

Product / Process Change Notice

PCN No.: Q000-PCN-PA201406-01B

Date: 2014-06-17.

Change Title: Add assembly bond wire material Cu (Copper) for QFP\LQFP series package products

Change Classification: Major Minor

Change item: Design Raw Material Wafer FAB Package Assembly Testing Others: _____.

Affected Product(s) :

QFP\LQFP series package products are affected and the affected product lists please refer to the Table I for more information

Description of Change(s) :

To add Cu (Copper) as a qualified assembly bond-wire material for QFP\LQFP package products

Reason for Change(s) :

The products with Copper bond wire process have become the mainstream in the current assembly house. Meanwhile, the Copper wire material is also proven to have the better electrical performance and physical related characteristics. Nuvoton has successfully completed the qualification of Copper bond wire at the QFP\LQFP packages and the Copper bond wire ICs are qualified by the customers as well. The Copper bond wire process can assure to satisfy the customer's demand for short and long term.

Impact of Change(s) : (positive & negative)

Form: No change.

Fit: No change.

Function: No concern.

Reliability : No concern

Qualification Plan/ Results :

1. We followed Nuvoton standard procedure to proceed with the QFP\LQFP package qualification.
2. The package passed Nuvoton package qualification criteria, please refer to appendix A ~ D for the detailed qualification report.

Implementation Plan :

Date Code: _____ onward Lot No.: _____ onward Implemented date: Sep. 15, 2014

Originator:

HYLai / Q100

Approval:(QA Director)

C.C. Chen/ Q000

Contact for Questions & Concerns

Name: HYLai TEL: 886-3-5770066 (ext. 1226) FAX: 886-3-5792673.

Address: No.4, Creation Rd. III Science-Based Industrial Park Hsinchu, Taiwan, R.O.C..

E-mail: hylai0@nuvoton.com.

Customer Comments:

Note: Please sign this notice, and return to Nuvoton contact within **30** days. If no response is received within **30** days, this Change Request will be assumed to meet your approval.

<input type="checkbox"/> Approval	<input type="checkbox"/> Disapproval	<input type="checkbox"/> Conditional Approval: _____.
Date: _____	Dept. name: _____	Person in charge: _____.

Follow-up and Tracing:

A. copies to

FAB: Integration _____ _____ _____ _____.

Test / Product: _____ _____ _____ _____.

Design/ Marketing: _____ _____ _____ _____.

Production control/ Others: _____ _____ _____ _____.

B. Changes:

1. Document / Test program:

Document No/ test program	Document name/ test program name	version		responsibor	Completed date	Remark
		before	after			
NA	NA	NA	NA	NA	NA	NA

Verified by: _____.

Table I: Affected part lists

Part No
W83627DHG-PT
W83627DHG-A
W83627UHG
W83792G
W83877TG
W83977AG-A
W83977EG-AW
W83977G-A
NCT6627UD

Appendix A: Assembly house Greatek's LQFP packages qualification report(Cu wire)

PACKAGE QUALIFICATRION REPORT

Subcontractor: GREATEK ELECTRONIC INC.

Package: LQFP 128L 14X14

Package Material: CU wire and GREEN

PREPARE : CSHuang

MANAGER: MYTsai

SUMMARY

The **LQF128L 14X14** products was passed the qualification tests.

A summary of the test result was as follows:

Pa. Pre-condition Test	: 0/675 pcs
Pa. High Temp. Storage Life Test	: 0/135 pcs
Pa. Pressure Cooker Test	: 0/135 pcs
Pa. Temperature Cycle Test	: 0/135 pcs

I . ENVIRONMENTAL TEST

A. Introduction

1. Pre-condition Test
2. Pressure Cooker Test (PCT)
3. Temperature Cycle Test (TCT)
4. High Temp. Storage Life Test(HTSL)

B. Test Results

1. Pre-condition Test
2. Pressure Cooker Test (PCT)
3. Temperature Cycle Test (TCT)
4. Highly Temp. Storage Life Test(HTSL)

I . ENVIRONMENTAL TESTS OF PROCEDURE

A. Introduction

1. Pre-condition Test

1.1 SCOPE

Pre-condition Test is to measure the resistance of SMD (Surface Mount Devices) to the storage environment at the customer site and to thermal stress created by IR reflow or Vapor Phase Reflow.

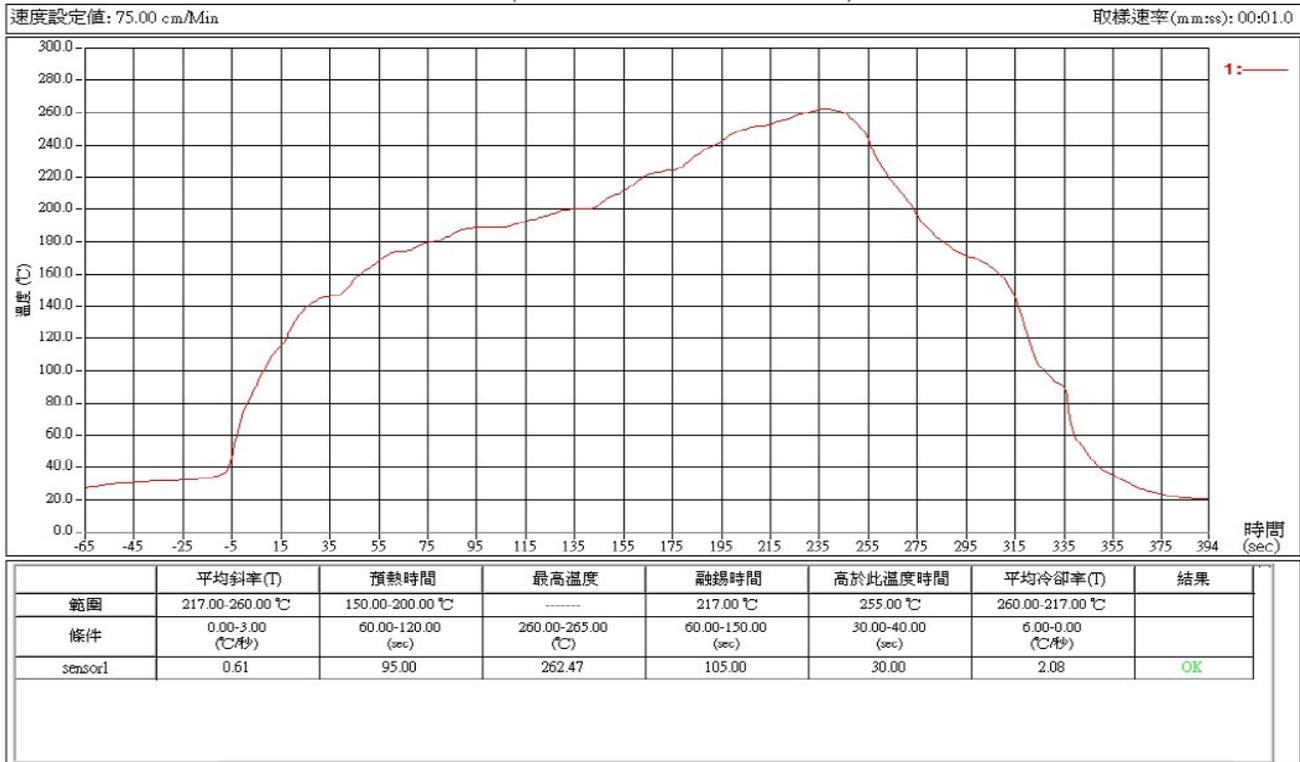
1.2 TEST CONDITION

- Step 1 : TCT(-65°C/150°C, 5 cycles)
- Step 2 : Bake(125°C, 24 hours)
- Step 3 : Soak(30°C/60%RH, 192 hours)
- Step 4 : IR reflow (260 °C), 3 Passes.

1.3 SAT COFIRMATION: To confirm delamination, cracking, popcorn .

Criteria: IPC/JEDEC J-STD-020C

1.4 IR REFLOW PROFILE (FOR IPC/JEDEC J-STD-020C)



Temp.	Criteria
Preheat 150 °C to 200 °C	60~180 sec
Time maintained above: Above 217 °C	60~150 sec
Peak temp	260 °C +0 °C/-5 °C
Time within 5 °C of actual Peak Temperature of peak	20~40 sec

2. Pressure Cooker Test (PCT)

2.1 SCOPE

PCT is to evaluate the device resistance to moisture penetration.

2.2 TEST CONDITION

Ta = 121°C, RH = 100%, Td = 168 Hrs. 2 ATM ,(JESD22-A102-A)

3. Temperature Cycle Test (TCT)

3.1 SCOPE

TCT is to evaluate the resistance of device to environmental temperature change.

3.2 TEST CONDITION

-65°C / 15min, transfer time 1min, +150 °C/15min, 1000 cycles.

MIL-STD-883E, Method 1010, Condition "C".

4. Highly Temp. Storage Life Test (HTSL)

4.1 SCOPE

The purpose of this test is to determine the effect on solid state electronic devices of storage at elevated temperature without electrical stress applied.

4.2 Test condition:

Temperature: 150°C, Time: 500/1000hrs

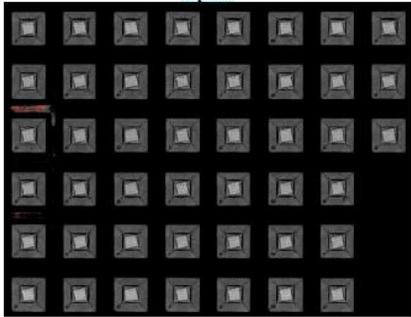
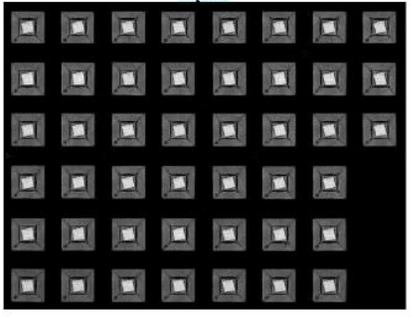
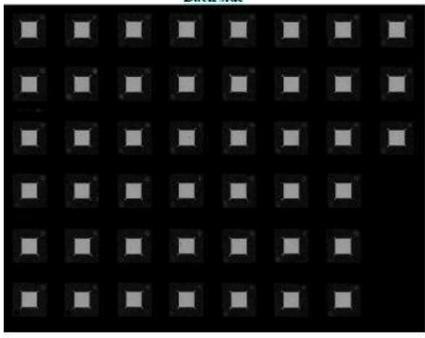
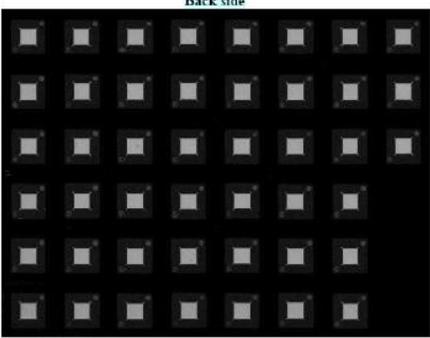
B. Test Results

1.1 Pre-condition Test

Run	Lot No	SAT before Precondition		SAT After Precondition		Remark
		Topside	Backside	Topside	Backside	
#1	20380640 -ZX	0/180	0/180	0/180	0/180	
#2	20380640 -ZY	0/180	0/180	0/180	0/180	
#3	20380640 -ZZ	0/180	0/180	0/180	0/180	

*Criteria: Acc/Rej = 0/1.

1.2 SAT Confirmation

	Before Precondition	After Precondition
TOP side	 <p>Top side</p>	 <p>Top side</p>
Back side	 <p>Back side</p>	 <p>Back side</p>

2. Pressure Cooker Test (PCT)

Run	Lot No	168 Hrs	Remark
#1	20380640 -ZX	0/45	
#2	20380640 -ZY	0/45	
#3	20380640 -ZZ	0/45	

*Criteria : Acc/Rej = 0/1.

3. Temperature Cycle Test (TCT)

Run	Lot No	500 Cycles	Remark
#1	20380640 -ZX	0/45	
#2	20380640 -ZY	0/45	
#3	20380640 -ZZ	0/45	

*Criteria : Acc/Rej = 0/1.

Run	Lot No	1000 Cycles	Remark
#1	20380640 -ZX	0/45	
#2	20380640 -ZY	0/45	
#3	20380640 -ZZ	0/45	

*Criteria : Acc/Rej = 0/1.

4. Highly Temp. Storage Life Test (HTSL)

Run	Lot No	500 Hrs	Remark
#1	20380640 -ZX	0/45	
#2	20380640 -ZY	0/45	
#3	20380640 -ZZ	0/45	

*Criteria : Acc/Rej = 0/1.

Run	Lot No	1000 Hrs	Remark
#1	20380640 -ZX	0/45	
#2	20380640 -ZY	0/45	
#3	20380640 -ZZ	0/45	

*Criteria : Acc/Rej = 0/1.



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Tel:886-3-577-0066
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PACKAGE QUALIFICATION REPORT

Package: QFP Package

Package Material: GREEN

Subcontractor : Greatek

Wire Bonding Material: Cu wire

ASSISTANT MANAGER : 黃玠升

RA MANAGER : 蔡明耀

SUMMARY

The **QFP Package** product was passed the qualification tests.
A summary of the test result was as follows:

Pa. Pre-condition Test	: 0/900EA
Pa. Pressure Cooker Test	: 0/135 EA
Pa. Temperature Cycle Test	: 0/270 EA
Pa. Highly Temp. Storage Life Test	: 0/270 EA

Publication Release Date: Mar.2010

I . ENVIRONMENTAL TEST

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B. Test Results

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I . ENVIRONMENTAL TESTS OF PROCEDURE

A. Introduction

1. Pre-condition Test

1.1 SCOPE

Pre-condition Test is to measure the resistance of SMD (Surface Mount Devices) to the storage environment at the customer site and to thermal stress created by IR reflow or Vapor Phase Reflow.

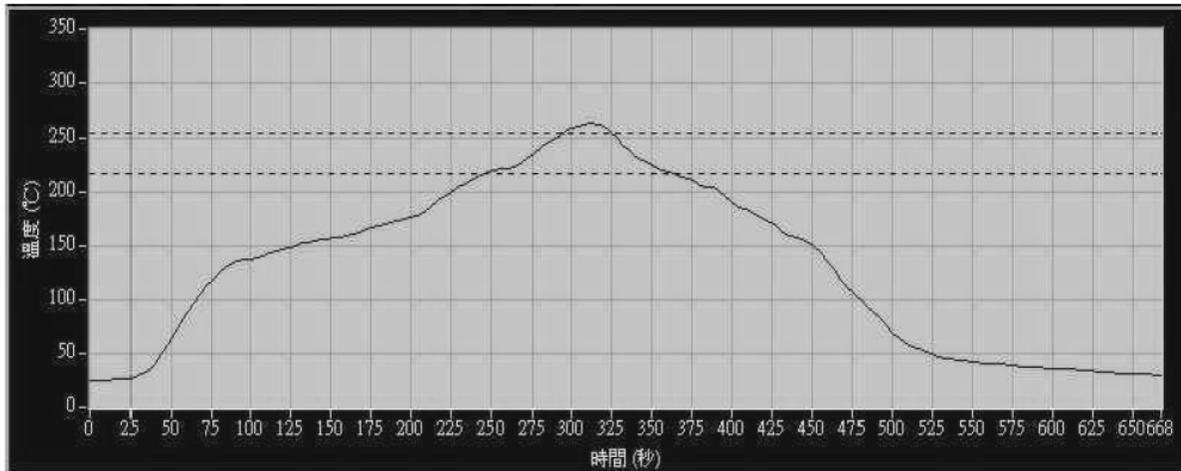
1.2 TEST CONDITION

- Step 1 : TCT(-65°C/150°C, 5 cycles)
- Step 2 : Bake(125°C, 24 hours)
- Step 3 : Soak(30°C/60%RH, 192 hours)
- Step 4 : IR reflow (260 °C), 3 Passes.

1.3 SAT COFIRMATION: To confirm delamination, cracking, popcorn .

Criteria: IPC/JEDEC J-STD-020C

1.4 IR REFLOW PROFILE (FOR IPC/JEDEC J-STD-020C)



Temp.	Criteria
Preheat 150 °C to 200 °C	60~180 sec
Time maintained above: Above 217 °C	60~150 sec
Peak temp	260 °C +0 °C/-5 °C
Time within 5 °C of actual Peak Temperature of peak	20~40 sec

2. Pressure Cooker Test (PCT)

2.1 SCOPE

PCT is to evaluate the device resistance to moisture penetration.

2.2 TEST CONDITION

Ta = 121°C, RH = 100%, Td = 168 Hrs. 2 ATM ,(JESD22-A102-A)

3. Temperature Cycle Test (TCT)

3.1 SCOPE

TCT is to evaluate the resistance of device to environmental temperature change.

3.2 TEST CONDITION

-65°C / 15min, transfer time 1min, +150 °C/15min, 1000 cycles.

MIL-STD-883E, Method 1010, Condition "C".

4. Highly Temp. Storage Life Test (HTSL)

4.1 SCOPE

The purpose of this test is to determine the effect on solid state electronic devices of storage at elevated temperature without electrical stress applied.

4.2 Test condition:

Temperature: 150°C, Time: 500/1000hrs

B. Test Results

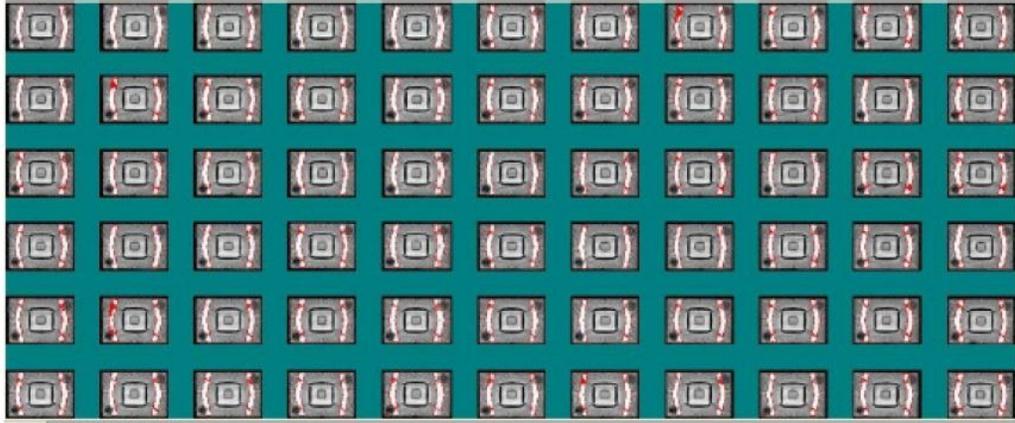
1.1 Pre-condition Test

Run	Lot No	SAT before Precondition		SAT After Precondition		Electric result
		Topside	Backside	Topside	Backside	
#1	2944B009-ZK	0/300	0/300	0/300	0/300	0/300
#2	2944B009-ZL	0/300	0/300	0/300	0/300	0/300
#3	2944B009-ZM	0/300	0/300	0/300	0/300	0/300

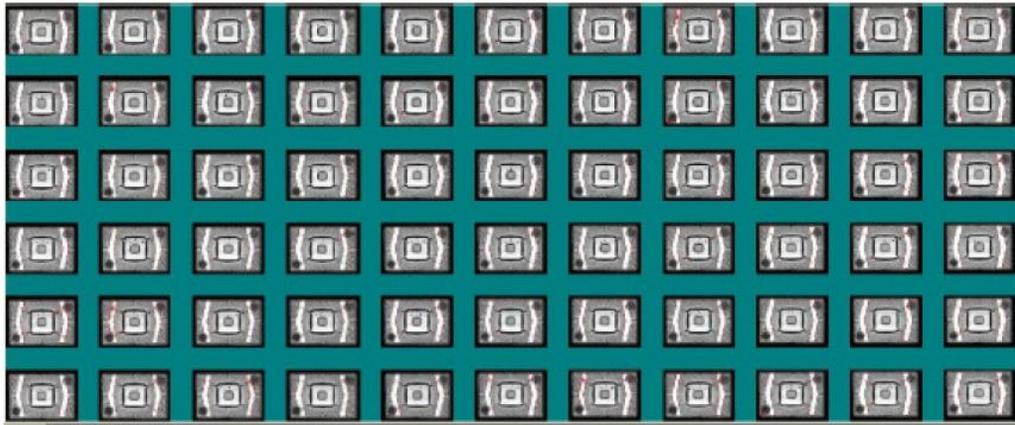
*Criteria: Acc/Rej = 0/1.

1.2 SAT confirmation

SAT before Precondition



SAT after Precondition



2. Pressure Cooker Test (PCT)

Run	Lot No	168 Hrs	Remark
#1	2944B009-ZK	0/45	

Publication Release Date: Mar.2010

#2	2944B009-ZL	0/45	
#3	2944B009-ZM	0/45	

*Criteria : Acc/Rej = 0/1.

3. Temperature Cycle Test (TCT)

Run	Lot No	500 Cycles	Remark
#1	2944B009-ZK	0/45	
#2	2944B009-ZL	0/45	
#3	2944B009-ZM	0/45	

*Criteria : Acc/Rej = 0/1.

Run	Lot No	1000 Cycles	Remark
#1	2944B009-ZK	0/45	
#2	2944B009-ZL	0/45	
#3	2944B009-ZM	0/45	

*Criteria : Acc/Rej = 0/1.

4. Highly Temp. Storage Life Test (HTSL)

Run	Lot No	500 Hrs	Remark
#1	2944B009-ZK	0/45	
#2	2944B009-ZL	0/45	
#3	2944B009-ZM	0/45	

*Criteria : Acc/Rej = 0/1.

Run	Lot No	1000 Hrs	Remark
#1	2944B009-ZK	0/45	
#2	2944B009-ZL	0/45	
#3	2944B009-ZM	0/45	

*Criteria : Acc/Rej = 0/1.

nuvoTon

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Tel: 1-408-544-1718

Nuvoton Technology Israel Ltd.

8 Hasadnaot Street, Herzlia B, 46130,
Israel
Tel: 972-9-970-2000

PACKAGE QUALIFICATION REPORT

Subcontractor:ASE(Chung-Li)
Package:LQFP Series
Package Material: GREEN
Wire Bonding Material :Cu wire

RA ENGINEER :許心怡

RA MANAGER :蔡明耀

SUMMARY

The **LQFP Series** product was passed the qualification tests.

A summary of the test result was as follows:

	S.S.
Pa. Pre-condition Test	: 405EA
Pa. Pressure Cooker Test	: 135EA
Pa. Temperature Cycle Test	: 135EA
Pa. Highly Temp. Storage Life Test	: 135EA

I. ENVIRONMENTAL TEST

A. Introduction

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B. Test Results

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4. Highly Temp. Storage Life Test(HTSL)

II. ENVIRONMENTAL TESTS OF PROCEDURE

A. Introduction

1. Pre-condition Test

1.1 SCOPE

Pre-condition Test is to measure the resistance of SMD (Surface Mount Devices) to the storage environment at the customer site and to thermal stress created by IR reflow or Vapor Phase Reflow.

1.2 TEST CONDITION

Step 1 : TCT(-65°C/150°C, 5 cycles)

Step 2 : Bake(125°C, 24 hours)

Step 3 : Soak(30°C/60%RH, 192 hours)

Step 4 : IR reflow (260 °C), 3 Passes.

1.3 SAT COFIRMATION: To confirm delamination, cracking, popcorn .

Criteria: IPC/JEDEC J-STD-020C

2. Pressure Cooker Test (PCT)

2.1 SCOPE

PCT is to evaluate the device resistance to moisture penetration.

2.2 TEST CONDITION

Ta = 121°C, RH = 100%, Td = 168 Hrs. 2 ATM ,(JESD22-A102-A)

3. Temperature Cycle Test (TCT)

3.1 SCOPE

TCT is to evaluate the resistance of device to environmental temperature change.

3.2 TEST CONDITION

-65°C / 15min, transfer time 1min, +150 °C/15min, 1000 cycles.

MIL-STD-883E, Method 1010, Condition "C".

4. Highly Temp. Storage Life Test (HTSL)

4.1 SCOPE

The purpose of this test is to determine the effect on solid state electronic devices of storage at elevated temperature without electrical stress applied.

4.2 Test condition:

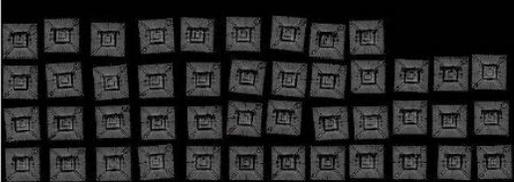
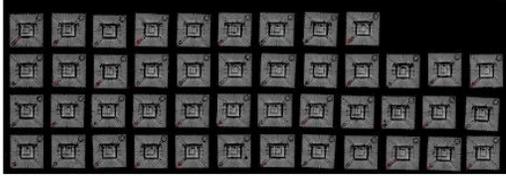
Temperature: 150°C ,Time: 500/1000hrs

B. Test Results

1.1 Pre-condition Test

Run	Lot No	SAT before Precondition	SAT After Precondition	Result	Remark
#1	2918B001-Z1	405	405	PASS	
#2	2918B001-Y1	405	405	PASS	
#3	2918B001-X1	405	405	PASS	

1.2 SAT confirmation:

SAT before Precondition	SAT after Precondition
	

2. Pressure Cooker Test (PCT)

Run	Lot No	168 Hrs(S.S.)	Result	Remark
#1	2918B001-Z1	45	PASS	
#2	2918B001-Y1	45	PASS	
#3	2918B001-X1	45	PASS	

3. Temperature Cycle Test (TCT)

Run	Lot No	1000 Cycles(S.S.)	Result	Remark
#1	2918B001-Z1	45	PASS	
#2	2918B001-Y1	45	PASS	
#3	2918B001-X1	45	PASS	

4. Highly Temp. Storage Life Test (HTSL)

Run	Lot No	1000 Hrs(S.S.)	Result	Remark
#1	2918B001-Z1	45	PASS	
#2	2918B001-Y1	45	PASS	
#3	2918B001-X1	45	PASS	

Waive Pre-cond. Of HTSL Test

Run	Lot No	1000 Hrs(S.S.)	Result	Remark
#1	2918B001-Z1	45	PASS	
#2	2918B001-Y1	45	PASS	
#3	2918B001-X1	45	PASS	

PACKAGE QUALIFICATION REPORT

Company : ASE Group Chung-Li

Package : QFP Series

Package Material : Green

Wire Bonding Material : Cu

RA ENGINEER : 許欣怡

RA MANAGER : Tsai Ming-yao

SUMMARY

The QFP Series product was passed the qualification tests.
A summary of the test result was as follows:

Pa. Pre-condition Test	: 405
Pa. Pressure Cooker Test	: 135
Pa. Temperature Cycle Test	: 135
Pa. HighlyTemp. Storage Life Test	: 135

Results of the life tests and environmental tests as well as the methods used on QFP Series product are described in details in the report.

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1.1 SCOPE

Pre-condition Test is to measure the resistance of SMD (Surface Mount Devices) to the storage environment at the customer site and to thermal stress created by IR reflow or Vapor Phase Reflow.

1.2 TEST CONDITION

- Step 1 : TCT(-65°C/150°C, 5 cycles)
- Step 2 : Bake(125°C, 24 hours)
- Step 3 : Soak(30°C/60%RH, 192 hours)
- Step 4 : IR reflow (260 °C), 3 Passes.

1.3 SAT COFIRMATION: To confirm delamination, cracking, popcorn .

Criteria: IPC/JEDEC J-STD-020

1.4 IR REFLOW PROFILE (FOR IPC/JEDEC J-STD-020)

2. Pressure Cooker Test (PCT)

2.1 SCOPE

PCT is to evaluate the device resistance to moisture penetration.

2.2 TEST CONDITION

Ta = 121°C, RH = 100%, Td = 168 Hrs. 2 ATM ,(JESD22-A102-A)

3. Temperature Cycle Test (TCT)

3.1 SCOPE

TCT is to evaluate the resistance of device to environmental temperature change.

3.2 TEST CONDITION

-65°C / 15min, transfer time 1min, +150 °C/15min, 500 cycles.

MIL-STD-883E, Method 1010, Condition "C".

4. Highly Temp. Storage Life Test (HTSL)

4.1 SCOPE

The purpose of this test is to determine the effect on solid state electronic devices of storage at elevated temperature without electrical stress applied.

4.2 Test condition:

Temperature:150°C,Time:1000hrs

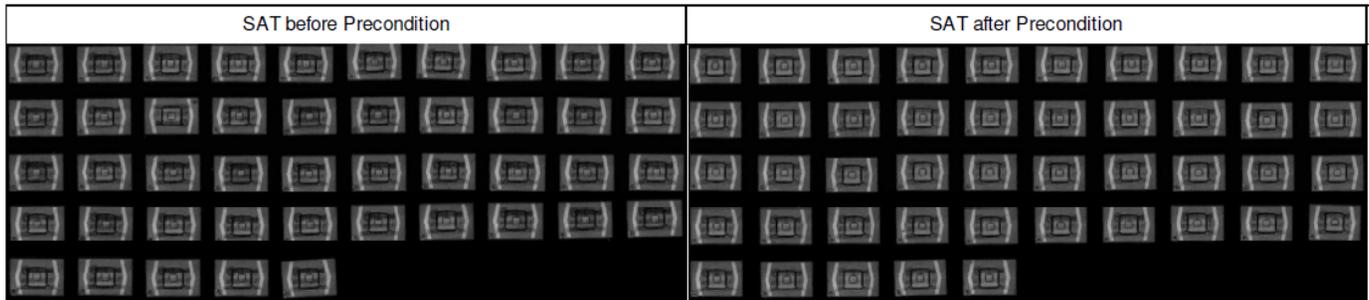
B. Test Results

1.1 Pre-condition Test

Run	Lot No	SAT before Precondition	SAT after Precondition	Result	Remark
#1	28180970-ZZ	405	405	PASS	
#2	28180970-ZX	405	405	PASS	
#3	28180970-ZY	405	405	PASS	

*Criteria: Acc/Rej = 0/1.

1.2 SAT confirmation



2. Pressure Cooker Test (PCT)

Run	Lot No	168 Hrs	Remark
#1	28180970-ZZ	0/45	
#2	28180970-ZX	0/45	
#3	28180970-ZY	0/45	

*Criteria: Acc/Rej = 0/1.

3. Temperature Cycle Test (TCT)

Run	Lot No	500 Cycles	Remark
#1	28180970-ZZ	0/45	
#2	28180970-ZX	0/45	
#3	28180970-ZY	0/45	

*Criteria: Acc/Rej = 0/1.

4. Highly Temp. Storage Life Test (HTSL)

Run	Lot No	1000 Hrs	Remark
#1	28180970-ZZ	0/45	
#2	28180970-ZX	0/45	
#3	28180970-ZY	0/45	

*Criteria: Acc/Rej = 0/1.