PRODUCT / PROCESS CHANGE INFORMATION

1. PCI basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCI No.	MDG/23/14025
1.3 Title of PCI	ASE KaoHsiung (Taiwan) additional source - PCN10689 information alignment - Second level interconnect (e4) or Lead finishing material information actualized for AMKOR ATP (Philippines) for LQFP 100 14x14 package products
1.4 Product Category	LQ14 product in e4 in AMKOR
1.5 Issue date	2023-05-12

2. PCI 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
General (Logistic)	(Not Defined)	ASE Kaohsiung (Taiwan) ST Muar (Malaysia) Amkor ATP (Philippines)

4. Description of change		
	Old	New
4.1 Description	Lead Finishing: e3 - ASE Kaohsiung Taiwan - ST Muar Malaysia - Amkor ATP Philippines Lead Finishing : e4 - ST Muar Malaysia	Lead Finishing : e3 - no change - ASE Kaohsiung Taiwan - ST Muar Malaysia - Amkor ATP Philippines Lead Finishing : e4 - ST Muar Malaysia - no change - Amkor ATP Philippines - information added in documentation
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	no impact - just information alignment	

5. Reason / motivation for change	
5.1 Motivation	Some missing information in the original PCN10689 documentation were misleading. Information has been re-aligned to stick to the actual product information.
5.2 Customer Benefit	SERVICE IMPROVEMENT

6. Marking of parts / traceability of change	
6.1 Description	no change

7. Timing / schedule	
7.1 Date of qualification results	2023-03-22
7.2 Intended start of delivery	2023-03-22
7.3 Qualification sample available?	Not Applicable

8. Qualification / Validation	
8.1 Description	14025 MDG-MCD-RER1810 V7-PCN10548 10549 10689 12854 13918-ASE LQFP 7x7 10x10 14x14 20x20 STM8L STM32 -report.pdf

8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-05-12

9. Attachments (additional documentations)
14025 Public product.pdf 14025 MDG-MCD-RER1810 V7-PCN10548 10549 10689 12854 13918-ASE LQFP 7x7 10x10 14x14 20x20 STM8L STM32 -report.pdf 14025 PCI14025_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
	STM32F101VGT6	
	STM32F103VCT6	
	STM32F103VCT6TR	
	STM32F103VDT6	
	STM32F103VET6	
	STM32F103VFT6	
	STM32F103VGT7	
	STM32F105VCT6	
	STM32F105VCT7	
	STM32F107VCT6	
	STM32F205VBT6	
	STM32F205VCT6	
	STM32F205VET6	
	STM32F205VGT6	
	STM32F207VGT6	
	STM32F303VDT6	
	STM32F303VET6	
	STM32F401VET6	
	STM32F405VGT6	
	STM32F407VET6	
	STM32F407VGT6	
	STM32F411VCT6	
	STM32F411VET6	
	STM32F417VGT6	
	STM32F427VIT6	
	STM32F429VIT6	
	STM32F437VGT6	
	STM32F437VIT6	
	STM32F446VCT7	
	STM32F469VGT6	
	STM32F469VIT6	
	STM32H742VGT6	
	STM32L151VDT6	
	STM32L151VET6	
	STM32L151VET6D	
	STM32L152VDT6X	
	STM32L433VCT6	
	STM32L471VET6	
	STM32L475VGT6	
	STM32L476VGT3	
	STM32L476VGT6	

	STM32L496VGT6	
	STM32F103VBT6	

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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
Approval List rev 7			
Function	**Location**	**Name**	**Date**
Subgroup Quality Manager	ST Rousset	Pascal NARCHE	26 Apr.,2023

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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 STM32F405ZGT6 STM32H743ZIT6	LQFP 144 20x20x1.4	

Qualification is based on standard STMicroelectronics Corporate Procedures for Quality and Reliability, in full compliancy 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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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

PCN10549 - Changes are described here below for LQFP20x20:

	Existing Back-end sites			Added back-end site
Assembly site	**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	Evertech AP4200	Sumitomo CRM1076YB	Sumitomo CRM 1076WA
Enhanced traceability in marking	No digit			2 digits

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PCN10689 - Changes are described here below for LQFP14x14:

Initial PCN10689 was created in 2018 when additional line was qualified for LQFP 100 14x14 package in ASE KaoHsiung (Taiwan). The original products assembled in AMKOR existing back-End site were displaying incomplete information about devices with e3 second level interconnect (lead finishing, leadframe, resin and glue) and no information about devices produced with e4 second level interconnect in AMKOR ATP (Philippines). Information has been updated in PCI14025 as below table.

	Existing Back-end sites						Added back-end site
Assembly site	**ST Muar Malaysia**		**Amkor ATP Philippines**				**ASE Kaohsiung Taiwan**
Leadframe	Pre Plated Frame	Copper Frame Spot Ag	Copper Frame Spot Ag			Copper Frame	Copper Frame Spot Ag
Leadfinishing (1)	Ni Pd Au (e4)	Pure Tin (e3)	Pure Tin (e3)			PPF (e4)	Pure Tin (e3)
Resin (2)	Sumitomo G700L	Sumitomo G700LS	Sumitomo EME 631HQ	Sumitomo EME 631SHQ		Sumitomo EME 631HQ	Sumitomo G631SH
Glue	Henkel 3280T	Henkel ABP8302	Evertech AP4200	Evertech AP4200	Ablestick 3230	Sumitomo CRM1076 YB	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

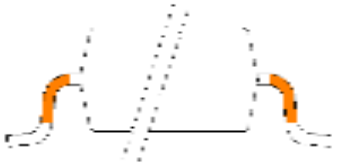
PCN12854 - Changes are described here below for LQFP7x7, for additional listed products in PCN:

	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.

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

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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)						
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

Package Related Tests						**Results**	
						LQFP 7x7	
Description	***Test/Method***	***Conditions***	***Sample Size***	***Criteria***	***Readout / Duration***	***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	

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	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.

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
Electrostatic discharge – Charge Device Model							
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							

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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

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Package oriented test results in LQFP14x14

Package Related Tests						Results			
						LQFP 14x14			
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	Lot 5	Lot 6	Lot 7	Lot 8
						436 E21L*436ESXX	448 E41L*448ESX1	411 E71L*411ESX3	435 E31L*435ESXZ
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	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

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Package oriented test results in LQFP20x20

Package Related Tests						Results		
						LQFP 20x20		
Description	Test/Method	Conditions	Sample Size	Criteria	Readout / Duration	Lot 9 414 E01A*414ESX3	Lot 10 413 E01A*413ESX2	Lot 11 450 E01A*450ESXY
Electrostatic discharge – Charge Device Model								
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

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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 CAMAS WA 98607-9299 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 mm²	X: 4236 µm Y: 4698 µm 19.9 mm²
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 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 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
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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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 mm²	X: 2903 µm Y: 2631 µm 7.6 mm²
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*435ESXZ*
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 mm²	X: 3312 µm Y: 3144 µm 10.4 mm²	X: 4006 µm Y: 3674 µm 14.7 mm²	X: 3176.4 µm Y: 3162.4 µm 10.0 mm²
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 mm²	X: 4004 µm Y: 4258 µm 17.0 mm²	X:4983 µm Y: 4662 µm 23.2 mm²
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

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 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 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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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 DESCIPTION

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
7	26 Apr., 2023	B. Routier-Scappucci	Update PCN10689 with information about e3 and e4 packages in AMKOR

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PRODUCT/PROCESS CHANGE NOTIFICATION
PCI14025– Additional information

ASE KaoHsiung (Taiwan) additional source PCN10689 information alignment - Second level interconnect (e4) or Lead finishing material information actualized for AMKOR ATP (Philippines) for LQFP 100 14x14 package products.

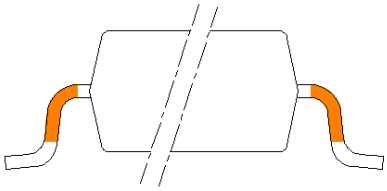
MDG – General Purpose Microcontrollers (GPM) sub-group

What is the change?

Initial PCN10689 was created in 2018 when additional line was qualified for LQFP 100 14x14 package in ASE KaoHsiung (Taiwan). The original products assembled in AMKOR existing back-End site were displaying incomplete information about devices with e3 second level interconnect (lead finishing, leadframe, resin and glue) and no information about devices produced with e4 second level interconnect in AMKOR ATP (Philippines). Information has been updated in the table about those e3 and e4 packages in AMKOR and reliability report upgraded accordingly (RER1810 Version 7).
The table below has been upgraded to reflect actual AMKOR production to avoid misunderstanding on some products. No change in ASE Kaohsiung production and PCN10689 is still valid.

	Existing back-end sites						Added back-end site
Assembly site	ST Muar Malaysia		Amkor ATP Philippines				ASE Kaohsiung Taiwan
Leadframe	Pre Plated Frame	Copper Frame Spot Ag	Copper Frame Spot Ag			Copper Frame	Copper Frame Spot Ag
Leadfinishing (1)	Ni Pd Au (e4)	Pure Tin (e3)	Pure Tin (e3)			PPF (e4)	Pure Tin (e3)
Resin (2)	Sumitomo G700L	Sumitomo G700LS	Sumitomo EME 631HQ	Sumitomo EME 631SHQ		Sumitomo EME 631HQ	Sumitomo G631SH
Glue	Henkel 3280T	Henkel ABP8302	Evertech AP4200	Evertech AP4200	Ablestick 3230	Sumitomo CRM1076 YB	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

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

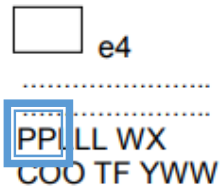


(2) Package darkness changes depending on molding compound.

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 can the change be seen?

The standard marking is:



PP code indicates the assembly traceability plant code.

Please refer to the DataSheet for marking details.

The marking is changing as follows:

Existing		Additional	
PP code	Fab	**PP** code	Fab
9H	ST Muar Malaysia	AA	ASE Kaohsiung Taiwan
7B	Amkor ATP Philippines		

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Public Products List

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PCI Title : ASE KaoHsiung (Taiwan) additional source - PCN10689 information alignment - Second level interconnect (e4) or Lead finishing material information actualized for AMKOR ATP (Philippines) for LQFP 100 14x14 package products

PCI Reference : MDG/23/14025

Subject : Public Products List

Dear Customer,

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

STM32F205VCT6	STM32F446VCT6	STM32F427VGT6
STM32L152VBT6ATR	STM32H753VIT6	STM32L151VCT6ATR
STM32L4R5VGT6	STM32F103VDT6TR	STM32F765VGT7
STM32F407VGT7	STM32L462VET6	STM32F417VGT7
STM32F103VBT7	STM32F405VGT6	STM32F373VBT6
STM32F078VBT6	STM32F745VET6	STM32H7A3VGT6
STM32G474VBT3	STM32F207VFT6	STM32F101VCT6
STM32F101V8T6	STM32F437VIT7TR	STM32L4R9VIT6
STM32F407VGT6	STM32F417VGT6TR	STM32F105VBT6
STM32H743VIT6TR	STM32L162VCT6A	STM32F765VGT6
STM32F303VCT6	STM32F417VGT6	STM32L152VBT6A
STM32F745VGT6TR	STM32F217VGT6TR	STM32F730V8T6TR
STM32F411VET6	STM32G473VET6	STM32F469VET6
STM32F745VET7	STM32F101VBT6TR	STM32H742VGT6
STM32F429VET6	STM32L073VBT6	STM32H743VIT6
STM32F207VFT6TR	STM32F469VIT6	STM32F398VET6
STM32F207VET6	STM32G441VBT6	STM32F107VCT6TR
STM32F071VBT6TR	STM32F401VDT6	STM32F429VIT6
STM32F415VGT6TR	STM32F217VET6TR	STM32F205VGT7
STM32H750VBT6TR	STM32F427VIT7TR	STM32F100VET6BTR
STM32F217VGT6	STM32F207VGT7	STM32F765VIT7
STM32L151V8T6	STM32F205VCT7	STM32G474VBT6
STM32G473QET6TR	STM32L152VBT6	STM32F437VGT6
STM32F405VGT7TR	STM32F215VGT7	STM32F723VET6
STM32F071V8T6	STM32L152VDT6TR	STM32L486VGT6TR
STM32F101VDT6TR	STM32F732VET6	STM32L476VGT3
STM32F373VBT7	STM32F071V8T7TR	STM32F767VGT7
STM32H742VIT6TR	STM32F479VIT6	STM32F071V8T7
STM32F415VGT6	STM32F411VCT6	STM32F303VBT6
STM32L072VZT6	STM32F746VET6TR	STM32H743VGT6
STM32F205VCT6TR	STM32F407VGT6TR	STM32F439VIT6
STM32F103VFT6	STM32L451VET6TR	STM32F437VGT7TR
STM32F103VFT7	STM32L151VCT6D	STM32F205VET7
STM32F103VGT7TR	STM32F103VCT6TR	STM32F746VGT6
STM32F103V8T6	STM32F756VGT6	STM32F429VIT6TR

Public Products List

STM32F205VGT6TR	STM32G431V8T6	STM32F205VCT7TR
STM32L476VCT6	STM32F217VET6	STM32L4R5VIT6
STM32F746VGT7	STM32F417VET6TR	STM32F098VCT6
STM32F412VGT6TR	STM32H742VGT6TR	STM32F207VCT6
STM32F072V8T6	STM32F427VIT6	STM32F373VCT6
STM32F777VIT6	STM32F101V8T6TR	STM32F446VET6TR
STM32L152VBT6TR	STM32F423VHT6	STM32F401VBT6
STM32L152V8T6	STM32L443VCT6	STM32H7B3VIT6
STM32F405VGT6TR	STM32L152VCT6TR	STM32F215VGT6
STM32F205VBT6	STM32L471VGT6TR	STM32L071V8T6TR
STM32G473QCT6	STM32L151VET7	STM32F103VDT6
STM32F100VET6B	STM32L4S5VIT6TR	STM32F103VCT6
STM32F103VET7	STM32F427VIT6TR	STM32F417VET6
STM32L475VCT6	STM32L152VDT6	STM32L151V8T6A
STM32F746VET6	STM32F401VDT6TR	STM32F101VBT6
STM32L431VCT6TR	STM32F412VGT7	STM32F723VCT6
STM32F103VBT6	STM32F732VET6TR	STM32F205VET6TR
STM32L162VDT6TR	STM32F103V8T6TR	STM32F091VBT7
STM32L4S9VIT6	STM32L476VCT6TR	STM32F439VGT6
STM32F207VGT6TR	STM32G474QET6	STM32F437VGT7
STM32F427VGT6TR	STM32G473VET3	STM32F446VCT7
STM32F105VCT7	STM32L4R7VIT6	STM32F091VCT6TR
STM32F411VCT6TR	STM32F103VET6	STM32L4S5VIT3
STM32F100V8T7B	STM32L151VBT6D	STM32F401VET6
STM32H750VBT6	STM32F730V8T6	STM32L071VBT6TR
STM32F437VIT6	STM32F401VET6TR	STM32F103VBT6TR
STM32L151VDT6	STM32F413VGT3TR	STM32F207VGT6
STM32F072VBT6TR	STM32L452VET3	STM32F302VET6TR
STM32F100VDT6BTR	STM32F072VBT6	STM32G474QBT6
STM32F767VIT7	STM32F101VFT6	STM32H7A3VIT6Q
STM32F407VET6TR	STM32F091VCT7TR	STM32F469VET6TR
STM32F429VET6TR	STM32H7B0VBT6TR	STM32F100VBT6B
STM32F205VFT6	STM32F469VIT6TR	STM32G484QET3
STM32L083VBT6	STM32F302VCT6TR	STM32F407VET6
STM32F437VIT7	STM32F071V8T6TR	STM32L162VET6TR
STM32F722VET7	STM32F405VGT7	STM32L471VGT3
STM32G473VCT3TR	STM32F302VCT7	STM32F407VGT7TR
STM32F100VBT7B	STM32F437VIT6TR	STM32F103VGT6TR
STM32F207VCT6TR	STM32F105VCT6TR	STM32L452VCT6
STM32F205VFT6TR	STM32F101VET6	STM32G473VCT6TR
STM32G484QET6	STM32L443VCT6TR	STM32F103VGT7
STM32L4A6VGT6TR	STM32F722VCT6	STM32F100VDT7B
STM32L151VBT6	STM32L476VET6TR	STM32H7B0VBT6
STM32F401VCT6	STM32L471VET6	STM32F101VCT6TR
STM32L496VGT6TR	STM32F205VGT7TR	STM32F303VDT6TR
STM32F103VET6TR	STM32L471VGT6	STM32L152V8T6TR
STM32L152VET6D	STM32F091VBT6	STM32L072V8T6
STM32L496VET6TR	STM32F413VGT6TR	STM32F105V8T6TR
STM32L151VCT6A	STM32F205VET7TR	STM32H7A3VIT6
STM32F373V8T6	STM32F767VGT6	STM32F303VCT7TR

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STM32L151VET6	STM32F437VIT6WTR	STM32F303VET6
STM32F103VDT7	STM32F446VET6	STM32F412VET3TR
STM32F071VBT6	STM32F207VET6TR	STM32L433VCT6TR
STM32F765VGT6TR	STM32F358VCT6	STM32F100VBT6BTR
STM32F722VET6	STM32L486VGT3	STM32F413VHT6
STM32L152VET6TR	STM32F103VET7TR	STM32L4R9VGT6
STM32L452VET6	STM32G473VET6TR	STM32F750V8T7
STM32L476VGT6TR	STM32F412VET6TR	STM32F302VDT6
STM32L151VET6D	STM32L073V8T6	STM32H7B3VIT6Q
STM32L151VBT6TR	STM32L151VET6DTR	STM32F103VBT7TR
STM32F100VCT6B	STM32L152VET6	STM32H742VIT6
STM32L152VCT6D	STM32F745VGT6	STM32F429VGT6
STM32F765VIT6	STM32F207VCT7	STM32L071VZT6
STM32G473VCT6	STM32L4A6VGT6P	STM32F215VET6
STM32L151VCT6TR	STM32L462VET6TR	STM32F446VCT6TR
STM32F412VET3	STM32G474VET3TR	STM32F378VCT6
STM32L083VZT6	STM32L451VET6	STM32L151VDT7X
STM32L4S7VIT6	STM32F411VET6TR	STM32F302VBT6
STM32L073VBT6TR	STM32F205VET6	STM32F750V8T6
STM32L152V8T6A	STM32G473VCT3	STM32F446VET7
STM32F302VDT6TR	STM32G474QCT6	STM32F107VCT7
STM32F437VGT6TR	STM32F429VGT6TR	STM32F103VGT6
STM32F303VBT6TR	STM32F303VDT6	STM32L151VBT6ATR
STM32F412VET6	STM32F091VCT6	STM32F101VFT6TR
STM32F105V8T6	STM32G474VET6TR	STM32G484VET6
STM32L433VCT6	STM32L431VCT6	STM32L486VGT6
STM32F767VIT6	STM32L4S5VIT6	STM32G431V6T6
STM32G473QBT6	STM32F091VCT7	STM32F401VBT6TR
STM32F469VGT6	STM32F107VCT6	STM32G474VBT3TR
STM32F101VDT6	STM32F722VET6TR	STM32L4A6VGT6PTR
STM32F103VFT6TR	STM32L071VBT6	STM32F100VDT6B
STM32F205VGT6	STM32F101VGT6	STM32L073VBT7TR
STM32L083VBT6TR	STM32L162VET6	STM32F733VET6
STM32L152VCT6A	STM32F100V8T6B	STM32L496VGT3
STM32G431VBT6	STM32L073VZT6	STM32L151VET6TR
STM32F302VET6	STM32F302VCT7TR	STM32F479VGT6
STM32F413VGT3	STM32L496VET3	STM32L072VBT6
STM32G483VET6	STM32L073VZT6D	STM32L071V8T6
STM32F100V8T6BTR	STM32F302VCT6	STM32F401VCT7
STM32L162VDT6	STM32L162VCT6D	STM32F107VBT6
STM32L496VGT6P	STM32L475VET6	STM32G473QET6
STM32L471VET6TR	STM32F423VHT6TR	STM32F722VET7TR
STM32L496VET6	STM32F756VGT7	STM32F413VGT6
STM32L083V8T6	STM32G483VET3	STM32F722VCT6TR
STM32G474VET3	STM32F412VGT6	STM32F303VCT6TR
STM32L162VCT6	STM32G474VET6	STM32L476VGT6
STM32F415VGT7TR	STM32L152VDT6X	STM32G474VCT6
STM32L4R5VIT6TR	STM32F303VCT7	STM32L152VCT6
STM32L073VBT7	STM32L073VZT3	STM32G474QET6TR
STM32F303VET6TR	STM32F303VET7	STM32F100VET7B

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STM32L4A6VGT6	STM32L476VET6	STM32L151VBT6A
STM32L496VGT6	STM32F373VCT6TR	STM32L451VCT6
STM32G483QET6	STM32L433VCT3	STM32L476VGT7
STM32F105VCT6	STM32F100VCT6BTR	STM32L475VGT6
STM32F302VBT6TR	STM32G473VBT6	

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