



# 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 SO8 PACKAGES.
- LOW DYNAMIC BREAKOVER VOLTAGE :  
TPI80N : 150V  
TPI120 : 200V

### DESCRIPTION

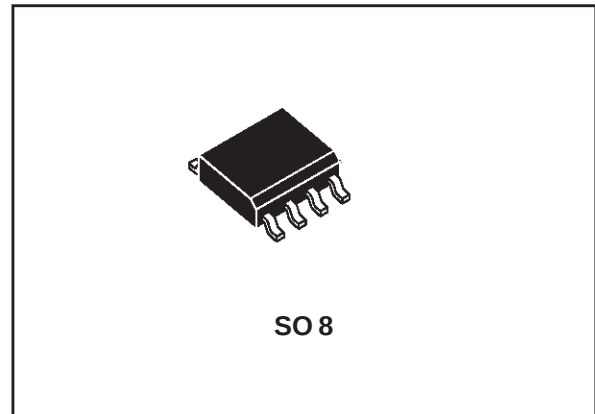
Dedicated devices for ISDN interface and high speed data telecom line protection. Equivalent to a triple TRISIL with low capacitance.

These devices provide :

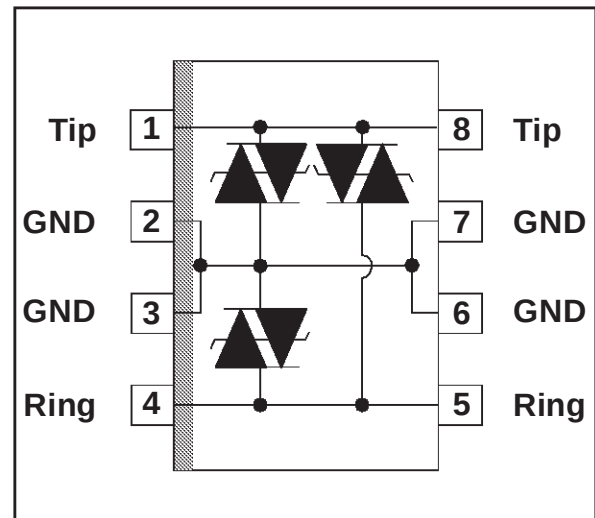
- low capacitance from lines to ground, allowing high speed transmission without signal attenuation.
- good capacitance balance between lines in order to ensure longitudinal balance.
- fixed breakdown voltage in both common and differential modes.
- the same surge current capability in both common and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



### SCHEMATIC DIAGRAM



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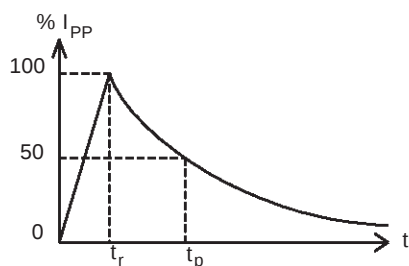
## TPI8011N/TPI12011N

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

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

**Note 1 :** Pulse waveform :

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

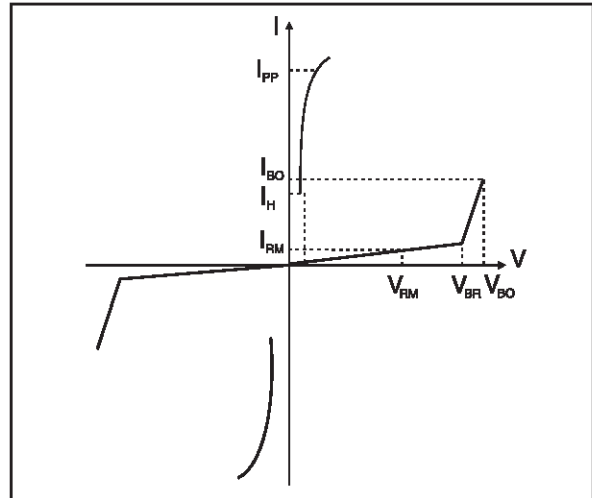


### THERMAL RESISTANCES

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

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

| 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          |

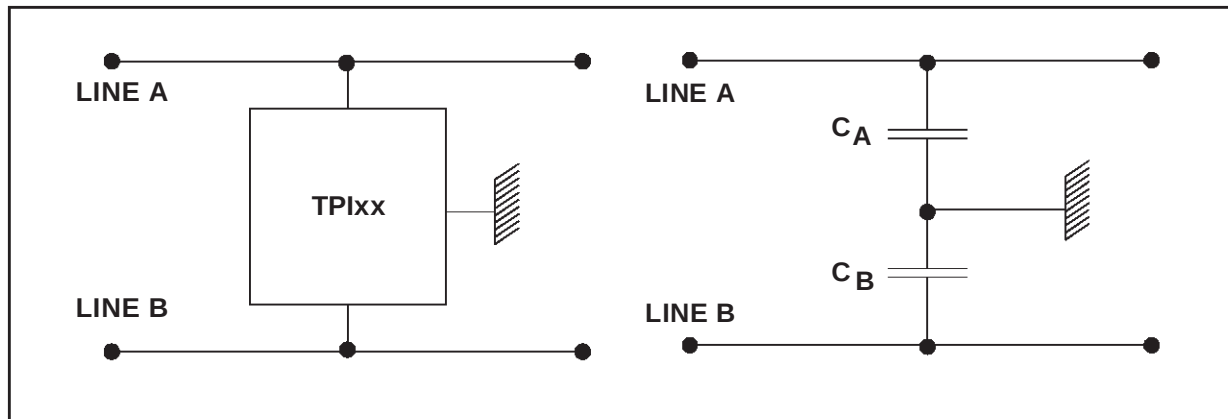


| Types     | $I_{RM} @ V_{RM}$<br>max. |     | $V_{BR} @ I_R$<br>min. |    | $V_{BO}$<br>max.<br>note1 | $V_{BO}$ dyn.<br>typ.<br>note2 | $I_{BO}$<br>max.<br>note1 | $I_H$<br>min.<br>note3 |
|-----------|---------------------------|-----|------------------------|----|---------------------------|--------------------------------|---------------------------|------------------------|
|           | $\mu\text{A}$             | 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.

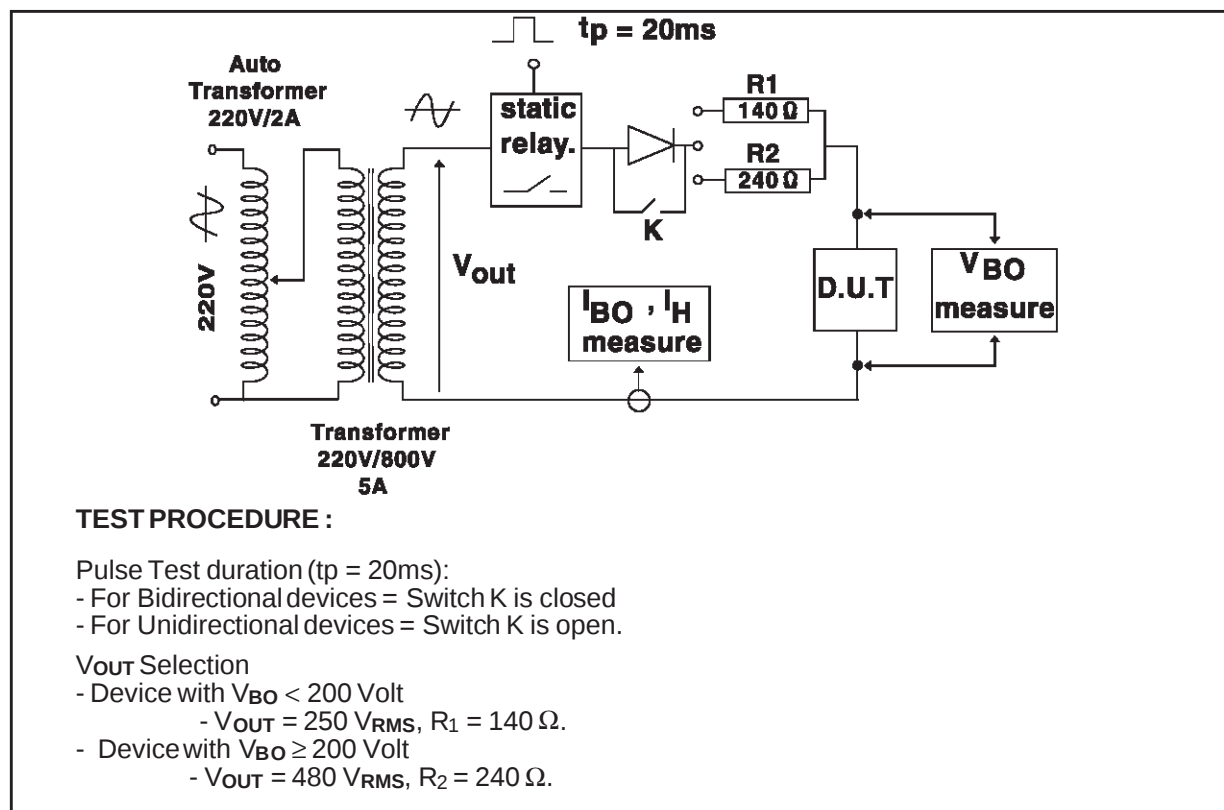
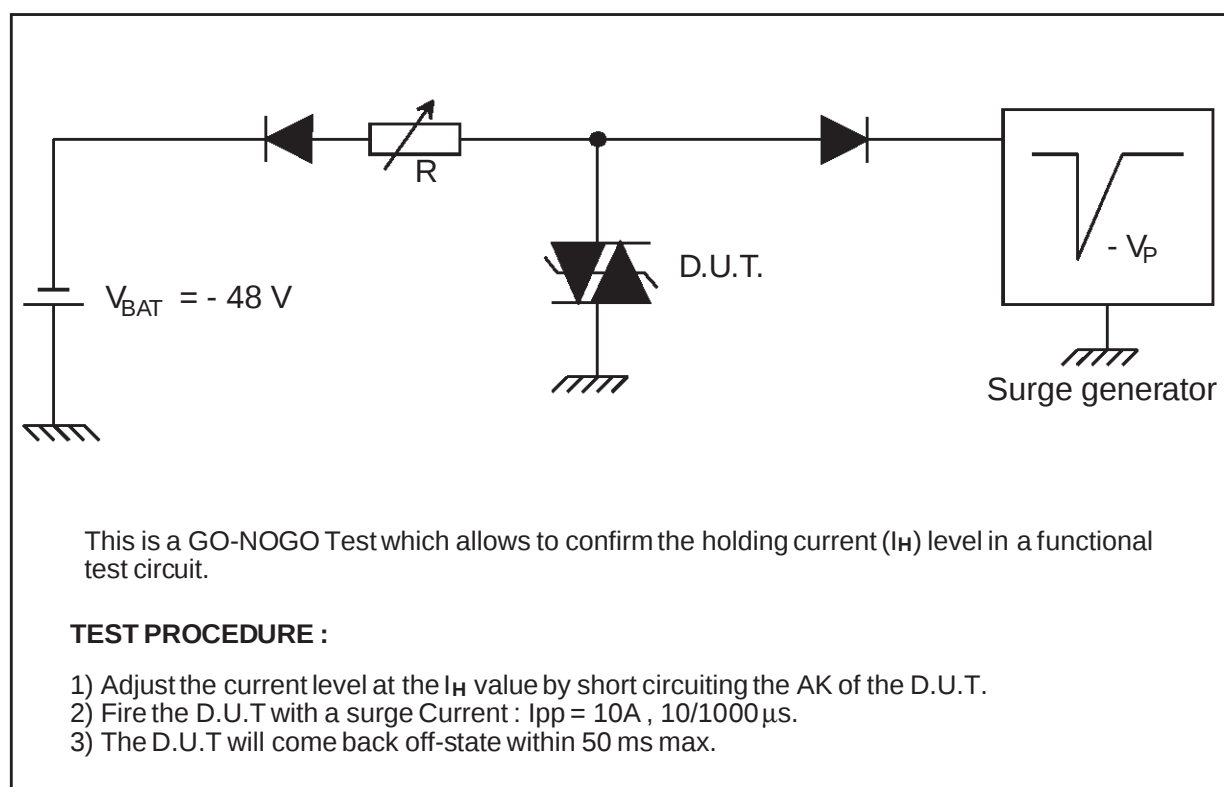
**Note 2 :** Surge test according to CCITT 1.5kV,10/700  $\mu\text{s}$  between Tip or Ring and ground.

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

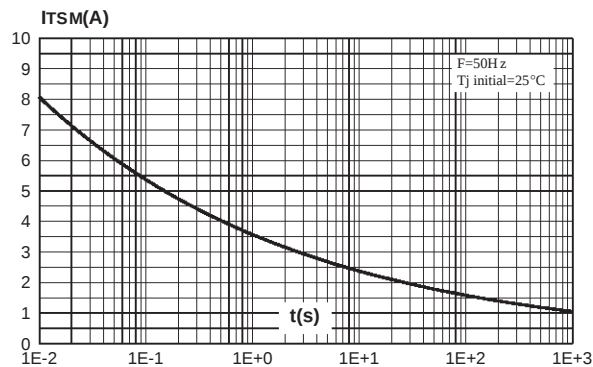
**CAPACITANCES CHARACTERISTICS**

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

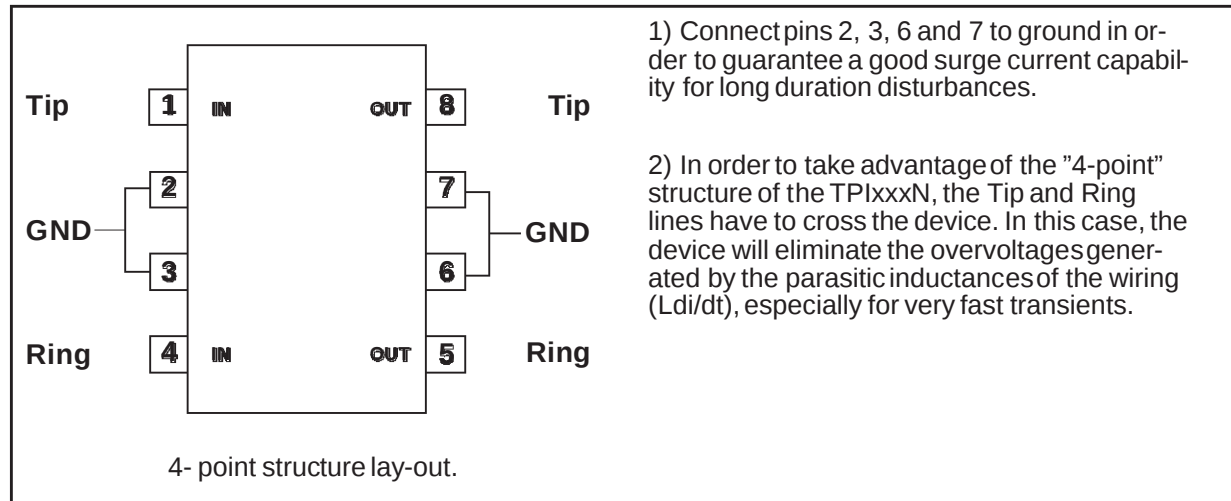
## REFERENCE TEST CIRCUIT 1 :

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

**Fig. 1 :** Surge peak current versus overload duration.

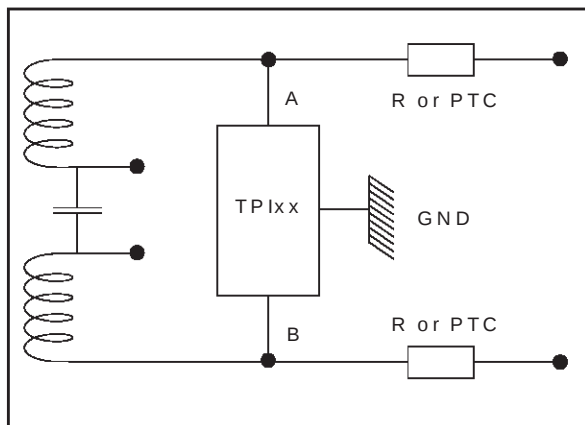


**APPLICATION NOTE.**

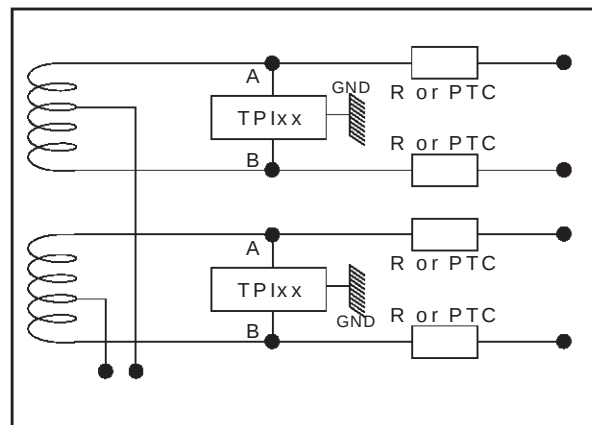


**APPLICATION CIRCUITS :**

**1 - U INTERFACE PROTECTION**



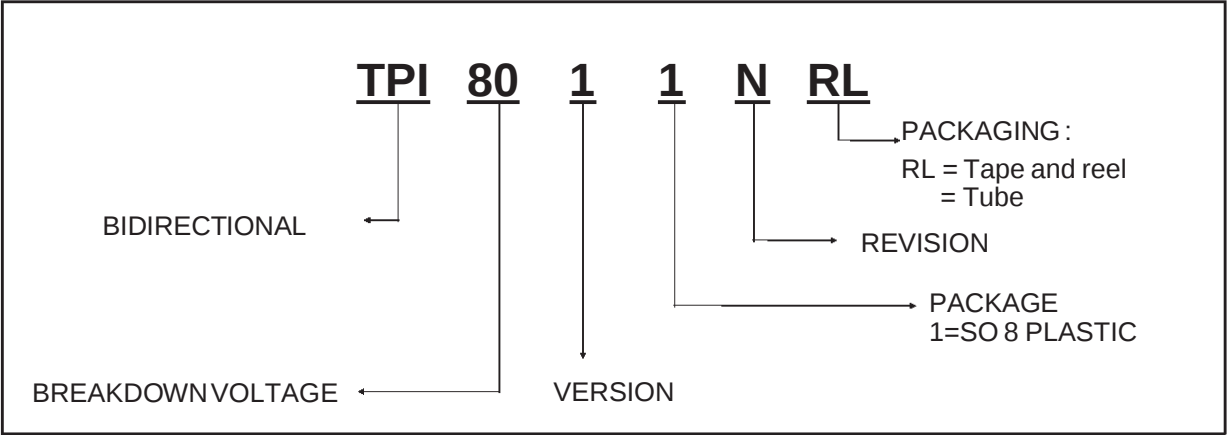
**2 - S INTERFACE PROTECTION**



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**

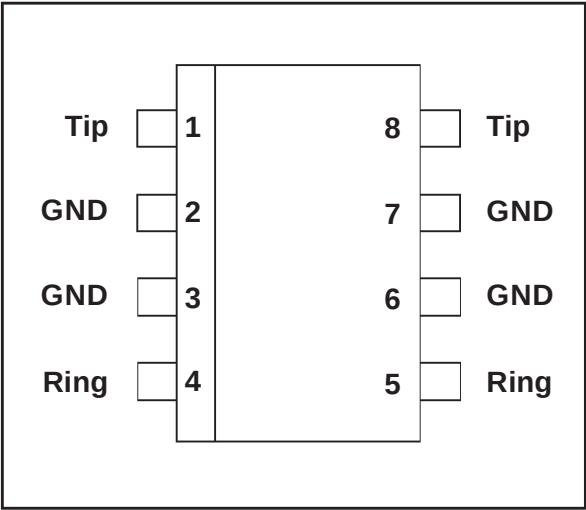


**MARKING**

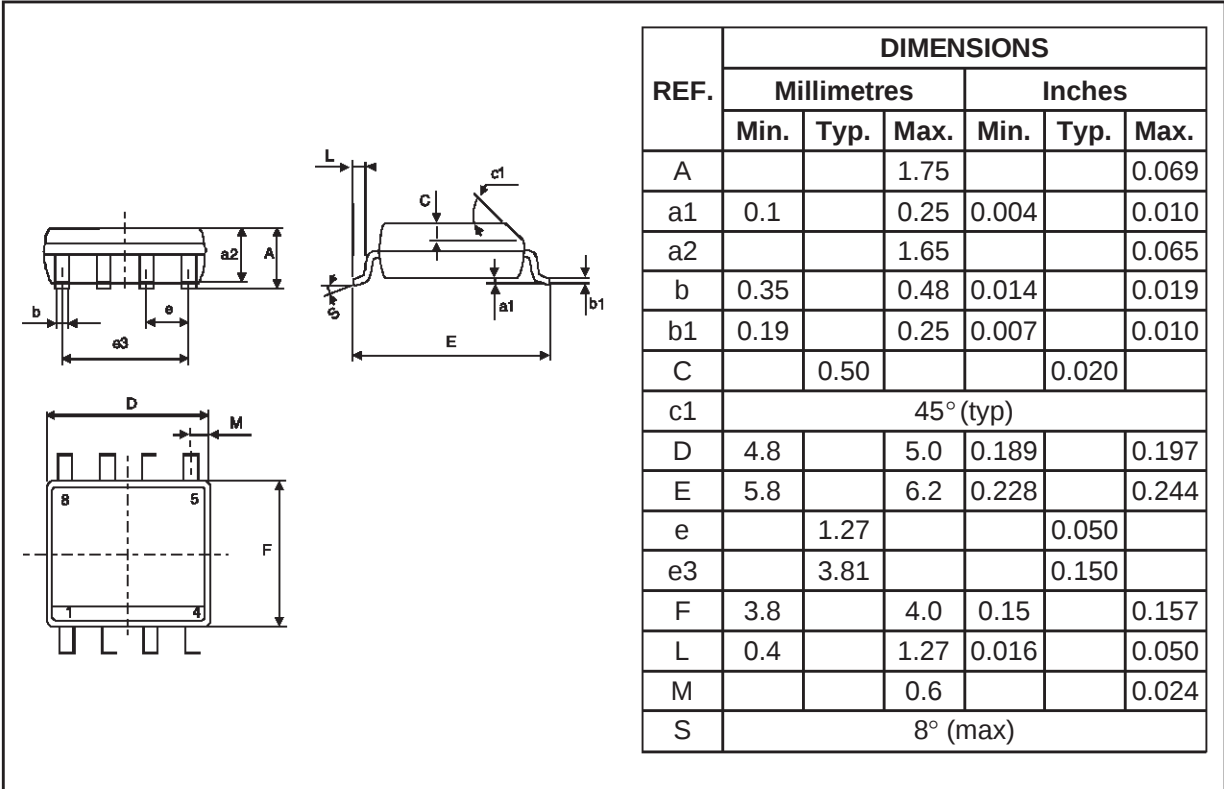
| Package | Type                  | Marking         |
|---------|-----------------------|-----------------|
| SO8     | TPI8011N<br>TPI12011N | TP80N<br>TP120N |

**CONNECTION DIAGRAM**

SO8 Plastic



# **PACKAGE MECHANICAL DATA** **SO8 Plastic**



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

**Weight :** 0.08g

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