



# SMTPB SERIES

TRISIL™

## MAIN APPLICATIONS

Any sensitive equipment requiring protection against lightning strikes:

- ANALOG AND DIGITAL LINE CARDS
- MAIN DISTRIBUTION FRAMES
- TERMINALS AND TRANSMISSION EQUIPMENT
- GMS-TUBE REPLACEMENT

## DESCRIPTION

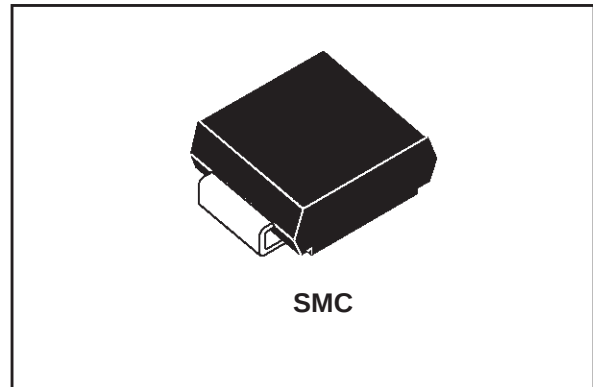
The SMTPBxx series has been designed to protect telecommunication equipment against lightning and transient induced by AC power lines.

## FEATURES

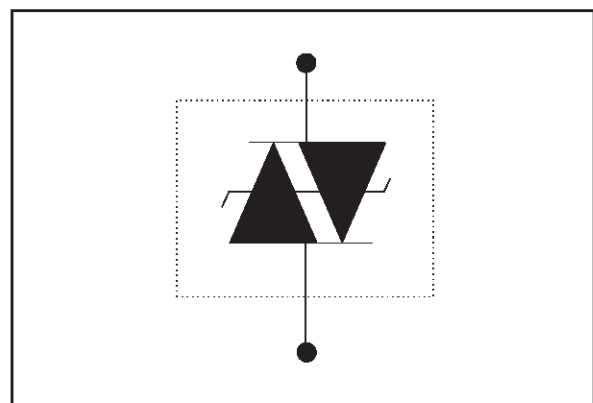
- BIDIRECTIONAL CROWBAR PROTECTION.
- BREAKDOWN VOLTAGE RANGE:  
From 62 V To 270 V.
- HOLDING CURRENT:  $I_H = 150 \text{ mA min}$
- REPETITIVE PEAK PULSE CURRENT :  
 $I_{PP} = 100 \text{ A, } 10/1000 \mu\text{s}$ .

## BENEFITS

- NO AGEING AND NO NOISE
- IF DESTROYED, THE SMTPB FALLS INTO SHORT CIRCUIT, STILL ENSURING PROTECTION



## SCHEMATIC DIAGRAM



| COMPLIES WITH THE FOLLOWING STANDARDS: | Peak Surge Voltage (V) | Voltage Waveform ( $\mu\text{s}$ ) | Current Waveform ( $\mu\text{s}$ ) | Admissible $I_{PP}$ (A) | Necessary Resistor ( $\Omega$ ) |
|----------------------------------------|------------------------|------------------------------------|------------------------------------|-------------------------|---------------------------------|
| CCITT K20                              | 4000                   | 10/700                             | 5/310                              | 100                     | -                               |
| VDE0433                                | 4000                   | 10/700                             | 5/310                              | 100                     | -                               |
| VDE0878                                | 4000                   | 1.2/50                             | 1/20                               | 100                     | -                               |
| IEC-1000-4-5                           | level 4<br>level 4     | 10/700<br>1.2/50                   | 5/310<br>8/20                      | 100<br>100              | -<br>-                          |
| FCC Part 68, lightning surge type A    | 1500<br>800            | 10/160<br>10/560                   | 10/160<br>10/560                   | 200<br>100              | -<br>-                          |
| FCC Part 68, lightning surge type B    | 100                    | 5/320                              | 5/320                              | 25                      | -                               |
| BELLCORE TR-NWT-001089 First level     | 2500<br>1000           | 2/10<br>10/1000                    | 2/10<br>10/1000                    | 500<br>100              | -<br>-                          |
| BELLCORE TR-NWT-001089 Second level    | 500                    | 2/10                               | 2/10                               | 500                     | -                               |
| CNET I31-24                            | 4000                   | 0.5/700                            | 0.8/310                            | 100                     | -                               |

## SMTPBxxx

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25°C)

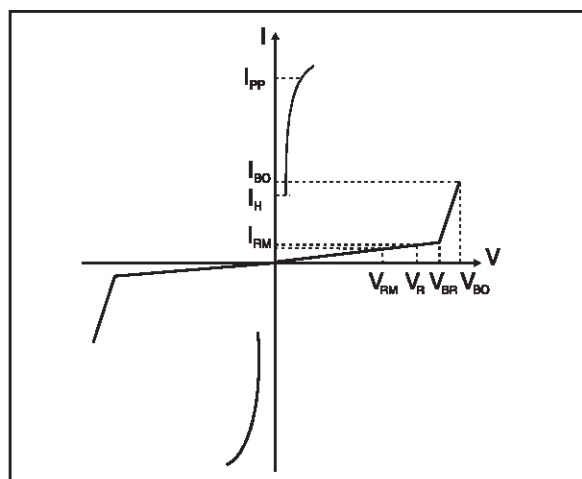
| Symbol                             | Parameter                                                 |                                  | Value                  | Unit     |
|------------------------------------|-----------------------------------------------------------|----------------------------------|------------------------|----------|
| P                                  | Power dissipation                                         | T <sub>lead</sub> = 50 °C        | 5                      | W        |
| I <sub>PP</sub>                    | Peak pulse current                                        | 10/1000 µs<br>8/20 µs<br>2/10 µs | 100<br>250<br>500      | A        |
| I <sub>TSM</sub>                   | Non repetitive surge peak on-state current                | tp = 20 ms                       | 50                     | A        |
| dV/dt                              | Critical rate of rise of off-state voltage                | V <sub>RM</sub>                  | 5                      | KV/µs    |
| T <sub>stg</sub><br>T <sub>j</sub> | Storage temperature range<br>Maximum junction temperature |                                  | - 55 to + 150<br>+ 150 | °C<br>°C |
| T <sub>L</sub>                     | Maximum lead temperature for soldering during 10 s.       |                                  | + 260                  | °C       |

### THERMAL RESISTANCES

| Symbol                | Parameter                                                                      | Value | Unit |
|-----------------------|--------------------------------------------------------------------------------|-------|------|
| R <sub>th</sub> (j-l) | Junction to leads                                                              | 20    | °C/W |
| R <sub>th</sub> (j-a) | Junction to ambient.<br>On printed circuit with standard footprint dimensions. | 75    | °C/W |

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

| Symbol          | Parameter                            |
|-----------------|--------------------------------------|
| V <sub>RM</sub> | Stand-off voltage                    |
| I <sub>RM</sub> | Leakage current at stand-off voltage |
| V <sub>R</sub>  | Continuous Reverse voltage           |
| V <sub>BR</sub> | Breakdown voltage                    |
| V <sub>BO</sub> | Breakover voltage                    |
| I <sub>H</sub>  | Holding current                      |
| I <sub>BO</sub> | Breakover current                    |
| I <sub>PP</sub> | Peak pulse current                   |
| C               | Capacitance                          |



| Type     | Marking | I <sub>RM</sub> @ V <sub>RM</sub><br>max. |     | I <sub>R</sub> @ V <sub>R</sub><br>max.<br>note1 |     | V <sub>BO</sub> @ I <sub>BO</sub><br>max.<br>note2 |     | I <sub>H</sub><br>min.<br>note3 | C<br>typ.<br>note4 |
|----------|---------|-------------------------------------------|-----|--------------------------------------------------|-----|----------------------------------------------------|-----|---------------------------------|--------------------|
|          |         | µA                                        | V   | µA                                               | V   | V                                                  | mA  | mA                              | pF                 |
| SMTPB62  | W07     | 2                                         | 56  | 50                                               | 62  | 82                                                 | 800 | 150                             | 160                |
| SMTPB68  | W11     | 2                                         | 61  | 50                                               | 68  | 90                                                 | 800 | 150                             | 160                |
| SMTPB120 | W21     | 2                                         | 108 | 50                                               | 120 | 160                                                | 800 | 150                             | 140                |
| SMTPB200 | W31     | 2                                         | 180 | 50                                               | 200 | 267                                                | 800 | 150                             | 130                |
| SMTPB270 | W43     | 2                                         | 243 | 50                                               | 270 | 360                                                | 800 | 150                             | 120                |

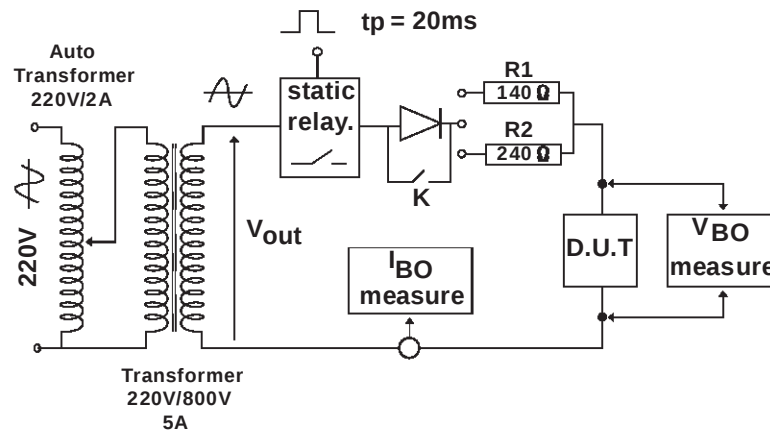
All parameters tested at 25°C, except where indicated.

**Note 1:** I<sub>R</sub> measured at V<sub>R</sub> guarantees V<sub>BRmin</sub> ≥ V<sub>R</sub>

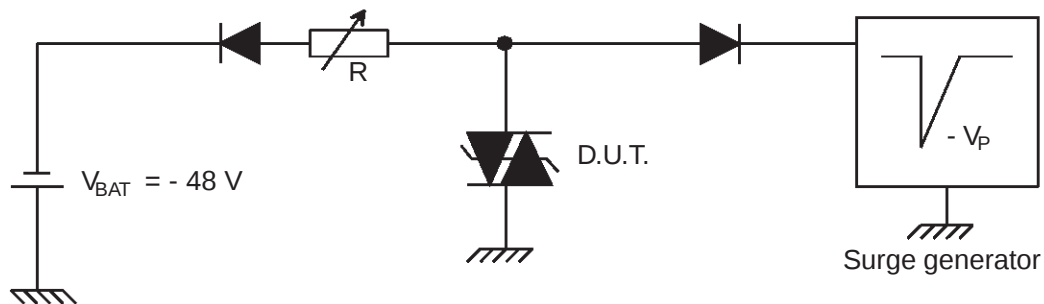
**Note 2:** Measured at 50 Hz (1 cycle) - See test circuit 1.

**Note 3:** See test circuit 2.

**Note 4:** V<sub>R</sub> = 1V, F = 1MHz. Refer to fig 3 for C versus V<sub>R</sub>.

**TEST CIRCUIT 1 FOR  $I_{BO}$  and  $V_{BO}$  parameters :****TEST PROCEDURE :**

- Pulse Test duration ( $t_p = 20\text{ms}$ ):
  - For Bidirectional devices = Switch K is closed
  - For Unidirectional devices = Switch K is open.
- $V_{OUT}$  Selection
  - Device with  $V_{BO} < 200\text{ Volt}$ 
    - $V_{OUT} = 250\text{ VRMS}$ ,  $R_1 = 140\ \Omega$ .
  - Device with  $V_{BO} \geq 200\text{ Volt}$ 
    - $V_{OUT} = 480\text{ VRMS}$ ,  $R_2 = 240\ \Omega$ .

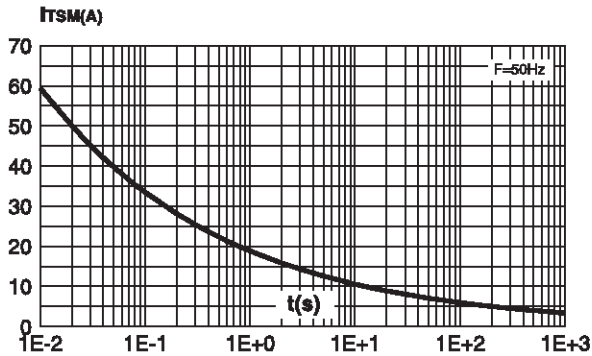
**TEST CIRCUIT 2 for  $I_H$  parameter.**

This is a GO-NOGO Test which allows to confirm the holding current ( $I_H$ ) level in a functional test circuit.

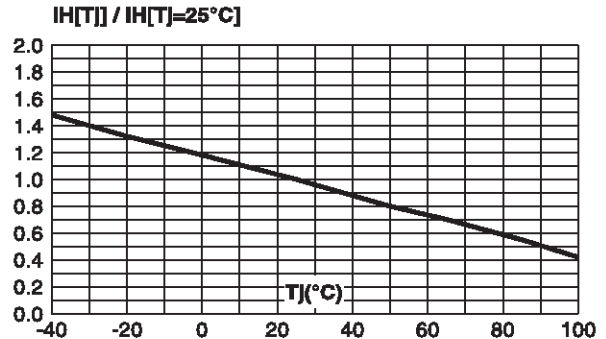
**TEST PROCEDURE :**

- 1) Adjust the current level at the  $I_H$  value by short circuiting the AK of the D.U.T.
- 2) Fire the D.U.T with a surge Current :  $I_{pp} = 10\text{A}$  ,  $10/1000\ \mu\text{s}$ .
- 3) The D.U.T will come back off-state within 50 ms max.

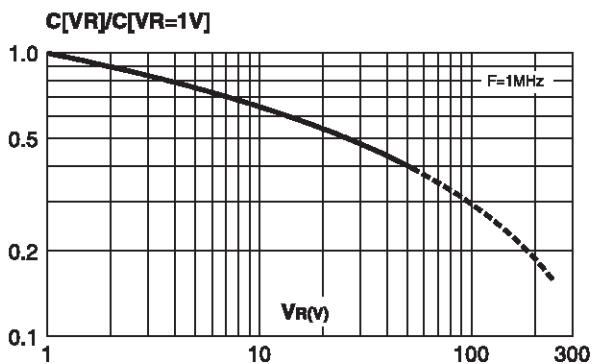
**Fig. 1:** Non repetitive surge peak on-state current versus overload duration ( $T_j$  initial=25°C).



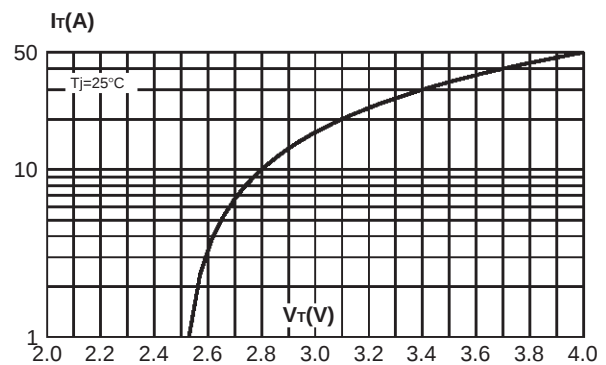
**Fig. 2:** Relative variation of holding current versus junction temperature.



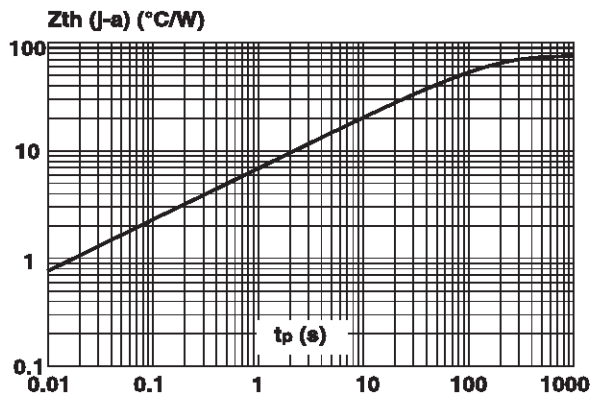
**Fig. 3:** Relative variation of junction capacitance versus reverse applied voltage (typical values). Note: For  $V_{RM}$  upper than 56V, the curve is extrapolated (dotted line).

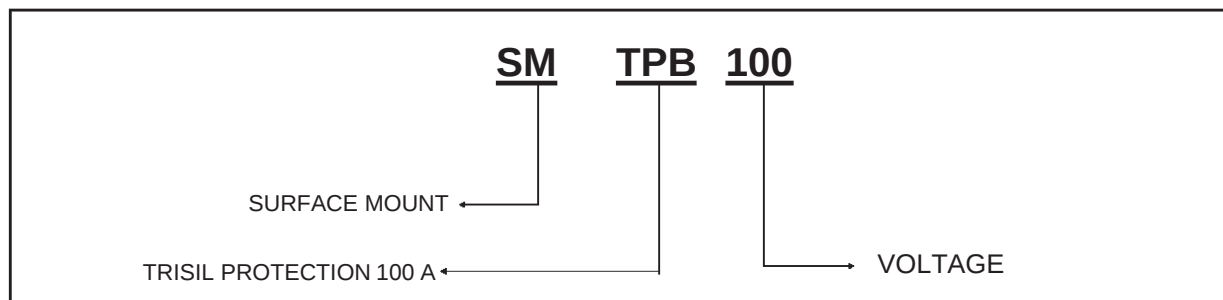


**Fig. 4:** On-state voltage versus on-state current (typical values).

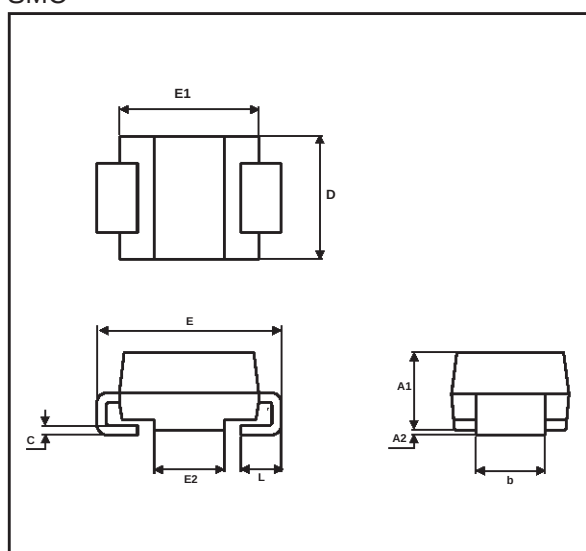


**Fig. 5:** Transient thermal impedance junction to ambient versus pulse duration (for FR4 PC Board with recommended pad layout).

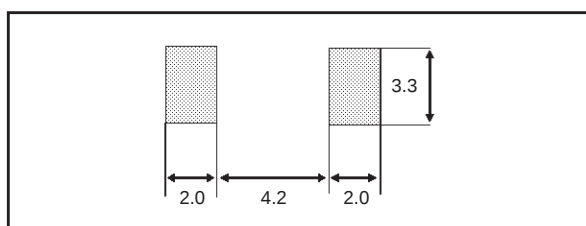


**ORDER CODE**


**Marking :** Logo, date code, type code.

**PACKAGE MECHANICAL DATA.**
**SMC**


| 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 |

**FOOTPRINT DIMENSIONS (in millimeters)**
**SMC**


**Packaging :** Standard packaging is in tape and reel

**Weight :** 0.25g.

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