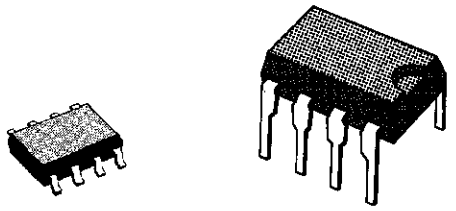
SGS-THOMSON MICROELECTRONICS

TPI80xxP/TPI120xxP

TRIBALANCED PROTECTION FOR ISDN INTERFACES

FEATURES

- BIDIRECTIONAL TRIPOLE PROTECTION.
- CROWBAR PROTECTION.
- PEAK PULSE CURRENT :
  I_{PP} = 30 A , 10/1000 µs.
- BREAKDOWN VOLTAGE:
  TPI80 = 80V
  TPI120 = 120V.
- AVAILABLE IN DIL8 AND SO8 PACKAGES.



SO 8
(Plastic)

DIL 8
(Plastic)

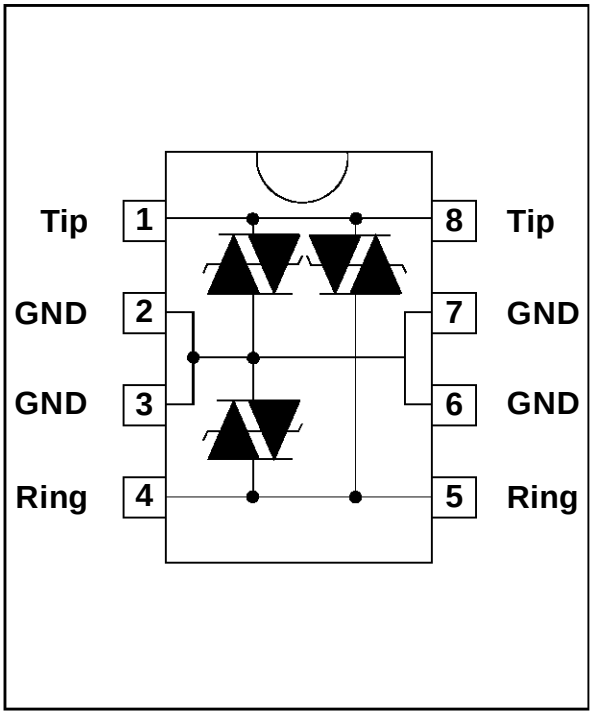
DESCRIPTION: TRIBALANCED PROTECTION

Dedicated devices for ISDN interface and high speed data telecom lines protection.

It's a tripole TRISIL with low capacitance providing:

- Low capacitances from lines to ground : allowing high speed transmission without signal attenuation.
- Good capacitance balance (Line A/Line B) in order to insure the longitudinal balance of the line.
- Fixed breakdown voltage in both common and differential modes.
- The same surge current capability in both common and differential modes.

SCHEMATIC DIAGRAM

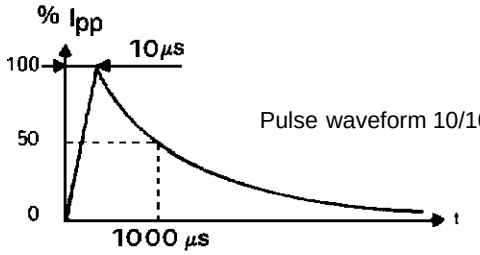


IN ACCORDANCE WITH FOLLOWING STANDARDS :

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 90	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



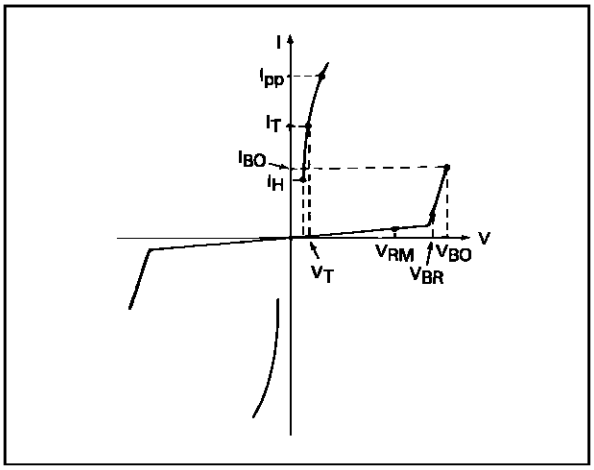
Pulse waveform 10/1000µs

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

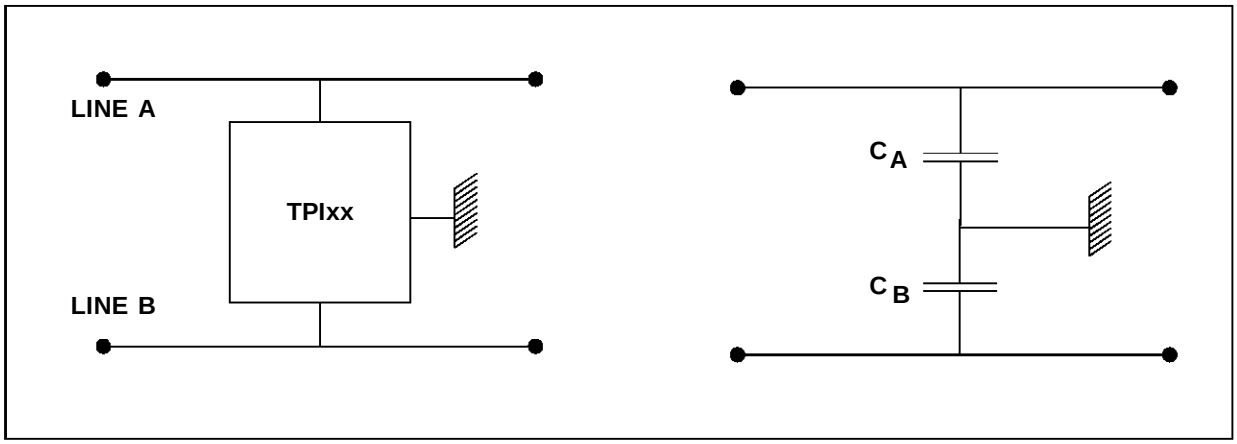
Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
V_T	On-state voltage
I_{BO}	Breakover current
I_{PP}	Peak pulse current



Types	I_R @ V_{RM} max		VBR @ I_R min		V_{BO} max note1	IBO max note1	IH min note1	VT max note2
	µA	V	V	mA	V	mA	mA	V
TPI80xxP	10	70	80	1	120	800	150	8
TPI120xxP	10	105	120	1	180	800	150	8

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..

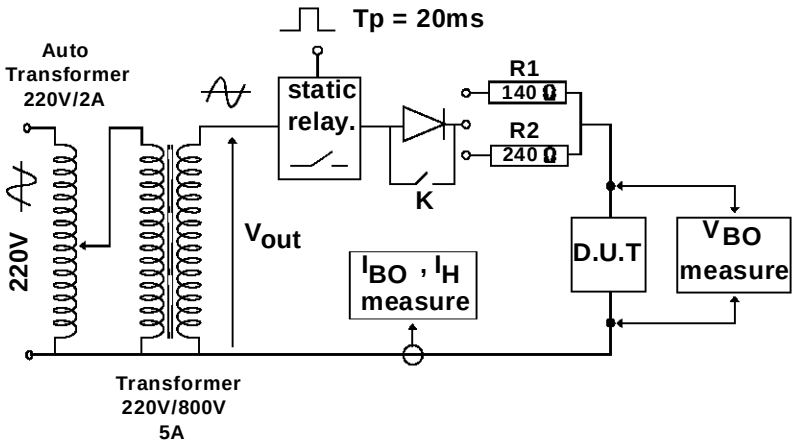
CAPACITANCES CHARACTERISTICS



CONFIGURATION	C_A (pf) max	C_B (pf) max	C_A - C_B (pf) max
V_A =1V V_B =56V	70	50	30
V_A = 56V V_B= 1V	50	70	30

All parameters tested at 25°C, except where indicated

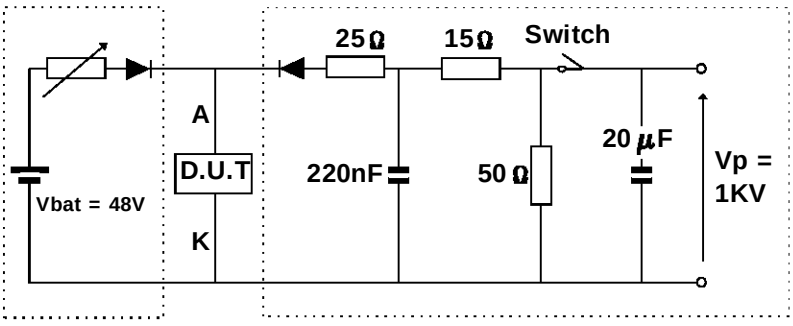
REFERENCE TEST CIRCUIT FOR I_H, I_{BO} and V_{BO} parameters :



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.



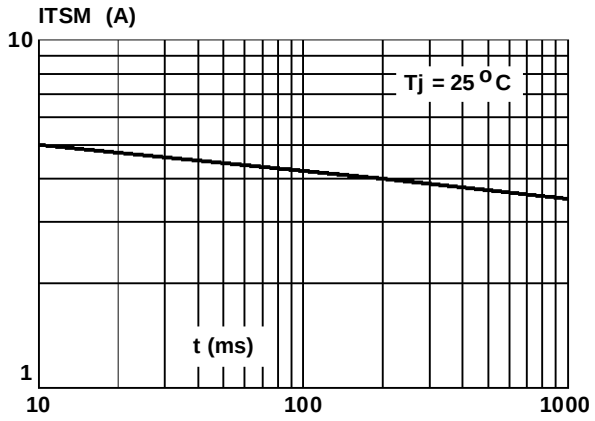
Surge Generator
10/700 µsec
Vp =1KV / Ipp = 25A

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.

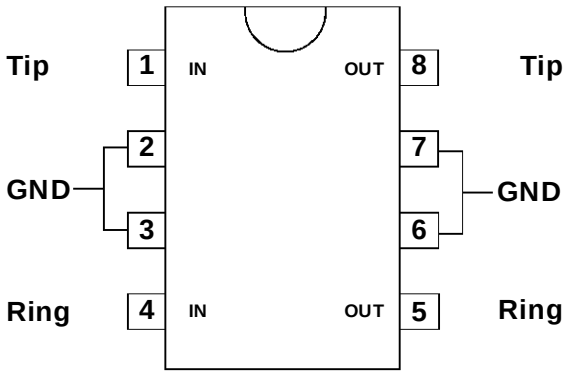
TEST PROCEDURE :

- 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.



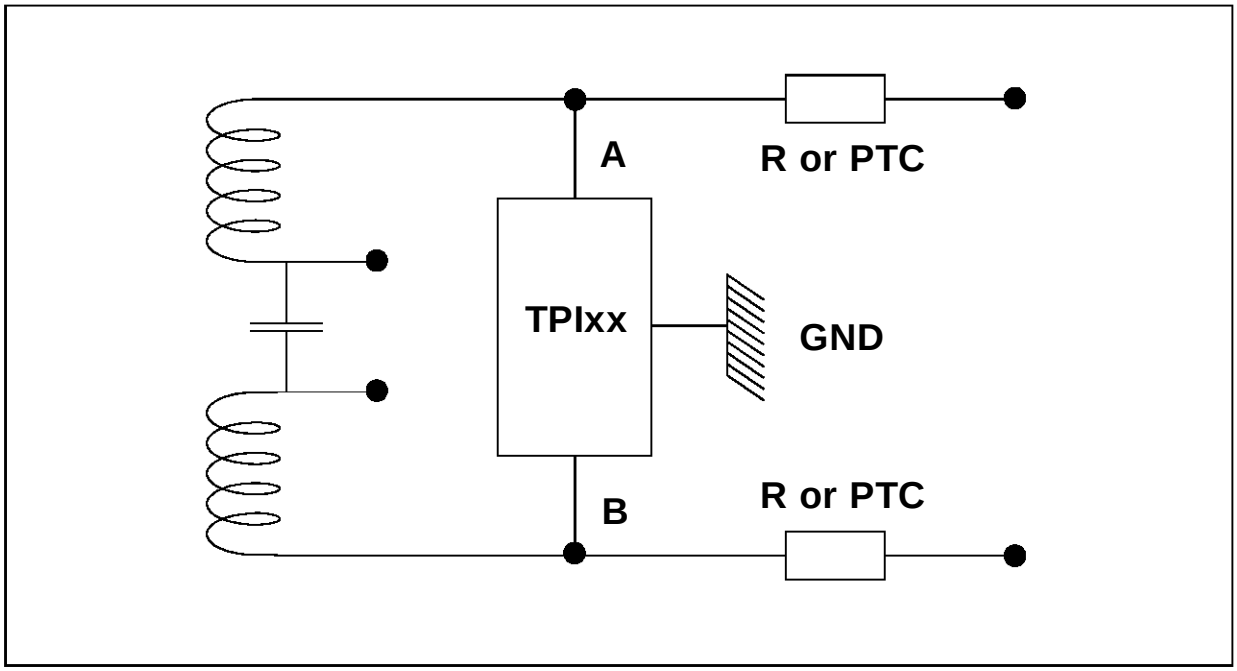
4- points structure lay-out.

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

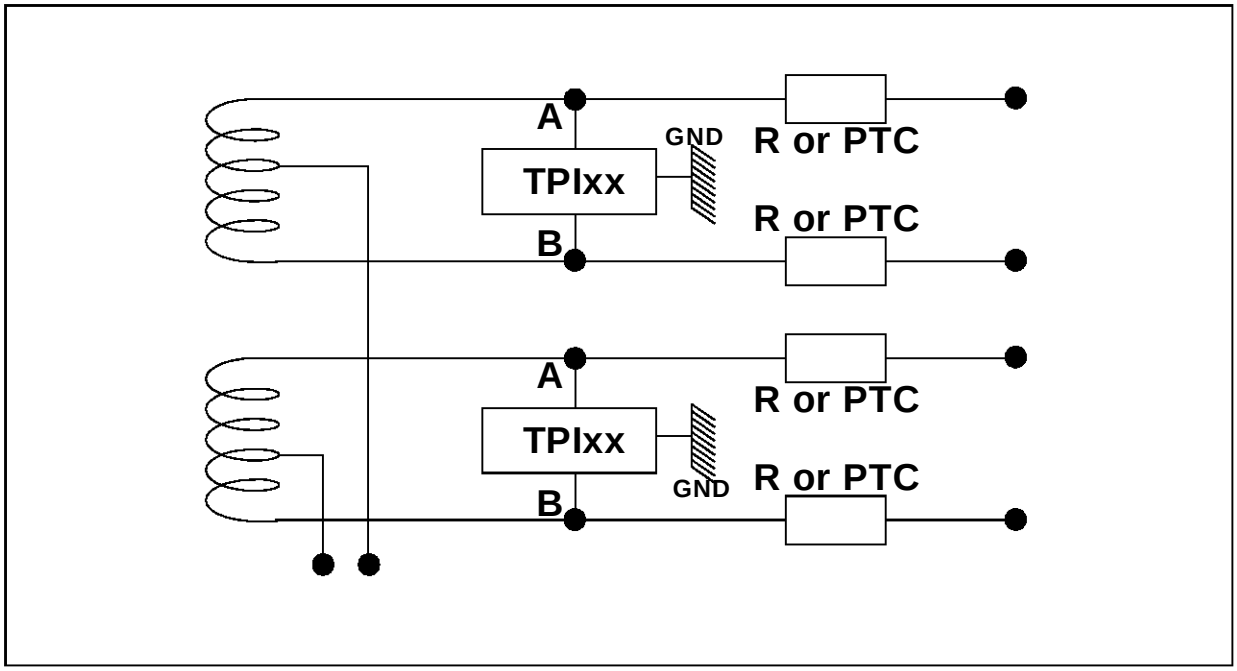
2) In order to take advantage of the "4-points structure" of the TPIxxxP, the tip and Ring lines have to cross through the device. in this case, the device will eliminate the overvoltages generated by the parasitic inductances of the wiring (Ldi/dt), especially for very fast Transients.

APPLICATION NOTE

U Interface Protection

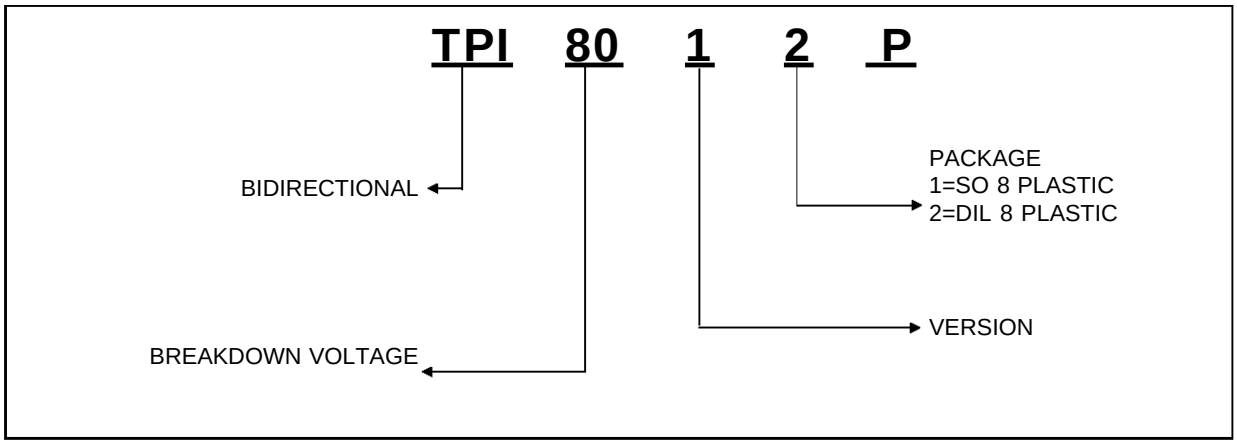


S Interface Protection



This component use an intemal diagram which allows to have symetrical characteristics with a good balanced behaviour.
This topology insures the same breakdown voltage level in positive and negative for differential or common mode surge.

ORDER CODE



MARKING

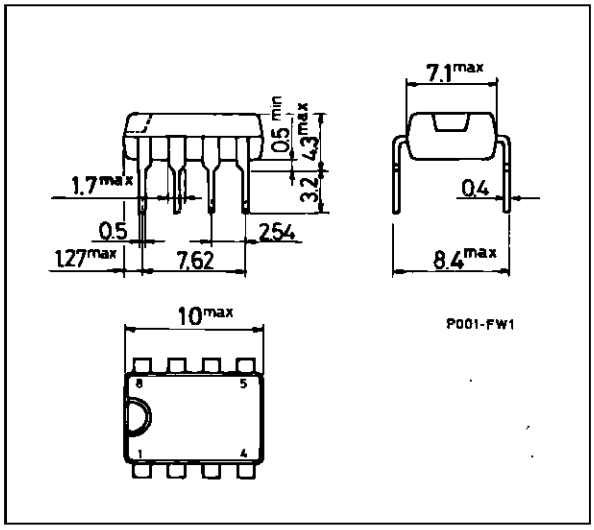
Package	Type	Marking
SO8	TPI8011 TPI12011	TPI80 TPI120

Package	Type	Marking
DIL8	TPI8012 TPI12012	TPI80 TPI120

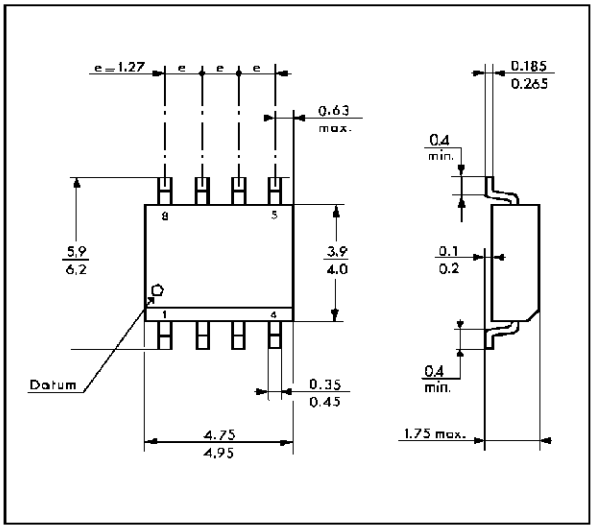
Packaging : Products supplied in antistatic tubes.

PACKAGE MECHANICAL DATA (in millimeters)

DIL 8 Plastic

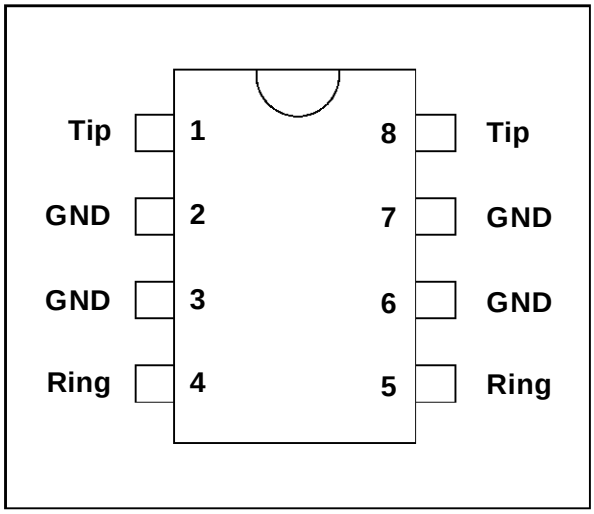


SO 8 Plastic



CONNECTION DIAGRAM

DIL 8 Plastic



SO 8 Plastic