

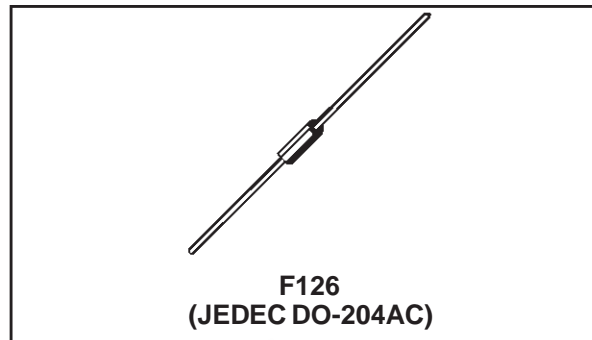


# TP30-xxx Series

TRISIL™

## FEATURES

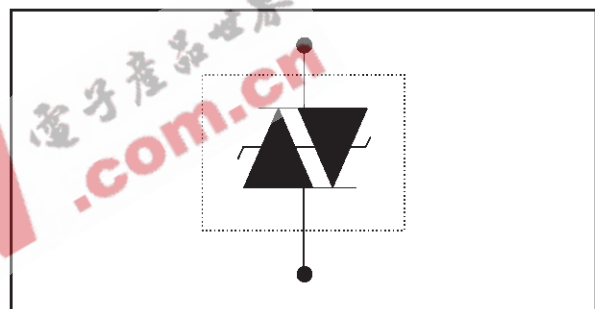
- BIDIRECTIONAL CROWBAR PROTECTION.
- VOLTAGE RANGE: FROM 62 V TO 270 V.
- HOLDING CURRENT :  
I<sub>H</sub> = 150 mA min.
- REPETITIVE PEAK PULSE CURRENT :  
I<sub>PP</sub> = 30 A, 10/1000 μs.
- JEDEC REGISTERED PACKAGE OUTLINE



## DESCRIPTION

The TP30-xxx series has been designed to protect telecommunication equipment against lightning surges and overvoltages induced by AC power lines.

## SCHEMATIC DIAGRAM



| COMPLIES WITH THE FOLLOWING STANDARDS: | Peak Surge Voltage (V) | Voltage Waveform (μs) | Current Waveform (μs) | Admissible I <sub>pp</sub> (A) | Necessary Resistor (Ω) |
|--|------------------------|-----------------------|-----------------------|--------------------------------|------------------------|
| (CCITT) ITU-K20                        | 1000                   | 10/700                | 5/310                 | 25                             | -                      |
| (CCITT) ITU-K17                        | 1500                   | 10/700                | 5/310                 | 38                             | -                      |
| VDE0433                                | 2000                   | 10/700                | 5/310                 | 40                             | 10                     |
| VDE0878                                | 2000                   | 1.2/50                | 1/20                  | 50                             | -                      |
| IEC-1000-4-5                           | level 2                | 10/700                | 5/310                 | 25                             | -                      |
|  | level 3                | 1.2/50                | 8/20                  | 50                             | -                      |
| FCC Part 68, lightning surge type A    | 1500                   | 10/160                | 10/160                | 65                             | 15.5                   |
|  | 800                    | 10/560                | 10/560                | 50                             | 8.0                    |
| FCC Part 68, lightning surge type B    | 1000                   | 9/720                 | 5/320                 | 25                             | -                      |
| BELLCORE TR-NWT-001089 First level     | 2500                   | 2/10                  | 2/10                  | 125                            | 15.0                   |
|  | 1000                   | 10/1000               | 10/1000               | 30                             | 23.3                   |
| BELLCORE TR-NWT-001089 Second level    | 5000                   | 2/10                  | 2/10                  | 125                            | 15.0                   |
| CNET I31-24                            | 1000                   | 0.5/700               | 0.8/310               | 25                             | -                      |

## TP30-xxx 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 | 3 W                |
| I <sub>PP</sub>  | Peak pulse current  | 10/1000 μs<br>8/20 μs    | 30 A               |
| I <sub>TSM</sub> | Non repetitive surge peak on-state current                        | t <sub>p</sub> = 20 ms   | 15 A               |
| I <sup>2</sup> t | I <sup>2</sup> t value for fusing                                 | t <sub>p</sub> = 20 ms   | 1 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> | Storage temperature range   | - 55 to + 150            | °C                 |
| T <sub>j</sub>   | Maximum junction temperature                                      | 150                      | °C                 |
| T <sub>L</sub>   | Maximum lead temperature for soldering during 10s at 5mm for case | 230                      | °C                 |

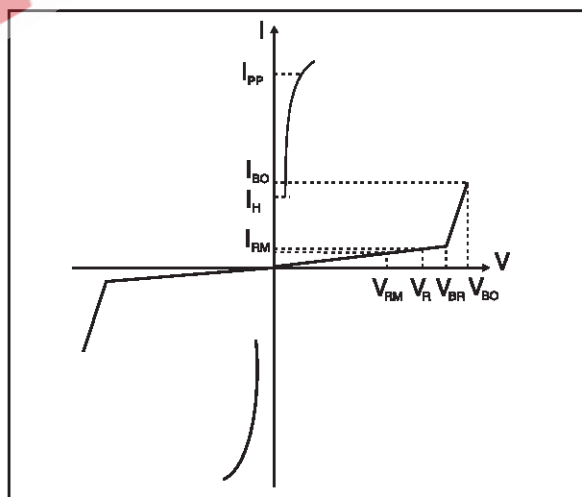
### THERMAL RESISTANCES

| Symbol                | Parameter  | Value | Unit |
|-----------------------|--|-------|------|
| R <sub>th</sub> (j-l) | Junction to leads  | 60    | °C/W |
| R <sub>th</sub> (j-a) | Junction to ambient on printed circuit with standard footprint dimension | 100   | °C/W |

### ELECTRICAL CHARACTERISTICS

(T<sub>amb</sub> = 25°C)

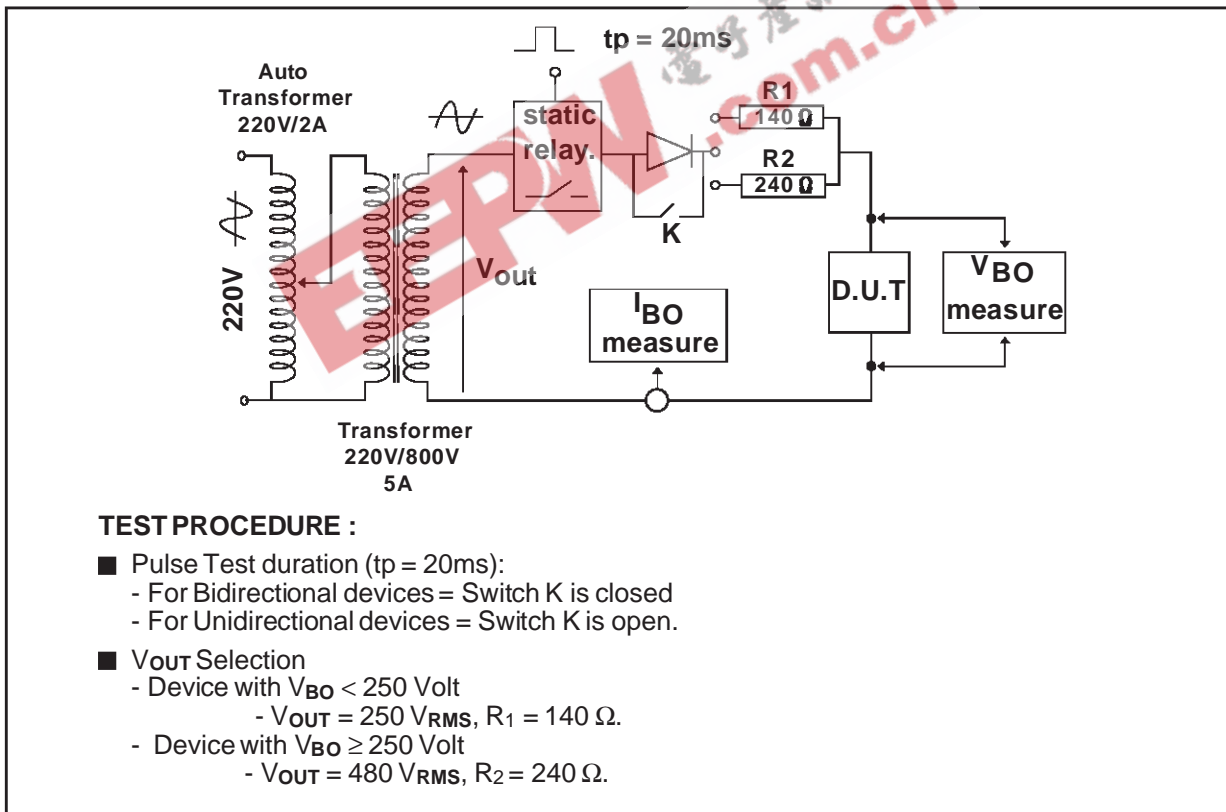
| Symbol          | Parameter                            |
|-----------------|--------------------------------------|
| V <sub>RM</sub> | Stand-off voltage                    |
| I <sub>RM</sub> | Leakage current at stand-off voltage |
| V <sub>R</sub>  | Continuous Reverse voltage           |
| V <sub>BR</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                          |



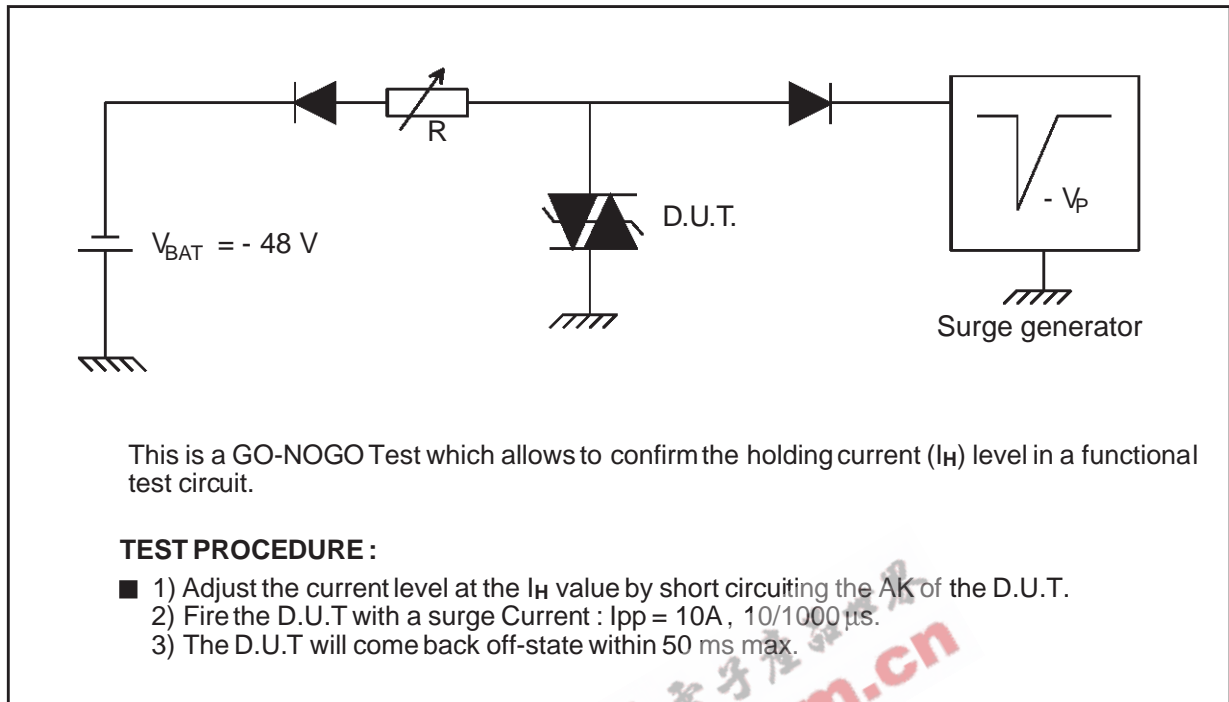
| Type     | $I_{RM}$ @ $V_{RM}$ |     | $I_R$ @ $V_R$            |     | $V_{BO}$ @ $I_{BO}$ |     | $I_H$<br>min<br>note 3 | C             |               |
|----------|---------------------|-----|--------------------------|-----|---------------------|-----|------------------------|---------------|---------------|
|          | max<br>$\mu A$      | V   | max<br>note 1<br>$\mu A$ | V   | max<br>note 2<br>V  | mA  |                        | typ<br>note 4 | typ<br>note 5 |
| TP30-62  | 2                   | 56  | 50                       | 62  | 82                  | 800 | 150                    | 50            | 20            |
| TP30-68  | 2                   | 61  | 50                       | 68  | 90                  | 800 | 150                    | 50            | 20            |
| TP30-100 | 2                   | 90  | 50                       | 100 | 133                 | 800 | 150                    | 40            | 16            |
| TP30-120 | 2                   | 108 | 50                       | 120 | 160                 | 800 | 150                    | 40            | 16            |
| TP30-130 | 2                   | 117 | 50                       | 130 | 173                 | 800 | 150                    | 35            | 14            |
| TP30-180 | 2                   | 162 | 50                       | 180 | 240                 | 800 | 150                    | 35            | 14            |
| TP30-200 | 2                   | 180 | 50                       | 200 | 267                 | 800 | 150                    | 30            | 12            |
| TP30-220 | 2                   | 198 | 50                       | 220 | 293                 | 800 | 150                    | 30            | 12            |
| TP30-240 | 2                   | 216 | 50                       | 240 | 320                 | 800 | 150                    | 30            | 12            |
| TP30-270 | 2                   | 243 | 50                       | 270 | 360                 | 800 | 150                    | 30            | 12            |

- Note 1:**  $I_R$  measured at  $V_R$  guarantee  $V_{BRmin} \geq V_R$   
**Note 2:** Measured at 50 Hz (1 cycle) - See test circuit 1.  
**Note 3:** See test circuit 2.  
**Note 4:**  $V_R = 1V, F = 1MHz.$   
**Note 5:**  $V_R = 50V, F = 1MHz.$

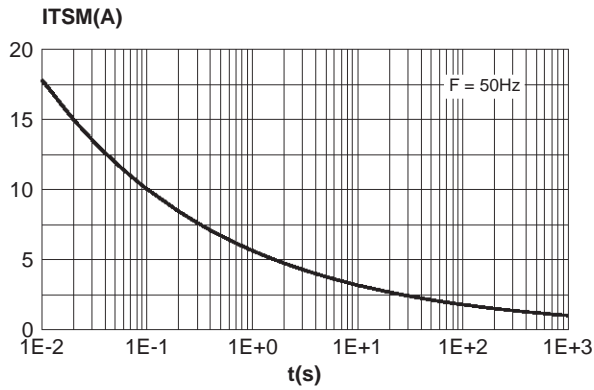
**TEST CIRCUIT 1 FOR  $I_{BO}$  and  $V_{BO}$  parameters:**



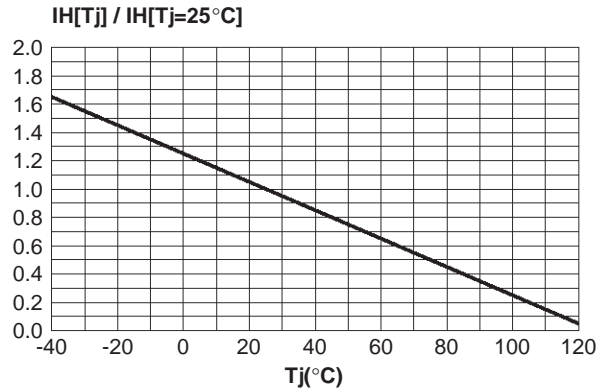
TEST CIRCUIT 2 for  $I_H$  parameter.



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

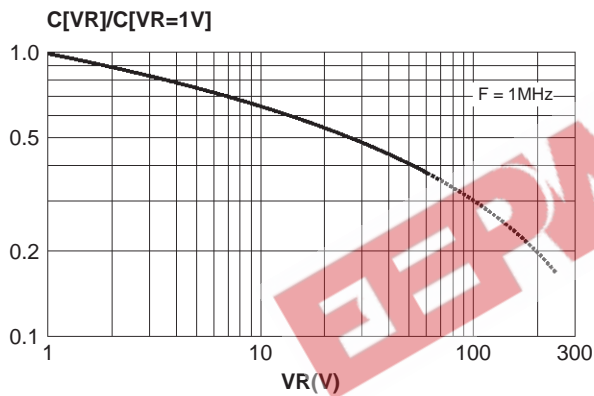


**Fig. 2:** Relative variation of holding current versus junction temperature.

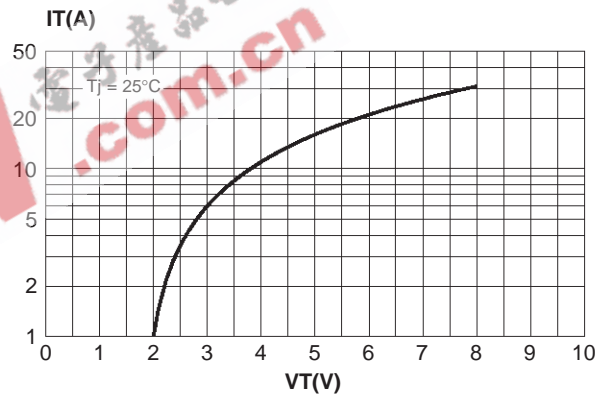


**Fig. 3:** Relative variation of junction capacitance versus reverse applied voltage (typical values).

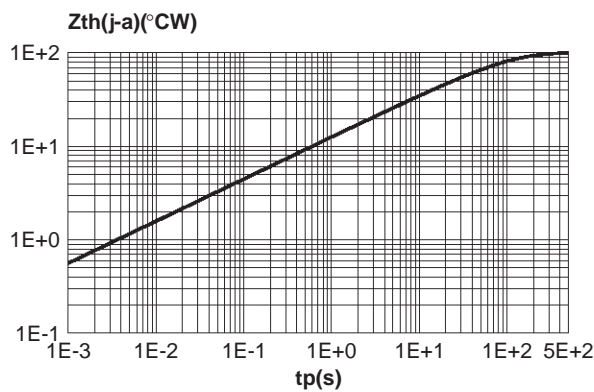
**Note:** For VRM upper than 56V, the curve is extrapolated (dotted line)



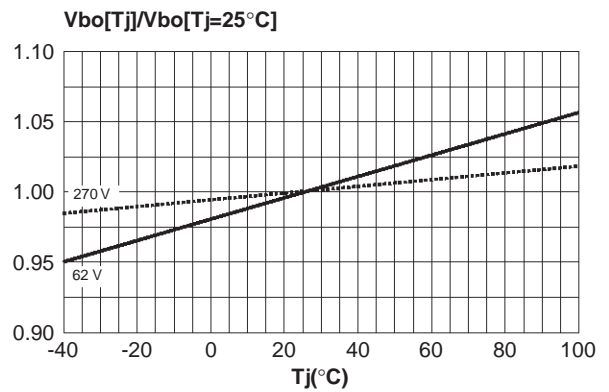
**Fig. 4:** On-state voltage versus on-state current (typical values).



**Fig. 5:** Variation of thermal impedance junction to ambient versus pulse duration.

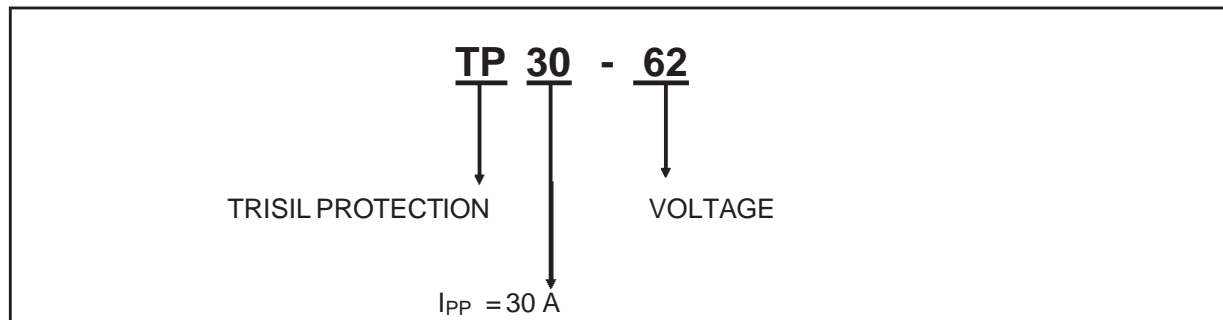


**Fig. 6:** Relative variation of  $V_{BO}$  voltage versus junction temperature.



## TP30-xxx Series

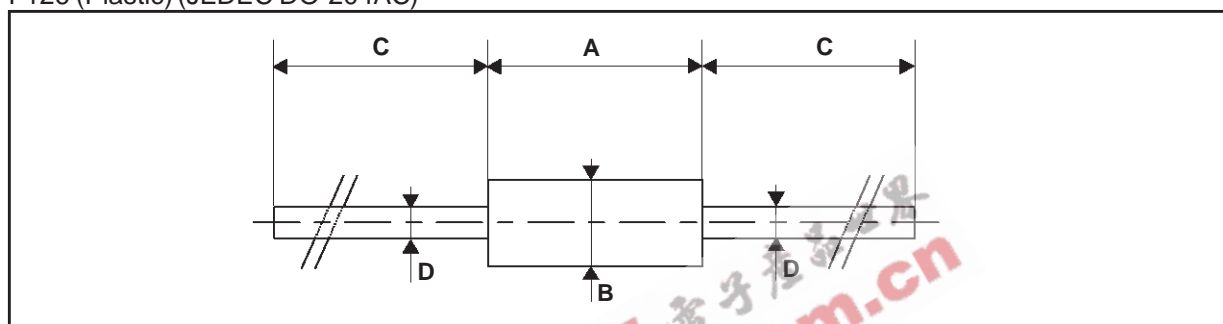
### ORDER CODE



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

### PACKAGE MECHANICAL DATA

F126 (Plastic) (JEDEC DO-204AC)



| REF. | DIMENSIONS  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 6.05        | 6.20 | 6.35 | 0.238  | 0.244 | 0.250 |
| B    | 2.95        | 3.00 | 3.05 | 0.116  | 0.118 | 0.120 |
| C    | 26          |      | 31   | 1.024  |       | 1.220 |
| D    | 0.76        | 0.81 | 0.86 | 0.030  | 0.032 | 0.034 |

**Packaging** : Tape and reel.

**Weight** : 0.40g

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1998 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>