

PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.	POWER AND DISCRETE PRODUCTS/24/14840	
1.3 Title of PCN	Mold Compound replacement on STS Plant for industrial devices	
1.4 Product Category	SiC	
1.5 Issue date	2024-06-27	

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	Riccardo NICOLoso
2.1.2 Marketing Manager	Antonino GAITO
2.1.3 Quality Manager	Vincenzo MILITANO

3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	Direct Material: Mold compound - Chemistry (raw material)	Shenzhen - China

4. Description of change

	Old	New
4.1 Description	Resin EMC: Kyocera KEG-300S-1	Resin SUMITOMO
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	PROCESSABILITY	

5. Reason / motivation for change

5.1 Motivation	KYOCERA KEG-300S-1 out of production
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change

6.1 Description	by QA number
-----------------	--------------

7. Timing / schedule

7.1 Date of qualification results	2024-06-25
7.2 Intended start of delivery	2024-09-25
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation

8.1 Description	14840 qualification.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2024-06-27

9. Attachments (additional documentations)

14840 Public product.pdf
14840 14840.pdf
14840 qualification.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
	SCT10N120	
	SCT20N120	
	SCT30N120	
	SCT50N120	

IMPORTANT NOTICE – PLEASE READ CAREFULLY

Subject to any contractual arrangement in force with you or to any industry standard implemented by us, STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2022 STMicroelectronics – All rights reserved



Public Products List

Public 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 : Mold Compound replacement on STS Plant for industrial devices

PCN Reference : POWER AND DISCRETE PRODUCTS/24/14840

Subject : Public Products List

Dear Customer,

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

SCT10N120	SCT1000N170	SCT30N120
SCT50N120	SCT20N120	

IMPORTANT NOTICE – PLEASE READ CAREFULLY

Subject to any contractual arrangement in force with you or to any industry standard implemented by us, STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2022 STMicroelectronics – All rights reserved

MOSFET Silicon Carbide SiC Technology

Product family diffused in ST CT6 Catania (Italy) and assembled in Package HIP247

ST Shenzhen STS (China) with Sumitomo Moulding Compound

Reliability Evaluation Plan

general Information on selected test vehicles	
Commercial Product	TV1: SCT015W120G3AG TV2: SCT1000N170AG TV3: SCT070W120G3AG
Product Line	TV1: BRJO TV2: K17F TV3: BRJ7
Silicon process Technology	SiC MOSFET GEN3
Package	HIP247

Note: this report 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 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).

Revision history

Rev.	Changes description	Author	Date
1.0	New release	G. Allegra	May 30 th 2024

Approved by

Function	Location	Name	Date
Division Reliability Manager	ST Catania (Italy)	M. De Tomasi	May 30 th 2024

Contents

1.	Reliability Evaluation Overview.....	3
1.1.	Objective and reliability strategy	3
	AEC-Q101 Test Plan Table.....	4
2.	Test summary details	5
2.1.	Test Summary table	5
	CONFIDENTIALITY OBLIGATIONS	7

1. Reliability Evaluation Overview

1.1. Objective and reliability strategy

Aim of this document is to present the reliability evaluation plan to release in mass production the products designed in Power MOSFET Silicon Carbide SiC Gen3 Technology, both for Automotive and Standard application domains, diffused in ST CT6 Catania (Italy) 6" Wafer Fab and assembled in HIP247 package in ST Shenzhen STS (China) Assembly Plant with use of Sumitomo Molding Compound.

The list of SiC Gen3 products assembled in HIP247 package that will have this improvement is long including die size in the range 2.6–26 mm² and Vds values in the range 1200–1700V.

The family of products designed in SiC Gen3 Technology in combination with HIP247 package in Shenzhen Assembly Plant was positively evaluated in agreement with AEC-Q101 rev.E and ST 0061692 guidelines in 2022 as per RERPTD21068.

Basing on above mentioned data, in order to assess the release of Resin Sumitomo G720EH for products designed in SiC Gen3 Technology in combination with HIP247 package, assembled in ST Shenzhen STS (China) a reliability evaluation on 3 lots of a selected test vehicles is needed.

Here below listed the chosen test vehicles selected to cover the features in terms of maximum and minimum die size and maximum Vds value inside the product family:

Commercial Product	Silicon line	Die size (mm ²)	Vds (V)	Reliability items
SCT1000N170AG	K17F	2.6	1700	PV, TC, AC, HTRB, HTGB, HV-H3TRB, IOL, DPA on 1 lot
SCT070W120G3AG	BRJ7	6.9	1200	PV, TC, AC, HTRB, HTGB, HV-H3TRB, IOL, DPA on 1 lot
SCT015W120G3AG	BRJO	26	1200	PV, TC, AC, HTRB, HTGB, HV-H3TRB, IOL, DPA on 1 lot (with process implementation)

The reliability evaluations will be done in agreement with AEC-Q101 rev.E and ST 0061692 guidelines performing the stress test on 1 lot of each indicated product.

This strategy will allow to cover all the needed item to address the resin change on the entire SiC product family in HIP247 package.

Dedicated test, in addition to the ones already mentioned will be performed if needed to cover specific customer's requirement and any feature gap not known.

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

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	Not Applicable
	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
	B1 a	1	ACBV	AC blocking voltage	Not Applicable
	B1 b	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	No
	C7	2	RTS	Resistance to Solvents	No
	C8	2	RSH	Resistance to Solder Heat	No
	C9	3	TR	Thermal Resistance	No
	C10	2	SD	Solderability	No
	C11	3	WG	Whisker Growth Evaluation	Not Applicable
	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	Yes
E ELECTRICAL VERIFICATION TESTS	E0	1	EV	Eternal 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

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	AEC-Q101 (Group A - ACCELERATED ENVIRONMENT STRESS TESTS) STM Test Conditions	Lots	S.S.	Total	Comments
PC	A1	-	-	-	-	-	Not Applicable
HAST	A2	-	-	-	-	-	NO, covered by H3TRB
H3TRB	A2 alt	JESD22A-101	1000h @ Ta=85°C, RH=85% Vds= 960V (BRJO & BRJ7) 1000h @ Ta=85°C, RH=85% Vds= 1360V (K17F)	3	77	231	
UHASt	A3	-	-	-	-	-	NO, covered by AC
AC	A3 alt	JESD22 A-102	Autoclave (Ta=121°C, Pa=2atm for 96 hours)	3	77	231	
TC	A4	JESD22A-104 Appendix 6 J-STD-035	Ta=-55°C / +150°C Duration= 1000cy	3	77	231	
TCHT	A4a		125°C TEST after TC				
TCDT	A4a alt		100% AM inspection after TC				
IOL	A5	MIL-STD-750 Method 1037	15Kcy / $\Delta T_j \geq 100^\circ\text{C}$	3	77	231	
PTC	A5alt	-	-	-	-	-	NO, covered by IOL

Test	#	Reference	AEC-Q101 (Group B - ACCELERATED LIFETIME SIMULATION TESTS) STM Test Conditions	Lots	S.S.	Total	Comments
HTRB	B1	JESD22 A-108	Tj=200°C, Vds=1360V (K17F), 1200V (BRJO and BRJ7) 1000h	3	77	231	
ACBV	B1a	-	-	-	-	-	Not Applicable Thyristors only
SSOP	B1b	-	-	-	-	-	Not Applicable Voltage Regulator only
HTGB	B2	JESD22 A-108	HTGB + Tj=200°C, Vgs= 22V, 1000h	3	77	231	
			HTGB - Tj=200°C, Vgs= -10V, 1000h	3	77	231	

Test	#	Reference	AEC-Q101 (Group C - PACKAGE ASSEMBLY INTEGRITY TESTS) STM Test Conditions	Lots	S.S.	Total	Comments
DPA	C1	AECQ101-004 Section 4	-	3	4	12	Devices after TC and H3TRB where done (1 lot / Test Vehicle)

PD	C2	JEDEC JESD22-B-100	-	-	-	-	
WBP	C3	MIL-STD-750-2 Method 2037	-	-	-	-	
WBS	C4	AEC Q101-003 JESD22 B116	-	-	-	-	
DS	C5	Not applicable: only for new package.		-	-	-	Data type 2
TS	C6			-	-	-	
RTS	C7			-	-	-	
RSH	C8	JEDEC JESD22-A-111 (SMD)	-	-	-	-	
TR	C9	JESD24-3, 24-4, 24-6	-	-	-	-	
SD	C10	JEDEC J-STD-002	-	-	-	-	
WG	C11	Not applicable: only for new package.		-	-	-	
CA	C12	Not applicable: only for new package. Items C12 through C15 are sequential tests for hermetic packages.		-	-	-	
VVF	C13			-	-	-	
MS	C14			-	-	-	
HER	C15			-	-	-	

Test	#	Reference	AEC-Q101 (Group D – DIE FABRICATION RELIABILITY TESTS) STM Test Conditions	Lots	S.S.	Total	Comments
DI	D1	AEC Q101-004 Section 3	-	3	5	15	

Test	#	Reference	AEC-Q101 (Group E – ELECTRICAL VERIFICATION TESTS) STM Test Conditions	Lots	S.S.	Total	Comments
EV	E0	JEDEC JESD22-B101	All qualification parts submitted for testing	3	539	1617	
TEST	E1		User specification or supplier's standard specification	3	539	1617	All qualification parts
PV	E2		All parameters according to user specification	3	25	75	
ESDH	E3	AEC-Q101-001	ESD HBM Characterization	-	-	-	No impact on active area or on gate oxide
ESDC	E4	AEC-Q101-005	ESD CDM Characterization	-	-	-	
UIS	E5	AEC-Q101-004 Section 2		-	-	-	Not applicable
SC	E6	-	-	-	-	-	No

CONFIDENTIALITY OBLIGATIONS

TERMS OF USE

BY ACCEPTING THIS DOCUMENT, YOU AGREE TO THE FOLLOWING TERMS OF USE:

This Document (the "Document") and all information contained herein is the property of STMicroelectronics ("ST"). The Document is believed to be accurate and reliable and is provided solely for the purpose of obtaining general information relating to an ST product. Accordingly, you hereby agree to make use of this Document solely for the purpose of obtaining general information relating to the ST product. You further acknowledge and agree that this Document may not be used in or in connection with any legal or administrative proceeding in any court, arbitration, agency, commission, or other tribunal or in connection with any action, cause of action, litigation, claim, allegation, demand, or dispute of any kind.

This Document shall in no event be regarded as a warranty of a certain functionality, condition, or quality of the ST product. Accordingly, you agree that in no event will ST or its affiliates be liable to you for any direct, indirect, consequential, exemplary, incidental, punitive, or other damages, including lost profits, arising from, or relating to your reliance upon or use of this Document. You further acknowledge and agree that the use of this Document in violation of these Terms of Use would cause immediate and irreparable harm to ST which could not adequately be remedied by damages. You therefore agree that injunctive relief is an appropriate remedy to enforce these Terms of Use. Disclosure of this Document to any non-authorized party must be previously authorized by ST only under the provision of a proper confidentiality contractual arrangement executed between ST and you and must be treated as strictly confidential.

At all times you will comply with the following security rules:

- Do not copy or reproduce all or part of this Document
- Keep this Document locked away
- Further copies can be provided on a "need to know basis", Please contact your local ST Sales Office or Document writer

Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement, including, without limitation, the warranty provisions thereunder.

In that respect, please note that ST products are not designed for use in some specific applications or environments described in above mentioned terms and conditions.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

ST assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license, express or implied, to any intellectual property right is granted by ST herein.

ST and ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this Document supersedes and replaces information previously supplied in any prior version of this Document.

MOSFET Silicon Carbide SiC Technology Product family diffused in ST CT6 Catania (Italy) and assembled in Package HIP247 ST Shenzhen STS (China) Sumitomo Moulding Compound Interim Reliability Evaluation Report

general Information on selected test vehicles	
Commercial Product	TV1: SCT015W120G3AG TV2: SCT1000N170AG TV3: SCT070W120G3AG
Product Line	TV1: BRJO TV2: K17F TV3: BRJ7
Silicon process Technology	SiC MOSFET GEN3
Package	HIP247

Note: this report 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 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).

Revision history

Rev.	Changes description	Author	Date
1	First release	G.Allegria	May 28 th 2024

Approved by

Function	Location	Name	Date
Division Reliability Manager	ST Agrate (Italy)	M. De Tomasi	May 28 th 2024

Table of Contents

1.	Reliability Evaluation Overview.....	3
1.1.	Objective	3
1.2.	Reliability Strategy and Test Plan	3
1.2.1.	Reliability strategy.....	3
1.2.2.	Test Plan	4
	AEC-Q101 Test Plan Table	4
1.3.	Conclusion.....	5
2.	Product Characteristics.....	6
2.1.	Generalities	6
2.1.1.	Test vehicle	6
2.2.	Traceability.....	9
2.2.1.	Wafer Fab information.....	9
2.2.2.	Assembly information	9
3.1.1.	Reliability Testing information	9
4.	Tests Results Summary.....	10
4.1.	Lot Information	10
4.2.	Test results summary (table)	10

1. Reliability Evaluation Overview

1.1. Objective

Aim of this document is to present the reliability evaluations performed on selected test vehicles to release in mass production the products designed in Power MOSFET Silicon Carbide SiC Technology, both for Automotive and Standard application domains, diffused in ST CT6 Catania (Italy) 6" Wafer Fab and assembled in package HIP247 in ST Shenzhen STS (China) Assembly Plant, with use of Sumitomo molding compound.

The SiC MOSFET GEN3 Technology products diffused in ST CT6 Catania (Italy) in combination with HIP247 package families in STS (China) were positively evaluated in 2022–2023 period in agreement with ST0061692 and AEC Q101 Rev.E guidelines (RERPTD21068).

Here below listed the chosen test vehicles selected to cover the features in terms of maximum and minimum die size and maximum and minimum Vds values inside the mentioned product family:

- **SCT015W120G3AG** (BRJO as ST internal line), 26 mm² (max die size) Vds breakdown voltage 1200V, with ROUND TEOS and Double Passivation
- **SCT1000N170AG** (K17F as ST internal line), 2.6 mm² (min die size), Vds breakdown voltage 1700V (max Vds), with Single Passivation
- **SCT070W120G3AG** (BRJ7 as internal line), 6.9 mm², Vds breakdown voltage 1200V, with Single Passivation

These are Power MOSFET Silicon Carbide based intended for Automotive application.
Performed reliability verifications is running with positive interim results (HTRB, TC, AC).

1.2. Reliability Strategy and Test Plan

1.2.1. Reliability strategy

Reliability trials performed as part of this reliability evaluation are in agreement with ST 0061692 and **AEC-Q101 rev E** specification and are listed in below Test Plan by using 1 lot per each Test Vehicle product. For details on test conditions, generic data used and specifications references refer to test results summary in section 3.

1.2.2. 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	No
	C7	2	RTS	Resistance to Solvents	No
	C8	2	RSH	Resistance to Solder Heat	No
	C9	3	TR	Thermal Resistance	Yes
	C10	2	SD	Solderability	No
	C11	3	WG	Whisker Growth Evaluation	Not Applicable
	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	Yes
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

Performed reliability verifications is running with positive interim results,
Neither electrical nor parametric rejects were detected at final electrical testing.

Based on the overall achieved positive interim results obtained on the evaluations performed on the selected Test Vehicles in agreement to with ST 0061692 and AEC-Q101 Rev.E specification, we can release the risk production for the products designed in Power MOSFET Silicon Carbide SiC Gen3 Technology, both for Automotive and Standard application domains, diffused in ST CT6 Catania (Italy) 6" Wafer Fab and assembled in package HIP247 in ST Shenzhen STS (China) Assembly Plant, with SUMITOMO molding compound.

2. Product Characteristics

2.1. Generalities

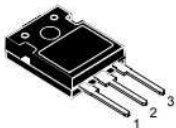
2.1.1. Test vehicle BRJ7, K17F, BRJO



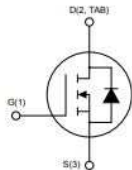
SCT070W120G3AG

Datasheet

Automotive-grade silicon carbide Power MOSFET 1200 V, 63 mΩ typ., 30 A in an HiP247 package



HiP247



Drain (TAB)
Gate (1)
Source (3)



Features

Order code	V _{DS}	R _{DS(on)} typ.	I _D
SCT070W120G3AG	1200 V	63 mΩ	30 A

- AEC-Q101 qualified
- Very low R_{DS(on)} over the entire temperature range
- High speed switching performances
- Very fast and robust intrinsic body diode
- Very high operating junction temperature capability (T_J = 200 °C)

Applications

- Main inverter (electric traction)
- DC/DC converter for EV/HEV
- On board charger (OBC)

Description

This silicon carbide Power MOSFET device has been developed using ST's advanced and innovative 3rd generation SiC MOSFET technology. The device features a very low R_{DS(on)} over the entire temperature range combined with low capacitances and very high switching operations, which improve application performance in frequency, energy efficiency, system size and weight reduction.

Product status link

SCT070W120G3AG

Product summary

Order code	SCT070W120G3AG
Marking	70W120G3AG
Package	HiP247
Packing	Tube



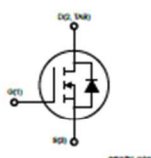
SCT1000N170

Datasheet

Silicon carbide Power MOSFET 1700 V, 1.0 Ω typ., 7 A in an HiP247 package



HiP247



Features

Order code	V _{DS}	R _{DS(on)} max.	I _D
SCT1000N170	1700 V	1.3 Ω	7 A

- High speed switching performance
- Very fast and robust intrinsic body diode
- Low capacitances
- Very high operating junction temperature capability ($T_J = 200^\circ\text{C}$)

Applications

- Auxiliary power supply for server
- Switch mode power supply

Description

This silicon carbide Power MOSFET is produced exploiting the advanced, innovative properties of wide bandgap materials. This results in unsurpassed on-resistance per unit area and very good switching performance almost independent of temperature. The outstanding thermal properties of the SiC material, combined with the device's housing in the proprietary HiP247 package, allows designers to use an industry standard outline with significantly improved thermal capability. These features render the device perfectly suitable for high-efficiency and high power density applications.



Product status link	
	SCT1000N170

Product summary	
Order code	SCT1000N170
Marking	SCT1000N170
Package	HiP247
Packing	Tube



SCT015W120G3AG

Target - Datasheet

Automotive silicon carbide Power MOSFET 1200 V, 128 A,
15 mΩ (typ., T_J = 25 °C) in a HiP247 package.

Order code	V _{DS}	R _{DS(on)}	I _D
SCT015W120G3AG	1200V	15mΩ	128A



Features

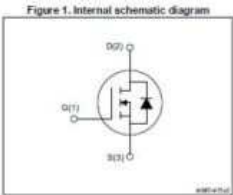
- Very low R_{DS(on)} over the entire temperature range
- High speed switching performances
- Very fast and robust intrinsic body diode
- Very high operating temperature capability (T_J=200°C)

Applications

- Switching mode power supply
- Power supply for renewable energy systems
- High Frequency DC-DC converter

Description

This silicon carbide Power MOSFET has been developed using ST's advanced and innovative 3rd generation SiC MOSFET technology. The device features remarkably low on-resistance per unit area and very good switching performance.



Maturity status link	
SCT015W120G3AG	
Device summary	
Order code	SCT015W120G3AG
Marking	TBD
Package	HiP247
Packing	Tube

2.2. Traceability

2.2.1. Wafer Fab information

Wafer fab name / location	CTWF 6" (Catania – Italy)
Wafer diameter (inches)	6"
Silicon process technology	SiC MOSFET Gen3
Die finishing front side	SiN/Polymide (SCT015W120G3AG) Polymide (SCT1000N170AG) Polymide (SCT070W120G3AG)
Die finishing back side	Ti-Ni-Au
Die size (micron)	5100 x 5100 (SCT015W120G3AG) 1600 x 1600 (SCT1000N170AG) 2800 x 2450 (SCT070W120G3AG)
Metal levels/ materials/ thicknesses	1 / AlSiCu /4.5um

2.2.2. Assembly information

3. Assembly plant name / location	ST Shenzhen STS (China)
Package description	HIP247
Lead frame/Substrate	HIP247 3L Mon Th2 Ve2 OpA SeINi/NiP
Die attach material	Preform Pb/Ag/Sn 95.5/2.5/2
Wire bonding material/diameter	WIRE Al 7 and 20 MILS (SCT015W120G3AG) WIRE Al 5 and 7 MILS (SCT1000N170AG) WIRE Al 5 and 10 MILS (SCT070W120G3AG)
Molding compound material	Sumitomo G720EH
Package Moisture Sensitivity Level (JEDEC J-STD020D)	Not applicable

3.1.1. Reliability Testing information

Reliability laboratory location	STM Catania (Italy)
---------------------------------	---------------------

4. Tests Results Summary

4.1. Lot Information

Lot #	Commercial Product	Product Line	Diffusion Lot	Tracecode
Lot1	SCT015W120G3AG	BRJO	VV349739	GK4192UT02
Lot2	SCT1000N170AG	K17F	VV301279	GK402603
Lot3	SCT070W120G3AG	BRJ7	VV334088	G348TMFRQ

4.2. Test results summary (table)

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

Test	#	Reference	AEC-Q101 (Group A – ACCELERATED ENVIRONMENT STRESS TESTS) STM Test Conditions	Lots	S.S.	Total	Results Fail/SS/lots	Comments
PC	A1	JESD22-A113 J-STD-020	Not applicable	-	-	-	-	
HAST	A2	-	-	-	-	-	-	NO, covered by H3TRB
H3TRB	A2 alt	JESD22A-101	1000h @ Ta=85°C, RH=85% Vds= 100V	3	77	231	/77/3 To be start	
			1000h @ Ta=85°C, RH=85% Vds= 960V (BRJO & BRJ7)	3	77	231	/77/3 To be start	
			1000h @ Ta=85°C, RH=85% Vds= 1360V (K17F)					
UHA	A3	-	-	-	-	-	-	NO, covered by AC
AC	A3 alt	JESD22 A-102	Autoclave (Ta=121°C, Pa=2atm for 96 hours)	3	77	231	0/77/3	
TC	A4	JESD22A-104 Appendix 6 J-STD-035	Ta=-55°C / +150°C Duration= 1000cy	3	77	231	0/77/2 BRJO to be start	
TCHT	A4a		125°C TEST after TC					
TCDT	A4a alt		100% AM inspection after TC					
IOL	A5	MIL-STD-750 Method 1037	15Kcy / ΔTj ≥ 100°C	3	77	231	/77/3 To be start	

PTC	A5alt	-	-	-	-	-	-	NO, covered by IOL
-----	-------	---	---	---	---	---	---	--------------------------

Test	#	Reference	AEC-Q101 (Group B – ACCELERATED LIFETIME SIMULATION TESTS) STM Test Conditions	Lots	S.S.	Total	Results Fail/SS/lots	Comments
HTRB	B1	JESD22 A-108	Tj=200°C, Vds=1360V (K17F), 1200V (BRJO and BRJ7) 1000h	3	77	231	0/77/3	
ACBV	B1a	-	-	-	-	-	-	Not Applicable Thyristors only
SSOP	B1b	-	-	-	-	-	-	Not Applicable Voltage Regulator only
HTGB	B2	JESD22 A-108	HTGB + Tj=200°C, Vgs= 22V, 1000h	3	77	231	/77/3 To be start	
			HTGB – Tj=200°C, Vgs= -10V, 1000h	3	77	231	/77/3 To be start	

Test	#	Reference	AEC-Q101 (Group C – PACKAGE ASSEMBLY INTEGRITY TESTS) STM Test Conditions	Lots	S.S.	Total	Results Fail/SS/lots	Comments
DPA	C1	AECQ101-004 Section 4		3	4	12	-	Devices after TC and 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 JESD22 B116		1	5	5	Done	From assembly data
DS	C5	MIL-STD-750-2 Method 2017		1	5	5	Done	From assembly data
TS	C6	MIL-STD-750-2 Method 2036	Not applicable: only for new package	-	-	-		
RTS	C7	JESD22-B-107		-	-	-		
RSH	C8	JESD22-A-111		-	-	-		

TR	C9	JESD24-3, 24-4, 24-6		1	10	10	Done	
SD	C10	JEDEC J-STD-002	Not applicable: only for new package	-	-	-		
WG	C11	Not applicable: only for new package.		-	-	-	-	
CA	C12	Not applicable: only for new package. Items C12 through C15 are sequential tests for hermetic packages.		-	-	-	-	
VVF	C13			-	-	-	-	
MS	C14			-	-	-	-	
HER	C15			-	-	-	-	

Test	#	Reference	AEC-Q101 (Group D – DIE FABRICATION RELIABILITY TESTS) STM Test Conditions	Lots	S.S.	Total	Results Fail/SS/lots	Comments
DI	D1	AEC Q101-004 Section 3	-	3	5	15	running	

Test	#	Reference	AEC-Q101 (Group E – ELECTRICAL VERIFICATION TESTS) STM Test Conditions	Lots	S.S.	Total	Results Fail/SS/lots	Comments
EV	E0	JEDEC JESD22-B101	All qualification parts submitted for testing	3	616	1848	Running	All samples
TEST	E1		User specification or supplier's standard specification	3	616	1848	Running	
PV	E2		All parameters according to user specification	3	25	75	Running	1 lots per each TV
ESDH	E3	AEC-Q101-001	ESD HBM Characterization	3	30	90		1 lot per each TV
ESDC	E4	AEC-Q101-005	ESD CDM Characterization	3	30	90		1 lot per each TV
UIS	E5	AEC-Q101-004 Section 2		-	-	-		Not applicable
SC	E6	-	-	-	-	-		No

CONFIDENTIALITY OBLIGATIONS

TERMS OF USE

BY ACCEPTING THIS DOCUMENT, YOU AGREE TO THE FOLLOWING TERMS OF USE:

This Document (the "Document") and all information contained herein is the property of STMicroelectronics ("ST"). The Document is believed to be accurate and reliable and is provided solely for the purpose of obtaining general information relating to an ST product. Accordingly, you hereby agree to make use of this Document solely for the purpose of obtaining general information relating to the ST product. You further acknowledge and agree that this Document may not be used in or in connection with any legal or administrative proceeding in any court, arbitration, agency, commission, or other tribunal or in connection with any action, cause of action, litigation, claim, allegation, demand, or dispute of any kind.

This Document shall in no event be regarded as a warranty of a certain functionality, condition, or quality of the ST product. Accordingly, you agree that in no event will ST or its affiliates be liable to you for any direct, indirect, consequential, exemplary, incidental, punitive, or other damages, including lost profits, arising from, or relating to your reliance upon or use of this Document. You further acknowledge and agree that the use of this Document in violation of these Terms of Use would cause immediate and irreparable harm to ST which could not adequately be remedied by damages. You therefore agree that injunctive relief is an appropriate remedy to enforce these Terms of Use. Disclosure of this Document to any non-authorized party must be previously authorized by ST only under the provision of a proper confidentiality contractual arrangement executed between ST and you and must be treated as strictly confidential.

At all times you will comply with the following security rules:

- Do not copy or reproduce all or part of this Document
- Keep this Document locked away
- Further copies can be provided on a "need to know basis", Please contact your local ST Sales Office or Document writer

Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement, including, without limitation, the warranty provisions thereunder.

In that respect, please note that ST products are not designed for use in some specific applications or environments described in above mentioned terms and conditions.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

ST assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license, express or implied, to any intellectual property right is granted by ST herein.

ST and ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this Document supersedes and replaces information previously supplied in any prior version of this Document.



Product/process change notification: Mold Compound replacement on STS Plant for industrial devices

POWER AND DISCRETE PRODUCTS/24/14840

Product family	Technology	Package
SiC MOS	Gen 1 and Gen 3	TO247

Description of the change

Mold Compound replacement on STS Plant for industrial devices with resin Resin SUMITOMO.

Reason

KYOCERA KEG-300S-1 out of production.

Date of implementation

WK39'24

Impact of the change

Form	
Fit	
Function	
Reliability	
Processability	X

Product/process change notification:
Mold Compound replacement on STS Plant for industrial devices

POWER AND
DISCRETE
PRODUCTS/24/14840

Qualification of the change

Qualification Report: see attached document.

Product/process change notification:
Mold Compound replacement on STS Plant for industrial devices

POWER AND
DISCRETE
PRODUCTS/24/14840

APPENDIX 1: RISK ASSESSMENT

#	Risks identified	Resulting potential risk	Class (low/medium/high)	Possible action
1				
2				
3				
4				
5				
...				

Product/process change notification:
Mold Compound replacement on STS Plant for industrial devices

POWER AND
DISCRETE
PRODUCTS/24/14840

APPENDIX 2: QUALIFICATION PLAN

#	Test name	Conditions	Sample size	Criteria
1				
2				
3				
4				
5				
...				

Product/process change notification:
Mold Compound replacement on STS Plant for industrial devices

POWER AND
DISCRETE
PRODUCTS/24/14840

APPENDIX 3: QUALIFICATION EXECUTION AND RESULT

#	Test name	Conditions	Sample size	Criteria	When	Status	Result
1							
2							
3							
4							
5							
...							

Product/process change notification:
<Description>

POWER AND
DISCRETE
PRODUCTS/24/14840

IMPORTANT NOTICE—PLEASE READ CAREFULLY

Subject to any contractual arrangement in force with you or to any industry standard implemented by us, STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2022 STMicroelectronics—All rights reserved