



## Public Products List

Public 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) LQFP7x7 and LQFP10x10 package capacity increase - on listed of products

**PCN Reference :** MDG/22/13388

**Subject :** Public Products List

Dear Customer,

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

STM32G070CBT6	STM32G431R8T6	STM32G070RBT6TR
STM32G071C8T6	STM32G431RBT6TR	STM32G431RBT3
STM32G431RBT6	STM32G070CBT6TR	STM32L471RET3TR
STM32G071CBT3	STM32G081RBT6	STM32G071R8T6
STM32L431RCT6TR	STM32L471RET3	STM32G071C8T6TR
STM32L496RGT6P	STM32G431RBT3TR	STM32G081CBT6
STM32G081CBT6TR	STM32G071RBT7TR	STM32L496RET6TR
STM32L496RGT3TR	STM32G071CBT7	STM32L433RCT3TR
STM32G081RBT3	STM32G441RBT6	STM32G071RBT7
STM32L471RET6TR	STM32G431R6T6	STM32L475RGT6TR
STM32L4A6RGT6P	STM32G071RBT3	STM32G071C8T3



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**ASE Kaohsiung (Taiwan) LQFP7x7 and LQFP10x10 package  
capacity increase - on listed of products**

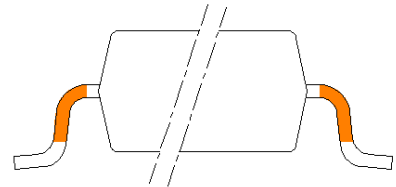
**MDG - Microcontrollers Division (MCD)**

**What are the changes?**

Changes described in table below:

	Existing back-end sites	Added back-end site
Assembly site	Stats ChipPAC JSCC Jiangyin China	ASE Kaohsiung Taiwan
Leadframe	Copper Frame Spot Ag	Copper Frame Spot Ag
Leadfinishing (1)	Pure Tin (e3)	Pure Tin (e3)
Resin (2)	Sumitomo G631SHQ	Sumitomo G631SH
Glue	Ablestik 3230	Sumitomo CRM 1076WA
Wire	Silver 96.5% 0.8mil	Gold 0.8mil
Enhanced Traceability in marking	2 digits	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.

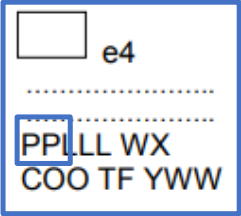
Marking position and size could be different upon assembly site, without any loss of information.



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**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
GQ	Stats ChipPAC JSCC Jiangyin China	AA	ASE Kaohsiung Taiwan



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## 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 "**PCN13388**" into the NPO Electronic Sheet/**Regional Sheet**
- request sample(s) through Notice tool, indicating a single Commercial Product for each request

Partial Ship: 01 Price Pol: 05 Status: 01 Canc:

%: 0 Sample Type: Sample Non Std Type

Closing Type: Sample Std Type  
Sample Non Std Type  
Sample Non Std w Spl Tests

Lab Sheet:

SO | NPO Sample

Header  
SO Nr: 0018502433 Customer: 99770200 01 ST-TOKYO SO Type: 30 Sample Order Cost Center: JT3129 SAMPLES /SALES J  
PO Nr: Carrier Code: 0001 Price Policy: 05 Currency: 02 U.S. DOLLAR Req Name:  
Notes: Status: 01 All items pending,ni Issuing Date: 25-JUN-2018 Ord Val: 0.0000 Sample Req Date: 25-Jun-2018

Sch I Nr	PO I. Nr.	Finished Good	Comm Qty	Open Qty	Plant Open Qty	Reqd Qty	Unit Price	RD	CD	EDD	St
1.1.10	000001	STM32F429NIH6	30	30	30	30	0.0000	25-Jun-18	01-Mar-59	01-Mar-59	01

Final Cust:  
PO Item: 000001 Comm Prod: STM32F429NIH6 Qty: 30 RD: 25-Jun-18 Unit Price: 0.0000 Final Cust: 8800367006 SANSHIN/NPC

Cust Part Nr: Finished Good: Partial Ship: 01 Price Pol: 05 Status: 01 Canc:

Notes: TAM K Pieces: 0 Our Share%: 0 Sample Type: Sample Non Std Type

Project Name: Closing Date: Closing Type:

Regional Sheet: PCN 10595

Lab Sheet:



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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)

Product / Process / Package Information for test vehicles				
<b>Commercial Product</b>	STM8L052C6T6 STM32F303CBT7	STM32F205RET6 STM32L052R8T6	STM32L151VDT6 STM32F071VBT6 STM32F207VET6 STM32L431VCT6	STM32F103ZET6 STM32F405ZGT6 STM32H743ZIT6
<b>Mask Set Revision</b>	F764XXX F422XXX	E411XXX3 F417XXX	F436XXX F448XXX1 E411XXX3 E435XXXZ	F414XXX3 E413XXX2 E450XXX
<b>Silicon Process Technology</b>	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
<b>Wafer Fabrication Location</b>	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
<b>Package</b>	LQFP 7x7x1.4 48L	LQFP 10x10x1.4 64L	LQFP 14x14x1.4 100	LQFP 20x20x1.4 144
<b>Assembly Plant Location</b>	ASE Kaohsiung (Taiwan)			

# MDG-MCD-RER1810

## Reliability Report

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



# MDG-MCD-RER1810 Reliability Report

## Contents

1	RELIABILITY RESULTS OVERVIEW .....	4
1.1	Objectives.....	4
1.2	Conclusion.....	4
2	RELIABILITY EVALUATION CONTEXT / PLAN / STRATEGY & RESULTS SUMMARY.....	5
2.1	Reliability Evaluation: Context & strategy summary .....	5
2.2	Reliability Test vehicles description.....	6
2.3	Reliability Information.....	7
2.4	Reliability Evaluation: Results summary .....	8
3	RELIABILITY TEST VEHICLES CHARACTERISTICS.....	12
3.1	Front-End information .....	12
3.2	Back-End information.....	16
4	APPLICABLE AND REFERENCE DOCUMENTS.....	20
5	GLOSSARY AND TESTS DESCRIPTION.....	20
6	REVISION HISTORY.....	20

# MDG-MCD-RER1810

## 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	ASE Kaohsiung (Taiwan)
STM32F303CBT7		
STM32F205RET6	LQFP 64 10x10x1.4	
STM32L052R8T6		
STM32L151VDT6	LQFP 100 14x14x1.4	
STM32F071VBT6		
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.

# MDG-MCD-RER1810

## 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:

	Existing Back-end sites			Added back-end site
Assembly site	Stats ChipPAC JSCC Jiangyin China	ST Muar Malaysia	Amkor ATP Philippines	ASE Kaohsiung Taiwan
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:

	Existing Back-end sites			Added back-end site
Assembly site	ST Muar Malaysia	ST Muar Malaysia	Amkor ATP Philippines	ASE Kaohsiung Taiwan
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

# MDG-MCD-RER1810

## Reliability Report

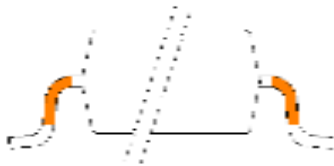
PCN10549 - Changes are described here below for LQFP20x20:

	Existing Back-end sites		Added back-end site
<b>Assembly site</b>	Amkor ATP Philippines		ASE Kaohsiung Taiwan
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	Evertch AP4200	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
<b>Assembly site</b>	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

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



- (2) Package darkness changes depending on molding compound.

## 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	
	LQFP 20*20	144L	STM32(1L*435)	TSMC 90nm	1	
			STM32(1A *414)	TSMC 0.18µm	1	
			STM32(1A *413)	Crolles CR300 M10	1	
				STM32(1A *450)	Crolles CR300 M40	1

# MDG-MCD-RER1810 Reliability Report

## 2.3 Reliability Information

Product / Process / Package Information for test vehicles				
<b>Finish Good</b>	ES8L052 C6T6\$E6	ES32F303 CBT7\$E3	ES32F205 RET6\$EA	ES32L052 R8T6\$E4
<b>Die Name /cut</b>	F764XXXXY	F422XXXXY	E411XXX3	F417XXXXX
<b>Diffusion Lot Number</b>	VG808155	9U804096	9R807141	VG815029
<b>Trace Code</b>	AA824048	AA830068	AA824059	AA824047
<b>Reliability Lab location</b>	ST ROUSSET (France) ST MUAR (Malaysia)			
<b>Fab name location</b>	ROUSSET R8	TSMC Fab11 US	TSMC Fab14 Taiwan	ROUSSET R8
<b>Assembly Plant Location</b>	ASE Kaohsiung (Taiwan)			
<b>Package description</b>	LQFP 48 7x7x1.4		LQFP 64 10x10x1.4	

Product / Process / Package Information for test vehicles							
<b>Finish Good</b>	ES32L151 VDT6\$E1	ES32F071 VBT6\$E1	ES32F207 VET6\$EA	ES32L431 VCT6\$E2	ES32F103 ZET6\$EA	ES32F405 ZGT6\$E4	ES32H743 ZIT6\$E3
<b>Die Name /cut</b>	F436XXXX	F448XXX1	E411XXX3	E435XXXZ	F414XXX3	E413XXX2	E450XXXXY
<b>Diffusion Lot Number</b>	VG813171	98815033	9R807141	9R807069	98812034	VQ749877	VQ743682
<b>Trace Code</b>	AA826001	AA826003	AA826002	AA836029	AA838038	AA845065	AA904060
<b>Reliability Lab location</b>	ST ROUSSET (France) ST MUAR (Malaysia)						
<b>Fab name location</b>	ROUSSET R8	TSMC Fab8 Taiwan	TSMC Fab14 Taiwan	TSMC Fab14 Taiwan	TSMC Fab8 Taiwan	ST Crolles 300	ST Crolles 300
<b>Assembly Plant Location</b>	ASE Kaohsiung (Taiwan)						
<b>Package description</b>	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](http://www.st.com/content/st_com/en/support/quality-and-reliability/certifications.html)

# MDG-MCD-RER1810 Reliability Report

## 2.4 Reliability Evaluation: Results summary

*Package oriented test results in LQFP7x7*

Package Related Tests						Results	
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	LQFP 7x7	
						Lot 1	Lot 2
						764 E75B*764ESXY	422 E65B*422ESXY
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	No delamination		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	
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.

# MDG-MCD-RER1810 Reliability Report

Package oriented test results in LQFP10x10

Package Related Tests						LQFP 10x10	
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	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
	JESD22-C101			500V (411)		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	No delamination		0/60	0/60
High Temperature Storage Life after preconditioning							
HTSL	JESD 22-A103	150°C	2 x 77	Elect test A0/R1	1000h	0/77	0/77
Thermal Cycling after Preconditioning							
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
Unbiased Highly Accelerated Temperature and Humidity Stress after Preconditioning							
uHAST	JESD 22A118	130°C, 85%RH 2Atm	2 x 77	Elect test A0/R1	96h	0/77	0/77
Temperature Humidity Bias after Preconditioning							
THB	JESD 22-A101	85°C/85%RH Bias VDD=3v6	2 x 77	Elect test A0/R1	1000h	0/77	0/77
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

# MDG-MCD-RER1810

## Reliability Report

*Package oriented test results in LQFP14x14*

Package Related Tests						Results			
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	LQFP 14x14			
						Lot 5	Lot 6	Lot 7	Lot 8
						436	448	411	435
						E21L*436ESXX	E41L*448ESX1	E71L*411ESX3	E31L*435ESXZ
<i>Electrostatic discharge – Charge Device Model</i>									
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	4 x 60	No 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



# MDG-MCD-RER1810 Reliability Report

*Package oriented test results in LQFP20x20*

Package Related Tests						Results		
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	LQFP 20x20		
						Lot 9	Lot 10	Lot 11
						414 E01A*414ESX3	413 E01A*413ESX2	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
Preconditioning: moisture sensitivity level 3								
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
		Delamination	3 x 60	No delamination		0/60	0/60	0/60
High Temperature Storage Life after preconditioning								
HTSL	JESD 22-A103	150°C	3 x 77	Elect test A0/R1	1000h	0/77	0/77	0/77
Thermal Cycling after Preconditioning								
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	
Unbiased Highly Accelerated Temperature and Humidity Stress after Preconditioning								
uHAST	JESD 22A118	130°C, 85%RH 2Atm	3 x 77	Elect test A0/R1	96h	0/77	0/77	0/77
Temperature Humidity Bias after Preconditioning								
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
Construction Analysis								
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

# MDG-MCD-RER1810

## Reliability Report

### 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
<b>Wafer Fab Name</b>	ROUSSET R8	TSMC Fab11 US
<b>Wafer Fab Location/ Address</b>	190 Avenue Celestin COQ, 13106 Rousset FRANCE	5509 N W Parker Street CAMAS WA 98607-9299 U.S.
<b>Process Technology Name</b>	CMOSF9GO2	CMOS M8 0.18µm EMBEDDED FLASH
<b>Wafer Diameter</b>	8 inches	8 inches
<b>Wafer Thickness</b>	375 +/- 25 µm	375 +/- 25 µm
<b>Die Size</b>	X: 1738 µm Y: 2876 µm 5.0 mm <sup>2</sup>	X: 4236 µm Y: 4698 µm 19.9 mm <sup>2</sup>
<b>Technology Mask Number</b>	39	34
<b>Scribe Line size x/y:</b>	80 µm x 80 µm	80 µm x 80 µm
<b>Pad Die Size /Pad type:</b>	65 µm x 108 µm	65 µm x 70 µm
<b>Metal Layers</b> 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 Metal 5 Ti/AICu/TxTN 0.900 µm	Metal 1 Tin/AICu/Tin 0.450 µm Metal 2 Tin/AICu/Tin 0.450 µm Metal 3 Tin/AICu/Tin 0.450 µm Metal 4 Tin/AICu/Tin 0.450 µm Metal 5 Tin/AICu/Tin 0.875 µm
<b>Passivation Layers</b> Number Materials Thickness	USG + NitUV (HFP USG+UV Nitride) 1.75µm	HDPox 10kA+SRO 1.5kA+PESIN 6kA 1.75µm
<b>Back Metal Finishing</b> Thickness	RAW SILICON - BACK GRINDING	RAW SILICON - BACK GRINDING

# MDG-MCD-RER1810

## Reliability Report

*Front-end information in LQFP10x10*

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

# MDG-MCD-RER1810 Reliability Report

*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*435ESXZ
<b>Wafer Fab Name</b>	ROUSSET R8	TSMC Fab8 - Taiwan	TSMC Fab14 - Taiwan	TSMC Fab14 - Taiwan
<b>Wafer Fab Location/ Address</b>	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
<b>Process Technology Name</b>	CMOSF9GO2	CMOS M8 0.18µm EMBEDDED FLASH	CMOSM10ULP 6M1T	90nm eFlash Generic TSMC
<b>Wafer Diameter</b>	8 inches	8 inches	12 inches	12 inches
<b>Wafer Thickness</b>	375 +/- 25 µm	381 +/- 25 µm	775 +/- 25 µm	775 +/- 25 µm
<b>Die Size</b>	X: 4574 µm Y: 4946 µm 22.6 mm <sup>2</sup>	X: 3312 µm Y: 3144 µm 10.4 mm <sup>2</sup>	X: 4006 µm Y: 3674 µm 14.7 mm <sup>2</sup>	X: 3176.4 µm Y: 3162.4 µm 10.0 mm <sup>2</sup>
<b>Technology Mask Number</b>	38	34	42	44
<b>Scribe Line size x/y</b>	80 µm x 80 µm	80 µm x 80 µm	80 µm x 80 µm	80 µm x 80 µm
<b>Pad Die Size /Pad type</b>	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
<b>Metal Layers</b> 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/AICu/TxTN 0.900 µm	Metal 1 Tin/AICu/Tin 0.450 µm Metal 2 Tin/AICu/Tin 0.450 µm Metal 3 Tin/AICu/Tin 0.450 µm Metal 4 Tin/AICu/Tin 0.450 µm Metal 5 Tin/AICu/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/AICu 0.730 µm Metal 7 AICu 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 AICu 1.450 µm
<b>Passivation Layers</b> 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
<b>Back Metal Finishing</b> Thickness	RAW SILICON - BACK GRINDING	RAW SILICON - BACK GRINDING	RAW SILICON	RAW SILICON

# MDG-MCD-RER1810 Reliability Report

*Front-end information in LQFP20x20*

Front-End	Diffusion FAB		
	Lot 9 414 E01A*414ESX3	Lot 10 413 E01A*413ESX2	Lot 11 450 E01A*450ESXY
<b>Wafer Fab Name</b>	TSMC Fab8 Taiwan	ST Crolles 300	ST Crolles 300
<b>Wafer Fab Location/ Address</b>	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
<b>Process Technology Name</b>	CMOS0.18µm Emb.Flash	CMOSM10LP 6M1T	CMOSM40
<b>Wafer Diameter</b>	8 inches	12 inches	12 inches
<b>Wafer Thickness</b>	375 +/- 25 µm	775 +/- 25 µm	775 +/- 25 µm
<b>Die Size</b>	X: 4511 µm Y: 4440 µm 20.0 mm <sup>2</sup>	X: 4004 µm Y: 4258 µm 17.0 mm <sup>2</sup>	X:4983 µm Y: 4662 µm 23.2 mm <sup>2</sup>
<b>Technology Mask Number</b>	31	41	50
<b>Scribe Line size x/y</b>	80.6 µm x 80.2 µm	80 µm x 80 µm	72 µm x 72 µm
<b>Pad Die Size /Pad type</b>	65 µm x 70 µm	59 µm x 123 µm 63 µm x 73 µm	54.9 µm x 54.4 µm
<b>Metal Layers</b> 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
<b>Passivation Layers</b> Number Materials Thickness	HDPox 10kA+SRO 1.5kA+PESIN 6kA 1.75µm	PSG + NITRIDE 1.1µm	PSG + NITRIDE 1.1µm
<b>Back Metal Finishing</b> Thickness	RAW SILICON - BACK GRINDING	RAW SILICON	RAW SILICON

# MDG-MCD-RER1810

## Reliability Report

### 3.2 Back-End information

*Back-end information in LQFP7x7*

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

# MDG-MCD-RER1810 Reliability Report

Back-end information in LQFP10x10

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

# MDG-MCD-RER1810

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



# MDG-MCD-RER1810

## Reliability Report

*Back-end information in LQFP20x20*

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

# MDG-MCD-RER1810

## Reliability Report

### 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

# **MDG-MCD-RER1810**

## **Reliability Report**

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