

1. Introduction

1.1 Testing was performed on the LGA2011 Socket to determine if it meets the requirements of product specification 108-78750.

1.2 Scope

This report covers the electrical, mechanical and environmental performance requirements of the LGA2011 Socket.

1.3 Conclusion

This test report confirmed that Tyco LGA2011 Socket satisfied the requirements of the product specification of 108-78750.

1.4 Test samples

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

Part Number	Description
1554653-X	LGA2011 Socket Assy

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)	Maximum chain resistance (2~14pos. chain average) : Refer to table1 *1	Acceptable
2.3	Dielectric withstanding voltage	360Vrms, 1 minute Current leakage : 0.5mA Max.	Acceptable
2.4	Insulation resistance	Impressed voltage 500 VDC. 800M Ω Min.	Acceptable

Mechanical Requirements

2.5	Vibration (Random)	Test Package mated Socket by 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 Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)*1	Acceptable
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Fig. 2(continue)

2.6	Physical shock	EIA-364-27 Test Package mated Socket by 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. Maximum chain resistance (2~14pos. chain average) : Refer to table1 (Final)*1	Acceptable
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2.7	Durability (Repeated mating / unmating)	Operation speed:8 cycle/min. No. of cycles: 30 cycles Maximum chain resistance (2~14pos. chain average) : Refer to table1 *1	Acceptable
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Environmental Requirements

2.8	Thermal humidity	Test package mated Socket with compressive load from heat sink. 85 °C, 85 % R.H. 1000 hour Maximum chain resistance (2~14pos. chain average) : Refer to table1 *1	Acceptable
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2.9	Temperature life (Heat aging)	Test package mated Socket with compressive load from heat sink. 125 °C, Duration : 1000 hours Maximum chain resistance (2~14pos. chain average) : Refer to table1 *1	Acceptable
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2.10	Thermal cycling	Test package mated Socket with compressive load from heat sink -25 °C / 15 min., +100 °C / 15 min. (1cycle) No. of cycle : 1000 cycles. Maximum chain resistance (2~14pos. chain average) : Refer to table1 *1	Acceptable
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Fig.2 (continue)

2.11	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 225 °C min. : 60 ~90sec Heat Peak : 245±5 °C Other than solder ball : 260 °C Max. No physical damage.	Acceptable
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*1 Bulk resistances of test CPU are subtracted.

Fig. 2 (end)

Table1: Max Chain Average Resistance

Number of contacts per chain	Max Chain LLCR (mΩ)
2	59.5
4	40.75
6	34.5
8	31.4
10	29.5
12	28.25
14	27.4

2. Test sequence

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

Fig.3

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 every 250 cycles (until 1000 cycles)

4. Test result

Conditions	Measure Item	n	Unit	Results				Requirement	Judgement
				MAX.	MIN.	AVE.	SIG.		

Test Group 1 (physical shock & Vibration)									
Initial	Termination resistance	9 Sockets (1755 chains)*2	mΩ	16.88	10.33	13.21	0.79	Refer to table1	Acceptable
After physical shock			mΩ	15.36	10.01	12.86	0.78	Refer to table1	Acceptable
After vibration			mΩ	15.81	10.53	12.55	0.73	Refer to table1	Acceptable

Test Group 2 (Temperature humidity)									
Initial	Termination resistance	10 Sockets (1950 chains)*2	mΩ	17.32	10.04	12.14	0.82	Refer to table1	Acceptable
Temp. humidity 250H			mΩ	19.19	10.08	11.60	0.77	Refer to table1	Acceptable
Temp. humidity 500H			mΩ	18.22	10.26	11.55	0.75	Refer to table1	Acceptable
Temp. humidity 750H			mΩ	21.98	10.01	11.51	0.75	Refer to table1	Acceptable
Temp. humidity 1000H			mΩ	17.59	10.04	11.46	0.69	Refer to table1	Acceptable

Conditions	Measure Item	n	Unit	Results				Requirement	Judgement
				MAX.	MIN.	AVE.	SIG.		

Test Group 3 (Durability)									
Initial	Termination resistance	10 Sockets (1950 chains *2)	mΩ	19.58	11.12	13.52	1.18	Refer to table1	Acceptable
Durability 5th			mΩ	19.21	10.10	13.14	1.06	Refer to table1	Acceptable
Durability 10th			mΩ	18.54	8.24	13.14	1.14	Refer to table1	Acceptable
Durability 30th			mΩ	22.60	7.39	13.26	1.15	Refer to table1	Acceptable

Test Group 4 (Dielectric withstand voltage, Insulation resistance)							
Initial	Dielectric Withstand voltage	24 points	—	No abnormalities		No abnormalities	Acceptable
	Insulation resistance	24 points	Ω	Over 800 MΩ .		800 MΩ Min.	Acceptable
After thermal cycling	Dielectric Withstand voltage	24 points	—	No abnormalities		No abnormalities	Acceptable
	Insulation resistance	24 points	Ω	Over 800 MΩ .		800 MΩ Min.	Acceptable
After temp. humidity	Dielectric Withstand voltage	24 points	—	No abnormalities		No abnormalities	Acceptable
	Insulation resistance	24 points	Ω	Over 800 MΩ .		800 MΩ Min.	Acceptable

Conditions	Measure Item	n	Unit	Results				Requirement	Judgement
				MAX.	MIN.	AVE.	SIG.		

Test Group 5 (Temperature life)									
Initial	Termination Resistance	10 Sockets (1950 chains *2)	mΩ	20.22	10.24	13.01	1.03	Refer to table1	Acceptable
Temperature life 250H			mΩ	19.76	10.17	12.71	1.16	Refer to table1	Acceptable
Temperature life 500H			mΩ	20.58	10.17	12.74	1.14	Refer to table1	Acceptable
Temperature life 750H			mΩ	20.39	10.30	12.74	1.18	Refer to table1	Acceptable
Temperature life 1000H			mΩ	21.52	10.04	12.70	1.24	Refer to table1	Acceptable

Test Group6 (Solder ball shear force)									
Initial	Solder ball shear force (Lead free solder ball)	16 contacts x 3 Sockets	gf	926.16	735.42	831.41	40.88	600gf Min	Acceptable

Test Group6 (Resistance to reflow soldering heat)									
Resistance to reflow soldering heat	Visual observation by magnify scope	10 Sockets	-	No housing damage, irregularity				No irregularity	Acceptable

Conditions	Measure Item	n	Unit	Results				Requirement	Judgement
				MAX.	MIN.	AVE.	SIG.		

Test Group 7 (Thermal cycling)									
Initial	Termination Resistance	10 Sockets (1950 chains *2)	mΩ	16.46	10.26	12.44	0.95	Refer to table1	Acceptable
Thermal cycling 250cycle				15.57	10.52	11.92	0.68	Refer to table1	Acceptable
Thermal cycling 500cycle				18.44	10.05	11.70	0.64	Refer to table1	Acceptable
Thermal cycling 750cycle				14.57	10.41	11.61	0.56	Refer to table1	Acceptable
Thermal cycling 1000cycle				14.99	10.08	11.51	0.58	Refer to table1	Acceptable

*2 One daisy chain includes 2~14 contacts electrically connected together by the CPU package.

REV	REV. RECORD	PREPARED		CHECK		APPROVAL	
A	RELEASED	S.AIHARA	9 th Feb '11	Y.SEKIBA	9 th Feb '11	I.ENOMOTO	15 th Feb '11