

Tripolar protection for ISDN interfaces

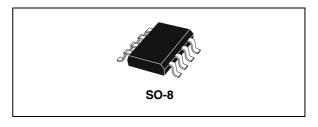
Features

- Bidirectional triple crowbar protection
- Peak pulse current: I_{PP} = 30 A , 10/1000 μs
- Breakdown voltage:
 - TPI80N: 80 VTPI120N: 120 V
- Available in SO-8 package
- Low dynamic breakover voltage:

TPI8011N: 120 VTPI12011N: 170 V

Benefits

- Low capacitance from lines to ground, allowing high speed transmission without signal attenuation
- Good capacitance balance between lines 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 (Ld_i/dt), especially for very fast transient overvoltages



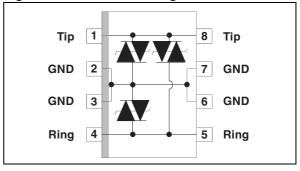
Complies with following standards

- CCITT K17-K20
 - 10/700 µs, 1.5 kV
 - 5/310 μ s, 38 A
- VDE 0433
 - 10/700 μ s, 2 kV
 - 5/310 μ s, 50 A
- VDE 0878
 - 1.2/50 μs, 1.5 kV
 - 1/20 µs, 40 A
- IEC 61000-4-2 level 4
 - 0.5/700 μs, 1.5 kV
 - 0.2/310 µs, 38 A

Description

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

Figure 1. Functional diagram



TM: Trisil is a trademark of STMicroelectronics

Characteristics TPI

1 Characteristics

Table 1. Absolute ratings $(T_{amb} = 25 \, ^{\circ}C)$

Symbol	Parameter	Value	Unit	
I _{PP}	Peak pulse current (see note ⁽¹⁾)	10/1000 μs 5/310 μs 2/10 μs	30 40 90	Α
I _{TSM}	Non repetitive surge peak on-state current (F = 50 Hz)	8 3.5	Α	
T _{stg} T _j	Storage temperature range Maximum junction temperature		- 55 to 150 150	°C
T _L	Maximum lead temperature for soldering during 10 s.	260	°C	

^{1.} See Figure 3.

Table 2. Thermal resistances

Symbol	Parameter	Value	Unit
R _{th(j-a)}	Junction to ambient	170	°C/W

Table 3. Electrical characteristics ($T_{amb} = 25$ °C)

	l								
Symbol	Parameter						1.		
V_{RM}	Stand-off voltage				 				
V _{BR}	Breakdo	wn voltage)						
V _{BO}	Breakov	er voltage			I _{BO}				
I _{RM}	Leakage	current							
I _{PP}	Peak pul	se current						V _{RM} V _{BR} V _{BO}	
I _{BO}	Breakover current				/				
I _H	Holding current								
V _F	Forward voltage drop								
С	Capacita	ince				ŕ	ı		
		I _{RM} @	V _{RM}	V _{BR}	@ I _R	V _{BO}	V _{BO} dyn.	I _{BO}	Ι _Η
Order code		max.		min.		max. note ⁽¹⁾	typ. note ⁽²⁾	max. note ⁽¹⁾	min. note ⁽³⁾
		μA	V	V	mA	V	V	mA	mA
TPI80	8011N 10 70 8		80	1	110	120	800	150	
TPI12	TPI12011N 10 105 1		120	1	160	170	800	150	

^{1.} See the reference test circuit 1 (Figure 5.)

Figure 2.

^{2.} Surge test according to CCITT 1.5 kV, $10/700~\mu s$ between Tip or Ring and ground

^{3.} See functional holding current test circuit 2 (Figure 6.)

TPI Characteristics

Table 4. Capacitance characteristics

CONFIGURATION	C _A (pF) max.	C _B (pF) max.	C _A - C _B (pF) max.	
V _A = -1 V V _B = -56 V	45	15	30	
V _A = -56 V V _B = -1 V		45	30	

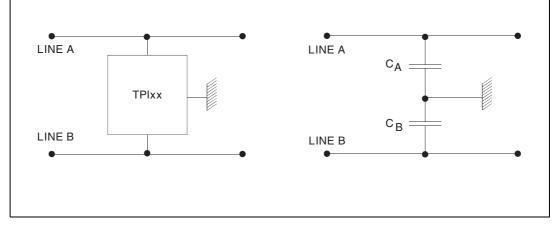
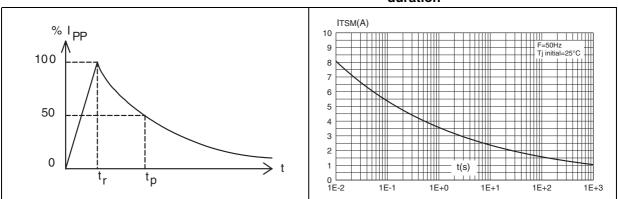


Figure 3. Pulse waveform (10/1000 μs)

Figure 4. Surge peak current versus overload duration



Characteristics TPI

Figure 5. Reference test circuit 1

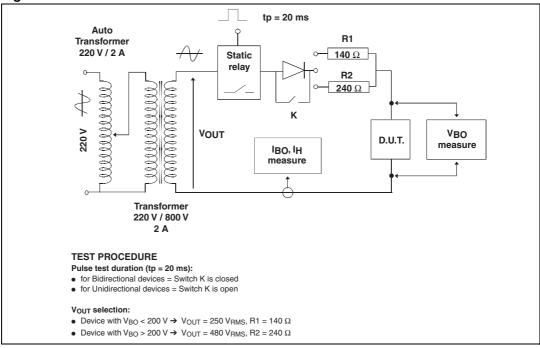
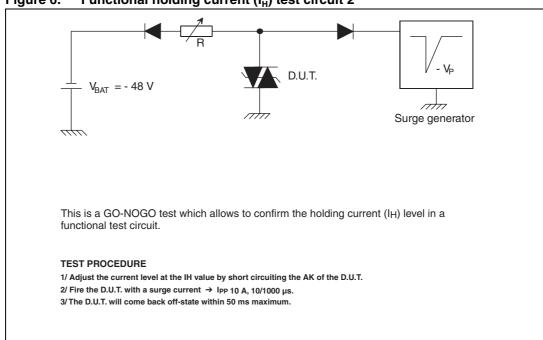


Figure 6. Functional holding current (I_H) test circuit 2



Application information 2

Figure 7. Application circuit - U interface protection

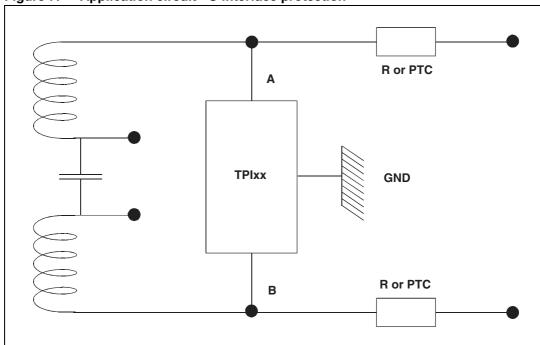
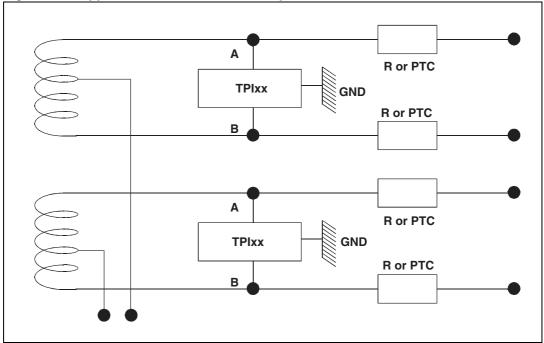


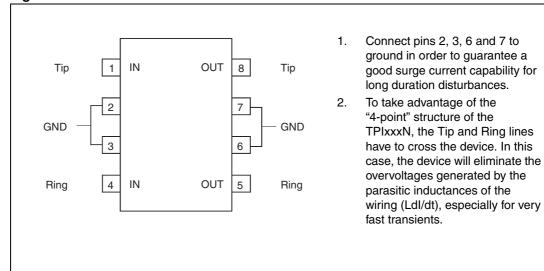
Figure 8. Application circuit - S interface protection



This component uses an internal 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.

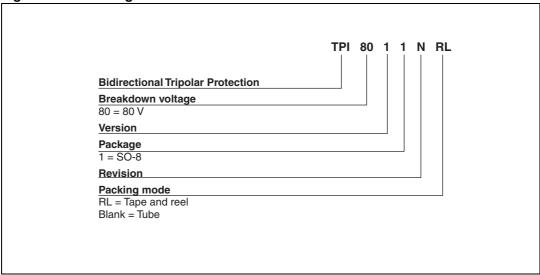
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Figure 9. Connections



3 Ordering information scheme

Figure 10. Ordering information scheme



TPI Package information

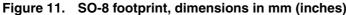
4 Package information

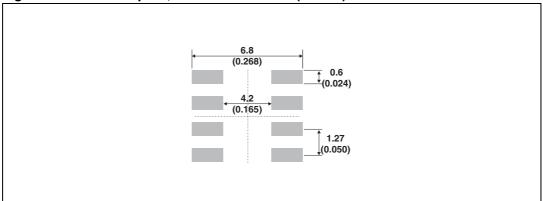
Epoxy meets UL94, V0

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Dimensions Ref **Millimeters** Inches Seating h x 45° Min. Min. Max. Max. Typ. Typ. 1.75 0.069 A1 0.1 0.25 0.004 0.010 A2 1.25 0.049 0.28 □ ppp C b 0.48 0.011 0.019 С 0.17 0.23 0.007 0.009 0.189 0.193 0.197 D 4.80 5.00 4.90 0.228 Ε 5.80 6.00 6.20 0.236 0.244 5 8 E1 3.80 3.90 4.00 0.150 0.154 0.157 0.050 1.27 е E1 E h 0.25 0.50 0.010 0.020 0.40 1.27 0.016 0.050 L

Table 5. SO-8 dimensions





L1

k

ppp

0°

1.04

8°

0.10

0°

577

0.041

8° 0.004 Ordering Information TPI

5 Ordering Information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
TPI8011N	TP80N			100	Tube
TPI8011NRL (1)	TP80N	SO-8	0.08 g	2500	Tape and reel
TPI12011N	TP120N	30-6		100	Tube
TPI12011NRL (1)	TP120N			2500	Tape and reel

^{1.} Prefered device

6 Revision history

Table 7. Document revision history

Date	Revision	Changes
August-2001	3A	Last update.
02-Aug-2004	4	V _{BO} dyn. (page 2) and capacitances (page 3) values update.
07-Nov-2007	5	Reformatted to current standards. Updated Package information.

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