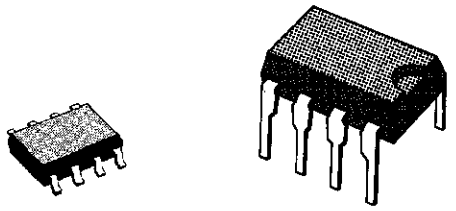
SGS-THOMSON MICROELECTRONICS

THDT51
THDT65

TRISIL FOR SLIC PROTECTION

FEATURES

- DUAL ASYMETRICAL TRANSIENT SUPPRESSOR
- PEAK PULSE CURRENT :
  I_{PP} = 30 A, 10/1000 µs.
- HOLDING CURRENT = 150 mA min
- BREAKDOWN VOLTAGE
  - THDT51 = 51 V
  - THDT65 = 65 V.
- LOW DYNAMIC CHARACTERISTICS
- AVAILABLE IN SO8 AND DIL8.



SO 8
(Plastic)

DIL 8
(Plastic)

DESCRIPTION

These devices have been especially designed to protect subscriber line card interfaces (SLIC) against transient overvoltages.

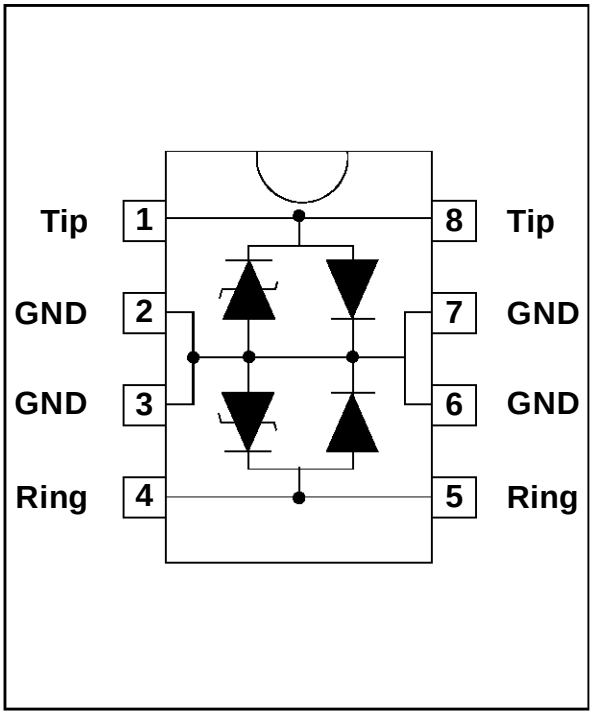
A particular attention has been given to the internal wire bonding . A 4-points configuration ensures a reliable protection, eliminating the overvoltage introduced by the parasitic inductances of the wiring (Ldi/dt) especially for very fast transients.

This new product generation, is providing very high surge current capability, in small packages like SO 8 and DIL 8. Dynamic characteristics have also been defined in order to meet SLIC max rating.

IN ACCORDANCE WITH FOLLOWING STANDARDS :

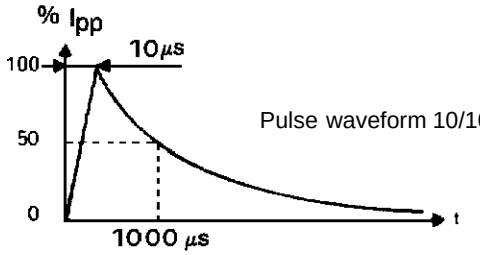
CCITT K17 - K20	10/700 µs	1.5 kV
	5/310 µs	38 A
VDE 0433	10/700 µs	2 kV
	5/200 µs	50 A
CNET	0.5/700 µs	1.5 kV
	0.2/310 µs	38 A

SCHEMATIC DIAGRAM



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 90	A
I_{TSM}	Non repetitive surge peak on-state current	tp = 10 ms tp = 1 s	10 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		- 55 to + 150 + 150	°C °C



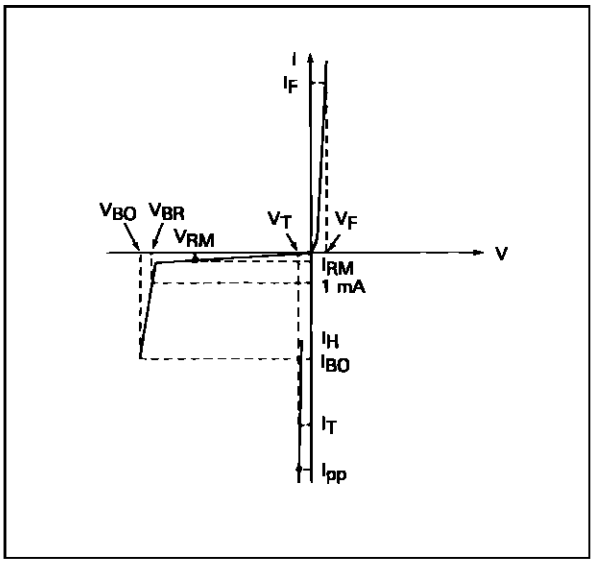
Pulse waveform 10/1000µs

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
R_{th} (j-a)	Junction-to-ambient	DIL 8 SO 8	125 170	°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
V_F	Forward Voltage Drop
I_{BO}	Breakover current
I_{PP}	Peak pulse current



PARAMETERS RELATED TO DIODE LINE/GND

Symbol	Test conditions	Value	Unit
V_F	Square pulse, tp = 500 µs, I_F = 3 A.	3	V
V_{FP}	I_{PP} = 30A, 10/1000µs	7	V

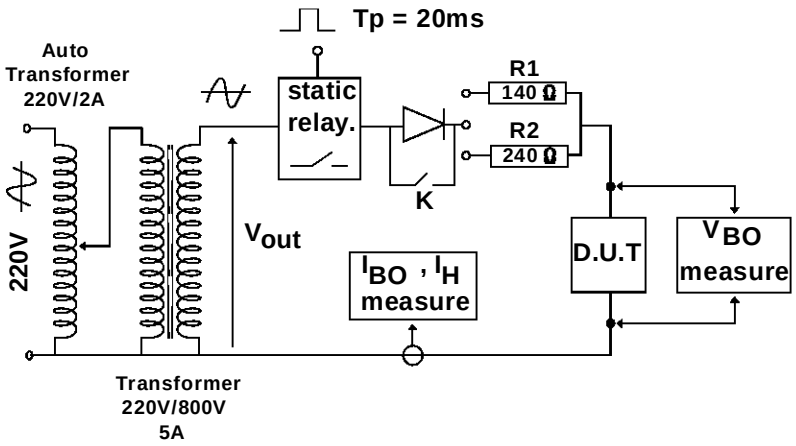
PARAMETERS RELATED TO PROTECTION THYRISTOR

Types	I_{RM} @ V_{RM} max		VBR @ I_R min		V_{BO} @ I_{BO} max			I_H min note1	V_T max note2	C max note3
	µA	V	V	mA	V	mA	mA	mA	V	pF
THDT51	10	50	51	1	70	50	500	150	4	200
THDT65	10	56	65	1	85	50	500	150	4	200

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.

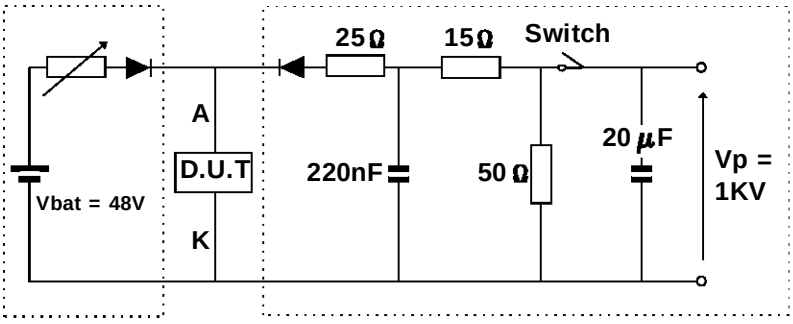
REFERENCE TEST CIRCUIT FOR I_H, I_{BO} and V_{BO} parameters :



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.



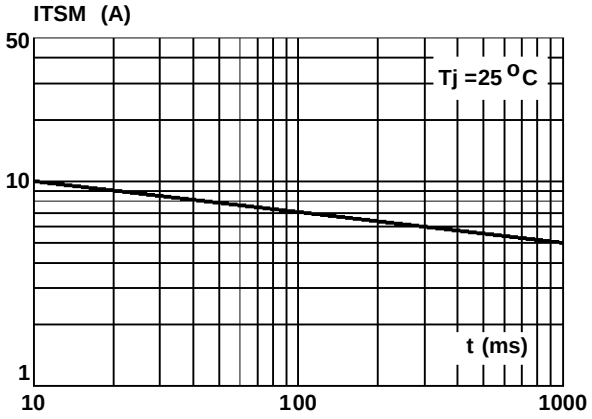
Surge Generator
10/700 µsec
Vp =1KV / Ipp = 25A

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

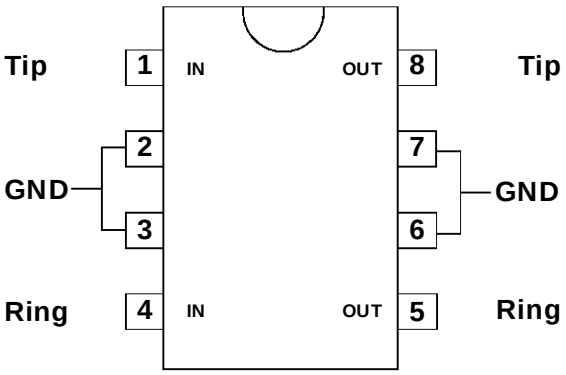
TEST PROCEDURE :

- 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.



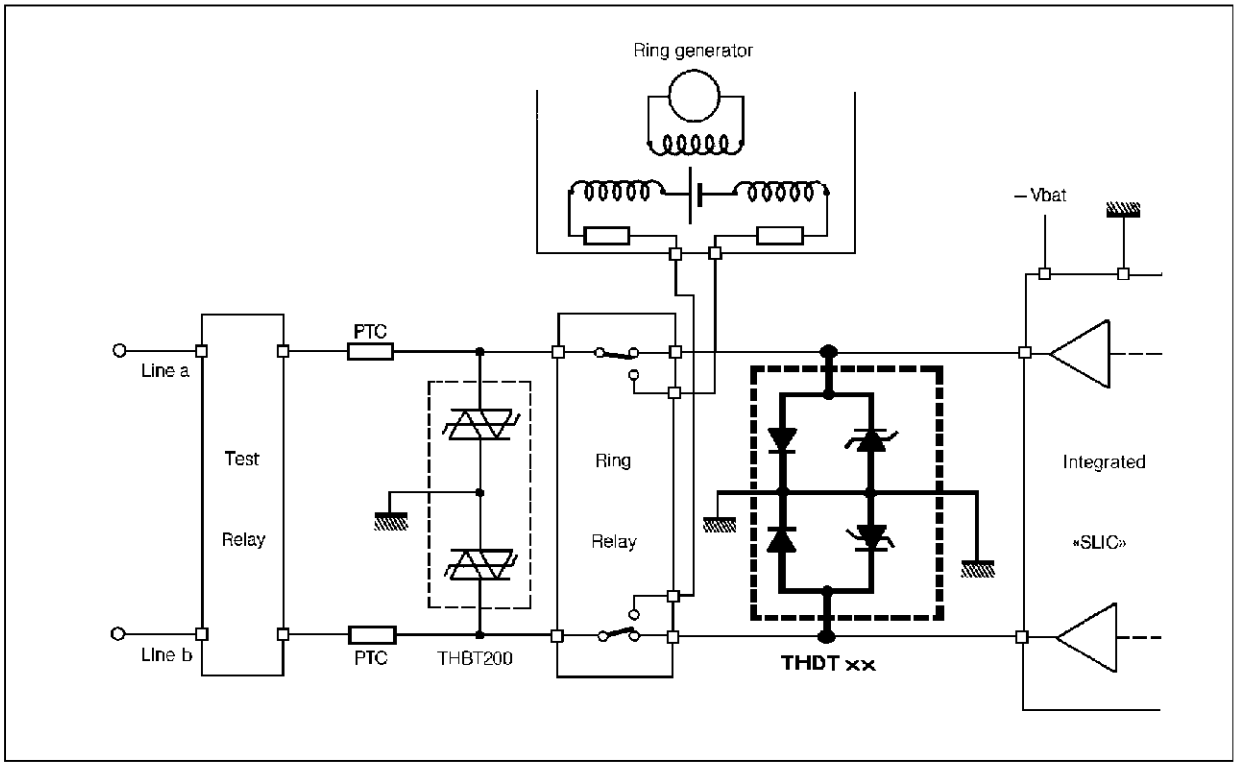
4- points structure lay-out.

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

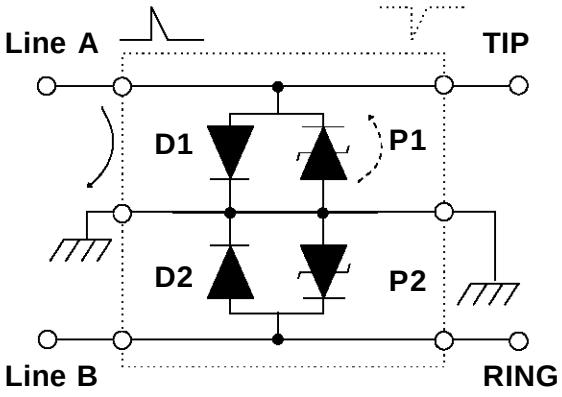
2) In order to take advantage of the "4-points structure" of the THDTxx, the tip and Ring lines have to cross through the device. in this case, the device will eliminate the overvoltages generated by the parasitic inductances of the wiring (Ldi/dt), especially for very fast Transients.

APPLICATION CIRCUIT

Typical slic protection concept



FUNCTIONAL DESCRIPTION



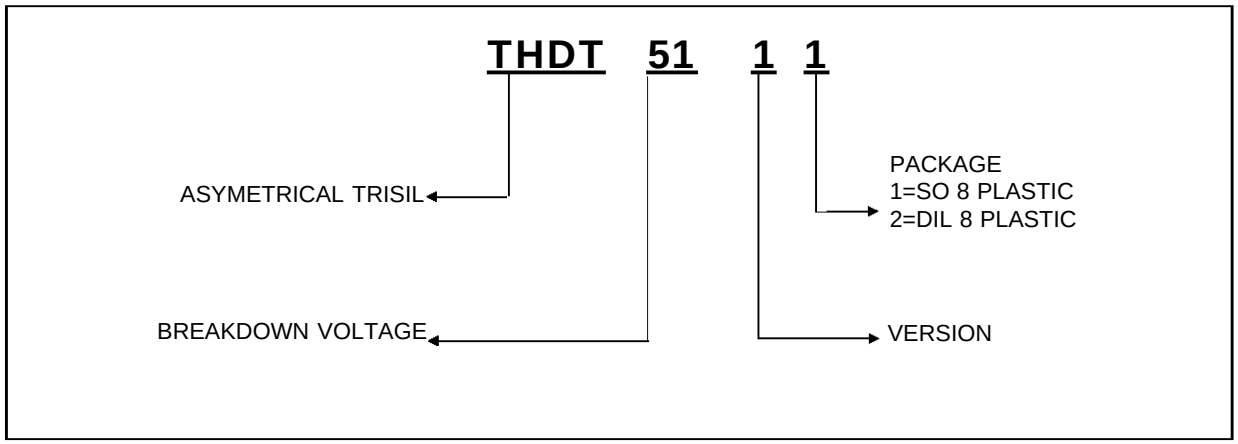
Line A Protection =

- For positive Surges versus GND, the diode D1 will conduct
- For negative Surges versus GND, the Protection device P1 will trigger at a maximum voltage equal to the V_{BO}.

Line B Protection =

- For Surges on line B, the operating mode is the same, D2 or P2 is activated.

ORDER CODE



MARKING

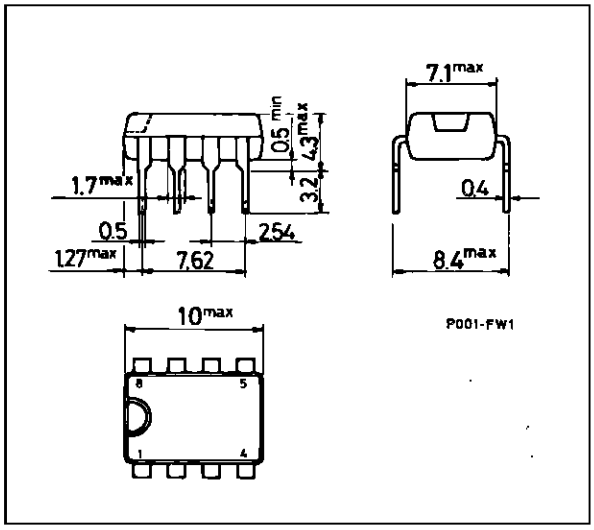
Package	Type	Marking
SO8	THDT5111 THDT6511	DT5111 DT6511

Package	Type	Marking
DIL8	THDT5112 THDT6512	DT5112 DT6512

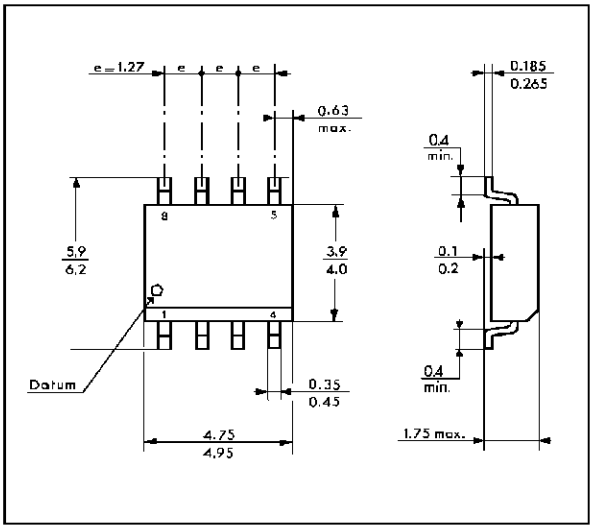
Packaging : Products supplied in antistatic tubes.

PACKAGE MECHANICAL DATA (in millimeters)

DIL 8 Plastic

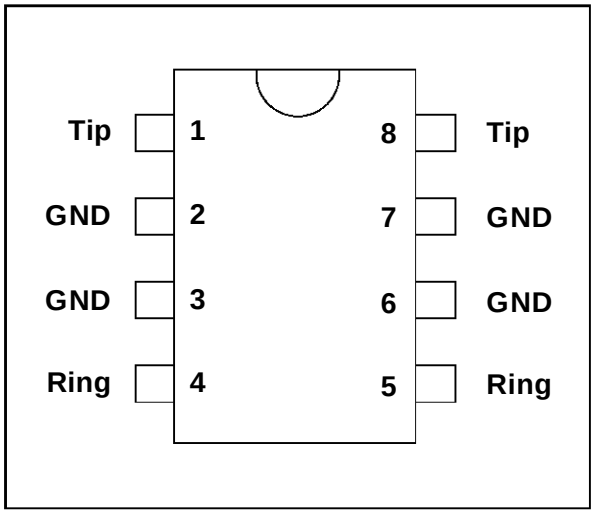


SO 8 Plastic



CONNECTION DIAGRAM

DIL 8 Plastic



SO 8 Plastic