


PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.	POWER AND DISCRETE PRODUCTS/24/14540	
1.3 Title of PCN	Die manufacturing process homogenization in ST Tours (France) for Automotive TVS (Transient Voltage Suppressor) devices	
1.4 Product Category	SM4TxxxY SMA6TxxxY SM6TxxxY SM15TxxxY SM30TxxxY SM50TxxxY	
1.5 Issue date	2024-04-15	

2. PCN Team

2.1 Contact supplier	
2.1.1 Name	PIKE EMMA
2.1.2 Phone	+44 1628896111
2.1.3 Email	emma.pike@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Stephane CHAMARD
2.1.2 Marketing Manager	Philippe LEGER
2.1.3 Quality Manager	Jean-Paul REBRASSE

3. Change

3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Wafer Fab (Process)	Change of top layer on die	ST Microelectronics Tours - France

4. Description of change

	Old	New
4.1 Description	Metallization AlNiAu	Metallization AlTiNiAu Secondary passivation (organic)
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No	

5. Reason / motivation for change

5.1 Motivation	In the frame of global production homogenization and continuous improvement, the latest metallization and passivation manufacturing processes developed on new products released will be applied to the whole TVS range.
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change

6.1 Description	New Finished Good/Type (ending by /NR) print on carton labels
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7. Timing / schedule

7.1 Date of qualification results	2024-04-05
7.2 Intended start of delivery	2024-10-18
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation

8.1 Description	14540 24003QRP.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2024-04-15

9. Attachments (additional documentations)

14540 Public product.pdf
14540 PCN Automotive TVS FE Homogenization.pdf
14540 24003QRP.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
	SM30T39CAY	

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Public Products List

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PCN Title : Die manufacturing process homogenization in ST Tours (France)

for Automotive TVS (Transient Voltage Suppressor) devices

PCN Reference : POWER AND DISCRETE PRODUCTS/24/14540

Subject : Public Products List

Dear Customer,

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

SM30T7.5CAY	SMA6T82AY	SMA6T56CAY
SM6T250CAY	SM30T6.8AY	SM50T30AY
SM30T26AY	SM4T35AY	SM4T23AY
SM30T28CAY	SM4T39CAY	SM4T50AY
SMA6T28CAY	SM30T12CAY	SM30T10CAY
SM4T15CAY	SMA6T24CAY	SMA6T22CAY
SMA6T24AY	SM6T6V8CAY	SM30T10AY
SM4T30CAY	SM4T47AY	SM30T26CAY
SM15T30CAY	SM6T42CAY	SM15T75CAY
SM15T15AY	SM30T28AY	SMA6T36AY
SM50T36AY	SMA6T22AY	SM6T75AY
SM4T6V7AY	SM30T82CAY	SM50T42AY
SM30T12AY	SM4T7V6CAY	SMA6T14CAY
SM30T117AY	SM6T82CAY	SM50T19AY
SM6T24AY	SMA6T30AY	SMA6T36CAY
SM4T10AY	SM4T26CAY	SM4T28CAY
SM15T68AY	SMA6T12CAY	SM6T18CAY
SMA6T30CAY	SM50T15AY	SMA6T18CAY
SM15T15CAY	SM6T27CAY	SMA6T10CAY
SMA6T7V6AY	SMA6T68CAY	SM4T12AY
SM6T47AY	SM4T33AY	SM15T22AY
SM30T30CAY	SM15T75AY	SM6T39AY
SM30T100CAY	SM50T68AY	SM50T28AY
SM6T27AY	SM15T10CAY	SM30T42AY
SM15T24CAY	SMA6T6V7CAY	SM15T6V8AY
SM50T10AY	SM6T42AY	SM6T68CAY
SM30T30AY	SM50T14AY	SM30T152CAY
SM6T6V8AY	SM50T13AY	SM50T7V5AY
SM6T10CAY	SM30T68CAY	SM15T36AY
SMA6T68AY	SM30T33CAY	SM15T7V5CAY
SM15T10AY	SMA6T12AY	SM6T16V5CAY
SM15T68CAY	SM6T22AY	SM30T180CAY
SM30T220CAY	SMA6T15AY	SM30T7.5AY
SM50T18AY	SM6T10AY	SMA6T15CAY
SMA6T33CAY	SM6T7V5AY	SM4T47CAY

SM15T36CAY	SM6T33CAY	SM30T6.8CAY
SM50T75AY	SM50T21AY	SM4T82CAY
SM4T28AY	SM30T23CAY	SM6T36AY
SM30T56AY	SM15T18CAY	SM30T68AY
SMA6T47AY	SM4T21CAY	SM30T220AY
SM4T56AY	SM4T15AY	SM4T12CAY
SM6T18AY	SM30T75AY	SM6T15CAY
SM30T82AY	SM4T56CAY	SM15T47CAY
SM4T39AY	SM6T68AY	SMA6T39AY
SM6T56AY	SM6T36CAY	SM6T24CAY
SM30T15CAY	SM15T47AY	SM50T82AY
SM15T18AY	SM50T33AY	SMA6T39CAY
SM15T33CAY	SM30T39AY	SM30T75CAY
SM30T21AY	SMA6T33AY	SM50T7V0AY
SM4T82AY	SM30T23AY	SM15T7V5AY
SM50T35AY	SM50T47AY	SM30T200CAY
SM30T117CAY	SM30T56CAY	SM6T33AY
SM30T35AY	SM30T15AY	SM50T39AY
SM30T152AY	SM4T30AY	SM15T33AY
SM6T47CAY	SM30T39CAY	SM15T39CAY
SMA6T82CAY	SM30T33AY	SMA6T7V6CAY
SM15T82AY	SM6T82AY	SM30T19CAY
SM4T33CAY	SM6T12CAY	SM50T6V8AY
SM4T68AY	SM30T180AY	SM4T68CAY
SM4T14AY	SM4T35CAY	SM30T100AY
SM15T27CAY	SM6T30CAY	SM50T27AY
SM6T15AY	SM50T26AY	SM30T47AY
SM15T39AY	SM6T22CAY	SM4T21AY
SM6T56CAY	SM50T12AY	SM15T22CAY
SMA6T14AY	SM4T7V6AY	SM15T27AY
SM50T23AY	SM15T6V8CAY	SM4T18AY
SM6T30AY	SM15T82CAY	SMA6T6V7AY
SM4T6V7CAY	SM30T35CAY	SM6T75CAY
SM30T42CAY	SM30T18AY	SM4T50CAY
SM15T24AY	SM30T19AY	SM30T47CAY
SMA6T18AY	SMA6T10AY	SM50T56AY
SM6T12AY	SM15T56CAY	SM6T7V5CAY
SM4T18CAY	SM15T12AY	SM30T21CAY
SMA6T28AY	SM4T14CAY	SM15T30AY
SM30T18CAY	SM50T16AY	SMA6T56AY
SM15T56AY	SM15T12CAY	SM6T16V5AY
SM30T200AY	SM4T26AY	SM4T10CAY
SMA6T47CAY	SM6T39CAY	SM4T23CAY

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Qualification Report

Qualification of passivation and metal stack homogenization on TVS (SMD packages)

General Information		Locations	
Product Line	Protection	Wafer Fab	ST Tours (France)
Product Description	Automotive TVS products	Assembly Plant	Subcontractor (9941) - China
Product Perimeter	SM4TxxxY SMA6TxxxY SM6TxxxY SM15TxxxY SM30TxxxY SM50TxxxY	Reliability Lab	ST Tours (France)
Product Group	APMS	Reliability Assessment	Compliant
Product Division	Discrete & Filter		
Packages	SMA - SMB - SMC		
Maturity level step	Qualified		

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	January 16, 2024	20	A. KHEDIM	Julien MICHELON	Qualification passivation and metal stack Homogenization of TVS (SMD packages) Preliminary report
2.0	January 30, 2024	20	A. KHEDIM	Julien MICHELON	Addition of RSH test
3.0	April 11, 2024	25	A. KHEDIM	Timothée PINGAULT <small>Digitally signed by Timothée PINGAULT Date: 2024.04.12 12:28:59 +02'00'</small>	Updated §5.3 and §6.1

Note: This report is a summary of the qualification trials performed in good faith by STMicroelectronics in order to evaluate the potential risks during the product life using a set of defined test methods. This report does not imply for STMicroelectronics expressly or implicitly any contractual obligations other than as set forth in STMicroelectronics general terms and conditions of Sale. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics.

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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD 47	Stress-Test-Driven Qualification of Integrated Circuits
JESD 94	Application specific qualification using knowledge based test methodology
JESD 22	Reliability test methods for packaged devices
MIL-STD-750C	Test method for semiconductor devices
AEC-Q101 Rev.E (for Automotive products)	Failure Mechanism Based Stress Test Qualification for Discrete Semiconductors in Automotive Applications
ZVEI 5.0	Guideline for Customer Notifications of Product and /or Process Changes (PCN) of Electronic Components specified for Automotive Applications

2 GLOSSARY

DPA	Destructive Physical Analysis
GD	Generic Data
H3TRB	High Humidity High Temperature Reverse Bias
HTRB	High Temperature Reverse Bias
PD	Physical Dimensions
PV	Parametric Verification
RS	Repetitive Surges
RSH	Resistance to solder heat
SS	Sample Size
TC	Temperature Cycling
UHAST	Unbiased Highly Accelerated Stress Test

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify the change for homogenization of the SMD unidirectional and bidirectional product range :

- 400W & 600W TVS embedded in SMA package,
- 600W TVS embedded in SMB package,
- 1500W, 3000W and 5000W TVS embedded in SMC package.

Commercial Product	Package	Comment (optional)
SM4TxxxY	SMA	Automotive Grade
SMA6TxxxY	SMA	
SM6TxxxY	SMB	
SM15TxxxY	SMC	
SM30TxxxY	SMC	
SM50TxxxY	SMC	

Involved Commercial part numbers					
SMA package		SMB package	SMC package		
SM4T10AY	SMA6T10AY	SM6T10AY	SM15T10AY	SM30T100AY	SM50T10AY
SM4T10CAY	SMA6T10CAY	SM6T10CAY	SM15T10CAY	SM30T100CAY	SM50T12AY
SM4T12AY	SMA6T12AY	SM6T12AY	SM15T12AY	SM30T10AY	SM50T13AY
SM4T12CAY	SMA6T12CAY	SM6T12CAY	SM15T12CAY	SM30T10CAY	SM50T14AY
SM4T14AY	SMA6T14AY	SM6T15AY	SM15T15AY	SM30T117AY	SM50T15AY
SM4T14CAY	SMA6T14CAY	SM6T15CAY	SM15T15CAY	SM30T117CAY	SM50T16AY
SM4T15AY	SMA6T15AY	SM6T16V5AY	SM15T18AY	SM30T12AY	SM50T18AY
SM4T15CAY	SMA6T15CAY	SM6T16V5CAY	SM15T18CAY	SM30T12CAY	SM50T19AY
SM4T18AY	SMA6T18AY	SM6T18AY	SM15T22AY	SM30T152AY	SM50T21AY
SM4T18CAY	SMA6T18CAY	SM6T18CAY	SM15T22CAY	SM30T152CAY	SM50T23AY
SM4T21AY	SMA6T22AY	SM6T22AY	SM15T24AY	SM30T15AY	SM50T26AY
SM4T21CAY	SMA6T22CAY	SM6T22CAY	SM15T24CAY	SM30T15CAY	SM50T27AY
SM4T23AY	SMA6T24AY	SM6T24AY	SM15T27AY	SM30T180AY	SM50T28AY
SM4T23CAY	SMA6T24CAY	SM6T24CAY	SM15T27CAY	SM30T180CAY	SM50T30AY
SM4T26AY	SMA6T28AY	SM6T250CAY	SM15T30AY	SM30T18AY	SM50T33AY
SM4T26CAY	SMA6T28CAY	SM6T27AY	SM15T30CAY	SM30T18CAY	SM50T35AY
SM4T28AY	SMA6T30AY	SM6T27CAY	SM15T33AY	SM30T19AY	SM50T36AY
SM4T28CAY	SMA6T30CAY	SM6T30AY	SM15T33CAY	SM30T19CAY	SM50T39AY
SM4T30AY	SMA6T33AY	SM6T30CAY	SM15T36AY	SM30T200AY	SM50T42AY
SM4T30CAY	SMA6T33CAY	SM6T33AY	SM15T36CAY	SM30T200CAY	SM50T47AY
SM4T33AY	SMA6T36AY	SM6T33CAY	SM15T39AY	SM30T21AY	SM50T56AY
SM4T33CAY	SMA6T36CAY	SM6T36AY	SM15T39CAY	SM30T21CAY	SM50T68AY
SM4T35AY	SMA6T39AY	SM6T36CAY	SM15T47AY	SM30T220AY	SM50T6V8AY
SM4T35CAY	SMA6T39CAY	SM6T39AY	SM15T47CAY	SM30T220CAY	SM50T75AY
SM4T39AY	SMA6T47AY	SM6T39CAY	SM15T56AY	SM30T23AY	SM50T7V0AY
SM4T39CAY	SMA6T47CAY	SM6T42AY	SM15T56CAY	SM30T23CAY	SM50T7V5AY
SM4T47AY	SMA6T56AY	SM6T42CAY	SM15T68AY	SM30T26AY	
SM4T47CAY	SMA6T56CAY	SM6T47AY	SM15T68CAY	SM30T26CAY	
SM4T50AY	SMA6T68AY	SM6T47CAY	SM15T6V8AY	SM30T28AY	
SM4T50CAY	SMA6T68CAY	SM6T56AY	SM15T6V8CAY	SM30T28CAY	
SM4T56AY	SMA6T6V7AY	SM6T56CAY	SM15T75AY	SM30T30AY	
SM4T56CAY	SMA6T6V7CAY	SM6T68AY	SM15T75CAY	SM30T30CAY	
SM4T68AY	SMA6T7V6AY	SM6T68CAY	SM15T7V5AY	SM30T33AY	
SM4T68CAY	SMA6T7V6CAY	SM6T6V8AY	SM15T7V5CAY	SM30T33CAY	
SM4T6V7AY	SMA6T82AY	SM6T6V8CAY	SM15T82AY	SM30T35AY	
SM4T6V7CAY	SMA6T82CAY	SM6T75AY	SM15T82CAY	SM30T35CAY	
SM4T7V6AY		SM6T75CAY		SM30T39AY	
SM4T7V6CAY		SM6T7V5AY		SM30T39CAY	
SM4T82AY		SM6T7V5CAY		SM30T42AY	
SM4T82CAY		SM6T82AY		SM30T42CAY	
		SM6T82CAY		SM30T47AY	
				SM30T47CAY	
				SM30T56AY	
				SM30T56CAY	
				SM30T6.8AY	
				SM30T6.8CAY	
				SM30T68AY	
				SM30T68CAY	
				SM30T7.5AY	
				SM30T7.5CAY	
				SM30T75AY	
				SM30T75CAY	
				SM30T82AY	
				SM30T82CAY	
				SM50T82AY	

The reliability test methodology used follows the JESD47: "Stress Test driven Qualification Methodology" and AECQ-101 RevE guidelines.

The reliability tests ensuing are:

- TC to ensure the mechanical robustness of the products.
- HTRB to evaluate the risk of contamination from the resin and the assembly process versus the die layout sensitivity.
- H3TRB, UHAST to check the robustness to corrosion and the good package hermeticity.
- RSH to check compatibility of package with customer assembly.
- Functional test: Repetitive IPP to verify robustness of device submitted to rated Ipp (as per data sheet)

For some tests, similarity methodology is used. See 5.1 "comments" for more details about similarities.

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.

Based on these results, TVS in SMD packages are compliant with AEC-Q101 Rev.E.

4 DEVICE CHARACTERISTICS

4.1 Device description

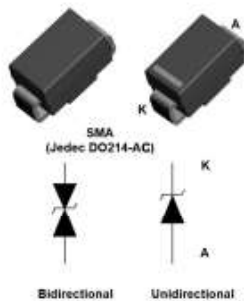
Example datasheet of TVS SMA package (SMA6T6V7CAY)




SMA6TY

Datasheet

Automotive 600 W TVS in SMA



Features

- AEC-Q101 qualified 
- Peak pulse power:
 - 600 W (10/1000 μ s) and 4 kW (8/20 μ s)
- Stand-off voltage range: from 5 V to 70 V
- Unidirectional and bidirectional types
- Low leakage current:
 - 0.2 μ A at 25 °C and 1 μ A at 85 °C
- Operating T_J max: 150 °C
- JEDEC registered package outline
- Lead finishing: matte tin plating

Complies with the following standards

- UL94, V0
- J-STD-020 MSL level 1
- J-STD-002, JESD 22-B102 E3 and MIL-STD-750, method 2026
- JESD-201 class 2 whisker test
- IPC7531 footprint and JEDEC registered package outline
- IEC 61000-4-4 level 4
 - 4 kV
- ISO 10605, IEC 61000-4-2, C = 150 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 10605, C = 330 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 7637-2 (not applicable to parts with V_{RM} lower than battery voltage)
 - Pulse 1: $V_S = -150$ V
 - Pulse 2a: $V_S = +112$ V
 - Pulse 3a: $V_S = -220$ V
 - Pulse 3b: $V_S = +150$ V

Product status link	
SMA6TY	SMA6T6V7AY , SMA6T6V7CAY , SMA6T7V6AY , SMA6T7V6CAY , SMA6T10AY , SMA6T10CAY , SMA6T12AY , SMA6T12CAY , SMA6T14AY , SMA6T14CAY , SMA6T15AY , SMA6T15CAY , SMA6T18AY , SMA6T18CAY , SMA6T22AY , SMA6T22CAY , SMA6T24AY , SMA6T24CAY , SMA6T28AY , SMA6T28CAY , SMA6T30AY , SMA6T30CAY , SMA6T33AY , SMA6T33CAY , SMA6T36AY , SMA6T36CAY , SMA6T39AY , SMA6T39CAY , SMA6T47AY , SMA6T47CAY , SMA6T56AY , SMA6T56CAY , SMA6T68AY , SMA6T68CAY , SMA6T82AY , SMA6T82CAY

Description

The SMA6TY Transil series has been designed to protect sensitive automotive circuits against surges defined in ISO 7637-2 and against electrostatic discharges according to ISO 10605.

The planar technology makes this device compatible with high-end circuits where low leakage current and high junction temperature are required to provide reliability and stability over time. SMA6TY are packaged in SMA.

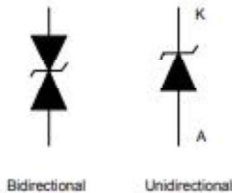
Example datasheet of TVS SMB package (SM6T22CAY)




SM6TY

Datasheet

Automotive 600 W TVS in SMB



Features

- AEC-Q101 qualified 
- Peak pulse power: 600 W (10/1000 μ s) and 4 kW (8/20 μ s)
- Stand-off voltage range from 5 V to 188 V
- Unidirectional and bidirectional types
- Low leakage current: 0.2 μ A at 25 °C and 1 μ A at 85 °C
- Operating T_j max: 150 °C
- High power capability at T_j max.: up to 515 W (10/1000 μ s)
- Lead finishing: matte tin plating

Complies with the following standards

- UL94, V0
- J-STD-020 MSL level 1
- J-STD-002, JESD 22-B102 E3 and MIL-STD-750, method 2026 solderable matte tin plated leads
- JESD-201 class 2 whisker test
- IPC7531 footprint
- JEDEC registered package outline
- IEC 61000-4-4 level 4:
 - 4 kV
- ISO10605, IEC 61000-4-2, C= 150 pF - R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO10605 - C = 330 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO7637-2 (Not applicable to parts with stand-off voltage lower than battery voltage)
 - Pulse 1: $V_S = -150$ V
 - Pulse 2a: $V_S = +112$ V
 - Pulse 3a: $V_S = -220$ V
 - Pulse 3b: $V_S = +150$ V

Product status link	
SM6TY	SM6T6V8AY, SM6T6V8CAY, SM6T7V5AY, SM6T7V5CAY, SM6T10AY, SM6T10CAY, SM6T12AY, SM6T12CAY, SM6T15AY, SM6T15CAY, SM6T16V5AY, SM6T16V5CAY, SM6T18AY, SM6T18CAY, SM6T22AY, SM6T22CAY, SM6T24AY, SM6T24CAY, SM6T27AY, SM6T27CAY, SM6T30AY, SM6T30CAY, SM6T33AY, SM6T33CAY, SM6T36AY, SM6T36CAY, SM6T39AY, SM6T39CAY, SM6T42AY, SM6T42CAY, SM6T47AY, SM6T47CAY, SM6T56AY, SM6T56CAY, SM6T68AY, SM6T68CAY, SM6T75AY, SM6T75CAY, SM6T82AY, SM6T82CAY

Description

The SM6TY series are designed to protect sensitive automotive circuits against surges defined in ISO 7637-2 and against electrostatic discharges according to ISO 10605.

The Planar technology makes it compatible with high-end circuits where low leakage current and high junction temperature are required to provide long term reliability and stability.

Example datasheet of TVS SMC package (SM50T30AY)



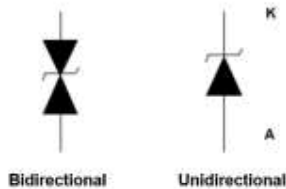
SM50TxxAY, SM50TxxCAY

Datasheet


Automotive 5000 W TVS in SMC



SMC
(JEDEC DO-214AB)



Features

- AEC-Q101 qualified 
- Peak pulse power:
 - 5000 W (10/1000 μ s)
 - up to 48 kW (8/20 μ s)
- Stand-off voltage range from 5 V to 100 V
- Unidirectional and bidirectional types
- Low leakage current: 0.2 μ A at 25 °C
- Operating T_j max: 175 °C
- JEDEC registered package outline
- Lead finishing: matte tin plating

Complies with the following standards

- UL94, V0
- J-STD-020 MSL level 1
- J-STD-002, JESD 22-B102 E3 and MIL-STD-750, method 2026
- JESD-201 class 2 whisker test
- IPC7531 footprint and JEDEC registered package outline
- IEC 61000-4-4 level 4:
 - 4 kV
- IEC 61000-4-2, C = 150 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 10605, C = 330 pF, R = 330 Ω :
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 7637-2 (not applicable to parts with V_{RM} lower than battery voltage):
 - Pulse 1: $V_S = -150$ V
 - Pulse 2a: $V_S = +112$ V
 - Pulse 3a: $V_S = -220$ V
 - Pulse3b: $V_S = +150$ V

Description

The SM50TY series are designed to protect sensitive automotive circuits against surges defined in ISO 7637-2 and against electrostatic discharges according to ISO 10605.

SM50TY is suitable for e-breaker and help to comply with ISO 16750.

The Planar technology makes it compatible with high-end circuits where low leakage current and high junction temperature are required to provide long term reliability and stability.

Product status link
SM50T6V8AY, SM50T6V8CAY,
SM50T7V0AY, SM50T7V0CAY,
SM50T7V5AY, SM50T7V5CAY,
SM50T10AY, SM50T10CAY,
SM50T12AY, SM50T12CAY,
SM50T13AY, SM50T13CAY,
SM50T14AY, SM50T14CAY,
SM50T15AY, SM50T15CAY,
SM50T16AY, SM50T16CAY,
SM50T18AY, SM50T18CAY,
SM50T19AY, SM50T19CAY,
SM50T21AY, SM50T21CAY,
SM50T23AY, SM50T23CAY,
SM50T26AY, SM50T26CAY,
SM50T27AY, SM50T27CAY,
SM50T28AY, SM50T28CAY,
SM50T30AY, SM50T30CAY,
SM50T33AY, SM50T33CAY,
SM50T35AY, SM50T35CAY,
SM50T36AY, SM50T36CAY,
SM50T39AY, SM50T39CAY,
SM50T42AY, SM50T42CAY,
SM50T47AY, SM50T47CAY,
SM50T56AY, SM50T56CAY,
SM50T68AY, SM50T68CAY,
SM50T75AY, SM50T75CAY,
SM50T82AY, SM50T82CAY,
SM50T100AY, SM50T100CAY,
SM50T117AY, SM50T117CAY

4.2 Construction Note

400W, 600W TVS package SMA qualification	
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - France
Technology / Process family	Discrete Transil
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - France
Assembly information	
Assembly site	Subcontractor (9941) - China
Package description	SMA
Molding compound	ECOPACK@2 molding compound
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	Subcontractor (9941) - China

600W TVS SMB qualification	
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - France
Technology / Process family	Discrete Transil
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - France
Assembly information	
Assembly site	Subcontractor (9941) - China
Package description	SMB
Molding compound	ECOPACK@2 molding compound
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	Subcontractor (9941) - China

1500W, 3000W, 5000W TVS SMC qualification	
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - France
Technology / Process family	Discrete Transil
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - France
Assembly information	
Assembly site	Subcontractor (9941) - China
Package description	SMC
Molding compound	ECOPACK@2 molding compound
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	Subcontractor (9941) - China

5 TESTS PLAN AND RESULTS SUMMARY

5.1 Test vehicles

Lot #	Finish Good	Package	Comments
Lot 1	SM4T39CAY	SMA	Qualification lot
Lot 2	SMAJ33CA	SMA	Qualification lot
Lot 3	SM6T39CA	SMB	Qualification lot
Lot 4	SM15T33CAY	SMC	Qualification lot
Lot 5	SM15T6V8CA	SMC	Qualification lot
Lot 6	SMC30J188CA	SMC	Qualification lot
Lot 7	SMC50J100A	SMC	Qualification lot
Lot 8	SMAJ5.0A	SMA	Qualification lot
Lot 9	SMA6J33A	SMA	Qualification lot
Lot 10	SM6T39AY	SMB	Qualification lot
Lot 11	SM30T6.8AY	SMC	Qualification lot
Lot 12	SM30T56CAY	SMC	Qualification lot

Detailed results in the chapter below will refer to these references.

5.2 **Test plan**

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
Pre and Post-Stress Electrical Test	TEST	User specification or supplier's standard Specification	All qualification parts tested per the requirements of the appropriate device specification.			
Pre-conditioning	PC	J-STD-020 JESD22-A113	All qualification parts tested per the requirements of the appropriate device specification.		As per targeted MSL Not applicable for PTH and WLCSP without coating	
MSL research	MSL	J-STD-020			Not applicable for PTH and WLCSP without coating	
External Visual	EV	JESD22B-101	All qualification parts tested per the requirements of the appropriate device specification.		Done during Assembly → Test & Finish inspection	
Parametric Verification	PV	User specification				
High Temperature Reverse Bias	HTRB	MIL-STD-750-1 M1038 Method A (for diodes, rectifiers and Zeners) M1039 Method A (for transistors)	Lot 1 Lot 2 Lot 3 Lot 4 Lot 5 Lot 6 Lot 7 Lot 9 Lot 10 Lot 11 Lot 12	77 77 77 77 77 77 77 77 77 77 77		X
AC blocking voltage	ACBV	MIL-STD-750-1 M1040 Test condition A			Required for Thyristor only. Alternative to HTRB	
High Temperature Forward Bias	HTFB	JESD22 A-108			Not required, applicable only to LEDs Alternative to HTRB	
High Temperature Operating Life	HTOL				Covered by HTRB or ACBV	
Steady State Operational	SSOP	MIL-STD-750-1 M1038 Test condition B			Required for Voltage Regulator (Zener) only.	
High Temperature Gate Bias	HTGB	JESD 22A-108			Required for Power MOSFET – IGBT only.	
High Temperature Storage Life	HTSL	JESD22 A-103			Covered by H3TRB	
Temperature Humidity Storage	THS	JESD22 A-118			Covered by H3TRB	
Temperature Cycling	TC	JESD22A-104	Lot 1 Lot 7 Lot 9 Lot 10 Lot 11	77 77 77 77 77		X
Temperature Cycling Hot Test	TCHT	JESD22A-104			Required for Power MOSFET – IGBT only.	
Temperature Cycling Delamination Test	TCDT	JESD22A-104 J-STD-035			Required for Power MOSFET – IGBT only. Alternative to TCHT	
Wire Bond Integrity	WBI	MIL-STD-750 Method 2037			For dissimilar metal bonding systems only	
Unbiased Highly Accelerated Stress Test	UHAST	JESD22A-118 or A101	Lot 1 Lot 2 Lot 3	77 77 77	Required for SCR/TRIAC RECTIFIER and Protection devices	X

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
			Lot 4 Lot 5 Lot 9 Lot 10 Lot 12	77 77 77 77 77		
Autoclave	AC	JESD22A-102			Alternative to UHAST	
Highly Accelerated Stress Test	HAST	JESD22A-110			Covered by H3TRB (same failure mechanisms activation).	
High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	Lot 1 Lot 2 Lot 3 Lot 7 Lot 10 Lot 12	77 77 77 77 77 77	Alternative to HAST	X
High Temperature High Humidity Bias	HTHH B	JED22A-101			Not required, LED only	
Intermittent Operational Life / Thermal Fatigue	IOL	MIL-STD-750 Method 1037			For power devices. Not required for Transient Voltage Suppressor (TVS) parts	
Power and Temperature Cycle	PTC	JED22A-105			For power devices. Not required for Transient Voltage Suppressor (TVS) parts Perform PTC if $\Delta T_j > 100^\circ\text{C}$ cannot be achieved with IOL Alternative to IOL	
ESD Characterization	ESD HBM	AEC Q101-001 and 005				
ESD Characterization	ESD CDM	AEC Q101-001 and 005				
Destructive Physical Analysis	DPA	AEC-Q101-004 Section 4	Lot 1 Lot 10 Lot 11 Lot 12	2 2*2 2 2	After H3TRB and TC	X
Physical Dimension	PD	JESD22B-100	Refer to annex 6.2			X
Terminal Strength	TS	MIL-STD-750 Method 2036			Required for leaded parts only	
Resistance to Solvents	RTS	JESD22B-107			Not applicable for Laser Marking	
Constant Acceleration	CA	MIL-STD-750 Method 2006			Required for hermetic packaged parts only.	
Vibration Variable Frequency	VVF	JESD22B-103			Required for hermetic packaged parts only.	
Mechanical Shock	MS	JESD22 B-104			Required for hermetic packaged parts only.	
Hermeticity	HER	JESD22A-109			Required for hermetic packaged parts only.	
Resistance to Solder Heat	RSH	JESD22 A-111 (SMD)	Lot 1 Lot 11	30 30		X
Solderability	SD	J-STD-002 JESD22B102				
Dead Bug Test	DBT	ST Internal specification			Mandatory for SMD package Data collection for PTH package	
Thermal Resistance	TR	JESD24-3, 24-4, 24-6 as appropriate			Required in case of process change. Not applicable to protection device as no limit specified in the datasheet	
Wire Bond Strength	WBS	MIL-STD-750 Method 2037			Covered during workability trials	

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
Bond Shear	BS	AEC-Q101-003			Covered during workability trials	
Die Shear	DS	MIL-STD-750 Method 2017			Not Applicable to parts with solder paste die attach	
Unclamped Inductive Switching	UIS	AEC-Q101-004 section 2			Required for Power MOS and internally clamped IGBTs only	
Dielectric Integrity	DI	AEC-Q101-004 section 3			Required for Power MOSFET – IGBT only.	
Short Circuit Reliability Characterization	SCR	AEC-Q101-006			Required for smart power parts only	
Whisker Growth Evaluation	WG	AEC-Q005 JESD201				
Early Life Failure Rate	ELFR	JESD74			Recommended for new techno development in case of identified failure mechanism	
Functional Test (in rush, di/dt,...)	FT	Internal specification				
Repetitive Surge	RS	Internal specification	Lot 1 Lot 3 Lot 4 Lot 5 Lot 6 Lot 8 Lot 9 Lot 10 Lot 11 Lot 12	20 20 20 20 20 20 20 20 20 20	Required for protection devices only.	X

Low Temperature Storage	LTS	JESD-22 A119: 209			AQG324 test for Modules	
Thermal shock test	TST	JESD22-A104			AQG324 test for Modules	
Power Cycling (seconds)	PCsec	MIL-STD750-1 Method1037			AQG324 test for Modules	
Power Cycling (minutes)	PCmin	MIL-STD750-1 Method1037			AQG324 test for Modules	
Mechanical shock	MS	IEC 600068-2-27			AQG324 test for Modules	
Vibration	V	IEC60068-2-6			AQG324 test for Modules	



Note 1: These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers."



6 ANNEXES

6.1 Parametric Verification

SM30T6.8AY

Characterization SM30T6.8AY											
Date : 05/04/2024											
Ref : 23512A											
Lab : ST Tours Characterization Lab											
TEST	VBR	VBR	VBR	IRM	IRM	IRM	VCL 10/1000 µs	RD	VCL 8/20 µs	RD	
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES	
Condition 1	-40°C	25°C	85°C	-40°C	25°C	85°C	25°C	25°C	25°C	25°C	
Condition 2	IR=10mA	IR=10mA	IR=10mA	VRM=5V	VRM=5V	VRM=5V	IPP=327A	IF1=163.5A	IPP=1610A	IF1=805A	
Condition 3								IF2=327A		IF2=1610A	
Condition 4								VR1= 1-VCL 10/1000 µs		VR1= 1-VCL 8/20 µs	
Condition 5								VR2= 2-VCL 10/1000 µs		VR2= 2-VCL 8/20 µs	
Min. Datasheet		6.4									
Typ. Datasheet		6.8									
Max. Datasheet		7.1			20µA	50µA	9.2	6.42mohm	14.4	4.53mohm	
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	
UNIT	V	V	V	nA	nA	µA	V	Ohm	V	Ohm	
N	30	30	30	30	30	30	30	30	30	30	
Min	6.4	6.602	6.778	85.46	263.7	0.7618	8.27	0.00422	12.613	0.0035	
Max	6.536	6.755	6.938	288.1	727.7	1.477	8.48	0.004525	13.015	0.0037	
Avg.	6.461	6.66	6.845	198.43	417.71	1.118	8.332	0.004413	12.756	0.0036	
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers											

SM30T56CAY

Characterization SM30T56CAY													
Date : 05/04/2024													
Ref : 23514A													
Lab : ST Tours Characterization Lab													
TEST	VBR	VBR	VBR	VBR	VBR	VBR	IRM	IRM	IRM	IRM	IRM	IRM	IRM
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	-40°C	-40°C	25°C	25°C	85°C	85°C	-40°C	-40°C	25°C	25°C	85°C	85°C	85°C
Condition 2	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	VRM=48V	VRM=48V	VRM=48V	VRM=48V	VRM=48V	VRM=48V	VRM=48V
Condition 3													
Condition 4													
Condition 5													
Min. Datasheet			53.2	53.2									
Typ. Datasheet			56	56									
Max. Datasheet			58.8	58.8					0.2µA	0.2µA	1µA	1µA	
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	
UNIT	V	V	V	V	V	V	nA	nA	nA	nA	nA	nA	
N	30	30	30	30	30	30	30	30	30	30	30	30	
Min	50.31	50.35	53.6	53.63	56.47	56.5	1.709	1.319	9.963	6.893	10.5	19.29	
Max	51.77	52.05	55.16	55.53	58.19	58.56	43.95	73.25	25.05	21.15	107	139.4	
Avg	51.21	51.21	54.58	54.58	57.56	57.57	13.241	23.85	18.62	14.78	49.48	59.47	
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD					
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES					
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C					
Condition 2	IPP=38A	IPP=38A	IF1=19A	IF1=19A	IPP=409A	IPP=409A	F1=204.5A	F1=204.5A					
Condition 3			IF2=38A	IF2=38A			IF2=409A	IF2=409A					
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs					
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs					
Min. Datasheet													
Typ. Datasheet													
Max. Datasheet	76.6	76.6	468mohm	468mohm	100	100	101mohm	101mohm					
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse					
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm					
N	15	15	15	15	15	14	15	15					
Min	63.8	63.4	0.2	0.205	72.67	72.33	0.0391	0.0391					
Max	66.5	66.7	0.268	0.268	76	74.33	0.0407	0.0407					
Avg	65.164	65.09	0.236	0.236	73.28	73.5	0.0397	0.0397					
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers													



SM6T39AY

Characterization SM6T39AY										
Date : 05/04/2024										
Ref : 23510A										
Lab : ST Tours Characterization Lab										
TEST	VBR	VBR	VBR	IRM	IRM	IRM	VCL 10/1000 µs	RD	VCL 8/20 µs	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	-40°C	25°C	85°C	-40°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=1mA	IR=1mA	IR=1mA	VRM=33.3V	VRM=33.3V	VRM=33.3V	IPP=11.1A	IF1=5.55A	IPP=57A	IF1=28.5A
Condition 3								IF2=11A		IF2=57A
Condition 4								VR1= 1-VCL 10/1000 µs		VR1= 1-VCL 8/20 µs
Condition 5								VR2= 2-VCL 10/1000 µs		VR2= 2-VCL 8/20 µs
Min. Datasheet		37.1								
Typ. Datasheet		39								
Max. Datasheet		41			0.2µA	1µA	53.9	1.16	69.7	0.504
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	V	V	nA	nA	µA	V	Ohm	V	Ohm
N	30	30	30	30	30	30	30	30	30	30
Min	35.72	38.15	40.32	2.93	0.683	2.442	46.5	0.678	50	0.210
Max	37.05	39.56	41.79	49.81	8.204	50.79	48.3	0.844	53	0.234
Avg.	36.23	38.72	40.919	17.5	4.213	15.773	47.27	0.754	51.33	0.225
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers										

SM15T33CAY

Characterization SM15T33CAY												
Date : 05/04/2024												
Ref : 23468A												
Lab : ST Tours Characterization Lab												
TEST	VBR	VBR	VBR	VBR	VBR	VBR	IRM	IRM	IRM	IRM	IRM	IRM
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	-40°C	-40°C	25°C	25°C	85°C	85°C	-40°C	-40°C	25°C	25°C	85°C	85°C
Condition 2	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	VRM=28.2V	VRM=28.2V	VRM=28.2V	VRM=28.2V	VRM=28.2V	VRM=28.2V
Condition 3												
Condition 4												
Condition 5												
Min. Datasheet			31.4	31.4								
Typ. Datasheet			33	33								
Max. Datasheet			34.7	34.7			0.2µA	0.2µA	1µA	1µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	V	V	V	V	nA	nA	nA	nA	nA	nA
N	30	30	30	30	30	30	30	30	30	30	30	30
Min	30.26	30.28	32.06	32.09	33.68	33.72	1.83	3.91	0.95	1.25	2.59	2.54
Max	31.12	31.05	33.01	32.94	34.68	34.63	49.81	41.27	8.33	9.25	62.27	52.25
Avg	30.63	30.61	32.47	32.44	34.10	34.07	19.76	22.38	4.13	5.03	19.51	23.40
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD				
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES				
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C				
Condition 2	IPP=33A	IPP=33A	IF1=16.5A	IF1=16.5A	IPP=168A	IPP=168A	IF1=84.5A	IF1=84.5A				
Condition 3			IF2=33A	IF2=33A			IF2=168A	IF2=168A				
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs				
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs				
Min. Datasheet												
Typ. Datasheet												
Max. Datasheet	45.7	45.7	0.333ohm	0.333ohm	59	59	0.14ohm	0.14ohm				
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse				
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm				
N	15	15	15	15	15	15	15	15				
Min	36.900	37.300	0.1212	0.1212	38.690	38.690	0.0318	0.0318				
Max	38.400	38.300	0.1515	0.1455	39.570	39.570	0.0361	0.0361				
Avg	37.700	37.713	0.1374	0.1358	39.149	39.173	0.0338	0.0339				
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers												

SMA6J33A

Characterization SMA6J33A							
Date : 05/04/2024							
Ref : 23511A							
Lab : ST Tours Characterization Lab							
TEST	VBR	IRM	IRM	VCL 10/1000 µs	RD	VCL 8/20 µs	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	25°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=1mA	VRM=33V	VRM=33V	IPP=11.8A	IF1=5.9A	IPP=57A	IF1=28.5A
Condition 3					IF2=11.8A		IF2=57A
Condition 4					VR1= 1-VCL 10/1000 µs		VR1= 1-VCL 8/20 µs
Condition 5					VR2= 2-VCL 10/1000 µs		VR2= 2-VCL 8/20 µs
Min. Datasheet	36.7						
Typ. Datasheet	38.6						
Max. Datasheet	40.6	0.2µA	1µA	51.9	0.963	69	0.512
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	nA	nA	V	Ohm	V	Ohm
N	30	30	30	30	30	30	30
Min	38.13	0.952	1.05	46.6	0.559	51.37	0.172
Max	40.19	22.71	46.88	49.8	0.779	54.49	0.235
Avg.	38.86	10.485	21.13	47.23	0.655	52.3	0.218
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.							
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SM6T39CA

Characterization SM6T39CA							
Date : 05/04/2024							
Ref : 23467A							
Lab : ST Tours Characterization Lab							
TEST	VBR	VBR	IRM	IRM	IRM	IRM	
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C	
Condition 2	IR=1mA	IR=1mA	VRM=33.3V	VRM=33.3V	VRM=33.3V	VRM=33.3V	
Condition 3							
Condition 4							
Condition 5							
Min. Datasheet	37.1	37.1					
Typ. Datasheet	39	39					
Max. Datasheet	41	41	0.2µA	0.2µA	1µA	1µA	
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	
UNIT	V	V	nA	nA	nA	nA	
N	30	30	30	30	30	30	
Min	38.56	38.56	1.444	1.807	8.314	9.649	
Max	39.75	39.95	2.42	2.45	14.35	13.03	
Avg.	39.013	39	1.8317	2.069	11.568	11.21	
VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
IPP=11.1A	IPP=11.1A	IF1=5.55A	IF1=5.55A	IPP=57A	IPP=57A	IF1=28.5A	IF1=28.5A
		IF2=11A	IF2=11A			IF2=57A	IF2=57A
		VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
		VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
53.9	53.9	1.16	1.16	69.7	69.7	0.504	0.504
Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
V	V	Ohm	Ohm	V	V	Ohm	Ohm
15	15	15	15	15	15	15	15
45.9	45.9	0.5714	0.5893	49	49	0.1754	0.1754
47.3	48.7	0.6964	0.6786	50.33	51.67	0.1870	0.1989
46.586	46.693	0.6262	0.6345	49.55	49.75	0.1762	0.1817
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.							
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SM15T6V8CA

Characterization SM15T6V8CA								
Date : 05/04/2024								
Ref : 23469A								
Lab : ST Tours Characterization Lab								
TEST	VBR	VBR	IRM	IRM	IRM	IRM		
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C	85°C	
Condition 2	IR=1mA	IR=1mA	VRM=5.8V	VRM=5.8V	VRM=5.8V	VRM=5.8V	VRM=5.8V	
Condition 3								
Condition 4								
Condition 5								
Min. Datasheet	6.45	6.45						
Typ. Datasheet	6.8	6.8						
Max. Datasheet	7.14	7.14	500µA	500µA	2000µA	2000µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse		
UNIT	V	V	µA	µA	µA	µA		
N	30	30	30	30	30	30		
Min	6.798	6.775	5.348	5.47	13.43	13.92		
Max	6.899	6.901	10.45	10.35	24.17	24.42		
Avg.	6.835	6.835	8.131	8.293	19.44	19.81		
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Condition 2	IPP=143A	IPP=143A	IF1=72A	IF1=72A	IPP=746A	IPP=746A	IF1=370A	IF1=370A
Condition 3			IF2=143A	IF2=143A			IF2=746A	IF2=746A
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
Min. Datasheet								
Typ. Datasheet								
Max. Datasheet	10.5	10.5	0.023	0.023	13.4	13.4	0.008ohm	0.008ohm
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	Ohm	Ohm	V	V	ohm	ohm
N	15	15	15	15	15	15	15	15
Min	8.25	8.21	0.00633	0.00647	11.73	11.8	0.00585	0.005851
Max	8.45	8.42	0.00845	0.00957	12.07	12.07	0.006382	0.006569
Avg.	8.31	8.26	0.00685	0.00729	11.85	11.91	0.00603	0.006184
(**)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.								
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers								

SMC30J188CA

Characterization SMC30J188CA								
Date : 05/04/2024								
Ref : 23470A								
Lab : ST Tours Characterization Lab								
TEST	VBR	VBR	IRM	IRM	IRM	IRM		
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C	85°C	
Condition 2	IR=1mA	IR=1mA	VRM=188V	VRM=188V	VRM=188V	VRM=188V	VRM=188V	
Condition 3								
Condition 4								
Condition 5								
Min. Datasheet	209	209						
Typ. Datasheet	220	220						
Max. Datasheet	237	237	0.2µA	0.2µA	1µA	1µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse		
UNIT	V	V	nA	nA	nA	nA		
N	30	30	30	30	30	30		
Min	215.3	214.8	20.27	3.809	23.44	21.98		
Max	224.4	221	51.57	36.82	86.44	100.8		
Avg.	217.58	217.5	32.048	21.58	50.12	54.9		
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Condition 2	IPP=9A	IPP=9A	IF1=4.5A	IF1=4.5A	IPP=80A	IPP=80A	IF1=40A	IF1=40A
Condition 3			IF2=9A	IF2=9A			IF2=80A	IF2=80A
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
Min. Datasheet								
Typ. Datasheet								
Max. Datasheet	328	328	10778mohm	10778mohm	388	388	1963mohm	1963mohm
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm
N	15	15	15	15	15	15	15	15
Min	247.8	261.6	0.333	3.755	272.2	273.8	0.418	0.4875
Max	270.8	267.1	4.333	4.444	278.6	279.8	0.548	0.52
Avg.	262.63	264.01	3.822	4.112	276.413	277.08	0.511	0.508
(**)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.								
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers								

SMC50J100A

Characterization SMC50J100A-TR							
Date : 05/04/2024							
Ref : 23471A							
Lab : ST Tours Characterization Lab							
TEST	VBR	IRM	IRM	VCL 10/1000 μ s	RD	VCL 8/20 μ s	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	25°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=1mA	VRM=100V	VRM=100V	IPP=28A	IF1=14A	IPP=227A	IF1=114A
Condition 3					IF2=28A		IF2=227A
Condition 4					VR1= 1-VCL 10/1000 μ s		VR1= 1-VCL 8/20 μ s
Condition 5					VR2= 2-VCL 10/1000 μ s		VR2= 2-VCL 8/20 μ s
Min. Datasheet	111						
Typ. Datasheet	117						
Max. Datasheet	123	0,2 μ A	1 μ A	179	2000mohm	212	392mohm
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	nA	nA	V	mohm	V	mohm
N	30	30	30	30	30	30	30
Min	114.8	7.301	10.01	142.5	892.85	159.82	0.181
Max	118.2	25.69	59.09	147.5	1130.71	164.83	0.196
Avg.	116.09	16.86	26.55	144.49	958.52	161.22	0.186
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SMAJ5.0A

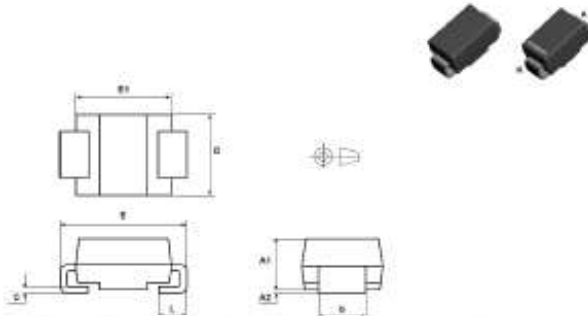
Characterization SMAJ5.0AH-TR							
Date : 05/04/2024							
Ref : 23510A							
Lab : ST Tours Characterization Lab							
TEST	VBR	IRM	IRM	VCL 10/1000 μ s	RD	VCL 8/20 μ s	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	25°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=10mA	VRM=5V	VRM=5V	IPP=43.5A	IF1=21.75A	IPP=174A	IF1=87A
Condition 3					IF2=43.5A		IF2=174A
Condition 4					VR1= 1-VCL 10/1000 μ s		VR1= 1-VCL 8/20 μ s
Condition 5					VR2= 2-VCL 10/1000 μ s		VR2= 2-VCL 8/20 μ s
Min. Datasheet	6.40						
Typ. Datasheet	6.74						
Max. Datasheet		20 μ A	50 μ A	9.2	0.049	13.4	0.036ohm
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	nA	nA	V	Ohm	V	Ohm
N	30	30	30	30	30	30	30
Min	6.686	25.5	82.13	8.41	0.021	12.04	0.0289
Max	6.819	220	397.2	8.68	0.04	12.6	0.0331
Avg.	6.731	48.33	122.76	8.53	0.0352	12.29	0.0308
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SM4T39CAY

Characterization SM4T39CAY								
Date : 08/04/2024								
Ref : 23465A								
Lab : ST Tours Characterization Lab								
TEST	VBR	VBR	IRM	IRM	IRM	IRM		
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC		
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C		
Condition 2	IR=1mA	IR=1mA	VRM=33V	VRM=33V	VRM=33V	VRM=33V		
Condition 3								
Condition 4								
Condition 5								
Min. Datasheet	36.7	36.7						
Typ. Datasheet	38.6	38.6						
Max. Datasheet	40.5	40.5	0,2µA	0,2µA	1µA	1µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse		
UNIT	V	V	nA	nA	nA	nA		
N	30	30	30	30	30	30		
Min	37.70	37.45	1.22	1.05	1.42	1.07		
Max	38.97	38.68	18.34	18.73	40.88	43.76		
Avg.	38.09	38.13	8.23	6.81	15.36	16.59		
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Condition 2	IPP=7.5A	IPP=7.5A	IF1=3.7A	IF1=3.7A	IPP=33A	IPP=33A	IF1=17A	IF1=17A
Condition 3			IF2=7.5A	IF2=7.5A			IF2=33A	IF2=33A
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
Min. Datasheet								
Typ. Datasheet								
Max. Datasheet	53.3	53.3	1.70	1.70	69.7	69.7	0.884	0.884
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm
N	15	15	15	15	15	15	15	15
Min	45.10	45.10	0.8421	0.8421	46.67	47.00	0.2500	0.2294
Max	47.20	47.70	1.1579	1.2105	48.33	48.33	0.2919	0.2919
Avg.	46.20	46.05	1.0053	1.0000	47.60	47.58	0.2680	0.2655
<p>(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.</p> <p>Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers</p>								

6.2 Physical Dimensions

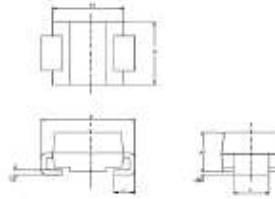
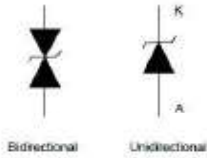
SMA package dimensions



Ref.	Millimeters	
	Min.	Max.
A1	1.90	2.45
A2	0.05	0.20
b	1.25	1.65
c	0.15	0.40
D	2.25	2.90
E	4.80	5.35
E1	3.95	4.60
L	0.75	1.50

Spec	A1	A2	b	c	D	E	E1	L
MIN:	1.90	0.05	1.25	0.15	2.25	4.80	3.95	0.75
MAX:	2.45	0.20	1.65	0.40	2.90	5.35	4.60	1.50
1	2.134	0.142	1.549	0.280	2.818	5.069	4.380	1.066
2	2.107	0.150	1.536	0.250	2.825	5.065	4.379	1.055
3	2.138	0.133	1.539	0.268	2.800	5.080	4.383	1.040
4	2.129	0.113	1.551	0.277	2.806	5.128	4.371	1.037
5	2.124	0.124	1.537	0.271	2.810	5.115	4.364	1.051
6	2.093	0.137	1.528	0.261	2.817	5.062	4.371	1.055
7	2.116	0.144	1.551	0.275	2.802	5.117	4.375	1.039
8	2.087	0.104	1.539	0.266	2.810	5.131	4.379	1.023
9	2.132	0.118	1.543	0.273	2.804	5.080	4.382	1.041
10	2.132	0.122	1.541	0.280	2.814	5.133	4.375	1.021
11	2.137	0.142	1.535	0.271	2.801	5.088	4.379	1.021
12	2.089	0.132	1.528	0.261	2.806	5.109	4.371	1.016
13	2.146	0.137	1.533	0.267	2.820	5.123	4.380	1.072
14	2.136	0.112	1.544	0.270	2.818	5.096	4.366	1.045
15	2.115	0.132	1.533	0.271	2.813	5.092	4.368	1.042
16	2.107	0.119	1.532	0.276	2.837	5.097	4.382	1.039
17	2.125	0.130	1.541	0.269	2.819	5.104	4.375	1.020
18	2.132	0.134	1.532	0.265	2.803	5.112	4.376	1.045
19	2.139	0.142	1.528	0.268	2.827	5.113	4.379	1.029
20	2.121	0.118	1.529	0.263	2.804	5.127	4.383	1.016
21	2.130	0.140	1.543	0.271	2.823	5.127	4.368	1.040
22	2.146	0.136	1.555	0.273	2.814	5.079	4.362	1.020
23	2.114	0.130	1.536	0.263	2.799	5.102	4.376	1.036
24	2.126	0.140	1.549	0.272	2.820	5.133	4.380	1.037
25	2.133	0.137	1.537	0.272	2.820	5.088	4.375	1.052
26	2.099	0.116	1.530	0.268	2.809	5.177	4.389	1.030
27	2.089	0.107	1.524	0.256	2.820	5.075	4.383	1.063
28	2.108	0.111	1.547	0.274	2.825	5.079	4.376	1.074
29	2.100	0.105	1.531	0.274	2.814	5.110	4.370	1.058
30	2.140	0.134	1.540	0.268	2.816	5.110	4.385	1.042
MIN	2.087	0.104	1.524	0.250	2.799	5.062	4.362	1.016
MAX	2.146	0.150	1.555	0.280	2.837	5.177	4.389	1.074
AVG	2.121	0.128	1.538	0.269	2.814	5.104	4.376	1.041

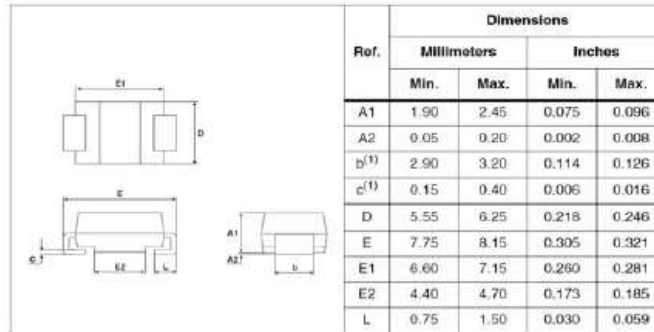
SMB package dimensions



Ref.	Dimensions			
	Millimeters		Inches ⁽¹⁾	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.3740	0.0965
A2	0.05	0.30	0.0020	0.0118
b	1.95	2.20	0.3700	0.0867
c	0.15	0.40	0.0059	0.0157
D	3.30	3.95	0.1299	0.1559
E	5.10	5.60	0.2008	0.2205
E1	4.05	4.30	0.1594	0.1691
L	0.75	1.30	0.0295	0.0511

Cote	A1	A2	b	c	D	E	E1	L
1	2.18	0.16	2.04	0.28	3.52	5.34	4.55	1.09
2	2.14	0.17	2.03	0.29	3.51	5.38	4.51	1.11
3	2.18	0.17	2.03	0.28	3.51	5.35	4.55	1.08
4	2.17	0.16	2.01	0.29	3.52	5.38	4.53	1.10
5	2.11	0.16	2.03	0.29	3.51	5.35	4.51	1.12
6	2.14	0.14	2.02	0.29	3.53	5.34	4.55	1.10
7	2.16	0.15	2.02	0.28	3.47	5.33	4.51	1.09
8	2.17	0.16	2.02	0.28	3.50	5.35	4.53	1.06
9	2.17	0.16	2.02	0.27	3.51	5.36	4.51	1.09
10	2.17	0.15	2.01	0.28	3.49	5.34	4.51	1.11
11	2.17	0.16	2.03	0.28	3.50	5.36	4.52	1.07
12	2.17	0.16	2.03	0.28	3.51	5.37	4.54	1.07
13	2.16	0.15	2.04	0.28	3.52	5.36	4.51	1.08
14	2.18	0.16	2.02	0.29	3.51	5.39	4.54	1.07
15	2.17	0.14	2.02	0.28	3.50	5.38	4.53	1.09
16	2.17	0.16	2.02	0.29	3.53	5.36	4.52	1.10
17	2.17	0.16	2.05	0.27	3.52	5.38	4.51	1.10
18	2.18	0.15	2.03	0.28	3.53	5.37	4.50	1.11
19	2.15	0.15	2.02	0.27	3.50	5.37	4.52	1.11
20	2.17	0.16	2.02	0.28	3.53	5.37	4.53	1.11
21	2.16	0.16	2.01	0.28	3.56	5.34	4.50	1.10
22	2.17	0.16	2.03	0.28	3.56	5.41	4.52	1.07
23	2.16	0.15	2.02	0.28	3.55	5.37	4.50	1.11
24	2.18	0.16	2.03	0.29	3.52	5.33	4.53	1.11
25	2.17	0.14	2.03	0.29	3.55	5.35	4.52	1.11
26	2.17	0.15	2.02	0.28	3.50	5.37	4.52	1.09
27	2.18	0.15	2.02	0.29	3.55	5.36	4.51	1.08
28	2.17	0.16	2.02	0.28	3.56	5.34	4.51	1.09
29	2.17	0.16	2.02	0.28	3.56	5.38	4.49	1.08
30	2.17	0.15	2.04	0.28	3.54	5.33	4.50	1.10
LSL	1.90	0.05	1.95	0.15	3.30	5.10	4.05	0.75
USL	2.45	0.20	2.20	0.40	3.95	5.60	4.60	1.50
MIN	2.11	0.14	2.01	0.27	3.47	5.33	4.49	1.06
MAX	2.18	0.17	2.05	0.29	3.56	5.41	4.55	1.12
AVG	2.17	0.16	2.02	0.28	3.52	5.36	4.52	1.09

SMC package dimensions



DIMENSION	A1	A2	b	c	D	E	E1	E2	L
Min (mm)	1.900	0.050	2.900	0.150	5.550	7.750	6.600	4.400	0.750
Max (mm)	2.450	0.200	3.200	0.400	6.250	8.150	7.150	4.700	1.500
1	2.047	0.144	2.952	0.267	5.796	7.839	6.909	4.508	1.108
2	2.096	0.158	3.004	0.263	5.692	7.804	6.910	4.553	1.102
3	2.038	0.146	2.976	0.274	5.758	7.782	6.922	4.537	1.111
4	2.097	0.151	2.960	0.262	5.687	7.793	6.927	4.543	1.102
5	2.086	0.152	2.984	0.269	5.765	7.806	6.895	4.557	1.093
6	2.071	0.146	2.996	0.275	5.762	7.790	6.933	4.561	1.091
7	2.061	0.141	3.005	0.286	5.755	7.783	6.917	4.565	1.064
8	2.101	0.137	3.007	0.285	5.744	7.791	6.878	4.556	1.078
9	2.099	0.129	2.976	0.276	5.788	7.794	6.925	4.568	1.112
10	2.096	0.137	2.955	0.261	5.767	7.822	6.911	4.564	1.15
11	2.122	0.161	2.983	0.271	5.765	7.783	6.918	4.569	1.08
12	2.100	0.155	3.000	0.267	5.779	7.775	6.899	4.539	1.106
13	2.123	0.153	2.990	0.262	5.789	7.808	6.875	4.570	1.118
14	2.104	0.149	3.003	0.271	5.800	7.801	6.869	4.564	1.084
15	2.053	0.144	2.988	0.271	5.770	7.782	6.887	4.554	1.092
16	2.110	0.146	3.012	0.267	5.752	7.780	6.907	4.558	1.104
17	2.067	0.155	2.981	0.257	5.770	7.790	6.861	4.590	1.11
18	2.095	0.147	2.996	0.262	5.780	7.785	6.883	4.567	1.103
19	2.100	0.146	2.994	0.260	5.793	7.783	6.861	4.572	1.104
20	2.097	0.152	3.005	0.260	5.784	7.793	6.680	4.555	1.097
21	2.097	0.148	2.992	0.253	5.768	7.803	6.863	4.561	1.107
22	2.094	0.159	2.971	0.270	5.770	7.788	6.904	4.556	1.091
23	2.095	0.152	2.983	0.288	5.766	7.804	6.933	4.573	1.075
24	2.109	0.137	3.008	0.279	5.779	7.786	6.925	4.584	1.093
25	2.077	0.142	2.970	0.265	5.768	7.781	6.892	4.587	1.085
26	2.085	0.158	2.963	0.263	5.756	7.769	6.915	4.559	1.076
27	2.069	0.140	3.005	0.265	5.801	7.796	6.875	4.571	1.092
28	2.104	0.146	2.981	0.270	5.765	7.761	6.906	4.589	1.105
29	2.096	0.142	2.975	0.269	5.768	7.801	6.895	4.563	1.068
30	2.067	0.136	2.989	0.260	5.761	7.784	6.875	4.578	1.094
MOY	2.089	0.147	2.987	0.268	5.767	7.792	6.892	4.562	1.097
MIN	2.038	0.129	2.952	0.253	5.687	7.761	6.680	4.508	1.064
MAX	2.123	0.161	3.012	0.288	5.801	7.839	6.933	4.590	1.150

6.3 Tests description

Test name	Description	Purpose
Die Oriented		
HTRB High Temperature Reverse Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: <ul style="list-style-type: none"> - Low power dissipation - Max. supply voltage compatible with diffusion process and internal circuitry limitations. Forward: device is forward biased with a current fixed and adjusted to reach the targeted junction temperature	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. To assess active area and contacts integrity
Package Oriented		
PC Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	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.
H3TRB High Humidity High Temperature Reverse Bias	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.
TC Temperature Cycling	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.
UHASt Unbiased Highly Accelerated Stress Test	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.
DPA Destructive Physical Analysis	Specific construction analysis on random parts that have successfully completed THB or TC.	To investigate on reliability stresses impact on delamination, corrosion and product construction integrity.
RSH Resistance to Solder Heat	Package is dipped by the leads in a solder bath after initial wet ageing (for SMDs only). Assessment by electrical test + no external crack	To simulate wave soldering process and verify that package will not be thermally damaged during this step.
Functional Tests		
RS Repetitive Surges	The device is submitted to a reverse current peak: I_{pp} , which depends of the current holding of the product.	To evaluate the holding of the component to a high electrical field. Short circuit or hot point is expected as failure mechanism.

(1) ADG: Automotive and Discrete Group

<h1>PCN</h1> <h2>Product/Process Change Notification</h2>			
<p>Die manufacturing process homogenization in ST Tours (France) for Automotive TVS (Transient Voltage Suppressor) devices</p>			
Notification number:	PDP/24/14540	Issue Date	12-Apr-2024
Issued by	Sophie da Silva		
Product series affected by the change	SM4TxxxY SMA6TxxxY SM6TxxxY SM15TxxxY SM30TxxxY SM50TxxxY Refer to attached table for involved Commercial Products		
Type of change	Front-End realization		
Description of the change			
Die manufacturing process homogenization for metallization and passivation at ST Tours on Automotive TVS.			
Reason for change			
In the frame of global production homogenization and continuous improvement, the latest metallization and passivation manufacturing processes developed on new products released will be applied to the whole TVS (Transient Voltage Suppressors) range.			
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 Moisture Sensitivity Level of the part (according to the IPC/JEDEC JSTD-020D standard) remains unchanged.</p> <p>There is no change in the packing modes and the standard delivery quantities either.</p>		
Disposition of former products			
Delivery of current products will be done until stock depletion.			

Issue date 12-Apr-2024

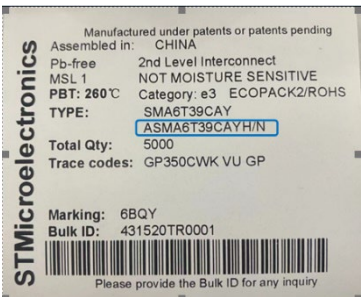
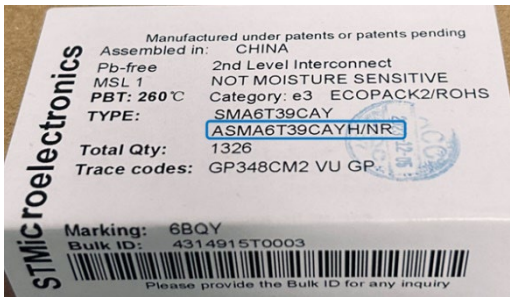
1/4

(1) ADG: Automotive and Discrete Group

Marking and traceability

Traceability of the change will be ensured by Finished Good/Type print on carton labels.

Commercial part number/Order code (example)	Former Finished Good/Type (example)	New Finished Good/Type (example)
SMA6T39CAY	ASMA6T39CAYH/N	Ending with /NR ASMA6T39CAYH/NR

Former Label (example)	New Label (example)
	

Qualification completion date

12-Apr-2024

Forecasted sample availability

Product family	Sub-family	Commercial part Number	Availability date
Protection	TVS	SM15T33CAY	Week18-2024
Protection	TVS	SM30T10AY	Week18-2024
Protection	TVS	SM30T10CAY	Week18-2024
Protection	TVS	SM30T12AY	Week18-2024
Protection	TVS	SM30T28AY	Week18-2024
Protection	TVS	SM30T33AY	Week18-2024
Protection	TVS	SM30T33CAY	Week18-2024
Protection	TVS	SM30T39CAY	Week18-2024
Protection	TVS	SM30T7.5CAY	Week18-2024
Protection	TVS	SM4T18AY	Week18-2024
Protection	TVS	SM4T30CAY	Week18-2024
Protection	TVS	SM4T33CAY	Week18-2024
Protection	TVS	SM4T35CAY	Week18-2024
Protection	TVS	SM4T39CAY	Week18-2024
Protection	TVS	SM4T47CAY	Week18-2024
Protection	TVS	SM4T82CAY	Week18-2024

Issue date 12-Apr-2024

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(1) ADG: Automotive and Discrete Group

Protection	TVS	SM6T30CAY	Week18-2024
Protection	TVS	SM6T33CAY	Week18-2024
Protection	TVS	SM6T36CAY	Week18-2024
Protection	TVS	SM6T39AY	Week18-2024
Protection	TVS	SM6T39CAY	Week18-2024
Protection	TVS	SMA6T18AY	Week18-2024
Protection	TVS	SMA6T28CAY	Week18-2024
Protection	TVS	SM30T220CAY	Week 21-2024

For sample(s) request, please inform FSE (Field Sales Engineer) in order to insert corresponding **Non-Standard Samples Order** (a single Commercial Product for each request) with **PCN reference** as additional information.

Other samples are available on demand.

Change implementation schedule

Sales-types	Estimated production start	Estimated first shipments
Finished Good	Week23-2024	Week42-2024

Comments:

With early PCN acceptance, shipments could be anticipated

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 180 days of receipt of this PCN will constitute acceptance of the change

Qualification program and results

24003QRP Attached

(1) ADG: Automotive and Discrete Group

Involved Commercial part numbers					
SMA package		SMB package		SMC package	
SM4T10AY	SMA6T10AY	SM6T10AY	SM15T10AY	SM30T100AY	SM50T10AY
SM4T10CAY	SMA6T10CAY	SM6T10CAY	SM15T10CAY	SM30T100CAY	SM50T12AY
SM4T12AY	SMA6T12AY	SM6T12AY	SM15T12AY	SM30T10AY	SM50T13AY
SM4T12CAY	SMA6T12CAY	SM6T12CAY	SM15T12CAY	SM30T10CAY	SM50T14AY
SM4T14AY	SMA6T14AY	SM6T15AY	SM15T15AY	SM30T117AY	SM50T15AY
SM4T14CAY	SMA6T14CAY	SM6T15CAY	SM15T15CAY	SM30T117CAY	SM50T16AY
SM4T15AY	SMA6T15AY	SM6T16V5AY	SM15T18AY	SM30T12AY	SM50T18AY
SM4T15CAY	SMA6T15CAY	SM6T16V5CAY	SM15T18CAY	SM30T12CAY	SM50T19AY
SM4T18AY	SMA6T18AY	SM6T18AY	SM15T22AY	SM30T152AY	SM50T21AY
SM4T18CAY	SMA6T18CAY	SM6T18CAY	SM15T22CAY	SM30T152CAY	SM50T23AY
SM4T21AY	SMA6T22AY	SM6T22AY	SM15T24AY	SM30T15AY	SM50T26AY
SM4T21CAY	SMA6T22CAY	SM6T22CAY	SM15T24CAY	SM30T15CAY	SM50T27AY
SM4T23AY	SMA6T24AY	SM6T24AY	SM15T27AY	SM30T180AY	SM50T28AY
SM4T23CAY	SMA6T24CAY	SM6T24CAY	SM15T27CAY	SM30T180CAY	SM50T30AY
SM4T26AY	SMA6T28AY	SM6T250CAY	SM15T30AY	SM30T18AY	SM50T33AY
SM4T26CAY	SMA6T28CAY	SM6T27AY	SM15T30CAY	SM30T18CAY	SM50T35AY
SM4T28AY	SMA6T30AY	SM6T27CAY	SM15T33AY	SM30T19AY	SM50T36AY
SM4T28CAY	SMA6T30CAY	SM6T30AY	SM15T33CAY	SM30T19CAY	SM50T39AY
SM4T30AY	SMA6T33AY	SM6T30CAY	SM15T36AY	SM30T200AY	SM50T42AY
SM4T30CAY	SMA6T33CAY	SM6T33AY	SM15T36CAY	SM30T200CAY	SM50T47AY
SM4T33AY	SMA6T36AY	SM6T33CAY	SM15T39AY	SM30T21AY	SM50T56AY
SM4T33CAY	SMA6T36CAY	SM6T36AY	SM15T39CAY	SM30T21CAY	SM50T68AY
SM4T35AY	SMA6T39AY	SM6T36CAY	SM15T47AY	SM30T220AY	SM50T6V8AY
SM4T35CAY	SMA6T39CAY	SM6T39AY	SM15T47CAY	SM30T220CAY	SM50T75AY
SM4T39AY	SMA6T47AY	SM6T39CAY	SM15T56AY	SM30T23AY	SM50T7V0AY
SM4T39CAY	SMA6T47CAY	SM6T42AY	SM15T56CAY	SM30T23CAY	SM50T7V5AY
SM4T47AY	SMA6T56AY	SM6T42CAY	SM15T68AY	SM30T26AY	
SM4T47CAY	SMA6T56CAY	SM6T47AY	SM15T68CAY	SM30T26CAY	
SM4T50AY	SMA6T68AY	SM6T47CAY	SM15T6V8AY	SM30T28AY	
SM4T50CAY	SMA6T68CAY	SM6T56AY	SM15T6V8CAY	SM30T28CAY	
SM4T56AY	SMA6T6V7AY	SM6T56CAY	SM15T75AY	SM30T30AY	
SM4T56CAY	SMA6T6V7CAY	SM6T68AY	SM15T75CAY	SM30T30CAY	
SM4T68AY	SMA6T7V6AY	SM6T68CAY	SM15T7V5AY	SM30T33AY	
SM4T68CAY	SMA6T7V6CAY	SM6T68AY	SM15T7V5CAY	SM30T33CAY	
SM4T6V7AY	SMA6T82AY	SM6T6V8AY	SM15T82AY	SM30T35AY	
SM4T6V7CAY	SMA6T82CAY	SM6T6V8CAY	SM15T82CAY	SM30T35CAY	
SM4T7V6AY		SM6T75AY		SM30T39AY	
SM4T7V6CAY		SM6T75CAY		SM30T39CAY	
SM4T82AY		SM6T7V5AY		SM30T42AY	
SM4T82CAY		SM6T7V5CAY		SM30T42AY	
		SM6T82AY		SM30T42CAY	
		SM6T82CAY		SM30T47AY	
				SM30T47CAY	
				SM30T56AY	
				SM30T56CAY	
				SM30T6.8AY	
				SM30T6.8CAY	
				SM30T68AY	
				SM30T68CAY	
				SM30T7.5AY	
				SM30T7.5CAY	
				SM30T75AY	
				SM30T75CAY	
				SM30T82AY	
				SM30T82CAY	
				SM50T82AY	

Qualification Report

Qualification of passivation and metal stack homogenization on TVS (SMD packages)

General Information		Locations	
Product Line	Protection	Wafer Fab	ST Tours (France)
Product Description	Automotive TVS products	Assembly Plant	Subcontractor (9941) - China
Product Perimeter	SM4TxxxY SMA6TxxxY SM6TxxxY SM15TxxxY SM30TxxxY SM50TxxxY	Reliability Lab	ST Tours (France)
Product Group	APMS		
Product Division	Discrete & Filter		
Packages	SMA - SMB - SMC		
Maturity level step	Qualified	Reliability Assessment	Compliant

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	January 16, 2024	20	A. KHEDIM	Julien MICHELON	Qualification passivation and metal stack Homogenization of TVS (SMD packages) Preliminary report
2.0	January 30, 2024	20	A. KHEDIM	Julien MICHELON	Addition of RSH test
3.0	April 11, 2024	25	A. KHEDIM	Timothée PINGAULT <small>Digitally signed by Timothée PINGAULT Date: 2024.04.12 12:28:59 +02'00'</small>	Updated §5.3 and §6.1

Note: This report is a summary of the qualification trials performed in good faith by STMicroelectronics in order to evaluate the potential risks during the product life using a set of defined test methods. This report does not imply for STMicroelectronics expressly or implicitly any contractual obligations other than as set forth in STMicroelectronics general terms and conditions of Sale. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics.

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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD 47	Stress-Test-Driven Qualification of Integrated Circuits
JESD 94	Application specific qualification using knowledge based test methodology
JESD 22	Reliability test methods for packaged devices
MIL-STD-750C	Test method for semiconductor devices
AEC-Q101 Rev.E (for Automotive products)	Failure Mechanism Based Stress Test Qualification for Discrete Semiconductors in Automotive Applications
ZVEI 5.0	Guideline for Customer Notifications of Product and /or Process Changes (PCN) of Electronic Components specified for Automotive Applications

2 GLOSSARY

DPA	Destructive Physical Analysis
GD	Generic Data
H3TRB	High Humidity High Temperature Reverse Bias
HTRB	High Temperature Reverse Bias
PD	Physical Dimensions
PV	Parametric Verification
RS	Repetitive Surges
RSH	Resistance to solder heat
SS	Sample Size
TC	Temperature Cycling
UHAST	Unbiased Highly Accelerated Stress Test

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify the change for homogenization of the SMD unidirectional and bidirectional product range :

- 400W & 600W TVS embedded in SMA package,
- 600W TVS embedded in SMB package,
- 1500W, 3000W and 5000W TVS embedded in SMC package.

Commercial Product	Package	Comment (optional)
SM4TxxxY	SMA	Automotive Grade
SMA6TxxxY	SMA	
SM6TxxxY	SMB	
SM15TxxxY	SMC	
SM30TxxxY	SMC	
SM50TxxxY	SMC	

Involved Commercial part numbers					
SMA package		SMB package		SMC package	
SM4T10AY	SMA6T10AY	SM6T10AY	SM15T10AY	SM30T100AY	SM50T10AY
SM4T10CAY	SMA6T10CAY	SM6T10CAY	SM15T10CAY	SM30T100CAY	SM50T12AY
SM4T12AY	SMA6T12AY	SM6T12AY	SM15T12AY	SM30T10AY	SM50T13AY
SM4T12CAY	SMA6T12CAY	SM6T12CAY	SM15T12CAY	SM30T10CAY	SM50T14AY
SM4T14AY	SMA6T14AY	SM6T14AY	SM15T14AY	SM30T117AY	SM50T15AY
SM4T14CAY	SMA6T14CAY	SM6T15CAY	SM15T15CAY	SM30T117CAY	SM50T16AY
SM4T15AY	SMA6T15AY	SM6T16V5AY	SM15T18AY	SM30T12AY	SM50T18AY
SM4T15CAY	SMA6T15CAY	SM6T16V5CAY	SM15T18CAY	SM30T12CAY	SM50T19AY
SM4T18AY	SMA6T18AY	SM6T18AY	SM15T22AY	SM30T152AY	SM50T21AY
SM4T18CAY	SMA6T18CAY	SM6T18CAY	SM15T22CAY	SM30T152CAY	SM50T23AY
SM4T21AY	SMA6T22AY	SM6T22AY	SM15T24AY	SM30T15AY	SM50T26AY
SM4T21CAY	SMA6T22CAY	SM6T22CAY	SM15T24CAY	SM30T15CAY	SM50T27AY
SM4T23AY	SMA6T24AY	SM6T24AY	SM15T27AY	SM30T180AY	SM50T28AY
SM4T23CAY	SMA6T24CAY	SM6T24CAY	SM15T27CAY	SM30T180CAY	SM50T30AY
SM4T26AY	SMA6T28AY	SM6T250CAY	SM15T30AY	SM30T18AY	SM50T33AY
SM4T26CAY	SMA6T28CAY	SM6T27AY	SM15T30CAY	SM30T18CAY	SM50T35AY
SM4T28AY	SMA6T30AY	SM6T27CAY	SM15T33AY	SM30T19AY	SM50T36AY
SM4T28CAY	SMA6T30CAY	SM6T30AY	SM15T33CAY	SM30T19CAY	SM50T39AY
SM4T30AY	SMA6T33AY	SM6T30CAY	SM15T36AY	SM30T200AY	SM50T42AY
SM4T30CAY	SMA6T33CAY	SM6T33AY	SM15T36CAY	SM30T200CAY	SM50T47AY
SM4T33AY	SMA6T36AY	SM6T33CAY	SM15T39AY	SM30T21AY	SM50T56AY
SM4T33CAY	SMA6T36CAY	SM6T36AY	SM15T39CAY	SM30T21CAY	SM50T68AY
SM4T35AY	SMA6T39AY	SM6T36CAY	SM15T47AY	SM30T220AY	SM50T6V8AY
SM4T35CAY	SMA6T39CAY	SM6T39AY	SM15T47CAY	SM30T220CAY	SM50T75AY
SM4T39AY	SMA6T47AY	SM6T39CAY	SM15T56AY	SM30T23AY	SM50T7V0AY
SM4T39CAY	SMA6T47CAY	SM6T42AY	SM15T56CAY	SM30T23CAY	SM50T7V5AY
SM4T47AY	SMA6T56AY	SM6T42CAY	SM15T68AY	SM30T26AY	
SM4T47CAY	SMA6T56CAY	SM6T47AY	SM15T68CAY	SM30T26CAY	
SM4T50AY	SMA6T68AY	SM6T47CAY	SM15T6V8AY	SM30T28AY	
SM4T50CAY	SMA6T68CAY	SM6T56AY	SM15T6V8CAY	SM30T28CAY	
SM4T56AY	SMA6T6V7AY	SM6T56CAY	SM15T75AY	SM30T30AY	
SM4T56CAY	SMA6T6V7CAY	SM6T68AY	SM15T75CAY	SM30T30CAY	
SM4T68AY	SMA6T7V6AY	SM6T68CAY	SM15T7V5AY	SM30T33AY	
SM4T68CAY	SMA6T7V6CAY	SM6T6V8AY	SM15T7V5CAY	SM30T33CAY	
SM4T6V7AY	SMA6T82AY	SM6T6V8CAY	SM15T82AY	SM30T35AY	
SM4T6V7CAY	SMA6T82CAY	SM6T75AY	SM15T82CAY	SM30T35CAY	
SM4T7V6AY		SM6T75CAY		SM30T39AY	
SM4T7V6CAY		SM6T7V5AY		SM30T39CAY	
SM4T82AY		SM6T7V5CAY		SM30T42AY	
SM4T82CAY		SM6T82AY		SM30T42CAY	
		SM6T82CAY		SM30T47AY	
				SM30T47CAY	
				SM30T56AY	
				SM30T56CAY	
				SM30T6.8AY	
				SM30T6.8CAY	
				SM30T68AY	
				SM30T68CAY	
				SM30T7.5AY	
				SM30T7.5CAY	
				SM30T75AY	
				SM30T75CAY	
				SM30T82AY	
				SM30T82CAY	
				SM50T82AY	

The reliability test methodology used follows the JESD47: "Stress Test driven Qualification Methodology" and AECQ-101 RevE guidelines.

The reliability tests ensuing are:

- TC to ensure the mechanical robustness of the products.
- HTRB to evaluate the risk of contamination from the resin and the assembly process versus the die layout sensitivity.
- H3TRB, UHAST to check the robustness to corrosion and the good package hermeticity.
- RSH to check compatibility of package with customer assembly.
- Functional test: Repetitive IPP to verify robustness of device submitted to rated Ipp (as per data sheet)

For some tests, similarity methodology is used. See 5.1 "comments" for more details about similarities.

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.

Based on these results, TVS in SMD packages are compliant with AEC-Q101 Rev.E.

4 DEVICE CHARACTERISTICS

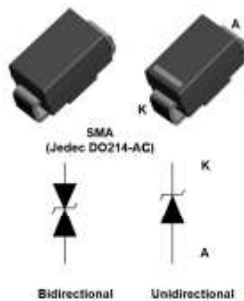
4.1 Device description

Example datasheet of TVS SMA package (SMA6T6V7CAY)



SMA6TY

Datasheet

Automotive 600 W TVS in SMA



Features

- AEC-Q101 qualified 
- Peak pulse power:
 - 600 W (10/1000 μ s) and 4 kW (8/20 μ s)
- Stand-off voltage range: from 5 V to 70 V
- Unidirectional and bidirectional types
- Low leakage current:
 - 0.2 μ A at 25 °C and 1 μ A at 85 °C
- Operating T_J max: 150 °C
- JEDEC registered package outline
- Lead finishing: matte tin plating

Complies with the following standards

- UL94, V0
- J-STD-020 MSL level 1
- J-STD-002, JESD 22-B102 E3 and MIL-STD-750, method 2026
- JESD-201 class 2 whisker test
- IPC7531 footprint and JEDEC registered package outline
- IEC 61000-4-4 level 4
 - 4 kV
- ISO 10605, IEC 61000-4-2, C = 150 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 10605, C = 330 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 7637-2 (not applicable to parts with V_{RM} lower than battery voltage)
 - Pulse 1: V_S = -150 V
 - Pulse 2a: V_S = +112 V
 - Pulse 3a: V_S = -220 V
 - Pulse 3b: V_S = +150 V

Description

The SMA6TY Transil series has been designed to protect sensitive automotive circuits against surges defined in ISO 7637-2 and against electrostatic discharges according to ISO 10605.

The planar technology makes this device compatible with high-end circuits where low leakage current and high junction temperature are required to provide reliability and stability over time. SMA6TY are packaged in SMA.

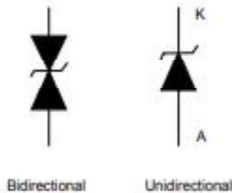
Product status link	
SMA6TY	SMA6T6V7AY, SMA6T6V7CAY, SMA6T7V6AY, SMA6T7V6CAY, SMA6T10AY, SMA6T10CAY, SMA6T12AY, SMA6T12CAY, SMA6T14AY, SMA6T14CAY, SMA6T15AY, SMA6T15CAY, SMA6T18AY, SMA6T18CAY, SMA6T22AY, SMA6T22CAY, SMA6T24AY, SMA6T24CAY, SMA6T28AY, SMA6T28CAY, SMA6T30AY, SMA6T30CAY, SMA6T33AY, SMA6T33CAY, SMA6T36AY, SMA6T36CAY, SMA6T39AY, SMA6T39CAY, SMA6T47AY, SMA6T47CAY, SMA6T56AY, SMA6T56CAY, SMA6T68AY, SMA6T68CAY, SMA6T82AY, SMA6T82CAY

Example datasheet of TVS SMB package (SM6T22CAY)



SM6TY

Datasheet

Automotive 600 W TVS in SMB



Features

- AEC-Q101 qualified 
- Peak pulse power: 600 W (10/1000 μ s) and 4 kW (8/20 μ s)
- Stand-off voltage range from 5 V to 188 V
- Unidirectional and bidirectional types
- Low leakage current: 0.2 μ A at 25 °C and 1 μ A at 85 °C
- Operating T_j max: 150 °C
- High power capability at T_j max.: up to 515 W (10/1000 μ s)
- Lead finishing: matte tin plating

Complies with the following standards

- UL94, V0
- J-STD-020 MSL level 1
- J-STD-002, JESD 22-B102 E3 and MIL-STD-750, method 2026 solderable matte tin plated leads
- JESD-201 class 2 whisker test
- IPC7531 footprint
- JEDEC registered package outline
- IEC 61000-4-4 level 4:
 - 4 kV
- ISO10605, IEC 61000-4-2, C= 150 pF - R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO10605 - C = 330 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO7637-2 (Not applicable to parts with stand-off voltage lower than battery voltage)
 - Pulse 1: $V_S = -150$ V
 - Pulse 2a: $V_S = +112$ V
 - Pulse 3a: $V_S = -220$ V
 - Pulse 3b: $V_S = +150$ V

Product status link	
SM6TY	SM6T6V8AY, SM6T6V8CAY, SM6T7V5AY, SM6T7V5CAY, SM6T10AY, SM6T10CAY, SM6T12AY, SM6T12CAY, SM6T15AY, SM6T15CAY, SM6T16V5AY, SM6T16V5CAY, SM6T18AY, SM6T18CAY, SM6T22AY, SM6T22CAY, SM6T24AY, SM6T24CAY, SM6T27AY, SM6T27CAY, SM6T30AY, SM6T30CAY, SM6T33AY, SM6T33CAY, SM6T36AY, SM6T36CAY, SM6T39AY, SM6T39CAY, SM6T42AY, SM6T42CAY, SM6T47AY, SM6T47CAY, SM6T56AY, SM6T56CAY, SM6T68AY, SM6T68CAY, SM6T75AY, SM6T75CAY, SM6T82AY, SM6T82CAY

Description

The SM6TY series are designed to protect sensitive automotive circuits against surges defined in ISO 7637-2 and against electrostatic discharges according to ISO 10605.

The Planar technology makes it compatible with high-end circuits where low leakage current and high junction temperature are required to provide long term reliability and stability.

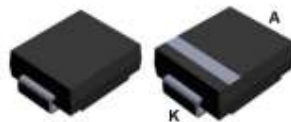
Example datasheet of TVS SMC package (SM50T30AY)



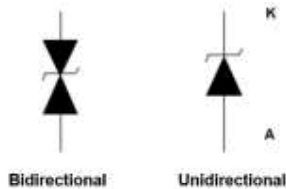
SM50TxxAY, SM50TxxCAY

Datasheet


Automotive 5000 W TVS in SMC



SMC
(JEDEC DO-214AB)



Features

- AEC-Q101 qualified 
- Peak pulse power:
 - 5000 W (10/1000 μ s)
 - up to 48 kW (8/20 μ s)
- Stand-off voltage range from 5 V to 100 V
- Unidirectional and bidirectional types
- Low leakage current: 0.2 μ A at 25 °C
- Operating T_j max: 175 °C
- JEDEC registered package outline
- Lead finishing: matte tin plating

Complies with the following standards

- UL94, V0
- J-STD-020 MSL level 1
- J-STD-002, JESD 22-B102 E3 and MIL-STD-750, method 2026
- JESD-201 class 2 whisker test
- IPC7531 footprint and JEDEC registered package outline
- IEC 61000-4-4 level 4:
 - 4 kV
- IEC 61000-4-2, C = 150 pF, R = 330 Ω exceeds level 4:
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 10605, C = 330 pF, R = 330 Ω :
 - 30 kV (air discharge)
 - 30 kV (contact discharge)
- ISO 7637-2 (not applicable to parts with V_{RM} lower than battery voltage):
 - Pulse 1: $V_S = -150$ V
 - Pulse 2a: $V_S = +112$ V
 - Pulse 3a: $V_S = -220$ V
 - Pulse3b: $V_S = +150$ V

Description

The SM50TY series are designed to protect sensitive automotive circuits against surges defined in ISO 7637-2 and against electrostatic discharges according to ISO 10605.

SM50TY is suitable for e-breaker and help to comply with ISO 16750.

The Planar technology makes it compatible with high-end circuits where low leakage current and high junction temperature are required to provide long term reliability and stability.

Product status link
SM50T6V8AY, SM50T6V8CAY,
SM50T7V0AY, SM50T7V0CAY,
SM50T7V5AY, SM50T7V5CAY,
SM50T10AY, SM50T10CAY,
SM50T12AY, SM50T12CAY,
SM50T13AY, SM50T13CAY,
SM50T14AY, SM50T14CAY,
SM50T15AY, SM50T15CAY,
SM50T16AY, SM50T16CAY,
SM50T18AY, SM50T18CAY,
SM50T19AY, SM50T19CAY,
SM50T21AY, SM50T21CAY,
SM50T23AY, SM50T23CAY,
SM50T26AY, SM50T26CAY,
SM50T27AY, SM50T27CAY,
SM50T28AY, SM50T28CAY,
SM50T30AY, SM50T30CAY,
SM50T33AY, SM50T33CAY,
SM50T35AY, SM50T35CAY,
SM50T36AY, SM50T36CAY,
SM50T39AY, SM50T39CAY,
SM50T42AY, SM50T42CAY,
SM50T47AY, SM50T47CAY,
SM50T56AY, SM50T56CAY,
SM50T68AY, SM50T68CAY,
SM50T75AY, SM50T75CAY,
SM50T82AY, SM50T82CAY,
SM50T100AY, SM50T100CAY,
SM50T117AY, SM50T117CAY

4.2 Construction Note

400W, 600W TVS package SMA qualification	
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - France
Technology / Process family	Discrete Transil
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - France
Assembly information	
Assembly site	Subcontractor (9941) - China
Package description	SMA
Molding compound	ECOPACK@2 molding compound
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	Subcontractor (9941) - China

600W TVS SMB qualification	
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - France
Technology / Process family	Discrete Transil
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - France
Assembly information	
Assembly site	Subcontractor (9941) - China
Package description	SMB
Molding compound	ECOPACK@2 molding compound
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	Subcontractor (9941) - China

1500W, 3000W, 5000W TVS SMC qualification	
Wafer/Die fab. information	
Wafer fab manufacturing location	ST Tours - France
Technology / Process family	Discrete Transil
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST Tours - France
Assembly information	
Assembly site	Subcontractor (9941) - China
Package description	SMC
Molding compound	ECOPACK@2 molding compound
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	Subcontractor (9941) - China

5 TESTS PLAN AND RESULTS SUMMARY

5.1 Test vehicles

Lot #	Finish Good	Package	Comments
Lot 1	SM4T39CAY	SMA	Qualification lot
Lot 2	SMAJ33CA	SMA	Qualification lot
Lot 3	SM6T39CA	SMB	Qualification lot
Lot 4	SM15T33CAY	SMC	Qualification lot
Lot 5	SM15T6V8CA	SMC	Qualification lot
Lot 6	SMC30J188CA	SMC	Qualification lot
Lot 7	SMC50J100A	SMC	Qualification lot
Lot 8	SMAJ5.0A	SMA	Qualification lot
Lot 9	SMA6J33A	SMA	Qualification lot
Lot 10	SM6T39AY	SMB	Qualification lot
Lot 11	SM30T6.8AY	SMC	Qualification lot
Lot 12	SM30T56CAY	SMC	Qualification lot

Detailed results in the chapter below will refer to these references.

5.2 **Test plan**

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
Pre and Post-Stress Electrical Test	TEST	User specification or supplier's standard Specification	All qualification parts tested per the requirements of the appropriate device specification.			
Pre-conditioning	PC	J-STD-020 JESD22-A113	All qualification parts tested per the requirements of the appropriate device specification.		As per targeted MSL Not applicable for PTH and WLCSP without coating	
MSL research	MSL	J-STD-020			Not applicable for PTH and WLCSP without coating	
External Visual	EV	JESD22B-101	All qualification parts tested per the requirements of the appropriate device specification.		Done during Assembly → Test & Finish inspection	
Parametric Verification	PV	User specification				
High Temperature Reverse Bias	HTRB	MIL-STD-750-1 M1038 Method A (for diodes, rectifiers and Zeners) M1039 Method A (for transistors)	Lot 1 Lot 2 Lot 3 Lot 4 Lot 5 Lot 6 Lot 7 Lot 9 Lot 10 Lot 11 Lot 12	77 77 77 77 77 77 77 77 77 77 77		X
AC blocking voltage	ACBV	MIL-STD-750-1 M1040 Test condition A			Required for Thyristor only. Alternative to HTRB	
High Temperature Forward Bias	HTFB	JESD22 A-108			Not required, applicable only to LEDs Alternative to HTRB	
High Temperature Operating Life	HTOL				Covered by HTRB or ACBV	
Steady State Operational	SSOP	MIL-STD-750-1 M1038 Test condition B			Required for Voltage Regulator (Zener) only.	
High Temperature Gate Bias	HTGB	JESD 22A-108			Required for Power MOSFET – IGBT only.	
High Temperature Storage Life	HTSL	JESD22 A-103			Covered by H3TRB	
Temperature Humidity Storage	THS	JESD22 A-118			Covered by H3TRB	
Temperature Cycling	TC	JESD22A-104	Lot 1 Lot 7 Lot 9 Lot 10 Lot 11	77 77 77 77 77		X
Temperature Cycling Hot Test	TCHT	JESD22A-104			Required for Power MOSFET – IGBT only.	
Temperature Cycling Delamination Test	TCDT	JESD22A-104 J-STD-035			Required for Power MOSFET – IGBT only. Alternative to TCHT	
Wire Bond Integrity	WBI	MIL-STD-750 Method 2037			For dissimilar metal bonding systems only	
Unbiased Highly Accelerated Stress Test	UHAST	JESD22A-118 or A101	Lot 1 Lot 2 Lot 3	77 77 77	Required for SCR/TRIAC RECTIFIER and Protection devices	X

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
			Lot 4 Lot 5 Lot 9 Lot 10 Lot 12	77 77 77 77 77		
Autoclave	AC	JESD22A-102			Alternative to UHAST	
Highly Accelerated Stress Test	HAST	JESD22A-110			Covered by H3TRB (same failure mechanisms activation).	
High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	Lot 1 Lot 2 Lot 3 Lot 7 Lot 10 Lot 12	77 77 77 77 77 77	Alternative to HAST	X
High Temperature High Humidity Bias	HTHH B	JED22A-101			Not required, LED only	
Intermittent Operational Life / Thermal Fatigue	IOL	MIL-STD-750 Method 1037			For power devices. Not required for Transient Voltage Suppressor (TVS) parts	
Power and Temperature Cycle	PTC	JED22A-105			For power devices. Not required for Transient Voltage Suppressor (TVS) parts Perform PTC if $\Delta T_j > 100^\circ\text{C}$ cannot be achieved with IOL Alternative to IOL	
ESD Characterization	ESD HBM	AEC Q101-001 and 005				
ESD Characterization	ESD CDM	AEC Q101-001 and 005				
Destructive Physical Analysis	DPA	AEC-Q101-004 Section 4	Lot 1 Lot 10 Lot 11 Lot 12	2 2*2 2 2	After H3TRB and TC	X
Physical Dimension	PD	JESD22B-100	Refer to annex 6.2			X
Terminal Strength	TS	MIL-STD-750 Method 2036			Required for leaded parts only	
Resistance to Solvents	RTS	JESD22B-107			Not applicable for Laser Marking	
Constant Acceleration	CA	MIL-STD-750 Method 2006			Required for hermetic packaged parts only.	
Vibration Variable Frequency	VVF	JESD22B-103			Required for hermetic packaged parts only.	
Mechanical Shock	MS	JESD22 B-104			Required for hermetic packaged parts only.	
Hermeticity	HER	JESD22A-109			Required for hermetic packaged parts only.	
Resistance to Solder Heat	RSH	JESD22 A-111 (SMD)	Lot 1 Lot 11	30 30		X
Solderability	SD	J-STD-002 JESD22B102				
Dead Bug Test	DBT	ST Internal specification			Mandatory for SMD package Data collection for PTH package	
Thermal Resistance	TR	JESD24-3, 24-4, 24-6 as appropriate			Required in case of process change. Not applicable to protection device as no limit specified in the datasheet	
Wire Bond Strength	WBS	MIL-STD-750 Method 2037			Covered during workability trials	

Stress	Abrv	Reference	Lot	SS	Comments	Test plan
Bond Shear	BS	AEC-Q101-003			Covered during workability trials	
Die Shear	DS	MIL-STD-750 Method 2017			Not Applicable to parts with solder paste die attach	
Unclamped Inductive Switching	UIS	AEC-Q101-004 section 2			Required for Power MOS and internally clamped IGBTs only	
Dielectric Integrity	DI	AEC-Q101-004 section 3			Required for Power MOSFET – IGBT only.	
Short Circuit Reliability Characterization	SCR	AEC-Q101-006			Required for smart power parts only	
Whisker Growth Evaluation	WG	AEC-Q005 JESD201				
Early Life Failure Rate	ELFR	JESD74			Recommended for new techno development in case of identified failure mechanism	
Functional Test (in rush, di/dt,...)	FT	Internal specification				
Repetitive Surge	RS	Internal specification	Lot 1 Lot 3 Lot 4 Lot 5 Lot 6 Lot 8 Lot 9 Lot 10 Lot 11 Lot 12	20 20 20 20 20 20 20 20 20 20	Required for protection devices only.	X

Low Temperature Storage	LTS	JESD-22 A119: 209			AQG324 test for Modules	
Thermal shock test	TST	JESD22-A104			AQG324 test for Modules	
Power Cycling (seconds)	PCsec	MIL-STD750-1 Method1037			AQG324 test for Modules	
Power Cycling (minutes)	PCmin	MIL-STD750-1 Method1037			AQG324 test for Modules	
Mechanical shock	MS	IEC 600068-2-27			AQG324 test for Modules	
Vibration	V	IEC60068-2-6			AQG324 test for Modules	



Note 1: These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers."

6 ANNEXES

6.1 Parametric Verification

SM30T6.8AY

Characterization SM30T6.8AY											
Date : 05/04/2024											
Ref : 23512A											
Lab : ST Tours Characterization Lab											
TEST	VBR	VBR	VBR	IRM	IRM	IRM	VCL 10/1000 µs	RD	VCL 8/20 µs	RD	
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES	
Condition 1	-40°C	25°C	85°C	-40°C	25°C	85°C	25°C	25°C	25°C	25°C	
Condition 2	IR=10mA	IR=10mA	IR=10mA	VRM=5V	VRM=5V	VRM=5V	IPP=327A	IF1=163.5A	IPP=1610A	IF1=805A	
Condition 3								IF2=327A		IF2=1610A	
Condition 4								VR1= 1-VCL 10/1000 µs		VR1= 1-VCL 8/20 µs	
Condition 5								VR2= 2-VCL 10/1000 µs		VR2= 2-VCL 8/20 µs	
Min. Datasheet		6.4									
Typ. Datasheet		6.8									
Max. Datasheet		7.1			20µA	50µA	9.2	6.42mohm	14.4	4.53mohm	
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	
UNIT	V	V	V	nA	nA	µA	V	Ohm	V	Ohm	
N	30	30	30	30	30	30	30	30	30	30	
Min	6.4	6.602	6.778	85.46	263.7	0.7618	8.27	0.00422	12.613	0.0035	
Max	6.536	6.755	6.938	288.1	727.7	1.477	8.48	0.004525	13.015	0.0037	
Avg.	6.461	6.66	6.845	198.43	417.71	1.118	8.332	0.004413	12.756	0.0036	

(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers

SM30T56CAY

Characterization SM30T56CAY													
Date : 05/04/2024													
Ref : 23514A													
Lab : ST Tours Characterization Lab													
TEST	VBR	VBR	VBR	VBR	VBR	VBR	IRM	IRM	IRM	IRM	IRM	IRM	IRM
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	-40°C	-40°C	25°C	25°C	85°C	85°C	-40°C	-40°C	25°C	25°C	85°C	85°C	85°C
Condition 2	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	VRM=48V	VRM=48V	VRM=48V	VRM=48V	VRM=48V	VRM=48V	VRM=48V
Condition 3													
Condition 4													
Condition 5													
Min. Datasheet			53.2	53.2									
Typ. Datasheet			56	56									
Max. Datasheet			58.8	58.8					0.2µA	0.2µA	1µA	1µA	
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	
UNIT	V	V	V	V	V	V	nA	nA	nA	nA	nA	nA	
N	30	30	30	30	30	30	30	30	30	30	30	30	
Min	50.31	50.35	53.6	53.63	56.47	56.5	1.709	1.319	9.963	6.893	10.5	19.29	
Max	51.77	52.05	55.16	55.53	58.19	58.56	43.95	73.25	25.05	21.15	107	139.4	
Avg	51.21	51.21	54.58	54.58	57.56	57.57	13.241	23.85	18.62	14.78	49.48	59.47	

TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TESTS_CALCULES	TESEC	TESTS_CALCULES	TESTS_CALCULES	TESTS_CALCULES
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Condition 2	IPP=38A	IPP=38A	IF1=19A	IF1=19A	IPP=409A	IPP=409A	F1=204.5A	F1=204.5A
Condition 3			IF2=38A	IF2=38A			IF2=409A	IF2=409A
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
Min. Datasheet								
Typ. Datasheet								
Max. Datasheet	76.6	76.6	468mohm	468mohm	100	100	101mohm	101mohm
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm
N	15	15	15	15	14	14	15	15
Min	63.8	63.4	0.2	0.205	72.67	72.33	0.0391	0.0391
Max	66.5	66.7	0.268	0.268	76	74.33	0.0407	0.0407
Avg	65.164	65.09	0.236	0.236	73.28	73.5	0.0397	0.0397

(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers



SM6T39AY

Characterization SM6T39AY										
Date : 05/04/2024										
Ref : 23510A										
Lab : ST Tours Characterization Lab										
TEST	VBR	VBR	VBR	IRM	IRM	IRM	VCL 10/1000 µs	RD	VCL 8/20 µs	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	-40°C	25°C	85°C	-40°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=1mA	IR=1mA	IR=1mA	VRM=33.3V	VRM=33.3V	VRM=33.3V	IPP=11.1A	IF1=5.55A	IPP=57A	IF1=28.5A
Condition 3								IF2=11A		IF2=57A
Condition 4								VR1= 1-VCL 10/1000 µs		VR1= 1-VCL 8/20 µs
Condition 5								VR2= 2-VCL 10/1000 µs		VR2= 2-VCL 8/20 µs
Min. Datasheet		37.1								
Typ. Datasheet		39								
Max. Datasheet		41			0.2µA	1µA	53.9	1.16	69.7	0.504
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	V	V	nA	nA	µA	V	Ohm	V	Ohm
N	30	30	30	30	30	30	30	30	30	30
Min	35.72	38.15	40.32	2.93	0.683	2.442	46.5	0.678	50	0.210
Max	37.05	39.56	41.79	49.81	8.204	50.79	48.3	0.844	53	0.234
Avg.	36.23	38.72	40.919	17.5	4.213	15.773	47.27	0.754	51.33	0.225
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers										

SM15T33CAY

Characterization SM15T33CAY												
Date : 05/04/2024												
Ref : 23468A												
Lab : ST Tours Characterization Lab												
TEST	VBR	VBR	VBR	VBR	VBR	VBR	IRM	IRM	IRM	IRM	IRM	IRM
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC
Condition 1	-40°C	-40°C	25°C	25°C	85°C	85°C	-40°C	-40°C	25°C	25°C	85°C	85°C
Condition 2	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	IR=1mA	VRM=28.2V	VRM=28.2V	VRM=28.2V	VRM=28.2V	VRM=28.2V	VRM=28.2V
Condition 3												
Condition 4												
Condition 5												
Min. Datasheet			31.4	31.4								
Typ. Datasheet			33	33								
Max. Datasheet			34.7	34.7			0.2µA	0.2µA	1µA	1µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	V	V	V	V	nA	nA	nA	nA	nA	nA
N	30	30	30	30	30	30	30	30	30	30	30	30
Min	30.26	30.28	32.06	32.09	33.68	33.72	1.83	3.91	0.95	1.25	2.59	2.54
Max	31.12	31.05	33.01	32.94	34.68	34.63	49.81	41.27	8.33	9.25	62.27	52.25
Avg	30.63	30.61	32.47	32.44	34.10	34.07	19.76	22.38	4.13	5.03	19.51	23.40
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD				
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES				
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C				
Condition 2	IPP=33A	IPP=33A	IF1=16.5A	IF1=16.5A	IPP=168A	IPP=168A	IF1=84.5A	IF1=84.5A				
Condition 3			IF2=33A	IF2=33A			IF2=168A	IF2=168A				
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs				
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs				
Min. Datasheet												
Typ. Datasheet												
Max. Datasheet	45.7	45.7	0.333ohm	0.333ohm	59	59	0.14ohm	0.14ohm				
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse				
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm				
N	15	15	15	15	15	15	15	15				
Min	36.900	37.300	0.1212	0.1212	38.690	38.690	0.0318	0.0318				
Max	38.400	38.300	0.1515	0.1455	39.570	39.570	0.0361	0.0361				
Avg	37.700	37.713	0.1374	0.1358	39.149	39.173	0.0338	0.0339				
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers												

SMA6J33A

Characterization SMA6J33A							
Date : 05/04/2024							
Ref : 23511A							
Lab : ST Tours Characterization Lab							
TEST	VBR	IRM	IRM	VCL 10/1000 µs	RD	VCL 8/20 µs	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	25°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=1mA	VRM=33V	VRM=33V	IPP=11.8A	IF1=5.9A	IPP=57A	IF1=28.5A
Condition 3					IF2=11.8A		IF2=57A
Condition 4					VR1= 1-VCL 10/1000 µs		VR1= 1-VCL 8/20 µs
Condition 5					VR2= 2-VCL 10/1000 µs		VR2= 2-VCL 8/20 µs
Min. Datasheet	36.7						
Typ. Datasheet	38.6						
Max. Datasheet	40.6	0.2µA	1µA	51.9	0.963	69	0.512
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	nA	nA	V	Ohm	V	Ohm
N	30	30	30	30	30	30	30
Min	38.13	0.952	1.05	46.6	0.559	51.37	0.172
Max	40.19	22.71	46.88	49.8	0.779	54.49	0.235
Avg.	38.86	10.485	21.13	47.23	0.655	52.3	0.218
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.							
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SM6T39CA

Characterization SM6T39CA							
Date : 05/04/2024							
Ref : 23467A							
Lab : ST Tours Characterization Lab							
TEST	VBR	VBR	IRM	IRM	IRM	IRM	
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C	
Condition 2	IR=1mA	IR=1mA	VRM=33.3V	VRM=33.3V	VRM=33.3V	VRM=33.3V	
Condition 3							
Condition 4							
Condition 5							
Min. Datasheet	37.1	37.1					
Typ. Datasheet	39	39					
Max. Datasheet	41	41	0.2µA	0.2µA	1µA	1µA	
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	
UNIT	V	V	nA	nA	nA	nA	
N	30	30	30	30	30	30	
Min	38.56	38.56	1.444	1.807	8.314	9.649	
Max	39.75	39.95	2.42	2.45	14.35	13.03	
Avg.	39.013	39	1.8317	2.069	11.568	11.21	
VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
IPP=11.1A	IPP=11.1A	IF1=5.55A	IF1=5.55A	IPP=57A	IPP=57A	IF1=28.5A	IF1=28.5A
		IF2=11A	IF2=11A			IF2=57A	IF2=57A
		VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
		VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
53.9	53.9	1.16	1.16	69.7	69.7	0.504	0.504
Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
V	V	Ohm	Ohm	V	V	Ohm	Ohm
15	15	15	15	15	15	15	15
45.9	45.9	0.5714	0.5893	49	49	0.1754	0.1754
47.3	48.7	0.6964	0.6786	50.33	51.67	0.1870	0.1989
46.586	46.693	0.6262	0.6345	49.55	49.75	0.1762	0.1817
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.							
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SM15T6V8CA

Characterization SM15T6V8CA								
Date : 05/04/2024								
Ref : 23469A								
Lab : ST Tours Characterization Lab								
TEST	VBR	VBR	IRM	IRM	IRM	IRM		
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C	85°C	
Condition 2	IR=1mA	IR=1mA	VRM=5.8V	VRM=5.8V	VRM=5.8V	VRM=5.8V	VRM=5.8V	
Condition 3								
Condition 4								
Condition 5								
Min. Datasheet	6.45	6.45						
Typ. Datasheet	6.8	6.8						
Max. Datasheet	7.14	7.14	500µA	500µA	2000µA	2000µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse		
UNIT	V	V	µA	µA	µA	µA		
N	30	30	30	30	30	30		
Min	6.798	6.775	5.348	5.47	13.43	13.92		
Max	6.899	6.901	10.45	10.35	24.17	24.42		
Avg.	6.835	6.835	8.131	8.293	19.44	19.81		
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Condition 2	IPP=143A	IPP=143A	IF1=72A	IF1=72A	IPP=746A	IPP=746A	IF1=370A	IF1=370A
Condition 3			IF2=143A	IF2=143A			IF2=746A	IF2=746A
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
Min. Datasheet								
Typ. Datasheet								
Max. Datasheet	10.5	10.5	0.023	0.023	13.4	13.4	0.008ohm	0.008ohm
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	Ohm	Ohm	V	V	ohm	ohm
N	15	15	15	15	15	15	15	15
Min	8.25	8.21	0.00633	0.00647	11.73	11.8	0.00585	0.005851
Max	8.45	8.42	0.00845	0.00957	12.07	12.07	0.006382	0.006569
Avg.	8.31	8.26	0.00685	0.00729	11.85	11.91	0.00603	0.006184
(**)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.								
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers								

SMC30J188CA

Characterization SMC30J188CA								
Date : 05/04/2024								
Ref : 23470A								
Lab : ST Tours Characterization Lab								
TEST	VBR	VBR	IRM	IRM	IRM	IRM		
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC	
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C	85°C	
Condition 2	IR=1mA	IR=1mA	VRM=188V	VRM=188V	VRM=188V	VRM=188V	VRM=188V	
Condition 3								
Condition 4								
Condition 5								
Min. Datasheet	209	209						
Typ. Datasheet	220	220						
Max. Datasheet	237	237	0.2µA	0.2µA	1µA	1µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse		
UNIT	V	V	nA	nA	nA	nA		
N	30	30	30	30	30	30		
Min	215.3	214.8	20.27	3.809	23.44	21.98		
Max	224.4	221	51.57	36.82	86.44	100.8		
Avg.	217.58	217.5	32.048	21.58	50.12	54.9		
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Condition 2	IPP=9A	IPP=9A	IF1=4.5A	IF1=4.5A	IPP=80A	IPP=80A	IF1=40A	IF1=40A
Condition 3			IF2=9A	IF2=9A			IF2=80A	IF2=80A
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
Min. Datasheet								
Typ. Datasheet								
Max. Datasheet	328	328	10778mohm	10778mohm	388	388	1963mohm	1963mohm
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm
N	15	15	15	15	15	15	15	15
Min	247.8	261.6	0.333	3.755	272.2	273.8	0.418	0.4875
Max	270.8	267.1	4.333	4.444	278.6	279.8	0.548	0.52
Avg.	262.63	264.01	3.822	4.112	276.413	277.08	0.511	0.508
(**)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.								
Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers								

SMC50J100A

Characterization SMC50J100A-TR							
Date : 05/04/2024							
Ref : 23471A							
Lab : ST Tours Characterization Lab							
TEST	VBR	IRM	IRM	VCL 10/1000 μ s	RD	VCL 8/20 μ s	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	25°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=1mA	VRM=100V	VRM=100V	IPP=28A	IF1=14A	IPP=227A	IF1=114A
Condition 3					IF2=28A		IF2=227A
Condition 4					VR1= 1-VCL 10/1000 μ s		VR1= 1-VCL 8/20 μ s
Condition 5					VR2= 2-VCL 10/1000 μ s		VR2= 2-VCL 8/20 μ s
Min. Datasheet	111						
Typ. Datasheet	117						
Max. Datasheet	123	0,2 μ A	1 μ A	179	2000mohm	212	392mohm
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	nA	nA	V	mohm	V	mohm
N	30	30	30	30	30	30	30
Min	114.8	7.301	10.01	142.5	892.85	159.82	0.181
Max	118.2	25.69	59.09	147.5	1130.71	164.83	0.196
Avg.	116.09	16.86	26.55	144.49	958.52	161.22	0.186
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SMAJ5.0A

Characterization SMAJ5.0AH-TR							
Date : 05/04/2024							
Ref : 23510A							
Lab : ST Tours Characterization Lab							
TEST	VBR	IRM	IRM	VCL 10/1000 μ s	RD	VCL 8/20 μ s	RD
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TEST CALCULES	TESEC	TESTS_CALCULES
Condition 1	25°C	25°C	85°C	25°C	25°C	25°C	25°C
Condition 2	IR=10mA	VRM=5V	VRM=5V	IPP=43.5A	IF1=21.75A	IPP=174A	IF1=87A
Condition 3					IF2=43.5A		IF2=174A
Condition 4					VR1= 1-VCL 10/1000 μ s		VR1= 1-VCL 8/20 μ s
Condition 5					VR2= 2-VCL 10/1000 μ s		VR2= 2-VCL 8/20 μ s
Min. Datasheet	6.40						
Typ. Datasheet	6.74						
Max. Datasheet		20 μ A	50 μ A	9.2	0.049	13.4	0.036ohm
Comments	Direct	Direct	Direct	Direct	Direct	Direct	Direct
UNIT	V	nA	nA	V	Ohm	V	Ohm
N	30	30	30	30	30	30	30
Min	6.686	25.5	82.13	8.41	0.021	12.04	0.0289
Max	6.819	220	397.2	8.68	0.04	12.6	0.0331
Avg.	6.731	48.33	122.76	8.53	0.0352	12.29	0.0308
(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances. Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers							

SM4T39CAY

Characterization SM4T39CAY								
Date : 08/04/2024								
Ref : 23465A								
Lab : ST Tours Characterization Lab								
TEST	VBR	VBR	IRM	IRM	IRM	IRM		
EQUIPMENT	TESEC	TESEC	TESEC	TESEC	TESEC	TESEC		
Condition 1	25°C	25°C	25°C	25°C	85°C	85°C		
Condition 2	IR=1mA	IR=1mA	VRM=33V	VRM=33V	VRM=33V	VRM=33V		
Condition 3								
Condition 4								
Condition 5								
Min. Datasheet	36.7	36.7						
Typ. Datasheet	38.6	38.6						
Max. Datasheet	40.5	40.5	0,2µA	0,2µA	1µA	1µA		
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse		
UNIT	V	V	nA	nA	nA	nA		
N	30	30	30	30	30	30		
Min	37.70	37.45	1.22	1.05	1.42	1.07		
Max	38.97	38.68	18.34	18.73	40.88	43.76		
Avg.	38.09	38.13	8.23	6.81	15.36	16.59		
TEST	VCL 10/1000 µs	VCL 10/1000 µs	RD	RD	VCL 8/20 µs	VCL 8/20 µs	RD	RD
EQUIPMENT	TESEC	TESEC	TEST CALCULES	TEST CALCULES	TESEC	TESEC	TESTS_CALCULES	TESTS_CALCULES
Condition 1	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Condition 2	IPP=7.5A	IPP=7.5A	IF1=3.7A	IF1=3.7A	IPP=33A	IPP=33A	IF1=17A	IF1=17A
Condition 3			IF2=7.5A	IF2=7.5A			IF2=33A	IF2=33A
Condition 4			VR1= 1-VCL 10/1000 µs	VR1= 1-VCL 10/1000 µs			VR1= 1-VCL 8/20 µs	VR1= 1-VCL 8/20 µs
Condition 5			VR2= 2-VCL 10/1000 µs	VR2= 2-VCL 10/1000 µs			VR2= 2-VCL 8/20 µs	VR2= 2-VCL 8/20 µs
Min. Datasheet								
Typ. Datasheet								
Max. Datasheet	53.3	53.3	1.70	1.70	69.7	69.7	0.884	0.884
Comments	Direct	Reverse	Direct	Reverse	Direct	Reverse	Direct	Reverse
UNIT	V	V	Ohm	Ohm	V	V	Ohm	Ohm
N	15	15	15	15	15	15	15	15
Min	45.10	45.10	0.8421	0.8421	46.67	47.00	0.2500	0.2294
Max	47.20	47.70	1.1579	1.2105	48.33	48.33	0.2919	0.2919
Avg.	46.20	46.05	1.0053	1.0000	47.60	47.58	0.2680	0.2655
<p>(*)These data are indicative values given as information only. Please note that the ST guarantee is the compliance of the products to the ST datasheet. Parameters distributions are not considered as a ST guarantee under any circumstances.</p> <p>Please note that these electrical parameters are 100% tested at 25°C at Final stage of back-end manufacturing before deliveries to customers</p>								

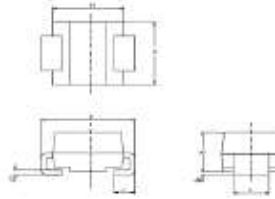
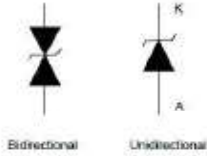
6.2 Physical Dimensions

SMA package dimensions



Spec	A1	A2	b	c	D	E	E1	L
MIN:	1.90	0.05	1.25	0.15	2.25	4.80	3.95	0.75
MAX:	2.45	0.20	1.65	0.40	2.90	5.35	4.60	1.50
1	2.134	0.142	1.549	0.280	2.818	5.069	4.380	1.066
2	2.107	0.150	1.536	0.250	2.825	5.065	4.379	1.055
3	2.138	0.133	1.539	0.268	2.800	5.080	4.383	1.040
4	2.129	0.113	1.551	0.277	2.806	5.128	4.371	1.037
5	2.124	0.124	1.537	0.271	2.810	5.115	4.364	1.051
6	2.093	0.137	1.528	0.261	2.817	5.062	4.371	1.055
7	2.116	0.144	1.551	0.275	2.802	5.117	4.375	1.039
8	2.087	0.104	1.539	0.266	2.810	5.131	4.379	1.023
9	2.132	0.118	1.543	0.273	2.804	5.080	4.382	1.041
10	2.132	0.122	1.541	0.280	2.814	5.133	4.375	1.021
11	2.137	0.142	1.535	0.271	2.801	5.088	4.379	1.021
12	2.089	0.132	1.528	0.261	2.806	5.109	4.371	1.016
13	2.146	0.137	1.533	0.267	2.820	5.123	4.380	1.072
14	2.136	0.112	1.544	0.270	2.818	5.096	4.366	1.045
15	2.115	0.132	1.533	0.271	2.813	5.092	4.368	1.042
16	2.107	0.119	1.532	0.276	2.837	5.097	4.382	1.039
17	2.125	0.130	1.541	0.269	2.819	5.104	4.375	1.020
18	2.132	0.134	1.532	0.265	2.803	5.112	4.376	1.045
19	2.139	0.142	1.528	0.268	2.827	5.113	4.379	1.029
20	2.121	0.118	1.529	0.263	2.804	5.127	4.383	1.016
21	2.130	0.140	1.543	0.271	2.823	5.127	4.368	1.040
22	2.146	0.136	1.555	0.273	2.814	5.079	4.362	1.020
23	2.114	0.130	1.536	0.263	2.799	5.102	4.376	1.036
24	2.126	0.140	1.549	0.272	2.820	5.133	4.380	1.037
25	2.133	0.137	1.537	0.272	2.820	5.088	4.375	1.052
26	2.099	0.116	1.530	0.268	2.809	5.177	4.389	1.030
27	2.089	0.107	1.524	0.256	2.820	5.075	4.383	1.063
28	2.108	0.111	1.547	0.274	2.825	5.079	4.376	1.074
29	2.100	0.105	1.531	0.274	2.814	5.110	4.370	1.058
30	2.140	0.134	1.540	0.268	2.816	5.110	4.385	1.042
MIN	2.087	0.104	1.524	0.250	2.799	5.062	4.362	1.016
MAX	2.146	0.150	1.555	0.280	2.837	5.177	4.389	1.074
AVG	2.121	0.128	1.538	0.269	2.814	5.104	4.376	1.041

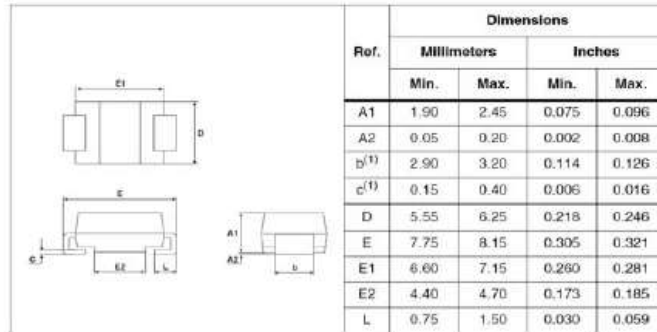
SMB package dimensions



Ref.	Dimensions			
	Millimeters		Inches ⁽¹⁾	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.3740	0.0965
A2	0.05	0.30	0.0020	0.0118
b	1.95	2.20	0.2708	0.0867
c	0.15	0.40	0.0059	0.0157
D	3.30	3.95	0.1299	0.1559
E	5.10	5.60	0.2008	0.2205
E1	4.05	4.30	0.1594	0.1691
L	0.75	1.30	0.0295	0.0511

Cote	A1	A2	b	c	D	E	E1	L
1	2.18	0.16	2.04	0.28	3.52	5.34	4.55	1.09
2	2.14	0.17	2.03	0.29	3.51	5.38	4.51	1.11
3	2.18	0.17	2.03	0.28	3.51	5.35	4.55	1.08
4	2.17	0.16	2.01	0.29	3.52	5.38	4.53	1.10
5	2.11	0.16	2.03	0.29	3.51	5.35	4.51	1.12
6	2.14	0.14	2.02	0.29	3.53	5.34	4.55	1.10
7	2.16	0.15	2.02	0.28	3.47	5.33	4.51	1.09
8	2.17	0.16	2.02	0.28	3.50	5.35	4.53	1.06
9	2.17	0.16	2.02	0.27	3.51	5.36	4.51	1.09
10	2.17	0.15	2.01	0.28	3.49	5.34	4.51	1.11
11	2.17	0.16	2.03	0.28	3.50	5.36	4.52	1.07
12	2.17	0.16	2.03	0.28	3.51	5.37	4.54	1.07
13	2.16	0.15	2.04	0.28	3.52	5.36	4.51	1.08
14	2.18	0.16	2.02	0.29	3.51	5.39	4.54	1.07
15	2.17	0.14	2.02	0.28	3.50	5.38	4.53	1.09
16	2.17	0.16	2.02	0.29	3.53	5.36	4.52	1.10
17	2.17	0.16	2.05	0.27	3.52	5.38	4.51	1.10
18	2.18	0.15	2.03	0.28	3.53	5.37	4.50	1.11
19	2.15	0.15	2.02	0.27	3.50	5.37	4.52	1.11
20	2.17	0.16	2.02	0.28	3.53	5.37	4.53	1.11
21	2.16	0.16	2.01	0.28	3.56	5.34	4.50	1.10
22	2.17	0.16	2.03	0.28	3.56	5.41	4.52	1.07
23	2.16	0.15	2.02	0.28	3.55	5.37	4.50	1.11
24	2.18	0.16	2.03	0.29	3.52	5.33	4.53	1.11
25	2.17	0.14	2.03	0.29	3.55	5.35	4.52	1.11
26	2.17	0.15	2.02	0.28	3.50	5.37	4.52	1.09
27	2.18	0.15	2.02	0.29	3.55	5.36	4.51	1.08
28	2.17	0.16	2.02	0.28	3.56	5.34	4.51	1.09
29	2.17	0.16	2.02	0.28	3.56	5.38	4.49	1.08
30	2.17	0.15	2.04	0.28	3.54	5.33	4.50	1.10
LSL	1.90	0.05	1.95	0.15	3.30	5.10	4.05	0.75
USL	2.45	0.20	2.20	0.40	3.95	5.60	4.60	1.50
MIN	2.11	0.14	2.01	0.27	3.47	5.33	4.49	1.06
MAX	2.18	0.17	2.05	0.29	3.56	5.41	4.55	1.12
AVG	2.17	0.16	2.02	0.28	3.52	5.36	4.52	1.09

SMC package dimensions



DIMENSION	A1	A2	b	c	D	E	E1	E2	L
Min (mm)	1.900	0.050	2.900	0.150	5.550	7.750	6.600	4.400	0.750
Max (mm)	2.450	0.200	3.200	0.400	6.250	8.150	7.150	4.700	1.500
1	2.047	0.144	2.952	0.267	5.796	7.839	6.909	4.508	1.108
2	2.096	0.158	3.004	0.263	5.692	7.804	6.910	4.553	1.102
3	2.038	0.146	2.976	0.274	5.758	7.782	6.922	4.537	1.111
4	2.097	0.151	2.960	0.262	5.687	7.793	6.927	4.543	1.102
5	2.086	0.152	2.984	0.269	5.765	7.806	6.895	4.557	1.093
6	2.071	0.146	2.996	0.275	5.762	7.790	6.933	4.561	1.091
7	2.061	0.141	3.005	0.286	5.755	7.783	6.917	4.565	1.064
8	2.101	0.137	3.007	0.285	5.744	7.791	6.878	4.556	1.078
9	2.099	0.129	2.976	0.276	5.788	7.794	6.925	4.568	1.112
10	2.096	0.137	2.955	0.261	5.767	7.822	6.911	4.564	1.15
11	2.122	0.161	2.983	0.271	5.765	7.783	6.918	4.569	1.08
12	2.100	0.155	3.000	0.267	5.779	7.775	6.899	4.539	1.106
13	2.123	0.153	2.990	0.262	5.789	7.808	6.875	4.570	1.118
14	2.104	0.149	3.003	0.271	5.800	7.801	6.869	4.564	1.084
15	2.053	0.144	2.988	0.271	5.770	7.782	6.887	4.554	1.092
16	2.110	0.146	3.012	0.267	5.752	7.780	6.907	4.558	1.104
17	2.067	0.155	2.981	0.257	5.770	7.790	6.861	4.590	1.11
18	2.095	0.147	2.996	0.262	5.780	7.785	6.883	4.567	1.103
19	2.100	0.146	2.994	0.260	5.793	7.783	6.861	4.572	1.104
20	2.097	0.152	3.005	0.260	5.784	7.793	6.680	4.555	1.097
21	2.097	0.148	2.992	0.253	5.768	7.803	6.863	4.561	1.107
22	2.094	0.159	2.971	0.270	5.770	7.788	6.904	4.556	1.091
23	2.095	0.152	2.983	0.288	5.766	7.804	6.933	4.573	1.075
24	2.109	0.137	3.008	0.279	5.779	7.786	6.925	4.584	1.093
25	2.077	0.142	2.970	0.265	5.768	7.781	6.892	4.587	1.085
26	2.085	0.158	2.963	0.263	5.756	7.769	6.915	4.559	1.076
27	2.069	0.140	3.005	0.265	5.801	7.796	6.875	4.571	1.092
28	2.104	0.146	2.981	0.270	5.765	7.761	6.906	4.589	1.105
29	2.096	0.142	2.975	0.269	5.768	7.801	6.895	4.563	1.068
30	2.067	0.136	2.989	0.260	5.761	7.784	6.875	4.578	1.094
MOY	2.089	0.147	2.987	0.268	5.767	7.792	6.892	4.562	1.097
MIN	2.038	0.129	2.952	0.253	5.687	7.761	6.680	4.508	1.064
MAX	2.123	0.161	3.012	0.288	5.801	7.839	6.933	4.590	1.150

6.3 Tests description

Test name	Description	Purpose
Die Oriented		
HTRB High Temperature Reverse Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: <ul style="list-style-type: none"> - Low power dissipation - Max. supply voltage compatible with diffusion process and internal circuitry limitations. Forward: device is forward biased with a current fixed and adjusted to reach the targeted junction temperature	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. To assess active area and contacts integrity
Package Oriented		
PC Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	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.
H3TRB High Humidity High Temperature Reverse Bias	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.
TC Temperature Cycling	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.
UHASt Unbiased Highly Accelerated Stress Test	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.
DPA Destructive Physical Analysis	Specific construction analysis on random parts that have successfully completed THB or TC.	To investigate on reliability stresses impact on delamination, corrosion and product construction integrity.
RSH Resistance to Solder Heat	Package is dipped by the leads in a solder bath after initial wet ageing (for SMDs only). Assessment by electrical test + no external crack	To simulate wave soldering process and verify that package will not be thermally damaged during this step.
Functional Tests		
RS Repetitive Surges	The device is submitted to a reverse current peak: I_{pp} , which depends of the current holding of the product.	To evaluate the holding of the component to a high electrical field. Short circuit or hot point is expected as failure mechanism.