

PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company	 STMicroelectronics International N.V
1.2 PCN No.	MDG/23/13918
1.3 Title of PCN	ASE Kaohsiung (Taiwan) additional source for LQFP 7x7 package on STM32L4/L5x, STM32C01/C03x and STM32G0x products (Addendum to PCN10548 and PCN12854)
1.4 Product Category	<ul style="list-style-type: none"> - STM32L4/L5x - STM32C01/C03x - STM32G0x in LQFP 7x7 package
1.5 Issue date	2023-02-28

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
2.2.2 Marketing Manager	Veronique BARLATIER
2.2.3 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: - Stats ChipPAC Jiangyin China (JSCC)	Back-end sources: - Stats ChipPAC Jiangyin China (JSCC) - ASE Kaohsiung Taiwan - Additional source For more information, please refer to PCN13918 – Additional information attached document. addendum to PCN10548 et 12854.
4.2 Anticipated Impact on form, fit, function, quality, reliability or processability?	Form: leadfinishing color, package darkness, marking info may slightly change (more details in PCN13918 additional information document attached) Fit: No change Fonction: No change	

5. Reason / motivation for change

5.1 Motivation	Due to the success on the market of STM32 devices, ST General Purpose Microcontroller sub-group decided to extend the capacity through an already qualified back-end site (refer to PCN10548 and PCN12854) 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	Change is visible through assembly traceability plant, in the marking: - "GQ" for Stats ChipPAC China - "AA" for ASE Kaohsiung Taiwan Please refer to PCN 13918 – Additional information attached document.
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7. Timing / schedule

7.1 Date of qualification results	2023-02-28
7.2 Intended start of delivery	2023-03-10
7.3 Qualification sample available?	Not Applicable

8. Qualification / Validation

8.1 Description	13918 MDG-MCD-RER1810 V6-ASE KH for LQFP7x7_10x10_14x14_20x20 STM8L STM32 - report.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-02-28

9. Attachments (additional documentations)

13918 Public product.pdf
 13918 MDG-MCD-RER1810 V6-ASE KH for LQFP7x7_10x10_14x14_20x20 STM8L STM32 -report.pdf
 13918 PCN13918_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
	STM32C031C4T6	
	STM32C031C6T6	
	STM32C031K4T6	
	STM32C031K6T6	
	STM32C031K6T7	
	STM32G051C8T3	
	STM32G0B0KET6	
	STM32G0B1CCT6TR	
	STM32G0B1KBT3	
	STM32G0B1KBT6N	
	STM32G0B1KCT6	
	STM32G0B1KCT6N	
	STM32G0B1KET6	
	STM32G0B1KET6N	
	STM32G0C1KCT6N	
	STM32G0C1KET6	
	STM32G0C1KET6N	
	STM32L412CBT6TR	
	STM32L431CBT6TR	
	STM32L433CCT6TR	
	STM32L552CET6	

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MDG-MCD-RER1810

Reliability Report

Qualification Type: ASSEMBLY LINE QUALIFICATION

ASE Kaohsiung (Taiwan) additional source for LQFP 7x7, LQFP 10x10, LQFP14x14 & LQFP20x20 extended listed products

(PCN10548)
(PCN10549)
(PCN10689)
(PCN12854)
(PCN13918)

Product / Process / Package Information for test vehicles

Commercial Product	STM8L052C6T6 STM32F303CBT7	STM32F205RET6 STM32L052R8T6	STM32L151VDT6 STM32F071VBT6 STM32F207VET6 STM32L431VCT6	STM32F103ZET6 STM32F405ZGT6 STM32H743ZIT6
Mask Set Revision	F764XXXY F422XXXY	E411XXX3 F417XXXX	F436XXXX F448XXX1 E411XXX3 E435XXXZ	F414XXX3 E413XXX2 E450XXXY
Silicon Process Technology	CMOSF9GO2 CMOS0.18µm Emb.Flash	CMOSM10ULP 6M1T CMOSF9GO2s	CMOSF9GO2 CMOS0.18µm Emb.Flash CMOSM10ULP 6M1T 90nm eFlash Generic TSMC	CMOS0.18µm Emb.Flash CMOSM10LP 6M1T CMOSM40
Wafer Fabrication Location	ROUSSET R8 TSMC Fab11 US	TSMC Fab14 Taiwan ROUSSET R8	ROUSSET R8 TSMC Fab8 Taiwan TSMC Fab14 Taiwan TSMC Fab14 Taiwan	TSMC Fab8 Taiwan ST Crolles 300 ST Crolles 300
Package	LQFP 7x7x1.4 48L	LQFP 10x10x1.4 64L	LQFP 14x14x1.4 100	LQFP 20x20x1.4 144
Assembly Plant Location	ASE Kaohsiung (Taiwan)			



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Approval List rev 1

Function	Location	Name	Date
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	30 Nov., 2018
Division Quality Manager	ST Rousset	Pascal NARCHE	30 Nov., 2018

Approval List rev 2

Function	Location	Name	Date
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	17 Jan., 2019
Division Quality Manager	ST Rousset	Pascal NARCHE	17 Jan., 2019

Approval List rev 3

Function	Location	Name	Date
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	26 Apr., 2019
Division Quality Manager	ST Rousset	Pascal NARCHE	2 May, 2019

Approval List rev 4

Function	Location	Name	Date
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	25 Jun.,2019
Division Quality Manager	ST Rousset	Pascal NARCHE	25 Jun.,2019

Approval List rev 5

Function	Location	Name	Date
Division Back-End Quality Manager	ST Rousset	Gisèle SEUBE	25 Jun.,2021

Approval List rev 6

Function	Location	Name	Date
Subgroup Quality Manager	ST Rousset	Pascal NARCHE	21 Feb.,2023

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Reliability Report

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Reliability Report

1 RELIABILITY RESULTS OVERVIEW

1.1 Objectives

The assembly line LQFP7x7 is qualified and in production for STM32 devices (please refer to report MDG-MCD-RER1717).

The aim of this report is to present results of the reliability evaluation for LQFP 7x7, LQFP 10x10, LQFP 14X14 & LQFP20x20 package manufactured at ASE Kaohsiung (Taiwan) assembly and test plant for STM8L and STM32 extended devices.

Test vehicles are described here below:

Product	Package	Assembly plant
STM8L052C6T6	LQFP 48 7x7x1.4	
STM32F303CBT7		
STM32F205RET6	LQFP 64 10x10x1.4	
STM32L052R8T6		
STM32L151VDT6		
STM32F071VBT6	LQFP 100 14x14x1.4	ASE Kaohsiung (Taiwan)
STM32F207VET6		
STM32L431VCT6		
STM32F103ZET6	LQFP 144 20x20x1.4	
STM32F405ZGT6		
STM32H743ZIT6		

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

1.2 Conclusion

All reliability tests have been completed with positive results for LQFP7x7, LQFP10x10, LQFP14x14 & LQFP20x20. Neither functional nor parametric rejects were detected at final electrical testing.

So, according to good reliability tests results in line with validated product mission profile and reliability strategy, the qualification is granted for the LQFP7x7, LQFP10x10, LQFP14x14 & LQFP20x20 assembly and test line at ASE Kaohsiung (Taiwan).

Refer to Section 2.0 for reliability test results.

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Reliability Report

2 RELIABILITY EVALUATION CONTEXT / PLAN / STRATEGY & RESULTS SUMMARY

2.1 Reliability Evaluation: Context & strategy summary

Due to the success on the market of STM8L & 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. This reliability evaluation concerns the qualification of a new assembly line for LQFP 7x7, LQFP 10x10, LQFP 14x14 and LQFP 20x20 package in ASE Kaohsiung (Taiwan).

PCN10548 - Changes are described here below for LQFP7x7 & LQFP10x10:

Assembly site	Existing Back-end sites			Added back-end site
	Stats ChipPAC JSCC Jiangyin China	ST Muar Malaysia	Amkor ATP Philippines	
Lead frame supplier	Copper Frame Spot Ag	Pre Plated Frame	Copper Frame Spot Ag	Copper Frame Spot Ag
Leadfinishing (1)	Pure Tin (e3)	Ni Pd Au (e4)	Pure Tin (e3)	Pure Tin (e3)
Molding compound (2)	Sumitomo G631SHQ	Sumitomo G700LS	Sumitomo G631HQ	Sumitomo G631SH
Die attach Glue	Ablestik 3230	Hitachi EN4900	Evertech AP4200	Sumitomo CRM 1076WA
Wire	Silver 96.5% 0.8mil	Gold 0.8mil Silver 96.5% 0.8mil	Gold 0.8mil	Gold 0.8mil
Enhanced traceability in marking	2 digits	2 digits	No digit	2 digits

PCN10689 - Changes are described here below for LQFP14x14:

Assembly site	Existing Back-end sites			Added back-end site
	ST Muar Malaysia	ST Muar Malaysia	Amkor ATP Philippines	
Lead frame supplier	Pre Plated Frame	Copper Frame Spot Ag	Copper Frame Spot Ag	Copper Frame Spot Ag
Leadfinishing (1)	Ni Pd Au (e4)	Pure Tin (e3)	Pure Tin (e3)	Pure Tin (e3)
Molding compound (2)	Sumitomo G700LS	Sumitomo G700LS	Sumitomo G631HQ	Sumitomo G631SH
Die attach Glue	Henkel 3280T	Henkel ABP8302	Evertech AP4200	Sumitomo CRM 1076WA
Wire	1.0mil Au	0.8mil Ag	0.8mil Au	0.8mil Au
Enhanced traceability in marking	No digit	2 digits	No digit	2 digits

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PCN10549 - Changes are described here below for LQFP20x20:

Assembly site	Existing Back-end sites			Added back-end site
	Amkor ATP Philippines			
Lead frame supplier	Copper Frame Spot Ag		Copper Frame	Copper Frame Spot Ag
Leadfinishing (1)	Pure Tin (e3)		PPF (e4)	Pure Tin (e3)
Molding compound (2)	Sumitomo EME-G631SHQ		Sumitomo G631HQ	Sumitomo G631SH
Die attach Glue	Ablestik 3230	Evertech AP4200	Sumitomo CRM1076YB	Sumitomo CRM 1076WA
Enhanced traceability in marking	No digit			2 digits

PCN12854 - Changes are described here below for LQFP7x7, for additional listed products in PCN:

	Existing Back-end site	Added back-end site
Assembly site	Stats ChipPAC JSCC Jiangyin China	ASE Kaohsiung Taiwan
Molding compound (2)	Sumitomo G631SHQ	Sumitomo G631SH
Die attach Glue	Ablestik 3230	Sumitomo CRM 1076WA
Wire	Silver 96.5% 0.8mil	Gold 0.8mil

PCN13918 - Changes are described here below for LQFP7x7, for additional listed products in PCN:

	Existing Back-end site	Added back-end site
Assembly site	Stats ChipPAC JSCC Jiangyin China	ASE Kaohsiung Taiwan
Molding compound (2)	Sumitomo G631SHQ	Sumitomo G631SH
Die attach Glue	Ablestik 3230	Sumitomo CRM 1076WA
Wire	Silver 96.5% 0.8mil	Gold 0.8mil
Marking composition	Without 2D	With 2D marking

(1) Lead color and surface finish change depending on leadfinishing.



(2) Package darkness changes depending on molding compound.

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2.2 Reliability Test vehicles description

Package line	Assembly Line	Package	Device (Partial RawLine Code)	Diffusion Process	Number Reliability Lots
LQFP	LQFP 7*7	48L	STM8(5B*764)	Rousset R8 F9GO2	1
			STM32(5B*422)	TSMC 0.18µm	1
	LQFP 10*10	64L	STM32(5W*411)	TSMC M10	1
			STM32(5W*417)	Rousset R8 F9GO2s	1
	LQFP 14*14	100L	STM32(1L*436)	Rousset R8 F9GO2	1
			STM32(1L*448)	TSMC 0.18µm	1
			STM32(1L*411)	TSMC M10	1
			STM32(1L*435)	TSMC 90nm	1
	LQFP 20*20	144L	STM32(1A *414)	TSMC 0.18µm	1
			STM32(1A *413)	Crolles CR300 M10	1
			STM32(1A *450)	Crolles CR300 M40	1

2.3 Reliability Information

Product / Process / Package Information for test vehicles				
Finish Good	ES8L052 C6T6\$E6	ES32F303 CBT7\$E3	ES32F205 RET6\$EA	ES32L052 R8T6\$E4
Die Name /cut	F764XXXY	F422XXXY	E411XXX3	F417XXXX
Diffusion Lot Number	VG808155	9U804096	9R807141	VG815029
Trace Code	AA824048	AA830068	AA824059	AA824047
Reliability Lab location	ST ROUSSET (France) ST MUAR (Malaysia)			
Fab name location	ROUSSET R8	TSMC Fab11 US	TSMC Fab14 Taiwan	ROUSSET R8
Assembly Plant Location	ASE Kaohsiung (Taiwan)			
Package description	LQFP 48 7x7x1.4		LQFP 64 10x10x1.4	

Product / Process / Package Information for test vehicles							
Finish Good	ES32L151 VDT6\$E1	ES32F071 VBT6\$E1	ES32F207 VET6\$EA	ES32L431 VCT6\$E2	ES32F103 ZET6\$EA	ES32F405 ZGT6\$E4	ES32H743 ZIT6\$E3
Die Name /cut	F436XXXX	F448XXX1	E411XXX3	E435XXXZ	F414XXX3	E413XXX2	E450XXXY
Diffusion Lot Number	VG813171	98815033	9R807141	9R807069	98812034	VQ749877	VQ743682
Trace Code	AA826001	AA826003	AA826002	AA836029	AA838038	AA845065	AA904060
Reliability Lab location	ST ROUSSET (France) ST MUAR (Malaysia)						



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Fab name location	ROUSSET R8	TSMC Fab8 Taiwan	TSMC Fab14 Taiwan	TSMC Fab14 Taiwan	TSMC Fab8 Taiwan	ST Crolles 300	ST Crolles 300
Assembly Plant Location	ASE Kaohsiung (Taiwan)						
Package description	LQFP 100 14x14x1.4				LQFP 100 20x20x1.4		

Comment:

ST is certified ISO/TS 16949. This induces certification for all internal and subcontractor plants
ST certification document can be downloaded under the following link:
http://www.st.com/content/st_com/en/support/quality-and-reliability/certifications.html

2.4 Reliability Evaluation: Results summary

Package oriented test results in LQFP7x7

Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	Results	
						LQFP 7x7	
						Lot 1	Lot 2
Electrostatic discharge – Charge Device Model							
ESD	ANSI/ESD STM5.3.1	N.A.	2 x 3	500V (764)	NA	0/3	
	JEDEC JS-002			500V (422)			0/3
Preconditioning: moisture sensitivity level 3							
PC	J-STD-020 JESD22-A113	MSL3	2 x 308	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308
			Delamination	2 x 60		0/60	0/60
High Temperature Storage Life after preconditioning							
HTSL	JESD 22-A103	150°C	1 x 77	Elect test A0/R1	1000h	0/77	
Thermal Cycling after Preconditioning							
TC	JESD 22-A104	-65°C/+150°C	1 x 77	Elect test A0/R1	500cy	0/77	
					1000cy for monitoring	0/77	
Unbiased Highly Accelerated Temperature and Humidity Stress after Preconditioning							
uHAST	JESD 22A118	130°C, 85%RH 2Atm	1 x 77	Elect test A0/R1	96h	0/77	
Biased Highly Accelerated temperature & humidity stress Test after Preconditioning							
HAST	JESD 22A110	110°C, 85%RH 1.2atm Bias	1 x 77	Elect test A0/R1	264h	0/77	

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Construction Analysis							
CA	Construction Analysis including : -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/B 108	2 x 50	No concern	NA	No concern	No concern

Note: The assembly line LQFP7x7 is qualified and in production for STM32 devices in TSMC 0.18µm (please refer to report MDG-MCD-RER1717).

For die 422 in LQFP7x7, only MSL3 CDM and construction analysis were performed to qualify leadframe with slot.

Package oriented test results in LQFP10x10

Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	LQFP 10x10	
						Lot 3	Lot 4
						411 E45W*411ESX3	417 E35W*417ESXX
<i>Electrostatic discharge – Charge Device Model</i>							
ESD	ANSI/ESD STM5.3.1	N.A.	2 x 3	500V (417)	NA	0/3	0/3
	JESD22-C101			500V (411)			
<i>Preconditioning: moisture sensitivity level 3</i>							
PC	J-STD-020 JESD22-A113	MSL3	2 x 308	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308
			Delamination	2 x 60		0/60	0/60
<i>High Temperature Storage Life after preconditioning</i>							
HTSL	JESD 22-A103	150°C	2 x 77	Elect test A0/R1	1000h	0/77	0/77
<i>Thermal Cycling after Preconditioning</i>							
TC	JESD 22-A104	65°C/+150°C	2 x 77	Elect test A0/R1	500cy	0/77	0/77
					1000cy for monitoring	0/77	0/77
<i>Unbiased Highly Accelerated Temperature and Humidity Stress after Preconditioning</i>							
uHAST	JESD 22A118	130°C, 85%RH 2Atm	2 x 77	Elect test A0/R1	96h	0/77	0/77
<i>Temperature Humidity Bias after Preconditioning</i>							
THB	JESD 22-A101	85°C/85%RH Bias VDD=3v6	2 x 77	Elect test A0/R1	1000h	0/77	0/77
<i>Construction Analysis</i>							
CA	Construction Analysis including :	JESD 22B102	2 x 50	No concern	NA	No concern	No concern



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	<ul style="list-style-type: none">-Wire bond shear-Wire bond pull-Solderability-Physical Dimension	JESDB100/B 108					
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Package oriented test results in LQFP14x14

Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	Results			
						LQFP 14x14			
						Lot 5	Lot 6	Lot 7	Lot 8
Electrostatic discharge – Charge Device Model									
ESD	ANSI/ESD STM5.3.1	N.A.	4 x 3	500V (448 & 435)	NA		0/3		0/3
	JESD22-C101			500V (436 & 411)		0/3		0/3	
Preconditioning: moisture sensitivity level 3									
PC	J-STD-020 JESD22-A113	MSL3	4 x 308	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308	0/308	0/308
				Delamination		0/60	0/60	0/60	0/60
High Temperature Storage Life after preconditioning									
HTSL	JESD 22-A103	150°C	4 x 77	Elect test A0/R1	1000h	0/77	0/77	0/77	0/77
Thermal Cycling after Preconditioning									
TC	JESD 22-A104	-65°C/+150°C	4 x 77	Elect test A0/R1	500cy	0/77	0/77	0/77	0/77
					1000cy for monitoring	0/77	0/77	0/77	0/77
Unbiased Highly Accelerated Temperature and Humidity Stress after Preconditioning									
uHAST	JESD 22A118	130°C, 85%RH 2Atm	4 x 77	Elect test A0/R1	96h	0/77	0/77	0/77	0/77
Temperature Humidity Bias after Preconditioning									
THB	JESD 22-A101	85°C/85%RH Bias VDD=3v6	4 x 77	Elect test A0/R1	1000h	0/77	0/77	0/77	0/77
Construction Analysis									
CA	Construction Analysis including : -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/B108	4 x 50	No concern	NA	No concern	No concern	No concern	No concern

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Package oriented test results in LQFP20x20

Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	Results		
						LQFP 20x20		
						Lot 9 414 E01A*414ESX3	Lot 10 413 E01A*413ESX2	Lot 11 450 E01A*450ESXY
<i>Electrostatic discharge – Charge Device Model</i>								
ESD	JESD22-C101	N.A.	4 x 3	500V for 414	N.A.	0/3		
	ANSI/ESD STM5.3.1			250V for 414 500V for 413		0/3	0/3	
	JEDEC JS-002			250V for 450				0/3
<i>Preconditioning: moisture sensitivity level 3</i>								
PC	J-STD-020 JESD22-A113	MSL3	3 x 308	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308	0/308	0/308
						0/60	0/60	0/60
<i>High Temperature Storage Life after preconditioning</i>								
HTSL	JESD 22-A103	150°C	3 x 77	Elect test A0/R1	1000h	0/77	0/77	0/77
<i>Thermal Cycling after Preconditioning</i>								
TC	JESD 22-A104	-65°C/+150°C	3 x 77	Elect test A0/R1	500cy	0/77	0/77	0/77
					1000cy for monitoring	0/77	0/77	
<i>Unbiased Highly Accelerated Temperature and Humidity Stress after Preconditioning</i>								
uHAST	JESD 22A118	130°C, 85%RH 2Atm	3 x 77	Elect test A0/R1	96h	0/77	0/77	0/77
<i>Temperature Humidity Bias after Preconditioning</i>								
THB	JESD 22-A101	85°C/85%RH Bias VDD=3v6	3 x 77	Elect test A0/R1	1000h	0/77	0/77	0/77
<i>Construction Analysis</i>								
CA	Construction Analysis including : -Wire bond shear -Wire bond pull -Solderability -Physical Dimension	JESD 22B102 JESDB100/B108	3 x 50	No concern	NA	No concern	No concern	No concern

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3 RELIABILITY TEST VEHICLES CHARACTERISTICS

3.1 Front-End information

Front-end information in LQFP7x7

Front-End	Diffusion FAB			
	Lot 1 764 E75B*764ESXY	Lot 2 422 E65B*422ESXY		
Wafer Fab Name	ROUSSET R8	TSMC Fab11 US		
Wafer Fab Location/Address	190 Avenue Celestin COQ, 13106 Rousset FRANCE	5509 N W Parker Street CAMA U.S.		
Process Technology Name	CMOSF9GO2	CMOS M8 0.18µm EMBEDDED FLASH		
Wafer Diameter	8 inches	8 inches		
Wafer Thickness	375 +/- 25 µm	375 +/- 25 µm		
Die Size	X: 1738 µm Y: 2876 µm 5.0 mm ²	X: 4236 µm Y: 4698 µm 19.9 mm ²		
Technology Mask Number	39	34		
Scribe Line size x/y:	80 µm x 80 µm	80 µm x 80 µm		
Pad Die Size /Pad type:	65 µm x 108 µm	65 µm x 70 µm		
Metal Layers Number Materials Thickness	Metal 1 TaN/Ta/Cu Metal 2 TaN/Ta/Cu Metal 3 TaN/Ta/Cu Metal 4 TaN/Ta/Cu Metal 5 Ti/AiCu/TxTN	0.280 µm 0.350 µm 0.350 µm 0.350 µm 0.900 µm	Metal 1 Tin/AiCu/Tin Metal 2 Tin/AiCu/Tin Metal 3 Tin/AiCu/Tin Metal 4 Tin/AiCu/Tin Metal 5 Tin/AiCu/Tin	0.450 µm 0.450 µm 0.450 µm 0.450 µm 0.875 µm
Passivation Layers Number Materials Thickness	USG + NitUV (HFP USG+UV Nitride) 1.75µm		HDPox 10kA+SRO 1.5kA+PESIN 6kA 1.75µm	
Back Metal Finishing Thickness	RAW SILICON - BACK GRINDING		RAW SILICON - BACK GRINDING	



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Reliability Report

Front-end information in LQFP10x10

Front-End	Diffusion FAB	
	Lot 3 411 E45W*411ESX3	Lot 4 417 E35W*417ESXX
Wafer Fab Name	TSMC Fab14 Taiwan	ROUSSET R8
Wafer Fab Location/Address	No. 1-1, Nan-Ke North Rd., Southern Taiwan Science Park, 741-44 TAIWAN	190 Avenue Celestin COQ, 13106 Rousset FRANCE
Process Technology Name	CMOSM10ULP 6M1T	CMOSF9GO2S
Wafer Diameter	12 inches	8 inches
Wafer Thickness	775 +/- 25 µm	375 +/- 25 µm
Die Size	X: 4006 µm Y: 3674 µm 14.7 mm ²	X: 2903 µm Y: 2631 µm 7.6 mm ²
Technology Mask Number	42	37
Scribe Line size x/y:	80 µm x 80 µm	80 µm x 80 µm
Pad Die Size /Pad type:	59 µm x 123 µm 63 µm x 73 µm	53 µm x 108 µm
Metal Layers Number Materials Thickness	Metal 1 TaN/Ta/CuSeed/Cu 0.220 µm Metal 2 TaN/Ta/CuSeed/Cu 0.280 µm Metal 3 TaN/Ta/CuSeed/Cu 0.280 µm Metal 4 TaN/Ta/CuSeed/Cu 0.280 µm Metal 5 TaN/Ta/CuSeed/Cu 0.280 µm Metal 6 Ta/TaN/AlCu 0.730 µm Metal 7 AlCu 1.200 µm	Metal 1 TaN/Ta/Cu 0.280 µm Metal 2 Ti/AlCu/TxTN 0.310 µm Metal 3 Ti/AlCu/TxTN 0.310 µm Metal 4 Ti/AlCu/TxTN 0.310 µm Metal 5 Ti/AlCu/TxTN 1.200 µm
Passivation Layers Number Materials Thickness	USG + NITRIDE 1.75µm	USG + NitUV (HFP USG+UV Nitride) 1.2 µm
Back Metal Finishing Thickness	RAW SILICON	RAW SILICON - BACK GRINDING

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Front-end information in LQFP14x14

Front-End	Diffusion FAB			
	Lot 5 436 E21L*436ESXX	Lot 6 448 E41L*448ESX1	Lot 7 411 E71L*411ESX3	Lot 8 435 E31L*435ESX2
Wafer Fab Name	ROUSSET R8	TSMC Fab8 - Taiwan	TSMC Fab14 - Taiwan	TSMC Fab14 - Taiwan
Wafer Fab Location/Address	190 Avenue Celestin COQ, 13106 Rousset FRANCE	No. 1-1, Nan-Ke North Rd., Southern Taiwan Science Park, 741-44 TAIWAN	No. 1-1, Nan-Ke North Rd., Southern Taiwan Science Park, 741-44 TAIWAN	No. 1-1, Nan-Ke North Rd., Southern Taiwan Science Park, 741-44 TAIWAN
Process Technology Name	CMOSF9GO2	CMOS M8 0.18µm EMBEDDED FLASH	CMOSM10ULP 6M1T	90nm eFlash Generic TSMC
Wafer Diameter	8 inches	8 inches	12 inches	12 inches
Wafer Thickness	375 +/- 25 µm	381 +/- 25 µm	775 +/- 25 µm	775 +/- 25 µm
Die Size	X: 4574 µm Y: 4946 µm 22.6 mm ²	X: 3312 µm Y: 3144 µm 10.4 mm ²	X: 4006 µm Y: 3674 µm 14.7 mm ²	X: 3176.4 µm Y: 3162.4 µm 10.0 mm ²
Technology Mask Number	38	34	42	44
Scribe Line size x/y	80 µm x 80 µm	80 µm x 80 µm	80 µm x 80 µm	80 µm x 80 µm
Pad Die Size /Pad type	65 µm x 108 µm	65 µm x 70 µm	59 µm x 123 µm 63 µm x 73 µm	123 µm x 59 µm
Metal Layers Number 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 Metal5 Ti/AlCu/TxTN 0.900 µm	Metal 1 Tin/AlCu/Tin 0.450 µm Metal 2 Tin/AlCu/Tin 0.450 µm Metal 3 Tin/AlCu/Tin 0.450 µm Metal 4 Tin/AlCu/Tin 0.450 µm Metal 5 Tin/AlCu/Tin 0.875 µm	Metal 1 TaN/Ta/CuSeed/Cu 0.220 µm Metal 2 TaN/Ta/CuSeed/Cu 0.280 µm Metal 3 TaN/Ta/CuSeed/Cu 0.280 µm Metal 4 TaN/Ta/CuSeed/Cu 0.280 µm Metal 5 TaN/Ta/CuSeed/Cu 0.280 µm Metal 6 Ta/TaN/AlCu 0.730 µm Metal 7 AlCu 1.200 µm	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
Passivation Layers Number Materials Thickness	USG + NitUV (HFP USG+UV Nitride) 1.75µm	HDPox 10kA+SRO 1.5kA+PESIN 6kA 1.75µm	USG + NITRIDE 1.75µm	USG + NITRIDE 1.75µm
Back Metal Finishing Thickness	RAW SILICON - BACK GRINDING	RAW SILICON - BACK GRINDING	RAW SILICON	RAW SILICON

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Front-end information in LQFP20x20

Front-End	Diffusion FAB		
	Lot 9 414 E01A*414ESX3	Lot 10 413 E01A*413ESX2	Lot 11 450 E01A*450ESXY
Wafer Fab Name	TSMC Fab8 Taiwan	ST Crolles 300	ST Crolles 300
Wafer Fab Location/Address	No. 1-1, Nan-Ke North Rd., Southern Taiwan Science Park, 741-44 TAIWAN	850 rue Jean MONNET 38920 Crolles FRANCE	850 rue Jean MONNET 38920 Crolles FRANCE
Process Technology Name	CMOS0.18µm Emb.Flash	CMOSM10LP 6M1T	CMOSM40
Wafer Diameter	8 inches	12 inches	12 inches
Wafer Thickness	375 +/- 25 µm	775 +/- 25 µm	775 +/- 25 µm
Die Size	X: 4511 µm Y: 4440 µm 20.0 mm ²	X: 4004 µm Y: 4258 µm 17.0 mm ²	X: 4983 µm Y: 4662 µm 23.2 mm ²
Technology Mask Number	31	41	50
Scribe Line size x/y	80.6 µm x 80.2 µm	80 µm x 80 µm	72 µm x 72 µm
Pad Die Size /Pad type	65 µm x 70 µm	59 µm x 123 µm 63 µm x 73 µm	54.9 µm x 54.4 µm
Metal Layers Number Materials Thickness	Metal 1 Tin/AlCu/Tin 0.450 µm Metal 2 Tin/AlCu/Tin 0.450 µm Metal 3 Tin/AlCu/Tin 0.450 µm Metal 4 Tin/AlCu/Tin 0.450 µm Metal 5 Tin/AlCu/Tin 0.875 µm	Metal 1 TaN/CuSeed/Cu 0.240 µm Metal 2 TaN/CuSeed/Cu 0.330 µm Metal 3 TaN/CuSeed/Cu 0.330 µm Metal 4 TaN/CuSeed/Cu 0.330 µm Metal 5 TaN/CuSeed/Cu 0.330 µm Metal 6 TaN/CuSeed/Cu 0.850 µm Metal 7 AlCu/TinArc 1.450 µm	Metal 1 Cu 0.130 µm Metal 2 Cu 0.140 µm Metal 3 Cu 0.140 µm Metal 4 Cu 0.140 µm Metal 5 Cu 0.140 µm Metal 6 Cu 0.140 µm Metal 7 Cu 1.000 µm Metal 8 Ta/TaN/AlCu 1.450 µm
Passivation Layers Number Materials Thickness	HDPOx 10kA+SRO 1.5kA+PESIN 6kA 1.75µm	PSG + NITRIDE 1.1µm	PSG + NITRIDE 1.1µm
Back Metal Finishing Thickness	RAW SILICON - BACK GRINDING	RAW SILICON	RAW SILICON



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Reliability Report

3.2 Back-End information

Back-end information in LQFP7x7

Back-End	Lot 1 764 E75B*764ESXY	Lot 2 422 E65B*422ESXY
Assembly Plant Location/ Address:	No.26, Chin 3rd Rd. Nantze, Kaohsiung, Taiwan	
Die Thickness after Back grinding:	NA	NA
Die sawing method:	Step cut	
Die attach material: Type: Supplier:	GLUE CRM 1076WA Sumitomo	
Lead frame material: Die paddle size:	Copper Frame Spot Ag 4.092 mm x 4.092 mm	Copper Frame Spot Ag 5.0 mm x 5.0 mm
Wire bonding: Type /Diameter:	WIRE Au 0.8 mil	
Lead Plating Natures Thickness	Pure Tin (e3) Tolerance 7 to 20 μ m	
Molding Compound Supplier:	EME-G631SH Sumitomo	
Package Moisture Sensitivity Level (JEDEC J-STD020D):	3 (1 WEEK at <=30C/60%RH)	



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Reliability Report

Back-end information in LQFP10x10

Back-End	Lot 3 411 E45W*411ESX3	Lot 4 417 E35W*417ESXX
Assembly Plant Location/Address:	No.26, Chin 3rd Rd. Nantze, Kaohsiung, Taiwan	
Die Thickness after Back grinding:	375 +/- 25 µm	NA
Die sawing method:	Step cut	
Die attach material: Type: Supplier:	GLUE CRM 1076WA Sumitomo	
Lead frame material: Die paddle size:	Copper Frame Spot Ag 5.7 mm x 5.7 mm	Copper Frame Spot Ag 5.7 mm x 5.7 mm
Wire bonding: Type /Diameter:	WIRE Au 0.8 mil	
Lead Plating Natures Thickness	Pure Tin (e3) Tolerance 7 to 20 µm	
Molding Compound Supplier:	EME-G631SH Sumitomo	
Package Moisture Sensitivity Level (JEDEC J-STD020D):	3 (1 WEEK at <=30C/60%RH)	



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Reliability Report

Back-end information in LQFP14x14

Back-End	Lot 5 436 E21L*436ESXX	Lot 6 448 E41L*448ESX1	Lot 7 411 E71L*411ESX3	Lot 8 435 E31L*435ESXZ
Assembly Plant Location/ Address:	No.26, Chin 3rd Rd. Nantze, Kaohsiung, Taiwan			
Die Thickness after Back grinding:	NA	NA	375 +/- 25 µm	375 +/- 25 µm
Die sawing method:	Step cut			
Die attach material: Type: Supplier:	GLUE CRM 1076WA Sumitomo			
Lead frame material: Die paddle size:	Copper Frame Spot Ag 6.6 mm x 6.6 mm			
Wire bonding: Type /Diameter:	WIRE Au 0.8 mil			
Lead Plating Natures Thickness	Pure Tin (e3) Tolerance 7 to 20 µm			
Molding Compound Supplier:	EME-G631SH Sumitomo			
Package Moisture Sensitivity Level (JEDEC J-STD020D):	3 (1 WEEK at <=30C/60%RH)			



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Back-end information in LQFP20x20

Back-End	Lot 9 414 E01A*414ESX3	Lot 10 413 E01A*413ESX2	Lot 11 450 E01A*450ESXY
Assembly Plant Location/ Address:	No.26, Chin 3rd Rd. Nantze, Kaohsiung, Taiwan		
Die Thickness after Back grinding:	NA	375 +/- 20 µm	300 +/- 25 µm
Die sawing method:	Step cut		Laser Grooving + Mechanical dicing
Die attach material: Type: Supplier:	GLUE CRM 1076WA Sumitomo		
Lead frame material: Die paddle size:	Copper Frame Spot Ag 6.6 mm x 6.6 mm		
Wire bonding: Type /Diameter:	WIRE Au 0.8 mil		
Lead Plating Natures Thickness	Pure Tin (e3) Tolerance 7 to 20 µm		
Molding Compound Supplier:	EME-G631SH Sumitomo		
Package Moisture Sensitivity Level (JEDEC J-STD020D):	3 (1 WEEK at <=30C/60%RH)		

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4 APPLICABLE AND REFERENCE DOCUMENTS

DMS 0061692 :	Reliability Tests And Criteria For Qualifications
SOP 2.6.2:	Process qualification and transfer management
SOP 2.6.7:	Product Maturity Level
SOP 2.6.9:	Package and process maturity management in Back End
SOP 2.6.11:	Program management from product qualification
SOP 2.6.19:	Process maturity level
ANSI/ESD STM5.3.1:	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
JESD22-C101:	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
JEDEC JS-002:	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
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:	Biased Highly Accelerated temperature & humidity stress
JESD22-A101:	Temperature Humidity Bias
JESD 22B102:	Solderability test
JESD22B100/B108:	Physical dimension

5 GLOSSARY AND TESTS DESCRIPTION

PC	Preconditioning (solder simulation)
HAST	Biased Highly Accelerated temperature & humidity stress Test
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	Date	Author	Comment
1	30 Nov., 2018	B. Routier-Scappucci	Release for production LQFP7x7& LQFP10x10
2	15 Jan., 2019	B. Routier-Scappucci	Correction typo errors and added LQFP14x14 package
3	25 Apr., 2019	B. Routier-Scappucci	Added LQFP20x20 package
4	25 Jun., 2019	B. Routier-Scappucci	Added results on die 450 LQFP20x20
5	23 Jun., 2021	B. Routier-Scappucci	Added new PCN12854 for additional products in LQFP7x7: STM32G0/STM32G03/STM32G05/STM32L46x/STM32L4P/STM32L5 families
6	21 Feb., 2023	B. Routier-Scappucci	Added new PCN13918 for additional products in LQFP7x7: STM32L4/L5x, STM32C01/C03x and STM32G0x products

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**PRODUCT/PROCESS
CHANGE NOTIFICATION
PCN13918– Additional information**

**ASE Kaohsiung (Taiwan) additional source for LQFP 7x7
package on STM32L4/L5x, STM32C01/C03x and STM32G0x
products (Addendum to PCN10548 and PCN12854)**

MDG - Microcontrollers Division (MCD)

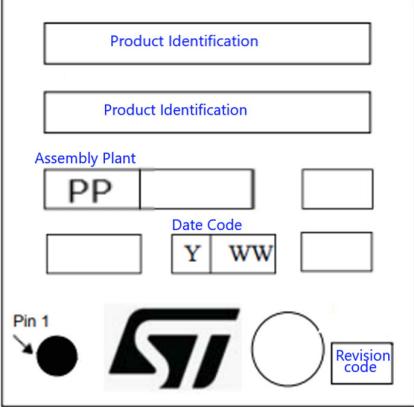
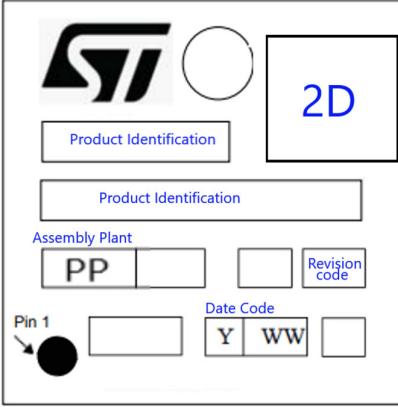
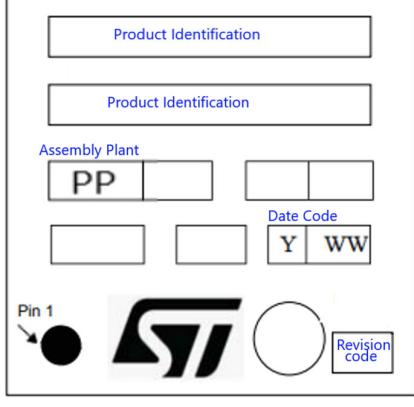
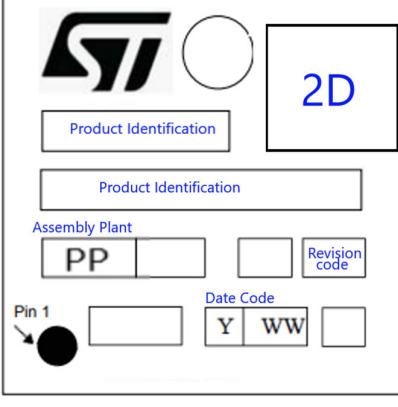
	Existing back-end site	Added back-end site
Assembly site	Stats ChipPAC JSCC Jiangyin China	ASE Kaohsiung Taiwan
Resin (1)	Sumitomo G631SHQ	Sumitomo G631SH
Glue	Ablestik 3230	Sumitomo CRM 1076WA
Wire	Silver 96.5% 0.8mil	Gold 0.8mil
Marking composition	Without 2D	With 2D Marking

What is the change?

- (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?

Package top view Marking is:

	Stats ChipPAC JSCC Jiangyin China	ASE Kaohsiung Taiwan
LQFP32	 <p>Product Identification Product Identification Assembly Plant PP [] [] [] Date Code [] Y WW [] Pin 1 [] ST [] [] Revision code</p>	 <p>Product Identification Product Identification Assembly Plant PP [] [] [] Revision code Pin 1 [] [] Date Code [] Y WW []</p>
LQFP48	 <p>Product Identification Product Identification Assembly Plant PP [] [] Date Code [] Y WW [] Pin 1 [] ST [] [] Revision code</p>	 <p>Product Identification Product Identification Assembly Plant PP [] [] [] Revision code Pin 1 [] [] Date Code [] Y WW []</p>

PP code indicates assembly traceability plant code.

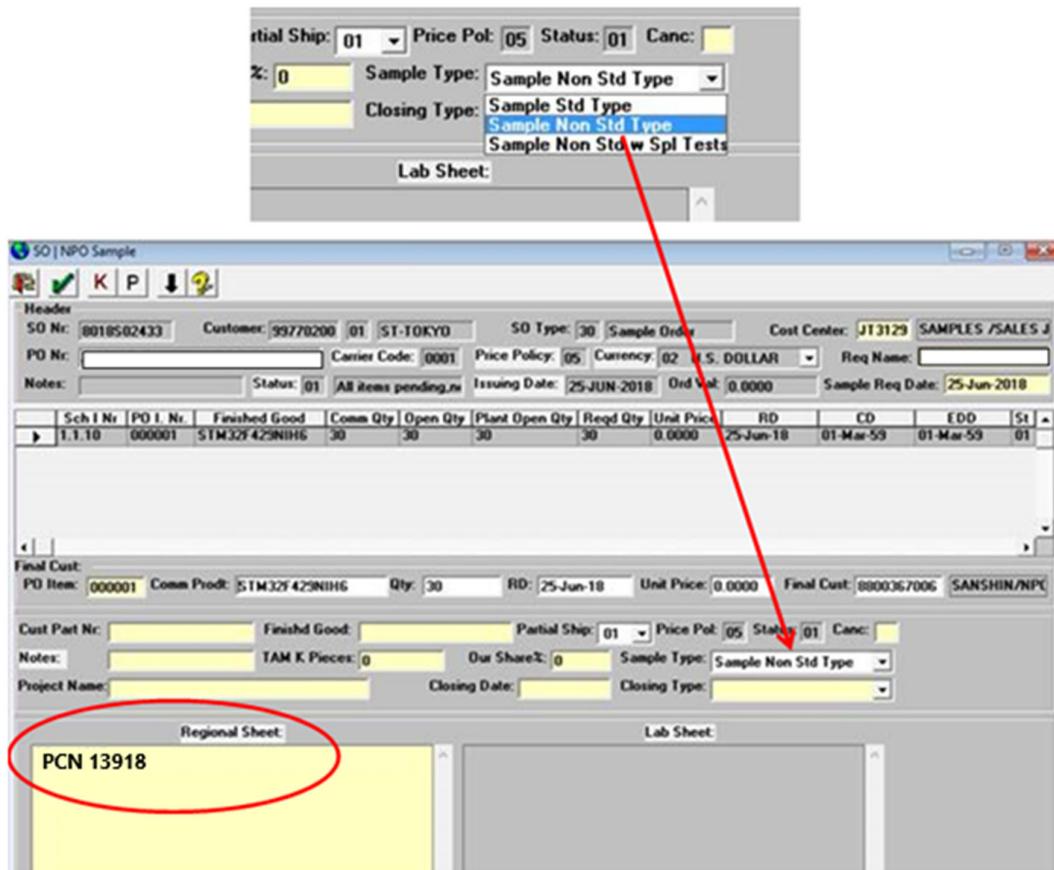
Existing		Additional	
PP code	Fab	PP code	Fab
GQ	Stats ChipPAC JSCC Jiangyin China	AA	ASE Kaohsiung Taiwan

Please refer to product [DataSheet](#) or Technical Note [TN1433](#) for package marking details.

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 “**PCN13918**” into the NPO Electronic Sheet/Regional Sheet
- request sample(s) through Notice tool, indicating a single Commercial Product for each request



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PCN Title : ASE Kaohsiung (Taiwan) additional source for LQFP 7x7 package on STM32L4/L5x, STM32C01/C03x and STM32G0x products (Addendum to PCN10548 and PCN12854)

PCN Reference : MDG/23/13918

Subject : Public Products List

Dear Customer,

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

STM32G050K6T6TR	STM32G0C1KET6	STM32L552CET6P
STM32L412CBT3TR	STM32G0B1KBT3TR	STM32C031K6T7
STM32G0B1KBT6	STM32G0C1KCT6N	STM32G051C8T3TR
STM32G0B1CCT7	STM32L412KBT3	STM32G0B1CCT6TR
STM32G051K8T7TR	STM32G0C1KET6N	STM32L452CET6P
STM32C031C4T6	STM32C031C6T7TR	STM32C031C4T6TR
STM32C031C6T7	STM32L412CBT3	STM32L412KBT3TR
STM32G051C8T3	STM32G0B0KET6	STM32G0B1KBT6N
STM32C031K6T7TR	STM32L462CET6P	STM32L443CCT6TR
STM32L433CCT6TR	STM32L433CCT3TR	STM32C031K4T6
STM32G0B0CET6TR	STM32L552CET6	STM32C031C6T6
STM32G0B1KET6	STM32G0B1KCT6N	STM32C031C6T6TR
STM32G0B1CBT3	STM32G0B1KET6N	STM32L412K8T6TR
STM32G0B1KCT6	STM32L412CBT6TR	STM32G0B1KBT3
STM32L431CBT6TR		

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