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TITLE DDR4 288P 0.85mm Pitch Socket		PAGE 1 of 8	REVISION A
		AUTHORIZED BY Nickor Zuo	DATE 25 Nov 15
		CLASSIFICATION UNRESTRICTED	

1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the DDR4 288P 0.85mm pitch socket.

2.0 Scope

This specification is applicable to DDR4 family DIMM socket of products which provides memory module card to PCB interconnecting.

3.0 Ratings

- 3.1 Operating Voltage Rating = 29.9 V_{AC} (RMS) or V_{DC} Max.
- 3.2 Operating Current Rating = 0.75 A/Contact Max.
- 3.3 Operating Temperature Range = -55 °C ~ +85 °C

4.0 Applicable Documents

- 4.1 FCI Engineering drawings 10124632, 10129040, 10130419, 10124677, 10124806, 10129206 etc.
- 4.2 FCI Product Shelf life-Storage-Solderability GS-20-060
- 4.3 FCI Package specification GS-14-2267
- 4.4 Flammability: UL94V-0 or similar applicable specification
- 4.5 EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.
- 4.6 IEC 60512: Connectors for Electronic Equipment – Tests and Measurement


5.0 Requirements

5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

5.2 Material

Terminal: Copper alloy
Housing: High temperature thermoplastic
Ejector: High temperature thermoplastic

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5.3 Terminal Plating

- Contact Area:
Performance-base plating, qualified to meet the requirements of this specification
- Tails: Tin plated over Nickel Or Tin-lead plated over Nickel

5.4 Design and Construction

Connectors shall be of the design, construction and physical dimensions specified on the applicable product drawings.

5.5 Visual

Visual examinations shall be performed using 10X magnification. Parts should be free from blistering, cracks, etc.

6.0 Electrical Characteristics

6.1 Contact Resistance, LLCR

The low level contact resistance shall not exceed 10 mΩ initially. The low level contact resistance shall also not exceed 10 mΩ increase in resistance (from the initial measurement) after any treatment and/or environmental exposure.

Measurements shall be in accordance with EIA-364-23.

The following details shall apply:

- a. Test Voltage - 20 mV Max.
- b. Test Current - 100 mA Max.

6.2 Insulation Resistance

The insulation resistance of unmated connectors shall not be less than 1MΩ initially and after environmental exposure.

Measurements shall be in accordance with EIA-364-21.

The following details shall apply:


- a. Test Voltage – 500V DC.
- b. Electrification Time - 2 minutes, unless otherwise specified.
- c. Points of Measurement - Between adjacent contacts.

6.3 Dielectric Withstanding Voltage

There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current > 1m amperes when unmated connectors are tested in accordance with EIA-364-20.

The following details shall apply:

- a. Test Voltage - 500V (AC RMS, 60Hz).
- b. Test Duration - 60 seconds.

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- c. Test Condition - 1 (760 Torr - sea level).
- d. Points of Measurement - Between adjacent contacts.

6.4 Temperature Rise

A thermocouple is inserted through holes in the socket housing, as close to the contact interface as possible. Temperature rise shall not exceed 30°C per contact.

The following details shall apply:

- a. Ambient Conditions – Still air at room temperature.
- b. Reference – EIA-364-70, method 2.
- C. 0.75 amp/pin

7.0 Mechanical Characteristics

7.1 Module Mating/Unmating Force

The force to mate a module with ejectors installed shall not exceed 106.8 N. The force to pull out a module without ejectors shall not be less than 19.77N.

The following details shall apply:

- a. Cross Head Speed for mating- 25.4mm per minute.
- b. Cross Head Speed for unmating – 12.7mm per minute.
- b. Utilize free floating fixtures.
- c. Reference –EIA-364-13.

7.2 Terminal Retention Force

Axially 300gf Min force to pull out a contact from housing, no movement of the contact more than 0.38mm.

The following details shall apply:


- a. Cross Head Speed - 25.4 ±1 mm per minute.
- b. Reference –EIA-364-29.

7.3 Forklock Retention Force

Axially 13.3N Min force to pull out a forklock from housing, no movement of the forklock more than 0.38mm.

The following details shall apply:

- a. Cross Head Speed - 25.4 ±1 mm per minute.
- b. Reference –EIA-364-29.

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7.4 Insertion Force –Connector to Board (For Forklock type only)
Axially force to insert the connector to PCB shall be 75N max

The following details shall apply:

- a. Cross Head Speed – 12.7 ±1 mm per minute.
- b. Reference –EIA-364-05.

7.5 Compliant Pin Insertion Force to PCB (For DDR4 PF only)

The force to insert a compliant pin into PCB hole at a rate of 25.4 ± 1mm/minute shall not exceed 1.5kg.

7.6 Compliant Pin Retention Force to PCB (For DDR4 PF only)

The force to pull out a compliant pin from PCB hole at a rate of 25.4 ± 1mm/minute shall not be less than 0.20kg.

8.0 Environmental Conditions

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 above as specified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

8.1 Thermal Shock – EIA-364-32, Method A, Table2, Test Condition 1

- a. Number of Cycles - perform 5 cycles in mated condition
- b. Temperature Range - Between -55 and 85 °C


8.2 Cyclic Temperature and Humidity – EIA-364-31, Method III without conditioning, initial measurements, cold shock and vibration. Ramp times should be 0.5 hour and dwell times should be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within specified levels, perform 24 cycles in mated condition.

8.3 Temperature Life (Preconditioning) –EIA-364-17, Method A (without electrical load), following shall be applied in mated connectors,

- a. Test Temperature – 105 °C
- b. Test Duration – 24 hours to simulate a 3 year life cycle for gold flash plating,36 hours to simulate a 5 year life cycle for 15u” gold or GXT plating,50 hours to simulate a 7 year life cycle for 30u” gold or GXT plating.

8.4 Temperature Life –EIA-364-1000, following shall be applied in mated connectors,

- a. Test Temperature – 105 °C
- b. Test Duration – 48 hours to simulate a 3 year life cycle for gold flash plating,72 hours to simulate a 5 year life cycle for 15u” gold or GXT plating,91 hours to simulate a 7 year life cycle for 30u” gold or GXT plating

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8.5 Mixed Flowing Gas– EIA-364-65, Class – 2A, Option 4.

The mated duration and unmated duration Per EIA-364-1000 table 4.1:5 days to simulate a 3 year life cycle for gold flash plating,7 days to simulate a 5 year life cycle for 15u” gold or GXT plating,10 days to simulate a 7 year life cycle for 30u” gold or GXT plating.

8.6 Thermal Disturbance

- a. Temperature– Between 15±3°C and 85±3°C without humidity control.
- b. Ramp should be a minimum of 2°C per minute.
- c. Dwell time: 5 minutes, start when the temperature have stabilized.
- d. Duration - perform 10 cycles in mated condition.

8.7 Vibration (Random) – EIA-364-28

- a. Test Condition –

Random profile:

5 Hz @ 0.01 g2/Hz to 20 Hz @ 0.02 g2/Hz (slope up)

20 Hz to 500 Hz @ 0.02 g2/Hz (flat)

Input acceleration is 3.13 g RMS

10 minutes per axis for all 3 axes on all samples

Random control limit tolerance is ± 3 dB

- b. Module weight 40 ± 2 grams. Center of gravity 18-20 mm from the module mating edge (bottom of the module where gold fingers reside)
- c. No physical damage and no discontinuities greater than 1 microseconds.

8.8 Mechanical Shock – EIA-364-27


- a. Condition - Trapezoidal shock 50 g ± 10%, duration 11ms, Velocity change 170 inches/sec, ± 10%
Three drops in each of six directions are applied to each of the three samples
- b. Module weight 40 ± 2 grams. Center of gravity 18-20 mm from the module mating edge (bottom of the module where gold fingers reside)
- c. No physical damage.

8.9 Durability - EIA-364-09, perform plug/unplug cycles.

- a. Number Cycles - 25 cycles
- b. Cycling Rate – 10 cycles/min

8.10 Durability (Preconditioning) - EIA-364-09, perform plug/unplug cycles.

- a. Number Cycles - 5 cycles
- b. Cycling Rate – 10 cycles/min

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8.11 Reseating

- a. Test conditions: -Manually plug/unplug connector for 3 cycles.
- b. No physical damage.

8.12 Solderability (For PTH&SMT TYPE only)

- a. Per JESD 22-B-102, Condition C, 8 hours ± 15 minutes steam precondition.
- b. Solder coverage: 95% min

9.0 QUALITY ASSURANCE PROVISIONS

9.1 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 ANSI Z-540 and ISO 9000.

9.2 Inspection Conditions

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

- a. Temperature: 25 +/- 5 °C
- b. Relative Humidity: 30% to 60%
- c. Barometric Pressure: Local ambient

9.3 The sample size is listed for each test in section 9.7 Qualification Test Table.

9.4 Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 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.


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

9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production.

9.6 Re-Qualification Testing

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

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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.

9.7 Qualification Test Table

TEST DESCRIPTION SEQUENCE	PARA.	Test Group									
		1	2	3	4	5	6	7	8	9	10
		Test Sequence									
Examination of Product	5.5	1 8	1 10	1 9	1 12	1 5	1 8		1 3	1 4	
Low Level Contact Resistance	6.1	2 5 7	2 5 7 9	2 5 8	2 5 7 9 11	2 4					
Durability (Preconditioning)	8.10	3	3	3	3						
Durability	8.9					3					
Insulation Resistance	6.2						2 6				
Dielectric Withstanding Voltage	6.3						3 7				
Temperature Life (Preconditioning)	8.3			4	4						
Temperature Life	8.4	4									
Thermal Shock	8.1		4				4				
Thermal Disturbance	8.6				8						
Cyclic Temp & Humidity	8.2		6				5				
Mixed Flowing Gas	8.5				6						
Mechanical Shock	8.8			7							
Vibration	8.7			6							
Reseating	8.11	6	8		10						
Solderability	8.12										1
Temperature Rise	6.4								2		
Module Mating Force	7.1									2	
Module Unmating Force	7.1									3	
Insertion force -Connector to board	7.4							1			
Compliant Pin Insertion Force	7.5							2			
Compliant Pin Retention Force	7.6							3			
Terminal Retention Force	7.2							4			
Forklock Retention Force	7.3							5			
Sample Size		5	5	5	5	5	5	5	5	5	5

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Note:

- 1) Insertion force-Connector to board test is applicable to forklock type only.
- 2) Compliant Pin Insertion Force/Compliant Pin Retention Force are applicable to PF type only.
- 3) Forklock retention force test is applicable to Forklock type only.
- 4) Solderability is applicable to PTH&SMT TYPE.

REVISION RECORD

<u>Rev</u>	<u>Page</u>	<u>Description</u>	<u>EC#</u>	<u>Date</u>
A	All	New release	NA	25 Nov 15