


PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.	ADG/23/14429	
1.3 Title of PCN	TO-92 New Molding Compound ATX Weihai (China)	
1.4 Product Category	HV MOSFET PLANAR POWER BIPOLAR	
1.5 Issue date	2023-11-22	

2. PCN Team

2.1 Contact supplier	
2.1.1 Name	Robert Goodman
2.1.2 Phone	+1 6024856271
2.1.3 Email	robert.goodman@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Maurizio GIUDICE,Angelo RAO
2.1.2 Marketing Manager	Paolo PETRALI,Natale Sandro D'ANGELO
2.1.3 Quality Manager	Vincenzo MILITANO

3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	New direct material part number (same supplier, different supplier or new supplier), Mold compound	ATX Weihai (China)

4. Description of change

	Old	New
4.1 Description	TO-92 Package of ATX Weihai (China) is manufactured with Molding Compound EK1850G	TO-92 Package of ATX Weihai (China) will be manufactured with Molding Compound KHG100MT
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	processability	

5. Reason / motivation for change

5.1 Motivation	PRODUCTION IMPROVEMENT
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change

6.1 Description	By internal traceability
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7. Timing / schedule

7.1 Date of qualification results	2023-11-15
7.2 Intended start of delivery	2024-03-17
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation

8.1 Description	14429 Binder1.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-11-22

9. Attachments (additional documentations)

14429 Public product.pdf
14429 14429.pdf
14429 Binder1.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
STQ1NC45R-AP	STQ1NC45R-AP	
	STQ1NK60ZR-AP	
	STQ1NK80ZR-AP	
	STQ2HNC60ZR-AP	
	STX616-AP	

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PCN Title : TO-92 New Molding Compound ATX Weihai (China)

PCN Reference : ADG/23/14429

Subject : Public Products List

Dear Customer,

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

STX616-AP	STQ2HMK60ZR-AP	STSA1805-AP
STQ2LN60K3-AP	STQ1NK80ZR-AP	STX13003-AP
STQ1NK60ZR-AP	STQ1HMK60R-AP	STX93003

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**New Molding Compound KMG100MT evaluation on Power Bipolar
High voltage multi-epitaxial Planar Products
on TO-92 package assembled in ATX Weihai (China)
Industrial domain
Reliability Evaluation Plan**

***Note:** this document is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the electronic device conformance to its specific mission profile for Industrial Application. This document and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics or under the approval of the author (see below).*

Revision history

Rev.	Changes description	Author	Date
1.0	New release	M.Panzarella	November 8 th , 2023

Approved by

Function	Location	Name	Date
Division Reliability Manager	ST Catania (Italy)	V.Giuffrida	November 8 th , 2023

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1. Reliability Evaluation Overview

1.1. Objective and reliability strategy

Aim of this document is to present the Reliability Evaluation Plan to be performed on **STX616-AP** (BV01 as silicon line) chosen as test vehicle to release the new KMG100MT Molding Compound on the products designed in power bipolar high voltage multi-epitaxial planar technology, intended for industrial domain, diffused in ST SG6 Ang Mo Kio (Singapore) 6" Wafer Fab, assembled in ATX Weihai (China) Subcon assembly plant in package TO-92.

The reliability evaluation plan is based on a full reliability stress test matrix according to ST 0061692 specification.

Details of each stress test and relevant conditions are reported in the tables at section 1.2 and 2.

1.2. Test Plan

1.2.1. Test Plan Table

#	TEST NAME	DESCRIPTION / COMMENTS	TEST FLAG
1	TEST	Pre- and Post- Stress Electrical Test	Yes
2	PC	Preconditioning	Not Applicable
3	EV	External Visual	Yes
4	HTRB	High Temperature Reverse Bias	Yes
5	HTGB	High Temperature Gate Bias	Not Applicable
6	TC	Temperature Cycling	Yes
7	AC	Autoclave	Yes
8	THB	Temperature Humidity Bias	Yes
9	IOL	Intermittent Operational Life	Yes
10	ESD	ESD Characterization	Yes

2. Test summary details

2.1. Test Summary table

Test method revision reference is the one active at the date of reliability trial execution.

Test	#	Reference	STM Test Conditions	Lots	S.S.	Total	Comments
TEST	1		User specification or supplier's standard specification	1	385	385	All qualification parts
PC	2	JEDEC/IPC J-STD-020 JESD22-A113	-	-	-	-	
EV	3	JESD22B-1011	All qualification parts submitted for testing	1	385	385	
HTRB	4	MIL-STD-750-1 M1038 Method A	Tj=150°C, Vces=784V, 1000h	1	77	77	
HTGB	5	JESD22 A-108	-	-	-	-	Not Applicable
TC	6	JESD22A-104	Ta=-55°C /+150°C, 1000cy	1	77	77	
AC	7	JESD22 A-102	Ta=121°C, Pa=2atm, RH=100%, 96h	1	77	77	
H3TRB	8	JESD22A-101	Ta=85°C, RH=85% Vds=100V, 1000h	1	77	77	
IOL	9	MIL-STD-750 Method 1037	15Kcy @ Ta=25°C with parts powered to ensure $\Delta T_j \geq 100^\circ\text{C}$ (not to exceed absolute maximum ratings).	1	77	77	
ESD	10	JEDEC JS-001 & JS-002	HBM / CDM	1	3	6	3 unit for each test

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**New Molding Compound KMG100MT evaluation
on Products in Power MOSFET High Voltage (HV)
on TO92 package assembled
in ATX (China)
Industrial domain
Reliability Evaluation Plan**

Note: this report is a summary of the reliability qualification plan that will be performed in good faith by STMicroelectronics to evaluate the electronic devices conformance to its specific mission profile and release them to mass production for Automotive Application. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics or under the approval of the author (see below).

Rev.	Changes description	Author	Date
1.0	First release	A. Settineri	10 th October 2023
2.0	Update to include ESD test		11 th October 2023

Approved by

Function	Location	Name	Date
Division Reliability Manager	ST Catania (Italy)	V. Giuffrida	11 th October 2023

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1. Reliability Evaluation Overview

1.1. Objective and Reliability strategy

Aim of this document is to present the qualification plan to release the New KMG100MT Molding Compound on the Products designed in Power MOSFET HV Supermesh and Supermesh III, Technologies for Standard application domains and assembled in package TO92 in ATX (China) Subcon Assembly Plant.

Starting from the present portfolio the involved products were classified Master and Derivative for Reliability purposes as per below table:

1.1.1. Classification table

Commercial Products	Silicon line	Die size (mm ²)	Back Side Finishing	Front Side Finishing	Wafer Thickness	Technology	Reliability Classification
STQ1Hnk60R-AP	EC6M01	3.3756	Ti-Ni-Ag	SiN (nitride)	280	Supermesh	MASTER requiring reliability evaluation on 1 lot
STQ1NC45R-AP	ECDO01	3.3756	Ti-Ni-Ag	SiN (nitride)	280	Supermesh	Derivative using Family Data coming from the evaluation on Master
STQ1NK60ZR-AP	EZ6P01	2.07	Ti-Ni-Ag	SiN (nitride)	280	Supermesh	Derivative using Family Data coming from the evaluation on Master
STQ1NK80ZR-AP	EZ8Q01	3.7878	Ti-Ni-Ag	SiN (nitride)	280	Supermesh	Derivative using Family Data coming from the evaluation on Master
STQ2Hnk60ZR-AP	EZ6001	4.82	Ti-Ni-Ag	SiN (nitride)	280	Supermesh	MASTER requiring reliability evaluation on 1 lot
STQ2LN60K3-AP	TZ6P01	4.2158	Ti-Ni-Au	SiN (nitride)	280	Supermesh III	MASTER requiring reliability evaluation on 1 lot

Basing on the overall assessed technical features, the products **STQ1Hnk60R-AP**, **STQ2Hnk60ZR-AP** and **STQ2LN60K3-AP** (EC6M01, EZ6001 and TZ6P01 as internal silicon lines) were classified Master as worse case device having maximum die size across all the other products sharing same Wafer Fab, FE process flow, Assembly Plant, Package and Bill of Material (BOM).

The reliability evaluations on master product will cover the other product classified as derivative on which a dedicated comparative Electrical data analysis will be performed.

Reliability Strategy and Test Plan

1.2. Reliability strategy

The reliability evaluations will be done on 1 lot of each Master products in agreement with ST 0061692 specification and are listed in below Test Plan. For details on test conditions, generic data used and specifications references, refer to test results summary in section 2.

1.3. Test Plan

Test Plan Table for MASTER

#	TEST NAME	DESCRIPTION / COMMENTS	TEST FLAG
1	TEST	Pre- and Post- Stress Electrical Test	Yes
2	PC	Preconditioning	No
3	EV	External Visual	Yes
4	HTRB	High Temperature Reverse Bias	Yes
5	HTGB	High Temperature Gate Bias	Yes
	HTGB(n)	High Temperature Gate Bias - negative	Yes
6	HTSL	High Temperature Storage Life	Yes
7	H3TRB	High Humidity High Temp. Reverse Bias	Yes
8	AC	Autoclave	Yes
9	TC	Temperature Cycling	Yes
10	IOL	Intermittent Operational Life	Yes
11	ESD -HBM	Human Body Model ESD	Yes
12	ESD - CDM	Charged Device Model ESD	Yes

2. Test summary details

2.1. Test Summary table

Test method revision reference is the one active at the date of reliability trial execution.

Test	#	Reference	STM Test Conditions	Lots*	S.S.	Total	Comments
TEST	1		User specification or supplier's standard specification	3*	616	1848	All qualification parts
PC	2	JEDEC/IPC J-STD-020 JESD22-A-113	-	-	-	-	Not included in qual plan
EV	3	JESD22 B-101	All qualification parts submitted for testing	3*	616	1848	
HTRB	4	JESD22 A-108	Tj=150°C, Vds=480V, 1000h	3*	77	231	
HTGB	5	JESD22 A-108	HTGB + Tj=150°C Vgs= +30V, 1000h	3*	77	231	
			HTGB - Tj=150°C Vgs= -30V, 1000h	3*	77	231	
HTSL	6	JESD22A103	Ta=150°C 1000h	3*	77	231	
H3TRB	7	JESD22A-101	Ta=85°C, RH=85% Vds =100V, 1000h	3*	77	231	
AC	8	JESD22 A-102	ENV. SEQ. (ES) Environmental Sequence TC: Ta=-55/150°C, 100cy + AC: Ta=121°C, RH100%, Pa=2atm for 96 hours	3*	77	231	
TC	9	JESD22A-104 Appendix 6 J-STD-035	Ta=-55°C /+150°C, 1000cy	3*	77	231	
IOL	10	MIL-STD-750 Method 1037	Ta=25°C with parts powered to insure $\Delta T_j \geq 100^\circ\text{C}$, 15Kcy	3*	77	231	
ESD - CDM	11	ANSI/ESDA/JEDEC C JS-001 and JS-002	Charge Device Model	3*	3	9	
ESD -HBM	12		Human Body Model	3*	3	9	

Note: one for each Master products

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Product/Process Change Notification: ADG/23/14429

TO-92 New Molding compound - ATX Weihai (China) - INDUSTRIAL

Description of the change

Automotive & Discrete Group (ADG)
Power Transistor Sub-Group
High Voltage Division
IGBT & IPM Division

Following the information of the discontinuation of the molding compound by our supplier and with the aim of ensuring business continuity, this document announces the new molding material KHG100MT for all products assembled in TO-92 package, manufactured in ATX Weihai factory (China).

The new KHG100MT molding compound guarantees the same quality and electrical characteristics of the current production.

The test vehicles involved in the qualification are listed in the following tables:

Technology	Package	Test Vehicle	Samples Availability	End of Qualification
HV MOSFET PLANAR HV MOSFET PLANAR HV MOSFET MDMESH	TO-92	STQ1HMK60R-AP STQ2HMK60ZR-AP STQ2LN60K3-AP	12/17/2023	12/1/2023
POWER BIPOLAR		STX616-AP	12/17/2023	12/1/2023

Any other Product related to the above series, even if not expressly included or partially mentioned in the attached table, is affected by this change.

Yours faithfully

Catania, 17 November 2023

Product/Process Change Notification:
 TO-92 New Molding compound - ATX Weihai plant (China) - INDUSTRIAL

ADG/23/14429

Reason	
Service Continuity	

Date of implementation	
March 17, 2024	

Impact of the change	
Form	
Fit	
Function	
Reliability	
Processibility	X

Qualification of the change	
See attached Qualification report plan.	

Marking and traceability:

Unless otherwise stated by customer specific requirement, traceability of products assembled in TO-92 package with new molding compound KHG100MT, manufactured in ATX Weihai plant (China), will be ensured by Q.A. number.

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