SM15T

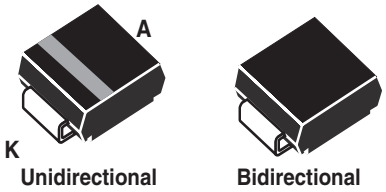
Transil™

Features

- Peak pulse power:
  - 1500 W (10/1000 µs)
- Breakdown voltage range: from 6.8 V to 220 V
- Unidirectional and bidirectional types
- Operating $T_{j\ max}$: 150 °C
- JEDEC registered package outline

Complies with the following standards

- IEC 61000-4-2 level 4
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- IEC61000-4-5
  - See *Table 4* for surge level
- MIL STD 883G-Method 3015-7: class 3B
  - 25 kV HBM (Human Body Model)
- UL 497B UL File Number :E136224
- UL94V-0 approved resin
- MIL-STD-750, Method 2026 soldererabilty
- EIA STD RS-481 & IEC60286-3 packing
- IPC7531 footprint



SMC
(JEDEC DO-214AB)

Description

TThe SM15T Transil series has been designed to protect sensitive equipment against electrostatic discharges according to IEC 61000-4-2, MIL STD 883 Method 3015, and electrical over stress such as IEC 61000-4-4 and 5. They are more generally for surges below 1500 W 10/1000 µs.

This 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.

SM15T are packaged in SMC (SMC footprint in accordance with IPC 7531 standard).

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1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter		Value	Unit
P_{PP}	Peak pulse power dissipation(1)	$T_{j\ initial} = T_{amb}$	1500	W
P	Power dissipation on infinite heatsink	T_{amb} = 55 °C	6.3	W
I_{FSM}	Non repetitive surge peak forward current for unidirectional types	t_p = 10 ms $T_{j\ initial} = T_{amb}$	200	A
T_{stg}	Storage temperature range		-65 to + 150	°C
T_j	Operating junction temperature range		-55 to + 150	°C
T_L	Maximum lead temperature for soldering during 10 s.		260	°C

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

Table 2. Thermal parameter

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

Table 3. Electrical characteristics - definitions

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current @ V_{RM}
I_{PP}	Peak pulse current
αT	Voltage temperature coefficient
V_F	Forward voltage drop
R_D	Dynamic resistance

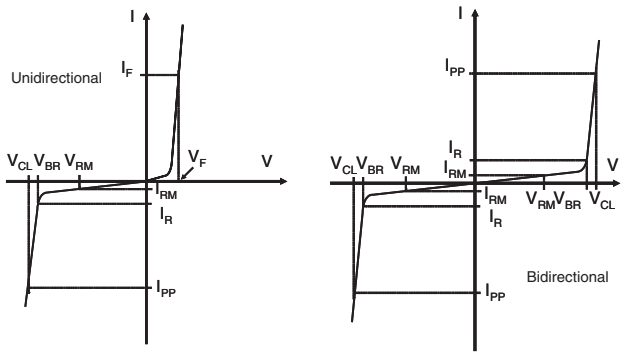


Table 4. Electrical characteristics - values (T_{amb} = 25 °C)

Type	I_{RM} @ V_{RM} max		V_{BR} @ I_R(1)				V_{CL} @ I_{PP} 10/1000 µs		V_{CL} @ I_{PP} 8/20 µs		αT(2)
			min	typ	max		max		max		max
	µA	V	V			mA	V	A	V	A	10^{-4}/°C
SM15T6V8A/CA	1000	5.8	6.45	6.8	7.14	10	10.5	143	13.4	746	5.7
SM15T7V5A/CA	500	6.4	7.13	7.5	7.88	10	11.3	132	14.5	690	6.1
SM15T10A/CA	10	8.55	9.5	10	10.5	1	14.5	103	18.6	538	7.3
SM15T12A/CA	1	10.2	11.4	12	12.6	1	16.7	90	21.7	461	7.8
SM15T15A/CA	1	12.8	14.3	15	15.8	1	21.2	71	27.2	368	8.4
SM15T18A/CA	1	15.3	17.1	18	18.9	1	25.2	59.5	32.5	308	8.8
SM15T22A/CA	1	18.8	20.9	22	23.1	1	30.6	49	39.3	254	9.2
SM15T24A/CA	1	20.5	22.8	24	25.2	1	33.2	45	42.8	234	9.4
SM15T27A/CA	1	23.1	25.7	27	28.4	1	37.5	40	48.3	207	9.6
SM15T30A/CA	1	25.6	28.5	30	31.5	1	41.5	36	53.5	187	9.7
SM15T33A/CA	1	28.2	31.4	33	34.7	1	45.7	33	59.0	169	9.8
SM15T36A/CA	1	30.8	34.2	36	37.8	1	49.9	30	64.3	156	9.9
SM15T39A/CA	1	33.3	37.1	39	41.0	1	53.9	28	69.7	143	10.0
SM15T68A/CA	1	58.1	64.6	68	71.4	1	92	16.3	121	83	10.4
SM15T75A/CA	1	64.1	71.3	75	78.8	1	103	14.6	134	75	10.5
SM15T100A/CA	1	85.5	95.0	100	105	1	137	11	178	56	10.6
SM15T150A/CA	1	128	143	150	158	1	207	7.2	265	38	10.8
SM15T200A/CA	1	171	190	200	210	1	274	5.5	353	28	10.8
SM15T220A/CA	1	188	209	220	231	1	328	4.6	388	26	10.8

1. Pulse test: t_p < 50 ms.
2. To calculate VBR versus junction temperature, use the following formula:
   $V_{BR\ @TJ} = V_{BR\ @\ 25\ °C}$ x (1 + αT x (T_J - 25))

Figure 1. Repetitive peak pulse current wave form

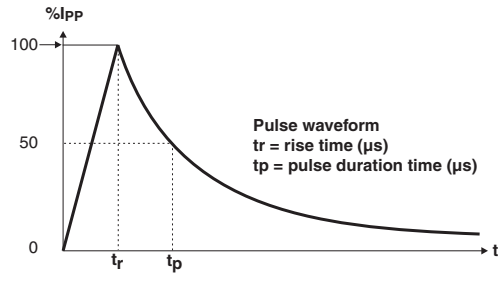


Figure 2. Peak pulse power dissipation versus initial junction temperature

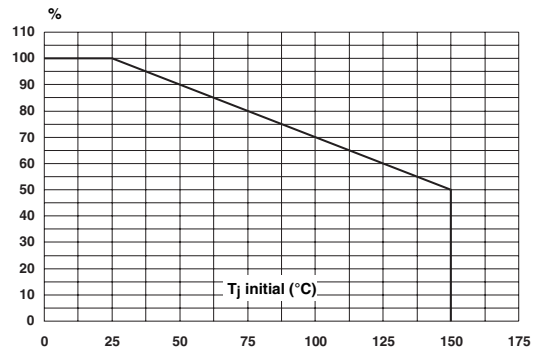


Figure 3. Peak pulse power versus exponential pulse duration

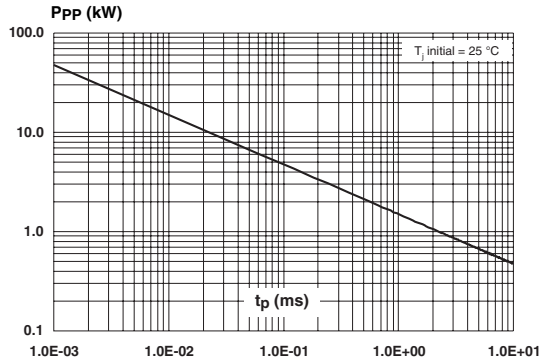


Figure 4. Clamping voltage versus peak pulse current (maximum values)

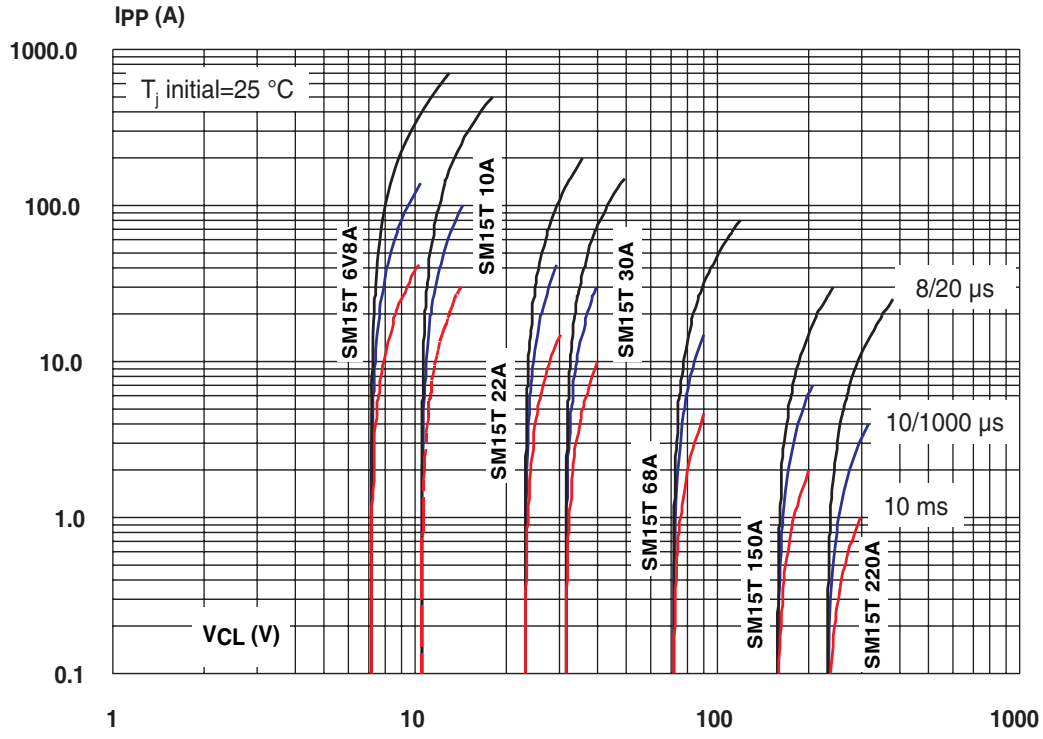


Figure 5. Capacitance versus reverse applied voltage (typical values, SM15TxxA)

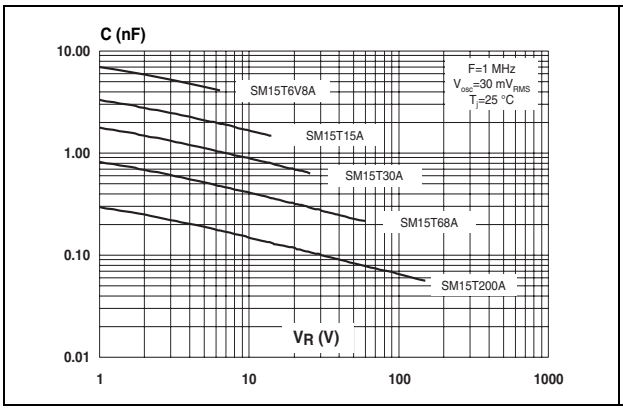


Figure 6. Capacitance versus reverse applied voltage (typical values, SM15TxxCA)

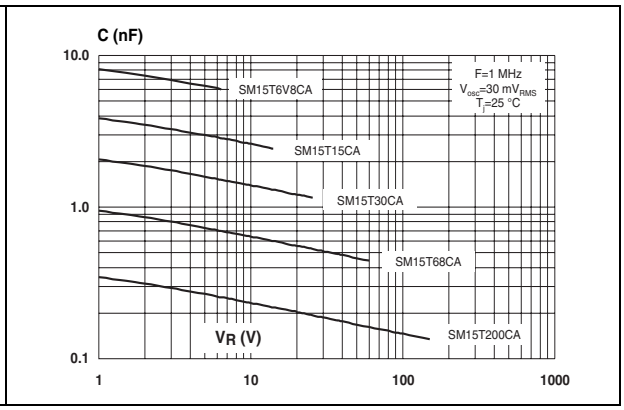


Figure 7. Peak forward voltage drop versus forward current (typical values)

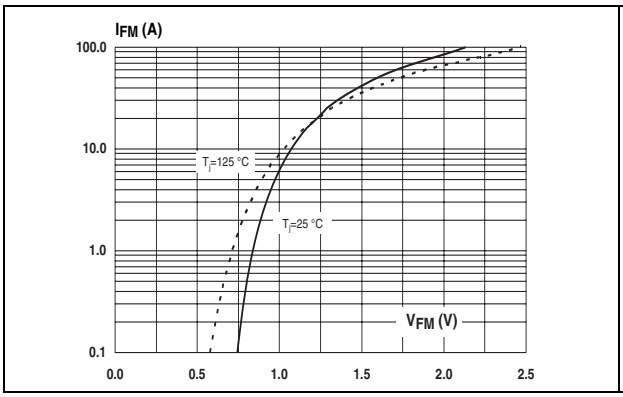


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration

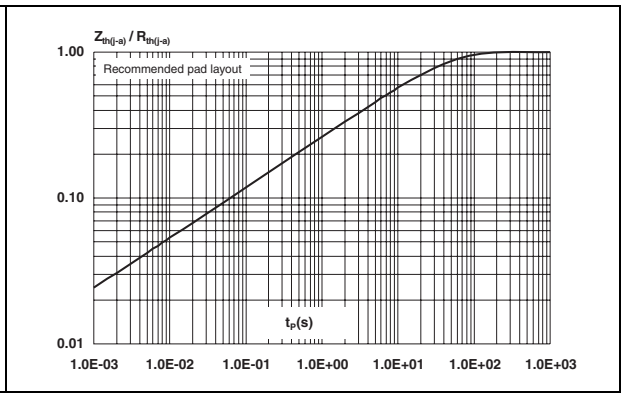


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead

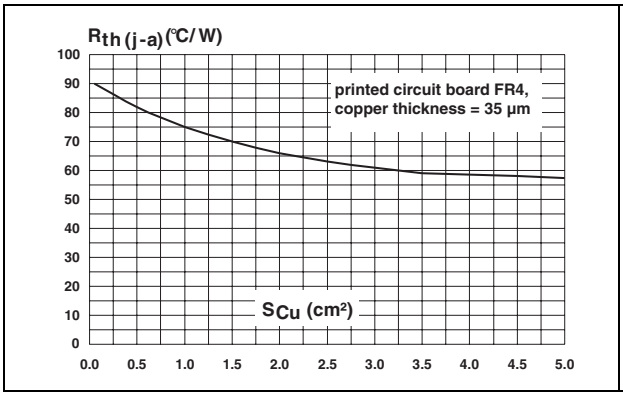
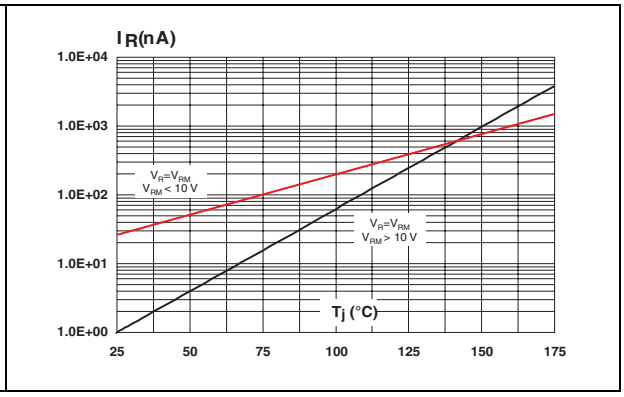
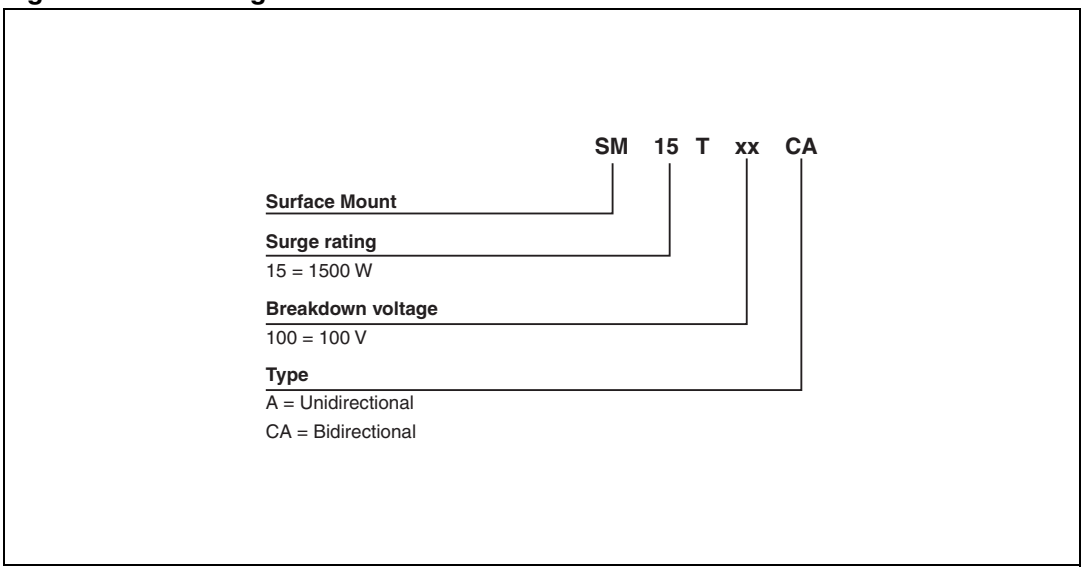


Figure 10. Leakage current versus junction temperature (typical values)



2 Ordering information scheme

Figure 11. Ordering information scheme

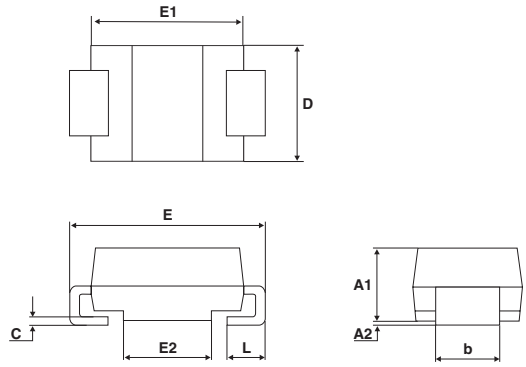


3 Package information

- Case: JEDEC DO-214AB molded plastic over Planar junction
- Terminals: Solder plated, solderable as per MIL-STD-750, Method 2026
- Polarity: For unidirectional types the band indicates cathode
- Flammability: Epoxy is rated UL94 V0
- 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 5. 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(1)	2.90	3.20	0.114	0.126
c(1)	0.15	0.40	0.006	0.016
D	5.55	6.25	0.218	0.246
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
L	0.75	1.50	0.030	0.059

1. Dimensions b and c apply to plated leads

Figure 12. Footprint dimensions in millimeter (inch)

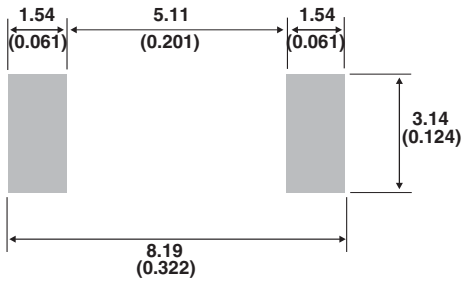


Figure 13. Marking layout

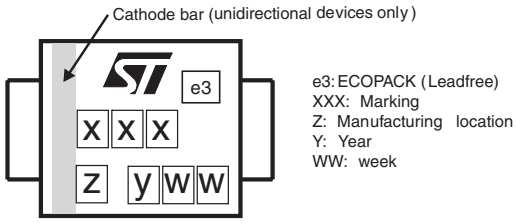


Table 6. Marking

Unidirectional	Marking	Bidirectional	Marking
SM15T6V8A	MDE	SM15T6V8CA	BDE
SM15T7V5A	MDG	SM15T7V5CA	BDG
SM15T10A	MDP	SM15T10CA	BDP
SM15T12A	MDT	SM15T12CA	BDT
SM15T15A	MDX	SM15T15CA	BDX
SM15T18A	MEE	SM15T18CA	BEE
SM15T22A	MEK	SM15T22CA	BEK
SM15T24A	MEM	SM15T24CA	BEM
SM15T27A	MEP	SM15T27CA	BEP
SM15T30A	MER	SM15T30CA	BER
SM15T33A	MET	SM15T33CA	BET
SM15T36A	MEV	SM15T36CA	BEV
SM15T39A	MEX	SM15T39CA	BEX
SM15T68A	MFP	SM15T68CA	BFP
SM15T75A	MFO	SM15T75CA	BFO
SM15T100A	MFX	SM15T100CA	BFX
SM15T150A	MGK	SM15T150CA	BGK
SM15T200A	MGV	SM15T200CA	BGV
SM15T220A	MGX	SM15T220CA	BGX

4 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
SM15TxxxA	See *Table 6 on page 8*	SMC	0.25 g	2500	Tape and reel
SM15TxxCA	See *Table 6 on page 8*				

5 Revision history

Table 8. Document revision history

Date	Revision	Description of changes
September-2001	3B	Last issue
19-Feb-2007	4	Reformatted to current standards. Peak pulse power *Figure 3 on page 4* updated.
25-Mar-2009	5	Reformatted to current standards. Updated ECOPACK statement. Updated characteristic curves, *Figure 2* to *Figure 10*.

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