temperature Cycling EIA-364-31.

- a. Relative Humidity - 90~95%
- b. Temperature – 25~65 °C
- c. Duration - 10days
- d. Omit step cold shock & vibration where applicable

7.3_ Temperature Life.

No physical damage shall be observed after tested in accordance with EIA-364-17.

The following details shall apply:

- a. Test Duration: 432 hours.
- b. Temperature: 115 °C.

8 QUALITY ASSURANCE PROVISIONS

8.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662 and ISO 9000.

8.2 Inspection Condition

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

- a) Temperature: 25°C±10 °C.
- b) Relative Humidity : 20% to 80%
- c) Atmospheric Pressure : 650mm to 800mm of Hg (86 ~106Kpa)

8.3 Sample Quantity and Description

The sample size to be tested in each group shown in Qualification Testing Sequences should follow Table 1; All samples must be free of defects that would impair normal connector operation. All samples must meet dimensional requirements of connector.

8.4 Acceptance

8.4.1 Mechanical requirements placed on test samples as indicated in Paragraphs 6 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

8.4.2 Failures attributed to equipment, test set up, or operator error shall not disqualify the product. If product failure occurs, corrective actions shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

8.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures, normally used in production. The test sequence shall be as shown in Qualification Testing Sequences Visual Examination: EIA 364-18

8.6 Re-qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate re-qualification testing consisting of all applicable parts of the qualification test matrix Table 1.

- a. A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.
- b. A significant change is made to the manufacturing process, which impacts the product form, fit or function.
- c. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.



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9 QUALIFICATION TESTING SEQUENCES

Table 1

QUALIFICATION TEST

No.	Description	Item	Test Group & Sequence												
			A	B	C	D	E	F	G	H					
1.	Examination of cage(s)	4.4	1,3	1,3,5	1,4	1,4	1,3	1	1,3	1,3					
2.	Durability		2												
3.	Mating/ un-mating Force				2										
4.	Transceiver Retention Force			4											
5.	Latch Strength of Cage			6											
6.	Strength of stop on cage			2											
7.	Press-fit Insertion Force			7											
8.	Extraction Force				3										
9.	Shearing Force							2							
10.	Cage installing to Panel force			8											
11.	Mechanical Vibration								2						
12.	Mechanical Shock									2					
13.	Thermal Shock					2									
14.	Humidity- Temperature Cycling					3									
15.	Temperature Life						2								
Sample Quantity			5	5	5	5	5	5	5	5					

REVISION RECORD

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A	All	Release specification		