PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	MDG/21/11945
1.3 Title of PCN	MUAR BE Capacity increase for LQFP 48 7x7 additional products listed
1.4 Product Category	STM8L15x 32K, STM8L15x 64K in LQFP48 7x7 package
1.5 Issue date	2021-03-25

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)	ST Muar (Malaysia), STATSChipPAC JSCC (JiangYin China), Amkor ATP (Philippines). ASE KaoHsiung (Taiwan)

4. Description of change		
	Old	New
4.1 Description	Assembly plants : ST Muar (Malaysia), STATS ChipPAC Shanghai (China), Amkor ATP (Philippines)	A new line in ST Muar (Malaysia) assembly site, for LQFP 48 7x7 products has been added. Additional to what has been already done in PCN9484.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No Change	

5. Reason / motivation for change	
5.1 Motivation	To increase assembly capacity for LQFP 48 7x7 products .
5.2 Customer Benefit	CAPACITY INCREASE

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	2021-02-24
7.2 Intended start of delivery	2021-05-25
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	11945 MDG-MCD RER1514 V2.0 - LQFP7x7 Muar - PCN9484 - PCN11945 - reliability evaluation report_.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2021-03-25

9. Attachments (additional documentations)
11945 Public product.pdf 11945 MDG-MCD RER1514 V2.0 - LQFP7x7 Muar - PCN9484 - PCN11945 - reliability evaluation report_.pdf 11945 PCN11945_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
	STM8L052C6T6	
	STM8L052C6T6TR	
	STM8L151C4T6	
	STM8L151C6T3	
	STM8L151C6T6	
	STM8L151C8T3	
	STM8L151C8T6	
	STM8L151C8T6TR	
	STM8L151C8T7	
	STM8L152C4T3	
	STM8L152C4T6	
	STM8L152C4T6TR	
	STM8L152C6T6	
	STM8L152C8T6	

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MMS- MCD RER1514
Reliability Report

Qualification Type : ASSEMBLY LINE QUALIFICATION, NEW BILL OF MATERIALS

LQFP 7x7 48L - ST Muar Qualification
Dice 410/427/765/768

(PCN MMS-MIC/15/9484 dated 30 Oct 2015 ; PCN MDG/20/11945)

Product / Process & Package Information	Die 410	Die 427	Die 765	Die 768
Commercial Product:	STM32F103CBT6	STM32L152CCT6	STM8S207C8T6	STM8L151C8T6
Product Line:	STM32F die 410	STM32L die 427	STM8S die 765	STM8L die 768
Product Description:	Micro 32Bits		Micro 8Bits	Micro 8Bits
Finish Good Code:	ES32F103CBT6$J8	ES32L152CCT6$B6	ES8S207C8T6$9C	8L151C8T6$J4
Mask Set Revision:	X410XXXX	X427XXXV	X765XXXV	X768XXXZ
Silicon Process Technology:	0.18 M8 EMBEDDED FLASH	8X - CMOSF9S	2V - CMOSF9 2V6 – CMOSF9 standard flow 3 metal	2V - CMOSF9 2V8 - CMOSF9 - GO2 ULL 4 metal
Wafer Fabrication Location:	TSMC Fab 3 Taiwan	ST Rousset 8 France	ST Rousset 8 France	ST Rousset 8 France
Electrical Wafer Sort Test Plant Location:	ST MICROELECTRONICS Ang Mo Kio EWS SINGAPORE		ARDENTEC Hsinchu EWS Taiwan	RS8E-Rousset EWS
Package:	LQFP 48 7x7x1.4			
Assembly Plant location:	ST Muar (Malaysia)			
Final Test plant location:	ST Muar (Malaysia)			

Approval List Rev 1.0			
Function	**Location**	**Name**	**Date**
Division Q&R Responsible	ST Rousset	Gisèle SEUBE	May31st, 2016
Division Quality Manager	ST Rousset	Pascal NARCHE	May31st, 2016

Approval List Rev 2.0			
Function	**Location**	**Name**	**Date**
Division Q&R Responsible	ST Rousset	Gisèle SEUBE	Feb 24th, 2021
Division Quality Manager	ST Rousset	Pascal NARCHE	Feb 24th, 2021

Contents

1 RELIABILITY RESULTS OVERVIEW

1.1 Objectives

This report summarizes the reliability results for LQFP 48 7x7 package manufactured at ST Muar (Malaysia).

Test vehicles are described here below:

Product	Package
STM32F103CBT6	LQFP 48 7x7x1.4
STM32L152CCT6	LQFP 48 7x7x1.4
STM8S207C8T6	LQFP 48 7x7x1.4

STM8L devices in CMOS F9 GO2 technology are qualified by similarity with STM8S test vehicle in CMOS F9 GO1 using same passivation and pad structure.

1.2 Context

In order to increase assembly capacity, ST Microcontrollers Division has decided to add a High-Density line in ST Muar (Malaysia) assembly site, for LQFP 48 7x7 products.

New Bill of Materials changes are described here below for LQFP 7x7 48L products:

	Existing Bill Of Materials			Added Bill Of Materials
Assembly site	STATS ChipPAC Shanghai (China)	Amkor ATP (Philippines)	ST Muar (Malaysia)	ST Muar (Malaysia)
Wire	Gold 0.8mil	Gold 0.8mil	Gold 0.8mil	Silver 0.8mil
Leadframe	Copper Frame Spot Ag	Copper Frame Spot Ag	Pre Plated Frame	Pre Plated Frame
Leadfinishing (*1)	Pure Tin (e3)	Pure Tin (e3)	Rough Ni Pd AgAu (e4)	Rough Ni Pd AgAu (e4)
Resin	Sumitomo G700E	Sumitomo G631HQ	Sumitomo G700LS	Sumitomo G700LS
Glue	Ablestik 3230	Evertech AP4200	Hitachi EN4900	Hitachi EN4900

Changes are qualified using the 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 the positive reliability results, the qualification is granted for High Density assembly line in ST Muar (Malaysia).

2 RELIABILITY TEST VEHICLES Characteristics

2.1 Reliability Test vehicles description

Package line	Assembly Line	Package	Device (Partial RawLine Code)	Diffusion Process	Number of Lots
HD LQFP	LQFP7*7	48L	STM8S (5B*765) STM32F (5B*410) STM32L (5B*427)	F9GO1 TSMC 0.18µm F9GO2S	1 1 1

2.2 Reliability Information

Lot ID	Lot 1	Lot 2	Lot 3
Die Name /cut:	410	427	765
Diffusion Lot Number:	93537129	VG536347	VG540309
Trace Code:	995510CH	995510CQ	995510CR
Assy lot number	995510CH01	995510CQ01	995510CR01
Raw Line Code Package:	J55B*410ESXX	U05B*427ESXV	J15B*765ESXV
Reliability Lab location :	ST Muar (Malaysia)		

2.3 Front-End information

Front-End	Lot 1 (410)	Lot 2 (427)	Lot 3 (765)
Wafer Diameter:	8 inches		
Wafer Thickness:	375 +/-25 µm		
Die Size:	3.3908 X 3.328 mm	3.263 X 4.199 mm	3.010 X 2.458 mm
Scribe Line size x/y:	80 x 80 µm		
Pad Die Size /Pad type:	59 x 123 µm	53 x 108 µm	65 x 108 µm
Metal Layers Number	Metal 1 Tin/AlCu/Tin	Metal 1 TaN/Ta/Cu	Metal 1 TaN/Ta/Cu

/Materials /Thickness:	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	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	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
Passivation Layers Thickness:	HDPox 10kA+SRO 1.5kA+PESIN 6kA	USG + NitUV (HFP USG+UV Nitride)	
Back Metal Finishing	RAW SILICON - BACK GRINDING		

2.4 Back-End information

Back-End	Lot 1 (410)	Lot 2 (427)	Lot 3 (765)
Assembly Plant Location/ Address:	ST MICROELECTRONICS TANJONG AGAS IND ESTATE PO BOX 28 84007 MUAR / JOHOR MALAYSIA		
Die Thickness after Back grinding:	NA	NA	NA
Die sawing method:	Step cut		
Die attach material: **Type:** **Supplier:**	Glue EN4900 ST16 Hitachi		
Lead frame material: **L/F Finishing Type:** **Die paddle size:** **Supplier:**	Copper LF-HD LQFP 48L 7x7 Rough µPPF (e4) Ni Pd AuAg 5 x 5 HDS		Copper LF-HD LQFP 48L 7x7 Rough µPPF (e4) Ni Pd AuAg 3.6 x 3.6 HDS
Wire bonding: **Type /Diameter:** **Supplier:**	AG 96,5% WIRE 0.8MIL MKE		
Pitch:	80µm	70µm	80,36µm
POA:	0110596		
Molding Compound Supplier:	EME-G700LS SUMITOMO		
Package Moisture Sensitivity Level (JEDEC J-STD020D):	2		

3 RELIABILITY RESULTS SUMMARY

3.1 Die oriented test

	Die Related Tests					Results LQFP 7x7		
Description	*Test/Method*	*Conditions*	*Sample Size*	*Criteria*	*Readout / Duration*	*410*	*427*	*765*
Electrostatic discharge – Charge Device Model								
ESD CDM	ANSI/ESD STM5.3.1	500V 1KV	3 units	500V for dice 410/427 1KV for 765	NA	0/3	0/3	0/3

3.2 Package Oriented Test

	Package Related Tests					Results LQFP 7x7		
Description	*Test/Method*	*Conditions*	*Sample Size*	*Criteria*	*Readout / Duration*	*410*	*427*	*765*
Preconditioning: moisture sensitivity level 1								
PC	J-STD-020 JESD22-A113	MSL1 For MSL2 Qual	308 units	Electrical test: A0/R1 (Accepted 0 reject/ Rejected 1 reject)	NA	0/308		
High Temperature Storage Life								
HTSL	JESD 22-A103	150°C	77 units	Elect test A0/R1	1000h	0/77	0/77	0/77
Thermal Cycling after Preconditioning								
TC	JESD 22-A104	-65c/+150°c	77 units	Elect test A0/R1	100cy	0/77	0/77	0/77
					500cy	0/77	0/77	0/77
					1000cy	0/77	0/77	0/77
Wire Bond Shear after Thermal Cycling								
Wire Bond Shear	AEC Q100-001	Min bond shear 15g after TC	30 x 3	A0/R1	After TC 500cy TC 1000cy	0/30	0/30	0/30
Wire Bond Pull after Thermal Cycling								
Wire Bond Pull	Mil Std 883 Method 2011	Minimum pull strength after TC=3 grams after TC	30 x 3	A0/R1	After TC 500cy TC 1000cy	0/30	0/30	0/30
Autoclave after Preconditioning								
AC	JESD 22A102	121°C ,100% 2Atm RH	77 units	Elect test A0/R1	96h	0/77	0/77	0/77

Temperature Humidity Bias after Preconditioning								
THB	JESD 22A110	85°C/85%RH Bias	77 units	Elect test A0/R1	1000h	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	50		No major concern	No major concern		

4 APPLICABLE AND REFERENCE DOCUMENTS

ADCS/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)
JESD 22-A103	High Temperature Storage Life
J-STD-020D:	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-A102:	Autoclave test (pressure pot)
JESD22-A104:	Temperature cycling
JESD22-A110:	Temperature Humidity Bake
JESD 22B102:	Solderability test
JESD22B100/B108:	Physical dimension

5 GLOSSARY AND TESTS DESCIPTION

PC	Preconditioning (solder simulation)
THB	Temperature Humidity Bias
TC	Temperature cycling
AC	Autoclave test (pressure pot)
HTSL	High temperature storage life
ADCS/DMS	ST Advanced Documentation Controlled system/ Documentation Management system
ESD CDM	Electrostatic discharge (charge device model)
CA	Construction Analysis

6 REVISION HISTORY

Version	Date	Author	Comment
1.0	May 31st, 2016	Olivier GIRAUD	Initial release for qualification
2.0	Feb 24, 2021	Lionel NEVORET	To include F9GO2 qualification

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PRODUCT/PROCESS CHANGE NOTIFICATION

PCN 11945 – Additional information

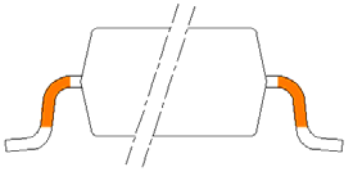
Capacity increase for LQFP 48 7x7 products
Additional products

MDG - Microcontrollers Division (MCD)

What are the changes?

	Existing back-end lines				Added back-end line
Assembly site	Stats ChipPAC JSCC Jiangyin China	ST Muar Malaysia	ASE Kaohsiung Taiwan	Amkor ATP Philippines	ST Muar Malaysia
Leadframe	Copper Frame Spot Ag	Pre Plated Frame	Copper Frame Spot Ag	Copper Frame Spot Ag	Pre Plated Frame
Lead finishing (1)	Pure Tin (e3)	Rough Ni Pd AgAu (e4)	Pure Tin (e3)	Pure Tin (e3)	Rough Ni Pd AgAu (e4)
Resin (2)	Sumitomo G631SHQ	Sumitomo G700LS	Sumitomo EME-G631SH	Sumitomo G631HQ	Sumitomo G700LS
Glue	Ablestik 3230	Hitachi EN4900GC	Sumitomo CRM 1076WA	Evertech AP4200	Hitachi EN4900GC
Wire	Silver 96.5% 0.8mil	Gold 0.8mil	Gold 0.8mil	Gold 0.8mil	Silver 96.5% 0.8mil
Enhanced Traceability in marking	2 digits	No digit	2 digits	No digit	2 digits

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

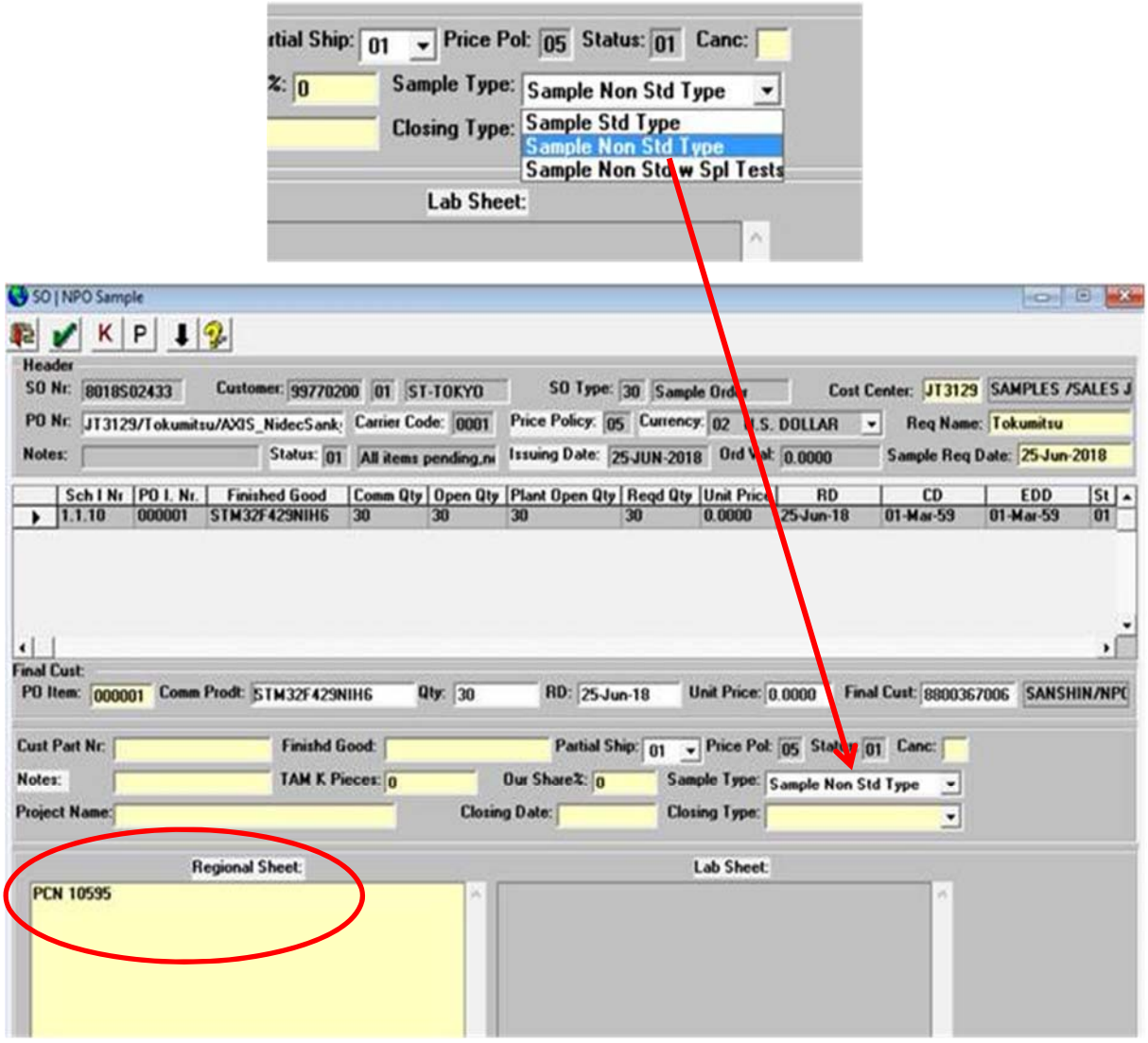


(2) Package darkness changes depending on molding compound.
Pin1 identifier can change in terms of form and positioning.
Marking position and size could be different upon assembly site, without any loss of information.

How 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 "**PCN 11945**" 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 : MUAR BE Capacity increase for LQFP 48 7x7 additional products listed

PCN Reference : MDG/21/11945

Subject : Public Products List

Dear Customer,

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

STM8L052C6T6	STM8L151C6T3TR	STM8L151C6T6
STM8L152C4T6	STM8L152C8T6TR	STM8L152C4T6TR
STM8L151C8T6TR	STM8L151C4T6TR	STM8L152C8T6
STM8L151C4T6	STM8L152C6T6	STM8L052C6T6TR
STM8L151C6T3	STM8L152C6T6TR	STM8L152C4T3
STM8L151C8T6	STM8L152C4T3TR	STM8L151C8T3
STM8L151C8T7	STM8L151C4T3	STM8L151C6T6TR

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