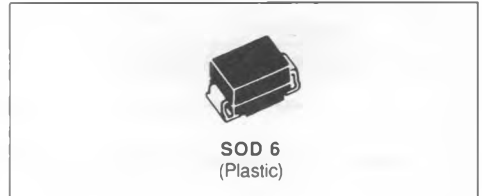


## UNI-AND BIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS

- HIGH SURGE CAPABILITY :  
400 W / 1 ms EXPO
- VERY FAST CLAMPING TIME :  
1 ps FOR UNIDIRECTIONAL TYPES  
5 ns FOR BIDIRECTIONAL TYPES
- LARGE VOLTAGE RANGE :  
5.5 V → 188 V
- ORDER CODE :  
TYPE NUMBER FOR UNIDIRECTIONAL  
TYPES, TYPE NUMBER + SUFFIX C FOR  
BIDIRECTIONAL TYPES



### DESCRIPTION

Transient voltage suppressor diodes especially useful in protecting integrated circuits, MOS, hybrids and other voltage-sensitive semiconductors and components.

### SURFACE MOUNT TRANSIL FEATURES

- A PERFECT PICK AND PLACE BEHAVIOUR
- AN EXCELLENT ON BOARD STABILITY
- A FULL COMPATIBILITY WITH BOTH GLUING AND PASTE SOLDERING TECHNOLOGIES
- BODY MARKED WITH TYPE CODE AND LOGO
- STANDARD PACKAGING : 12 mm TAPE (EIA STD. RS481)
- TINNED COPPER LEADS
- HIGH TEMPERATURE RESISTANT RESIN

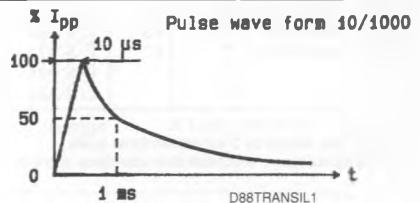
### ABSOLUTE RATINGS (limiting values)

| Symbol             | Parameter  | Value                                | Unit  |
|--------------------|--|--------------------------------------|-------|
| $P_p$              | Peak Pulse Power for 1 ms Exponential Pulse                        | $T_j$ Initial = 25 °C<br>See note 1  | 400 W |
| P                  | Power Dissipation on Infinite Heatsink                             | $T_{amb} = 25$ °C                    | 1.2 W |
| $I_{FSM}$          | Non Repetitive Surge Peak Forward Current for Unidirectional Types | $T_j$ Initial = 25 °C<br>$t = 10$ ms | 50 A  |
| $T_{stg}$<br>$T_j$ | Storage and Operating Junction Temperature Range                   | - 65 to 175                          | °C    |
| $T_L$              | Maximum Lead Temperature for Soldering During 10 s                 | 150                                  | °C    |
|                    |  | 260                                  | °C    |

### THERMAL RESISTANCE

| Symbol        | Parameter      | Value | Unit |
|---------------|----------------|-------|------|
| $R_{th(j-l)}$ | Junction-leads | 20    | °C/W |

Note : 1. For surges upper than the maximum values, the diode will present a short-circuit anode-cathode.



ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25 °C)

| Symbol                | Parameter                                    | Value                |           |
|-----------------------|--|----------------------|-----------|
| V <sub>RM</sub>       | Stand-off Voltage                            | See tables           |           |
| V <sub>(BR)</sub>     | Breakdown Voltage                            |                      |           |
| V <sub>(CL)</sub>     | Clamping Voltage                             |                      |           |
| I <sub>PP</sub>       | Peak Pulse Current                           |                      |           |
| α <sub>T</sub>        | Temperature Coefficient of V <sub>(BR)</sub> |                      |           |
| C                     | Capacitance                                  |                      |           |
| t <sub>clamping</sub> | Clamping Time (0 volt to V <sub>(BR)</sub> ) | Unidirectional Types | 1 ps max. |
|                       |  | Bidirectional Types  | 5 ns max. |

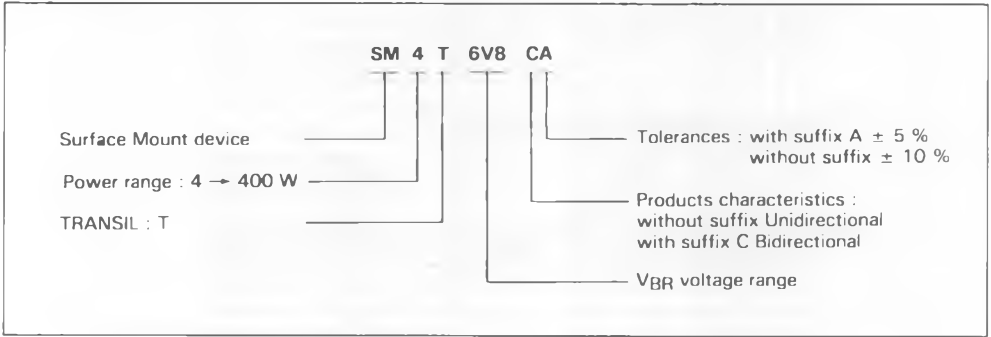
| Types          |               | Marking        |               | I <sub>RM</sub> @ V <sub>RM</sub> max. |      | V <sub>(BR)</sub> * @ I <sub>R</sub> |      |      | V <sub>(CL)</sub> @ I <sub>PP</sub> max. |          | V <sub>(CL)</sub> @ I <sub>PP</sub> max. |      | α <sub>T</sub> max. | C** typ. V <sub>R</sub> =0 f=1MHz |      |
|----------------|---------------|----------------|---------------|--|------|--------------------------------------|------|------|--|----------|--|------|---------------------|-----------------------------------|------|
| Unidirectional | Bidirectional | Unidirectional | Bidirectional | (μA)                                   | (V)  | min.                                 | nom. | max. | (mA)                                     | (V)      | (A)                                      | (V)  | (A)                 | (10 <sup>-4</sup> /°C)            | (pF) |
|                |               |                |               |  |      |                                      |      |      |  | 1ms expo | 8-20μs expo                              |      |                     |                                   |      |
| SM4T6V8        | SM4T6V8C      | QD             | VD            | 1000                                   | 5.5  | 6.12                                 | 6.8  | 7.48 | 10                                       | 10.8     | 37                                       | 14   | 164                 | 5.7                               | 3500 |
| SM4T6V8A       | SM4T6V8CA     | QE             | VE            | 1000                                   | 5.8  | 6.45                                 | 6.8  | 7.14 | 10                                       | 10.5     | 38                                       | 13.4 | 174                 | 5.7                               | 3500 |
| SM4T7V5        | SM4T7V5C      | QF             | VF            | 500                                    | 6.05 | 6.75                                 | 7.5  | 8.25 | 10                                       | 11.7     | 34                                       | 15.2 | 151                 | 6.1                               | 3100 |
| SM4T7V5A       | SM4T7V5CA     | QG             | VG            | 500                                    | 6.4  | 7.13                                 | 7.5  | 7.88 | 10                                       | 11.3     | 35.4                                     | 14.5 | 160                 | 6.1                               | 3100 |
| SM4T10         | SM4T10C       | QN             | VN            | 10                                     | 8.1  | 9                                    | 10   | 11   | 1  | 15       | 27                                       | 19.5 | 246                 | 7.3                               | 2000 |
| SM4T10A        | SM4T10CA      | QP             | VP            | 10                                     | 8.55 | 9.5                                  | 10   | 10.5 | 1  | 14.5     | 27.6                                     | 18.6 | 258                 | 7.3                               | 2000 |
| SM4T12         | SM4T12C       | QS             | VS            | 5                                      | 9.72 | 10.8                                 | 12   | 13.2 | 1  | 17.3     | 23.1                                     | 22.7 | 211                 | 7.8                               | 1550 |
| SM4T12A        | SM4T12CA      | QT             | VT            | 5                                      | 10.2 | 11.4                                 | 12   | 12.6 | 1  | 16.7     | 24                                       | 21.7 | 221                 | 7.8                               | 1550 |
| SM4T15         | SM4T15C       | QW             | VW            | 5                                      | 12.1 | 13.5                                 | 15   | 16.5 | 1  | 22       | 18.2                                     | 28.4 | 169                 | 8.4                               | 1200 |
| SM4T15A        | SM4T15CA      | QX             | VX            | 5                                      | 12.8 | 14.3                                 | 15   | 15.8 | 1  | 21.2     | 19                                       | 27.2 | 176                 | 8.4                               | 1200 |
| SM4T18         | SM4T18C       | RD             | UD            | 5                                      | 14.5 | 16.2                                 | 18   | 19.8 | 1  | 26.5     | 15.1                                     | 34   | 141                 | 8.8                               | 975  |
| SM4T18A        | SM4T18CA      | RE             | UE            | 5                                      | 15.3 | 17.1                                 | 18   | 18.9 | 1  | 25.2     | 16                                       | 32.5 | 148                 | 8.8                               | 975  |
| SM4T22         | SM4T22C       | RH             | UH            | 5                                      | 17.8 | 19.8                                 | 22   | 24.2 | 1  | 31.9     | 12.5                                     | 41.2 | 116                 | 9.2                               | 800  |
| SM4T22A        | SM4T22CA      | RK             | UK            | 5                                      | 18.8 | 20.9                                 | 22   | 23.1 | 1  | 30.6     | 13                                       | 39.3 | 122                 | 9.2                               | 800  |
| SM4T24         | SM4T24C       | RL             | UL            | 5                                      | 19.4 | 21.6                                 | 24   | 26.4 | 1  | 34.7     | 11.5                                     | 44.9 | 107                 | 9.4                               | 725  |
| SM4T24A        | SM4T24CA      | RM             | UM            | 5                                      | 20.5 | 22.8                                 | 24   | 25.2 | 1  | 33.2     | 12                                       | 42.8 | 112                 | 9.4                               | 725  |
| SM4T27         | SM4T27C       | RN             | UN            | 5                                      | 21.8 | 24.3                                 | 27   | 29.7 | 1  | 39.1     | 10.2                                     | 50.5 | 95                  | 9.6                               | 625  |
| SM4T27A        | SM4T27CA      | RP             | UP            | 5                                      | 23.1 | 25.7                                 | 27   | 28.4 | 1  | 37.5     | 10.7                                     | 48.3 | 99                  | 9.6                               | 625  |
| SM4T30         | SM4T30C       | RQ             | UQ            | 5                                      | 24.3 | 27                                   | 30   | 33   | 1  | 43.5     | 9.2                                      | 56.1 | 86                  | 9.7                               | 575  |
| SM4T30A        | SM4T30CA      | RR             | UR            | 5                                      | 25.6 | 28.5                                 | 30   | 31.5 | 1  | 41.5     | 9.6                                      | 53.5 | 90                  | 9.7                               | 575  |
| SM4T33         | SM4T33C       | RS             | US            | 5                                      | 26.8 | 29.7                                 | 33   | 36.3 | 1  | 47.7     | 8.4                                      | 61.7 | 78                  | 9.8                               | 510  |
| SM4T33A        | SM4T33CA      | RT             | UT            | 5                                      | 28.2 | 31.4                                 | 33   | 34.7 | 1  | 45.7     | 8.8                                      | 59   | 81.5                | 9.8                               | 510  |
| SM4T36         | SM4T36C       | RU             | UU            | 5                                      | 29.1 | 32.4                                 | 36   | 39.6 | 1  | 52       | 7.7                                      | 67.3 | 71                  | 9.9                               | 480  |
| SM4T36A        | SM4T36CA      | RV             | UV            | 5                                      | 30.8 | 34.2                                 | 36   | 37.8 | 1  | 49.9     | 8  | 64.3 | 74.5                | 9.9                               | 480  |
| SM4T39         | SM4T39C       | RW             | UW            | 5                                      | 31.6 | 35.1                                 | 39   | 42.9 | 1  | 56.4     | 7.1                                      | 73   | 66                  | 10.0                              | 450  |
| SM4T39A        | SM4T39CA      | RX             | UX            | 5                                      | 33.3 | 37.1                                 | 39   | 41   | 1  | 53.9     | 7.4                                      | 69.7 | 69                  | 10.0                              | 450  |
| SM4T68         | SM4T68C       | SN             | WN            | 5                                      | 55.1 | 61.2                                 | 68   | 74.8 | 1  | 98       | 4.1                                      | 127  | 38                  | 10.4                              | 270  |
| SM4T68A        | SM4T68CA      | SP             | WP            | 5                                      | 58.1 | 64.6                                 | 68   | 71.4 | 1  | 92       | 4.3                                      | 121  | 39.5                | 10.4                              | 270  |
| SM4T100        | SM4T100C      | SW             | WW            | 5                                      | 81   | 90                                   | 100  | 110  | 1  | 144      | 2.8                                      | 187  | 25.5                | 10.6                              | 200  |
| SM4T100A       | SM4T100CA     | SX             | WX            | 5                                      | 85.5 | 95                                   | 100  | 105  | 1  | 137      | 2.9                                      | 178  | 27                  | 10.6                              | 200  |
| SM4T150        | SM4T150C      | TH             | XH            | 5                                      | 121  | 135                                  | 150  | 165  | 1  | 215      | 1.9                                      | 277  | 17.3                | 10.8                              | 145  |
| SM4T150A       | SM4T150CA     | TK             | XK            | 5                                      | 128  | 143                                  | 150  | 158  | 1  | 207      | 2  | 265  | 18.1                | 10.8                              | 145  |
| SM4T200        | SM4T200C      | TS             | XS            | 5                                      | 162  | 180                                  | 200  | 220  | 1  | 287      | 1.4                                      | 370  | 13                  | 10.8                              | 120  |
| SM4T200A       | SM4T200CA     | TT             | XT            | 5                                      | 171  | 190                                  | 200  | 210  | 1  | 274      | 1.5                                      | 353  | 13.6                | 10.8                              | 120  |
| SM4T220        |               | TU             |               | 5                                      | 178  | 198                                  | 220  | 242  | 1  | 315      | 1.3                                      | 406  | 11.8                | 10.8                              | 110  |
| SM4T220A       |               | TV             |               | 5                                      | 188  | 209                                  | 220  | 231  | 1  | 301      | 1.4                                      | 388  | 12.4                | 10.8                              | 110  |

\* Pulse test t<sub>p</sub> ≤ 50 ms δ < 2 %.

\*\* Divide these values by 2 for bidirectional types

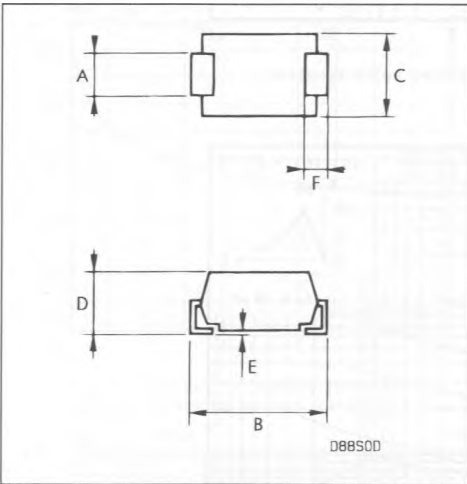
For bidirectional types, electrical characteristics apply in both directions

**ORDER CODE**



**PACKAGE MECHANICAL DATA**

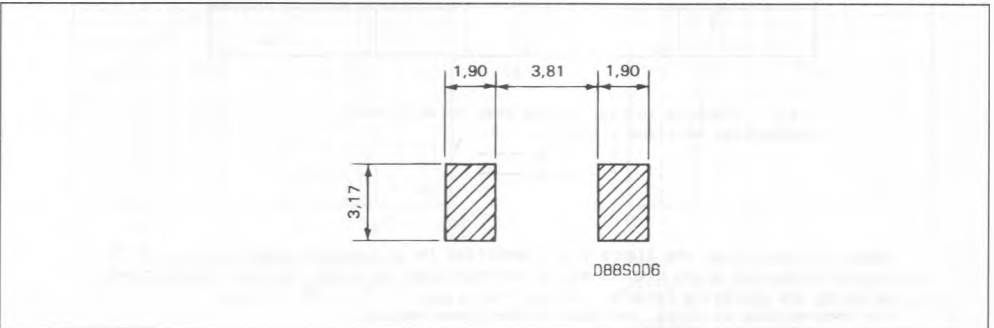
SOD 6 Plastic



| Ref. | Millimetres |      | Inches |       |
|------|-------------|------|--------|-------|
|      | Min.        | Max. | Min.   | Max.  |
| A    | 2.8         | 3.2  | 0.110  | 0.126 |
| B    | 6.0         | 6.4  | 0.236  | 0.252 |
| C    | 3.8         | 4.2  | 0.150  | 0.165 |
| D    | 2.5         | 3.1  | 0.098  | 0.122 |
| E    | —           | 0.1  | —      | 0.004 |
| F    | 0.9         | 1.3  | 0.035  | 0.051 |

Laser marking.  
The logo indicates cathode for unidirectional types.

**FOOT PRINT DIMENSIONS (Millimeters)**



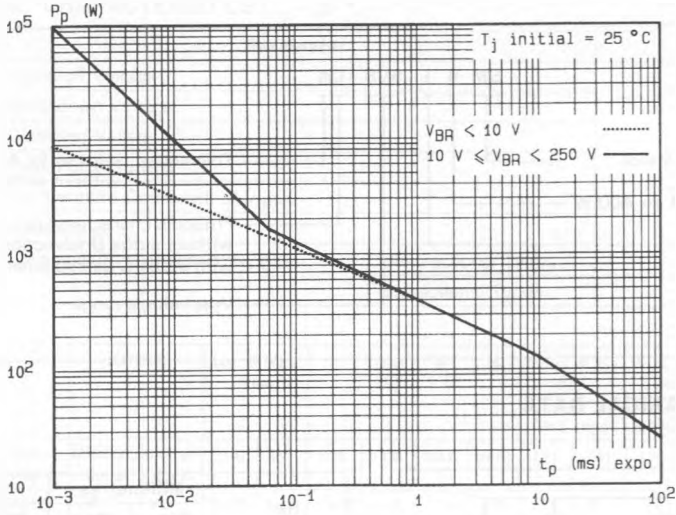


Fig.1 - Peak pulse power versus exponential pulse duration.

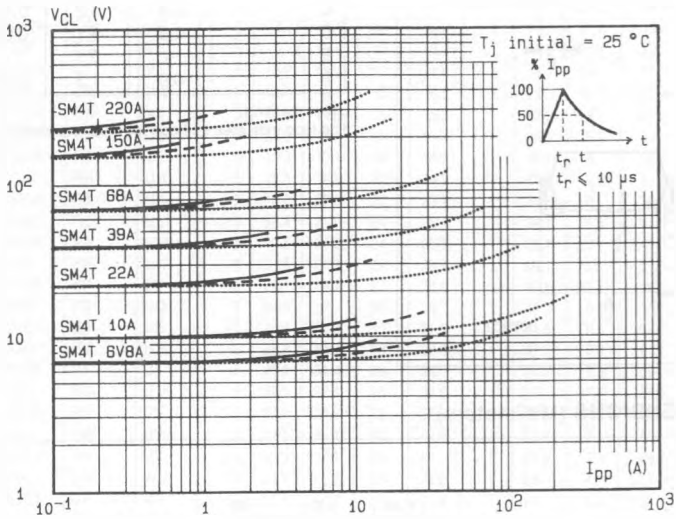


Fig.2 - Clamping voltage versus peak pulse current.  
 exponential waveform  $t = 20 \mu s$  .....  
 $t = 1$  ms ----  
 $t = 10$  ms ———

Note : The curves of the figure 2 are specified for a junction temperature of 25 °C before surge. The given results may be extrapolated for other junction temperatures by using the following formula :  $\Delta V (BR) = \alpha_T (V (BR)) \times [T_j - 25] \times V (BR)$   
 For intermediate voltages, extrapolate the given results.

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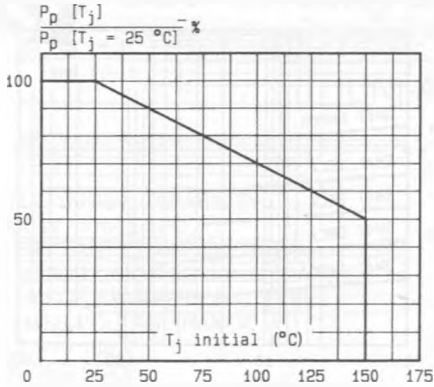


Fig. 3 - Allowable power dissipation versus junction temperature.

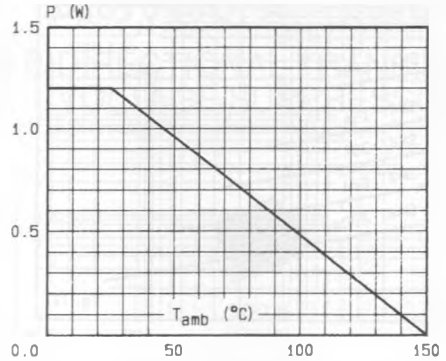


Fig. 4 - Power dissipation versus ambient temperature.

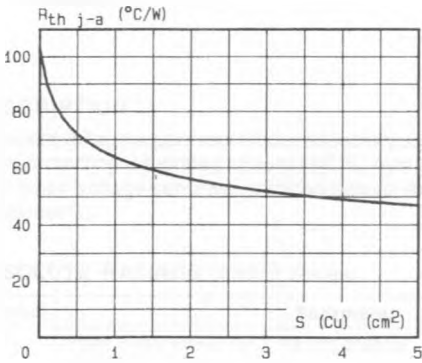


Fig. 5 - Thermal resistance junction-ambient versus Cu surface (printed circuit).

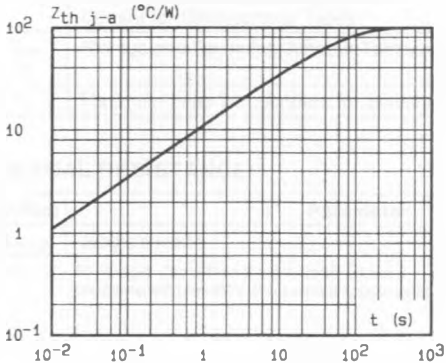


Fig. 6 - Transient thermal impedance junction-ambient versus pulse duration.

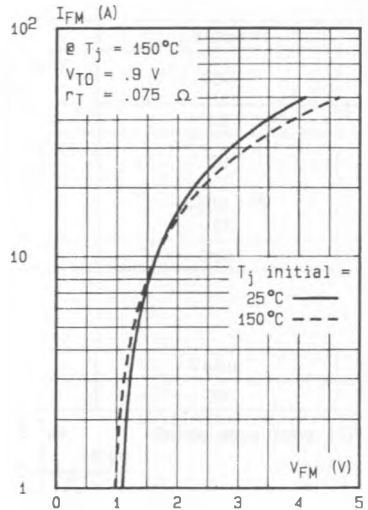


Fig. 7 - Peak forward current versus peak forward voltage drop (typical values for unidirectional types).

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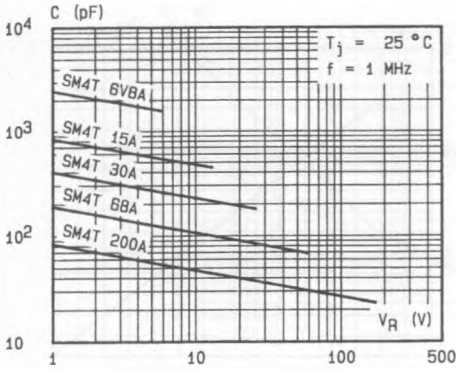


Fig.8a - Capacitance versus reverse applied voltage for unidirectional types (typical values).

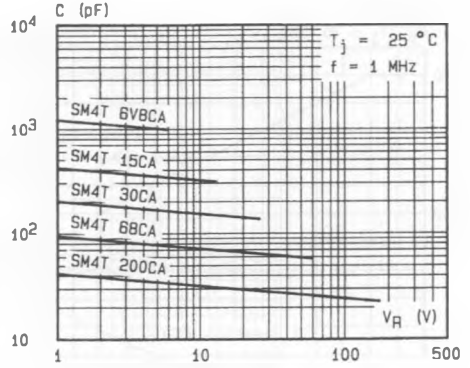


Fig.8b - Capacitance versus reverse applied voltage for bidirectional types (typical values).

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