

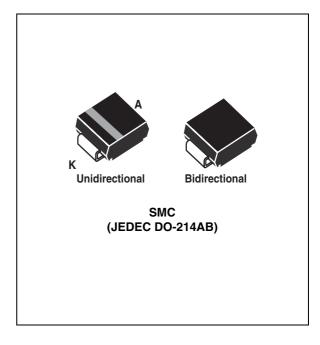
Transil™

Features

- Peak pulse power:
 - 1500 W (10/1000 μs)
 - 10 kW (8/20 μs)
- Breakdown voltage range: from 6.8 V to 220 V
- Unidirectional and bidirectional types
- Low leakage current:
 - 0.2 µA at 25 °C
 - 1 μA at 85 °C
- Operating T_{i max}: 150 °C
- High power capability at T_{imax}:
 - 1250 W (10/1000 μs)
- JEDEC registered package outline

Complies with the following standards

- IEC 61000-4-2 level 4
 - 15 kV (air discharge)
 - 8 kV (contact discharge)
- IEC 61000-4-5
 - See Table 3 for surge level
- MIL STD 883G, method 3015-7: class 3B
 - 25 kV HBM (human body model)
- UL 497B file number: QVGQ2.E136224
- Resin meets UL 94, V0
- MIL-STD-750, method 2026 soldererabilty
- EIA STD RS-481 and IEC 60286-3 packing
- IPC 7531 footprint



Description

The SM15T Transil series has been designed to protect sensitive equipment against electrostatic discharges according to IEC 61000-4-2, and MIL STD 883, method 3015, and electrical over stress according to IEC 61000-4-4 and 5. These devices are more generally used against surges below 1500 W (10/1000 μ s).

Planar technology makes these devices suitable for 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).

TM: Transil is a trademark of STMicroelectronics

Characteristics SM15T

1 Characteristics

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

Symbol	Parameter	Value	Unit	
P_PP	Peak pulse power dissipation ⁽¹⁾	$T_{j \text{ initial}} = T_{amb}$	1500	W
T _{stg}	Storage temperature range	-65 to + 150	°C	
Tj	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

Figure 1. Electrical characteristics - definitions

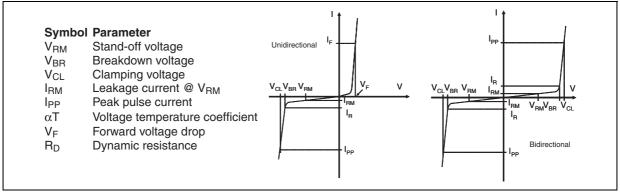
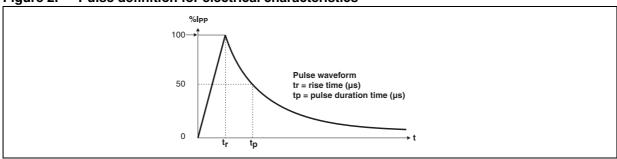


Figure 2. Pulse definition for electrical characteristics



SM15T Characteristics

Table 3. Electrical characteristics, parameter values ($T_{amb} = 25$ °C)

Order code	I _{RM} max@V _{RM}			V _{BR} @I _R ⁽¹⁾			V _{CL} @I _{PP} 10/1000 μs		R _D 10/1000 μs	V _{CL} @I _{PP} 8/20 μs		R _D 8/20 μs	α T ⁽²⁾	
Order code	25 °C	85 °C		min	typ	max		max			max			max
	μ	A	٧		٧		mA	V ⁽³⁾	A ⁽⁴⁾	Ω	V ⁽³⁾	A ⁽⁴⁾	Ω	10-4/ °C
SM15T6V8A/CA	500	2000	5.8	6.45	6.8	7.14	10	10.5	143	0.023	13.4	746	0.008	5.7
SM15T7V5A/CA	250	1000	6.4	7.13	7.5	7.88	10	11.3	132	0.026	14.5	690	0.010	6.1
SM15T10A/CA	10	50	8.55	9.5	10	10.5	1	14.5	103	0.039	18.6	538	0.015	7.3
SM15T12A/CA	0.2	1	10.2	11.4	12	12.6	1	16.7	90	0.046	21.7	461	0.020	7.8
SM15T15A/CA	0.2	1	12.8	14.3	15	15.8	1	21.2	71	0.076	27.2	368	0.031	8.4
SM15T18A/CA	0.2	1	15.3	17.1	18	18.9	1	25.2	59.5	0.106	32.5	308	0.044	8.8
SM15T22A/CA	0.2	1	18.8	20.9	22	23.1	1	30.6	49	0.153	39.3	254	0.064	9.2
SM15T24A/CA	0.2	1	20.5	22.8	24	25.2	1	33.2	45	0.178	42.8	234	0.075	9.4
SM15T27A/CA	0.2	1	23.1	25.7	27	28.4	1	37.5	40	0.228	48.3	207	0.096	9.6
SM15T30A/CA	0.2	1	25.6	28.5	30	31.5	1	41.5	36	0.278	53.5	187	0.12	9.7
SM15T33A/CA	0.2	1	28.2	31.4	33	34.7	1	45.7	33	0.333	59.0	169	0.14	9.8
SM15T36A/CA	0.2	1	30.8	34.2	36	37.8	1	49.9	30	0.403	64.3	156	0.17	9.9
SM15T39A/CA	0.2	1	33.3	37.1	39	41.0	1	53.9	28	0.461	69.7	143	0.20	10.0
SM15T68A/CA	0.2	1	58.1	64.6	68	71.4	1	92	16.3	1.26	121	83	0.60	10.4
SM15T75A/CA	0.2	1	64.1	71.3	75	78.8	1	103	14.6	1.66	134	75	0.74	10.5
SM15T100A/CA	0.2	1	85.5	95.0	100	105	1	137	11	2.91	178	56	1.30	10.6
SM15T150A/CA	0.2	1	128	143	150	158	1	207	7.2	6.81	265	38	2.82	10.8
SM15T200A/CA	0.2	1	171	190	200	210	1	274	5.5	11.6	353	28	5.11	10.8
SM15T220A/CA	0.2	1	188	209	220	231	1	328	4.6	21.1	388	26	6.04	10.8

^{1.} Pulse test : t_p < 50 ms

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

^{3.} To calculate maximum clamping voltage at other surge level, use the following formula: $V_{CL} = R_D x I_{PP} + V_{BRmax}$

^{4.} Surge capability given for both directions for unidirectional and bidirectional types.

Characteristics SM15T

Figure 3. Peak pulse power dissipation versus initial junction temperature (printed circuit board)

Figure 4. Peak pulse power versus exponential pulse duration

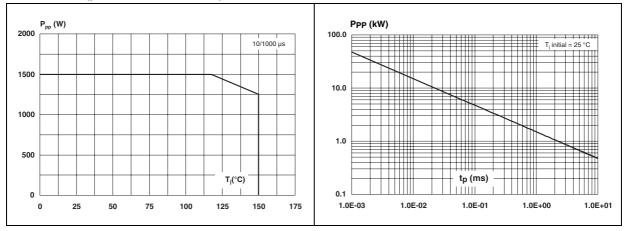
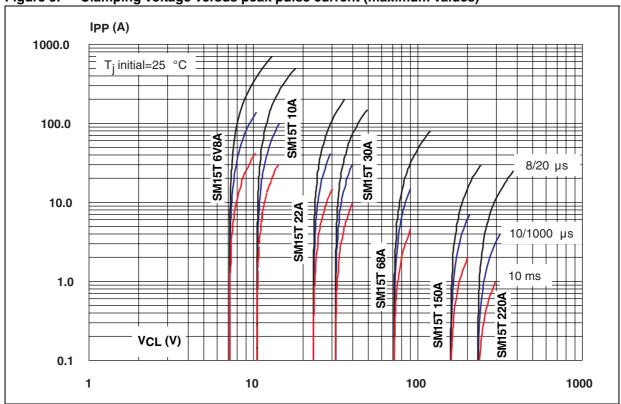


Figure 5. Clamping voltage versus peak pulse current (maximum values)



SM15T Characteristics

Figure 6. Capacitance versus reverse applied Figure 7. Capacitance voltage (typical values, SM15TxxA) voltage

Capacitance versus reverse applied voltage (typical values, SM15TxxCA)

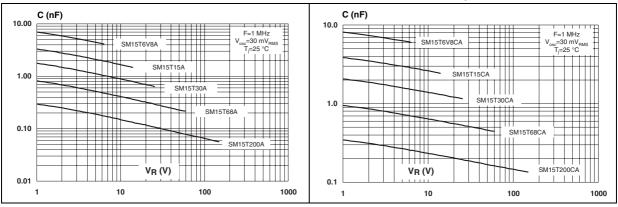


Figure 8. Peak forward voltage drop versus forward current (typical values)

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

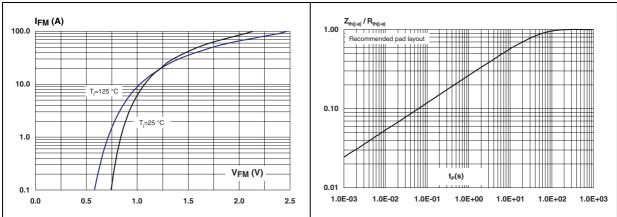
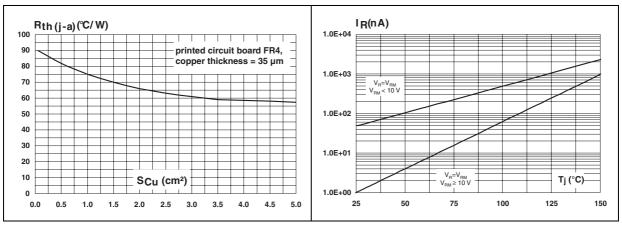


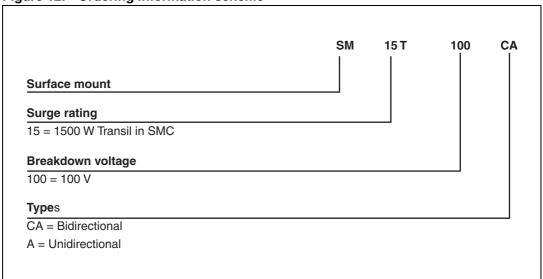
Figure 10. Thermal resistance junction to ambient versus copper surface under each lead

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



2 Ordering information scheme

Figure 12. Ordering information scheme



SM15T Package information

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 UL 94, 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 4. SMC dimensions

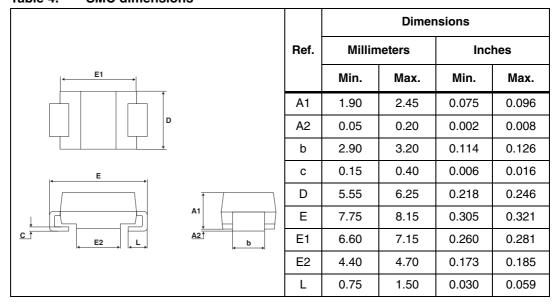
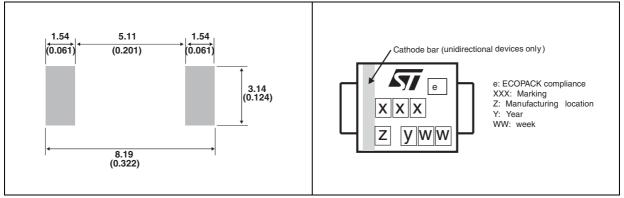


Figure 13. SMC footprint dimensions in mm Figure 14. Marking layout⁽¹⁾ (inches)



1. Marking layout can vary according to assembly location.

Package information SM15T

Table 5. Marking

Order code	rder code Marking		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 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode	
SM15TxxxA/CA ⁽¹⁾	See Table 5 on page 8	SMC	0.25 g	2500	Tape and reel	

Where xxx is nominal value of V_{BR} and A or CA indicates unidirectional or bidirectional version. See Table 3 for list of available devices and their order codes

5 Revision history

Table 7. Document revision history

Date	Revision	Description of changes
September-2001	3B	Last issue
19-Feb-2007	4	Peak pulse power Figure 4 on page 4 updated.
04-Feb-2009	5	Updated ECOPACK statement. Added R _D columns in <i>Table 3</i> . Updated characteristic curves, <i>Figure 3</i> to <i>Figure 11</i> .
17-Sep-2009	6	Document updated for low leakage current.

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