

MMS/MCD RELIABILITY EVALUATION REPORT

Identification number : RERMCD1122

Qualification Type : Product Evaluation

Product / Process information	
Commercial product	STM32L1xx
Product line	427X66
Product description	STM32L Scorpio2 256k
Production Mask Set revision	427XXXV (Cut 1.5)
Product Division	Microcontrollers Division (MCD)
Silicon process technology	CMOSF9S
Wafer fabrication location	ST Rousset, France
Electrical Wafer Sort test plant location	ST Rousset, France

Package information		
Package	Assembly Plant location	Final Test plant location
LQFP100 14x14x1.4	AMKOR ATK1 (KOREA)	AMKOR ATK3 (KOREA)
UFBGA100 7x7x0.6	AMKOR ATK4 (KOREA)	AMKOR ATK3 (KOREA)
WLCSP63	STAT ChipPAC Singapore	STAT ChipPAC Singapore
LQFP64 10x10x1.4	STAT ChipPAC Shanghai	STAT ChipPAC Shanghai
LQFP48 7x7x1.4	STAT ChipPAC Shanghai	STAT ChipPAC Shanghai
UFQFPN48 7x7x0.55	STAT ChipPAC Malaysia	STAT ChipPAC Malaysia

Reliability assessment: PASS

Approval List			
Function	Site	Name	Date
Div Q&R Responsible	ST Rousset	Frederic BRAVARD	17-March-14
Div Quality Manager	ST Rousset	Pascal NARCHE	17-March-14
MMS Laboratory Manager	ST Rousset	Didier GRAU	17-March-14
Approval List: Rev04			
Div Q&R Responsible	ST Rousset	Frederic BRAVARD	15-Apr-15



Contents

- 1 RELIABILITY EVALUATION OVERVIEW.....3**
 - 1.1 OBJECTIVES3
 - 1.2 CONCLUSION.....3

- 2 RELIABILITY DEVICE CHARACTERISTICS.....4**
 - 2.1 RELIABILITY TEST VEHICLE(S) DESCRIPTION4
 - 2.2 RELIABILITY TEST VEHICLE(S) TRACEABILITY4
 - 2.2.1 *Product vehicles used for die and package reliability evaluation*..... 4
 - 2.2.2 *Front-End Information* 6
 - 2.2.3 *Back-End Information*..... 7

- 3 RELIABILITY EVALUATION PLAN / RESULTS SUMMARY.....10**
 - 3.1 RELIABILITY EVALUATION : RESULTS SUMMARY10
 - 3.1.1 *Die Related tests:*.....
 - 3.1.2 *Packages Related tests:*

- 4 APPLICABLE AND REFERENCE DOCUMENTS17**

- 5 GLOSSARY.....17**

- 6 REVISION HISTORY.....17**

1 RELIABILITY EVALUATION OVERVIEW

1.1 Objectives

The aim of this report is to present the results of the reliability evaluation performed on the STM32L1xx 256Kbytes - die 427XXXV, diffused in ST Rousset 8" fab and assembled on the following packages:

- LQFP100 14x14 in AMKOR ATK1
- UFBGA100 7x7 in AMKOR ATK4
- WLCSP63 7x9 in STATChipPAC Singapore
- LQFP64 10x10 in STAT ChipPAC Shanghai
- LQFP48 7x7 in STAT ChipPAC Shanghai
- UFQFPN48 7x7 in STAT ChipPAC Malaysia

1.2 Conclusion

All reliability tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing.

According to the reliability tests results, the qualification is granted for the STM32L1xx 256k F/G and its subsets, diffused in ST R8" Rousset – FRANCE (die 427XXXV) and assembled in the above listed packages.

Refer to [Section 3.1 Reliability evaluation: Results Summary](#) for details on reliability test results.

2 RELIABILITY DEVICE CHARACTERISTICS

2.1 Reliability Test vehicle(s) description

The medium density plus ultralow power STM32L1xx 256k incorporates the connectivity power of the universal serial bus (USB) with the high-performance ARM Cortex™-M3 32-bit RISC core operating at a 32 MHz frequency, a memory protection unit (MPU), high-speed embedded memories (Flash memory up to 256 Kbytes and RAM up to 32 Kbytes) and an extensive range of enhanced I/Os and peripherals connected to two APB buses.

The STM32L1xx medium density plus devices offer two operational amplifiers, one 12-bit ADC, two DACs, two ultralow power comparators, one general-purpose 32-bit timer, six general-purpose 16-bit timers and two basic timers, which can be used as time bases.

The STM32L1xx 256k devices contain standard and advanced communication interfaces:

- Up to two I2Cs
- Three SPIs, all with muxed I2Ss
- Three USARTs
- CAN

The medium density plus ultralow power STM32L1xx 256k operates from a 1.8 to 3.6 V power supply (down to 1.65 V at power down) with BOR and from a 1.65 to 3.6 V power supply without BOR option.

2.2 Reliability Test vehicle(s) Traceability

2.2.1 Product vehicles used for die and package reliability evaluation

2.2.2

RER lot ID	Lot 1-2-3	Lot 4-5-6	Lot 7	Lot 8-9-10
Finish Good	32L152VCT6\$S1	32L152VCT6\$S1	32L152VCH6\$S1	32L151UCY6DTR\$H1
Die name /Cut	426A / Cut 1.0	427A / Cut 1.0	427A / Cut 1.0	427A / Cut 1.0
Lab. Location	ST Rousset		ST Rousset	
Fab name location.	RS8F ROUSSET		RS8F ROUSSET	
EWS name location	CMOSF9 GO2 SHRINK		CMOSF9 GO2 SHRINK	
Assembly plant location	AMKOR ATK3		AMKOR ATK3	ChipPAC Singapore
FTname location	AMKOR ATK1		AMKOR ATK4	ChipPAC Singapore
Package Description	LQFP100 14x14		UFBGA100 7x7	WLCSP63 7x9



Reliability Evaluation Report

RER lot ID	Lot 11	Lot 12	Lot 13	Lot 14	Lot15
Finish Good	32L152RCT6\$B1	32L152CCT6\$B1	32L152CCU6\$H1	32L152VCT6\$S4	32L152VCT6\$P6
Die name /Cut	427A / Cut 1.0	427A / Cut 1.0	427A / Cut 1.0	427X / Cut 1.3	427V/ Cut 1.5
Lab. Location	ST Rousset		ST Rousset		
Fab name location.	RS8F ROUSSET		RS8F ROUSSET		
EWS name location	CMOSF9 GO2 SHRINK		CMOSF9 GO2 SHRINK		
Assembly plant location	ChipPAC Shangai		ChipPAC Malaysia	AMKOR ATK3	AMKOR ATP1
FTname location	ChipPAC Shangai		ChipPAC Malaysia	AMKOR ATK1	AMKOR ATP3
Package Description	LQFP64 10x10	LQFP48 7x7	UFQFPN48 7x7	LQFP100 14x14	LQFP100 14x14

2.2.2 Front-End Information

	Diffusion FAB
Wafer Fab Name	ST ROUSSET R8"
Wafer Fab Location / Address	STMicroelectronics, 190 av Celestin Coq. ZI - Rousset-Peynier -13106 Rousset Cedex
Process Technology Name	CMOSF9S
Wafer Diameter	8 inch
Wafer Thickness	375 +/- 25 µm
Die size	3.263 x 4.199 mm
Technology Mask Number	37
Layer Under Metallization - Material - Thickness	Silicon oxide 600nm
Metal Layers - Number - Material - Thickness	Metal 1 TaN/Ta/Cu 0.280µm Metal 2 Ti/AICu/TxTN 0.310µm Metal 3 Ti/AICu/TxTN 0.310µm Metal 4 Ti/AICu/TxTN 0.310µm Metal 5 Ti/AICu/TxTN 1.200µm
Passivation Layers	Oxide USG 12KÅ + Nitride 5.5KÅ
Back Metal Finishing - Thickness	NA
Die overcoat: - Material - Thickness	NA
Other Device using same process	STM32L1xx 427x66
FIT Level (Ea=0.7eV, C.L:60%, 55°C)	23 FIT at qualification date
Wafer Level Reliability - Electro-Migration (FIT/Mb) - Time Dependent Dielectric Breakdown [TDDB] Or Gate Oxide Integrity (GOI) - Hot Carrier Injection (HCI) - Negative Bias Thermal Instability (NBTI) - Stress Migration (SM)	Yes Yes Yes Yes Yes Yes

2.2.3 Back-End Information

Package Description	LQFP100 14x14	UFBGA100 7x7
Assembly Plant Name	AMKOR ATK1	AMKOR ATK4
Assembly Plant Location / Address	Korea / 151, Dongil-ro, Seongdong-gu Seoul 133-706	Korea / 100, Amkor-ro, Buk-gu Gwangju 500-733
Die Thickness after Back grinding	375µm +/- 25 µm	75µm +/- 12 µm
Die sawing method	Sawing	Sawing
Die attach material - Type (Glue/Film) - Supplier / refer	Glue 8200C ABLESTIK	Glue ATB130U ABLESTIK
Wire bonding - Type / diameter - Supplier / characteristics - Method (ultrasonic / thermosonic)	Gold wire diam. 0.8MIL Thermosonic	Gold wire diam. 0.8MIL Thermosonic
Lead frame or substrate material	LQFP 14x14 100L PPF	UFBGA 7x7 100L
Lead platings - Nature - Thickness	Nickel: 0.4µm min to 1.5µm max Palladium: 0.02µm min to 0.5µm max Gold: 0.003µm min to 0.02µm max	N.A
Balls material & diameter (GBA & CSP)	NA	Solder ball SN96.5 AG3.5% Diam 200µm
Routing layer material (CSP)	NA	NA
Passivation (CSP)	NA	NA
Back side coating (CSP) - Material - Thickness	NA	NA
Molding compound / Resin encapsulation - Type - Supplier / refer	GE7470LQ NITTO	GE100LFCS NITTO
Package moisture sensitivity level (JEDEC J-STD020D)	MSL3	MSL3



Reliability Evaluation Report

Package Description	LQFP48 7x7	LQFP64 10x10
Assembly Plant Name	STATS ChipPAC Shanghai	STATS ChipPAC Shanghai
Assembly Plant Location / Address	188 Hua Xu Road Xujin County Qingpu District Shanghai 201702 CHINA	188 Hua Xu Road Xujin County Qingpu District Shanghai 201702 CHINA
Die Thickness after Back grinding	375µm +/- 25 µm	375µm +/- 25 µm
Die sawing method	Sawing	Sawing
Die attach material - Type (Glue/Film) - Supplier / refer	Glue 3230 ABLESTIK	Glue 3230 ABLESTIK
Wire bonding - Type / diameter - Supplier / characteristics - Method (ultrasonic / thermosonic)	Gold wire diam. 0.8MIL Thermosonic	Gold wire diam. 0.8MIL Thermosonic
Lead frame or substrate material	LQFP 7x7 48L	LQFP 10x10 64L
Lead platings - Nature - Thickness	100% Matt Tin 10µm thickness: tolerance 7 to 20 µm for connections	100% Matt Tin 10µm thickness: tolerance 7 to 20 µm for connections
Balls material & diameter (GBA & CSP)	NA	NA
Routing layer material (CSP)	NA	NA
Passivation (CSP)	NA	NA
Back side coating (CSP) - Material - Thickness	NA	NA
Molding compound / Resin encapsulation - Type - Supplier / refer	G700E SUMITOMO	G700E SUMITOMO
Package moisture sensitivity level (JEDEC J-STD020D)	MSL3	MSL3

Package Description	UFQFPN 48 7x7	WLCSP63 7x9
Assembly Plant Name	STATS ChipPAC Malaysia	STATS ChipPAC Singapore
Assembly Plant Location / Address	Sdn Bhd 73 Lorong Enggang Ulu Kelang Free Trade Zone 54200 Kuala Lumpur Malaysia	5 Yishun Street 23 Singapore 768442
Die Thickness after Back grinding	150µm +/- 25 µm	355µm +/- 25 µm
Die sawing method	Sawing	Laser Groove + Blade saw
Die attach material - Type (Glue/Film) - Supplier / refer	Glue 8290 ABLEBOND	NA
Wire bonding - Type / diameter - Supplier / characteristics - Method (ultrasonic / thermosonic)	Gold wire diam. 0.8MIL Thermosonic	NA
Lead frame or substrate material	UQFN 7x7 48L	NA
Lead platings - Nature - Thickness	100% Matt Tin 10µm thickness: tolerance 7 to 20 µm for connections	NA
Balls material & diameter (GBA & CSP)	NA	Solder ball SAC1255N Diam 250µm
Routing layer material (CSP)	NA	AICu 0.5
Passivation (CSP)	NA	Polymide passivation
Back side coating (CSP) - Material - Thickness	NA	PET film 25µm
Molding compound / Resin encapsulation - Type - Supplier / refer	G770 SUMITOMO	NA
Package moisture sensitivity level (JEDEC J-STD020D)	MSL3	MSL1

3 RELIABILITY EVALUATION PLAN / RESULTS SUMMARY

3.1 Reliability evaluation : results summary

The STM32L1xx 256k is processed in the CMOSF9GO2 SHRINK (F9GO2S) process which is a derivative process of CMOSF9GO2.

The qualification strategy of the STM32L1xx 256k is based on:

- The driver test chip 426MPW 128k (426XXXA)
- The product STM32L1xx 256k. (427XXXA)

The STM32L1xx 256K is designed from the same platform that the 426MPW test chip. The main difference concerns the memory size (128K for 426XXXA & 256K for 427XXXA).

A WLCSP63 package from STATSChipPAC Singapore has been assessed

Based on these data, the qualification has been defined as following:

- Die qualification: 3 diffusion lots of 426XXXA (3 lots for digital & memory)
3 diffusion lots of 427XXXA (1 lot for digital & memory + 2 additional lots for memory)
1 diffusion lot of 427XXXV
- Package qualification: TQFP100: 1 assembly lot for 426XXXA & 1 assembly lot for 427XXXA
UFBGA100: 1 assembly lot for 427XXXA
WLCSP63: 3 assembly lots for 427CCCA
LQFP64: 1 assembly lot for 427XXXA
LQFP48: 1 assembly lot for 427XXXA
UFQFPN48: 1 assembly lot for 427XXXA

The reliability test plan and result summary are presented in the following tables:

1. Table 1 & Table2 for Die oriented tests
- Table 3 & Table4 for LQFP100 Package oriented tests
- Table 1 for UFBGA100 Package oriented tests
- Table 1 for WLCSP63 Package oriented tests
- Table 1 for LQFP64 Package oriented tests
- Table 1 for LQFP48 Package oriented tests
- Table 1 for UFQFPN48 Package oriented tests

3.1.1 Die Related tests:

Table 1. Die oriented test results TEST CHIP die 426

Die Related Tests - short description					Results		
Test/Method	Conditions	Sample Size	Criteria	Read out / Duration	Lot 1	Lot 2	Lot 3
Electrostatic discharge - Human Body Model							
JESD22-A114	1500 Ω, 100 pF	1x3	1kV class 1C	1KV	0/3		
Electrostatic discharge - Charge Device Model							
JESD22-C101	LQFP100	1x3	250V class II	250V	0/3		
LATCH UP							
JESD78	LQFP100	1x6	A0/R1 ⁽¹⁾	105°C	0/6		
NVM Endurance & Data Retention – 10k prog / 100k data cycles EW @ +105°C then Storage							
JESD22-A117	Cycling 125°C	3x77	A0/R1 ⁽¹⁾	After cycling	0/77	0/77	0/77
	HTB 150°C	3x77		504h	0/77	0/77	0/77
				1008h	0/77	0/77	0/77
				1512h	0/77	0/77	0/77
NVM Endurance & Data Retention – 10k prog / 100k data cycles EW @ +25°C then Storage							
JESD22-A117	Cycling 25°C	3x77	A0/R1 ⁽¹⁾	After cycling	0/77	0/77	0/77
	HTB 150°C	3x77		168h	0/77	0/77	0/77
NVM Endurance & Data Retention – 10k prog / 100k data cycles EW @ -40°C then Storage							
JESD22-A117	Cycling -40°C	3x77	A0/R1 ⁽¹⁾	After cycling	0/77	0/77	0/77
	HTB 150°C	3x77		168h	0/77	0/77	0/77
High Temperature Operating Live							
JESD-22A108	HTOL 125°C, 3.6V	3x77	A0/R1 ⁽¹⁾	168h	0/77	0/77	0/77
				672h	0/77	0/77	0/77
				1512h	0/77	0/77	0/77
Early Life Failure Rate							
MIL-STD-883 Method 1005 JESD22-A108 JESD74	HTOL 140°C, 3.6V	3x500	A0/R1 ⁽¹⁾	24h	0/500	0/500	0/500

(1) : ACCEPTED 0 FAIL / REJECTED 1 FAIL



Table 2. Die oriented test results die 427

Die Related Tests - short description					Results				
Test/Method	Conditions	Sample Size	Criteria	Read out / Duration	Lot 4	Lot 5	Lot 6	Lot 14	Lot 15
					Cut 1.0			Cut 1.3	Cut 1.5
Electrostatic discharge - Human Body Model									
ANSI/ESDA/ JEDEC JS-001	1500 Ω, 100 pF	1x3	1kV class 1C	1KV	0/3				
		1x3	2kV Class 2	2kV				0/3	0/3
Electrostatic discharge - Charge Device Model									
ANSI/ESD STM5.3.1	LQFP100	1x3	250V class II	250V	0/3				
	UFBGA100	1x3			0/3				
	LQFP100	1x3	500V Class II	500V				0/3	0/3
	UFBGA100	1x3						0/3	
	LQFP 64	1x3						0/3	
	LQFP48	1x3						0/3	
	UFQFPN 48	1x3						0/3	
	WLCSP 63	1x3						0/3	
LATCH UP									
JESD78	LQFP100	1x6	A0/R1 ⁽¹⁾	105°C	0/6			0/6	0/6
NVM Endurance & Data Retention – 10k prog / 100k data cycles EW @ +105°C then Storage									
JESD22-A117	Cycling 125°C	3x77	A0/R1 ⁽¹⁾	After cycling	0/77	0/77	0/77		
				504h	0/77	0/77	0/77		
	HTB 150°C	3x77		1008h	0/77	0/77	0/77		
				1512h	0/77	0/77	0/77		
NVM Endurance & Data Retention – 10k prog / 100k data cycles EW @ +25°C then Storage									
JESD22-A117	Cycling 25°C	1x77	A0/R1 ⁽¹⁾	After cycling	0/77				
	HTB 150°C	1x77		168h	0/77				
NVM Endurance & Data Retention – 10k prog / 100k data cycles EW @ -40°C then Storage									
JESD22-A117	Cycling -40°C	1x77	A0/R1 ⁽¹⁾	After cycling	0/77				
	HTB 150°C	1x77		168h	0/77				
High Temperature Operating Live									
JESD-22A108	HTOL 125°C, 3.6V	1x77	A0/R1 ⁽¹⁾	168h	0/77				0/77
				672h	0/77				
				1512h	0/77				
Early Life Failure Rate									
MIL-STD-883 Method 1005 JESD22-A108 JESD74	HTOL 140°C, 3.6V	1x500	A0/R1 ⁽¹⁾	24h	0/500				

(1) : ACCEPTED 0 FAIL / REJECTED 1 FAIL

3.1.2 Packages Related tests:

Table 3. LQFP100 Package oriented test results for Test Chip 426MPW

Short description					Results
Test/Method	Conditions	Sample Size	Criteria	Read out /Duration	Lot 1 LQFP100
Preconditioning: moisture sensitivity level 3					
J-STD-020D JESD22-A113	Peak temperature at 260 °C, 3 IR-reflows	1x308	A0/R1 ⁽¹⁾	N.A	0/308
Temperature Humidity Bias after Preconditioning					
JESD 22-A101	85°C,85% RH VDD=3v6	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77
Autoclave after Preconditioning					
JESD 22-A102	Ta=121°C P=2.08atm	1x77	A0/R1 ⁽¹⁾ 96h	96h	0/77
Thermal Cycling after Preconditioning					
JESD 22-A104	Ta= 50°C/+150°C	1x77	A0/R1 ⁽¹⁾ 1000TC	1000 TC	0/77
High Temperature Storage Life after Preconditioning					
JESD 22-A103	150°C	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77

Table 4. LQFP100 Package oriented test results for 427XXXX

Short description					Results
Test/Method	Conditions	Sample Size	Criteria	Read out /Duration	Lot 4 LQFP100
Preconditioning: moisture sensitivity level 3					
J-STD-020D JESD22-A113	Peak temperature at 260 °C, 3 IR-reflows	1x308	A0/R1 ⁽¹⁾	N.A	0/308
Temperature Humidity Bias after Preconditioning					
JESD 22-A101	85°C,85% RH VDD=3v6	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77
Autoclave after Preconditioning					
JESD 22-A102	Ta=121°C P=2.08atm	1x77	A0/R1 ⁽¹⁾ 96h	96h	0/77
Thermal Cycling after Preconditioning					
JESD 22-A104	Ta= 50°C/+150°C	1x77	A0/R1 ⁽¹⁾ 1000TC	1000 TC	0/77
High Temperature Storage Life after Preconditioning					
JESD 22-A103	150°C	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77

(1) : ACCEPTED 0 FAIL / REJECTED 1 FAIL

Table 5. UFBGA100 Package oriented test results

Short description					Results
Test/Method	Conditions	Sample Size	Criteria	Read out /Duration	Lot 7 UFBGA100
Preconditioning: moisture sensitivity level 3 MSL3					
J-STD-020D JESD22-A113	Peak temperature at 260 °C, 3 IR-reflows	1x231	A0/R1	N.A	0/231
Temperature Humidity Bias after Preconditioning					
JESD 22-A101	85°C,85% RH VDD=3v6	1x77	A0/R1 500h	1000h	0/77
Thermal Cycling after Preconditioning					
JESD 22-A104	Ta=-50°C/+150°C	1x77	A0/R1 1000TC	1000 TC	0/77
High Temperature Storage Life after Preconditioning					
JESD 22-A103	150°C	1x77	A0/R1 500h	1000h	0/77

Table 6. WLCSP63 Package oriented test results

Short description					Results		
Test/Method	Conditions	Sample Size	Criteria	Read out /Duration	Lot 8 WLCSP63	Lot 9 WLCSP63	Lot 10 WLCSP63
Preconditioning: moisture sensitivity level 1 MSL1							
J-STD-020A JEP113-B	Peak temperature at 235 °C, 3 IR-reflows	3x308	A0/R1	N.A	0/308	0/308	0/308
Temperature Humidity Bias after Preconditioning							
JESD 22-A101	85°C,85% RH VDD=3v6	3x77	A0/R1 1000h	1000h	0/77	0/77	0/77
Thermal Cycling after Preconditioning							
JESD 22-A104	Ta=-50°C/+150°C	3x77	A0/R1 1000TC	1000 TC	0/77	0/77	0/77
High Temperature Storage Life after Preconditioning							
JESD 22-A103	150°C	3x77	A0/R1 1000h	1000h	0/77	0/77	0/77
UHAST after Preconditioning							
JESD 22-A118	130°C, 85% RH	3x77	A0/R1 ⁽¹⁾ 96h	96h	0/77	0/77	0/77

Table 7. LQFP64 Package oriented test results

Short description					Results
Test/Method	Conditions	Sample Size	Criteria	Read out /Duration	Lot 11 LQFP64
Preconditioning: moisture sensitivity level 3					
J-STD-020D JESD22-A113	Peak temperature at 260 °C, 3 IR-reflows	1x308	A0/R1 ⁽¹⁾	N.A	0/308
Temperature Humidity Bias after Preconditioning					
JESD 22-A101	85°C,85% RH VDD=3v6	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77
Autoclave after Preconditioning					
JESD 22-A102	Ta=121°C P=2.08atm	1x77	A0/R1 ⁽¹⁾ 96h	96h	0/77
Thermal Cycling after Preconditioning					
JESD 22-A104	Ta= 50°C/+150°C	1x77	A0/R1 ⁽¹⁾ 1000TC	1000 TC	0/77
High Temperature Storage Life after Preconditioning					
JESD 22-A103	150°C	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77

Table 8. LQFP48 Package oriented test results

Short description					Results
Test/Method	Conditions	Sample Size	Criteria	Read out /Duration	Lot 12 LQFP48
Preconditioning: moisture sensitivity level 3					
J-STD-020D JESD22-A113	Peak temperature at 260 °C, 3 IR-reflows	1x308	A0/R1 ⁽¹⁾	N.A	0/308
Temperature Humidity Bias after Preconditioning					
JESD 22-A101	85°C,85% RH VDD=3v6	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77
Autoclave after Preconditioning					
JESD 22-A102	Ta=121°C P=2.08atm	1x77	A0/R1 ⁽¹⁾ 96h	96h	0/77
Thermal Cycling after Preconditioning					
JESD 22-A104	Ta= 50°C/+150°C	1x77	A0/R1 ⁽¹⁾ 1000TC	1000 TC	0/77
High Temperature Storage Life after Preconditioning					
JESD 22-A103	150°C	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77

			1000h		
--	--	--	-------	--	--

Table 9. UFQFPN48 Package oriented test results

Short description					Results
Test/Method	Conditions	Sample Size	Criteria	Read out /Duration	Lot 13 UQFPN48
Preconditioning: moisture sensitivity level 3					
J-STD-020D JESD22-A113	Peak temperature at 260 °C, 3 IR-reflows	1x308	A0/R1 ⁽¹⁾	N.A	0/308
Temperature Humidity Bias after Preconditioning					
JESD 22-A101	85°C,85% RH VDD=3v6	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77
Autoclave after Preconditioning					
JESD 22-A102	Ta=121°C P=2.08atm	1x77	A0/R1 ⁽¹⁾ 96h	96h	0/77
Thermal Cycling after Preconditioning					
JESD 22-A104	Ta= 50°C/+150°C	1x77	A0/R1 ⁽¹⁾ 1000TC	1000 TC	0/77
High Temperature Storage Life after Preconditioning					
JESD 22-A103	150°C	1x77	A0/R1 ⁽¹⁾ 1000h	1000h	0/77

4 APPLICABLE AND REFERENCE DOCUMENTS

- ADCS 0061692 : RELIABILITY TESTS AND CRITERIA FOR QUALIFICATIONS
- • SOP 2.6.11: Program management for product qualification
- SOP 2.6.19: Process maturity level
- 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

- JESD22-A114: electrostatic discharge (ESD) sensitivity testing human body model (HBM)
- ANSI-ESD STM5.3.1: Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
- JESD78: IC Latch-up test

- JESD22-A108: Temperature, bias, and operating life
- JESD22-A103: High temperature storage life
- JESD22-A117: Endurance and Data retention

- J-STD-020D: Moisture/reflow sensitivity classification for nonhermetic solid state surface mounts devices
- JESD22-A113: Preconditioning of nonhermetic surface mount devices prior to reliability testing
- JESD22-A101: Steady state temperature humidity bias life test
- JESD22-A118: Accelerated moisture resistance - unbiased hast
- JESD22-A104: Temperature cycling

5 GLOSSARY

EDR	NVM endurance, data retention and operational life
HTOL	High temperature operating life
HTB	High temperature bake
ESD HBM	Electrostatic discharge (human body model)
ESD CDM	Electrostatic discharge (charge device model)
LU	Latch-up
ELFR	Early Life Failure Rate
UHASt	Unbiased Highly Accelerated Temperature and Humidity Stress Test
PC	Preconditioning
TC	Thermal Cycling
THB	Temperature humidity bias

6 REVISION HISTORY

Date	Revision	Changes
7-December-2012	1	Initial release
11-March-2014	2	Updated with Cut 1.3 die 427XXXX
14-April-2014	3	Typo error on temperature cycling
15-April-2015	4	Add 427XXXV results



Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2015 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com