# SMC30J

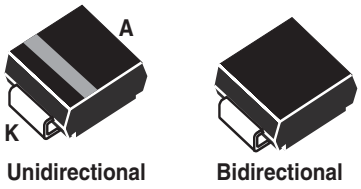
## 3000 W Transil™

## 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




**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).

**TM**: Transil is a trademark of STMicroelectroniocs

# 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 |
| $\alpha T$ | Voltage temperature coefficient |
| $V_F$ | Forward voltage drop |
| $R_D$ | Dynamic resistance |

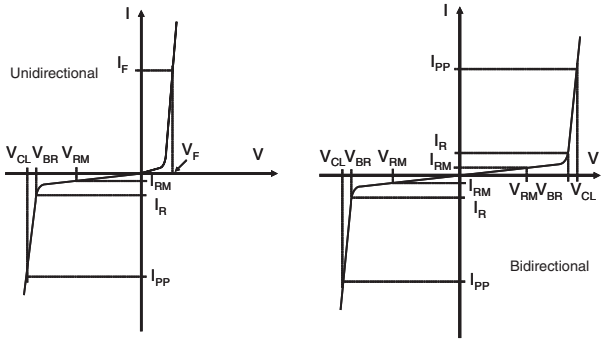



**Figure 2. Pulse definition for electrical characteristics**

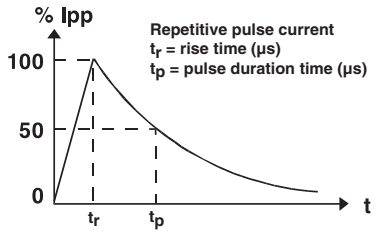


**Table 3. Electrical characteristics - parameter values ($T_{amb}$ = 25 °C)**

| 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)**

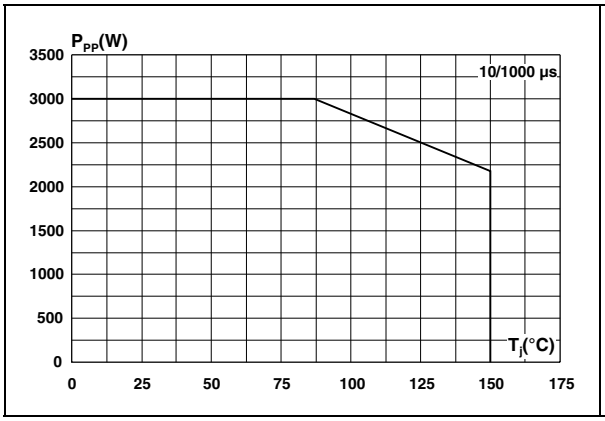



**Figure 4. Peak pulse power versus exponential pulse duration ($T_j$ initial = 25 °C)**

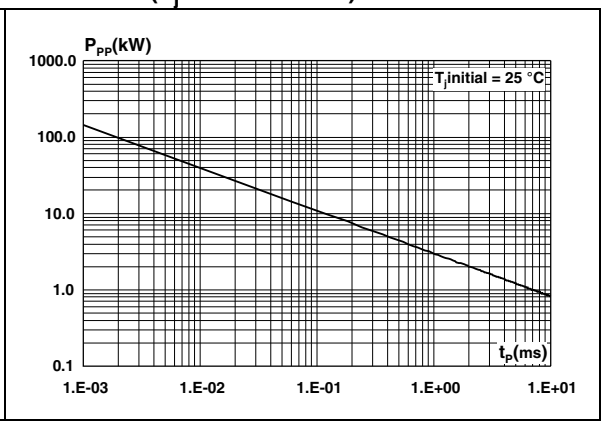



**Figure 5. Clamping voltage versus peak pulse current (exponential waveform, maximum values)**

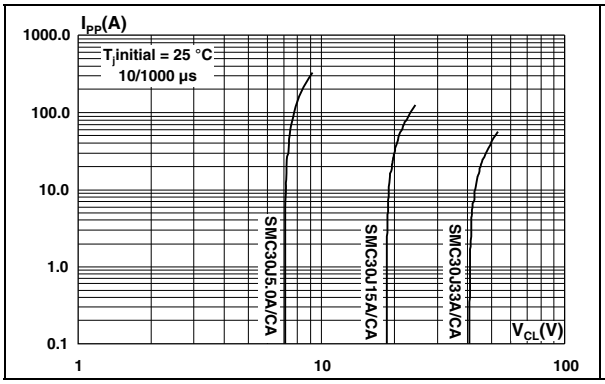



**Figure 6. Junction capacitance versus reverse applied voltage for unidirectional types (typical values)**

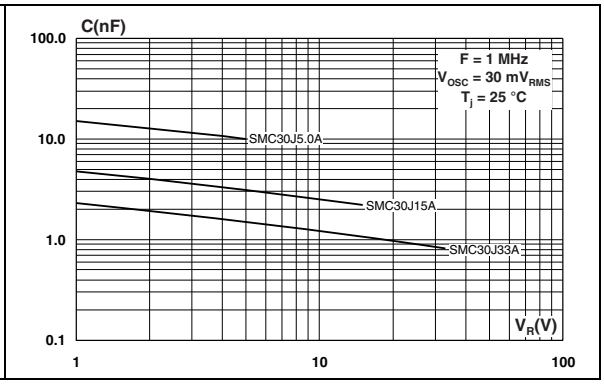



**Figure 7. Junction capacitance versus reverse applied voltage for bidirectional types (typical values)**

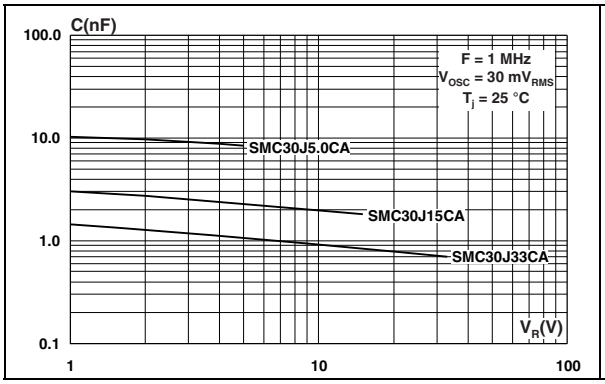



**Figure 8. Peak forward voltage drop versus peak forward current (typical values)**

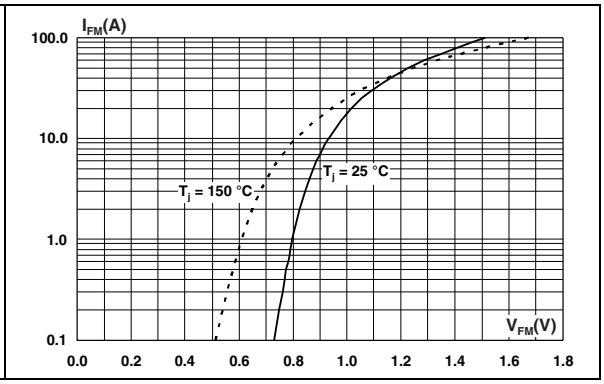


**Figure 9. Relative variation of thermal impedance, junction to ambient, versus pulse duration**

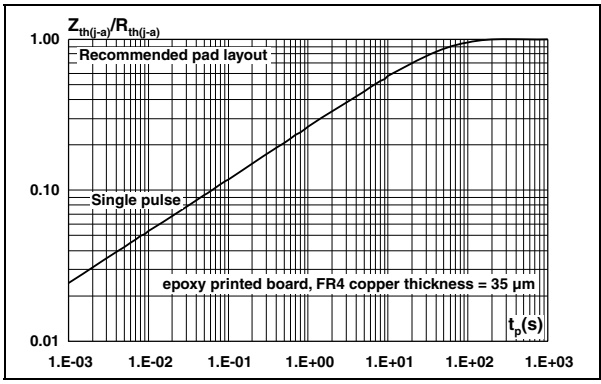



**Figure 10. Thermal resistance junction to ambient versus copper surface under each lead**

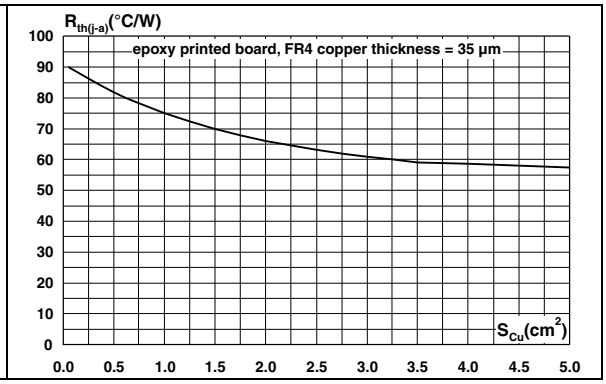
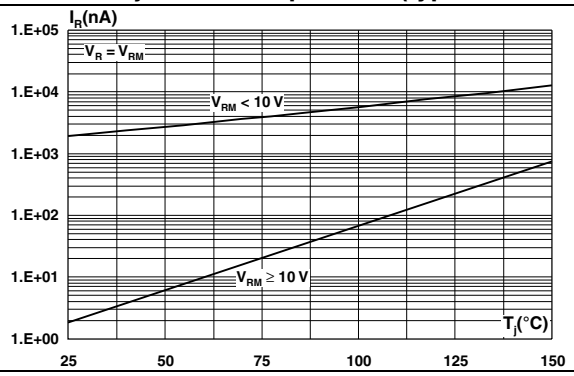
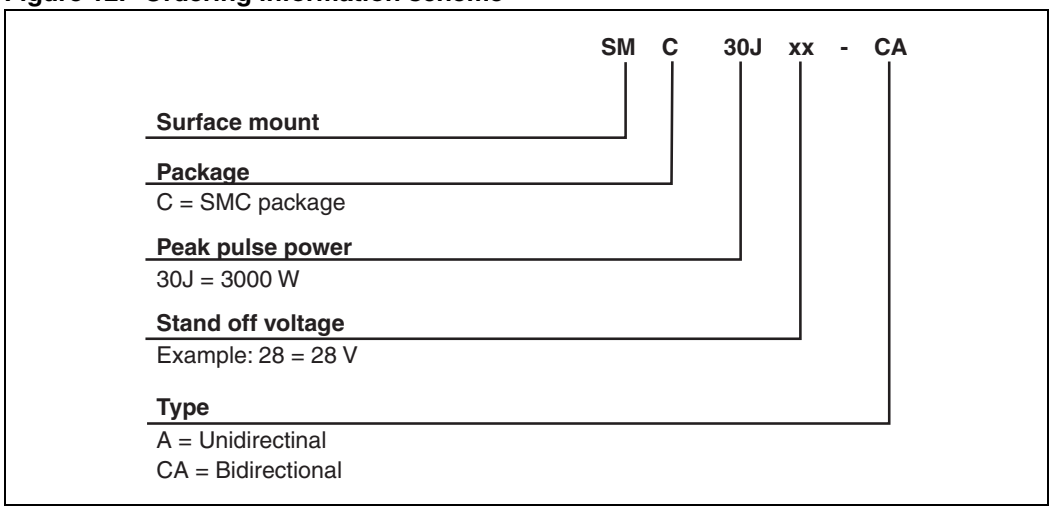



**Figure 11. Leakage current versus junction temperature (typical values)**



# 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

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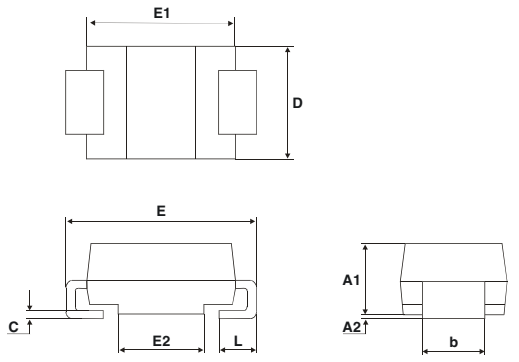
**Table 4. SMC dimensions**




| 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)**

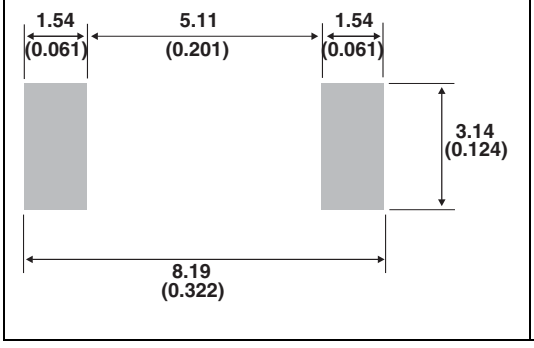
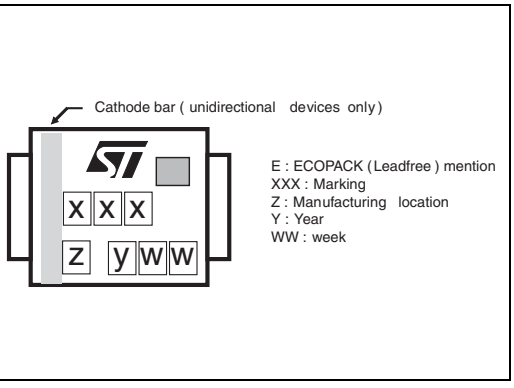



**Figure 14. Marking layout(1)**




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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