Land Grid Array, LGA4189 socket

1. SCOPE

1.1. Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of LGA4189 socket.

1.2. Qualification Test Results

The Qualification Test Report number for this testing is 501-115166.

2. APPLICABLE DOCUMENTS

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

2.1. Tyco electronics specifications

A. 109-5000 : Test specification, general requirements for test methods
B. 411- 115008 : Instruction sheet
C. 114-115024 : Application specification
D. 501-115166 : Qualification test report

2.2. Commercial standards and specifications

A. MIL-STD-202 Test method for electronic and electric parts.
B. EIA-364: Electrical connector / socket test Procedures including environmental classifications.

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

A. Socket assembly
- Contact : Copper Alloy, Au plating on contact area over Ni plating.
- Base housing : Thermoplastic UL94V-0.
- PnP Cap : Thermoplastic UL94V-0.
- Solder Ball : SAC

B. TFLM Bolster assembly
- Bolster Plate : Stainless steel.
- Spring lever-1 : Music wire
- Spring lever-2 : Music wire
- Spring stud : Stainless steel.
- M3 Nut : Steel.
- Nut cap : Thermoplastic UL94V-0.
- Nut cap-side : Thermoplastic UL94V-0.
- Wire stop pin : Stainless steel.
- Insulator : Polycarbonate plus acrylic adhesive layer.

C. Back plate assembly
- Back plate : Stainless steel
- Insulator : Polycarbonate plus acrylic adhesive layer.
- Extra Insulator : Polycarbonate plus acrylic adhesive layer.

D. Carrier
- Carrier Plastic : Thermoplastic UL94V-0.
- Dynamic Shim : Stainless steel.
- Tim Break Lever : Stainless steel.

E. Dust cover
- Dust cover : Thermoplastic UL94V-0.

3.3. Ratings

A. Temperature rating:
- Continuous : 0 to 85 °C
- Operating : -25 to 100°C

3.4. Performance requirements and test descriptions.

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig. 1.

All tests shall be performed in the room temperature, unless otherwise specified.

3.5. Test Requirements and Procedures Summary

Test Items	Requirements	Procedures
Initial examination of product	Meets requirements of customer drawing.	EIA-364-18. Visual and dimensional inspection. No physical damage
Final examination of product	Meets visual requirements.	EIA-364-18. Visual inspection.
	Electrical Requirements	
Termination resistance (Low level)	36 mohm Maximum	EIA-364-23C. Subject specimens to 10 mA maximum and 20 mV maximum open circuit voltage.
Dielectric withstanding voltage	No creeping discharge nor flashover shall occur. Current leakage: 0.5mA Max	EIA-364-20D 360 Vrms for 1 minute. Test between adjacent contacts of unmated specimens.
Insulation resistance	800MΩ Min	EIA-364-21D. Impressed voltage 500VDC. Test between adjacent contacts of unmated specimens
	Mechanical Requirements	
Durability Test (Bolster to back plate)	No thread fastener, galling or shavings as seen from the naked eye	Electric driver (8in-lbf) Cycles: 6 cycles in any sequence.
Load Test	215lbf+/-15lbf at 1mm displacement	Torque to 12in-lbf Operation speed: 0.25mm/sec
Solder ball shear force	600 gf Min.	Operation speed: 0.2mm/sec Measure solder ball horizontal shear force from contact paddle.

Figure 1 (Continue)

Environmental Requirement

Durability (Repeated mate unmating)	36 mohm Maximum	EIA-364-9C Operation rate: 8cycle/min No. of cycles: 30cycles.
Vibration (Random)	36 mohm Maximum	Follow Intel specification Test Package mated socket with ILM assy' and compressive load from heat sink 5Hz @0.01 g^2 /Hz to 20Hz @ 0.02 g^2 /Hz(slope up) 20 to 500Hz @ 0.02 g^2 /Hz (flat) Input acceleration: 1.44 g RMS, 20 minutes per axis for all 3 axes on all samples Radom control limit tolerance is ±3dB
Physical shock	36 mohm Maximum	EIA-364-27B, Condition A PHM(Processor Heatsink Module) mated socket with bolster plate & back plate assy and compressive load from PHM Accelerated velocity: 490 m/s^2 (50 G) Waveform: Halfsine Duration: 11 m sec. Number of drops: 3 drops each to normal and reversed directions of X, Y and Z axes, totally 18 drops.
Temperature humidity	36 mohm Maximum	PHM(Processor Heatsink Module) mated socket with bolster plate & back plate assy and compressive load from PHM 85 °C, 85 % R.H.504 hours
Temperature life (Heat aging)	36 mohm Maximum	EIA-364-17B Condition 5, Time condition D PHM(Processor Heatsink Module) mated socket with bolster plate & back plate assy and compressive load from PHM 105 °C, / 1000 hours
Thermal cycling (TC-Q)	36 mohm Maximum	PHM(Processor Heatsink Module) mated socket with bolster plate & back plate assy and compressive load from PHM -25 °C / 15 min., +100 °C / 15 min. / cycle, 1250 cycles
Resistance to reflow soldering heat	Tested housing shall show no evidence of deformation or fusion of housing and no physical damage.	Test socket on PCB. (Lead Free, Sn-Ag-Cu solder ball) Solder ball part Pre-Heat 150～170 °C : 90 sec Min. Heat 217 °C min. : 40～100sec Heat Peak : 245±5 °C Other than solder ball Heat Peak : 260 °C max.
Porosity test	2 pores Max per 30 contacts.	EIA-364-53B. Concentrated reagent grade nitric acid: 70% ± 1% HNO_3. 75 minutes ± 5 minutes at 23 °C ± 2 °C Test must be performed on 30 loose contacts.
Temperature humidity (For hardware)	No Visible corrosion	Bolster and backplate component 85 °C, 85 % R.H.168 hours

Figure 1 (end)

3.6. Product Qualification Test Sequence

Table 2

Test examination / Test sequence	Test Group								
	1	2	3	4	5	6	7	8	9
Test sequence (a)									
Examination of product	1,7	1,5	1,5	1,10	1,5	1,3	1,5	1	1
Termination resistance (Low Level)	2,4,6	2,4	2,4		2,4		2,4		
Dielectric withstanding voltage				2,5,8					
Insulation resistance				3,6,9					
Vibration (Low frequency)	5								
Physical shock	3								
Durability (Repeated mate/unmating)			3 (b)						
Temperature humidity		3(e)		7(g)					
Temperature life (Heat aging)					3(c)				
Thermal cycling				4(f)			3(d)		
Solder ball shear force									2
Resistance to reflow soldering heat						2			
Prosity test								2	

NOTE

(a) Numbers indicate sequence in which the tests are performed.
(b) Durability 30X
(c) Perform termination resistance every 250 hours (until 1000 hours).
(d) Perform termination resistance 150 cycles, 300 cycles, 600 cycles, 900cycles, 1250cycles.
(e) Perform termination resistance 312 hours, 408 hours, 504H
(f) 10 cycles
(g) 504 hours

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in table 2.

4.2. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before re-submittal.

4.3. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

Product parts number	Description
1-2324271-1(*2)	Right Segment for LGA4189-4, Socket P4(30u" Au)
1-2324271-2 (*2)	Left Segment for LGA4189-4, Socket P4(30u" Au)
1-2324271-3(*2)	Right Segment for LGA4189-4, Socket P4(15u" Au)
1-2324271-4 (*2)	Left Segment for LGA4189-4, Socket P4(15u" Au)
1-2324271-5(*2)	Right Segment for LGA4189-5, Socket P5(30u" Au)
1-2324271-6 (*2)	Left Segment for LGA4189-5, Socket P5(30u" Au)
1-2324271-7(*2)	Right Segment for LGA4189-5, Socket P5(15u" Au)
1-2324271-8 (*2)	Left Segment for LGA4189-5, Socket P5(15u" Au)
1-2332283-1	LGA 4189-P4 kit package (30u' Au)
1-2332283-2	LGA 4189-P4 kit package (15u' Au)
1-2332283-3	LGA 4189-P5 kit package (30u' Au)
1-2332283-4	LGA 4189-P5 kit package (15u' Au)
2-2330550-X(*2)	TFLM Bolster Assy, Socket P4
3-2330550-X(*2)	TFLM Bolster Assy, Socket P5
2-2330551-X(*2)	ICX Backplate Assy, Socket P4/P5
2-2330552-1(*2)	CPX-4 PHM Carrier Assy, Socket P4
2-2330552-2(*2)	ICX Point PHM Carrier Assy, Socket P4
3-2330552-1(*2)	CPX Point PHM Carrier Assy, Socket P5

*2: Refer to customer drawing for detail

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