SMC30J

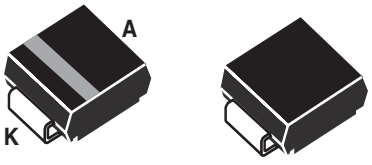
3000 W Transil™

Features

- Peak pulse power:
  - 3000 W (10/1000 µs)
- Stand off voltage range: from 5 V to 33 V
- Unidirectional and bidirectional types
- Low leakage current: 0.2 µA
- Operating $T_{j\,max}$: 150 °C
- High power capability at $T_{j\,max}$:
  - 2200 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)
- MIL STD 883G, method 3015-7 Class 3B
  - 25 kV HBM (human body model)
- Resin meets UL 94, V0
- MIL-STD-750, method 2026 solderability
- EIA STD RS-481 and IEC 60286-3 packing
- IPC 7531 footprint



Unidirectional Bidirectional

SMC
(JEDEC DO-214AB)

Description

The SMC30J Transil series has been designed to protect sensitive equipment against surges below 3000 W (10/1000 µs) and against electro-static discharges according to IEC 61000-4-2, and MIL STD 883, method 3015.

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. SMC30J 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}	3000	W
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 resistances

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

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

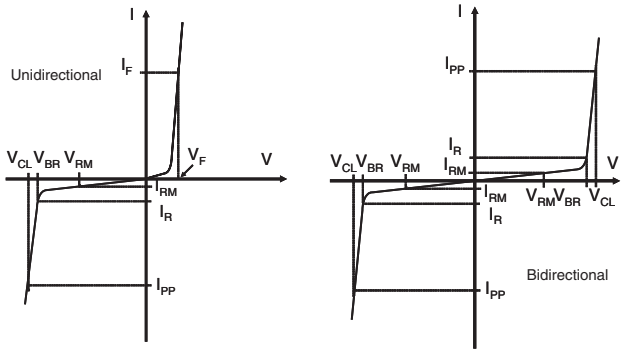


Figure 2. Pulse definition for electrical characteristics

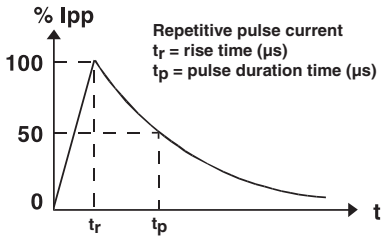


Table 3. Electrical characteristics - parameter values (T_{amb} = 25 °C)

Order code	I_{RM} max@V_{RM}		V_{BR} @I_R(1)			V_{CL} @I_{PP} 10/1000 µs		R_D (2) 10/1000 µs	αT (3)
			min	typ		max			max
	µA	V	V		mA	V	A(4)	Ω	10-4/ °C
SMC30J5.0A/CA	500	5	6.4	6.74	10	9.2	327	0.008	5.7
SMC30J6.0A/CA	500	6	6.7	7.05	10	10.3	291	0.011	5.9
SMC30J6.5A/CA	250	6.5	7.2	7.58	10	11.2	268	0.014	6.1
SMC30J8.5A/CA	10	8.5	9.4	9.9	1	14.4	208	0.022	7.3
SMC30J10A/CA	0.2	10	11.1	11.7	1	17	176	0.030	7.8
SMC30J12A/CA	0.2	12	13.3	14	1	19.9	151	0.039	8.3
SMC30J13A/CA	0.2	13	14.4	15.2	1	21.5	140	0.045	8.4
SMC30J15A/CA	0.2	15	16.7	17.6	1	24.4	123	0.055	8.8
SMC30J16A/CA	0.2	16	17.8	18.7	1	26	115	0.063	8.8
SMC30J18A/CA	0.2	18	20	21.1	1	29.2	103	0.079	9.2
SMC30J20A/CA	0.2	20	22.2	23.4	1	32.4	93	0.097	9.4
SMC30J22A/CA	0.2	22	24.4	25.7	1	35.5	85	0.115	9.6
SMC30J24A/CA	0.2	24	26.7	28.1	1	38.9	77	0.140	9.6
SMC30J26A/CA	0.2	26	28.9	30.4	1	42.1	71	0.165	9.7
SMC30J28A/CA	0.2	28	31.1	32.7	1	45.4	66	0.192	9.8
SMC30J30A/CA	0.2	30	33.3	35.1	1	48.4	62	0.215	9.9
SMC30J33A/CA	0.2	33	36.7	38.6	1	53.3	56	0.261	10.0

1. Pulse test : t_p < 50 ms
2. To calculate maximum clamping voltage at other surge level,use the following formula: $V_{CLmax} = V_{CL} - R_D \times (I_{PP} - I_{PPappli})$ where $I_{PPappli}$ is the surge current in the application
3. To calculate V_{BR} or V_{CL} versus junction temperature, use the following formulas:
   V_{BR} @ $T_J = V_{BR}$ @ 25°C x (1 + αT x (T_J – 25))
   V_{CL} @ $T_J = V_{CL}$ @ 25°C x (1 + αT x (T_J – 25))
4. Surge capability given for both directions for unidirectional and bidirectional types.

Figure 3. Peak pulse power dissipation versus initial junction temperature (typical value)

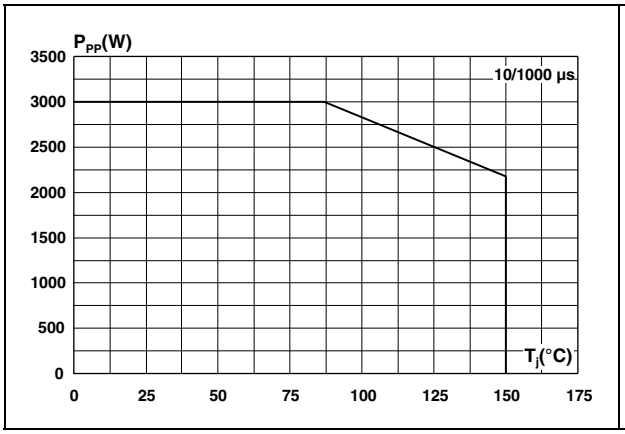


Figure 4. Peak pulse power versus exponential pulse duration (T_j initial = 25 °C)

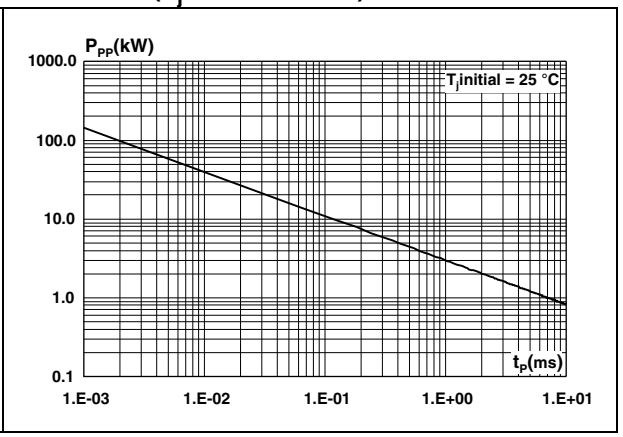


Figure 5. Clamping voltage versus peak pulse current (exponential waveform, maximum values)

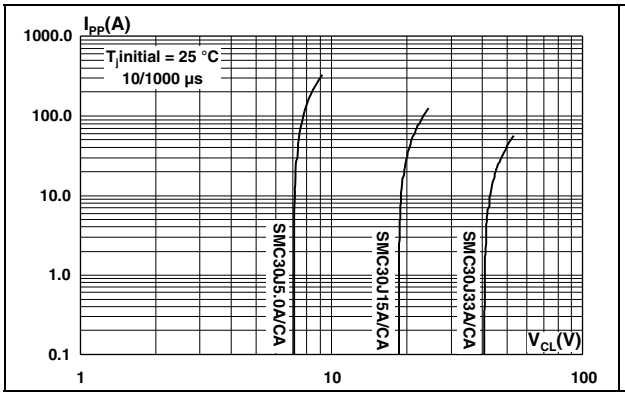


Figure 6. Junction capacitance versus reverse applied voltage for unidirectional types (typical values)

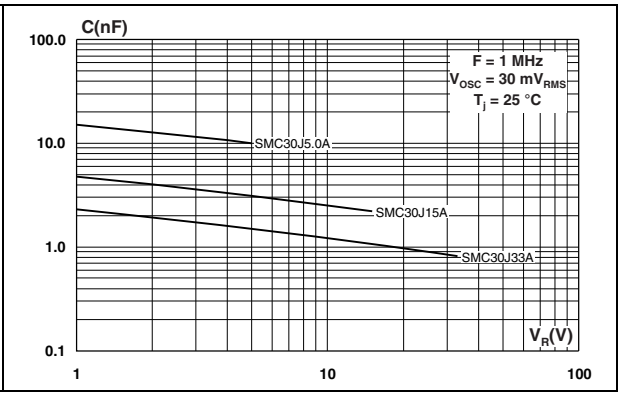


Figure 7. Junction capacitance versus reverse applied voltage for bidirectional types (typical values)

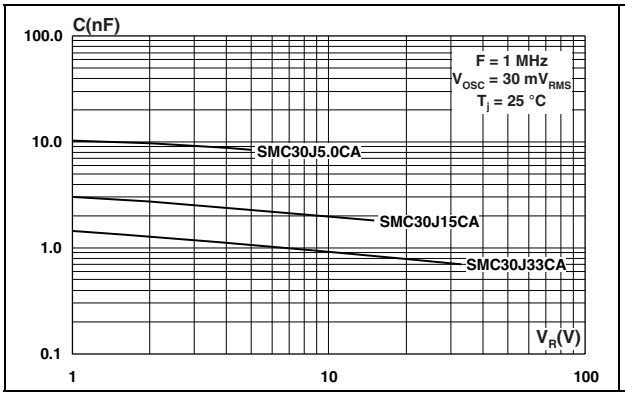


Figure 8. Peak forward voltage drop versus peak forward current (typical values)

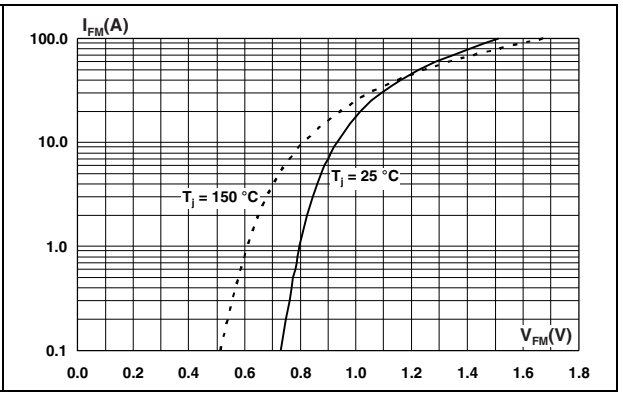


Figure 9. Relative variation of thermal impedance, junction to ambient, versus pulse duration

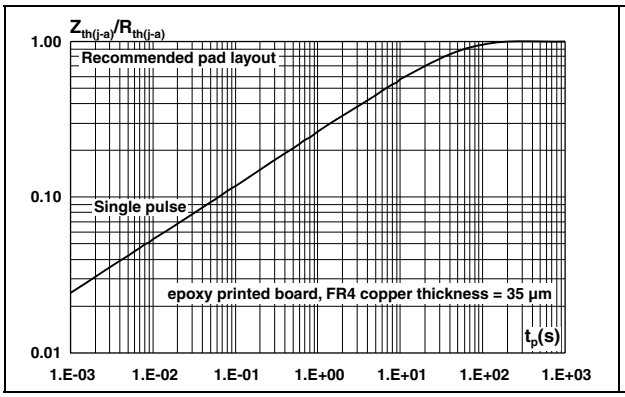


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead

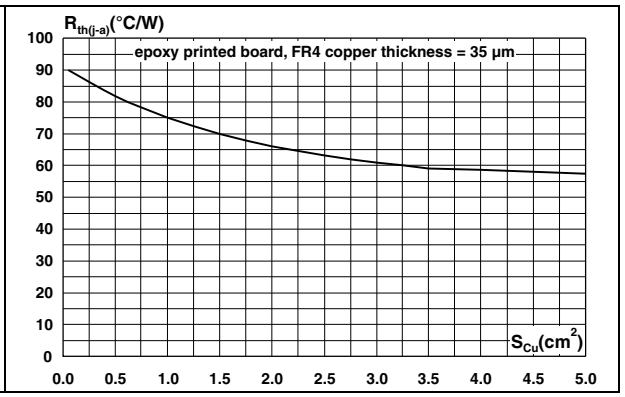
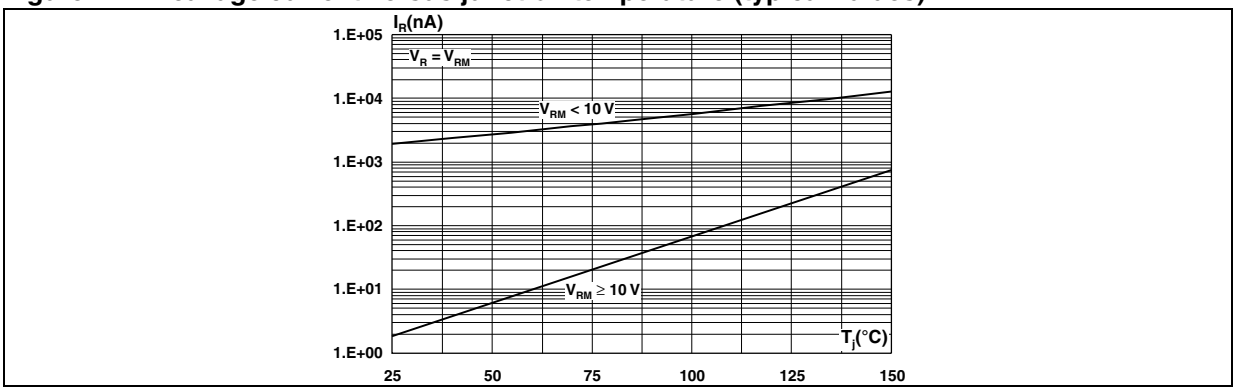
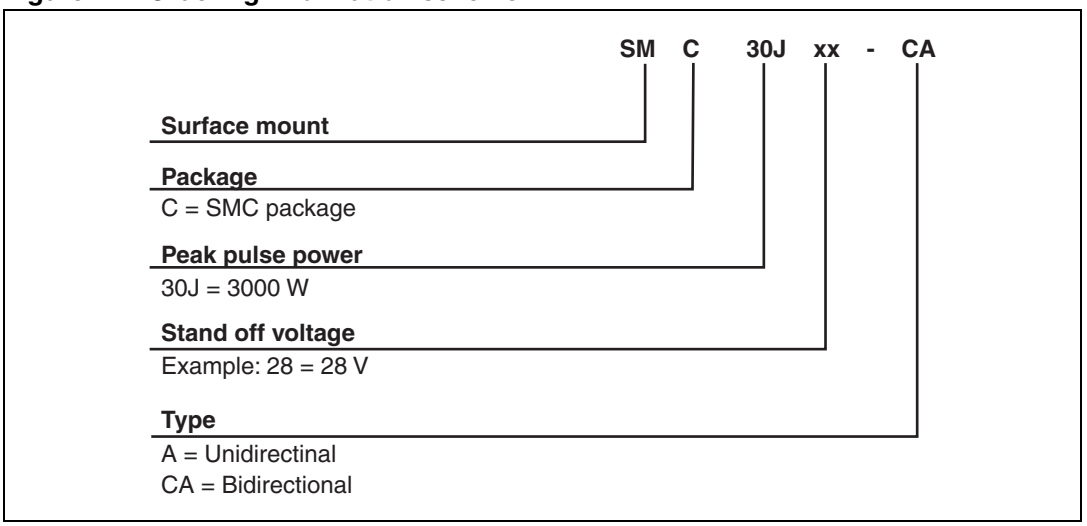


Figure 11. Leakage current versus junction temperature (typical values)



2 Ordering information scheme

Figure 12. Ordering information scheme

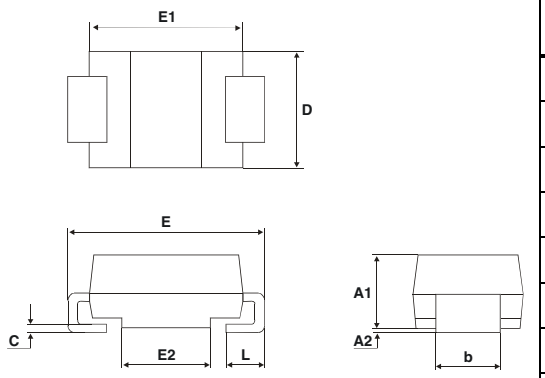


3 Package information

- 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 mm (inches)

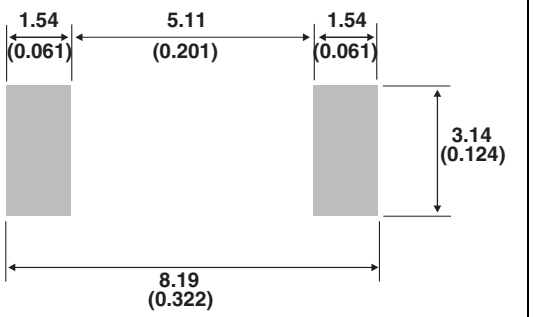
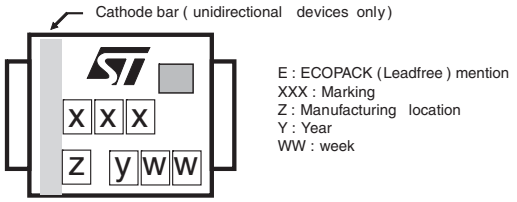


Figure 14. Marking layout(1)



1. Marking layout can vary according to assembly location.

Table 5. Marking

Order code	Marking	Order code	Marking
SMC30J5.0A	3AAA	SMC30J5.0CA	3BAA
SMC30J6.0A	3AAB	SMC30J6.0CA	3BAB
SMC30J6.5A	3AAC	SMC30J6.5CA	3BAC
SMC30J8.5A	3AAD	SMC30J8.5CA	3BAD
SMC30J10A	3AAE	SMC30J10CA	3BAE
SMC30J12A	3AAF	SMC30J12CA	3BAF
SMC30J13A	3AAG	SMC30J13CA	3BAG
SMC30J15A	3AAH	SMC30J15CA	3BAH
SMC30J16A	3AAI	SMC30J16CA	3BAI
SMC30J18A	3AAJ	SMC30J18CA	3BAJ
SMC30J20A	3AAK	SMC30J20CA	3BAK
SMC30J22A	3AAL	SMC30J22CA	3BAL
SMC30J24A	3AAE	SMC30J24CA	3BAE
SMC30J26A	3AAM	SMC30J26CA	3BAM
SMC30J28A	3AAN	SMC30J28CA	3BAN
SMC30J30A	3AAO	SMC30J30CA	3BAO
SMC30J33A	3AAP	SMC30J33CA	3BAP

4 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
SMC30JxxxA/CA(1)	See *Table 5 on page 8*	SMC	0.25 g	2500	Tape and reel

1. 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	Changes
28-Jul-2011	1	Initial release.

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