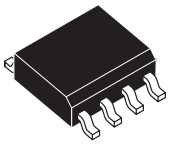
TPI8011N
TPI12011N

Application Specific Discretes
A.S.D.™

TRIPOLAR PROTECTION FOR ISDN INTERFACES

FEATURES

- BIDIRECTIONAL TRIPLE CROWBAR PROTECTION.
- PEAK PULSE CURRENT :
  I_{PP} = 30 A , 10/1000 µs.
- BREAKDOWN VOLTAGE:
  TPI80xxN : 80V
  TPI120xxN : 120V.
- AVAILABLE IN SO-8 PACKAGES.
- LOW DYNAMIC BREAKOVER VOLTAGE :
  TPI80N : 150V
  TPI120 : 200V



SO-8

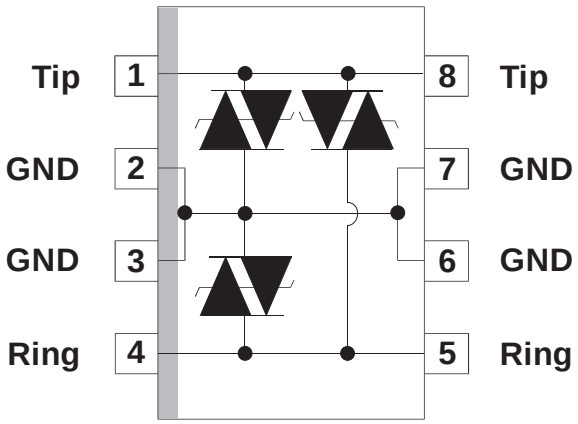
DESCRIPTION

Dedicated devices for ISDN interface and high speed data telecom line protection. Equivalent to a triple TRISIL with low capacitance.

These devices provide :

- low capacitance from lines to ground, allowing high speed transmission without signal attenuation.
- good capacitance balance between lines in order to ensure longitudinal balance.
- fixed breakdown voltage in both common and differential modes.
- the same surge current capability in both common and differential modes.
- A particular attention has been given to the internal wire bonding. The “4-point” configuration ensures a reliable protection, eliminating overvoltages introduced by the parasitic inductances of the wiring (Ldi/dt), especially for very fast transient overvoltages.

SCHEMATIC DIAGRAM



COMPLIES WITH THE FOLLOWING STANDARDS :

CCITT K17 - K20	10/700 µs	1.5	kV
	5/310 µs	38	A
VDE 0433	10/700 µs	2	kV
	5/310 µs	50	A
VDE 0878	1.2/50 µs	1.5	kV
	1/20 µs	40	A
CNET	0.5/700 µs	1.5	kV
	0.2/310 µs	38	A

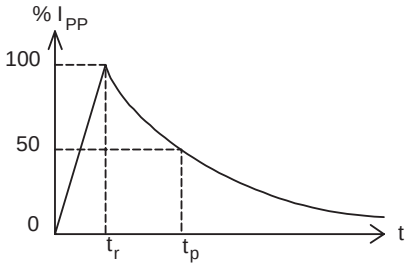
TM: ASD is a trademark of STMicroelectronics.

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

Symbol	Parameter		Value	Unit
I_{PP}	Peak pulse current (see note 1)	10/1000 µs 5/320 µs 2/10 µs	30 40 90	A
I_{TSM}	Non repetitive surge peak on-state current (F = 50 Hz).	tp = 10 ms t = 1 s	8 3.5	A
T_{stg} T_j	Storage temperature range Maximum junction temperature		- 55 to + 150 150	°C
T_L	Maximum lead temperature for soldering during 10s		260	°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

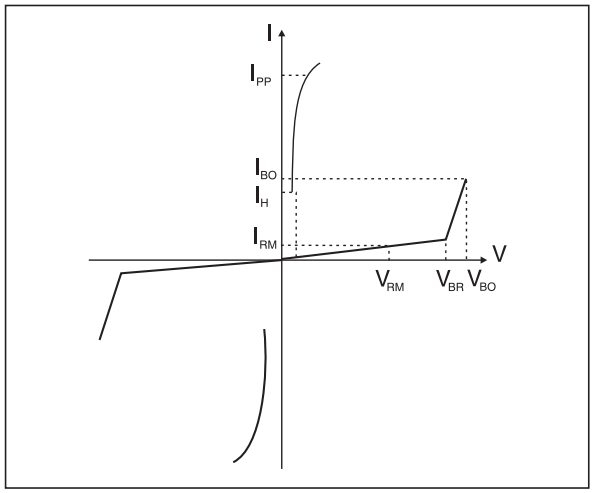


THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th\ (j-a)}$	Junction to ambient	SO-8	170	°C/W

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C)

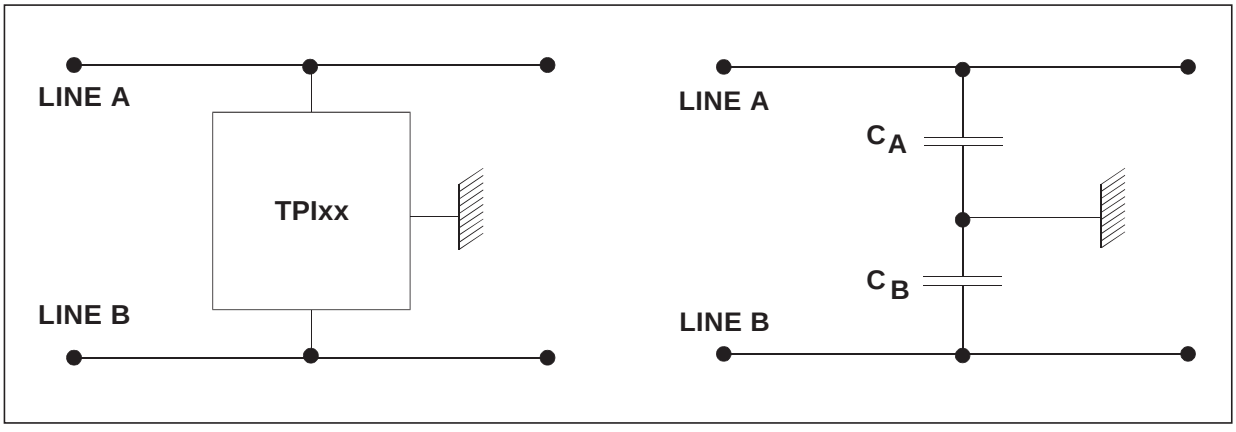
Symbol	Parameter
V_{RM}	Stand-off voltage
I_{RM}	Leakage current
V_{BR}	Breakdown voltage
V_{BO}	Breakover voltage
I_H	Holding current
I_{BO}	Breakover current
I_{PP}	Peak pulse current
V_F	Forward Voltage Drop
C	Capacitance



Types	I_{RM} @ V_{RM}		V_{BR} @ I_R		V_{BO}	VBO dyn.	I_{BO}	I_H
	max.		min.		max. note1	typ. note2	max. note1	min. note3
	µA	V	V	mA	V	V	mA	mA
TPI8011N	10	70	80	1	120	150	800	150
TPI12011N	10	105	120	1	180	200	800	150

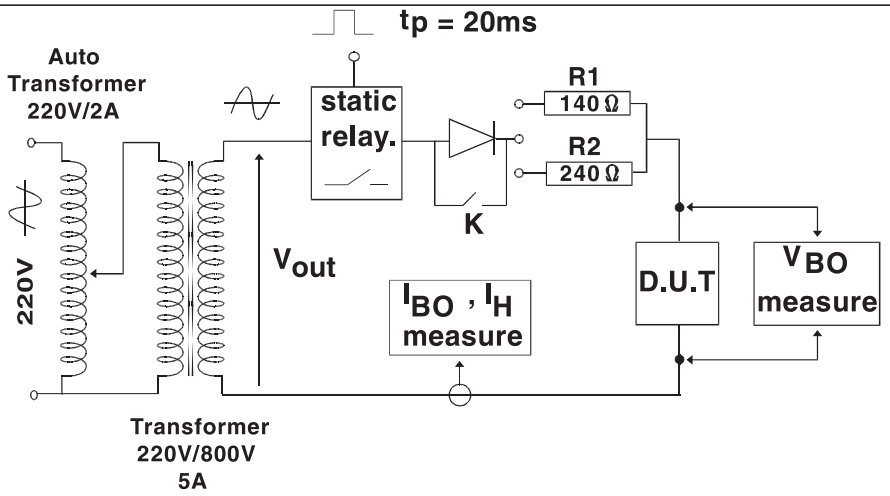
Note 1 : See the reference test circuit 1.
Note 2 : Surge test according to CCITT 1.5kV,10/700 µs between Tip or Ring and ground.
Note 3 : See functional holding current test circuit 2.

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

REFERENCE TEST CIRCUIT 1 :

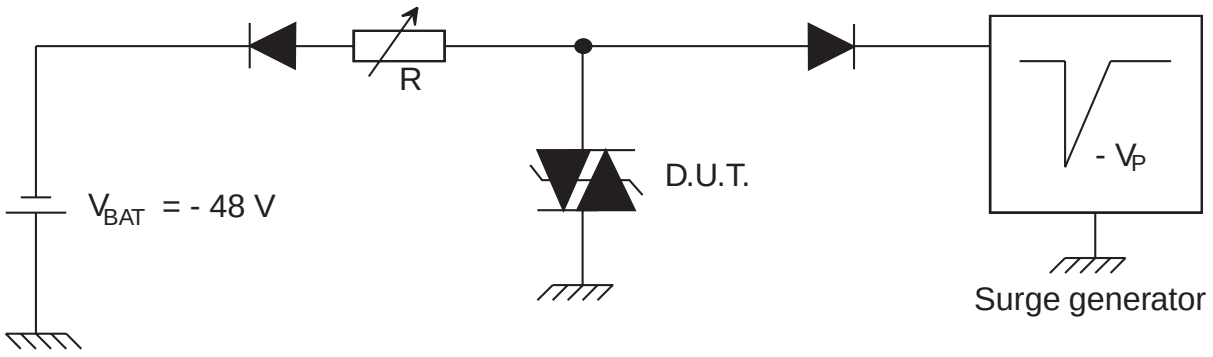


TEST PROCEDURE :

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 Ω.
- Device with V_{BO} ≥ 200 Volt
  - V_{OUT} = 480 V_{RMS}, R_2 = 240 Ω.

FUNCTIONAL HOLDING CURRENT (I_H) TEST CIRCUIT 2 :

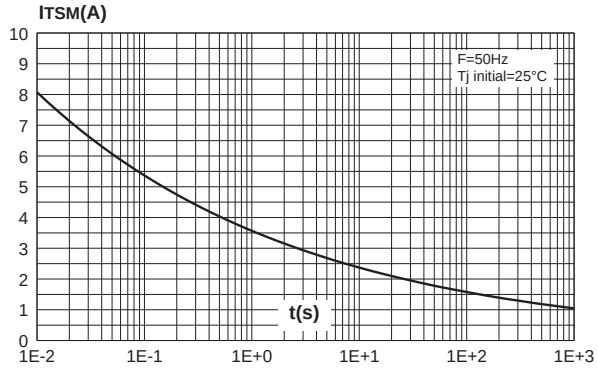


This is a GO-NOGO Test which allows to confirm the holding current (I_H) level in a functional test circuit.

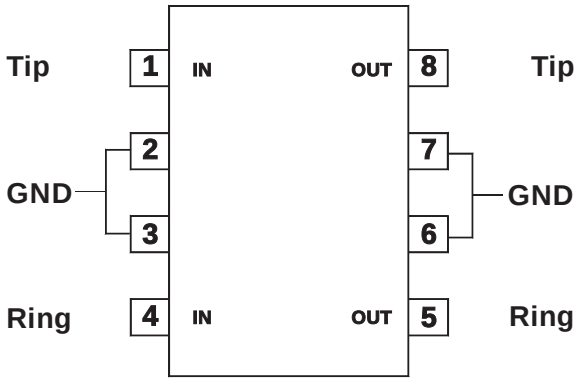
TEST PROCEDURE :

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.

Fig. 1 : Surge peak current versus overload duration.



APPLICATION NOTE.



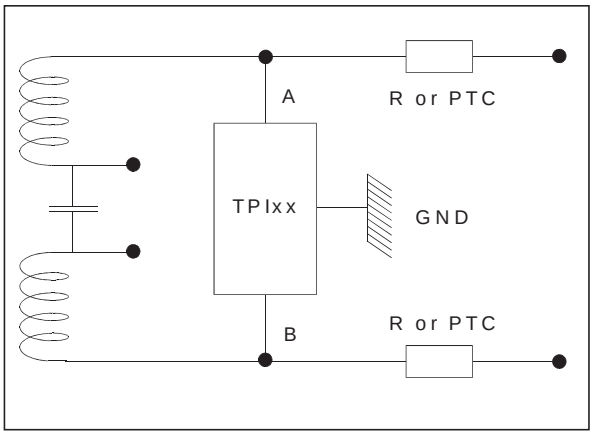
4- point structure lay-out.

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

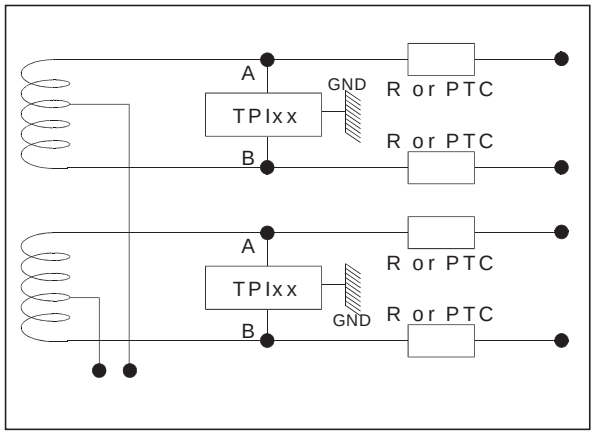
2) In order to take advantage of the “4-point” structure of the TPIxxxN, the Tip and Ring lines have to cross the device. In this case, the device will eliminate the overvoltages generated by the parasitic inductances of the wiring (Ldi/dt), especially for very fast transients.

APPLICATION CIRCUITS :

1 - U INTERFACE PROTECTION

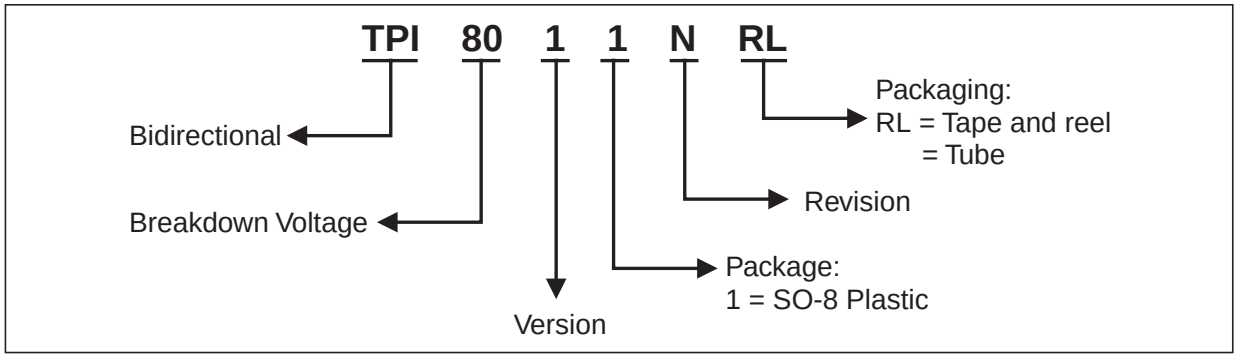


2 - S INTERFACE PROTECTION



This component uses an intemal structure resulting in symetrical characteristics with a good balanced behaviour. Its topology ensures the same breakdown voltage level for positive and negative surges in differential and common mode .

ORDER CODE

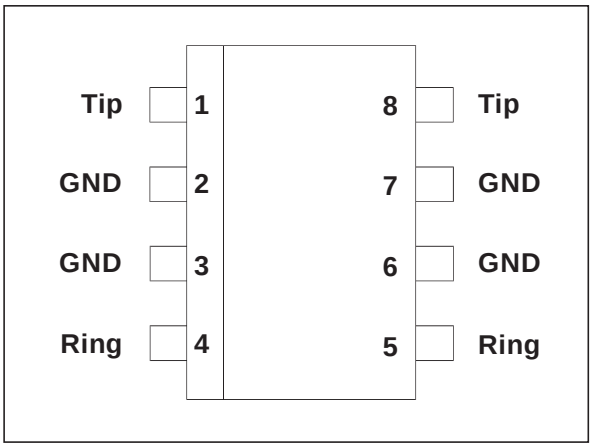


MARKING

Package	Type	Marking
SO-8	TPI8011N TPI12011N	TP80N TP120N

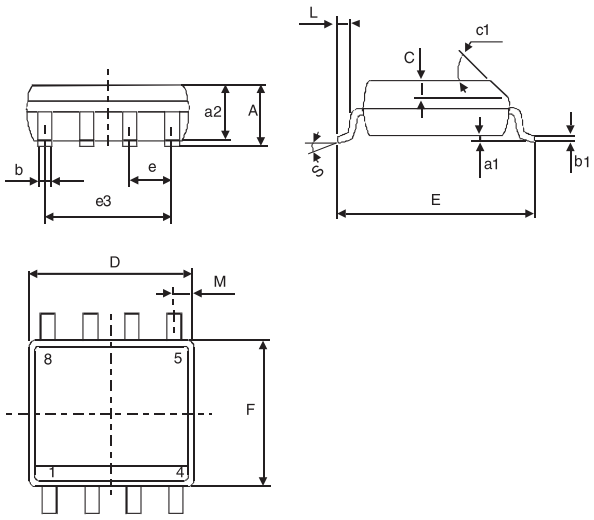
CONNECTION DIAGRAM

SO-8 Plastic



PACKAGE MECHANICAL DATA

SO-8 Plastic



REF.	DIMENSIONS					
	Millimetres			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C		0.50			0.020	
c1	45° (typ)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.15		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max)					

Packaging : Products supplied in antistatic tubes or tape and reel.

Weight : 0.08g