



## TPB SERIES

TRISIL™

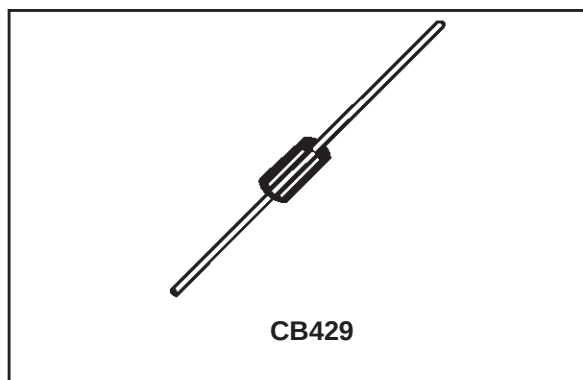
### FEATURES

- BIDIRECTIONAL CROWBAR PROTECTION.
- VOLTAGE RANGE: FROM 62 V TO 270 V.
- HOLDING CURRENT :  
 $I_H = 150\text{mA min.}$
- REPETITIVE PEAK PULSE CURRENT :  
 $I_{PP} = 100\text{ A, } 10/1000\text{ }\mu\text{s.}$
- UL RECOGNIZED FILE # E136224

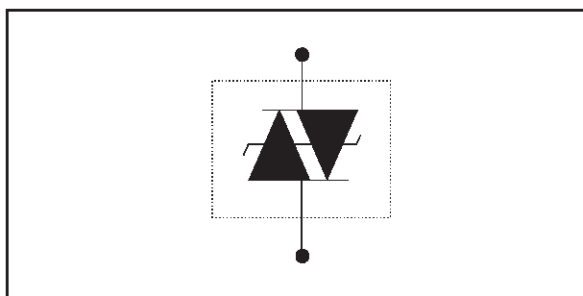
### DESCRIPTION

The TPB series are TRISIL devices especially designed for protecting sensitive telecommunication equipment against lightning and transient voltages induced by AC power lines. They are available in the CB429 axial package.

TRISIL devices provide bidirectional protection by crowbar action. Their characteristic response to transient overvoltages makes them particularly suited to protect voltage sensitive telecommunication equipment.



### 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                     | -                               |

## TPB SERIES

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

| Symbol                             | Parameter                                                         |                                  | Value                | Unit             |
|------------------------------------|-------------------------------------------------------------------|----------------------------------|----------------------|------------------|
| P                                  | Power dissipation on infinite heatsink                            | T <sub>amb</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>150<br>500    | A                |
| I <sub>TSM</sub>                   | Non repetitive surge peak on-state current                        | tp = 20 ms                       | 50                   | A                |
| I <sup>2</sup> t                   | I <sup>2</sup> t value for fusing                                 | tp = 20 ms                       | 25                   | A <sup>2</sup> s |
| 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 10s at 5mm for case |                                  | 230                  | °C               |

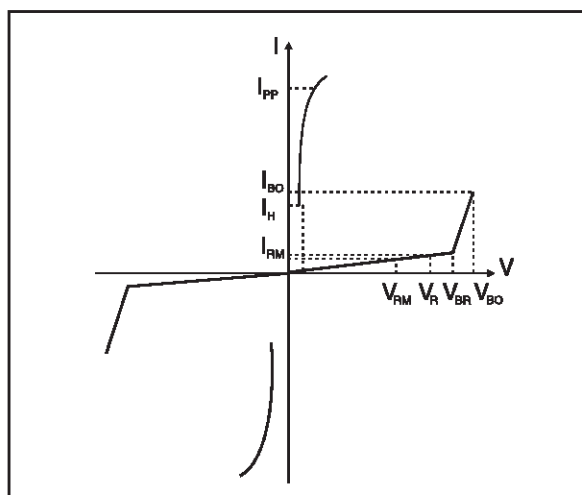
### THERMAL RESISTANCES

| Symbol                | Parameter                                                          | Value | Unit |
|-----------------------|--------------------------------------------------------------------|-------|------|
| R <sub>th</sub> (j-l) | Junction to leads (L <sub>lead</sub> = 10mm)                       | 20    | °C/W |
| R <sub>th</sub> (j-a) | Junction to ambient on printed circuit (L <sub>lead</sub> = 10 mm) | 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   | 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>max.<br>note4 |
|--------|-------------------------------------------|-----|--------------------------------------------------|-----|----------------------------------------------------|-----|---------------------------------|--------------------|
|        | μA                                        | V   | μA                                               | V   | V                                                  | mA  | mA                              | pF                 |
| TPB62  | 2                                         | 56  | 50                                               | 62  | 82                                                 | 800 | 150                             | 300                |
| TPB68  | 2                                         | 61  | 50                                               | 68  | 90                                                 | 800 | 150                             | 300                |
| TPB100 | 2                                         | 90  | 50                                               | 100 | 133                                                | 800 | 150                             | 200                |
| TPB120 | 2                                         | 108 | 50                                               | 120 | 160                                                | 800 | 150                             | 200                |
| TPB130 | 2                                         | 117 | 50                                               | 130 | 173                                                | 800 | 150                             | 200                |
| TPB180 | 2                                         | 162 | 50                                               | 180 | 240                                                | 800 | 150                             | 200                |
| TPB200 | 2                                         | 180 | 50                                               | 200 | 267                                                | 800 | 150                             | 200                |
| TPB220 | 2                                         | 198 | 50                                               | 220 | 293                                                | 800 | 150                             | 200                |
| TPB240 | 2                                         | 216 | 50                                               | 240 | 320                                                | 800 | 150                             | 200                |
| TPB270 | 2                                         | 243 | 50                                               | 270 | 360                                                | 800 | 150                             | 200                |

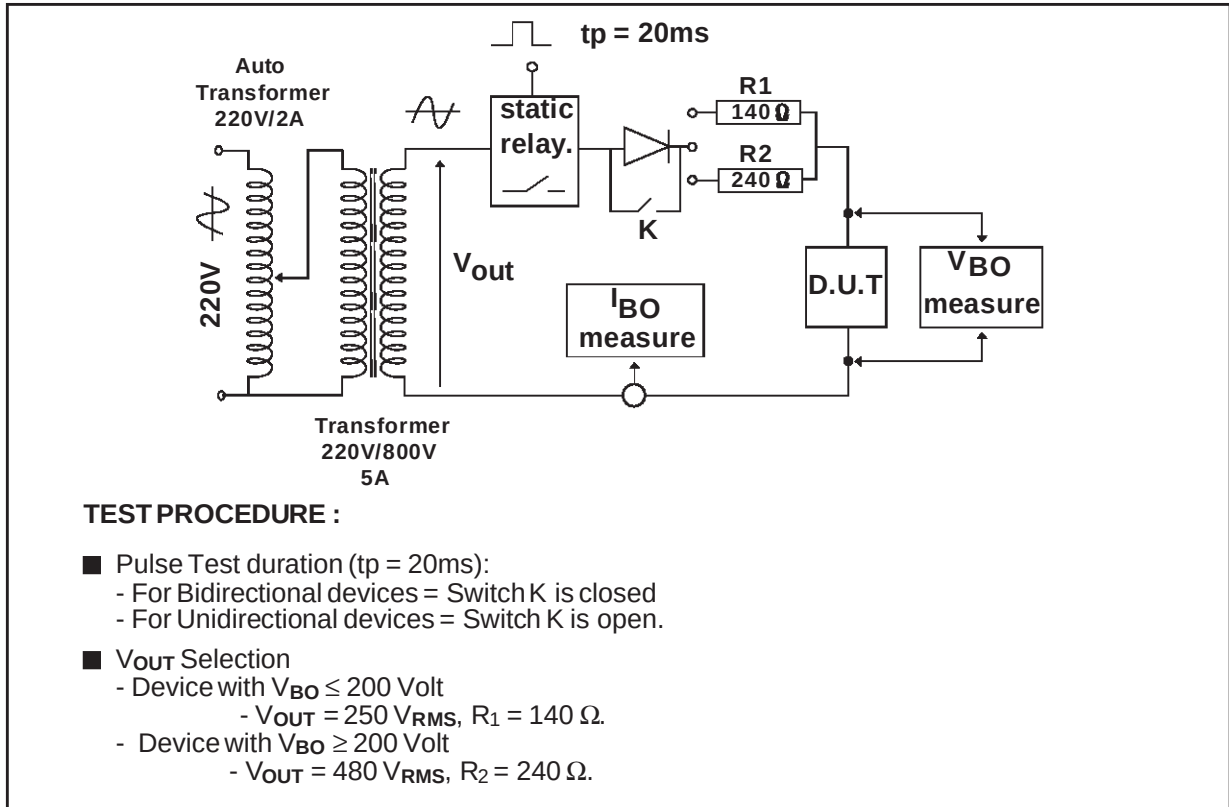
**Note 1:** I<sub>R</sub> measured at V<sub>R</sub> guarantees V<sub>BRmin</sub> ≥ V<sub>R</sub>

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

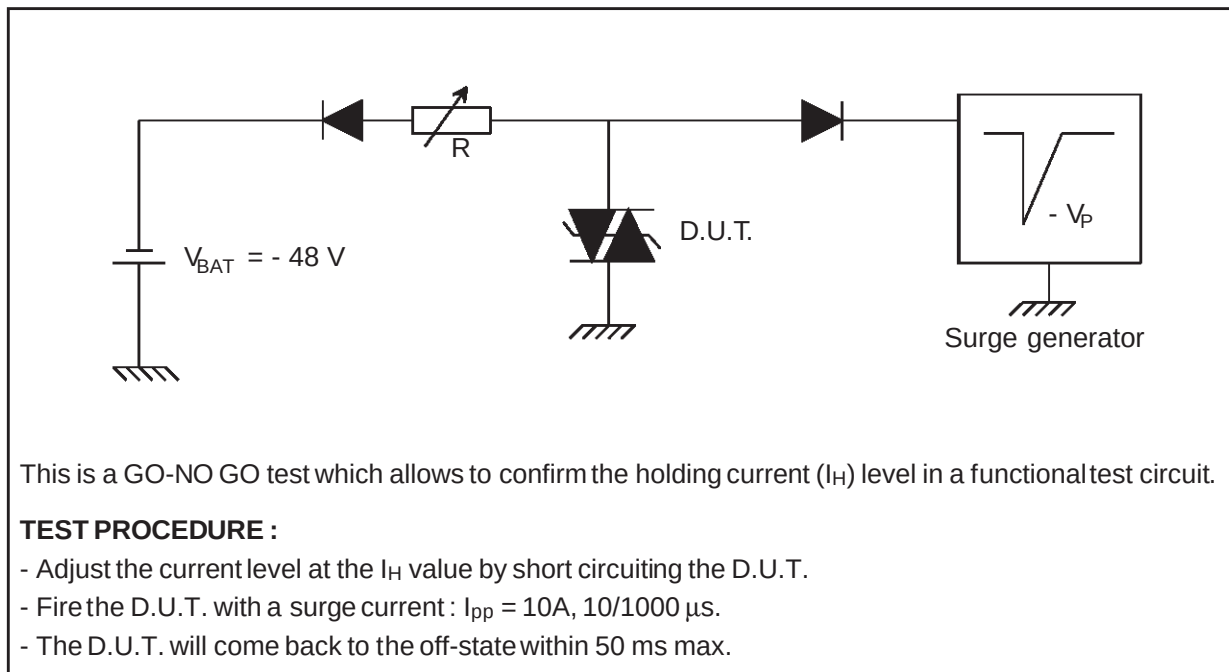
**Note 2:** Measured at 50 Hz (1 cycle) - See test circuit 1.

**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:**

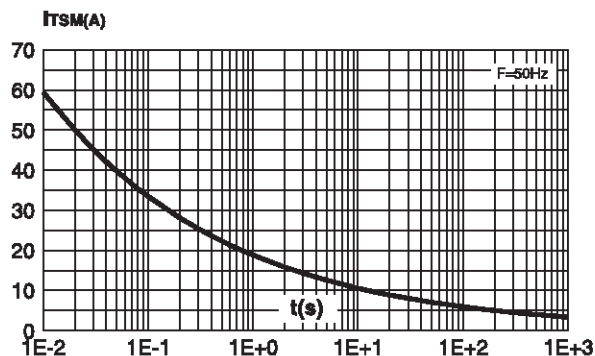


**TEST CIRCUIT 2 for  $I_H$  parameter**

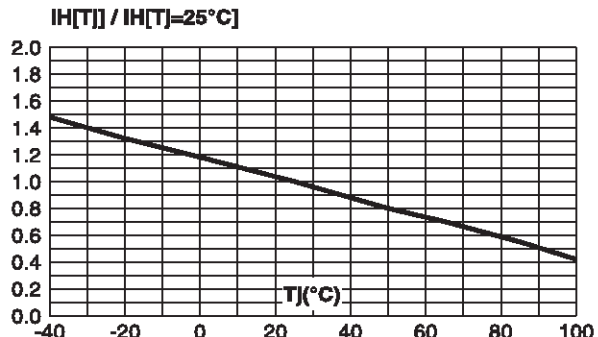


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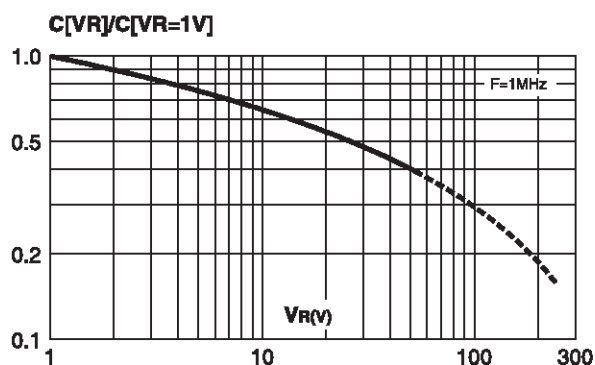
**Fig. 1:** Non repetitive surge peak on-state current versus overload duration ( $T_j$  initial=25°C).



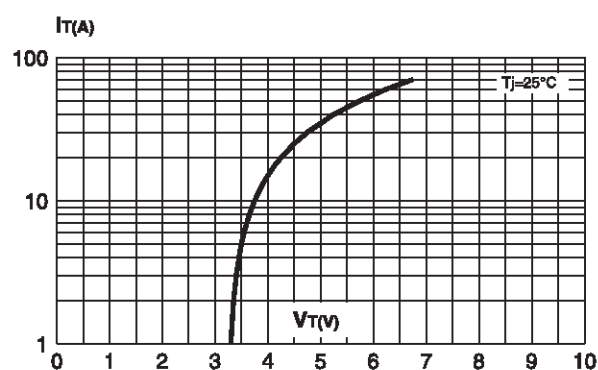
**Fig. 2:** Relative variation of holding current versus junction temperature.



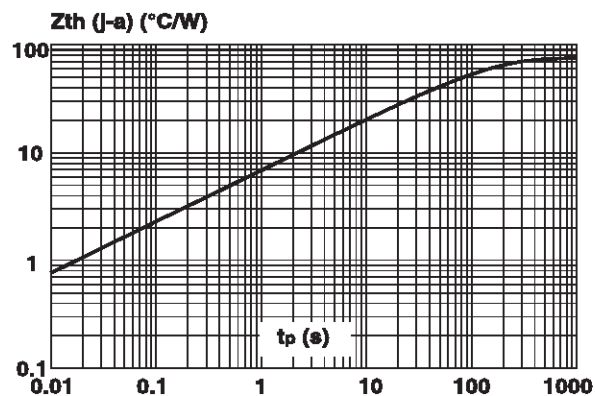
**Fig. 3:** Relative variation of junction capacitance versus reverse applied voltage (typical values). Note: For  $V_{RM}$  upper than 56V, the curve is extrapolated (dotted line).



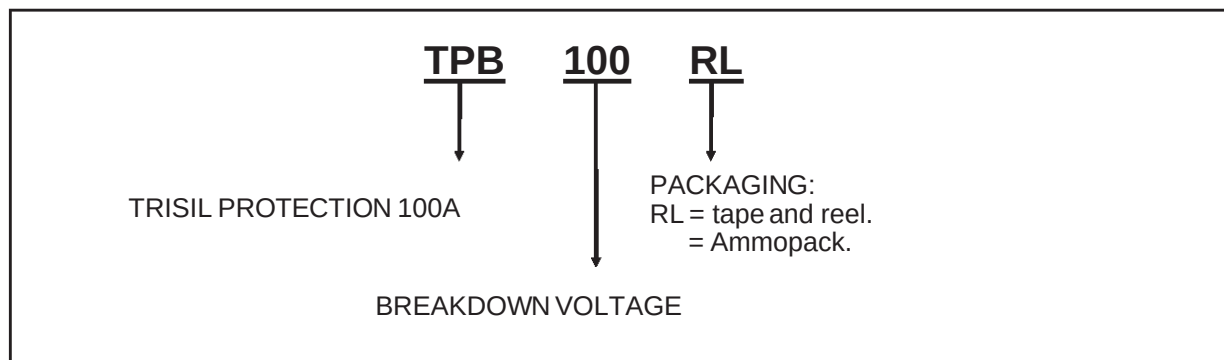
**Fig. 4:** On-state current versus on-state voltage (typical values).



**Fig. 5:** Transient thermal impedance junction to ambient versus pulse duration (for FR4 PC Board with  $T_{\text{Lead}} = 10\text{ mm}$ ).



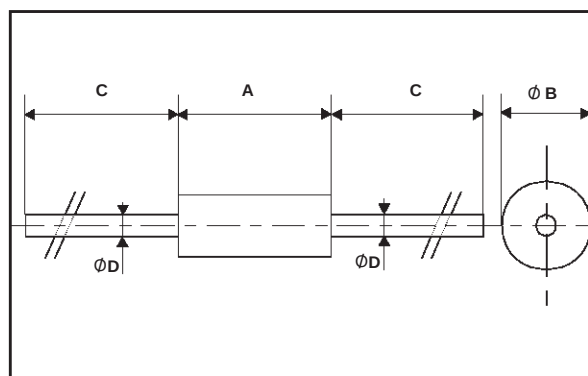
ORDER CODE



**MARKING :** Logo, Date Code, Part Number.

**PACKAGE MECHANICAL DATA.**

CB429 Plastic



| REF.                                                              | DIMENSIONS  |      |      |        |       |       |
|-------------------------------------------------------------------|-------------|------|------|--------|-------|-------|
|                                                                   | Millimeters |      |      | Inches |       |       |
|                                                                   | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A                                                                 | 9.45        | 9.50 | 9.80 | 0.372  | 0.374 | 0.386 |
| B                                                                 | 26          |      |      | 1.024  |       |       |
| Ø C                                                               | 4.90        | 5.00 | 5.10 | 0.193  | 0.197 | 0.201 |
| Ø D                                                               | 0.94        | 1.00 | 1.06 | 0.037  | 0.039 | 0.042 |
| L1                                                                |             |      | 1.27 |        |       | 0.050 |
| <b>note 1 :</b> the lead is not controlled in zone L <sub>1</sub> |             |      |      |        |       |       |

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

**Weight :** 0.85g

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