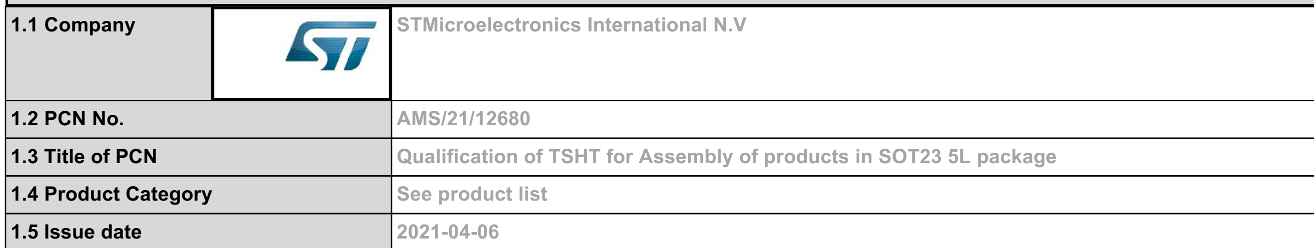
PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data		
1.1 Company		STMicroelectronics International N.V
1.2 PCN No.		AMS/21/12680
1.3 Title of PCN		Qualification of TSHT for Assembly of products in SOT23 5L package
1.4 Product Category		See product list
1.5 Issue date		2021-04-06

2. PCN Team	
2.1 Contact supplier	
2.1.1 Name	HARTMANN DORIS
2.1.2 Phone	+49 89460062186
2.1.3 Email	doris.hartmann@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Marcello SAN BIAGIO
2.1.2 Marketing Manager	Salvatore DI VINCENZO
2.1.3 Quality Manager	Jean-Marc BUGNARD,Giuseppe LISI

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Transfer	Line transfer for a full process or process brick (process step, control plan, recipes) from one site to another site: Assembly site (SOP 2617)	Assembly plant : TSHT

4. Description of change		
	Old	New
4.1 Description	Assembly plant : - Carsem	Assembly plant : - Carsem - TSHT
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No impact	

5. Reason / motivation for change	
5.1 Motivation	The qualification of TSHT for SOT23 5L package will allow us to rationalize our production tool and provide better delivery service
5.2 Customer Benefit	SERVICE IMPROVEMENT

6. Marking of parts / traceability of change	
6.1 Description	New finished good codes

7. Timing / schedule	
7.1 Date of qualification results	2021-03-11
7.2 Intended start of delivery	2021-06-30
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	12680 Qual report.zip		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2021-04-06

9. Attachments (additional documentations)
12680 Public product.pdf 12680 Qual report.zip

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
	LMV321RILT	
STM6822SWY6F	STM6822SWY6F	
TS321ILT	TS321ILT	
TS391ILT	TS391ILT	
TS951ILT	TS951ILT	

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Public Products List

Publict 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 : Qualification of TSHT for Assembly of products in SOT23 5L package
PCN Reference : AMS/21/12680

Subject : Public Products List

Dear Customer,

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

TS431AILT	TS431BILT	STM6717SVWY6F
STM6718SYWY6F	STM6825SWY6F	STM6717SFWY6F
STM6823MWY6F	STM6823LWY6F	TS9511ILT
TS391ILT	STM6717TGWY6F	TS431ILT
STM6823TJWY6F	STM6322TWY6F	STM6322RWY6F
STM6718SVWY6F	TLVH431LIL5T	STM6822MWY6F
STM6321TWY6F	STM6825RWY6F	STM6821RWY6F
STM6717SYWY6F	TS391RILT	TS321ILT
STM6322MWY6F	STM6821MWY6F	STM6718TWWY6F
STM6321LWY6F	STM6822RWY6F	STM6322SWY6F
TS951ILT	LMV321RILT	STM6821SWY6F
STM6824RWY6F	TS321AILT	TLVH431BIL5T
STM6717TWWY6F	STM6825LWY6F	STM6822ZWY6F
STM6821LWY6F	STM6717TZWY6F	STM6717SDWY6F
STM6822YWY6F	TLVH431AIL5T	STM6824LWY6F
STM6321MAWY6F	STWD100NWWY3F	STM6822TWY6F
STM6824TWY6F	STM6322LWY6F	STM6718TZWY6F
STM6718TGWY6F	STM6825TWY6F	STM6822LWY6F
STM6824SWY6F	TS391AILT	STM6717SJWY6F
STM6825MWY6F	STWD100NYWY3F	STWD100NXWY3F
STM6718SFWY6F	STM6822SWY6F	STM6717TGGWY6F
STM6824MWY6F	STM6823SWY6F	STM6823TWY6F
STM6823RWY6F	STM6321MWY6F	STM6321RWY6F
STM6821TWY6F	STM6321SWY6F	

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REL.6088- 1469 -2021

Reliability Evaluation Report

SOT 23 5 Lead assembled in SC-Tianshui Huatian-China (TSHT) TS431AILT (S431) TLVH431AIL5T (V431)

General Information	
Product Lines	S43101 V43101
Product Description	VOLTAGE REFERENCES
P/N	*TS431AILT* *TLVH431AIL5T*
Product Group	*AMS (Analog MEMS & Sensor Group)*
Product division	*General Purpose Analog & RF Division POWER MANAGEMENT*
Package	SOT 23 5 Lead
Silicon Process technology	*BICMOS 2* *BCD 3 - 3S*

Locations	
Wafer fab	*Singapore SG6*
Assembly plant	*SC-Tianshui Huatian-China (TSHT)*
Reliability	*PASS*

Version	Date	Pages	Created by	Approved by	Comment
1.0	March 2021	7	Antonio Russo	Giuseppe Lisi	Intermediate Report

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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

2 RELIABILITY EVALUATION OVERVIEW

2.1 OBJECTIVES

In order to qualify SOT 23 5 Lead assembled in SC-Tianshui Huatian-China (TSHT), we have requested three different assy lots of S431 and three different assy lots of V431 as requested by JEDEC 47 for this type of change.

2.1 CONCLUSION

Qualification Plan requirements will be fulfilled without exception. We have completed all the GATE reliability trials on 3 assy lots of S431 and 3 assy lots of V431 that have shown that the device behaves correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the ruggedness of the products and safe operation, which is consequently expected during their lifetime. More details are available below in test and results summary.

3 CHANGE DESCRIPTION

Qualification of SOT 23 5 Lead assembled in SC-Tianshui Huatian-China (TSHT).

	TS431AILT	***TLVH431AIL5T***
Wafer/Die fab. Information		
Wafer fab manufacturing location	SINGAPORE AngMoKio	
Technology	BICMOS 2	BCD 3 - 3S
Die finishing back side	RAW SILICON - BACK GRINDING	RAW SILICON
Die size	900 x1350 um	710 x 990 um
Passivation type	P-VAPOX(SiO2) / NITRIDE (SiN)	USG-PSG-SiON-PIX
Assembly information		
Assembly site	**SC-Tianshui Huatian-China (TSHT)**	
Package description	SOT 23 5 Lead	
Mold Compound	Epoxy	
Frame	Pure Tin Plating Sn 100%	
Bond Wire	1.0 mil Cu	

4 TESTS RESULTS SUMMARY

4.1 Test vehicle

Lot #	Commercial product	Rawline	Package	Product Line
1	TS431AILT	RRWY*S431BR6	SOT 23 5 Lead	S43101
2				
3				
4	TLVH431AIL5T	RRWY*V431AD6		*V43101*
5				
6				

4.2 Test plan and results summary for S431

Test	PC	Std ref.	Conditions	ss	Steps	SS Lot 1	SS Lot 2	SS Lot 3	Note
Die Oriented Reliability trials									
HTSL	N	JESD22 A-103	Ta = 150°C	231	168 H	0/77	0/77	0/77	
					500 H	0/77	0/77	0/77	
					1000 H	Running	Running	Running	
Package Oriented Reliability trials									
PC	-	JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Oven Reflow @ Tpeak=260°C 3 times	462	Final	Pass	Pass	Pass	
UHAST	Y	JESD22-A118	130 °C / 85% RH	231	96 H	0/77	0/77	0/77	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	231	100cy	0/77	0/77	0/77	
					500cy	0/77	0/77	0/77	
					1000 cy	Running	Running	Running	
Package Assembly Integrity trials									
WBP	N	Mil-STD-883, Method 2011 AEC-Q003	30 wires, characterization	15	Final	Pass CPK>1.67	Pass CPK>1.7	Pass CPK>1.67	
WBS	N	AEC-Q100-001 AEC-Q003	30 balls, characterization	15	Final	Pass CPK>1.67	Pass CPK>1.7	Pass CPK>1.67	
Solderability	N	JSTD-002D	>95% lead coverage	5	Final	Pass	Pass	Pass	
Physical Dimension	N	JESD22 B100	-	30	Final	Pass CPK>1.67	Pass CPK>1.7	Pass CPK>1.67	

4.3 Test plan and results summary for V431

Test	PC	Std ref.	Conditions	ss	Steps	SS Lot 1	SS Lot 2	SS Lot 3	Note
Die Oriented Reliability trials									
HTSL	N	JESD22 A-103	Ta = 150°C	231	168 H	0/77	0/77	0/77	
					500 H	0/77	0/77	0/77	
					1000 H	0/77	0/77	0/77	
Package Oriented Reliability trials									
PC	-	JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Oven Reflow @ Tpeak=260°C 3 times	462	Final	Pass	Pass	Pass	
UHAST	Y	JESD22-A118	130 °C / 85% RH	231	96 H	0/77	0/77	0/77	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	231	100cy	0/77	0/77	0/77	
					500cy	0/77	0/77	0/77	
					1000 cy	0/77	0/77	0/77	
Package Assembly Integrity trials									
WBP	N	Mil-STD-883, Method 2011 AEC-Q003	30 wires, characterization	15	Final	Pass CPK>1.67	Pass CPK>1.7	Pass CPK>1.67	
WBS	N	AEC-Q100-001 AEC-Q003	30 balls, characterization	15	Final	Pass CPK>1.67	Pass CPK>1.7	Pass CPK>1.67	
Solderability	N	JSTD-002D	>95% lead coverage	5	Final	Pass	Pass	Pass	
Physical Dimension	N	JESD22 B100	-	30	Final	Pass CPK>1.67	Pass CPK>1.7	Pass CPK>1.67	

5 ANNEXES

5.1 Pin connections

Please refer to product datasheet

5.2 Package Mechanical data

Please refer to product datasheet

6 TEST DESCRIPTION

Test name	Description	Purpose
Die Oriented		
HTSL High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
Package Oriented		
PC Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "popcorn" effect and delamination.
UHAST	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
TC Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
Other		
WBS Wire Bond Shear	A process in which an instrument uses a chisel shaped tool to shear or push a ball or wedge/stitch bond off the bonding surface. The force required to cause this separation is recorded and is referred to as the bond shear strength. The bond shear strength of a ball bond, when correlated to the diameter of the ball bond, is an indicator of the quality of the metallurgical bond between the ball bond and the die bonding surface metallization.	This test establishes a procedure for determining the strength of the interface between a ball bond and a package bonding surface. This strength measurement is extremely important in determining the integrity of the metallurgical bond which has been formed.
WBP Wire Bond Pull	The apparatus for this test shall consist of suitable equipment for applying the specified stress to lead wire or terminal as required in the specified test condition. A calibrated measurement and indication of the applied stress in grams force (gf) shall be provided by equipment capable of measuring stresses.	The purpose of this test is to measure bond strengths, evaluate bond strength distributions, or determine compliance with specified bond strength requirements of the applicable acquisition document.

AMS (Analog, MEMS & Sensor Group)

General Purpose Analog & RF Division

Conditioning & interfaces

Quality and Reliability

Reliability Evaluation Report

SOT 23 5 Lead assembled in SC-Tianshui Huatian-China (TSHT) TS9511ILT (0951)

General Information	
Product Lines	095171
Product Description	*High performance OPAMPS*
P/N	*TS9511ILT*
Product Group	*AMS (Analog MEMS & Sensor Group)*
Product division	*CONDITIONING & INTERFACES*
Package	WY SOT23 5L
Silicon Process technology	*HF2CMOS*

Locations	
Wafer fab	*AM6F*
Assembly plant	*TSHT*
Reliability Lab	*TSHT Reliability lab* *Grenoble Reliability lab*

Version	Date	Pages	Created by	Approved by	Comment
1.0	March 2021	6	Claudine Larato	Jean-Marc Bugnard	Intermediate Report

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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
AEC-Q100	Failure mechanism based stress test qualification for IC

2 RELIABILITY EVALUATION OVERVIEW

2.1 OBJECTIVES

This report contains the reliability evaluation of 095171 in SOT 23 5L assembled in TSHT. Change followed by pcp : PCP: AMG_AMKB_077587

2.1 CONCLUSION

All reliability tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing. Based on the overall results obtained, 0951 product assembled in SO 23 5L in TSHT, has positively passed reliability evaluation.

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3 CHANGE DESCRIPTION

HF2CMOS qualification in SO 23 5L assembled in TSHT.

	B6AA61
Wafer/Die fab. Information	
Wafer fab manufacturing location	AM6F
Technology	HF2CMOS
Die finishing back side	RAW SILICON
Die size	1350 x 880 um
Assembly information	
Assembly site	**TSHT**
Package description	WY SO23 5L
Mold Compound	CEL-1702HF9TS-G1
Dia attach	8200T
Frame	FRAME SO23 5L 46X64-16R ASM
Bond Wire	1 mil PdCu MKE

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4 TESTS RESULTS SUMMARY

4.1 Test vehicle

Lot #	Commercial product	Rawline	Package	Product Line
1	TS9511ILT	BSWY*0951AR6	SO23	095171

4.2 Test plan and results summary

Test	PC	Std ref.	Conditions	ss	Steps	SS Lot 1	Note
Die Oriented Reliability trials							
HTSL	N	JESD22 A-103	Ta = 150°C	80	168 H	0/80	
					500 H	0/80	
					1000 H	0/80	
Package Oriented Reliability trials							
PC	-	JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Oven Reflow @ Tpeak=260°C 3 times	160	Final	Pass	No delam Pre and Post PC
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	80	96 H	0/80	
TC	Y	JESD22 A-104	Ta = -55°C to 150°C	80	500cy	0/80	No delam after 100 and 500 TC
					1000 cy		
THB	Y	JESD22 A-101	85°C/85%RH bias	80	500 H		
					1000 H		
Package Assembly Integrity trials							
WBP	-	M2011	30 wires, characterization	10	Final	Pass	
WBS	-	JESD22-B116	30 balls, characterization	10	Final	Pass	
Solderability	-	JESD22-B102	-Dry 150℃/16hrs Sn/Pb bath,220ºc -Dry 150℃/16hrs, Sn/Ag/Cu bath,245ºc -Dream 93%/8hrs, Sn/Pb bath,220ºc -Dream 93%/8hrs, Sn/Ag/Cu bath,245ºc	5 each condition	Final	Pass	>95% lead coverage

5 ANNEXES

5.1 Pin connections

Please refer to product datasheet

5.2 Package Mechanical data

Please refer to product datasheet

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6 TEST DESCRIPTION

Test name	Description	Purpose
Die Oriented		
HTSL High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
Package Oriented		
PC Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.
AC Auto Clave (Pressure Pot)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
TC Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
THB Temperature Humidity Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.
Other		
WBS Wire Bond Shear	A process in which an instrument uses a chisel shaped tool to shear or push a ball or wedge/stitch bond off the bonding surface. The force required to cause this separation is recorded and is referred to as the bond shear strength. The bond shear strength of a ball bond, when correlated to the diameter of the ball bond, is an indicator of the quality of the metallurgical bond between the ball bond and the die bonding surface metallization.	This test establishes a procedure for determining the strength of the interface between a ball bond and a package bonding surface. This strength measurement is extremely important in determining the integrity of the metallurgical bond which has been formed.
WBP Wire Bond Pull	The apparatus for this test shall consist of suitable equipment for applying the specified stress to lead wire or terminal as required in the specified test condition. A calibrated measurement and indication of the applied stress in grams force (gf) shall be provided by equipment capable of measuring stresses.	The purpose of this test is to measure bond strengths, evaluate bond strength distributions, or determine compliance with specified bond strength requirements of the applicable acquisition document.

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