PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	ADG/23/14341
1.3 Title of PCN	STI47N60DM6AG Wafer Front-end Capacity Extension (CTM8 Catania) - AUTOMOTIVE
1.4 Product Category	Power MOSFET
1.5 Issue date	2023-10-23

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	Maurizio GIUDICE
2.1.2 Marketing Manager	Antonino PELLEGRINO
2.1.3 Quality Manager	Vincenzo MILITANO

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: Wafer fabrication	AMK-Catania

4. Description of change		
	Old	New
4.1 Description	STI47N60DM6AG is manufactured in the 8” wafer line of (SG8” Singapore)	STI47N60DM6AG will be manufactured in the 8” wafer line of (CTM8 Catania)
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	processability	

5. Reason / motivation for change	
5.1 Motivation	Front-End Capacity Extension
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	By internal traceability and dedicated FG code

7. Timing / schedule	
7.1 Date of qualification results	2023-10-09
7.2 Intended start of delivery	2024-04-11
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	14341 RERPTD23056_1.0_STI47N60DM6AG_PQ6L_CT8_I2PAK_STS_Second source activation.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-10-23

9. Attachments (additional documentations)
14341 Public product.pdf 14341 14341.pdf 14341 RERPTD23056_1.0_STI47N60DM6AG_PQ6L_CT8_I2PAK_STS_Second source activation.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
	STI47N60DM6AG	

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Product/process change notification: ADG/23/14341

STI47N60DM6AG Wafer Front-end Capacity Extension (CTM8 Catania) - AUTOMOTIVE

Description of the change

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

Following the continuous improvement of our service and to increase Front-end Capacity, this document is announcing the new 8” wafer line for MDMesh DM6 Technology of Power MOSFET Transistors in ST’s CTM8 Catania FAB.
STI47N60DM6AG manufactured in 8" wafer size of CT8” Catania FAB, guarantees the same quality and electrical characteristics as per current production.

Yours faithfully

Catania, October 11, 2023

Reason

Front-End Capacity extension

Date of implementation

April 11, 2024

Impact of the change

Form	
Fit	
Function	
Reliability	
Processibility	X

Qualification of the change

See attached Qualification report plan.

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Public Products List

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PCN Title : STI47N60DM6AG Wafer Front-end Capacity Extension (CTM8 Catania) - AUTOMOTIVE

PCN Reference : ADG/23/14341

Subject : Public Products List

Dear Customer,

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

STI47N60DM6AG		

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STI47N60DM6AG- PQ6LA1
Second source activation in ST CT8 Catania (Italy)
8" Wafer fab
Automotive domain
Interim Reliability Evaluation Report

General Information	
Commercial Product	STI47N60DM6AG
Product Line	PQ6LA1
Silicon process Technology	MDmesh™ DM6
Package	I2PAK

Note: *this document is a summary of the reliability trials to be performed in good faith by STMicroelectronics in order to evaluate the electronic device conformance to its specific mission profile for Automotive 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	First release including preliminary data	A. Settinieri	18th July 2023

Approved by

Function	Location	Name	Date
Division Reliability Manager	ST Catania (Italy)	V. Giuffrida	18th July 2023

Table of Contents

1. Reliability Evaluation Overview

1.1. Objective

Aim of this document is to present the reliability evaluation results to release second source activation in ST CT8 Catania (Italy) 8" Wafer Fab in addition to SG8 Ang Mo Kio (Singapore) 8" Wafer Fab for Automotive application domain.
The selected test vehicle for this evaluation is STI47N60DM6AG (PQ6LA1 as ST internal silicon line) designed in MDmesh™ DM6 Technology, assembled in package I2PAK in ST Shenzhen (China) Assembly Plant.

Reliability Strategy and Test Plan

1.2. Reliability strategy

Reliability trials are performed in agreement with **AEC-Q101 Rev. E** and **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

1.2.1. Test Plan

AEC-Q101 Test Plan Table

TEST GROUP	#	Data Type	TEST NAME	DESCRIPTION / COMMENTS	TEST FLAG
A ACCELERATED ENVIRONMENT STRESS TESTS	A1	1	PC	Preconditioning	No
	A2	1	HAST	Highly Accelerated Stress Test	No
	A2 alt	1	H3TRB	High Humidity High Temp. Reverse Bias	Yes
	A3	1	UHAST	Unbiased Highly Accelerated Stress Test	No
	A3 alt	1	AC	Autoclave	Yes
	A4	1	TC	Temperature Cycling	Yes
	A4a	1	TCHT	Temperature Cycling Hot Test	Yes
	A4a alt	1	TCDT	Temperature Cycling Delamination Test	Yes
	A5	1	IOL	Intermittent Operational Life	Yes
	A5alt	1	PTC	Power Temperature Cycling	No
B ACCELERATED LIFETIME SIMULATION TESTS	B1	1	HTRB	High Temperature Reverse Bias	Yes
	B1a	1	ACBV	AC blocking voltage	Not Applicable
	B1b	1	SSOP	Steady State Operational	Not Applicable
	B2	1	HTGB	High Temperature Gate Bias	Yes
C PACKAGE ASSEMBLY INTEGRITY TESTS	C1	1	DPA	Destructive Physical Analysis	Yes
	C2	2	PD	Physical Dimension	Yes
	C3	3	WBP	Wire Bond Pull Strength	Yes
	C4	3	WBS	Wire Bond Shear Strength	Yes
	C5	3	DS	Die Shear	Yes

	C6	2	TS	Terminal Strength	Yes
	C7	2	RTS	Resistance to Solvents	Yes
	C8	2	RSH	Resistance to Solder Heat	Yes
	C9	3	TR	Thermal Resistance	Yes
	C10	2	SD	Solderability	Yes
	C11	3	WG	Whisker Growth Evaluation	Yes
	C12	2	CA	Constant Acceleration	Not Applicable
	C13	2	VVF	Vibration Variable Frequency	Not Applicable
	C14	2	MS	Mechanical Shock	Not Applicable
	C15	2	HER	Hermeticity	Not Applicable
D DIE FABRICATION RELIABILITY TESTS	D1	3	DI	Dielectric Integrity	Similarity (generic data)
E ELECTRICAL VERIFICATION TESTS	E0	1	EV	External Visual	Yes
	E1	1	TEST	Pre- and Post-Stress Electrical Test	Yes
	E2	1	PV	Parametric Verification	Yes
	E3	1	ESDH	ESD HBM Characterization	Yes
	E4	2	ESDC	ESD CDM Characterization	Yes
	E5	3	UIS	Unclamped Inductive Switching	Not Applicable
	E6	3	SC	Short Circuit Characterization	No

1.3. Conclusion

The preliminary reliability results achieved on first 2 lots of the product STI47N60DM6AG (PQ6L as ST internal silicon line) in Power MOSFET MDmesh™ DM6 Technology diffused in ST CT8 Catania (Italy) 8" Wafer Fab and assembled in I2PAK in ST Shenzhen (China) Assembly Plant are positive without observing any abnormal drift or deviation.
Remaining verifications are running and the report will be updated once they will be completed.

2. Product Characteristics

2.1. Generalities

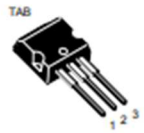
2.1.1. Test vehicle

life.augmented

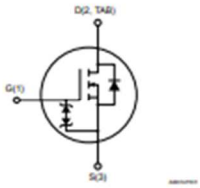
STI47N60DM6AG

Datasheet

Automotive-grade N-channel 600 V, 70 mΩ typ., 36 A MDmesh™ DM6 Power MOSFET in an I²PAK package



I²PAK



STPOWER

Product status link
STI47N60DM6AG

Product summary	
Order code	STI47N60DM6AG
Marking	47N60DM6
Package	I²PAK
Packing	Tube

Features

Order code	V_{DS}	$R_{DS(on)}$ max.	I_D
STI47N60DM6AG	600 V	80 mΩ	36 A

- AEC-Q101 qualified
- Fast-recovery body diode
- Lower $R_{DS(on)}$ per area vs previous generation
- Low gate charge, input capacitance and resistance
- 100% avalanche tested
- Extremely high dv/dt ruggedness
- Zener-protected

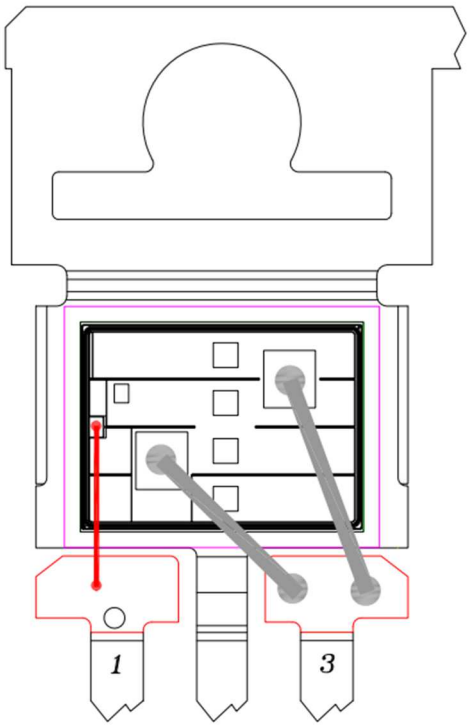
Applications

- Switching applications

Description

This high-voltage N-channel Power MOSFET is part of the MDmesh™ DM6 fast-recovery diode series. Compared with the previous MDmesh fast generation, DM6 combines very low recovery charge (Q_{rr}), recovery time (t_{rr}) and excellent improvement in $R_{DS(on)}$ per area with one of the most effective switching behaviors available in the market for the most demanding high-efficiency bridge topologies and ZVS phase-shift converters.

2.1.2. Pin Connection/ Bonding Diagram



2.2. Traceability

2.2.1. Wafer Fab information

Wafer fab name / location	ST CT8 Catania (Italy)
Wafer diameter (inches)	8”
Silicon process technology	MDmesh™ DM6
Die finishing front side	TEOS +SiN (Nitride)
Die finishing back side	Ti-NiV-Ag
Die size (micron)	6850x5080 um
Metal levels/ materials/ thicknesses	AlCu/Ti/TiN (4.5um)

2.2.2. Assembly Information

Assembly plant name / location	ST Shenzhen (China)
Package description	I2PAK
Lead frame/Substrate	FRAME TO220 Mon Ve5 OpD/M/Q/N SellNi/NiP
Die attach material	PREFORM Pb/Ag/Sn 95.5/2.5/2
Wire bonding material/diameter	Wires Al 5mils (Gate) Al 15mils (Source)
Molding compound material	RESIN LOCTITE HYSOL GR30
Package Moisture Sensitivity Level (JEDEC J-STD020D)	Not available

2.2.3. Reliability Testing Information

Reliability laboratory location	STM Catania (Italy)

3. Test summary details

3.1. Lot Information:

Lot #	Product Line	Diffusion Lot	Tracecode	Note
Lot1	PQ6LA1	V5205JYM	GK308C9U	
Lot2		V5205844	GK313NXP	
Lot3		V522760J	GK3227NW	The activity on this lot is still running

3.2. Test Summary table

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

Test	#	Reference	**AEC-Q101 (Group A)** STM Test Conditions	Lots	S.S.	Total	Results FAIL/SS/Lots	Comments
PC	A1	JEDEC/IPC J-STD-020 JESD22-A-113	-	-	-	-		Only devices for H3TRB, AC, TC and IOL tests
HAST	A2	-	-	-	-	-		NO, covered by H3TRB
H3TRB	A2 alt	JESD22A-101	Ta=85°C, RH=85%, Vds=100V, 1000h	3	77	231	0/77/2 completed on Lot1 and Lot2. 168h passed on Lot 3	
UHAST	A3	-	-	-	-	-		NO, covered by AC

AC	A3 alt	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	0/77/2 completed on Lot1 and Lot2. Running on Lot 3	
TC	A4	JESD22A-104 Appendix 6 J-STD-035	Ta=-55°C /+150°C, 1000cy	3	77	231	0/77/2 completed on Lot1 and Lot2. 200cy passed on Lot 3	
TCHT	A4a		125°C TEST after TC					
TCDT	A4a alt		100% SAM inspection after TC					
IOL	A5	MIL-STD-750 Method 1037	15Kcy / ΔTj ≥ 100°C	3	77	231	0/77/2 completed on Lot1 and Lot2. Running on Lot 3	
PTC	A5alt	-	-	-	-	-		NO, covered by IOL
Test	#	Reference	**AEC-Q101 (Group B)** STM Test Conditions	Lots	S.S.	Total	Results FAIL/SS/Lots	Comments
HTRB	B1	JESD22 A-108	Tj=150°C, Vds=600V 1000h	3	77	231	0/77/2 completed on Lot1 and Lot2. 168h passed on Lot 3	
ACBV	B1a	-	-	-	-	-		Not Applicable Thyristors only
SSOP	B1b	-	-	-	-	-		Not Applicable Voltage Regulator only
HTGB	B2	JESD22 A-108	HTGB + Tj=150°C, Vgs= +25V,1000h	3	77	231	0/77/2 completed on Lot1 and Lot2. 168h passed on Lot 3	
			HTGB - Tj=150°C, Vgs= -25V,1000h	3	77	231	0/77/2 completed on Lot1 and Lot2. 168h passed on Lot 3	
Test	#	Reference	**AEC-Q101 (Group C)** STM Test Conditions	Lots	S.S.	Total	Results FAIL/SS/Lots	Comments
DPA	C1	AECQ101-004 Section 4	-	1	4	4	To be stated	Devices after TC, H3TRB
PD	C2	JEDEC JESD22-B-100	-	1	30	30	Done	From assembly data
WBP	C3	MIL-STD-750-2 Method 2037	-	1	5	5	Done	From assembly data
WBS	C4	AEC Q101-003	-	1	5	5	Done	From assembly data

		JESD22 B116						
DS	C5	Not applicable: only for new package.		1	5	5	Done	Data type 2
TS	C6			1	30	30	Done	
RTS	C7			1	30	30	Done	
RSH	C8			1	30	30	Done	
TR	C9	JESD24-3, 24-4, 24-6	-	1	10	10	Done	From assembly data
SD	C10	JEDEC J-STD-002	-	1	10	10	Done	From assembly data
WG	C11			1	10	10	Done	From assembly data
CA	C12	Not applicable: only for new package. Items C12 through C15 are sequential tests for hermetic packages.		-	-	-		Data type 2
VVF	C13			-	-	-		
MS	C14			-	-	-		
HER	C15			-	-	-		
Test	#	Reference	**AEC-Q101 (Group D)** STM Test Conditions	Lots	S.S.	Total	Results FAIL/SS/Lots	Comments
DI	D1	AEC Q101-004 Section 3	-	1	5	5	Done	From Technology data
Test	#	Reference	**AEC-Q101 (Group E)** STM Test Conditions	Lots	S.S.	Total	Results FAIL/SS/Lots	Comments
EV	E0	JEDEC JESD22-B101	All qualification parts submitted for testing	3	539	1617	0/539/3	
TEST	E1	User specification or supplier's standard specification	All qualification parts	3	539	1617	0/539/3	
PV	E2		All parameters according to user specification	3	25	75	Running	
ESDH	E3	AEC-Q101-001	ESD HBM Characterization	1	30	30	Running	
ESDC	E4	AEC-Q101-005	ESD CDM Characterization	1	30	30	Running	
UIS	E5	AEC-Q101-004 Section 2		-	-	-		Not Applicable
SC	E6	-	-	-	-	-		No

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