

PCN Product/Process Change Notification

Additional Assembly and Test Location in China for Protection devices housed in SMA Flat package

Notification number:	IPD- DIS/15/9245	Issue Date	13/05/2015
Issued by	Aline AUGIS		
Product series affected by the change	This change impact SMA6F5.0A-TR Specific devices not expressly listed in the above list are included in this change		
Type of change	Assembly site multisourcing		

Description of the change

In order to better meet the market demand, we have decided to **expand our manufacturing capacities** for all our **Protection devices** housed in **SMA Flat package** with one **additional assembly and test line** in a new **China subcontractor**.

Multi-sourcing	Package	Current	New
Assembly & test location	SMA FLAT	CHINA (subco 1) – ECOPACK®2	CHINA (subco 1) – ECOPACK®2 CHINA (subco 2) – ECOPACK®2

Specific devices not expressly listed in the above table are included in this change.

Reason for change

This multi-sourcing will increase our **manufacturing capacity** for a better service on the considered **Protection devices** housed in the **SMA FLAT** package.

Former versus changed product:

The changed products do not present modified electrical, dimensional or thermal parameters, leaving unchanged the current information published in the product datasheet

The Moisture Sensitivity Level of the part (according to the IPC/JEDEC JSTD-020D standard) remains unchanged.

The footprint recommended by ST remains the same.

There is no change in the packing modes and the standard delivery quantities either.

The products remain in full compliance with the ST ECOPACK®2 grade (“halogen-free”).

(1) IPD: Industrial & Power Discretes - ASD: Application Specific Device – IPAD™: Integrated Passive and Active Devices

Disposition of former products

Deliveries of former product will continue.

Marking and traceability

Traceability for the implemented change will be ensured by the **marking**, an **internal codification** and by the **Q.A. number**.

Package	Marking
CHINA (subco 1)	GP
CHINA (subco 2)	G3

Qualification complete date

24-04-2015

Forecasted sample availability

Samples are available upon request.

Change implementation schedule

Sales types	Estimated production start	Estimated first shipments
All	W26-2015	W33-2015

Comments:

Customer's feedback

Please contact your local ST sales representative or quality contact for requests concerning this change notification.
 Absence of acknowledgement of this PCN within 30 days of receipt will constitute acceptance of the change
 Absence of additional response within 90 days of receipt of this PCN will constitute acceptance of the change

Qualification program and results

QRP15025 Attached

External Reliability Report
***Additional Assembly and Test Location in
 China for Protection devices housed in
 SMA Flat packages***

General Information	
Product Line	Protection (BU80)
Product Description	SMA6F5.0A-TR
Product Group	IPD
Product division	ASD & IPAD
Package	SMA flat
Maturity level step	Qualified

Locations	
Wafer fab	STM Tours (France)
Assembly plant	Subcontractor China
Reliability Lab	STM Tours (France)

DISTRIBUTION LIST

NAME	FUNCTION	NAME	FUNCTION
Claude Pouet	PE&D Engineer	Eric Fourtou	Product Engineer
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Nicolas Porcher	PE&D Technician	Stephane Forster	Reliability Engineer

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	23/04/2015	7	Julien MICHELON	Jean-Paul REBRASSE	

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.
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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
SOP 2614	Reliability requirements for product qualification
0061692	Reliability tests and criteria for qualifications
FMEA	8315399
RER	1206004

2 GLOSSARY

DUT	Device Under Test
PCB	Printed Circuit Board
SS	Sample Size
HTRB	High Temperature Reverse Bias
TC	Temperature Cycling
PCT	Pressure Pot 2 bars
THB	Temperature Humidity Bias
RS	Repetitive Surges
SD	Solderability
u-HAST	Unbiased High Accelerated Stress Test

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify SMA6F5.0A-TR in additional subcontractor location.

3.2 Conclusion

Qualification Plan requirements have been fulfilled without exception. Reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the robustness of the products and safe operation, which is consequently expected during their lifetime.

4 DESCRIPTION OF THE CHANGE

In order to better meet the market demand, we have decided to expand our manufacturing capacities for all our Protection devices housed in SMA Flat package with one additional assembly and test line in a new China subcontractor.

Multi-sourcing	Package	Current	New
Assembly & test location	SMA FLAT	CHINA (subco 1) – ECOPACK®2	CHINA (subco 1) – ECOPACK®2 CHINA (subco 2) – ECOPACK®2

5 TESTS RESULTS SUMMARY

5.1 Test vehicles

Lot #	Commercial product	Die manufacturing plant	Assembly plant	Package	Comments
Lot 1	SMA6F5.0A-TR	STMicroelectronics Tours (France)	Subcon China	SMA-FLAT	Qualification lot at subco 2
Lot 2	Generic TVS part (VRM=13V)				
Lot 3	Generic TVS part (VRM=13V)				
Lot 4	SMA6F5.0A-TR				
Lot 5	SMA6F5.0A-TR				

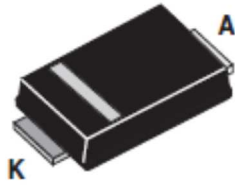
5.2 Test plan and results summary

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS				
						Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
Die Oriented Tests										
HTRB	N	JESD22 A-108	Temperature=175°C Tension=5V	234	168h	0/80	-	-	0/77	0/77
					504h	0/80	-	-	0/77	0/77
					1000h	0/80	-	-	0/77	0/77
Repetitive Surges	Y	ADCS0060282	IPP(10/1000µs)=29A/µs	40	50 surges	-	0/20	0/20	-	-
Repetitive Surges	Y	ADCS0060282	IPP(10/1000µs)=68A/µs	20	50 surges	0/20	-	-	-	-
Package Oriented Tests										
TC	Y	JESD22 A-104	Frequency (cy/h)=2cy/h Temperature (high)=150°C Temperature (low)=-65°C	75	500cy	0/25	0/25	0/25	-	-
THB	Y	JESD22 A-101	Humidity (HR)=85% Temperature=85°C Tension=13V	50	168h	-	0/25	0/25	-	-
					504h	-	0/25	0/25	-	-
					1000h	-	0/25	0/25	-	-
THB	Y	JESD22 A-101	Humidity (HR)=85% Temperature=85°C Tension=5V	25	168h	0/25	-	-	-	-
					504h	0/25	-	-	-	-
					1000h	0/25	-	-	-	-
uHAST	Y	JESD22 A110-B	Humidity (HR)=85% Pressure=2.3bars Temperature=130°C	75	96h	0/25	0/25	0/25	-	-
Solderability	N	JESD22 B-102	Steam Ageing 8h SnAgCu bath 245°C	15	Visual	0/15	-	-	-	-
			Steam Ageing 8h SnPb 220°C	15	Visual	0/15	-	-	-	-
			Dry Ageing 16h SnAgCu 245°C	15	Visual	0/15	-	-	-	-
			Dry Ageing 16h SnPb 220°C	15	Visual	0/15	-	-	-	-
MSL search	N	J-STD-020	Bake 24h + storage 85°C 85% + 3 IR reflows	30	168h	0/30	-	-	-	-

6 ANNEXES

6.1 Device details

6.1.1 Pin connection



6.1.2 Package outline/Mechanical data

- SMAflat

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.25		1.65	0.049		0.065
c	0.15		0.40	0.006		0.016
D	2.25		2.95	0.088		0.116
E	4.80		5.60	0.189		0.220
E1	3.95		4.60	0.156		0.181
L	0.75		1.50	0.030		0.059
L1		0.50			0.019	
L2		0.50			0.019	

6.2 Tests description

Test name	Standard Reference	Description	Purpose
Die Oriented			
HTRB High Temperature Reverse Bias	JESD22 A-108	HTRB : High Temperature Reverse Bias HTFB / HTGB : High Temperature Forward (Gate) Bias The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: - low power dissipation; - max. supply voltage compatible with diffusion process and internal circuitry limitations	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way. To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects.
Package Oriented			
uHAST	JESD22-A110-B	The device is biased under 130°C 85% RH during 96 hours, or equivalent 110°C 85% RH during 264 hours, minimizing its internal power dissipation.	The Highly-Accelerated Temperature and Humidity Stress Test is performed for the purpose of evaluating the reliability of non-hermetic packaged solid-state devices in humid environments. It employs severe conditions of temperature, humidity, and bias which accelerate the penetration of moisture through the external protective material (encapsulant or seal) or along the interface between the external protective material and the metallic conductors which pass through it. The stress usually activates the same failure mechanisms as the "85/85" Steady-State Humidity Life Test (THB).
TC Temperature Cycling	JESD22 A-104	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	JESD22 A-101	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.

Test name	Standard Reference	Description	Purpose
<p>PC Preconditioning</p>	<p>JESD22 A-113</p>	<p>The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.</p>	<p>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.</p>
<p>Solderability</p>	<p>J-STD-002</p>	<p>The purpose of this test method is to provide a referee condition for the evaluation of the solderability of terminations (including leads up to 0.125 inch in diameter) that will be assembled using tin lead eutectic solder.</p>	<p>This evaluation is made on the basis of the ability of these terminations to be wetted and to produce a suitable fillet when coated by tin lead eutectic solder. These procedures will test whether the packaging materials and processes used during the manufacturing operations process produce a component that can be successfully soldered to the next level assembly using tin lead eutectic solder. A preconditioning test is included in this test method, which degrades the termination finish to provide a guard band against marginal finish.</p>
<p>Repetitive surges</p>	<p>ADCS0060282</p>	<p>Devices are submitted to rated Ipp for 50 surges.</p>	<p>This test is intended to verify robustness of device submitted to rated Ipp (as per data sheet) = exploration of reverse characteristic at a calibrated current value followed by the measure of voltage clamping value. Failure mode expected is short circuit of the device due to hot spot creation into silicon bulk at device periphery where the electrical field gradient is the most important. Physical analysis must be done to verify consistency of the failure mode and discriminate from extrinsic causes related to process escapes.</p>



Public Products List

PCN Title : Additional Assembly and Test Location in China for Protection devices housed in SMA Flat package

PCN Reference : IPD/15/9245

PCN Created on : 13-May-2015

Subject : Public Product List

Dear Customer,

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

SMA6F5.0A-TR		
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PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.	IPD/15/9245	
1.3 Title of PCN	Additional Assembly and Test Location in China for Protection devices housed in SMA Flat package	
1.4 Product Category	SMA6F5.0A-TR and specific devices	
1.5 Issue date	2015-05-19	

2. PCN Team

2.1 Contact supplier	
2.1.1 Name	ROBERTSON HEATHER
2.1.2 Phone	+1 8475853058
2.1.3 Email	heather.robertson@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Christian NOPPER
2.1.2 Marketing Manager	Eric PARIS
2.1.3 Quality Manager	Jean-Paul REBRASSE

3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Machines	Additional equipment of same brand and model on same manufacturing site (capacity increase)	Subcontractor in China

4. Description of change

	Old	New
4.1 Description	CHINA (subco 1) – ECOPACK®2	CHINA (subco 1) – ECOPACK®2 CHINA (subco 2) – ECOPACK®2
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	no	

5. Reason / motivation for change

5.1 Motivation	This multi-sourcing will increase our manufacturing capacity for a better service on the considered Protection devices housed in the SMA FLAT package.
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change

6.1 Description	marking, internal codification and QA number
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7. Timing / schedule

7.1 Date of qualification results	2015-05-13
7.2 Intended start of delivery	2015-08-10
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation

8.1 Description			
8.2 Qualification report and qualification results	In progress	Issue Date	

9. Attachments (additional documentations)9245PpPrdtLst.pdf
PCN SMAF.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
	SMA6F5.0A-TR	

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