

Product / Process Change Notice

PCN No.: Q000-PCN-PA202108-03A

Date: 2021-09-01.

Change Title: <u>Add ASECL as new assembly site for LQFP package products.</u>			
Change Classification: ☒ Major ☐ Minor Change item: ☐ Design ☐ Raw Material ☐ Wafer FAB ☒ Package Assembly ☐ Testing ☐ Others: _____.			
Affected Product(s) : The affected products are LQFP package type products shown as Table 1.			
Description of Change(s) : Add new assembly site for LQFP package type products at ASECL (ASE Group ChungLi site, Taiwan) as the 2nd source for back up. All the other wafer process and manufacturing steps remain unchanged. ASECL is a qualified vendor for Nuvoton in assembly process. <u>New Supplier</u> ASE Group ChungLi site, Taiwan (hereinafter "ASECL"), (550, Chung-Hwa Road Section 1, Chung-Li, 320, Taiwan, R.O.C.)			
Reason for Change(s) : Enabling an alternate assembly house capability for the subject product to increase manufacturing capacity, extend manufacturing flexibility and enhance preparation for disaster recovery.			
Impact of Change(s) : (positive & negative) Form: The topside mark of the affected products will have a slight modification for easy identification of products made at the alternate assembly house. And the assembly vendor marking code will be changed from "S" to "A". Fit: No change. Function: No change. Reliability: No concern (Passed Nuvoton assembly package qualification.)			
Qualification Plan/ Results : Passed Nuvoton's qualification of assembly package, please refer to appendix A for details.			
Implementation Plan : 1. This PCN is the formal announcement of the site change in process. 2. Nuvoton is ready to execute this PCN immediately after customer approval. Therefore, if customer approval is obtained prior to the implementation date, Nuvoton will make this PCN effective right afterwards. ☐ Date Code: _____ onward ☐ Lot No.: _____ onward ☒ Implemented date: <u>Nov. 30, 2021 (scheduled)</u>			
Originator:	H.Y. Lai / Q100	Approval:(QRA Director)	C.H. Shen/ Q000
Contact for Questions & Concerns	Name: <u>HYLai</u> TEL: <u>886-3-5770066 (ext. 31226)</u> FAX: <u>886-3-5792673.</u> Address: <u>No.4, Creation Rd. III Science-Based Industrial Park Hsinchu, Taiwan, R.O.C..</u> E-mail: <u>hylai0@nuvoton.com.</u>		

Customer Comments:

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

☐ Approval	☐ Disapproval	☐ Conditional Approval: _____.
Date: _____	Dept. name: _____	Person in charge: _____.

Follow-up and Tracing:

A. copies to

FAB: N/A

Test / Product: ☐ MT00 WCHung ☐ MT10 YHHsieh.

Design/ Marketing: ☐ MU00 CHLu ☐ ME00 SHChen.

Production control/ Others: ☐ P100 YFLiu ☐ P100 CHHsu ☐ Q200 YChung ☐ Q200 LWKe.

B. Changes:

1. Document / Test program:

Document No/ test program	Document name/ test program name	Version		Responsible	Completed date	Remark
		before	after			
NA	NA	NA	NA	NA	NA	NA

Verified by: HYLai.

Table 1: The affected products list

Part No.
N32926U4DN
N32926U1DN
N9H26K61N
N9H30K41I
N9H30K61I
NUC975DK61Y
NUC976DK61YC
NUC977DK61Y
NUC978DK61Y
NUC980DK61Y
NUC980DK61YC

Appendix A: Nuvoton's qualification report of assembly package

PACKAGE QUALIFICATION REPORT

Company : ASE Group Chung-Li

Package : LQFP216L_24X24_(MCP)

Package Material : Green

Wire Bonding Material : Cu

RA ENGINEER : 葉曉陵

RA MANAGER : Tsai Ming-yao

SUMMARY

The LQFP216L(MCP) product was passed the qualification tests.
A summary of the test result was as follows:

Pre-condition Test	: 270
Pressure Cooker Test	: 135
Temperature Cycle Test	: 135
HighlyTemp. Storage Life Test	:135

Results of the life tests and environmental tests as well as the methods used on LQFP216L product are described in details in the report.

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-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

With pre-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

With pre-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:

Without pre-condition.

Temperature:150°C,Time:1000hrs

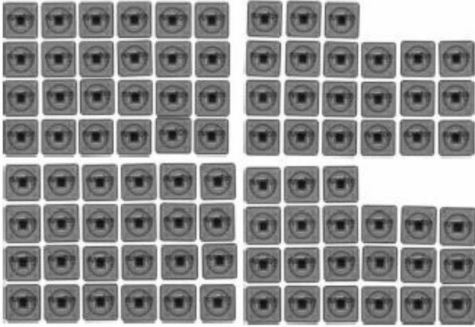
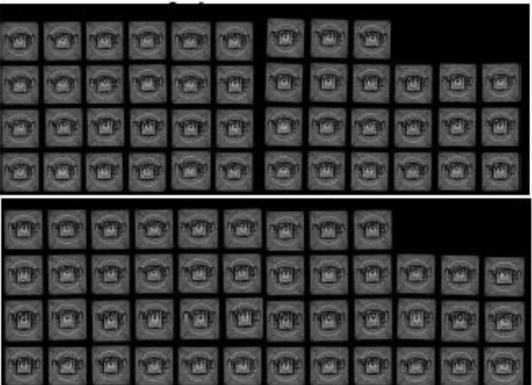
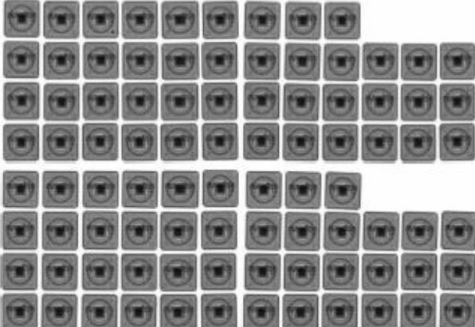
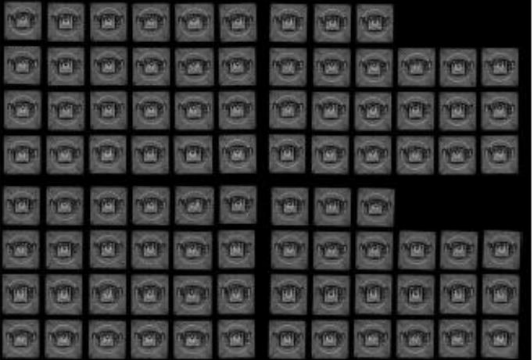
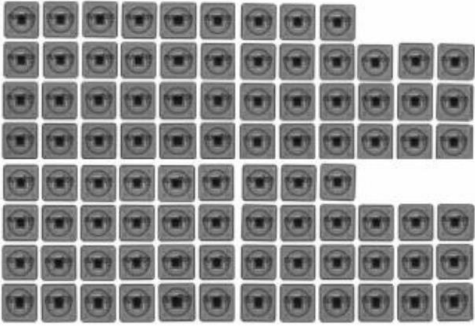
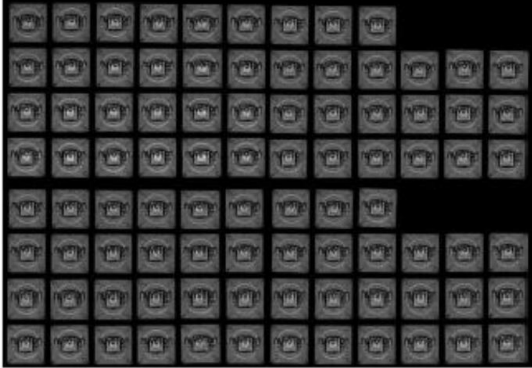
B. Test Results

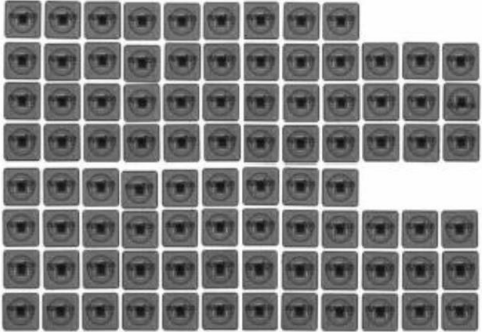
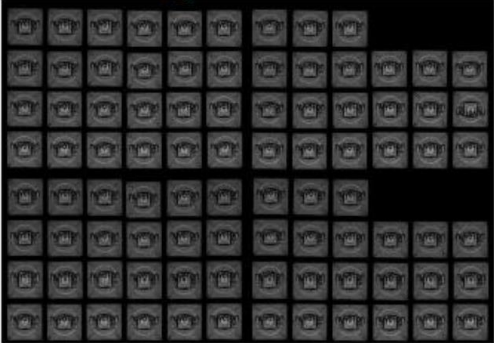
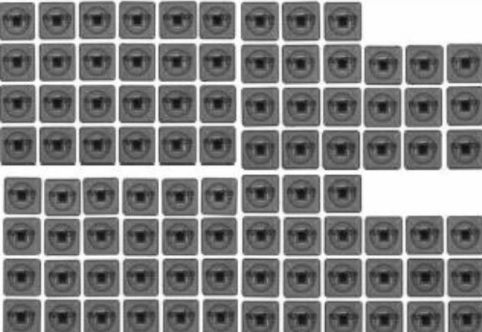
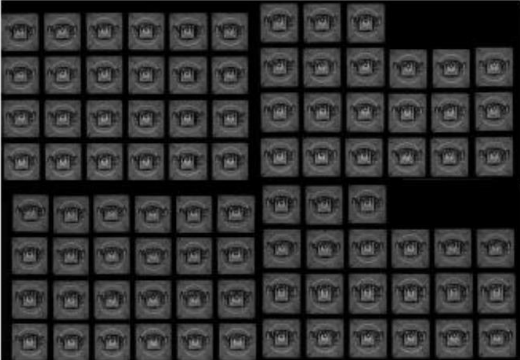
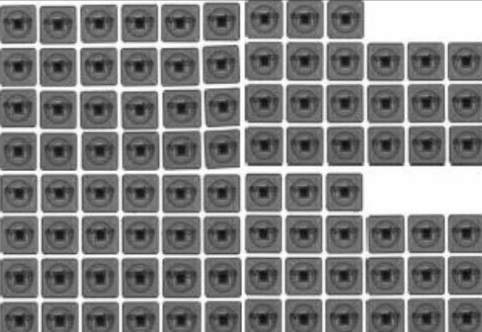
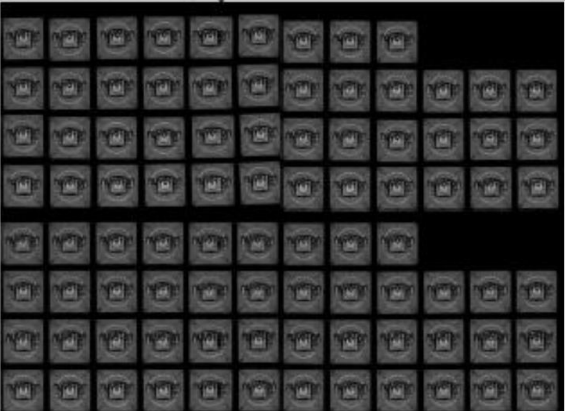
1.1 Pre-condition Test

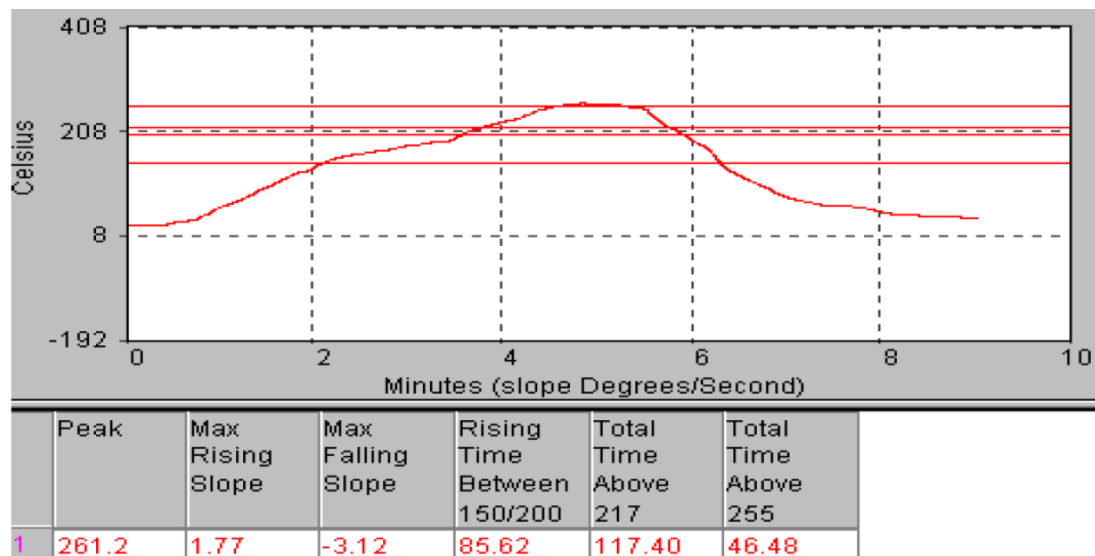
Run	Lot No	SAT Before Pre-condition		SAT After Pre-condition		Electric Result
		Through SCAN	Reflection	Through SCAN	Reflection	
#1	E504M002-ZX	0/45	0/45	0/45	0/45	0/45
#2	E504M002-ZY	0/45	0/45	0/45	0/45	0/45
#3	E504M002-ZZ	0/45	0/45	0/45	0/45	0/45

*Criteria: Acc/Rej = 0/1.

1.2 SAT confirmation

SAT Before Precondition		
Lot number	Through SCAN	Reflection
E504M002-ZX		
E504M002-ZY		
E504M002-ZZ		

SAT After Precondition		
Lot number	Through SCAN	Reflection
E504M002-ZX		
E504M002-ZY		
E504M002-ZZ		



2. Pressure Cooker Test (PCT)

Run	Lot No	168 Hrs	Remark
#1	E504M002-ZX	0/45	
#2	E504M002-ZY	0/45	
#3	E504M002-ZZ	0/45	

*Criteria: Acc/Rej = 0/1.

3. Temperature Cycle Test (TCT)

Run	Lot No	1000 Cycles	Remark
#1	E504M002-ZX	0/45	
#2	E504M002-ZY	0/45	
#3	E504M002-ZZ	0/45	

*Criteria: Acc/Rej = 0/1.

4. Highly Temp. Storage Life Test (HTSL)

Run	Lot No	1000 Hrs	Remark
#1	E504M002-ZX	0/45	
#2	E504M002-ZY	0/45	
#3	E504M002-ZZ	0/45	

*Criteria: Acc/Rej = 0/1.