

Application Specific Discretes  
 A.S.D.<sup>TM</sup>

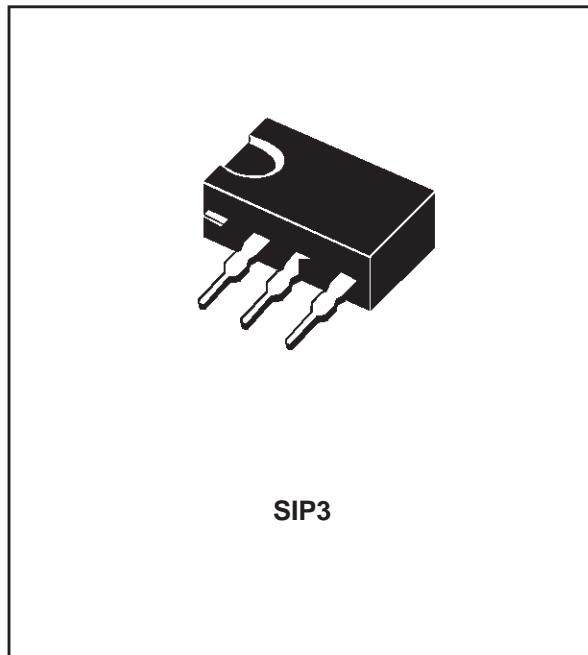
 TRANSIENT VOLTAGE SUPPRESSOR  
 FOR SLIC PROTECTION

**FEATURES**

- DUAL BIDIRECTIONAL CROWBAR PROTECTION.
- PEAK PULSE CURRENT :
  - IPP = 35 A, 10/1000  $\mu$ s.
- HOLDING CURRENT = 150 mA min
- BREAKDOWN VOLTAGE = 200 V min.
- BREAKOVER VOLTAGE = 290 V max.
- MONOLITHIC DEVICE.

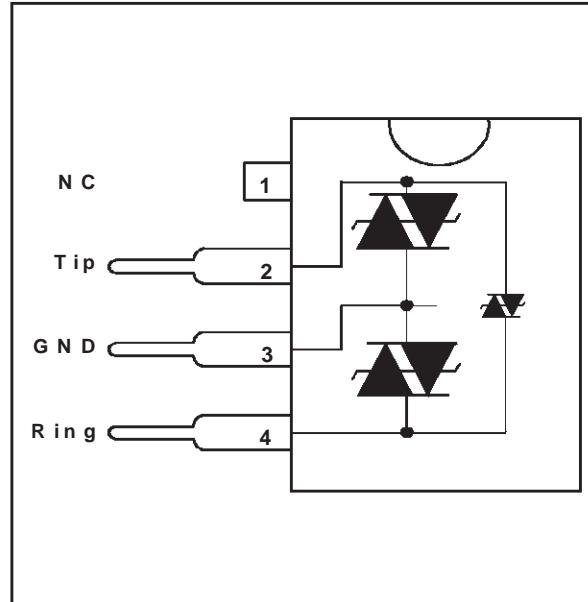
**DESCRIPTION**

This monolithic protection device has been especially designed to protect subscriber line cards. The THBT200S device is particularly suitable to protect ring generator relay against transient overvoltages.


**COMPLIES WITH THE FOLLOWING STANDARDS:**

<b>CCITT K20 :</b>	10/700 $\mu$ s	1kV
	5/310 $\mu$ s	25A
<b>VDE 0433 :</b>	10/700 $\mu$ s	2kV
	5/310 $\mu$ s	45A (*)
<b>VDE 0878 :</b>	1.2/50 $\mu$ s	1.5kV
	1/20 $\mu$ s	40A
<b>FCC part 68 :</b>	2/10 $\mu$ s	2.5kV
	2/20 $\mu$ s	80A (*)
<b>BELLCORE</b> <b>TR-NWT-001089 :</b>	2/10 $\mu$ s	2.5kV
	2/10 $\mu$ s	80A
	10/1000 $\mu$ s	1kV
	10/1000 $\mu$ s	35A (*)

(\*) with series resistors or PTC.

**SCHEMATIC DIAGRAM**


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## THBT200S1

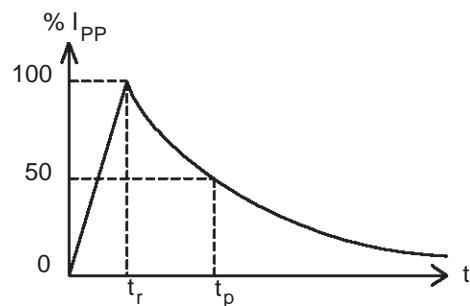
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### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^{\circ}\text{C}$ )

Symbol	Parameter		Value	Unit
$I_{PP}$	Peak pulse current (see note 1)	10/1000 $\mu\text{s}$ 8/20 $\mu\text{s}$ 2/10 $\mu\text{s}$	35 70 80	A
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 20\text{ms}$	20	A
$T_{stg}$ $T_j$	Storage and operating junction temperature range Maximum junction temperature		- 40 to + 150 + 150	$^{\circ}\text{C}$
$T_L$	Maximum lead temperature for soldering during 10s		230	$^{\circ}\text{C}$

Note 1 : Pulse waveform :

$$\begin{array}{lll} 10/1000\mu\text{s} & t_r=10\mu\text{s} & t_p=1000\mu\text{s} \\ 5/310\mu\text{s} & t_r=5\mu\text{s} & t_p=310\mu\text{s} \\ 2/10\mu\text{s} & t_r=2\mu\text{s} & t_p=10\mu\text{s} \end{array}$$

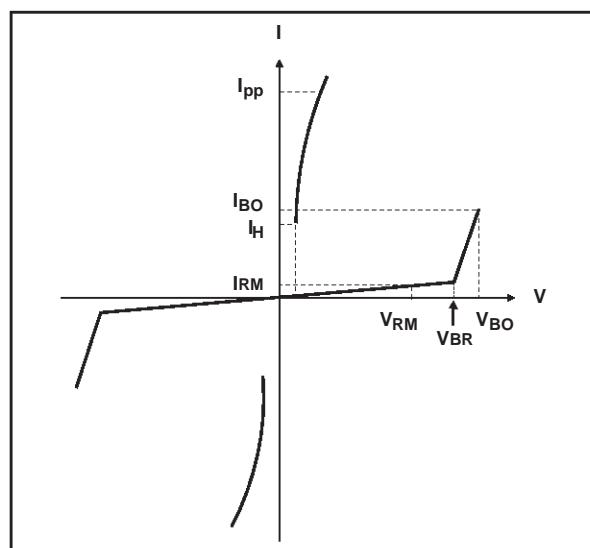


### THERMAL RESISTANCE

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

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

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



## 1 - PARAMETERS RELATED TO ONE TRISIL. (Between TIP and GND or RING and GND)

$I_{RM}$ @ $V_{RM}$ max.		$V_{BR}$ @ $I_R$ min.		$V_{BO}$ @ $I_{BO}$ max.      min.      max. note 1			$I_H$ min. note 2	C max. note 3
$\mu A$	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  $I_H$ ,  $I_{BO}$  and  $V_{BO}$  parameters.

Note 2 : See test circuit 2.

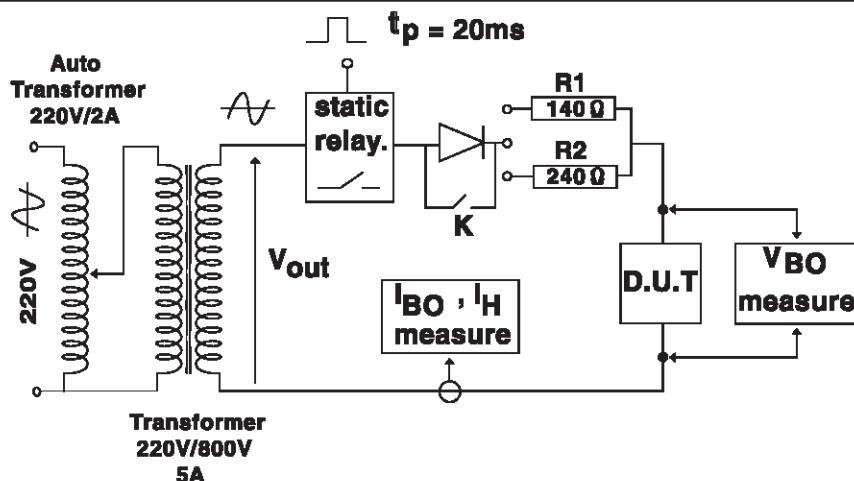
Note 3 :  $V_R = 1V$ ,  $F = 1MHz$ .

2 - PARAMETERS RELATED TO  
TIP and RING TRISIL.

$I_{RM}$ @ $V_{RM}$ max.		C max.
$\mu A$	V	pF
10	180	200

## THBT200S1

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



#### TEST PROCEDURE :

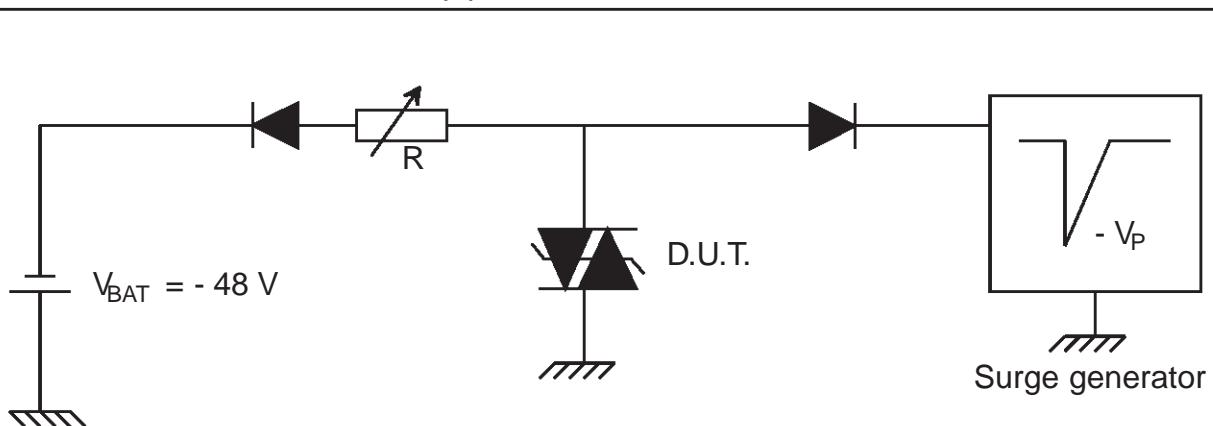
Pulse Test duration ( $t_p = 20\text{ms}$ ):

- For Bidirectional devices = Switch K is closed
- For Unidirectional devices = Switch K is open.

$V_{out}$  Selection

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

### FUNCTIONAL HOLDING CURRENT ( $I_H$ ) TEST CIRCUIT 2.



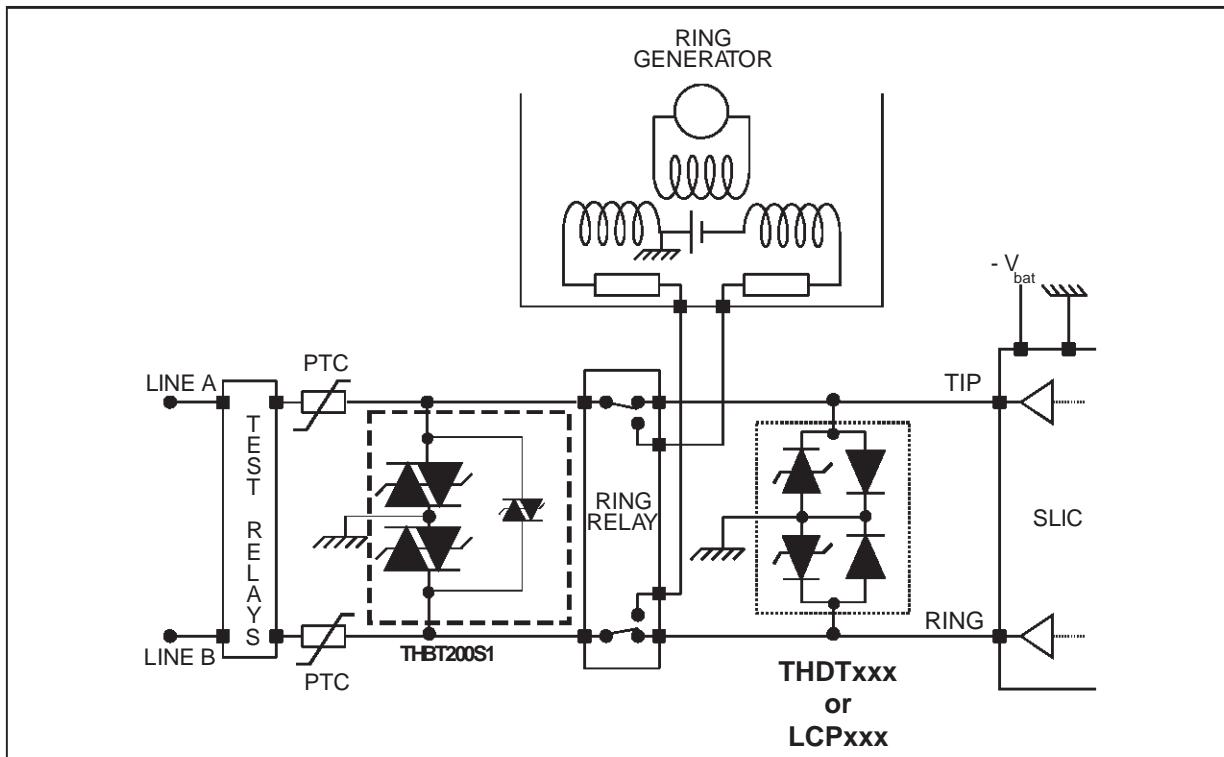
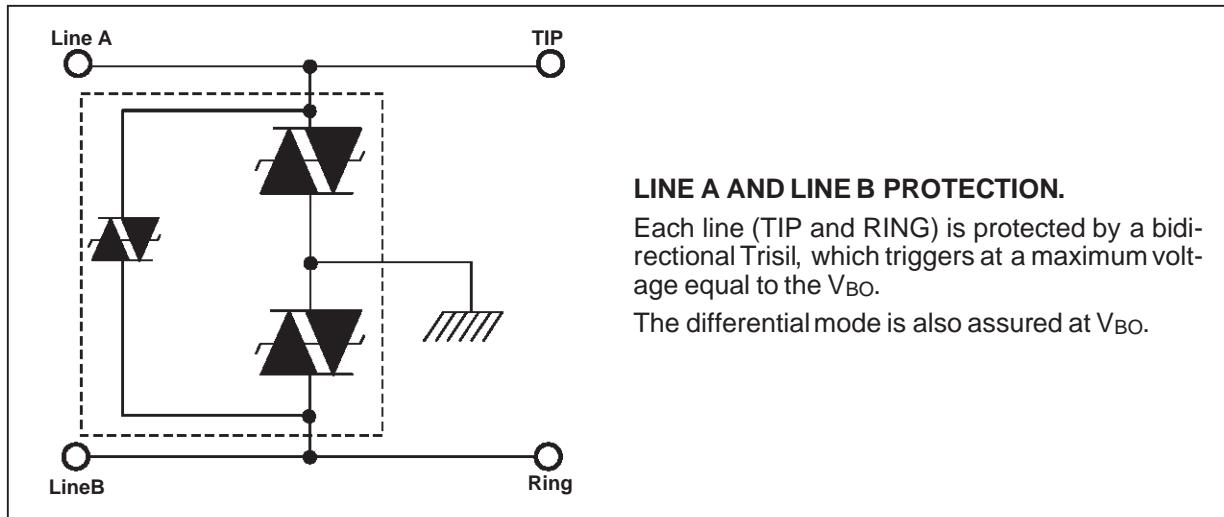
This is a GO-NOGO Test which allows to confirm the holding current ( $I_H$ ) level in a functional test circuit.

#### 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.

**APPLICATION CIRCUIT**

Typical line card protection concept

**FUNCTIONAL DESCRIPTION****LINE A AND LINE B PROTECTION.**

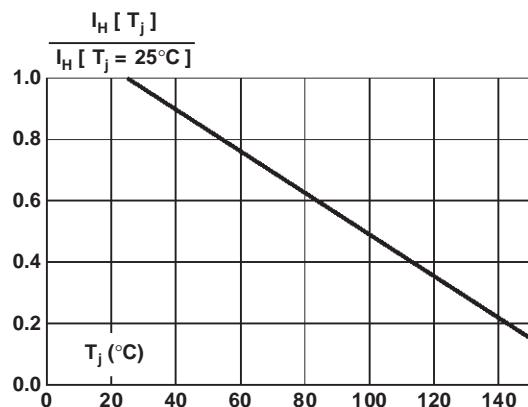
Each line (TIP and RING) is protected by a bidirectional Trisil, which triggers at a maximum voltage equal to the  $V_{BO}$ .

The differential mode is also assured at  $V_{BO}$ .

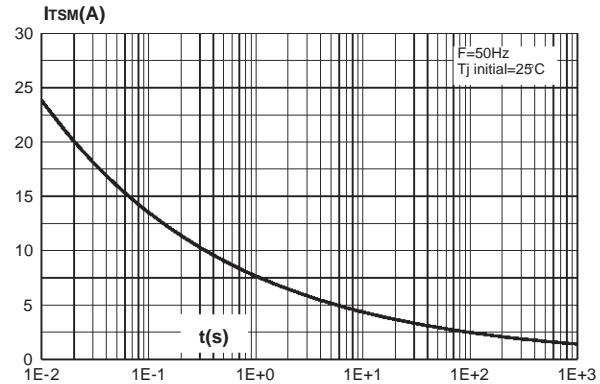
## THBT200S1

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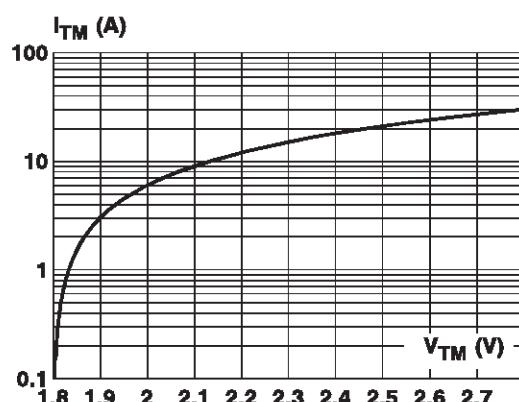
**Fig. 1** : Relative variation of holding current versus junction temperature.



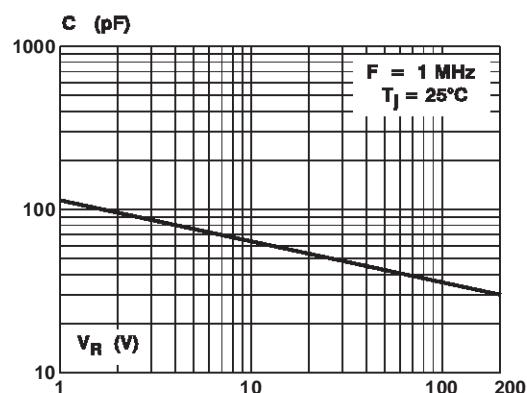
**Fig. 2** : Surge peak current versus overload duration.



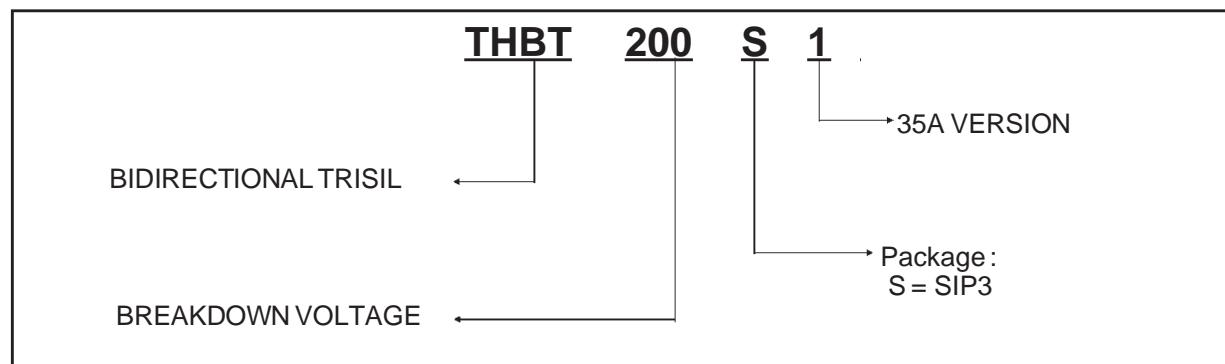
**Fig. 3** : Peak on state voltage versus peak on state current (typical values).



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

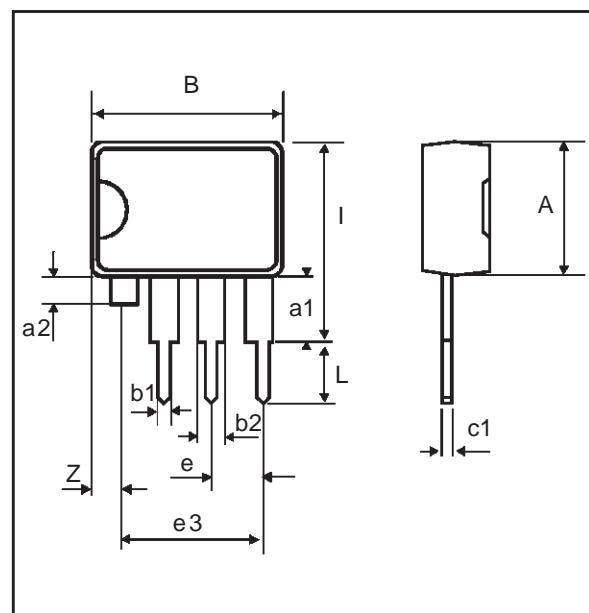


## ORDER CODE



## MARKING :

Package	Types	Marking
SIP3	THBT200S1	TBT200S1

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	
I			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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