



# TPI8011N TPI12011N

Application Specific Discretes  
A.S.D.<sup>TM</sup>

## TRIPOLAR PROTECTION FOR ISDN INTERFACES

### FEATURES

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

### DESCRIPTION

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

These devices provide :

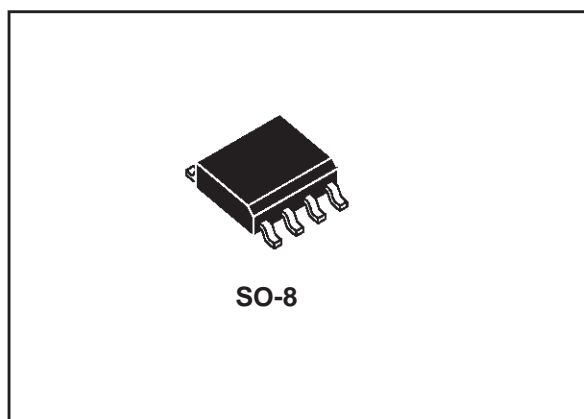
- low capacitance from lines to ground, allowing high speed transmission without signal attenuation.
- good capacitance balance between lines in order to ensure longitudinal balance.
- fixed breakdown voltage in both common and differential modes.
- the same surge current capability in both common and 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.

### COMPLIES WITH THE FOLLOWING STANDARDS :

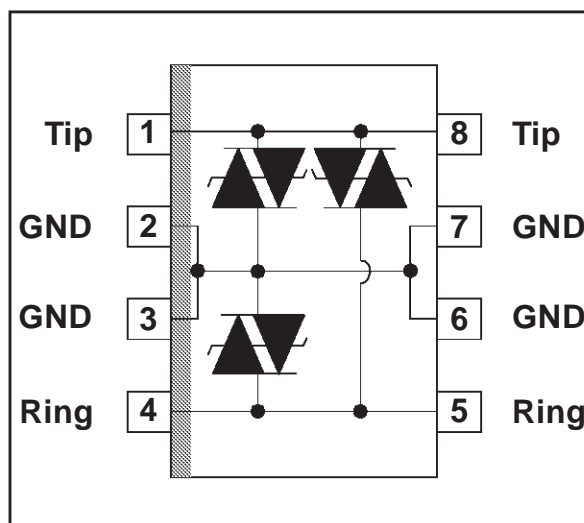
CCITT K17 - K20	10/700 $\mu\text{s}$	1.5 kV
	5/310 $\mu\text{s}$	38 A
VDE 0433	10/700 $\mu\text{s}$	2 kV
	5/310 $\mu\text{s}$	50 A
VDE 0878	1.2/50 $\mu\text{s}$	1.5 kV
	1/20 $\mu\text{s}$	40 A
CNET	0.5/700 $\mu\text{s}$	1.5 kV
	0.2/310 $\mu\text{s}$	38 A

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### SCHEMATIC DIAGRAM



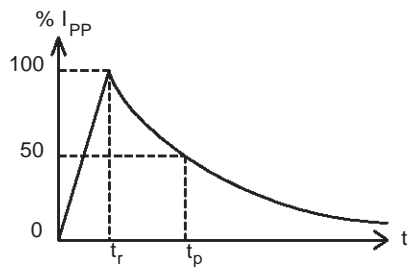
## TPI8011N/TPI12011N

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

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

**Note 1 :** Pulse waveform :

10/1000 $\mu\text{s}$	$t_r=10\mu\text{s}$	$t_p=1000\mu\text{s}$
5/310 $\mu\text{s}$	$t_r=5\mu\text{s}$	$t_p=310\mu\text{s}$
2/10 $\mu\text{s}$	$t_r=2\mu\text{s}$	$t_p=10\mu\text{s}$

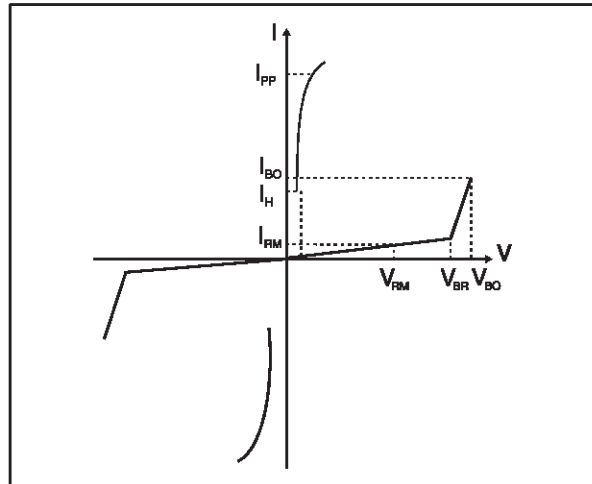


### THERMAL RESISTANCES

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

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

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



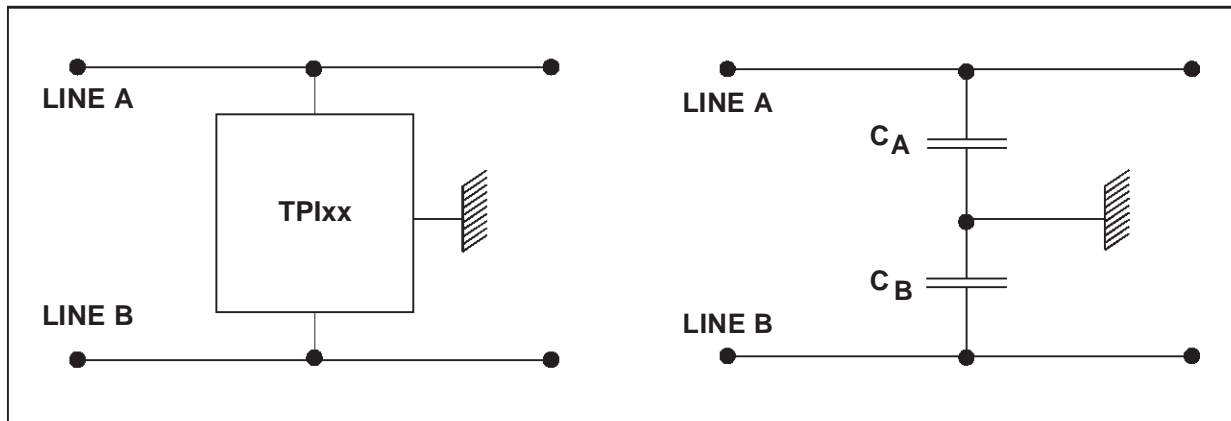
Types	$I_{RM}$ @ $V_{RM}$		$V_{BR}$ @ $I_R$		$V_{BO}$	$V_{BO}$ dyn.	$I_{BO}$	$I_H$
	max.		min.		max.	typ.	max.	min.
	$\mu\text{A}$	V	V	mA	V	V	mA	mA
TPI8011N	10	70	80	1	120	150	800	150
TPI12011N	10	105	120	1	180	200	800	150

**Note 1 :** See the reference test circuit 1.

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

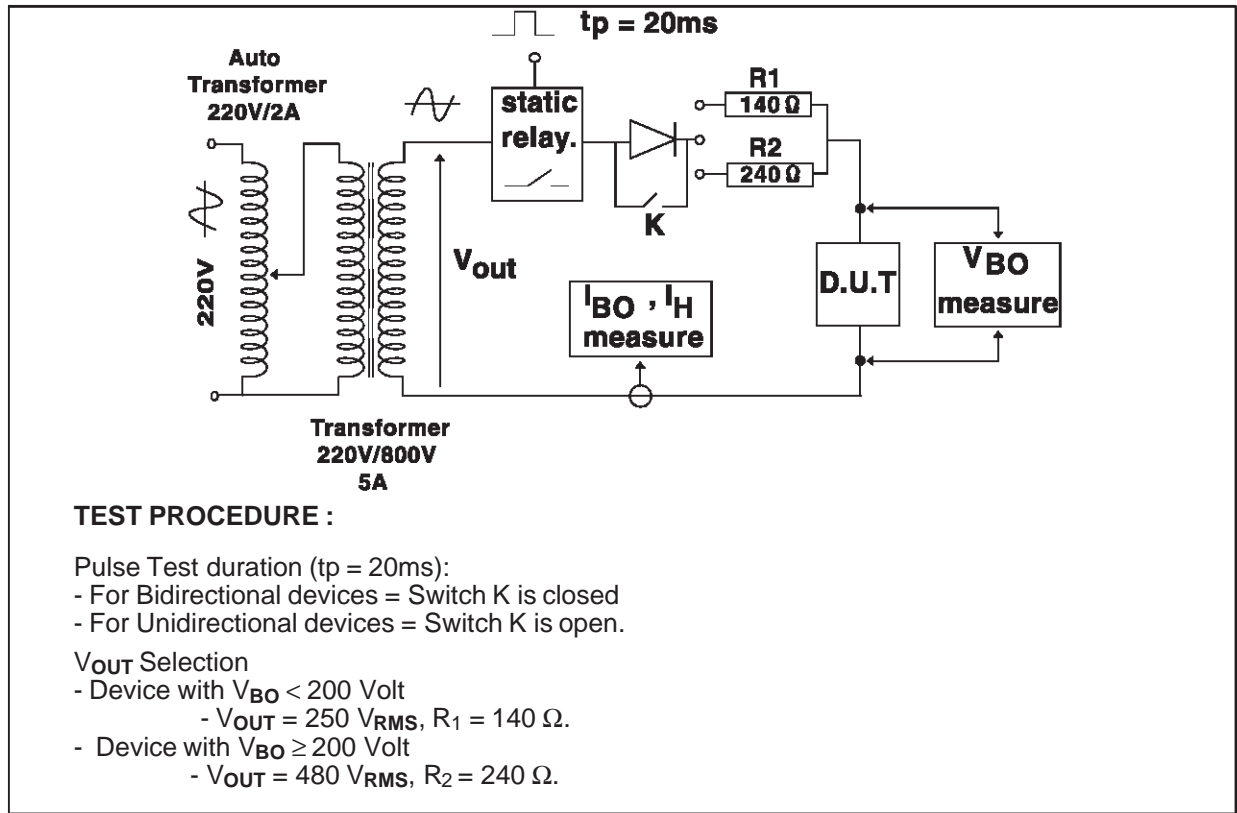
**Note 3 :** See functional holding current test circuit 2.

**CAPACITANCES CHARACTERISTICS**



CONFIGURATION	$C_A$ (pF) max	$C_B$ (pF) max	$C_A - C_B$ (pF) max
$V_A = 1\text{V}$ $V_B = 56\text{V}$	70	50	30
$V_A = 56\text{V}$ $V_B = 1\text{V}$	50	70	30

REFERENCE TEST CIRCUIT 1 :



FUNCTIONAL HOLDING CURRENT ( $I_H$ ) TEST CIRCUIT 2 :

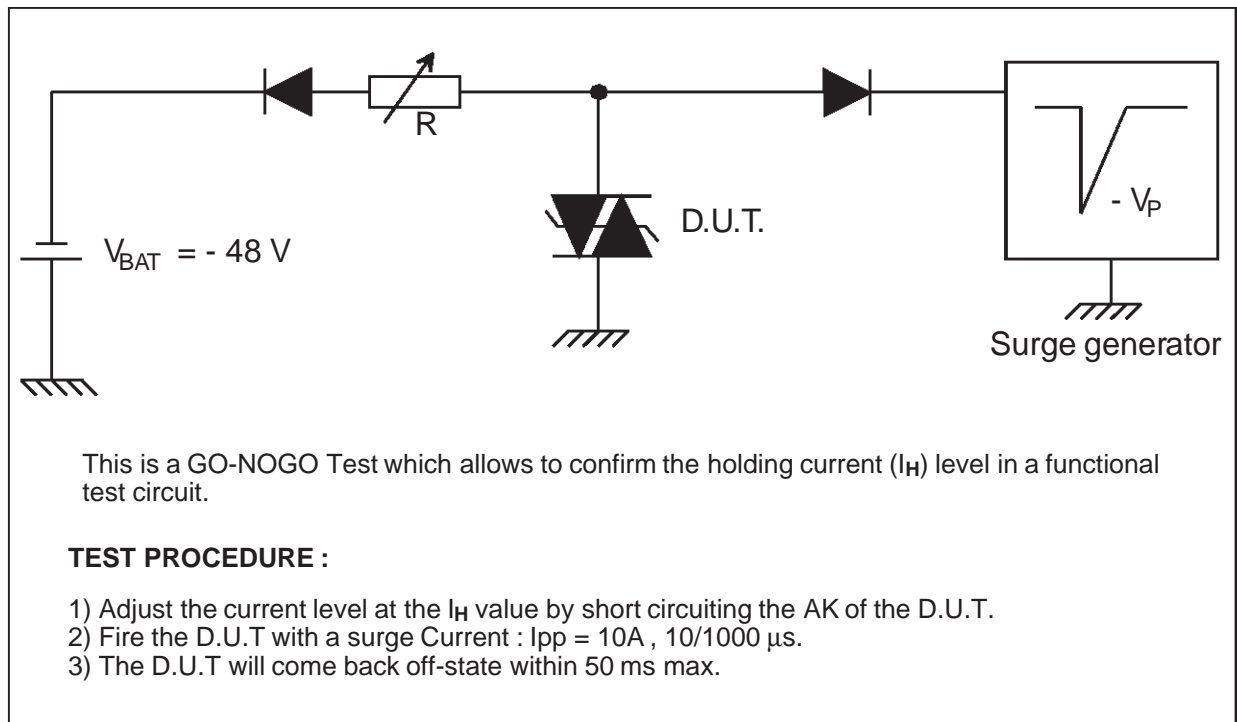
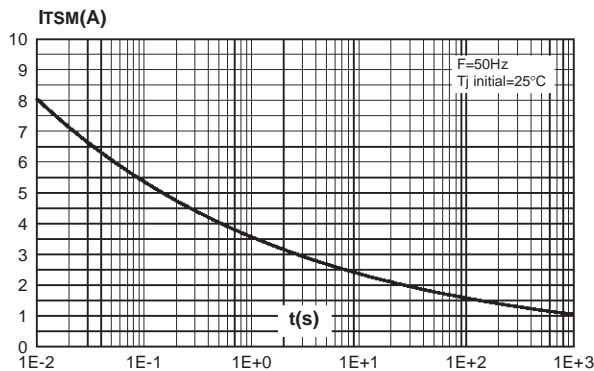
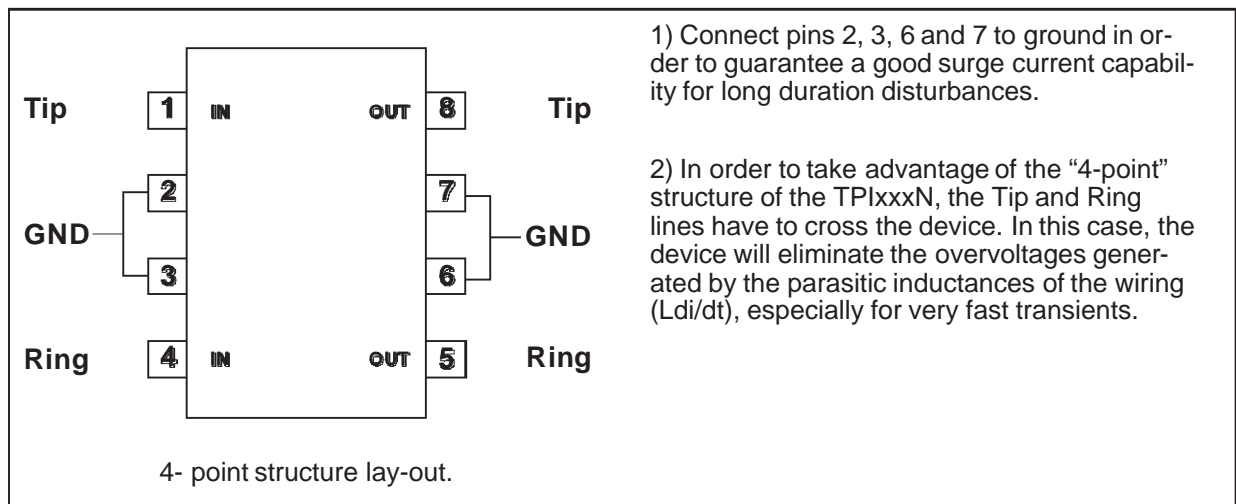


Fig. 1 : Surge peak current versus overload duration.

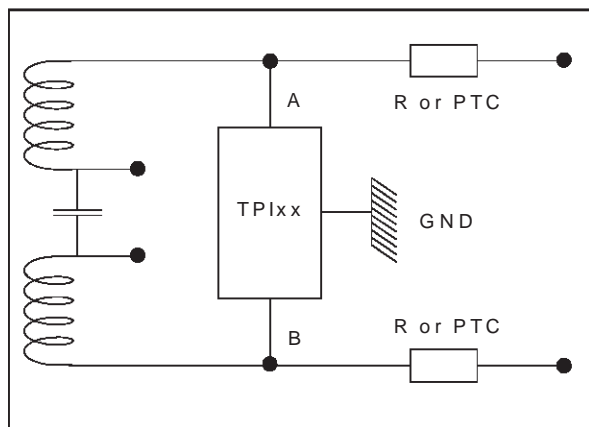


APPLICATION NOTE.

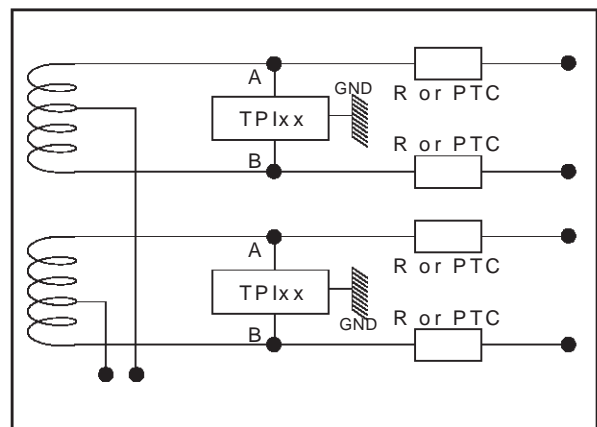


APPLICATION CIRCUITS :

1 - U INTERFACE PROTECTION



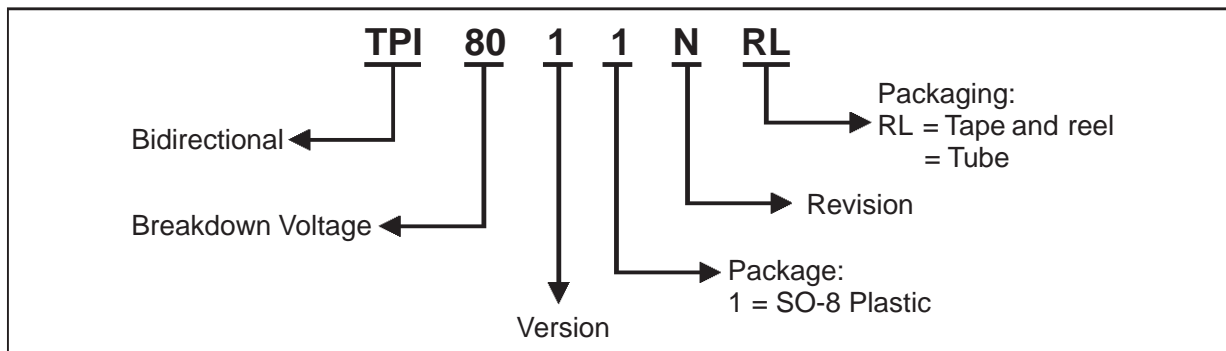
2 - S INTERFACE PROTECTION



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

## TPI8011N/TPI12011N

### ORDER CODE

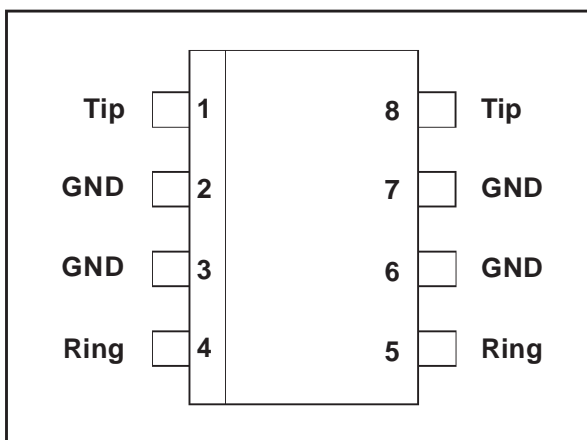


### MARKING

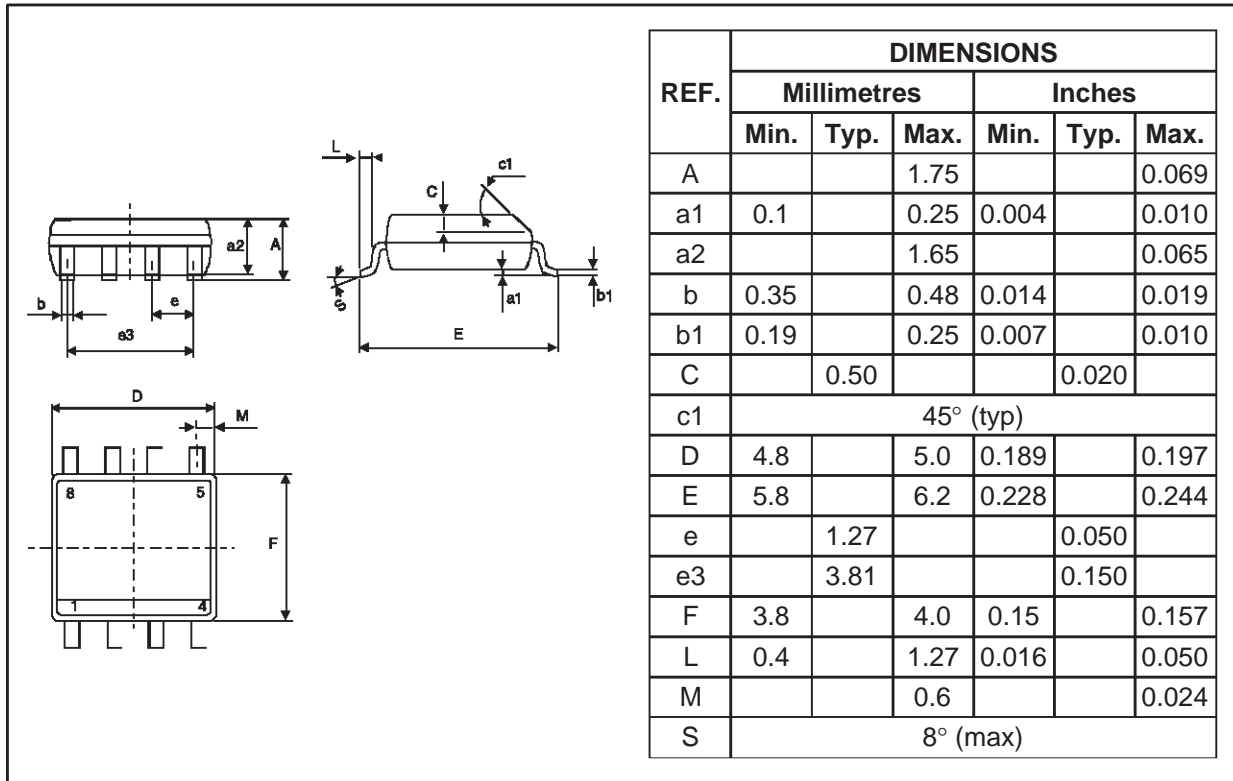
Package	Type	Marking
SO-8	TPI8011N TPI12011N	TP80N TP120N

### CONNECTION DIAGRAM

#### SO-8 Plastic



**PACKAGE MECHANICAL DATA**  
SO-8 Plastic



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

**Weight** : 0.08g

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