

Lever actuated Land Grid Array, LGA115X socket

1. SCOPE

1.1. Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of LGA115X socket.

1.2. Qualification Test Results

The Qualification Test Report number for this testing is 501-5953. This documentation is available from Star TEC.

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. 411-78321 : Instruction sheet
- C. 114-5444 : Application specification
- D. 501-5953 : 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.

Cap : Thermoplastic UL94V-0.

B. ILM assembly

Load plate : Stainless steel.

Frame : Stainless steel.

Lever : Stainless steel.

ILM screw : Steel.

Shoulder screw : Steel.

Insulator : Polycarbonate plus acrylic adhesive layer.

C. Back plate assembly

Back plate : Stainless steel

Insulator : Polycarbonate plus acrylic adhesive layer.

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)	Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)	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	800M Ω Min	EIA-364-21D. Impressed voltage 500VDC. Test between adjacent contacts of unmated specimens

Mechanical Requirements

Package mating operation force of lever	Operation force 49N (5kgf) Max.	Operation speed: 100mm/min. Measure the vertical force required to lock the lever by loading at the tip of the lever.
Package unmating operation force of lever	Operation force 49N (5kgf) Max.	Operation speed: 100mm/min. Measure the vertical force required to unlock the lever by loading at the tip of lever
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)	Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)	EIA-364-9C Operation rate: 8cycle/min No. of cycles: 30cycles.
Vibration (Random)	Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)	EIA-364-28 test condition VII , Condition D Test Package mated socket with ILM assy and compressive load from heat sink Vibration frequency: 10 to 2000Hz (Random) Accelerated velocity: 30.38 m/s ² (3.1 G),rms, Vibration direction: In each of 3 mutually perpendicular planes. Duration: 15 minute each
Physical shock	Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)	EIA-364-27B, Condition A Test Package mated socket with ILM assy and compressive load from heat sink 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	Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)	Test Package mated socket with ILM assy and compressive load from heat sink 85 °C, 85 % R.H. 504 hours
Temperature life (Heat aging)	Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)	EIA-364-17B Condition 5, Time condition D Test Package mated socket with ILM assy and compressive load from heat sink 105 °C, / 1000 hours
Thermal cycling (TC-Q)	Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)	Test Package mated socket with ILM assy and compressive load from heat sink -25 °C / 15 min., +100 °C / 15 min. / cycle, 1250 cycles

Figure 1 (continue)

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 degC ± 2 degC Test must be performed on 30 loose contacts.

Figure 1 (end)

Table 1
Maximum daisy chain resistance criterion for different chain length.

Number of contacts within chain	Maximum LLCR (m-Ohm) allowable at 25degC
2	59.50
4	39.25
6	32.50
8	29.12
10	27.10
12	25.75
14	24.78

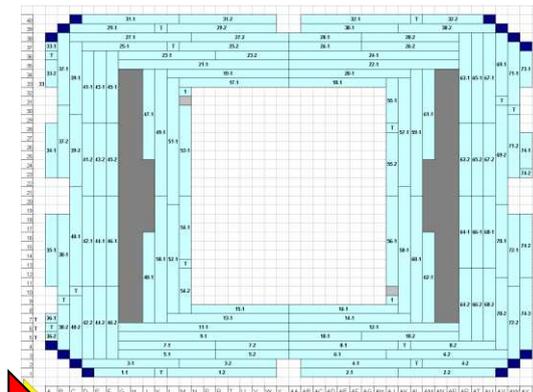


Figure 2
Location of termination resistance daisy chain, socket top side view.

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	1,5	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								
Package mating operation force of lever						2			
Package unmating operation force of lever						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						4			
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, 504 hours.
- (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
2040540-1 (*2)	LGA1156 Socket
2069965-X (*2)	LGA1155 Socket
2134928-X (*2)	LGA1150 Socket
2199191-X (*2) 2287402-X (*2)	LGA1151 Socket
2013882-X (*2) 2134397-X (*2)	ILM assembly
2013883-X (*2)	Back plate assembly
2013884-X (*2)	Shoulder screw
2040979-X (*2)	ILM screw

*2: Refer to customer drawing for detail

Rev.	Rev. Record	Prepared		Check		Approval	
0	RELEASE	T.S	24 th Oct 2008	Y.S	24 th Oct 2008	S.H	24 th Oct 2008
1	REVISED	T.S	16 th Feb 2009	H.T	16 th Feb 2009	T.N	16 th Feb 2009
2	REVISED	T.S	11 th Mar 2009	H.T	11 th Mar 2009	T.N	11 th Mar 2009
A	REVISED	T.S	29 th Sep 2009	Y.S	29 th Sep 2009	T.N	29 th Sep 2009
B	REVISED	Y.T	1 st Sep 2010	H.T	1 st Sep 2010	T.N	1 st Sep 2010
C	REVISED	S.A	19 th Jan 2011	Y.S	19 th Jan 2011	T.N	19 th Jan 2011
D	REVISED	Y.T	26 th Apr 2011	Y.S	26 th Apr 2011	T.N	26 th Apr 2011
E	REVISED	J.W	09 th May 2014	S.L	09 th May 2014	C.W	09 th May 2014
F	REVISED	J.W	12 th Apr 2016	S.L	12 th Apr 2016	C.W	12 th Apr 2016