PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	MDG/21/12189
1.3 Title of PCN	ASE Kaohsiung (Taiwan) additional source for LQFP14x14 128L package for STM32G4 512K products
1.4 Product Category	LQFP14x14 128L for STM32G4 512K listed products
1.5 Issue date	2021-03-17

2. PCN Team	
2.1 Contact supplier	
2.1.1 Name	ROBERTSON HEATHER
2.1.2 Phone	+1 8475853058
2.1.3 Email	heather.robertson@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Ricardo Antonio DE SA EARP
2.1.2 Marketing Manager	Veronique BARLATIER
2.1.3 Quality Manager	Pascal NARCHE

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Transfer	Line transfer for a full process or process brick (process step, control plan, recipes) from one site to another site: Assembly site (SOP 2617)	ASE Kaohsiung Taiwan

4. Description of change		
	Old	New
4.1 Description	Back-end sources: - Amkor ATP Philippines	Back-end sources: - Amkor ATP Philippines - ASE Kaohsiung Taiwan - Additional source For more information, please refer to PCN12189 – Additional information attached document.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	same Form, Fit, Function - No change in spec. Different manufacturing site	

5. Reason / motivation for change	
5.1 Motivation	Due to the success on the market of STM32 devices, ST Microcontrollers Division decided to qualify an additional back-end site to maintain state of the art service level to our customers thanks to extra capacity.
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	Tracability is ensure by ST internal tools. Please refer to PCN12189 – Additional information attached document.

7. Timing / schedule	
7.1 Date of qualification results	2021-02-08
7.2 Intended start of delivery	2021-04-08
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation	
8.1 Description	12189 MDG-MCD RER2009 V1.0 PCN12189 - ASE additional source for LQFP 14x14 - 469XXXY - Report.pdf

8.2 Qualification report and qualification results	Available (see attachment)	**Issue Date**	2021-03-17

9. Attachments (additional documentations)
12189 Public product.pdf 12189 MDG-MCD RER2009 V1.0 PCN12189 - ASE additional source for LQFP 14x14 - 469XXXY - Report.pdf 12189 PCN12189_Additional information.pdf

10. Affected parts		
10. 1 Current		**10.2 New (if applicable)**
10.1.1 Customer Part No	**10.1.2 Supplier Part No**	**10.1.2 Supplier Part No**
	STM32G473QET6	
	STM32G473VCT6	
	STM32G473VET6	
	STM32G474QET6	
	STM32G474VBT6	
	STM32G474VET3	
	STM32G474VET6	
	STM32G484QET6	
	STM32G484VET6	

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Reliability Evaluation Report

MDG-MCD-RER2009

STM32G4 512K (469)

ASE Kaohsiung (Taiwan) additional source for LQFP128L 14x14 (PCN12189)

General Information	
Commercial Product	STM32G474QET3
Product Line:	469X66
Die revision:	X469XXXY
Product Description:	STM32G 469
Package:	LQFP128 14x14x1.4
Silicon Technology:	90nm eFlash Generic TSMC
Division (2):	MDG-MCD

Traceability	
Diffusion Plant (2):	*TSMC Fab 14 (Taiwan)*
Assembly Plant (2):	*ASE (Taiwan)*

Reliability Assessment	
Pass	☒
Fail	☐
Investigation required (2)	☐

Note: *this report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the electronic device conformance to its specific mission profile. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics or under the approval of the author (see below).*

Version	Date	Author	Function
1.0	08th February 2021	Cédric CHASTANG	MDG-MCD-QA Back end

APPROVED BY:

Function	Location	Name	Date
BE Quality Manager	ST Rousset	Gisèle SEUBE	08th February 2021
Division Quality Manager	ST Rousset	Pascal NARCHE	08th February 2021

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1 RELIABILITY EVALUATION OVERVIEW

1.1 Objective

The aim of this report is to present results of the reliability evaluation performed on STM32G4 die 469 for LQFP128L 14x14 in ASEKH.

Changes are described here below:

	Old	New
Description	Back-end sources: - Amkor ATP Philippines	Back-end sources: - Amkor ATP Philippines - ASE Kaohsiung Taiwan additional source

1.2 Reliability Strategy

Test vehicles for reliability trials are described here below:

Product	Package	Diffusion or Assembly plant
STM32G474QET3	LQFP128 14x14x1.4	ASE (Taiwan)

Qualification is based on standard STMicroelectronics Corporate Procedures for Quality and Reliability, in full compliancy with the JESD-47 international standard

1.3 Conclusion

All reliability tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing.

According to good reliability tests results in line with validated product mission profile and reliability strategy, the qualification is granted for the 469 LQFP128L 14X14 product in ASE Kaohsiung.

Refer to Section 3.0 for reliability test results.

2 TEST VEHICLE CHARACTERISTICS

2.1 Generalities

STM32 Package Test Vehicles

Package line	Assembly Line Package	Package	Device (Partial RawLine Code)	Diffusion Process	Number of Lots
LQFP	ASE	LQFP 14X14 128L	469 / TC*469	TSMC Fab 14 (Taiwan)	1

2.2 Traceability

2.2.1 Wafer fab information

Table 1

Wafer fab information	
FAB1 die 447	
Wafer fab name / location	TSMC Fab14 / Taiwan
Wafer diameter (inches)	12
Wafer thickness (µm)	775+/-25 µm
Silicon process technology	90nm eFLASH_L
Number of masks	42
Die finishing front side (passivation) materials/thicknesses	PSG + NITRIDE / 1.75 µm
Die finishing back side Materials	RAW SILICON
Die area (Stepping die size)	4298.4 x 4045.6 µm
Die pad size	123 x 59 µm
Sawing street width (X,Y)	79.96 x 80 µm
Metal levels/Materials/Thicknesses	Metal 1 TaN/Ta/CuSeed/Cu 0.240 µm Metal 2 TaN/Ta/CuSeed/Cu 0.310 µm Metal 3 TaN/Ta/CuSeed/Cu 0.310 µm Metal 4 TaN/Ta/CuSeed/Cu 0.310 µm Metal 5 TaN/Ta/CuSeed/Cu 0.310 µm Metal 6 TaN/Ta/CuSeed/Cu 0.850 µm Metal 7 AlCu 1.450 µm

2.2.2 Assembly information

Table 2

Assembly Information	
Package 1 - LQFP14X14 100L	
Assembly plant name / location	ASE (Taiwan)
Pitch (mm)	0.4
Die thickness after back-grinding (µm)	375 µm +/- 25µm
Die sawing method	Laser groove + single cut
Bill of Material elements	
Lead frame/Substrate material/supplier/reference	LF# A07757 LQ14 128L Pure Tin C7025 5.5sq
Lead frame finishing (material/thickness)	Pure Tin (e3) Tolerance 7 to 20 µm
Die attach material/type(glue/film)/supplier	SUMITOMO EPOXY CRM 1076WA
Wire bonding material/diameter/supplier	wire gold 2N 0.8 mils
Molding compound material/supplier/reference	SUMITOMO EME-G631SH ASE TAIWAN
Package Moisture Sensitivity Level (JEDEC J-STD020D)	MSL3

2.2.3 Reliability testing information

Table 3

Reliability Testing Information	
Reliability laboratory name / location	ST RSST in Rousset

Note: ST is ISO 9001 certified. This induces certification of all internal and subcontractor labs.
ST certification document can be downloaded under the following link:
http://www.st.com/content/st_com/en/support/quality-and-reliability/certifications.html

3 TESTS RESULTS SUMMARY

3.1 Lot Information

Table 4

Lot #	Diffusion Lot / Wafer ID	Die Revision (Cut)	Assy Lot / Trace Code	Raw Line	Package	Note
1	9R949165	Cut 2.2	AA025004	E4TC*469ESXY	LQFP128L	

3.2 Test plan and results summary

Table 5 - ACCELERATED ENVIRONMENT STRESS TESTS

LQFP14x14 128L, ASE

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
ESD CDM	ANSI/ESDA/ STM5.3.1	250V	1	3	3	Lot1: 0/3	
PC	J-STD-020 JESD22-A113	24h bake@125°C, MSL3 (192h@30C/60%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	1	308	308	Lot1: 0/308	
TC	JESD22-A104	Ta=-65/150°C, Duration= 500cyc ☒ After PC	1	77	77	Lot1: 0/77	
UHAST	JESD22-A118	Ta=130°C, 85% RH, 2 atm Duration= 96hrs ☒ After PC	1	77	77	Lot1: 0/77	
HTSL	JESD 22-A103	Ta=150°C, Duration= 1000hrs ☒ After PC	1	77	77	Lot1: 0/77	
THB	JESD 22-A101	Ta=85°C/85%RH, Bias VDD=3v6 ☒ After PC	1	77	77	Lot1: 0/77	

Note: Test method revision reference is the one active at the date of reliability trial execution

Table 6 - PACKAGE ASSEMBLY INTEGRITY TESTS

Test code	Method	Tests Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
CA	Construction Analysis including -Lazer groove -wafer skeleton -Focus on scribe line inspection -Wire bond shear -Wire bond pull -Solderability -POA compliancy	JESD 22B102 JESDB100/B108	1	50	50	Lot1: 0/50	No concern

4 APPLICABLE AND REFERENCE DOCUMENTS

Reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
SOP2.4.4	Record Management Procedure
SOP2.6.2	Internal Change Management
SOP2.6.7	Finished Good Maturity Management
SOP2.6.9	Package & Process Maturity Management in BE
SOP2.6.11	Program Management for Product Development
SOP2.6.17	Management of Manufacturing Transfers
SOP2.6.19	Front-End Technology Platform Development and Qualification
DMS 0061692	Reliability Tests and Criteria for Product Qualification
ANSI/ESDA JEDEC JS-002	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
J-STD-020:	Moisture/reflow sensitivity classification for non-hermetic solid state surface mount devices
JESD22-A113:	Preconditioning of non-hermetic surface mount devices prior to reliability testing
JESD22-A118:	Unbiased Highly Accelerated temperature & humidity Stress Test
JESD22-A104:	Temperature cycling
JESD22-A110:	Temperature Humidity Bake
JESD 22B102:	Solderability test
JESD22B100/B108:	Physical dimension

5 GLOSSARY

Reference	Short description
PC	Preconditioning (solder simulation)
THB	Temperature Humidity Bias
TC	Temperature cycling
uHAST	Unbiased Highly Accelerated Stress Test
HTSL	High temperature storage life
DMS	ST Advanced Documentation Controlled system/ Documentation Management system
ESD CDM	Electrostatic discharge (charge device model)
CA	Construction Analysis

6 REVISION HISTORY

Revision	Author	Content description	Approval List			
			Function	Location	Name	Date
1.0	Cédric Chastang	Initial release	Division Quality Manager	RSST	Pascal NARCHE	08th February 2021
			Back-end MCD Quality Manager	RSST	Gisele SEUBE	08th February 2021

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PRODUCT/PROCESS CHANGE NOTIFICATION
PCN – Additional information

ASE Kaohsiung (Taiwan) additional source For LQFP14x14 128L package for STM32G4 512K products

MDG - Microcontrollers Division (MCD)

What are the changes?

Changes described in table below:

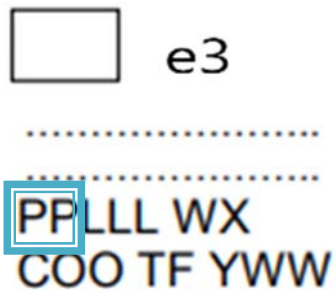
	Existing back-end site	Added back-end site
Assembly site	**AMKOR ATP1 (Philippines)**	**ASE Kaohsiung (Taiwan)**
Glue	Evertech AP4200	Sumitomo CRM 1076WA
Molding compound (1)	Sumitomo G631HQ	Sumitomo G631SH

(1) Package darkness changes depending on molding compound.

Pin1 identifier can change in terms of form and positioning.
Marking position and size could be different upon assembly site, without any loss of information.

How can the change be seen?

The standard marking is:



PP code indicates assembly traceability plant code.

Please refer to DataSheet for marking details.

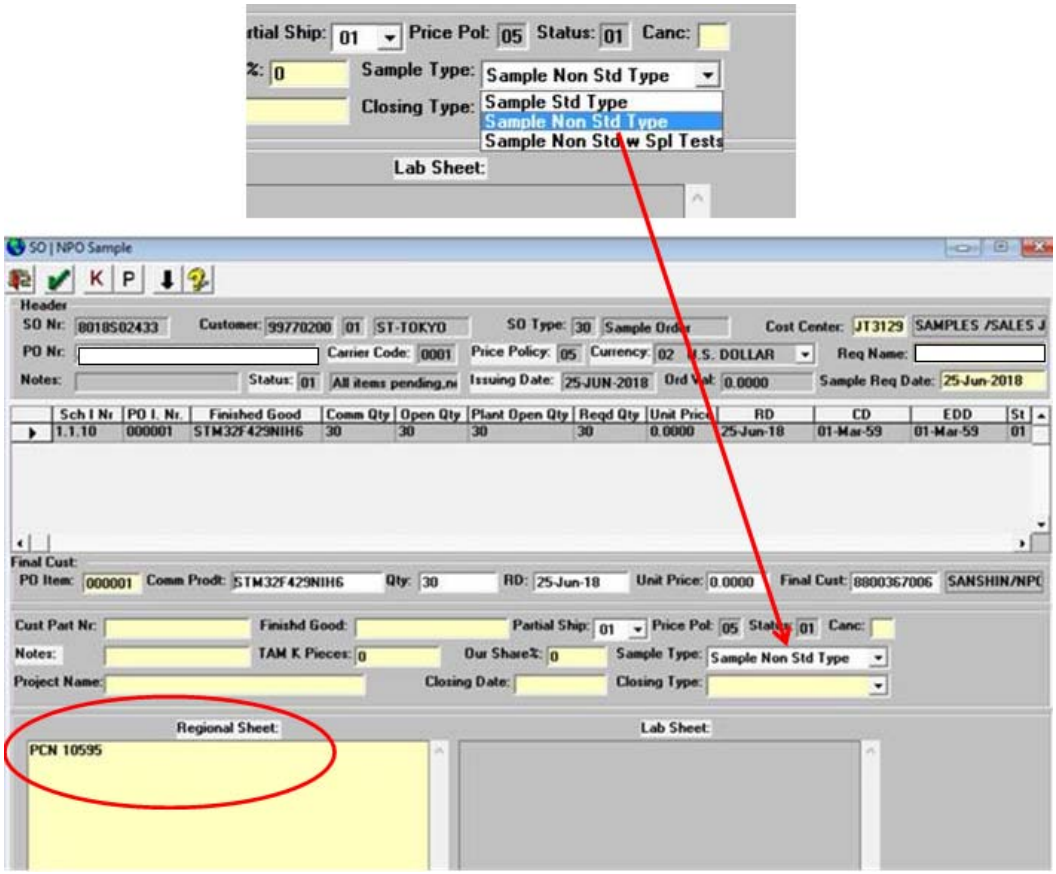
The marking is changing as follows:

Existing		Additional	
PP code	Fab	PP code	Fab
7B	Amkor ATP Philippines	AA	ASE Kaohsiung Taiwan

How to order samples?

For all samples request linked to this PCN, please:

- place a **Non-standard** sample order (choose Sample Non Std Type from pull down menu)
- insert the PCN number "**PCN11189**" into the NPO Electronic Sheet/**Regional Sheet**
- request sample(s) through Notice tool, indicating a single Commercial Product for each request



Public Products List

Publict Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

PCN Title : ASE Kaohsiung (Taiwan) additional source for LQFP14x14 128L package for STM32G4 512K products

PCN Reference : MDG/21/12189

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

STM32G474QCT6	STM32G473QCT6	STM32G474VET6TR
STM32G473VCT6	STM32G483VET6	STM32G474VET3
STM32G474QET6TR	STM32G474VET6	STM32G474VCT6
STM32G473QBT6	STM32G473VET6TR	STM32G473VCT6TR
STM32G474VBT3	STM32G474QET6	STM32G483QET6
STM32G473VET3	STM32G474QBT6	STM32G484QET6
STM32G474VET3TR	STM32G474VBT3TR	STM32G474VBT6
STM32G484VET6	STM32G473QET6	STM32G473VET6

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