SGS-THOMSON MICROELECTRONICS

THDT58S

TRISIL FOR SLIC PROTECTION

FEATURES

- CROWBAR PROTECTION
- DUAL ASYMETRICAL TRANSIENT SUPPRESSOR
- PEAK PULSE CURRENT :
  - I_{PP} = 75 A, 10/1000 μs.
- HOLDING CURRENT = 150 mA min
- BREAKDOWN VOLTAGE = 58 V.
- BREAKOVER VOLTAGE = 80V max.

SIP 3
(Plastic)

DESCRIPTION

This device has been especially designed to protect subscriber line card interfaces (SLIC) against transient overvoltages.
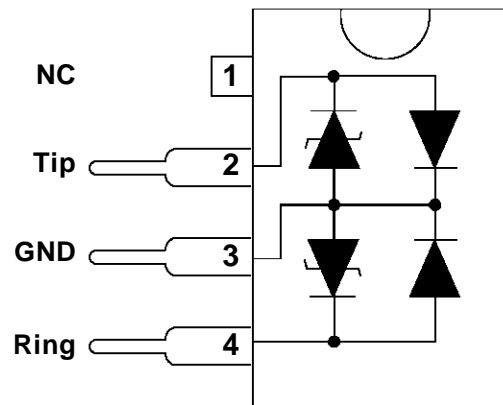
Its ion-implanted technology confers excellent electrical characteristics on it.
This is why this device easily fits the main protection standards which are related to the overvoltages on telecom lines.
This product is compatible with TO202 and TO220 packages.
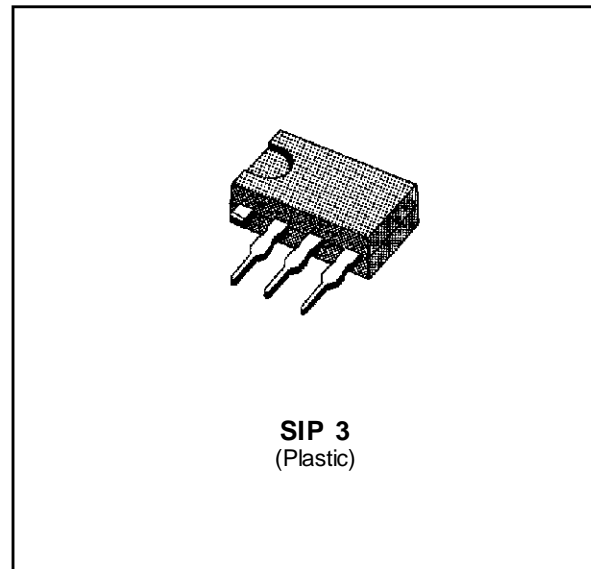
IN ACCORDANCE WITH FOLLOWING STANDARDS :

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

NC   1
Tip   2
GND   3
Ring   4

ABSOLUTE RATINGS (limiting values) (-40°C $\leq$ T$_{amb}$ $\leq$ + 85°C)

Symbol	Parameter		Value	Unit
I$_{PP}$	Peak pulse current	10/1000 µs 8/20 µs	75 150	A
I$_{TSM}$	Non repetitive surge peak on-state current	tp = 20 ms	30	A
I$_{FSM}$	Non repetitive surge peak forward current	tp = 20 ms	30	A
di/dt	Critical rate of rise of off-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
T$_L$	Maximum lead temperature for soldering during 10 s.		260	°C

Pulse waveform 10/1000µs
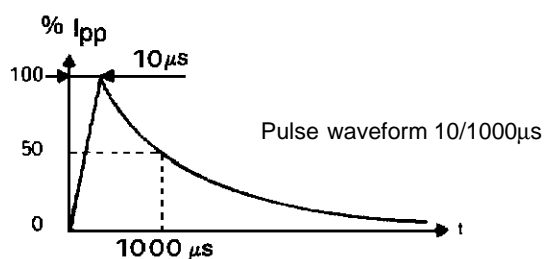
THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
R$_{th}$ (j-a)	Junction-to-ambient	70	°C/W

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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
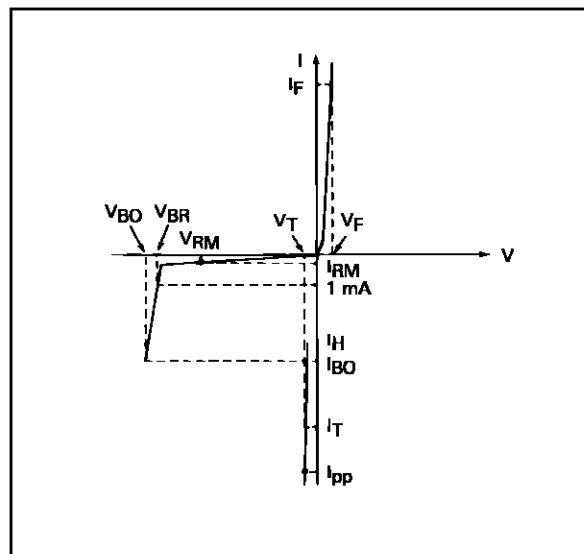
PARAMETER RELATED TO THE DIODE LINE/GND

Symbol	Test conditions	Value	Unit
V_F	Square pulse, $t_p = 500\ \mu s$ $I_F = 5$ A.	5	V

PARAMETERS RELATED TO THE PROTECTION THYRISTOR

Type	I_{RM} @	V_{RM}	V_{BR} @	I_R	V_{BO}	@	I_{BO}	I_H	V_T	C
	max		min		max	min	max	min	max	max
						note1		note1	note2	note3
	μA	V	V	mA	V	mA	mA	mA	V	pF
THDT58S	10	56	58	1	80	150	800	150	5	400

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$_{BR}$ ≤ 150 Volt
    - V$_{OUT}$ = 250 V$_{RMS}$, R$_1$ = 140 Ω.
  - Device with V$_{BR}$ ≥ 150 Volt
    - V$_{OUT}$ = 480 V$_{RMS}$, R$_2$ = 240 Ω.

FUNCTIONAL HOLDING CURRENT (I$_H$) TEST CIRCUIT = GO - NOGO TEST.
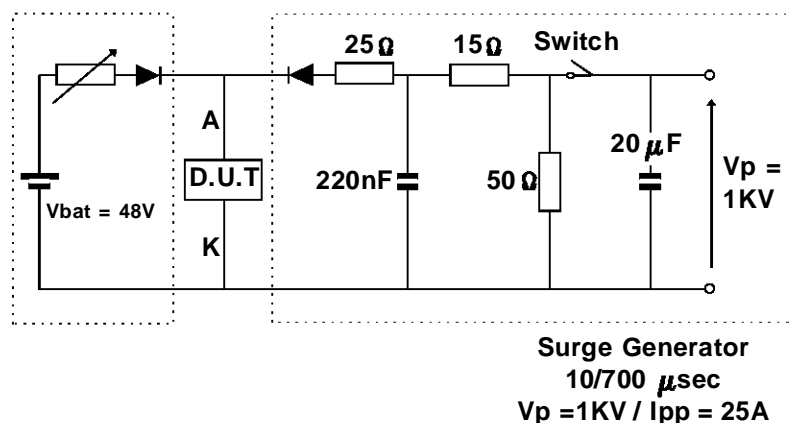
This is a GO-NOGO Test which allows to confirm the holding current (I$_H$) level in a functional test circuit. This test can be performed if the reference test circuit can't be implemented.

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 withing a duration of 50 ms max.

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Figure 1 : Relative variation of holding current versus junction temperature.
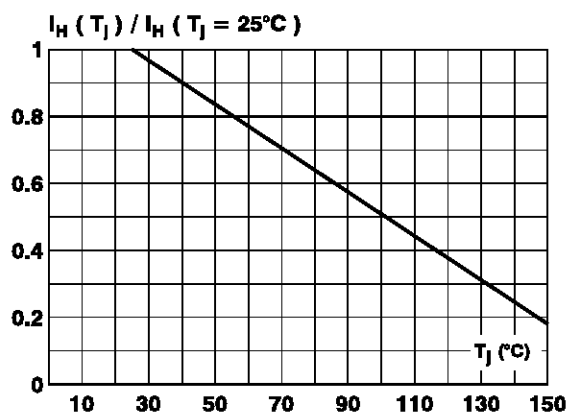
Figure 2 : Non repetitive surge peak on state current versus number of cycles (1 cycle = 20 ms.
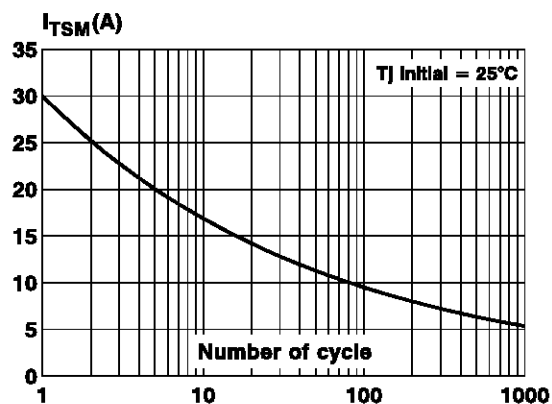
Figure 3 : Peak on state voltage versus peak on state current (typical values).
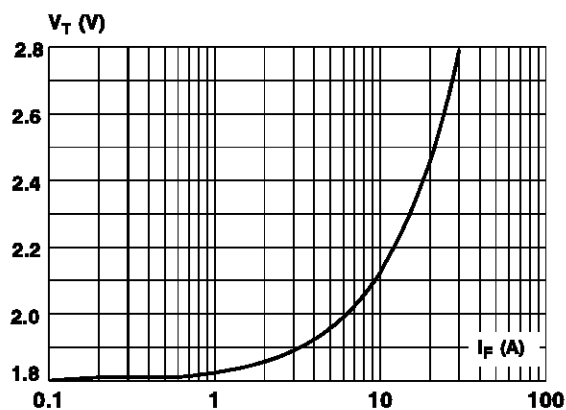

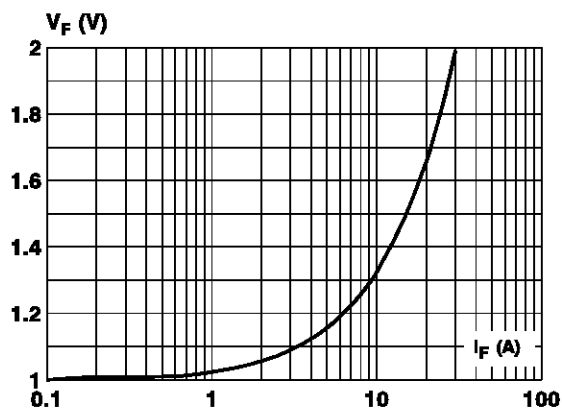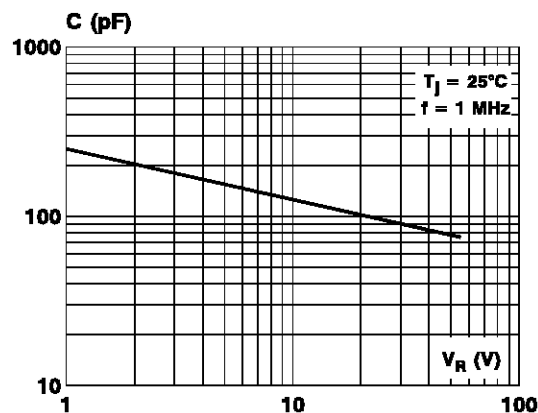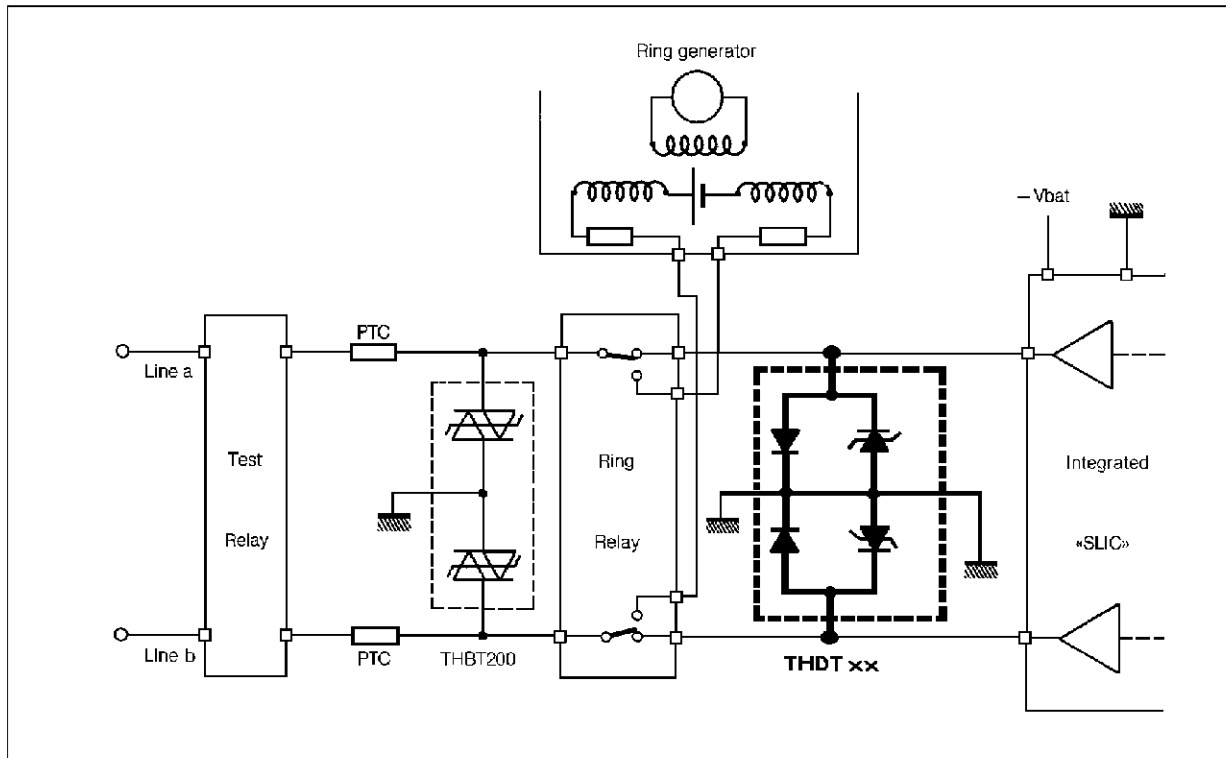**Figure 4** : Peak forward voltage drop versus peak forward current (typical values).

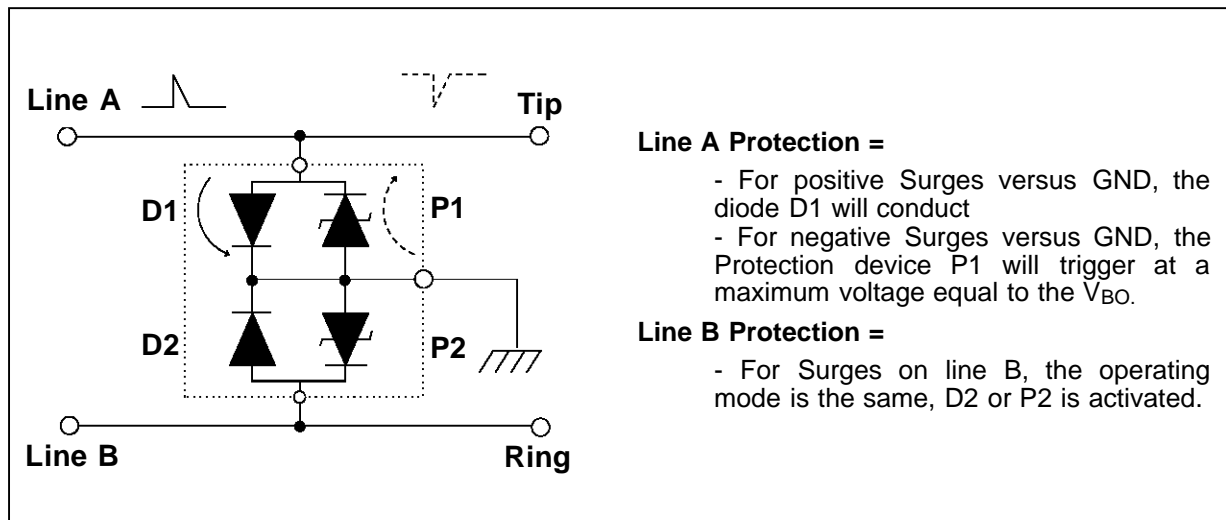**Figure 5** : Capacitance versus reverse applied voltage (typical values).
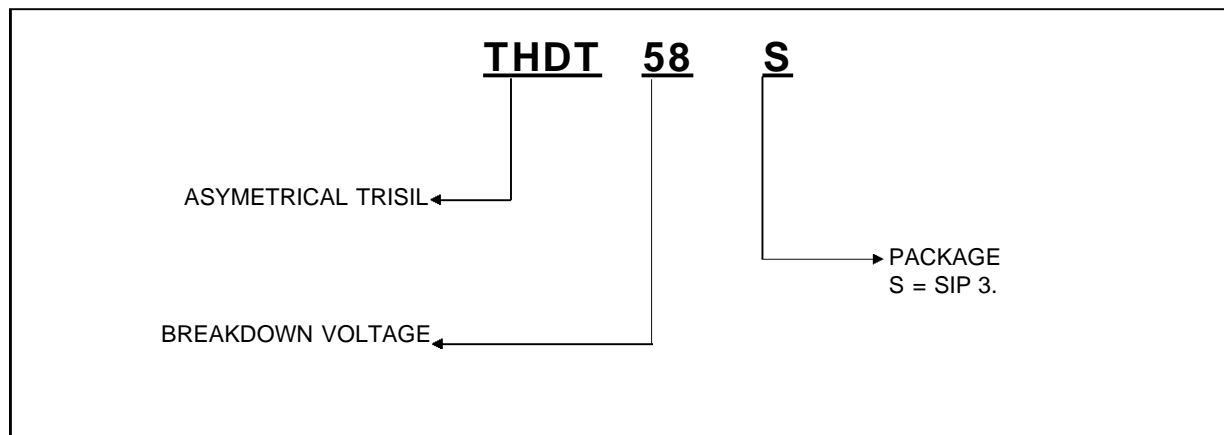
APPLICATION CIRCUIT

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

ASYMETRICAL TRISIL

BREAKDOWN VOLTAGE

PACKAGE
S = SIP 3.

MARKING

Package	Type	Marking
SIP3	THDT58S	THDT58S

PACKAGE MECHANICAL DATA   (in millimeters)
SIP 3 Plastic.
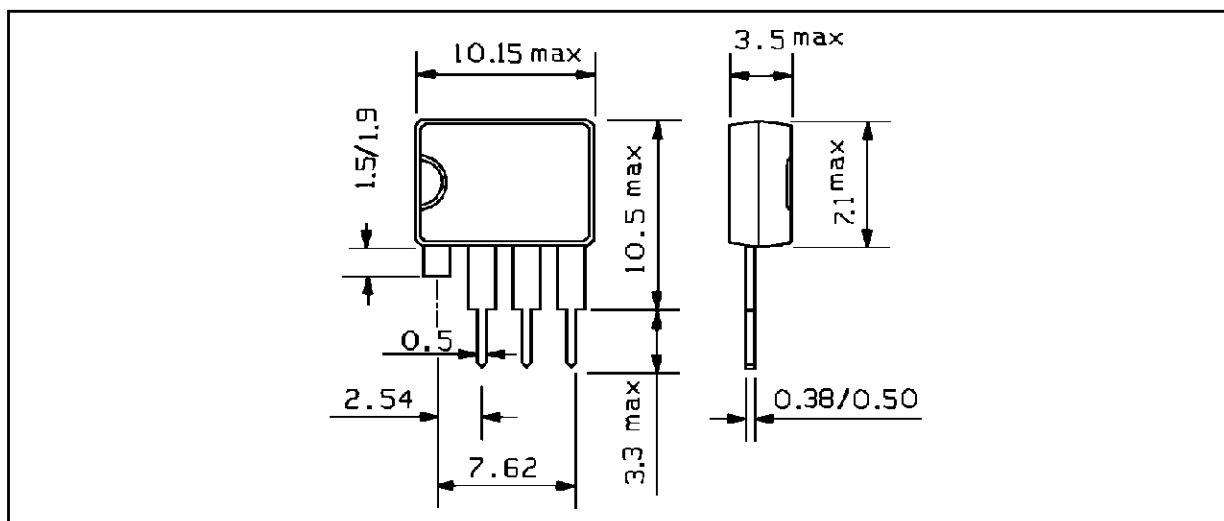
Packaging : Products supplied in antistatic tubes.

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