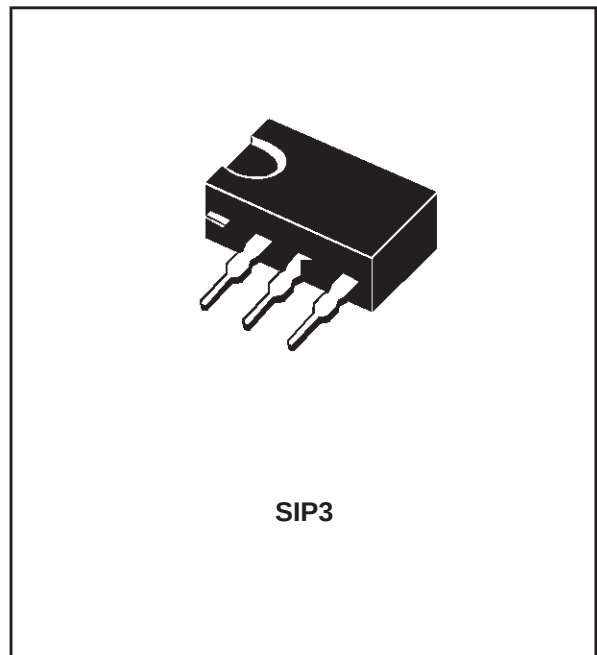


## FEATURES

- DUAL BIDIRECTIONAL CROWBAR PROTECTION.
- PEAK PULSE CURRENT :  
-  $I_{PP} = 75 \text{ A}$ , 10/1000  $\mu\text{s}$ .
- HOLDING CURRENT = 150 mA min
- BREAKDOWN VOLTAGE = 200 V min.
- BREAKOVER VOLTAGE = 290 V max.
- MONOLITHIC DEVICE.

## DESCRIPTION

This monolithic protection device has been especially designed to protect subscriber line cards. The THBT200 device is particularly suitable to protect ring generator relay against transient overvoltages.

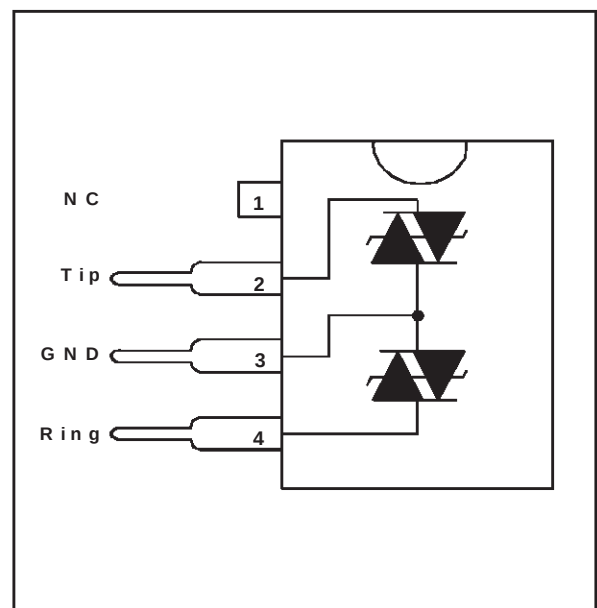


## COMPLIES WITH THE FOLLOWING STANDARDS :

|                                     |                       |          |
|-------------------------------------|-----------------------|----------|
| <b>CCITT K20 :</b>                  | 10/700 $\mu\text{s}$  | 1kV      |
|                                     | 5/310 $\mu\text{s}$   | 25A      |
| <b>VDE 0433 :</b>                   | 10/700 $\mu\text{s}$  | 2kV      |
|                                     | 5/310 $\mu\text{s}$   | 50A      |
| <b>VDE 0878 :</b>                   | 1.2/50 $\mu\text{s}$  | 1.5kV    |
|                                     | 1/20 $\mu\text{s}$    | 40A      |
| <b>FCC part 68 :</b>                | 2/10 $\mu\text{s}$    | 2.5kV    |
|                                     | 2/20 $\mu\text{s}$    | 225A (*) |
| <b>BELLCORE<br/>TR-NWT-001089 :</b> | 2/10 $\mu\text{s}$    | 2.5kV    |
|                                     | 2/10 $\mu\text{s}$    | 225A (*) |
|                                     | 10/1000 $\mu\text{s}$ | 1kV      |
|                                     | 10/1000 $\mu\text{s}$ | 75A (*)  |

(\*) with series resistors or PTC.

## SCHEMATIC DIAGRAM



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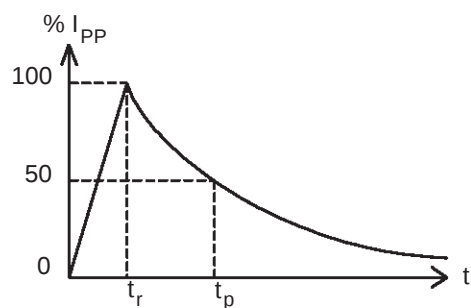
## THBT200S

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

| Symbol             | Parameter                                                           |                                                                                          | Value                   | Unit               |
|--------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------|--------------------|
| $I_{PP}$           | Peak pulse current (see note 1)                                     | 10/1000 $\mu\text{s}$<br>5/310 $\mu\text{s}$<br>8/20 $\mu\text{s}$<br>2/10 $\mu\text{s}$ | 75<br>125<br>150<br>225 | A                  |
| $I_{TSM}$          | Non repetitive surge peak on-state current<br>( $F = 50\text{Hz}$ ) | $t_p = 20\text{ms}$                                                                      | 30                      | A                  |
| $T_{stg}$<br>$T_j$ | Storage temperature range<br>Maximum junction temperature           |                                                                                          | - 40 to + 150<br>150    | $^{\circ}\text{C}$ |
| $T_L$              | Maximum lead temperature for soldering during 10s                   |                                                                                          | 230                     | $^{\circ}\text{C}$ |

**Note 1 :** Pulse waveform :

|                       |                     |                       |
|-----------------------|---------------------|-----------------------|
| 10/1000 $\mu\text{s}$ | $t_r=10\mu\text{s}$ | $t_p=1000\mu\text{s}$ |
| 5/310 $\mu\text{s}$   | $t_r=5\mu\text{s}$  | $t_p=310\mu\text{s}$  |
| 2/10 $\mu\text{s}$    | $t_r=2\mu\text{s}$  | $t_p=10\mu\text{s}$   |

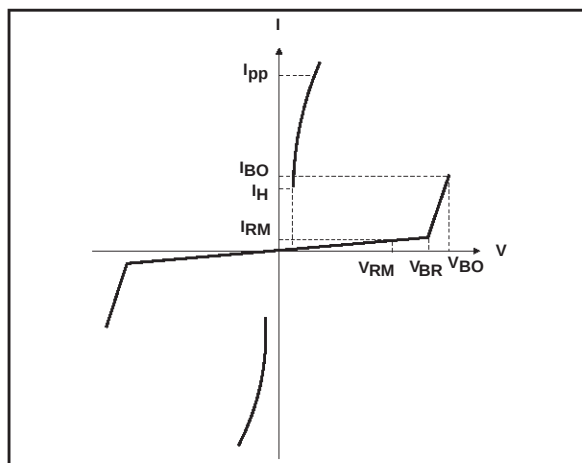


### THERMAL RESISTANCE

| Symbol        | Parameter           | Value | Unit                 |
|---------------|---------------------|-------|----------------------|
| $R_{th(j-a)}$ | Junction to ambient | 80    | $^{\circ}\text{C/W}$ |

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$ ).

| Symbol   | Parameter                   |
|----------|-----------------------------|
| $V_{RM}$ | Stand-off voltage           |
| $I_{RM}$ | Leakage current at $V_{RM}$ |
| $V_{BR}$ | Continuous reverse voltage  |
| $V_{BO}$ | Breakover voltage           |
| $I_H$    | Holding current             |
| $I_{BO}$ | Breakover current           |
| $I_{PP}$ | Peak pulse current          |
| C        | Capacitance                 |

**PARAMETERS RELATED TO ONE TRISIL (Between TIP and GND or RING and GND)**

| $I_{RM} @ V_{RM}$ |     | $V_{BR} @ I_R$ |    | $V_{BO} @ I_{BO}$ |      |      | $I_H$  | C      |
|-------------------|-----|----------------|----|-------------------|------|------|--------|--------|
| max.              |     | min.           |    | max.              | min. | max. | min.   | max.   |
|                   |     |                |    | note 1            |      |      | note 2 | note 3 |
| $\mu\text{A}$     | V   | V              | mA | V                 | mA   | mA   | mA     | pF     |
| 10                | 180 | 200            | 1  | 290               | 150  | 800  | 150    | 200    |

**Note 1:** See reference test circuit 1 for  $I_{BO}$  and  $V_{BO}$  parameters.

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

**Note 3:**  $V_R = 1\text{V}$ ,  $F = 1\text{MHz}$ .



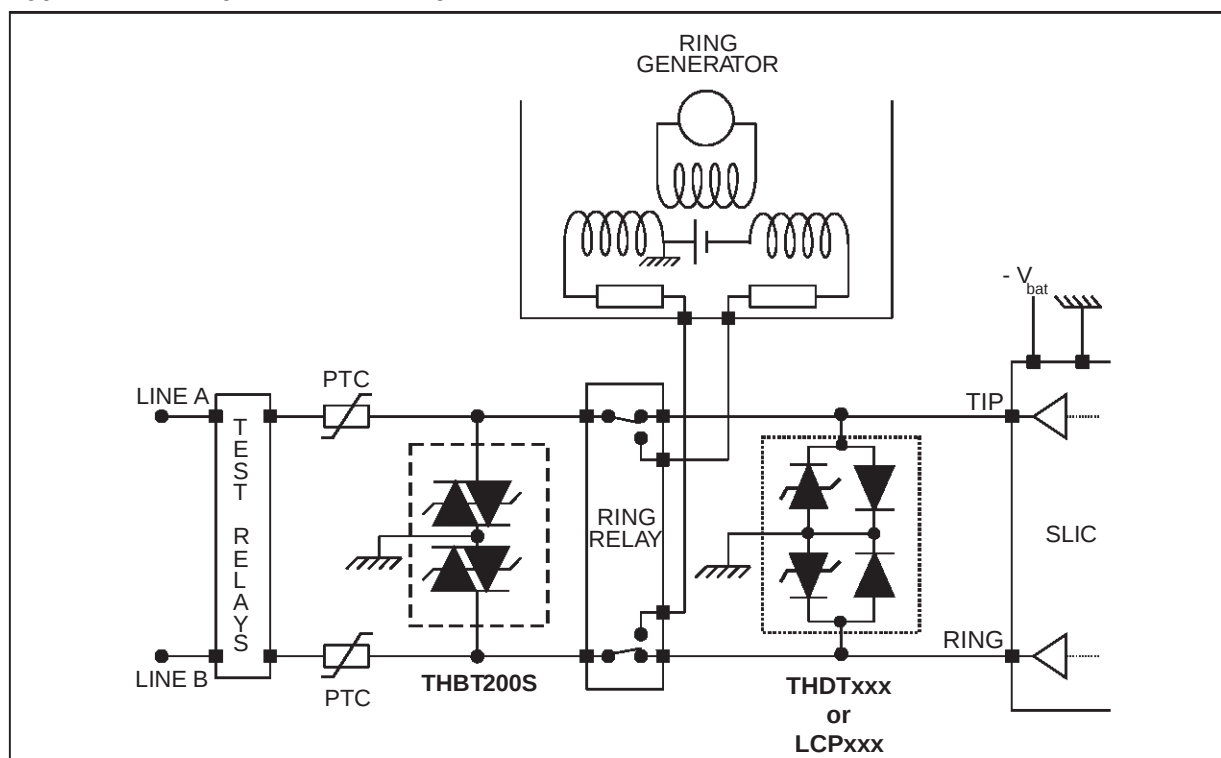
- Device with  $V_{BO} < 200$  Volt
  - $V_{OUT} = 250 V_{RMS}$ ,  $R_1 = 140 \Omega$ .
- Device with  $V_{BO} \geq 200$  Volt
  - $V_{OUT} = 480 V_{RMS}$ ,  $R_2 = 240 \Omega$ .

### TEST PROCEDURE :

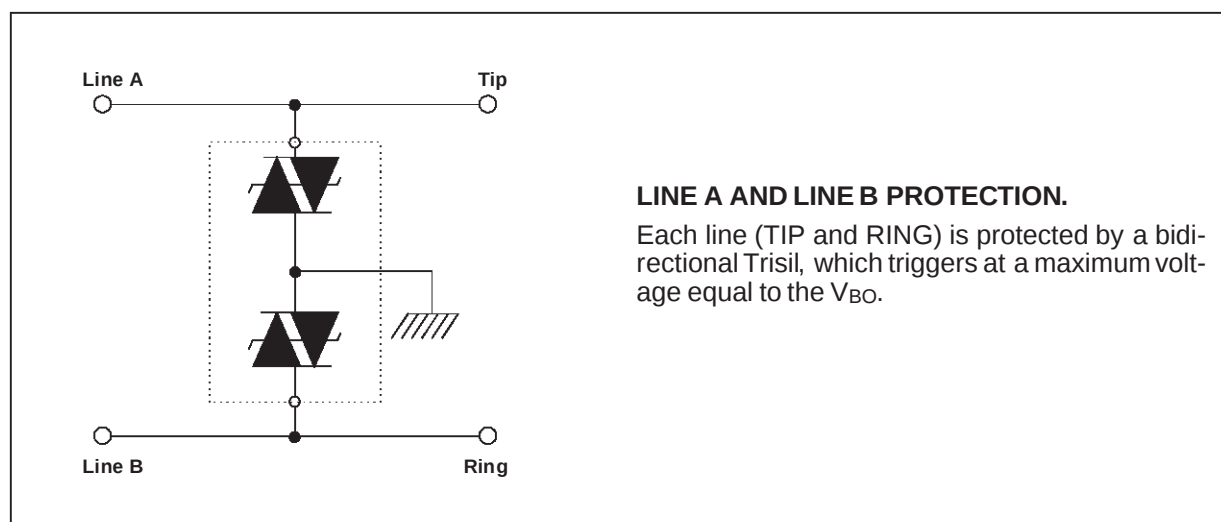
- 1) Adjust the current level at the  $I_H$  value by short circuiting the AK of the D.U.T.
- 2) Fire the D.U.T with a surge Current :  $I_{pp} = 10A$  ,  $10/1000\mu s$ .
- 3) The D.U.T will come back off-state within 50 ms max.

## APPLICATION CIRCUIT

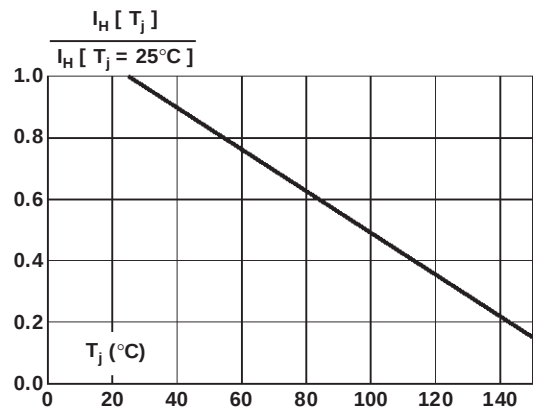
## Typical line card protection concept



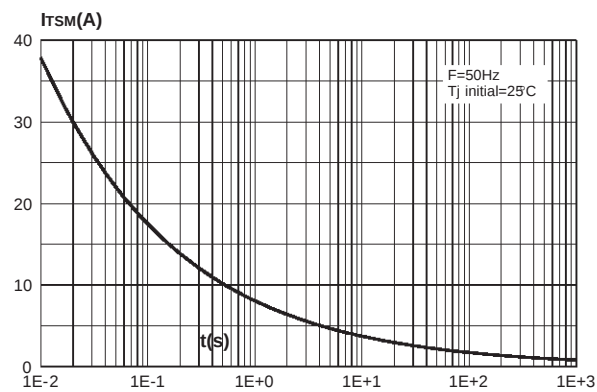
## FUNCTIONAL DESCRIPTION



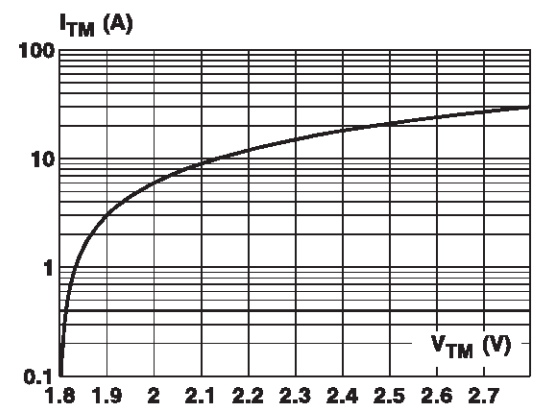
**Fig. 1 :** Relative variation of holding current versus junction temperature.



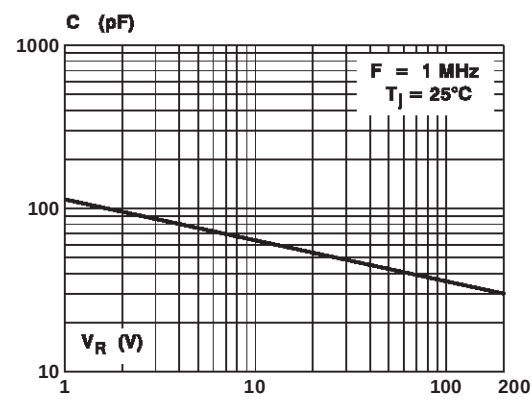
**Fig. 2 :** Surge peak current versus overload duration.



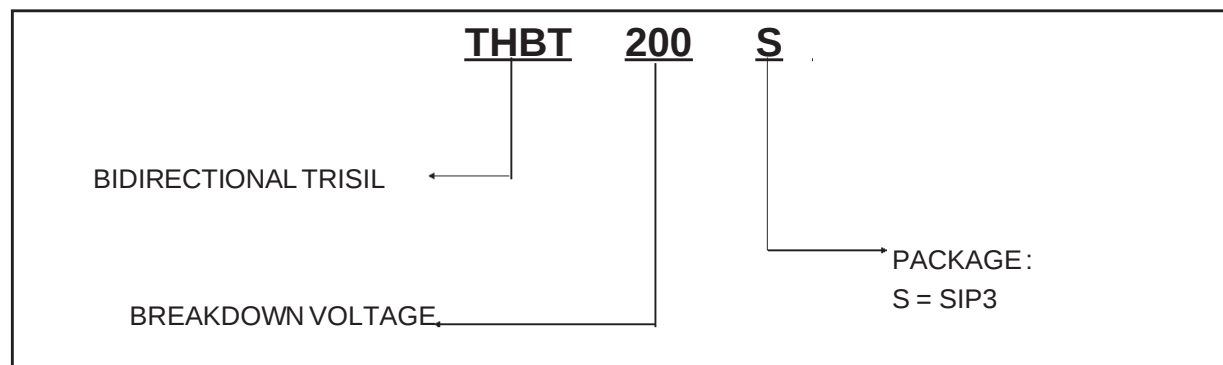
**Fig. 3 :** Peak on state voltage versus peak on state current (typical values).



**Fig. 4 :** Capacitance versus reverse applied voltage (typical values).



## ORDER CODE

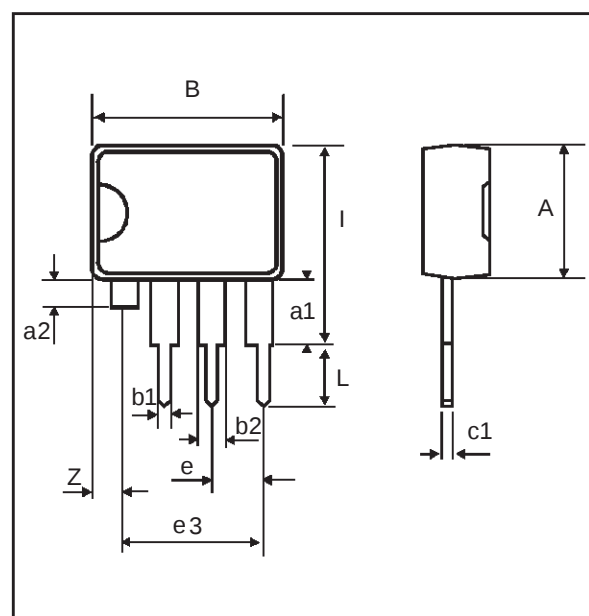


## MARKING :

| Package | Types    | Marking  |
|---------|----------|----------|
| SIP3    | THBT200S | THBT200S |

## PACKAGE MECHANICAL DATA

SIP3 Plastic



| REF. | DIMENSIONS  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimetres |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    |             |      | 7.10  |        |      | 0.280 |
| a1   | 2.80        |      |       | 0.110  |      |       |
| a2   | 1.50        |      | 1.90  | 0.059  |      | 0.075 |
| B    |             |      | 10.15 |        |      | 0.400 |
| b1   |             | 0.50 |       | 0.020  |      |       |
| b2   | 1.35        |      | 1.75  | 0.053  |      | 0.069 |
| c1   | 0.38        |      | 0.50  | 0.015  |      | 0.020 |
| e    |             | 2.54 |       | 0.100  |      |       |
| e3   |             | 7.62 |       | 0.200  |      |       |
| L    |             |      | 10.50 |        |      | 0.413 |
| L    |             | 3.30 |       | 0.130  |      |       |
| Z    |             |      | 1.50  |        |      | 0.059 |

**Packaging:** Products supplied in antistatic tubes.**Weight:** 0.55g

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