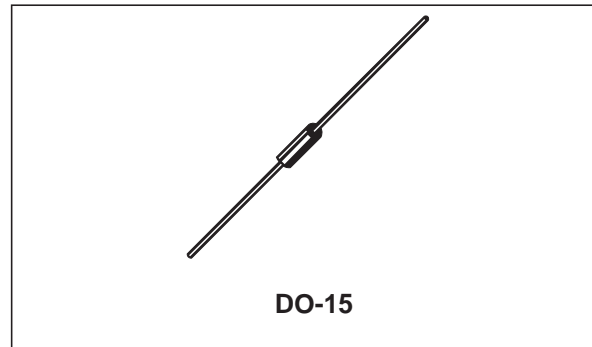


## FEATURES

- BIDIRECTIONAL CROWBAR PROTECTION.
- VOLTAGE RANGE: FROM 62 V TO 270 V.
- HOLDING CURRENT :  
 $I_H = 150\text{mA min.}$
- REPETITIVE PEAK PULSE CURRENT :  
 $I_{PP} = 50\text{ A, } 10/1000\ \mu\text{s.}$

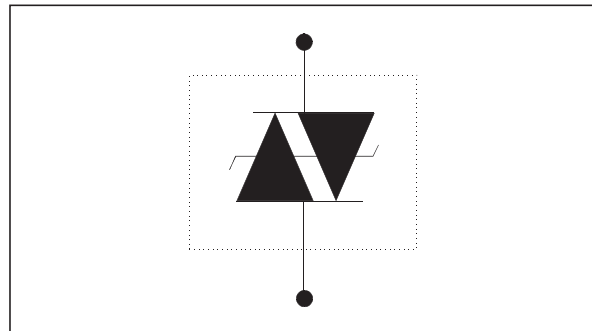


## DESCRIPTION

The TPA 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 DO-15 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) ITU-K20                        | 1000                   | 10/700                             | 5/310                              | 25                      | -                               |
| (CCITT) ITU-K17                        | 1500                   | 10/700                             | 5/310                              | 38                      | -                               |
| VDE0433                                | 2000                   | 10/700                             | 5/310                              | 50                      | -                               |
| VDE0878                                | 2000                   | 1.2/50                             | 1/20                               | 50                      | -                               |
| IEC-1000-4-5                           | level 3<br>level 4     | 10/700<br>1.2/50                   | 5/310<br>8/20                      | 50<br>100               | -<br>-                          |
| FCC Part 68, lightning surge type A    | 1500<br>800            | 10/160<br>10/560                   | 10/160<br>10/560                   | 75<br>55                | 12.5<br>6.5                     |
| FCC Part 68, lightning surge type B    | 1000                   | 9/720                              | 5/320                              | 25                      | -                               |
| BELLCORE TR-NWT-001089 First level     | 2500<br>1000           | 2/10<br>10/1000                    | 2/10<br>10/1000                    | 150<br>50               | 11.5<br>10                      |
| BELLCORE TR-NWT-001089 Second level    | 5000                   | 2/10                               | 2/10                               | 150                     | 11.5                            |
| CNET I31-24                            | 1000                   | 0.5/700                            | 0.8/310                            | 25                      | -                               |

## TPA 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 | 1.7                  | W                |
| I <sub>PP</sub>                    | Peak pulse current  | 10/1000 μs<br>8/20 μs    | 50<br>100            | A                |
| I <sub>TSM</sub>                   | Non repetitive surge peak on-state current                | t <sub>p</sub> = 20 ms   | 30                   | A                |
| I <sup>2</sup> t                   | I <sup>2</sup> t value for fusing                         | t <sub>p</sub> = 20 ms   | 9                    | 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         |

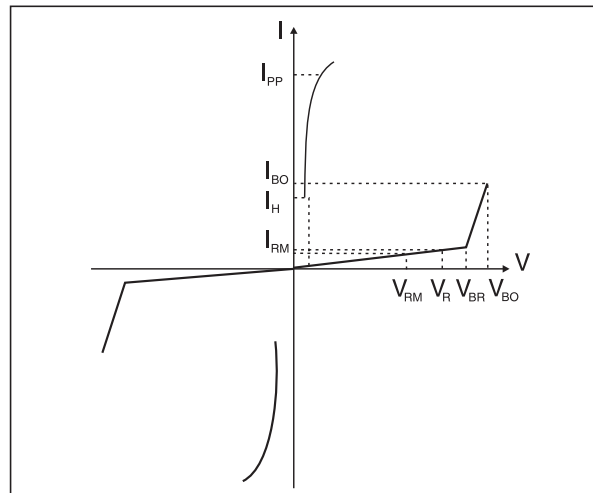
### THERMAL RESISTANCES

| Symbol                | Parameter  | Value | Unit |
|-----------------------|--|-------|------|
| R <sub>th (j-l)</sub> | Junction to leads (L <sub>lead</sub> = 10mm)                       | 60    | °C/W |
| R <sub>th (j-a)</sub> | Junction to ambient on printed circuit (L <sub>lead</sub> = 10 mm) | 100   | °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                          |

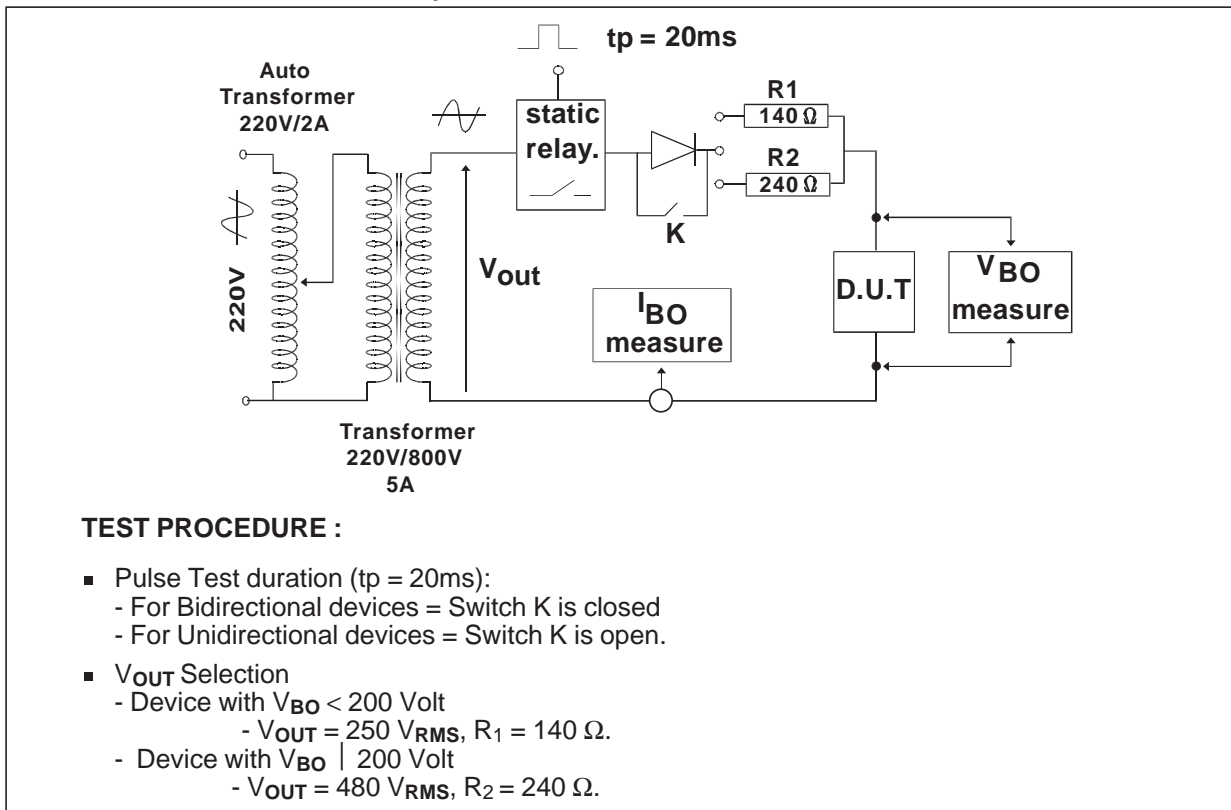


| Type   | I <sub>RM</sub> @ V <sub>RM</sub> |     | I <sub>R</sub> @ V <sub>R</sub> |     | V <sub>BO</sub> @ I <sub>BO</sub> |     | I <sub>H</sub>       | C                    |
|--------|-----------------------------------|-----|---------------------------------|-----|-----------------------------------|-----|----------------------|----------------------|
|        | max.<br>μA                        | V   | max.<br>note 1<br>μA            | V   | max.<br>note 2<br>V               | mA  | min.<br>note 3<br>mA | max.<br>note 4<br>pF |
| TPA62  | 2                                 | 56  | 50                              | 62  | 82                                | 800 | 150                  | 150                  |
| TPA68  | 2                                 | 61  | 50                              | 68  | 90                                | 800 | 150                  | 150                  |
| TPA100 | 2                                 | 90  | 50                              | 100 | 133                               | 800 | 150                  | 100                  |
| TPA120 | 2                                 | 108 | 50                              | 120 | 160                               | 800 | 150                  | 100                  |
| TPA130 | 2                                 | 117 | 50                              | 130 | 173                               | 800 | 150                  | 100                  |
| TPA180 | 2                                 | 162 | 50                              | 180 | 240                               | 800 | 150                  | 100                  |
| TPA200 | 2                                 | 180 | 50                              | 200 | 267                               | 800 | 150                  | 100                  |
| TPA220 | 2                                 | 198 | 50                              | 220 | 293                               | 800 | 150                  | 100                  |
| TPA240 | 2                                 | 216 | 50                              | 240 | 320                               | 800 | 150                  | 100                  |
| TPA270 | 2                                 | 243 | 50                              | 270 | 360                               | 800 | 150                  | 100                  |

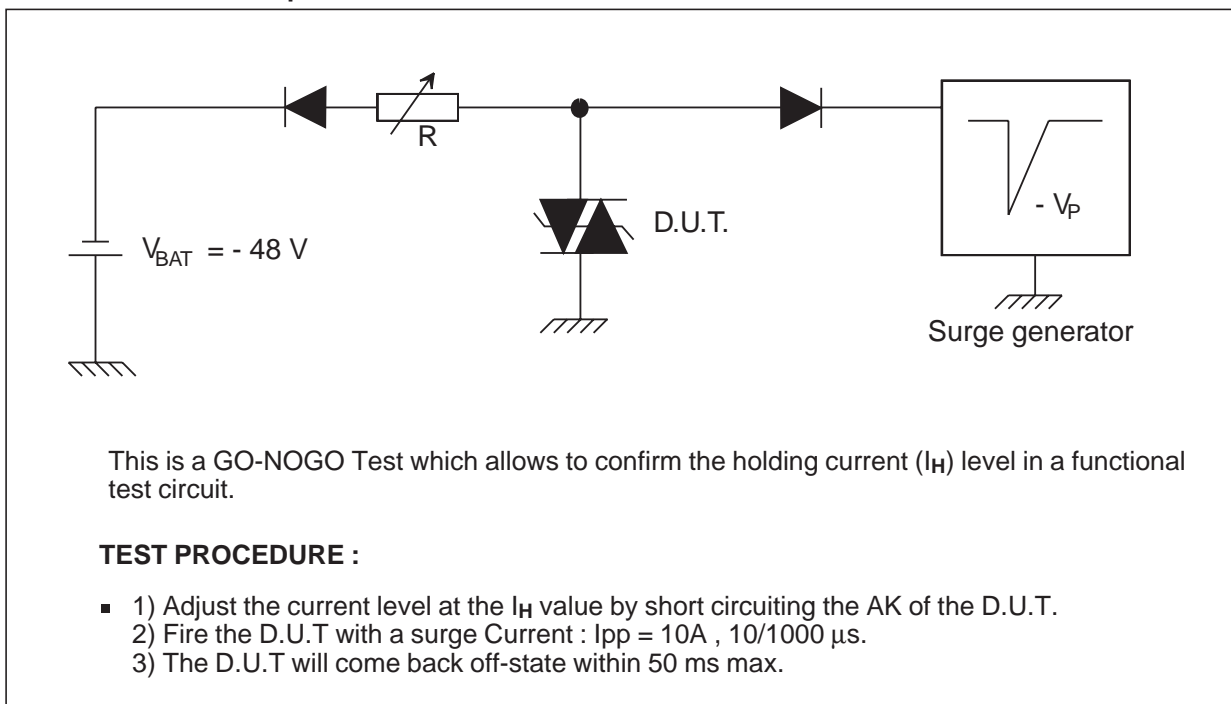
**Note 1:** I<sub>R</sub> measured at V<sub>R</sub> guarantee V<sub>BRmin</sub> | V<sub>R</sub>  
**Note 3:** See test circuit 2.

**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 :**

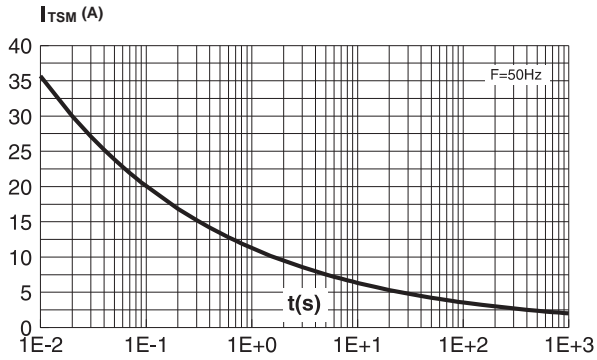


**TEST CIRCUIT 2 for  $I_H$  parameter.**

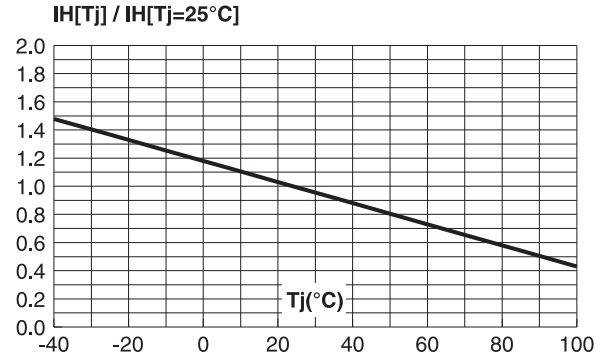


## TPA SERIES

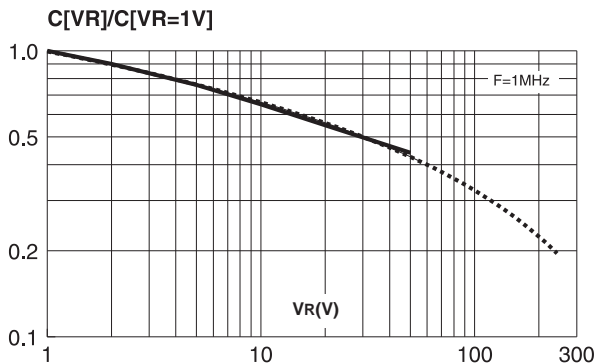
**Fig. 1:** Non repetitive surge peak on-state current versus overload duration ( $T_j$  initial=25°C).



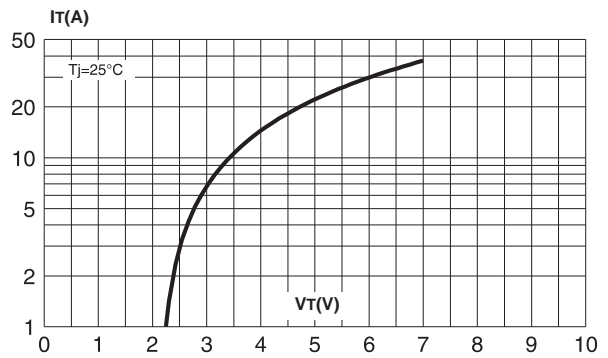
**Fig. 2:** Relative variation of holding current versus junction temperature.



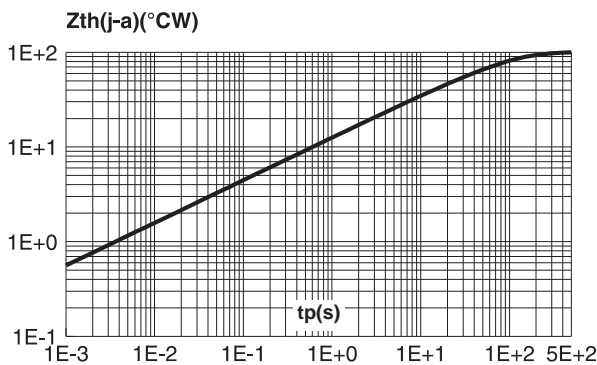
**Fig. 3:** Relative variation of junction capacitance versus reverse applied voltage (typical values). **Note:** For  $V_{RM}$  upper than 56V, the curve is extrapolated (dotted line).



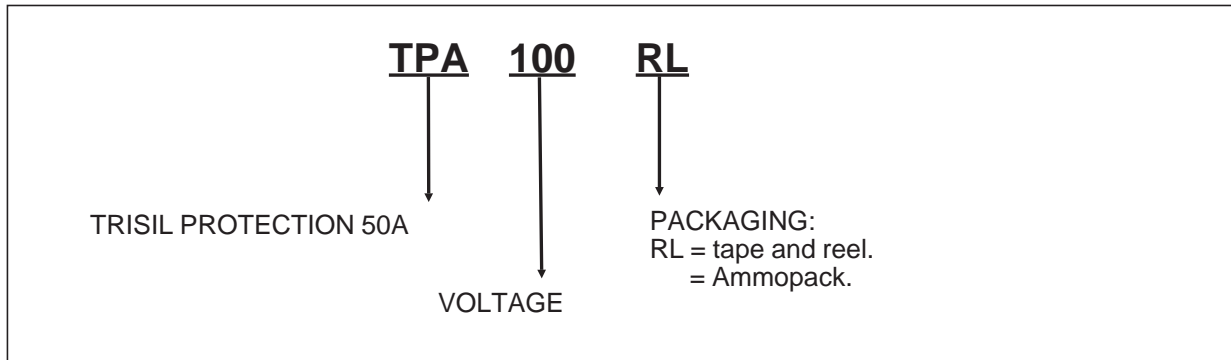
**Fig. 4:** On-state current versus on-state voltage (typical values).



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

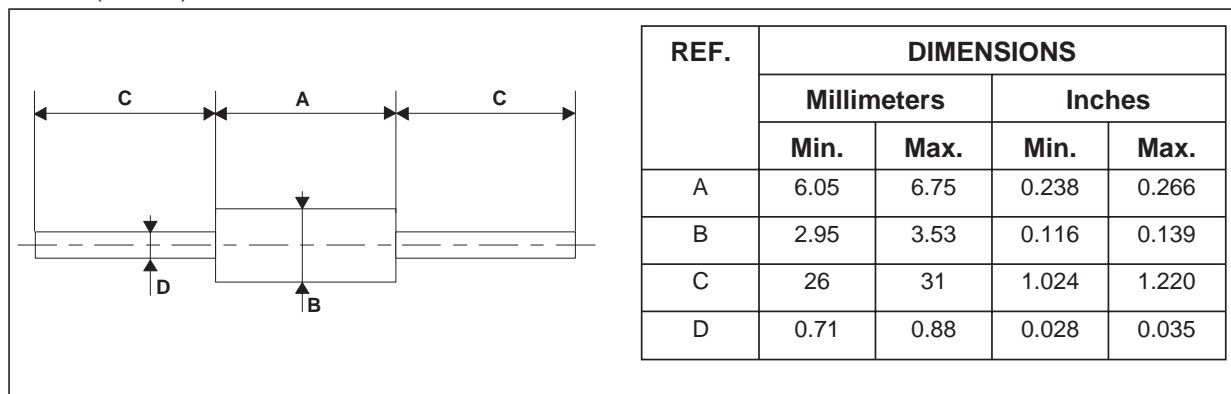


**ORDER CODE**



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

**PACKAGE MECHANICAL DATA**  
 DO-15 (Plastic)



**Weight:** 0.4 g

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

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