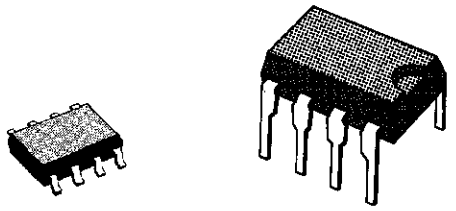
SGS-THOMSON MICROELECTRONICS

THBT150
THBT200 / THBT270

TRISIL

FEATURES

- BIDIRECTIONAL TRIPLE PROTECTION
- CROWBAR PROTECTION
- PEAK PULSE CURRENT :
  I_{PP} = 30 A , 10/1000 µs
- HOLDING CURRENT = 150 mA min
- AVAILABLE IN DIP 8 AND SO 8 PACKAGES



SO 8
(Plastic)

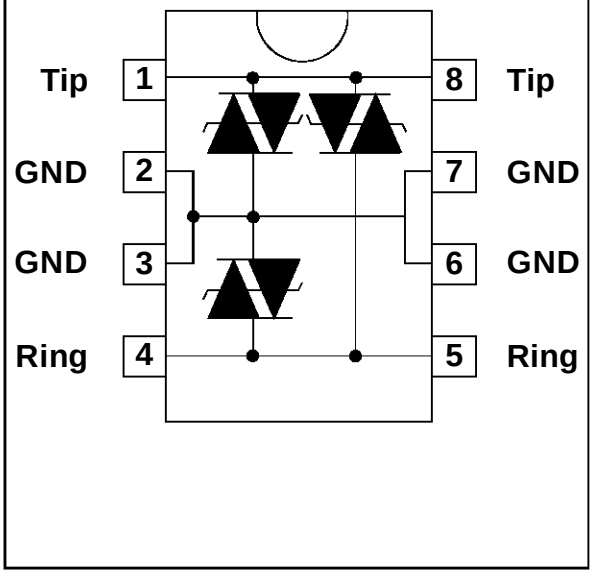
DIL 8
(Plastic)

DESCRIPTION

Dedicated to telecommunication equipment protection, these devices provide a triple bidirectional protection function.
They ensure the same protection capability with the same breakdown voltage both in common mode and in differential mode.

Particular attention has been given to the internal wire bonding . A 4-point configuration ensures reliable protection, eliminating the overvoltage introduced by the parasitic inductances of the wiring (Ldi/dt) especially for very fast transients.

SCHEMATIC DIAGRAM

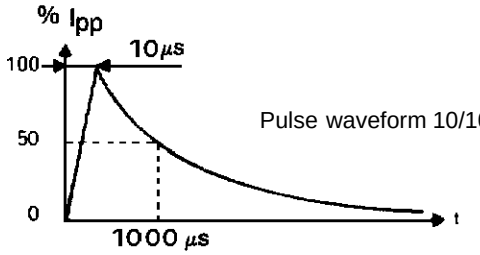


IN ACCORDANCE WITH FOLLOWING STANDARDS :

CCITT K17 - K20	10/700 µs	1.5 kV
	5/310 µs	38 A
VDE 0433	10/700 µs	2 kV
	5/200 µs	50 A
CNET	0.5/700 µs	1.5 kV
	0.2/310 µs	38 A

ABSOLUTE RATINGS (limiting values) (-40°C ≤ T_{amb} ≤ +85°C)

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current	10/1000 µs 5/320 µs 2/10 µs	30 40 75	A
I_{TSM}	Non repetitive surge peak on-state current	tp = 10 ms tp = 1 s	5 3.5	A
di/dt	Critical rate of rise of on-state current	Non repetitive	100	A/µs
dv/dt	Critical rate of rise of off-state voltage	67% V_{BR}	5	KV/µs
T_{stg} T_j	Storage and operating junction temperature range		- 40 to + 150 + 150	°C °C



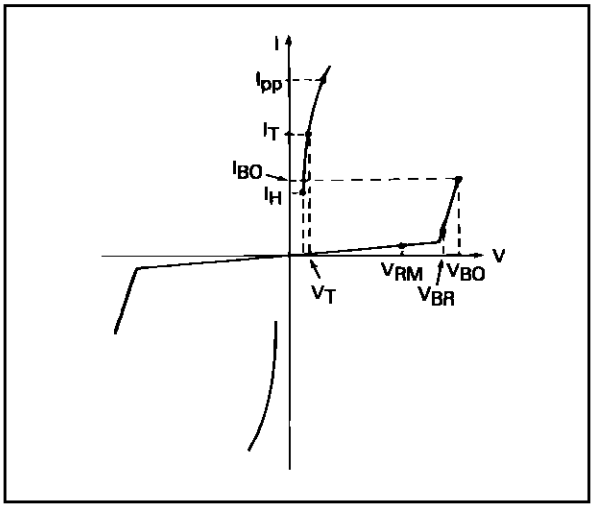
Pulse waveform 10/1000µs

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
R_{th} (j-a)	Junction-to-ambient	DIL 8 SO 8	125 171	°C/W °C/W

ELECTRICAL CHARACTERISTICS

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
V_T	On-state voltage
I_{BO}	Breakover current
I_{PP}	Peak pulse current



STATIC PARAMETERS

Types	I_R @ V_{RM} max		VBR @ I_R min		V_{BO} @ I_{BO} max			IH min note1	VT max note2	C max note3
	µA	V	V	mA	V	mA	mA	mA	V	pF
THBT150	5	135	150	1	210	50	400	150	8	200
THBT200	5	180	200	1	290	50	400	150	8	200
THBT270	5	240	270	1	380	50	400	150	8	200

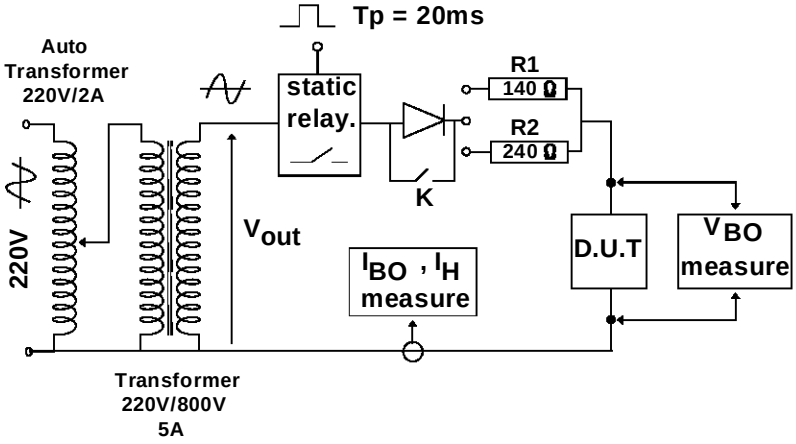
DYNAMIC PARAMETERS

Types	V_{BO} dyn Typical Value note 4
	(V)
THBT150	290
THBT200	380
THBT270	420

All parameters tested at 25°C, except where indicated

Note 1 : See the reference test circuit for I_H, I_{BO} and V_{BO} parameters.
Note 2 : Square pulse Tp = 500 µs - I_T = 5A.
Note 3 : V_R = 1V, F = 1MHz.
Note 4 : The dynamic breakover voltage is meassured with following surge test : CCITT - 1.5 KV 10/700 µs

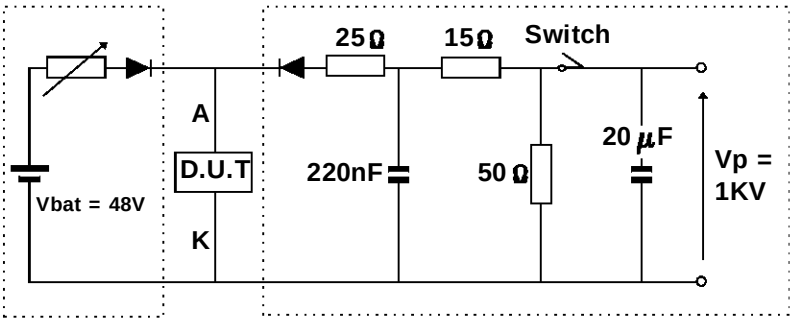
REFERENCE TEST CIRCUIT FOR I_H, I_{BO} and V_{BO} parameters :



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 $V_{BR} \leq 150$ Volt
    - $V_{OUT} = 250\ V_{RMS}$, $R_1 = 140\ \Omega$.
  - Device with $V_{BR} \geq 150$ Volt
    - $V_{OUT} = 480\ V_{RMS}$, $R_2 = 240\ \Omega$.

FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT = GO - NOGO TEST



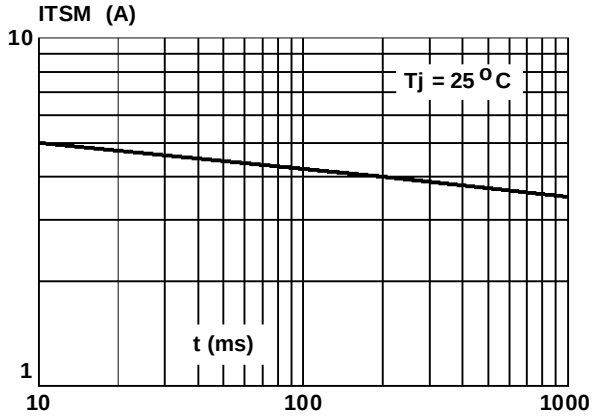
Surge Generator
10/700 µsec
Vp =1KV / Ipp = 25A

This is a GO-NOGO Test which allows to confirm the holding current (I_H) level in a functional test circuit. This test can be performed if the reference test circuit can't be implemented.

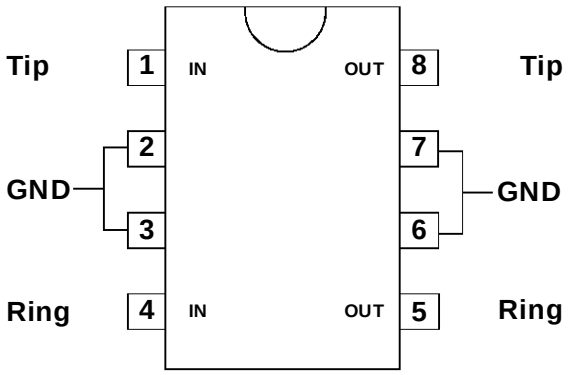
TEST PROCEDURE :

- 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 = 25A , 10/700 µs.
  3) The D.U.T will come back to the OFF-State within a duration of 50 ms max.

Figure 1 : Non repetitive surge peak on-state current. (with sinusoidal pulse : F =50Hz)



APPLICATION NOTE



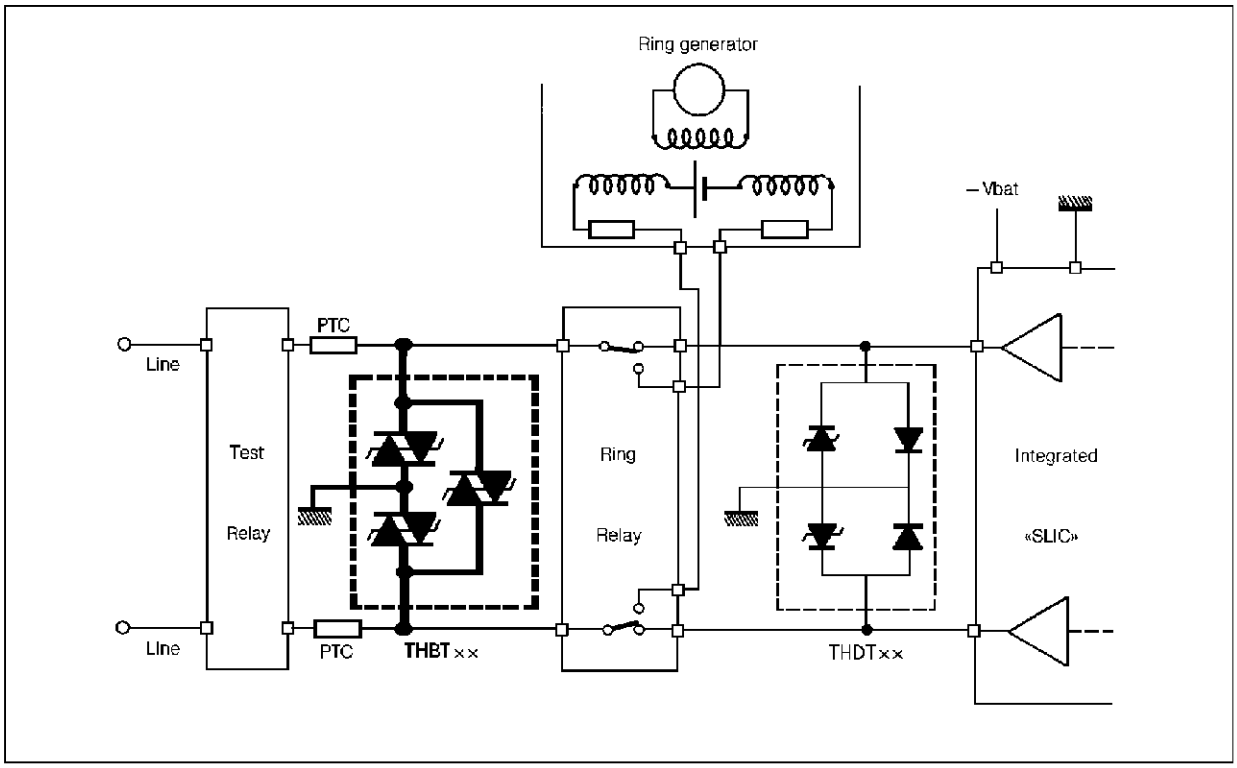
4- points structure lay-out.

1) Connect pins 2, 3, 6 and 7 to ground in order to guarantee a good surge current capability for long duration disturbances.

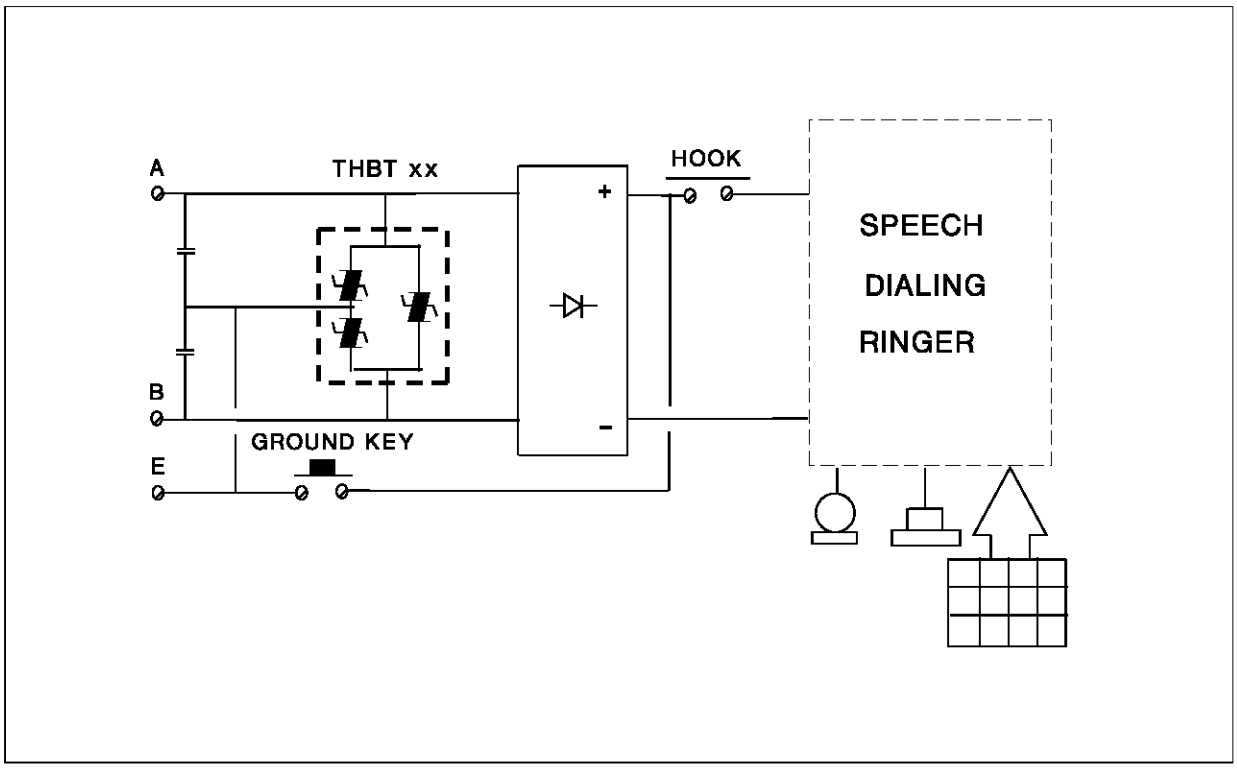
2) In order to take advantage of the "4-points structure" of the THBTxxx, the tip and Ring lines have to cross through the device. In this case, the device will eliminate the overvoltages generated by the parasitic inductances of the wiring (Ldi/dt), especially for very fast Transients.

APPLICATION CIRCUIT

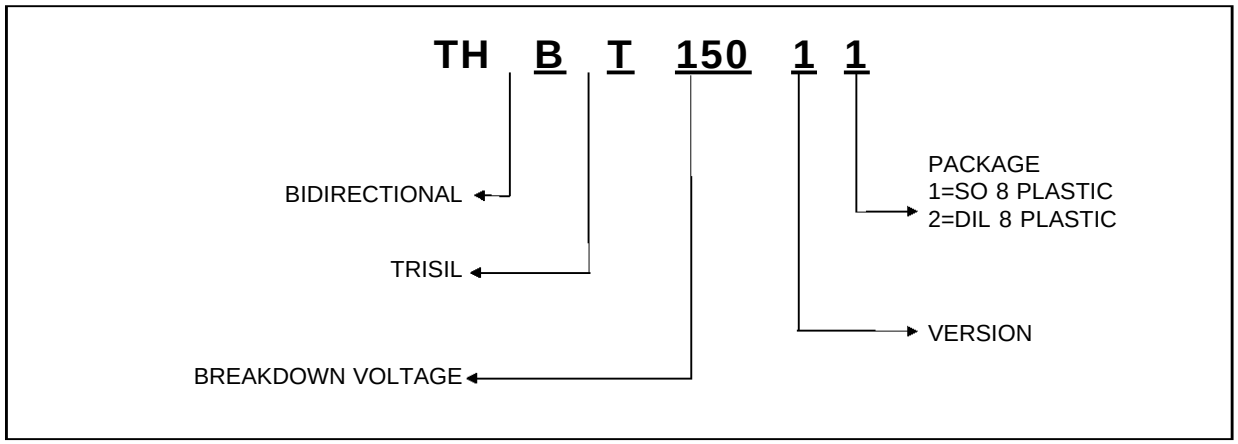
Line card protection



Ground key telephone set protection



ORDER CODE



MARKING

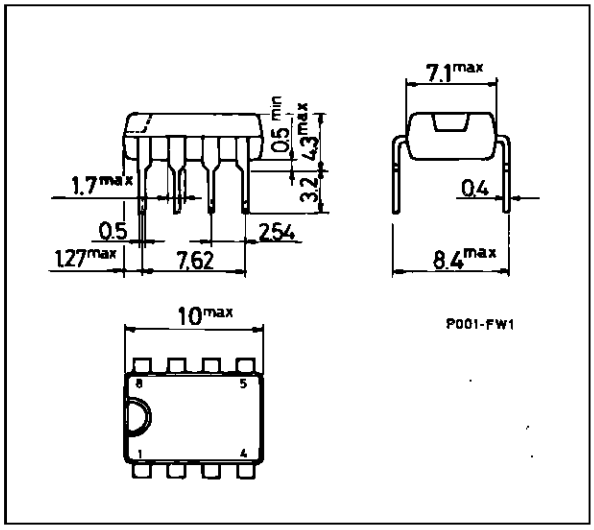
Package	Type	Marking
SO8	THBT15011 THBT20011 THBT27011	BT1511 BT2011 BT2711

Package	Type	Marking
DIL8	THBT15012 THBT20012 THBT27012	BT1512 BT2012 BT2712

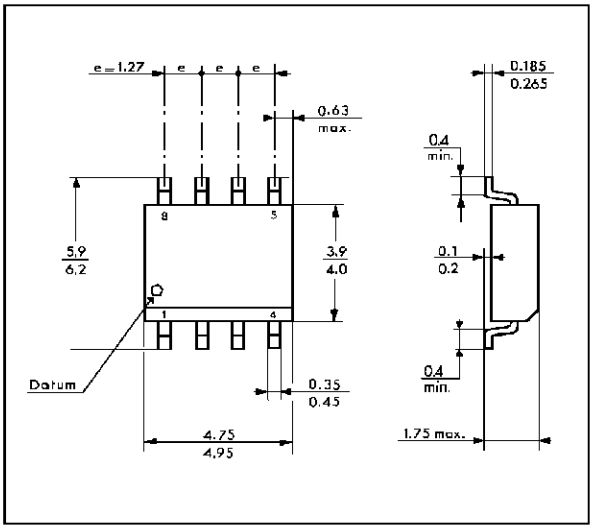
Packaging : Products supplied in antistatic tubes.

PACKAGE MECHANICAL DATA (in millimeters)

DIL 8 Plastic

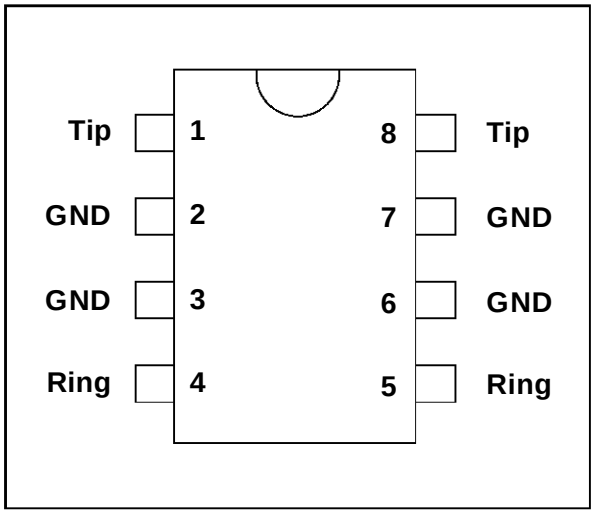


SO 8 Plastic



CONNECTION DIAGRAM

DIL 8 Plastic



SO 8 Plastic