PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	MDG/20/12217
1.3 Title of PCN	Change leadframe supplier - STM8S20x - STM8AFxx/ALxx - VFQFPN 32L 5x5 Automotive selected products
1.4 Product Category	- STM8S20x - STM8AFxx/ALxx
1.5 Issue date	2020-10-01

2. PCN Team	
2.1 Contact supplier	
2.1.1 Name	NEMETH KRISZTINA
2.1.2 Phone	+49 89460062210
2.1.3 Email	krisztina.nemeth@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**
Materials	Change of qualified supplier providing the same part number for direct material	Amkor ATP (The Philippines)

4. Description of change		
	Old	**New**
4.1 Description	Change from: - leadframe supplier: ALS	Change to: - new leadframe supplier: HDS
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No Impact on Form, Fit, Function	

5. Reason / motivation for change	
5.1 Motivation	ALS leadframe supplier has shutdown its operation by December 2019
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change	
6.1 Description	Traceability of the change is ensured by ST internal tools.

7. Timing / schedule	
7.1 Date of qualification results	2020-09-01
7.2 Intended start of delivery	2020-10-20
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	12217 MDG-MCD RER1915 V1.0 PCN12217-STM8A VQFN5x5- LF supplier change- reliability evaluation report.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	**Issue Date**	2020-10-01

9. Attachments (additional documentations)

12217 Public product.pdf
12217 MDG-MCD RER1915 V1.0 PCN12217-STM8A VQFN5x5- LF supplier change- reliability evaluation report.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
	STM8AF6266UCY	

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Reliability Evaluation Report

MDG-MCD-RER1915

STM8A (79H-79J-79B-79A)

HDS Lead Frame qualification for VQFN5x5 32L

AMKOR-ATP3 (PCN12217)

General Information		Traceability	
Commercial Product	*STM8AF6226UDY* *STM8AF6266UDY* *STM8AL3136UCY*	Diffusion Plant	*Rousset RS8F*
Product Line	79JX19, 79BX03, 79HX19	Assembly Plant (2)	*AMKOR - PHILIPPINES*
Die revision	*X79JX10A, X79BX14W, X79HX21Z*		
Product Description	*STM8A*		
Package	*VFQFPN32L 5X5x1.0*	**Reliability Assessment**	
Silicon Technology	*CMOSF9 GO1/ GO2 Rousset*	Pass	☒
Division	*MDG-MCD*	Fail	☐

***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	September 1st, 2020	Céline NAVARRO	MDG-MCD-Q&R Technician

APPROVED BY:

Function	Location	Name	Date
Division Q&R Responsible	Rousset	Pascal NARCHE	September 1st, 2020
BE Quality Manager	Rousset	Gisele SEUBE	September 1st, 2020

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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 STM8AL & STM8AF for VQFN5x5 lead frame, HDS supplier.

This Production Change Notification (PCN) concerns change of Lead frame supplier for VQFPN5x5 at AMKOR Philippines.

Changes are described here below:

	From:	To:
Assembly site	ATP3	ATP3
Lead frame supplier	ALS manufactured leadframes	HDS manufactured leadframes

1.2 Reliability Strategy

3 Test vehicles for reliability trials are described here below:

Product	Process or Package	Diffusion or Assembly plant
STM8AF6226UDY	CMOSF9S GO1- VFQFPN 5X5x1.0	Rousset 8 - ATP3 AMKOR
STM8AF6266UDY	CMOSF9S GO1 - VFQFPN 5X5x1.0	Rousset 8 - ATP3 AMKOR
STM8AL3136UCY	CMOSF9S GO2 - VFQFPN 5X5x1.0	Rousset 8 - ATP3 AMKOR

Die 79A is qualified by similarity with dice 79B & 79J, same front end technology.

Qualification is based on standard STMicroelectronics Corporate Procedures for Quality and Reliability, in full compliancy with the JESD-47 international standard & AEC Q100 automotive specifications.

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 STM8A in package VFQPN 32L 5x5 assembled with HDS lead frame.

Refer to Section 3.0 for reliability test results.

2 TEST VEHICLE CHARACTERISTICS

2.1 Generalities

Package line	Assembly Line Package	Device (RawLine Code)	Diffusion Process	Number of Lots
VQFN	VFQFPN 5X5x1.0 32L 0.5 pitch	Q242*79JX10A	CMOSF9 GO1	1
	VFQFPN 5X5x1.0 32L 0.5 pitch	Q042*79BX14W	CMOSF9 GO1	1
	VFQFPN 5X5x1.0 32L 0.5 pitch	Q342*79HX21Z	CMOSF9 GO2	1

2.2 Traceability

2.2.1 Wafer fab information

Table 1

Wafer fab information			
Test vehicle	79H	79J	79B
Wafer fab name / location	RS8F Rousset		
Wafer diameter (inches)	8 inches		
Wafer thickness (µm)	375 +/- 25µm		
Silicon process technology	CMOSF9 GO2	CMOSF9 GO1	
Number of masks	39	29	
Die finishing front side (passivation) materials	USG + NitUV (HFP USG+UV Nitride)		
Die finishing back side Materials	RAW SILICON - BACK GRINDING		
Die area (Stepping die size)	X:1738, Y:2876 µm	X:1334, Y:2210 µm	X:2118, Y:2358 µm
Die pad size	65 x 108 µm		
Sawing street width (X,Y) (µm)	80 x 80 µm		
Metal levels/ Materials/ Thickness	Metal 1 TaN/Ta/Cu 0.280 µm Metal 2 TaN/Ta/Cu 0.350 µm Metal 3 TaN/Ta/Cu 0.350 µm Metal 4 TaN/Ta/Cu 0.350 µm Metal 5 Ti/AlCu/TxTN 0.900 µm	Metal 1 TaN/Ta/Cu 0.280 µm Metal 2 TaN/Ta/Cu 0.350 µm Metal 3 TaN/Ta/Cu 0.350 µm Metal 4 Ti/AlCu/TxTN 0.900 µm	

2.2.2 Assembly information

Table 2

Assembly Information	
Assembly plant name / location	AMKOR - Philippines
Pitch (mm)	0.5
Die thickness after back-grinding (µm)	250 +/- 25µm
Die sawing method	Step cut
Bill of Material elements	
Lead frame/Substrate material/supplier/reference	LF VQFN 5X5 32L 3.9SQ RU Cu sid101371814 HDS
Lead frame finishing (material/thickness)	Pure Tin (e3): tolerance 7 to 20 µm
Die attach material/type (glue/supplier)	ABLESTIK Dexter 1234-100
Wire bonding material/diameter	GOLD WIRE 0.8 MILS
Molding compound material/supplier/reference	SUMITOMO EME-G700Y
Package Moisture Sensitivity Level (JEDEC J-STD020D)	3

2.2.3 Reliability testing information

Table 3

Reliability Testing Information	
Reliability laboratory name / location	ST Muar (Malaysia) / ST Rousset (France)

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	VG912372	Cut1.0	7B006A9X	Q242*79JX10A	VFQFPN32L 5X5x1.0	Package Reliability assessment
2	VG925533	Cut1.4	7B006A9W	Q042*79BX14W	VFQFPN32L 5X5x1.0	Package Reliability assessment
3	VG940726	Cut1.1	7B006A9Y	Q342*79HX21Z	VFQFPN32L 5X5x1.0	Package Reliability assessment

3.2 Test plan and results summary

Table 5 - ACCELERATED ENVIRONMENT STRESS TESTS

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
ESD CDM	ANSI/ESD STM5.3.1	500V	3	3	3	Lot1: 0/3 Lot2: 0/3 Lot3: 0/3	
PC	J-STD-020	24h bake@125°C, MSL3 (192h@30C/60%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	3	308	924	Lot1: 0/308 Lot2: 0/308 Lot3: 0/308	*No delamination TSAM/CSAM after Pre-conditioning*
TC	JESD22-A104	Ta=-65/150°C Duration= 500cyc ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	
UHAST	JESD22-A118	Ta=130°C ,85% RH Duration= 96hrs ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	
HTSL	JESD 22-A103	Ta=150°C , Duration= 1000hrs ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	
THB	JESD 22-A101	Ta=85°C/85%RH VDD=3v6 for STM8AL VDD= 5v6 for STM8AF ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	

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

Table 7 - 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 -Wire bond shear -Wire bond pull -Solderability	JESD 22B102 JESDB100/ B108	3	50	150	Lot1: 0/50 Lot2: 0/50 Lot3: 0/50	No concern

4 APPLICABLE AND REFERENCE DOCUMENTS

Reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
AEC Q100	Stress-Test Qualification of Integrated Circuits (Automotive)
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/ESD STM5.3.1	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
JESD 22-A108	Temperature, Bias and Operating Life
JESD 22-A103	High Temperature Storage Life
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
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	Céline Navarro	Initial release	Division Q&R Responsible	RSST	Pascal NARCHE	September 1st, 2020
			Division Quality Manager	RSST	Gisele SEUBE	September 1st, 2020

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