SGS-THOMSON MICROELECTRONICS

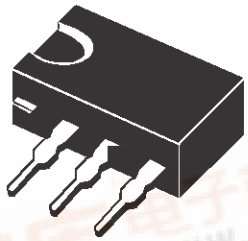
THBT200S1

Application Specific Discretes
A.S.D.™

TRANSIENT VOLTAGE SUPPRESSOR FOR SLIC PROTECTION

FEATURES

- DUAL BIDIRECTIONAL CROWBAR PROTECTION.
- PEAK PULSE CURRENT :
  - I_{PP} = 35 A, 10/1000 µs.
- HOLDING CURRENT = 150 mA min
- BREAKDOWN VOLTAGE = 200 V min.
- BREAKOVER VOLTAGE = 290 V max.
- MONOLITHIC DEVICE.



SIP3

DESCRIPTION

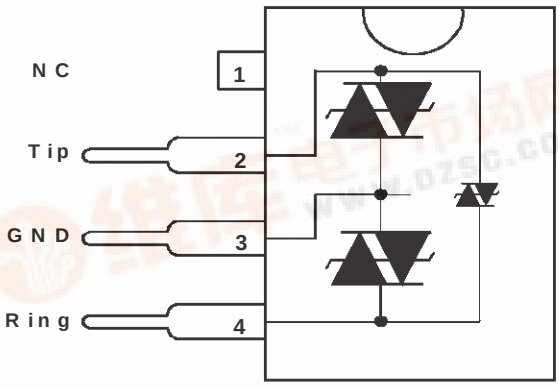
This monolithic protection device has been especially designed to protect subscriber line cards. The THBT200S device is particularly suitable to protect ring generator relay against transient overvoltages.

COMPLIES WITH THE FOLLOWING STANDARDS :

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

(*) with series resistors or PTC.

SCHEMATIC DIAGRAM

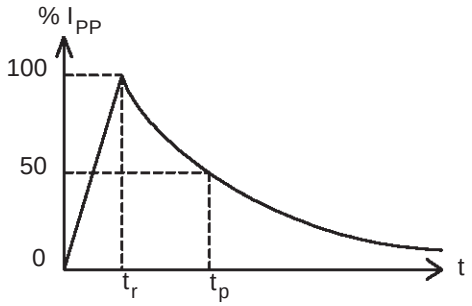


ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C)

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

Note 1 : Pulse waveform :

10/1000µs	t_r=10µs	t_p=1000µs
5/310µs	t_r=5µs	t_p=310µs
2/10µs	t_r=2µs	t_p=10µs

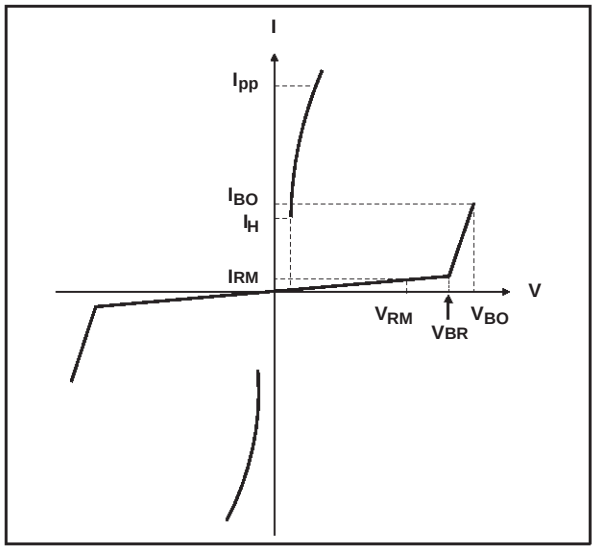


THERMAL RESISTANCE

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

ELECTRICAL CHARACTERISTICS (T_{amb}=25°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)

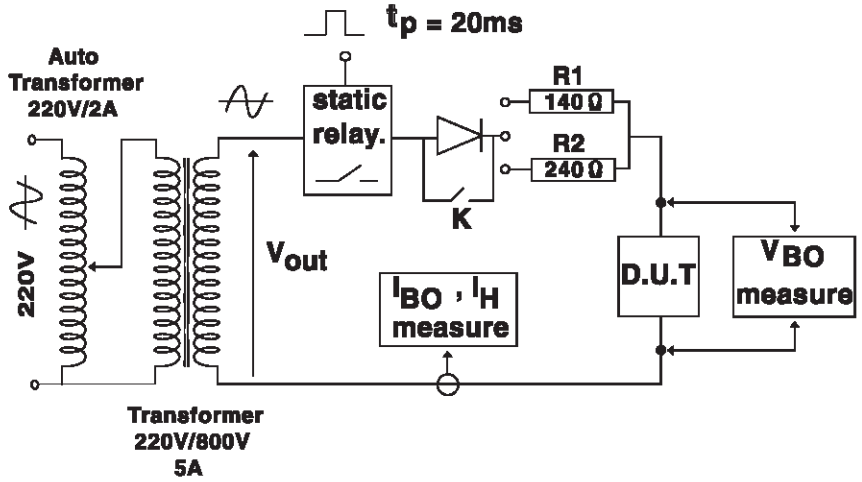
I_{RM} @ V_{RM} max.		V_{BR} @ I_R min.		V_{BO} @ I_{BO} max.	min.	max. note 1	I_H min. note 2	C max. note 3
µA	V	V	mA	V	mA	mA	mA	pF
10	180	200	1	290	150	800	150	200

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.
µA	V	pF
10	180	200

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

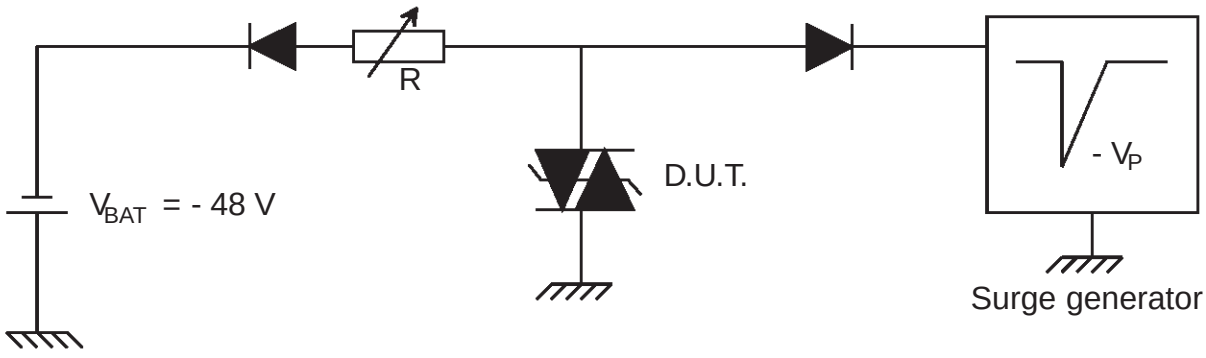


TEST PROCEDURE :

Pulse Test duration (tp = 20ms):
- For Bidirectional devices = Switch K is closed
- For Unidirectional devices = Switch K is open.

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

FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT 2.



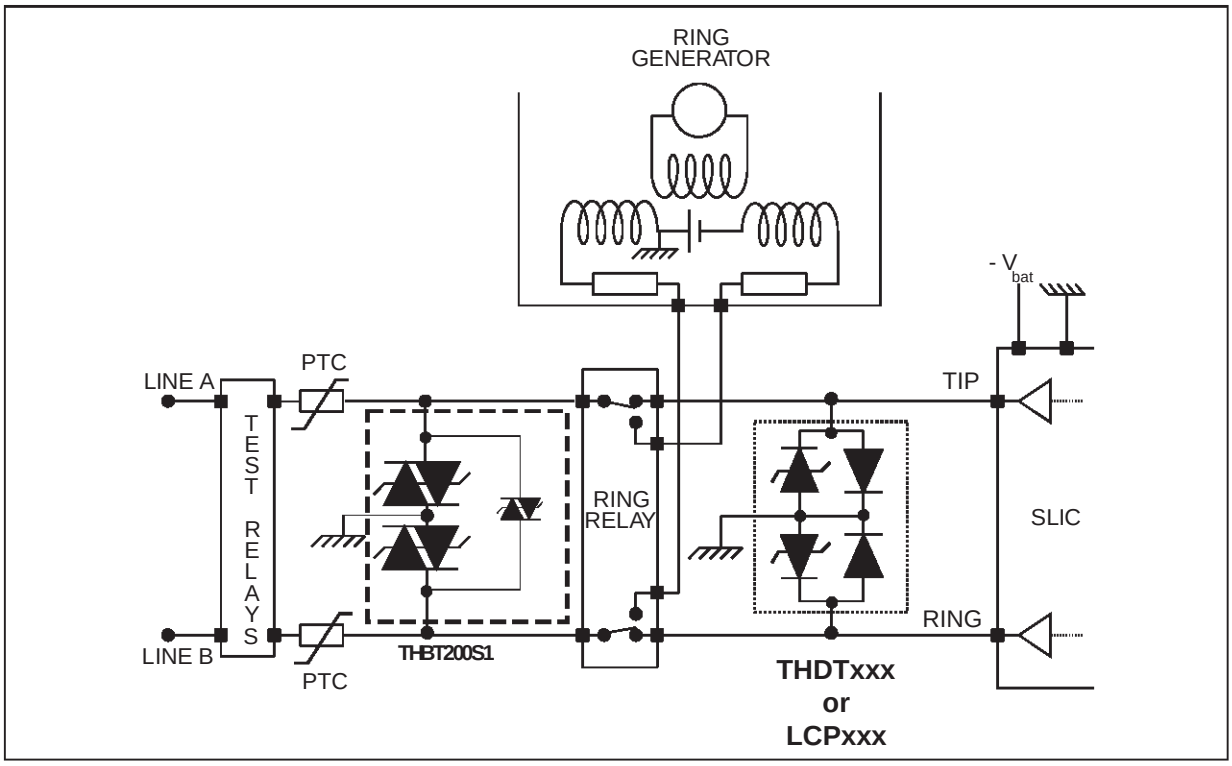
This is a GO-NOGO Test which allows to confirm the holding current (I_H) level in a functional test circuit.

TEST PROCEDURE :

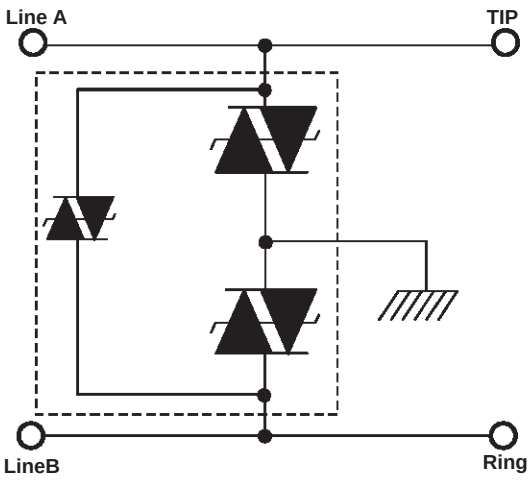
1) Adjust the current level at the I_H value by short circuiting the AK of the D.U.T.
2) Fire the D.U.T with a surge Current : Ipp = 10A , 10/1000 µs.
3) The D.U.T will come back off-state within 50 ms max.

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}.

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

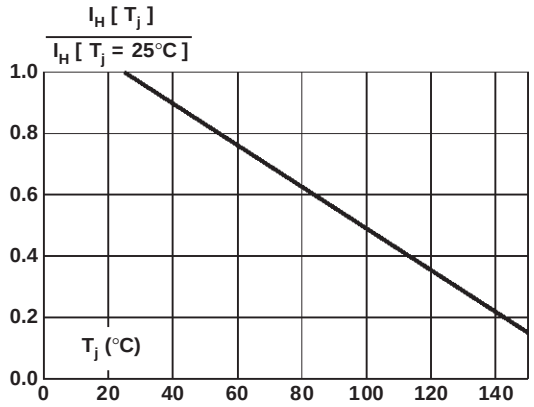


Fig. 2 : Surge peak current versus overload duration.

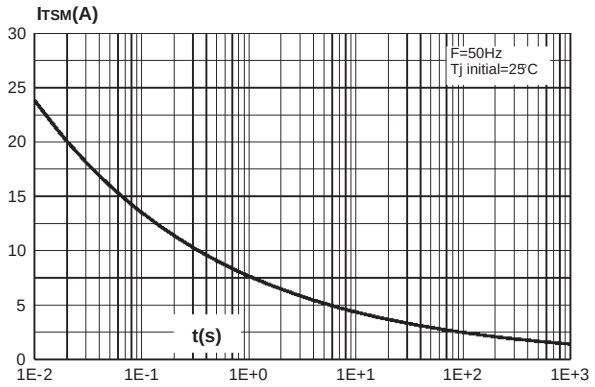


Fig. 3 : Peak on state voltage versus peak on state current (typical values).

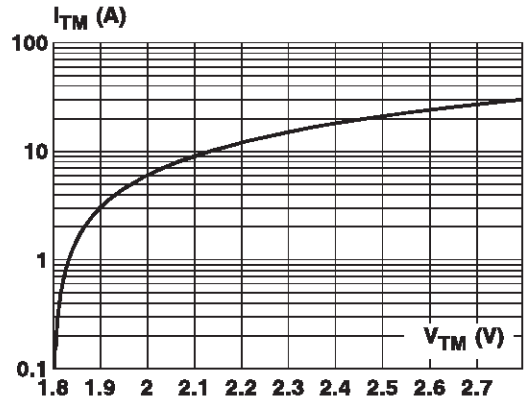
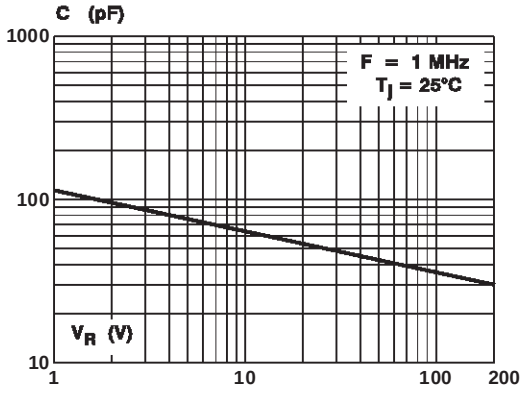
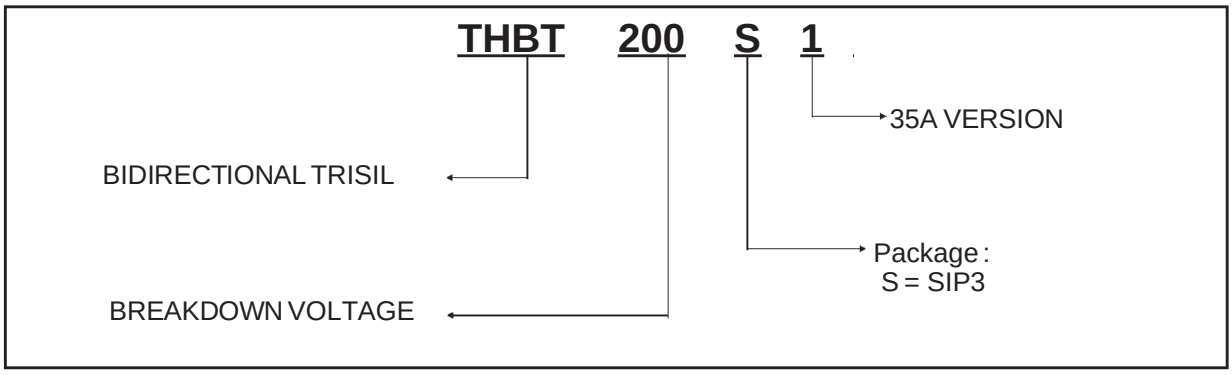


Fig. 4 : Capacitance versus reverse applied voltage (typical values).



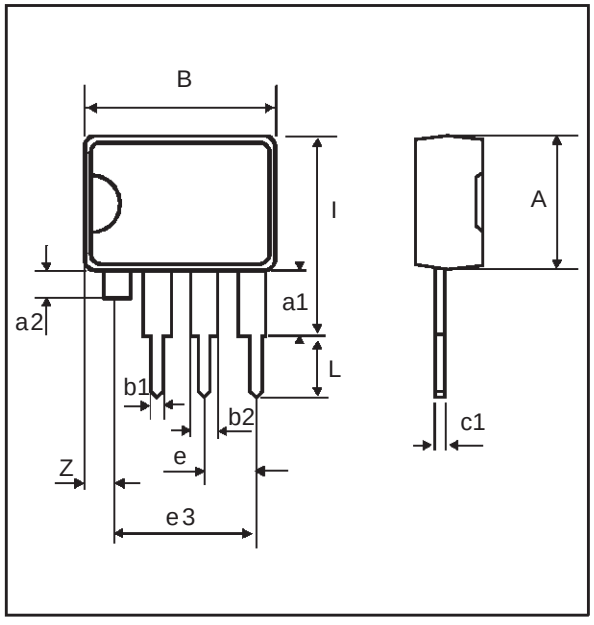
ORDER CODE



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