

- 1. Introduction
  - 1.1 Testing was performed on the LGA 3647 to determine if it meets the requirement of Product Specification , 108-115115 REV.A
  - 1.2 Scope
 

This report covers the electrical, mechanical and environmental performance requirements of the LGA 3647. The qualification testing for standard type was performed between 6 Sep 2016 and 14 Oct 2016.
  - 1.3 Conclusion
 

LGA 3647 meets the electrical, mechanical and environmental performance requirements of Product Specification, 108-115115 REV.A
  - 1.4 Test Samples
 

Samples were taken randomly from current production. The following samples were used.

Part Number	Description
2-2129710-5	LGA 3647-0 left segment (individual package)
2-2129710-6	LGA 3647-0 right segment (individual package)
2-2129710-7	LGA 3647-1 left segment (individual package)
2-2129710-8	LGA 3647-1 right segment (individual package)
2-2822979-3	LGA 3647-0 kit package
2-2822979-4	LGA 3647-1 kit package
2299804-1	Narrow Non-fabric Bolster Plate Assembly
2299805-1	Narrow Back Plate Assembly
2299806-1	Narrow Non-fabric Carrier
2310924-1	Narrow Fabric Bolster Plate Assembly
2310927-1	Narrow Fabric Carrier

Fig. 1

2. Test Contents

No.	Test Items	Requirements	Judgement
2.1	Examination of product	Visual Inspection No physical damage	Acceptable
Electrical Requirements			
2.2	Termination resistance (Low level)	Refer to table 1 (Daisy chain LLCR)	Acceptable
2.3	Dielectric withstanding voltage	360 Vrms, 1 minute Current leakage : 0.5mA Max.	Acceptable
2.4	Insulation resistance	Impressed voltage 500 VDC. 800M $\Omega$ Min.	Acceptable
Mechanical Requirements			
2.5	Durability Test (Bolster to back plate)	Electric driver (8in-lbf) Cycles: 6 cycles following a sequence. No thread fastener, galling or shavings as seen from the naked eye	Acceptable
2.6	Durability Test (Bolster to heatsink)	Electric driver (12in-lbf) Cycles: 6 cycles following a sequence. No thread fastener, galling or shavings as seen from the naked eye	Acceptable
2.7	Solder ball share force	600gf Min. Test must be performed on 8 contacts x 3 sockets.	Acceptable

Figure. 2 (continued)

Environmental Requirements			
2.8	Durability (Repeated mating / unmating)	Operation speed:8 cycle/min. No. of cycles: 30 cycles Refer to table 1 (Daisy chain LLCR)	Acceptable
2.9	Vibration, random.	Vibration Frequency: 10 to 2000Hz (Random) Accelerated Velocity: 30.38 m/s <sup>2</sup> (3.1G),rms. Vibration Direction: In each of 3 mutually perpendicular planes Duration: 15 minute each Refer to table 1 (Daisy chain LLCR)	Acceptable
2.10	Physical shock	Accelerated velocity: 490 m/s <sup>2</sup> ( 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. Refer to table 1 (Daisy chain LLCR)	Acceptable
2.11	Thermal humidity	PHM mated socket with bolster plate & back plate assy and compressive load from PHM 85 °C, 85 % R.H. 504 hour Refer to table 1 (Daisy chain LLCR)	Acceptable
2.12	Temperature life (Heat aging)	PHM mated socket with bolster plate & back plate assy and compressive load from PHM 105 °C, Duration : 1000 hours Refer to table 1 (Daisy chain LLCR)	Acceptable
2.13	Thermal cycling	PHM mated socket with bolster plate & back plate assy and compressive load from PHM -25 °C / 15 min., +100 °C / 15 min. (1cycle) No. of cycle : 1250 cycles. Refer to table 1 (Daisy chain LLCR)	Acceptable
2.14	Resistance to reflow soldering heat	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 : 260 °C Max No physical damage.	Acceptable
2.15	Porosity test	EIA-364-60. Test must be performed on 30 loose contacts. 2Pores Max per 30 contacts.	Acceptable

Figure. 2 (end)

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

Number of contacts within chain	Maximum LLCR (m-Ohm) allowable at 25degC
1	165
2	72
3	51
4	43
5	39
10	30
15	28.3
20	27.7
50	24.2
100	23

Chain numbers are subject to change on actual testing

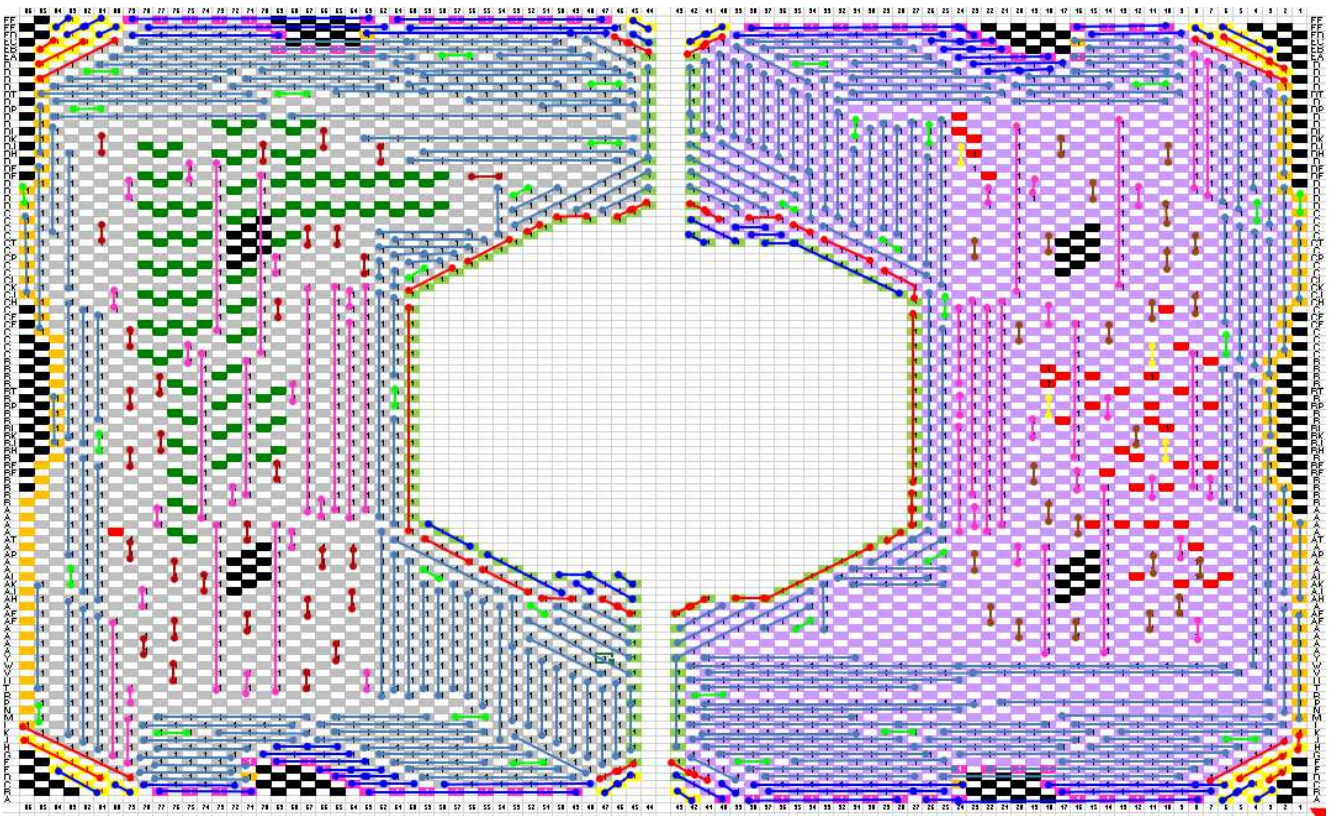


Figure 3  
Location of termination resistance daisy chain, socket top side view.

3. 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 1000 hours.
- (d) Perform termination resistance 300 cycles, 600 cycles, 900cycles, 1250cycles.
- (e) Perform termination resistance 504 hours.
- (f) 10 cycles
- (g) 504 hours

4. Test Result

Group	Test Item	N	Condition	Test Result			Requirement	Conclusion
				Max	Min	Ave		
1	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Initial	34.0 mΩ	10.7 mΩ	16.9 mΩ	36mΩ Max	Meet Spec
	Physical Shock	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	35.8 mΩ	10.2 mΩ	16.2 mΩ	36mΩ Max	Meet Spec
	Vibration	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	34.7 mΩ	10.0 mΩ	15.6 mΩ	36mΩ Max	Meet Spec
	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec
2	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Initial	26.9 mΩ	11.4 mΩ	16.1 mΩ	36mΩ Max	Meet Spec
	Temperature Humidity (504H)	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	32.5 mΩ	10.0 mΩ	13.4 mΩ	36mΩ Max	Meet Spec
	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec
3	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Initial	27.2 mΩ	11.3 mΩ	15.5 mΩ	36mΩ Max	Meet Spec
	Durability	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	24.9 mΩ	10.4 mΩ	13.9 mΩ	36mΩ Max	Meet Spec
	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec
4	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	Withstanding Voltage	25	Initial	No creeping discharge nor flashover occurred.			No abnormalities	Meet Spec
	Insulation Resistance	25	Initial	9.74xE10	9.02xE10	9.42xE10	800MΩ Min	Meet Spec
	Thermal Cycling(10X)	5	Final	No physical damage			No abnormalities	Meet Spec
	Withstanding Voltage	25	Final	No creeping discharge nor flashover occurred.			No abnormalities	Meet Spec
	Insulation Resistance	25	Final	2.02xE11	0.07xE11	1.17xE11	800MΩ Min	Meet Spec
	Temperature Humidity	5	Final	No physical damage			No abnormalities	Meet Spec
	Withstanding Voltage	25	Final	No creeping discharge nor flashover occurred.			No abnormalities	Meet Spec
	Insulation Resistance	25	Final	4.42xE10	0.34xE10	1.11xE10	800MΩ Min	Meet Spec
Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec	
5	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Initial	28.1 mΩ	11.7 mΩ	16.1 mΩ	36mΩ Max	Meet Spec
	Temperature Life (1000H)	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	35.7 mΩ	10.8 mΩ	15.7 mΩ	36mΩ Max	Meet Spec
	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec

Group	Test Item	N	Condition	Test Result			Requirement	Conclusion
				Max	Min	Ave		
6	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	Resistance to Reflow Soldering Heat	5	Final	No physical damage			No abnormalities	Meet Spec
	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec
7	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Initial	28.1 mΩ	11.7 mΩ	16.1 mΩ	36mΩ Max	Meet Spec
	Thermal Cycling(300X)	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	32.7 mΩ	10.1 mΩ	16.6 mΩ	36mΩ Max	Meet Spec
	Thermal Cycling(600X)	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	34.5 mΩ	10.2 mΩ	15.4 mΩ	36mΩ Max	Meet Spec
	Thermal Cycling(900X)	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	35.5 mΩ	11.5 mΩ	15.6 mΩ	36mΩ Max	Meet Spec
	Thermal Cycling(1250X)	5	Final	No physical damage			No abnormalities	Meet Spec
	LLCR	2520	Final	34.4 mΩ	11.1 mΩ	17.2 mΩ	36mΩ Max	Meet Spec
8	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec
	Examination of Product	5	Initial	No physical damage			No abnormalities	Meet Spec
	Porosity Test	5	Final	Less than 2 pores			No abnormalities	Meet Spec
9	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec
	Shear Force	24	Final	10.27N	6.70N	8.27N	5.9N Min	Meet Spec
	Examination of Product	5	Final	No physical damage			No abnormalities	Meet Spec

End

REV	REV. RECORD	PREPARED		CHECK		APPROVAL	
A	RELEASED	Winng Wang	07 <sup>th</sup> Dec '16	Simon Li	07 <sup>th</sup> Dec '16	Corel Wang	07 <sup>th</sup> Dec '16
B	REVISED	Jeff Wang	12 <sup>th</sup> Dec '16	Simon Li	12 <sup>th</sup> Dec '16	Corel Wang	12 <sup>th</sup> Dec '16