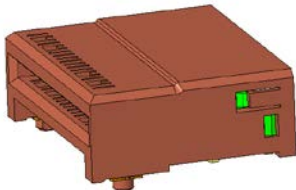


QSFP224 1x1 CONNECTOR

Product Name	Part No.	Product Picture
QSFP224 CONN.	PQP038-753X-001-1H	

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1 SCOPE

This specification defines the performance, tests, quality and reliability requirements of the QSFP



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224G series connector products.

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 EIA-364-18, Initial examination of product.
- 2.1.2 EIA-364-18, Final examination of product
- 2.1.3 EIA-364-70, Current rating
- 2.1.4 EIA-364-21, Insulation resistance
- 2.1.5 EIA-364-13, Mating/Unmating force (Insertion/Withdrawal force)
- 2.1.6 EIA-364-04, Force-Deflection
- 2.1.7 EIA-364-23, Low Level Contact Resistance (LLCR)
- 2.1.8 EIA-364-20, Withstanding voltage
- 2.1.9 EIA-364-28, Random vibration
- 2.1.10 EIA-364-27, Mechanical shock
- 2.1.11 EIA-364-09, Durability
- 2.1.12 EIA-364-32, Thermal shock
- 2.1.13 EIA-364-31, Humidity/temperature cycling
- 2.1.14 EIA-364-17, Temperature life
- 2.1.15 EIA-364-65, Mixed flowing gas
- 2.1.16 EIA-364-10, Thermal cycling
- 2.1.17 EIA-364-91, Dust
- 2.1.18 EIA-364-110, Thermal disturbance

3 MECHANICAL DIMENSIONS**3.1 Dimensions:**

Refer to customer 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)



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3 / 9**4.2 Materials**

- a. Contacts: Copper and Copper alloy.
- b. Insulator: High temperature Engineering plastics, UL94 V-0.

4.3 Finish

Plated spec for qualification components shall be meet the connector's application.

4.4 Workmanship

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

5 RATINGS

5.1 Operating Voltage Rating = 30 volts AC/DC max.

5.2 Operating Temperature Range = -45°C TO +85°C

5.3 Mating Cycles = 100

6 HIGH-SPEED ELECTRICAL PERFORMANCE (SIGNAL INTEGRITY)**6.1 Signal Integrity Test Procedures and Test Conditions**

To be agreed upon with CEI-112G-VSR-PAM4.

7 ELECTRICAL CHARACTERISTICS

7.1 Current Rating: 0.5 ampere maximum per signal contact
0.5 ampere maximum per low speed contact
When tested in accordance with EIA-364-70.

7.2 Insulation Resistance: The insulation resistance of mated connectors shall not be less than 1000M ohms initially and 1000M ohms after environmental exposure, when tested in accordance with EIA-364-21. The following details shall apply:

- a. Test Voltage - 100 volts DC.
- b. Electrification Time - 1 minutes min., unless otherwise specified.
- c. Points of Measurement - Between adjacent contacts (or between contacts and other conductive surfaces, if applicable)

8 MECHANICAL CHARACTERISTICS**8.1 Mating/Un-mating Force**

The force to mate a plug connector shall not exceed 40N. The unmating force shall not exceed



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30N. The following details shall apply:

- a. Cross Head Speed: 25.4±3 mm or inch per minute.
- b. Utilize free floating fixtures.
- c. Reference EIA-364-13, Method A.

9 ENVIRONMENTAL RELIABILITY

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 electrical and mechanical requirements as specified in the Section 11 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

ELECTRICAL TESTS

9.1 Low Level Contact Resistance (LLCR)

The low level contact resistance shall not exceed 30 milliohms initially. The low level contact resistance shall also not exceed 10 milliohms increase in resistance (from the initial measurement) after any treatment and/or environmental exposure. Measurements shall be in accordance with EIA-364-23.

- a. Method of Connection – 4-wire
- b. Test Voltage - 20 milli-volts DC max open circuit.
- c. Test Current - Not to exceed 100 milli-amperes.

9.2 Dielectric Withstanding voltage

There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current (>0.5m amperes) when mated connectors are tested in accordance with EIA-364-20.

- a. Test Voltage: 300 volts AC at sea level.
- b. Test Duration: 60 seconds min.
- c. Points of Measurement - Between adjacent contacts

or between contacts and other conductive surfaces, if applicable.

MECHANICAL TESTS

9.3 Durability



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Mating and un-mating with applicable PCB, Durability tested in accordance with EIA-364-9.

- a. Number of Cycles: 100 cycles.
- b. Cycling Rates: 500±50 cycles/hour
- c. No physical damage.

9.4 Durability (Preconditioning)

Mating and un-mating with applicable PCB, Durability tested in accordance with EIA-364-9.

- a. Number of Cycles: 20 cycles.
- b. Cycling Rates: 500±50 cycles/hour.
- c. No physical damage.

9.5 Vibration

Mated plug and connector with fixture and placed on the test bench.

- a. Reference: EIA-364-28, Test Condition VII, Level D
- b. 20-500Hz; 3.10Grms; 15 min; 3 mutually perpendicular axes
- c. No interrupts greater than 1 microsecond, no damage.

9.6 Mechanical Shock

Mated plug and connector with fixture and placed on the test bench.

- a. Reference: EIA-364-27 Method A
- b. Peak Value: 50G, Duration: 11mSec. Waveform: Half Sine. Change speed: 3.44 m/s.
- c. Number of Shocks/Direction: 3 shocks/direction (18 total).
- d. Discontinuity less than 1µs, No damage.
- e. Test current: 10 mA.

9.7 Reseating

- a. No evidence of physical damage visible as a result of reseating (1 cycle).

ENVIRONMENTAL TESTS**9.8 Thermal Shock**

- a. Reference: EIA-364-32, Method A, Test Condition VII
- b. Number of Cycles: 5 cycles
- c. Temperature Range: Between -55°C and 85°C
- d. Time at Each Temperature: 30 minutes

9.9 Humidity/temperature cycling

- a. Reference: EIA-364-31, Method III, Condition B, omitting 7b (vibration)
- b. Environmental condition: $25\pm 2^{\circ}\text{C}$ to $65\pm 2^{\circ}\text{C}$ at 90 to 98%RH;
- c. Ramp time 0.5Hour
- d. Dwell time 24 hour for one cycle, total: 10 cycles

9.10 Thermal Cycling

- a. Reference: EIA-364-110, Condition A
- b. Test condition: Cycle the connector between $15\pm 3^{\circ}\text{C}$ and $85\pm 3^{\circ}\text{C}$, Humidity is not controlled
- c. Test duration: Ramps should be a minimum of 2°C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes)
- d. Number of cycles: 10 cycles

9.11 Temperature Life

- a. Reference: EIA-364-17, Method A
- b. Test Duration: LLCR checked after 240 hours.
- c. Temperature: $105^{\circ}\text{C}\pm 2^{\circ}\text{C}$
- d. (Telcordia GR-1217 requirement)

9.12 Temperature Life (Preconditioning)

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

The following details shall apply:

- a. Test Duration: **132** hours.
- b. Temperature: $105^{\circ}\text{C}\pm 2^{\circ}\text{C}$.

9.13 Mixed Flowing Gas corrosion

- a. Reference: EIA-364-65
- b. Class II A (4 gas)
- c. Duration - 14 days
- d. One-half of the specimens unmated for 7 days followed by 7 days mated. Remaining one-half of the specimens mated for all 14 days
- e. LLCR tested on all samples after 7 days and again after 14 days.

9.14 Dust

- a. Reference: EIA-364-91
- b. Expose unmated connectors to dust contamination.
- c. Dust composition: #1. Flow rate: 300 meters/minute.
- d. Exposure time: 1 hour

10 QUALITY ASSURANCE PROVISIONS

10.1 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.

10.2 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)

10.3 Sample Quantity and Description

The sample size for each electrical and mechanical qualification test (Table 1 and Table 2) and for each group in the Reliability Qualification Test Plan (Table 3) should follow EIA-364-1000; All samples must be free of defects that would impair normal connector operation. All samples must meet dimensional requirements of connector.

10.4 Acceptance

10.4.1 Electrical and mechanical requirements placed on test samples as indicated in Sections 7, 8, and 9 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.

10.4.2 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.

10.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures, normally used in production. The test sequences are outlined in Tables 1-3.

10.6 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,

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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.			

11 QUALIFICATION TESTING SEQUENCES

Table 1

RELIABILITY QUALIFICATION TEST									
No .	Description	Section	Test Group & Sequence						
			1	2	3	4	5	6	
1	LLCR	9.1	1,4,6	1,4,6 ,8	1,4,6 ,8	1,4,6 ,8	1,4,6 ,8	2,7	
2	Withstanding voltage	9.2						1,6	
3	Durability	9.3						5	
4	Durability (Preconditioning)	9.4	2	2	2	2	2		
5	Vibration	9.5			5				
6	Mechanical Shock	9.6			7				
7	Reseating	9.7	5	7		7	7		
8	Thermal Shock	9.8		3					
9	Humidity/temperature cycling	9.9		5					
10	Thermal Cycling	9.10					5		
12	Temperature Life	9.11	3 ¹						
13	Temperature Life (Preconditioning)	9.12			3	3			
14	Mixed Flowing Gas corrosion	9.13				5 ²			
15	Dust	9.14					3		
16	Insulation Resistance	7.2						3,8	
17	Insertion/Withdrawal Force	8.1						4,9	

¹During Temperature Life testing, samples shall be tested for LLCR at 240hrs

²During Mixed Flowing Gas testing, one-half of the samples shall be unmated for 7 days, followed by 7 days mated. The remaining one-half of the samples shall be mated for all 14 days. LLCR shall be tested on all samples after 7 days and again after 14 days.

REVISION RECORD

Rev	Page	Description	EC#	Date
X1	All	NEW RELEASE		2025.05.09