

PCN Product/Process Change Notification			
Mold compound replacement for TO92			
Notification number:	ADG-DIS/19/xxxx	Issue Date	05/04/2019
Issued by	Aline Augis		
Product series affected by the change	SCR Thyristor X006, X00619 and X02 series in TO92 Triac Z01 and Z00607 series in TO92 ST THYRISTOR ASD in TO92 ACS SERIES in TO92		
Type of change	Back end realization		
Description of the change Mold compound replacement for the Thyristors housed in TO92 package.			
Reason for change Product discontinuance from the current supplier.			
Former versus changed product:	<p>The changed products do not present modified electrical, dimensional or thermal parameters, leaving unchanged the current information published in the product datasheet</p> <p>The footprint recommended by ST remains the same.</p> <p>There is no change in the packing modes and the standard delivery quantities either.</p> <p>The products remain in full compliance with the ST ECOPACK®2 grade ("halogen-free").</p>		
Disposition of former products Delivery of former products will be done until stock depletion.			
Marking and traceability The traceability is ensured by the internal codification and the QA number. No change of marking. A specific letter (N) adding at the end of the finished good name: With previous compound = X00602MA1AA2\E With new compound = X00602MA1AA2\EN			
Qualification complete date	April 2019		

(1) ADG: Automotive and Discrete Group

Forecasted sample availability

Product family	Sub-family	Commercial part Number	Availability date
TRIAC	TO92	ACS108-6SA-TR	Week-18
TRIAC	TO92	ACS108-8SA-TR	Week-20
THYRISTOR	TO92	P0102DA 5AL3	Week-20
THYRISTOR	TO92	P0130AA 2AL3	Week-20
THYRISTOR	TO92	TS110-7A1	Week-20
THYRISTOR	TO92	TS110-8SA1	Week-18
THYRISTOR	TO92	X00602MA 5AL2	Week-18
THYRISTOR	TO92	X00619MA5AL2	Week-18
THYRISTOR	TO92	X0202MA 2BL2	Week-20
THYRISTOR	TO92	X0205MA 2BL2	Week-20
TRIAC	TO92	Z00607MA 1BA2	Week-18
TRIAC	TO92	Z0103MA 2AL2	Week-20
TRIAC	TO92	Z0103NA 2AL2	Week-20
TRIAC	TO92	Z0107MA 2AL2	Week-20
TRIAC	TO92	Z0107NA 2AL2	Week-20

Other commercial part numbers can be made available on demand, the typical lead time for availability is five weeks after order entry.

Change implementation schedule

Sales types	Estimated production start	Estimated first shipments
All CP	Week 27-2019	Week 29-2019

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

QRP19032 Attached

External Reliability Evaluation Report

New Resin Qualification on TO-92 package

General Information		Locations		
Product Lines	<i>BU 58</i>	Wafer fab	<i>STMicroelectronics Tours (FRANCE)</i>	
Products Description	<i>TS110x</i>	Assembly plant	<i>Subcontractor 994X (CHINA)</i>	
	<i>XL0840x</i>		Reliability Lab	<i>STMicroelectronics Tours (FRANCE)</i>
	<i>ACS10x</i>	Reliability assessment		<i>Pass</i>
	<i>P01x</i>			
	<i>X0x</i>			
<i>Z0x</i>				
Product Group	<i>ADG</i>			
Product division	<i>Discrete & Filter Division</i>			
Package	<i>TO-92</i>			
Maturity Step Level	<i>Qualified</i>			

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
Rev. 1	March 26 th ; 2019	11	Erika LAURET	Julien MICHELON	First issue

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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TABLE OF CONTENTS

1	APPLICABLE AND REFERENCE DOCUMENTS	3
2	GLOSSARY	3
3	RELIABILITY EVALUATION OVERVIEW.....	4
3.1	OBJECTIVES	4
3.2	CONCLUSION	4
4	CHANGE DESCRIPTION.....	5
5	TESTS RESULTS SUMMARY	5
5.1	TEST VEHICLES	5
5.2	TEST PLAN AND RESULTS SUMMARY	6
6	ANNEXES.....	7
6.1	DEVICE DETAILS.....	7
6.2	TESTS DESCRIPTION	8
6.3	LIST OF PRODUCT INVOLVED IN THIS QUALIFICATION.....	9

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD 22	Reliability test methods for packaged devices
JESD 47	Stress-Test-Driven Qualification of Integrated Circuits
JESD 94	Application specific qualification using knowledge based test methodology
MIL-STD-750C	Test method for semiconductor devices

2 GLOSSARY

BOM	Bill Of Materials
DUT	Device Under Test
HTRB	High Temperature Reverse Bias
TC	Temperature Cycling
THB	Temperature Humidity Bias
RSH	Resistance to Solder Heat
UHAST	Unbiased Highly Accelerated Stress Test
P/N	Part Number
RH	Relative Humidity
SS	Sample Size

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

Qualification of new resin assembled in TO-92 package.

3.2 Conclusion

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

4 CHANGE DESCRIPTION

Qualification of new supplier of Halogen-Free Molding Compound for TO-92 package at subcontractor in China in replacement of current resin.

5 TESTS RESULTS SUMMARY

5.1 Test vehicles

Four test vehicles were chosen:

- ACS108-8TK-TR
- Z00607MA 1BA2
- P0102DA 5AL3
- TS110-8SA1

Lot #	Part number	Package	Comment
Lot 1	ACS108-8TK-TR	TO-92	Qualification data
Lot 2	Z00607MA 1BA2	TO-92	Qualification data
Lot 3	P0102DA 5AL3	TO-92	Qualification data
Lot 4	TS110-8SA1	TO-92	Qualification data

5.2 Test plan and results summary

Test	Std ref.	Conditions	SS	Step	Failure/SS			
					Lot 1	Lot 2	Lot 3	Lot 4
Die Oriented Tests								
HTRB	JESD22 A-108 MIL-STD-750C	Temperature=125°C Tension= VAC 600V	77	1000h		0/77		
HTRB	JESD22 A-108 MIL-STD-750C	Temperature=125°C Tension= VAC 800V	154	1000h	0/77			0/77
Package Oriented Tests								
TC	JESD22 A-104	Frequency (cy/h)=2cy/h Temperature (high)=150°C Temperature (low)=-65°C	308	500cy	0/77	0/77	0/77	0/77
RSH	ST 0060102 JESD22 B-106-A	Temperature=260°C Time (on)=10s	30	MESURE AFTER DIP			0/30	
THB	JESD22 A-101	Humidity (HR)=85% Temperature=85°C Tension=100V	74	1000h	0/25	0/25		0/24*
UHASt	JESD22 A-118	Humidity (HR)=85% Pressure=2.3bar Temperature=130°C	231	96h	0/77	0/77		0/77

* Note: quantity reduced due to scrap unit

6 ANNEXES

6.1 Device details

6.1.1 Pin connection

Refer to products datasheets.

6.1.2 Package outline/Mechanical data

Refer to products datasheets

6.2 Tests Description

Test name	Standard Reference	Description	Purpose
Die Oriented			
HTRB High Temperature Reverse Bias	JESD22 A-108 MIL-STD-750C	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			
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.
RSH Resistance to solder heat	ST 0060102 JESD22 B-106-A	Device is submitted to a dipping in a solder bath at 260°C with a dwell time of 10s. Only for through hole mounted devices.	This test is used to determine whether solid state devices can withstand the effects of the temperature to which they will be subjected during soldering of their leads. The heat is conducted through the leads into the device package from solder heat at the reverse side of the board. This procedure does not simulate wave soldering or reflow heat exposure on the same side of the board as the package body.
UHAST Unbiased Highly Accelerated Stress Test	JESD22 A-118	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.

6.3 List of product involved in this qualification

X00602MA 1AA2	P0102DA 5AL3
X00602MA 2AL2	P0109DA 5AL3
X00602MA 5AL2	P0111DA 1AA3
X00619MA1AA2	P0111DA 5AL3
X00619MA2AL2	P0111MA 1AA3
X00619MA5AL2	P0111MA 1AA3
X0202DA 1BA2	P0111MA 1AA3
X0202MA 1BA2	P0115DA 5AL3
X0202MA 2BL2	P0115DA 5AL3
X0202NA 1BA2	P0118DA 1AA3
X0202NA2BL2	P0118DA 1AA3
X0203MA 1BA2	P0118MA 2AL3
X0203NA 1BA2	P0118MA 5AL3
X0205MA 1BA2	P0124CA 5AL3
X0205MA 2BL2	P0130AA 1EA3
X0205NA 1BA2	P0130AA 2AL3
X0225MA 1DA2	ACS102-6TA-TR
X0227MA 5DL2	FLC21-135A
Z00607MA 1BA2	XL0840
Z00607MA 2BL2	XL0840-AP
Z00607MA 5BL2	XL0840-TR
Z0103MA 1AA2	ACS108-6SA
Z0103MA 2AL2	ACS108-6SA-AP
Z0103MA 5AL2	ACS108-6SA-TR
Z0103NA 1AA2	ACS108-8SA
Z0103NA 2AL2	ACS108-8SA-AP
Z0107DA 2AL2	ACS108-8SA-TR
Z0107MA 1AA2	TS110-7A1
Z0107MA 2AL2	TS110-7A1-AP
Z0107MA 5AL2	TS110-8A1
Z0107NA 1AA2	TS110-8A1-AP
Z0107NA 2AL2	TS110-8A2
Z0107NA 5AL2	TS110-8A2-AP
Z0109MA 1AA2	TS110-8SA1
Z0109MA 2AL2	TS110-8SA1-AP
Z0109MA 5AL2	TS110-8SA2
Z0109NA 2AL2	TS110-8SA2-AP
Z0110MA 1AA2	
Z0127MA 2EL2	
P0102DA 1AA3	
P0102DA 2AL3	