

Features

- Peak pulse power:
 - 1500 W (10/1000 μ s)
- Stand off voltage range: from 5 V to 188 V
- Unidirectional and bidirectional types
- Operating T_j max: 150 °C
- JEDEC registered package outline

Complies with the following standards

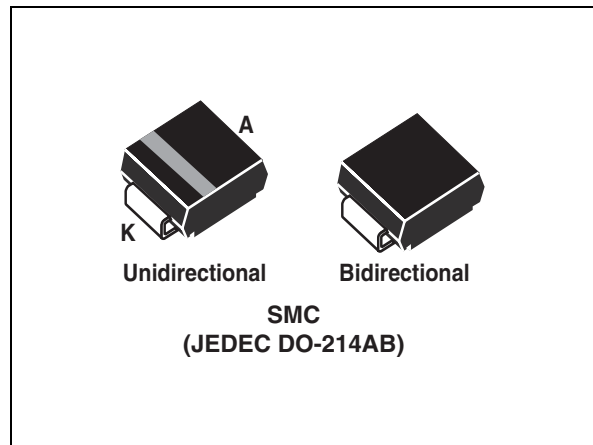
- IEC61000-4-2 level 4
 - 15 kV (air discharge)
 - 8 kV (contact discharge)
- IEC61000-4-5 (see [Table 3](#) for surge level)
- MIL STD 883G - Method 3015-7 Class 3B
 - 25 kV HBM (human body model)
- UL94V-0 approved resin
- MIL-STD-750, Method 2026 solderability
- EIA STD RS-481 and IEC60286-3 packing
- IPC7531 footprint

Description

The SMCJ Transil series has been designed to protect sensitive equipment against electrostatic discharges according to IEC61000-4-2, MIL STD 883 Method 3015, and electrical IEC stress such as IEC61000-4-4 and 5. They are more generally for surges below 1500 W 10/1000 μ s.

The planar technology makes it compatible with high-end equipment and SMPS where low leakage current and high junction temperature are required to provide reliability and stability over time.

SMCJ are packaged in SMC (SMC footprint in accordance with IPC 7531 standard).



TM: Transil is a trademark of STMicroelectronics

1 Characteristics

Table 1. Absolute maximum ratings ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter	Value	Unit
P_{PP}	Peak pulse power dissipation ⁽¹⁾	$T_j \text{ initial} = T_{amb}$ 1500	W
P	Power dissipation on infinite heatsink	$T_{amb} = 60\text{ }^{\circ}\text{C}$ 6.5	W
I_{FSM}	Non repetitive surge peak forward current for unidirectional types	$t_p = 10\text{ ms}$ $T_j \text{ initial} = T_{amb}$ 200	A
T_{stg}	Storage temperature range	-65 to +150	$^{\circ}\text{C}$
T_j	Operating junction temperature range	-55 to +150	$^{\circ}\text{C}$
T_L	Maximum lead temperature for soldering during 10 s.	260	$^{\circ}\text{C}$

1. For a surge greater than the maximum values, the diode will fail in short-circuit.

Table 2. Thermal resistances

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to leads	15	$^{\circ}\text{C/W}$
$R_{th(j-a)}$	Junction to ambient on printed circuit on recommended pad layout	90	$^{\circ}\text{C/W}$

Figure 1. Electrical characteristics - parameters

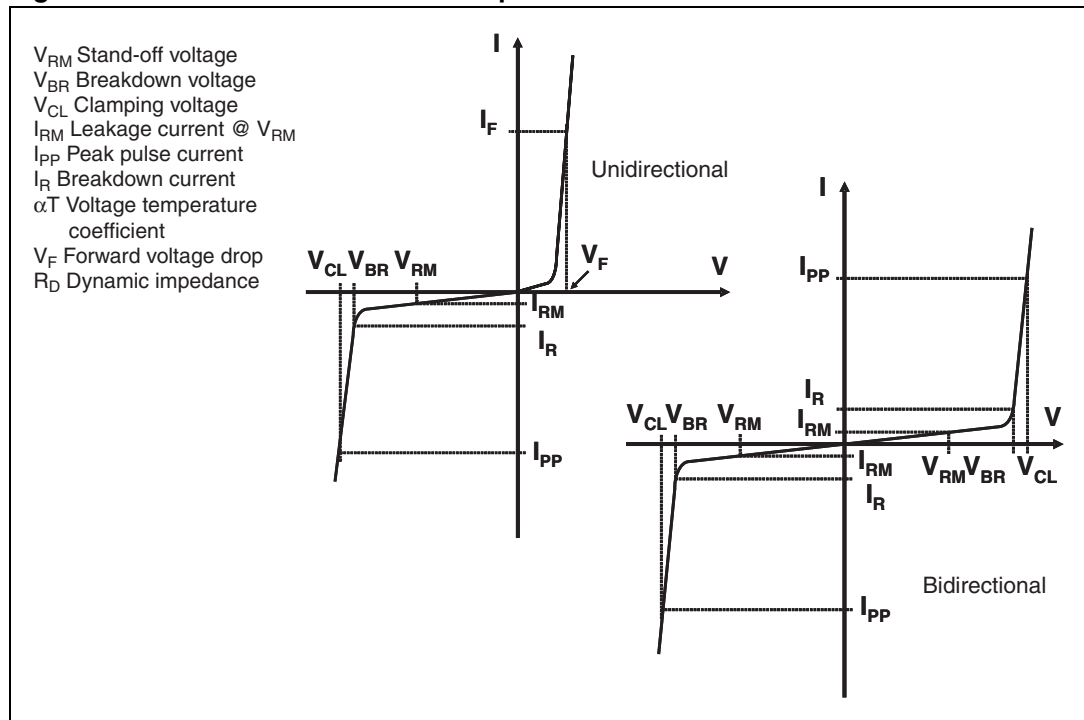


Table 3. Electrical characteristics - parameter values ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Type	$I_{RM} @ V_{RM}$		$V_{BR} @ I_R \text{ min}^{(1)}$		$V_{CL} @ I_{PP} \text{ 10/1000 } \mu\text{s}$		$V_{CL} @ I_{PP} \text{ 8/20 } \mu\text{s}$		$\alpha T^{(2)}$
	max		min		max		max		max
	μA	V	V	mA	V	A	V	A	10-4/ $^{\circ}\text{C}$
SMCJ5.0A/CA	800	5.0	6.4	10	9.2	171	13.4	746	5.7
SMCJ6.0A/CA	800	6.0	6.7	10	10.3	152	13.7	730	5.9
SMCJ6.5A/CA	500	6.5	7.2	10	11.2	140	14.5	690	6.1
SMCJ8.5A/CA	5	8.5	9.4	1	14.4	105	19.5	512	7.3
SMCJ10A/CA	5	10	11.1	1	17	92	21.7	461	7.8
SMCJ12A/CA	5	12	13.3	1	19.9	79	25.3	394	8.3
SMCJ13A/CA	1	13	14.4	1	21.5	73	27.2	368	8.4
SMCJ15A/CA	1	15	16.7	1	24.4	64	32.5	308	8.8
SMCJ18A/CA	1	18	20.0	1	29.2	53	39.3	254	9.2
SMCJ20A/CA	1	20	22.2	1	32.4	48	42.8	234	9.4
SMCJ22A/CA	1	22	24.4	1	35.5	44	48.3	207	9.6
SMCJ24A/CA	1	24	26.7	1	38.9	40	50	200	9.6
SMCJ26A/CA	1	26	28.9	1	42.1	37	53.5	187	9.7
SMCJ28A/CA	1	28	31.1	1	45.4	34	59	169	9.8
SMCJ30A/CA	1	30	33.3	1	48.4	32	64.3	156	9.9
SMCJ33A/CA	1	33	36.7	1	53.3	29	69.7	143	10.0
SMCJ40A/CA	1	40	44.4	1	64.5	24	84	119	10.1
SMCJ48A/CA	1	48	53.3	1	77.4	20	100	100	10.3
SMCJ58A/CA	1	58	64.4	1	93.6	16	121	83	10.4
SMCJ70A/CA	1	70	77.8	1	113	13.9	146	69	10.5
SMCJ85A/CA	1	85	94	1	137	11.5	178	56	10.6
SMCJ100A/CA	1	100	111	1	162	9.7	212	47	10.7
SMCJ130A/CA	1	130	144	1	209	7.5	265	38	10.8
SMCJ154A/CA	1	154	171	1	246	6.1	317	31.5	10.8
SMCJ170A/CA	1	170	189	1	275	5.7	353	28	10.8
SMCJ188A/CA	1	188	209	1	328	4.6	388	26	10.8

1. Pulse test : $t_p < 50 \text{ ms}$

2. To calculate V_{BR} versus junction temperature, use the following formula :
 $V_{BR} @ T_J = V_{BR} @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$

Figure 2. Pulse form

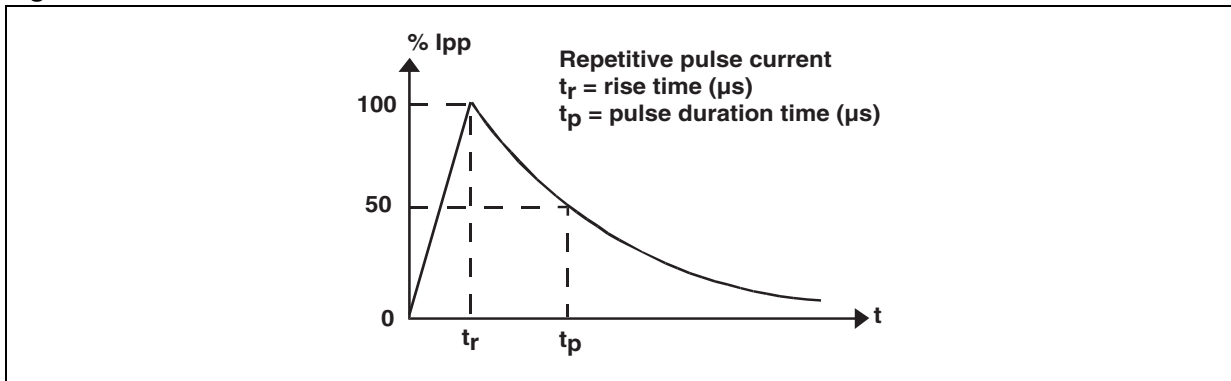


Figure 3. Peak pulse power dissipation versus initial junction temperature

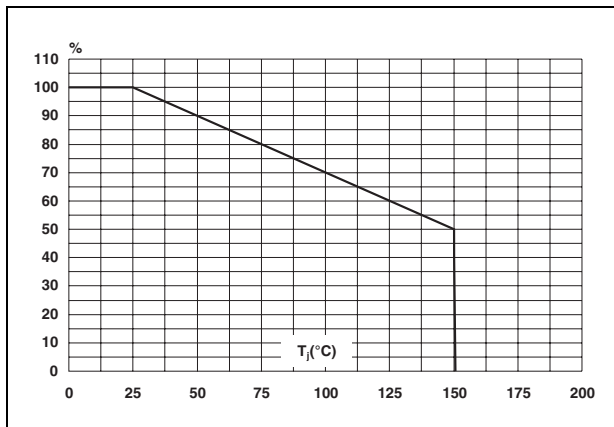


Figure 4. Peak pulse power versus exponential pulse duration (T_j initial = 25 °C)

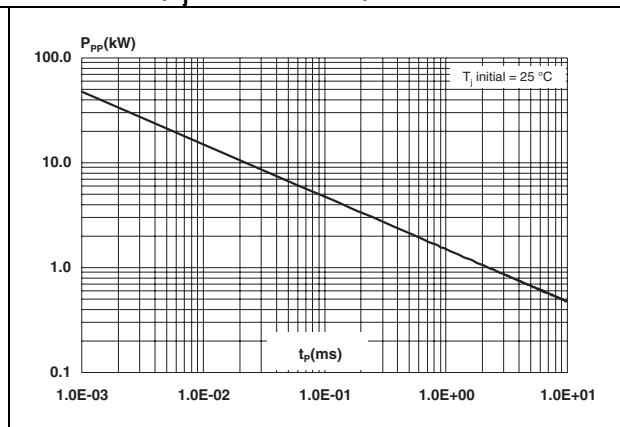


Figure 5. Clamping voltage versus peak pulse current (exponential waveform, maximum values)

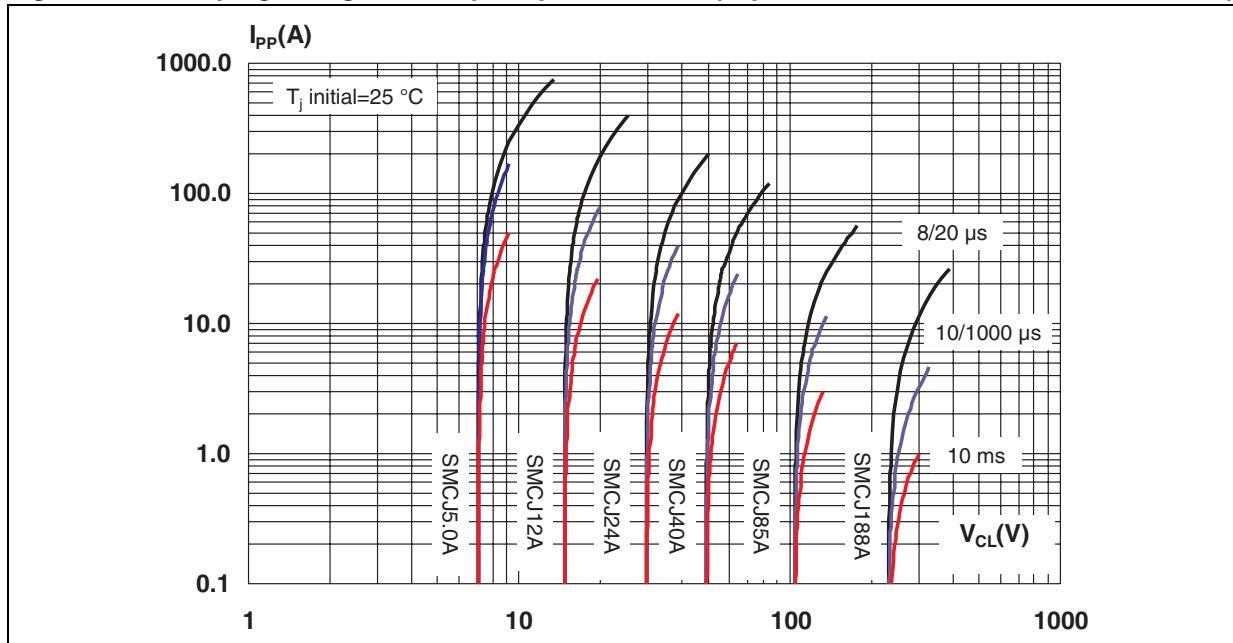


Figure 6. Junction capacitance versus reverse applied voltage for unidirectional types (typical values)

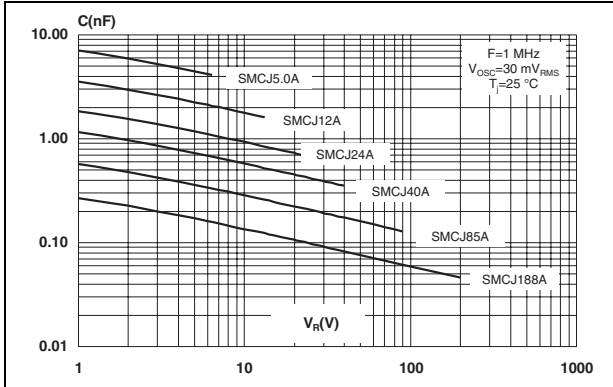


Figure 7. Junction capacitance versus reverse applied voltage for bidirectional types (typical values)

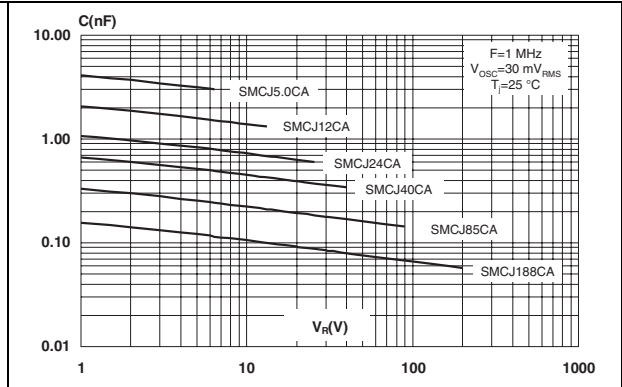


Figure 8. Peak forward voltage drop versus peak forward current (typical values)

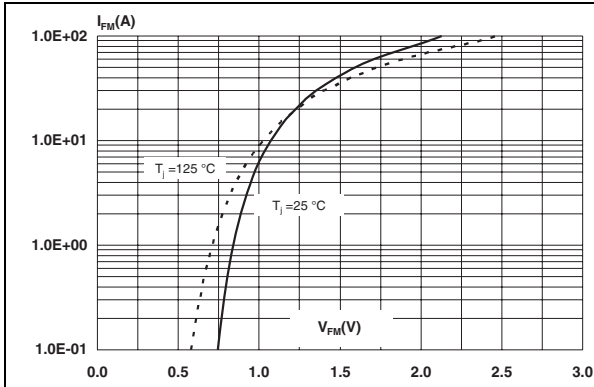


Figure 9. Relative variation of thermal impedance, junction to ambient, versus pulse duration

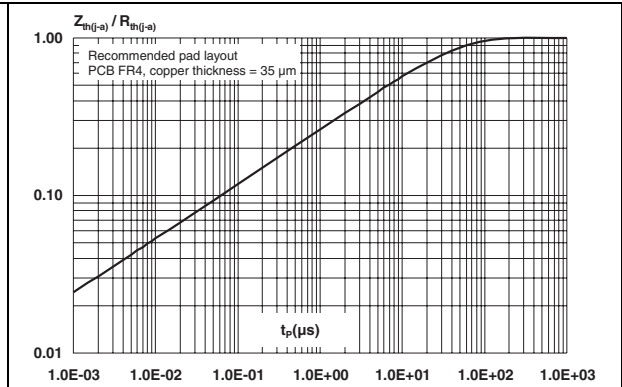


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead

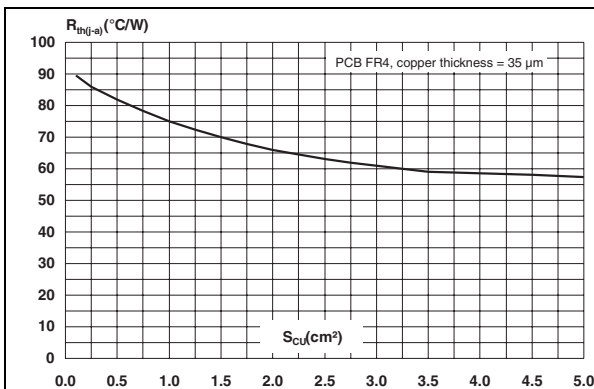
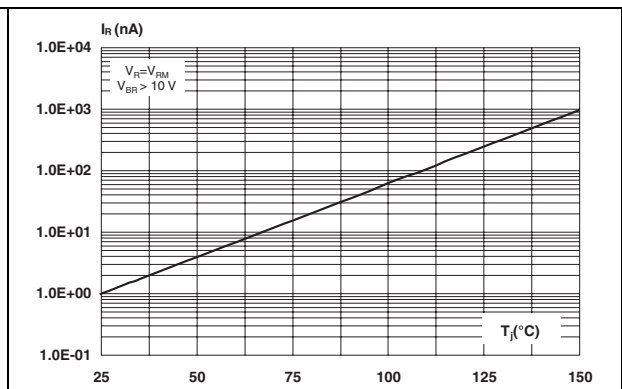
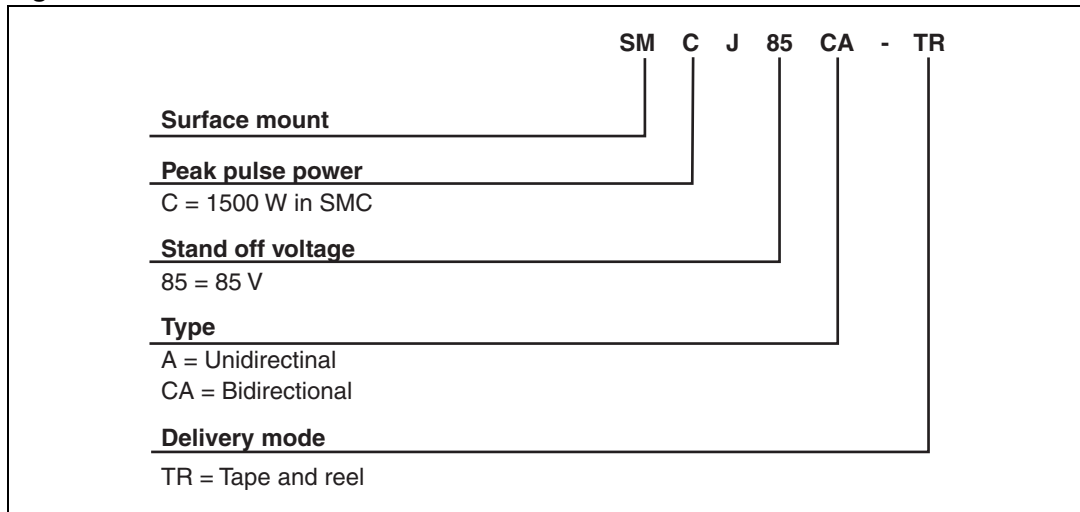


Figure 11. Leakage current versus junction temperature (typical values)



2 Order information scheme

Figure 12. Order information scheme



3 Package information

- Case: JEDEC DO-214AB molded plastic over planar junction
- Terminals: solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: for unidirectional types the band indicates cathode
- Flammability: epoxy is rated UL94V-0
- RoHS package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 4. SMC dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	2.90	3.2	0.114	0.126
c	0.15	0.41	0.006	0.016
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
D	5.55	6.25	0.218	0.246
L	0.75	1.60	0.030	0.063

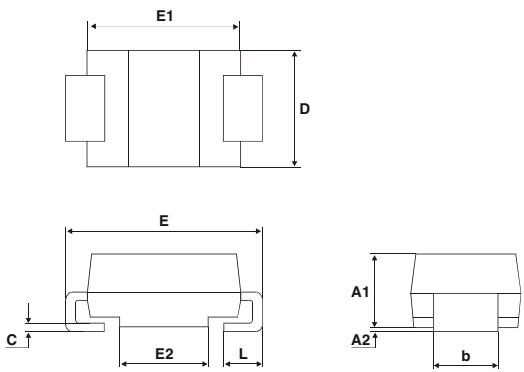


Figure 13. Footprint dimensions (millimeter)

Figure 14. Marking layout

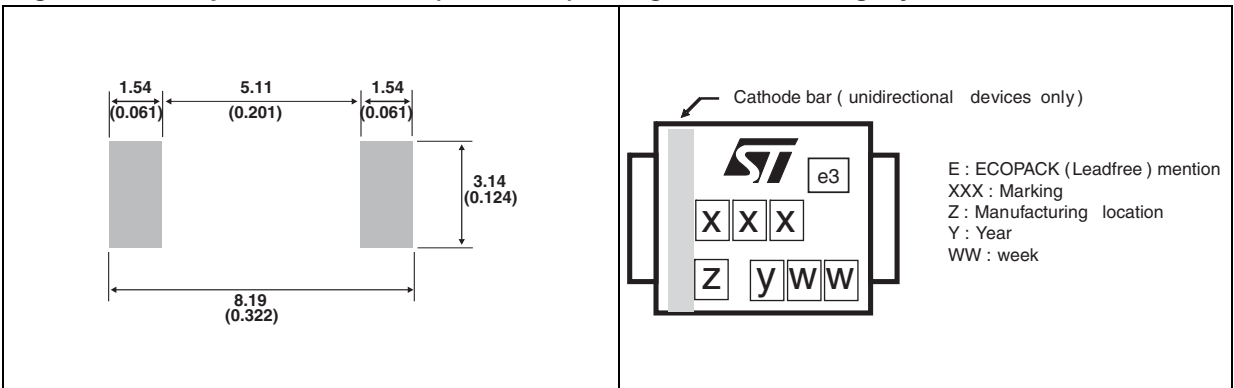


Table 5. Marking

Type	Marking	Type	Marking
SMCJ5.0A-TR	FUA	SMCJ5.0CA-TR	FBA
SMCJ6.0A-TR	FUB	SMCJ6.0CA-TR	FBB
SMCJ6.5A-TR	FUC	SMCJ6.5CA-TR	FBC
SMCJ8.5A-TR	FUD	SMCJ8.5CA-TR	FBD
SMCJ10A-TR	FUF	SMCJ10CA-TR	FBF
SMCJ12A-TR	FUH	SMCJ12CA-TR	FBH
SMCJ13A-TR	FUI	SMCJ13CA-TR	FBI
SMCJ15A-TR	FUJ	SMCJ15CA-TR	FBJ
SMCJ18A-TR	FUL	SMCJ18CA-TR	FBL
SMCJ20A-TR	FUM	SMCJ20CA-TR	FBM
SMCJ22A-TR	FUN	SMCJ22CA-TR	FBN
SMCJ24A-TR	FUO	SMCJ24CA-TR	FBO
SMCJ26A-TR	FUP	SMCJ26CA-TR	FBP
SMCJ28A-TR	FUQ	SMCJ28CA-TR	FBQ
SMCJ30A-TR	FUR	SMCJ30CA-TR	FBR
SMCJ33A-TR	FUS	SMCJ33CA-TR	FBS
SMCJ40A-TR	FUU	SMCJ40CA-TR	FBU
SMCJ48A-TR	FUW	SMCJ48CA-TR	FBW
SMCJ58A-TR	FUZ	SMCJ58CA-TR	FBZ
SMCJ70A-TR	GUB	SMCJ70CA-TR	GBB
SMCJ85A-TR	GUE	SMCJ85CA-TR	GBE
SMCJ100A-TR	GUG	SMCJ100CA-TR	GBG
SMCJ130A-TR	GUI	SMCJ130CA-TR	GBI
SMCJ154A-TR	GUL	SMCJ154CA-TR	GBL
SMCJ170A-TR	GUM	SMCJ170CA-TR	GBM
SMCJ188A-TR	GUN	SMCJ188CA-TR	GBN

4 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
SMCJxxxA-TR	See Table 5	SMC	0.25 g	2500	Tape and reel
SMCJxxxCA-TR	See Table 5	SMC	0.25 g	2500	Tape and reel

5 Revision history

Table 7. Document revision history

Date	Revision	Changes
August-1999	5A	Previous update.
14-May-2009	6	Reformatted to current standards. Added ECOPACK statement.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2009 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com