

**PROGRAMMABLE TRANSIENT VOLTAGE SUPPRESSOR  
AND CURRENT REGULATION**

**FEATURES**

- UNIDIRECTIONAL FUNCTION
- PROGRAMMABLE BREAKDOWN VOLTAGE UP TO 250 V
- PROGRAMMABLE CURRENT LIMITATION FROM 40 mA TO 500 mA
- HIGH SURGE CURRENT CAPABILITY  
 $I_{PP} = 30A \quad 10/1000 \mu s$
- AVAILABLE IN DIL 8 AND SO 8 PACKAGES

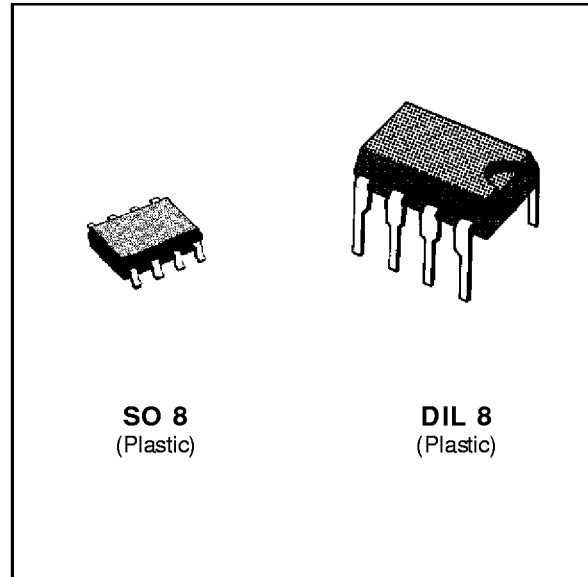
**DESCRIPTION**

Dedicated to sensitive telecom equipment protection, this device can provide both voltage protection and current limitation with a very tight tolerance.

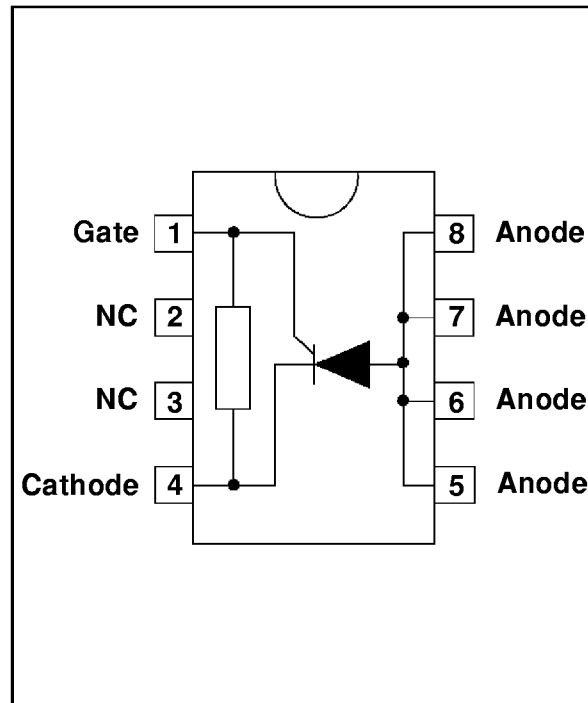
The breakdown voltage can be easily programmed by using an external zener diode.

A multiple protection mode can be also performed when using several zener diodes, providing to each line interface an optimized protection level.

The current limiting function is achieved with the use of a resistor between the gate and the cathode. The value of the resistor will determine the level of the desired current.



**SCHEMATIC DIAGRAM**

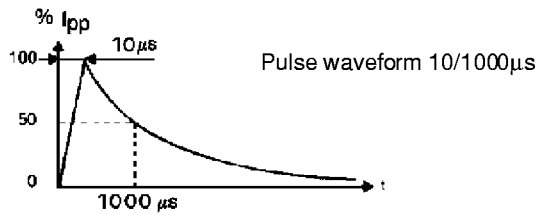


**IN ACCORDANCE WITH FOLLOWING STANDARDS :**

CCITT K17 - K20	{	10/700 $\mu s$	1.5 kV
		5/310 $\mu s$	38 A
VDE 0433	{	10/700 $\mu s$	2 kV
		5/200 $\mu s$	50 A
CNET	{	0.5/700 $\mu s$	1.5 kV
		0.2/310 $\mu s$	38 A

**ABSOLUTE RATINGS** (limiting values) ( $-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +85^{\circ}\text{C}$ )

Symbol	Parameter		Value	Unit
$I_{\text{pp}}$	Peak pulse current	10/1000 $\mu\text{s}$ 5/320 $\mu\text{s}$ 2/10 $\mu\text{s}$	30 40 75	A
$I_{\text{TSM}}$	Non repetitive surge peak on-state current	$t_p = 10 \text{ ms}$ $t_p = 1 \text{ s}$	5 3.5	A
$di/dt$	Critical rate of rise of on-state current	Non repetitive	100	A/ $\mu\text{s}$
$dv/dt$	Critical rate of rise of off-state voltage	67% $V_{\text{BR}}$	5	KV/ $\mu\text{s}$
$T_{\text{stg}}$ $T_j$	Storage and operating junction temperature range		- 40 to + 150 + 150	$^{\circ}\text{C}$ $^{\circ}\text{C}$

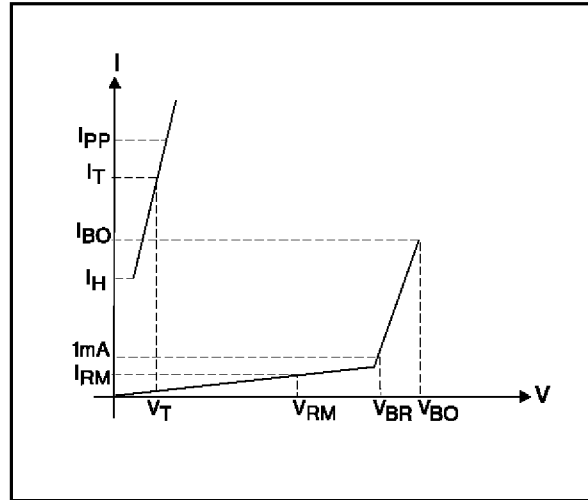


**THERMAL RESISTANCES**

Symbol	Parameter		Value	Unit
$R_{\text{th}} (j-a)$	Junction-to-ambient	DIL 8 SO 8	125 171	$^{\circ}\text{C}/\text{W}$ $^{\circ}\text{C}/\text{W}$

**ELECTRICAL CHARACTERISTICS**

Symbol	Parameter
V <sub>RM</sub>	Stand-off voltage
V <sub>BR</sub>	Breakdown voltage
V <sub>BO</sub>	Breakover voltage
I <sub>H</sub>	Holding current
V <sub>T</sub>	On-state voltage @ I <sub>T</sub>
I <sub>BO</sub>	Breakover current
I <sub>PP</sub>	Peak pulse current
V <sub>G</sub>	Gate voltage
I <sub>G</sub>	Firing gate current



**OPERATION WITHOUT GATE ( 0°C ≤ T<sub>amb</sub> ≤ 70°C)**

TYPE	I <sub>RM</sub> @ V <sub>RM</sub>		V <sub>BR</sub> @ I <sub>R</sub>		V <sub>BO</sub>	@	I <sub>BO</sub>	I <sub>H</sub>	V <sub>T</sub>	C
	max		min		max	min	max	min	max	max
	μA	V	V	mA	V	mA	mA	mA	V	pF
TPP250	6	60	250	1	340	15	200	180	5	100

**OPERATION WITH GATE ( T<sub>amb</sub> = 25°C)**

Types	V <sub>GN</sub> @ I <sub>GN</sub> = 30 mA		I <sub>G</sub>	
	min	max	min	max
	note 4		V <sub>A</sub> - C = 100 V	
	V	V	mA	mA
TPP250	1.05	1.35	5	40

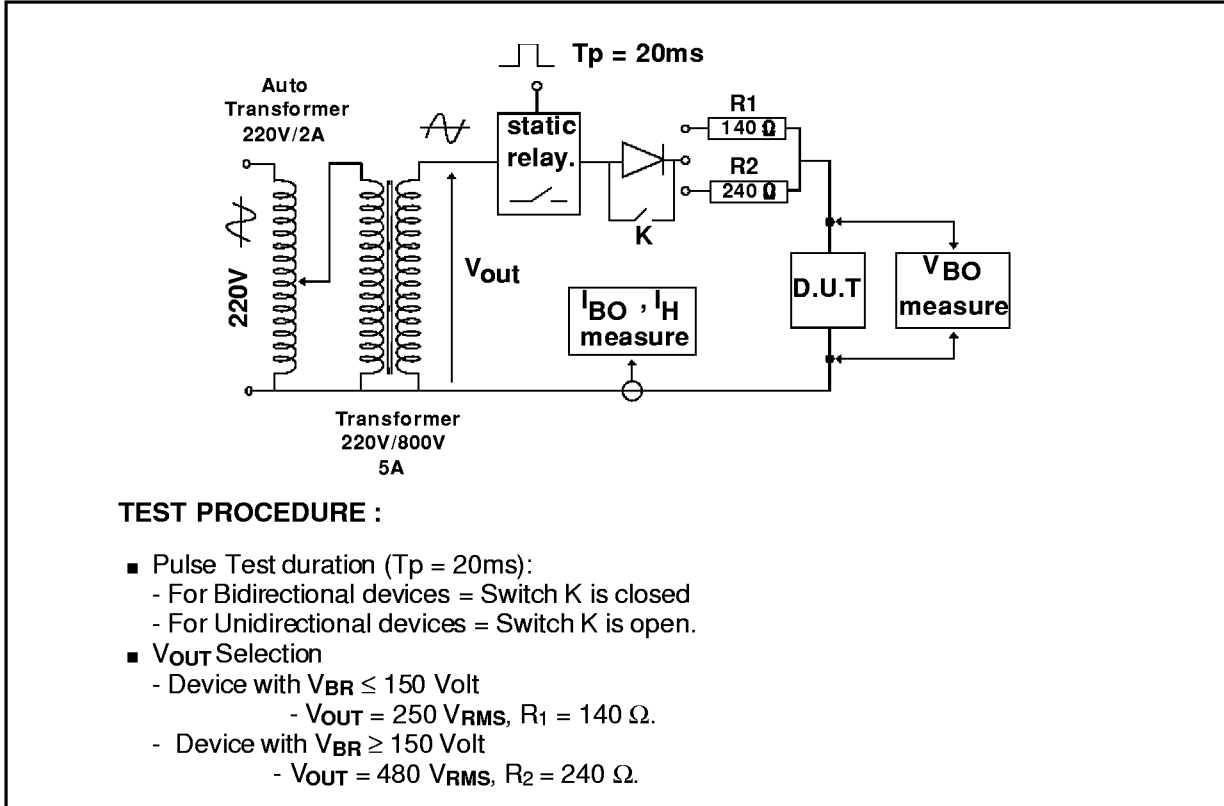
**Note 1 :** See the reference test circuit for I<sub>H</sub>, I<sub>BO</sub> and V<sub>BO</sub> parameters.

**Note 2 :** Square pulse T<sub>P</sub> = 500μs - I<sub>T</sub> = 1A.

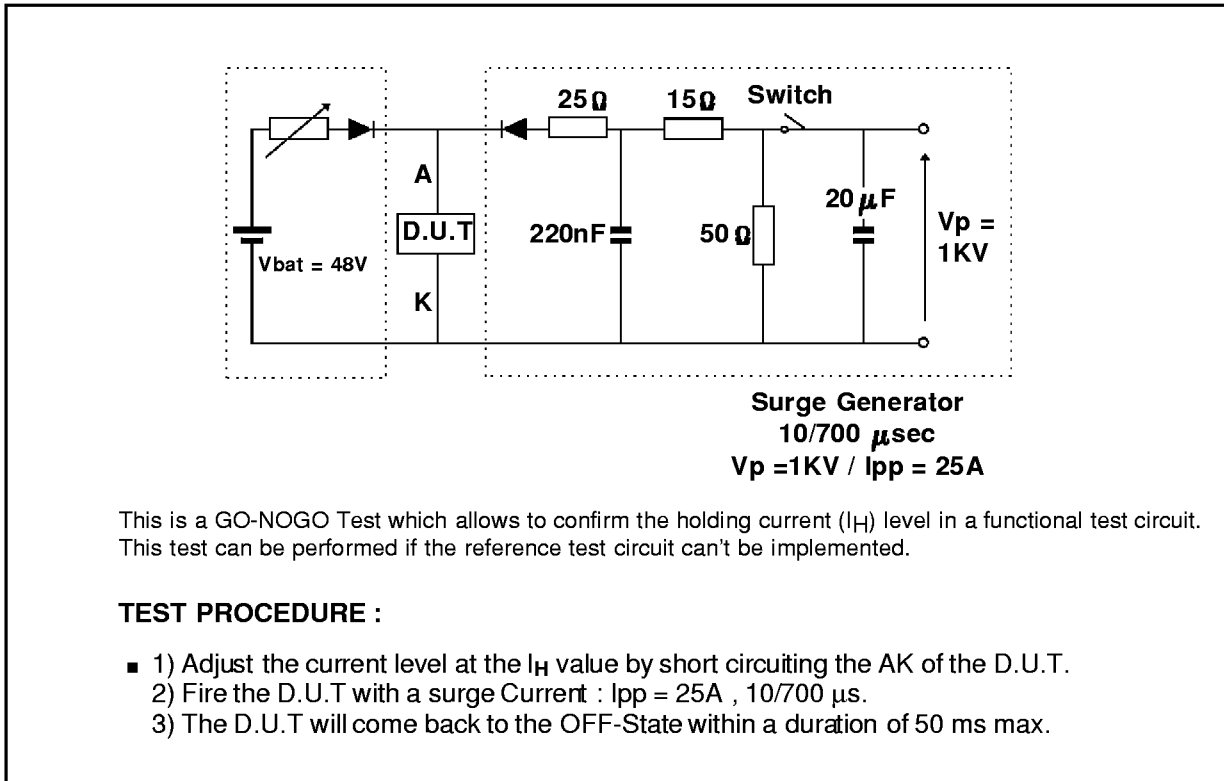
**Note 3 :** V<sub>R</sub> = 5 V, F = 1MHz.

**Note 4 :** V<sub>GN</sub> limits are given at the typical I<sub>GN</sub> value.

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



FUNCTIONAL HOLDING CURRENT ( $I_H$ ) TEST CIRCUIT = GO - NOGO TEST.



**APPLICATION CIRCUIT**

**Overvoltage protection and current limitation**

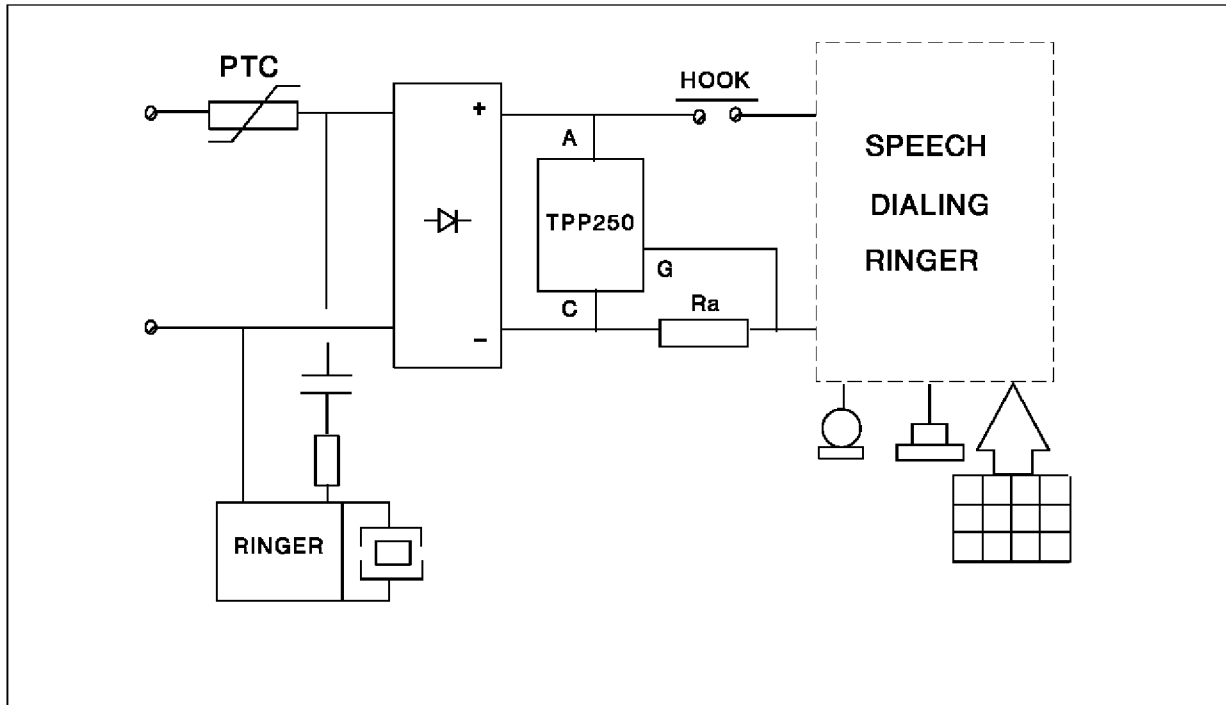
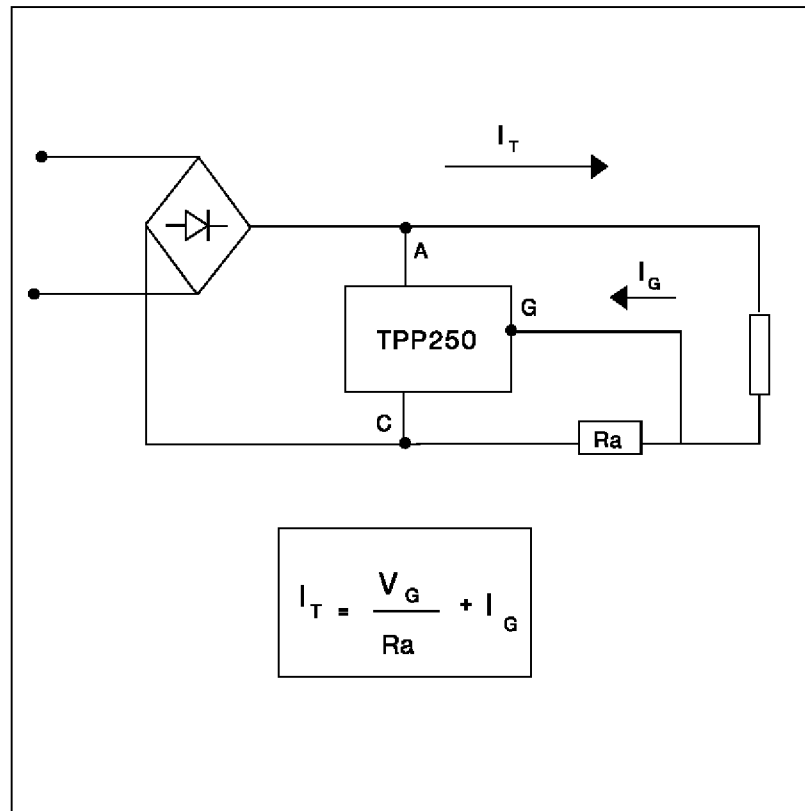
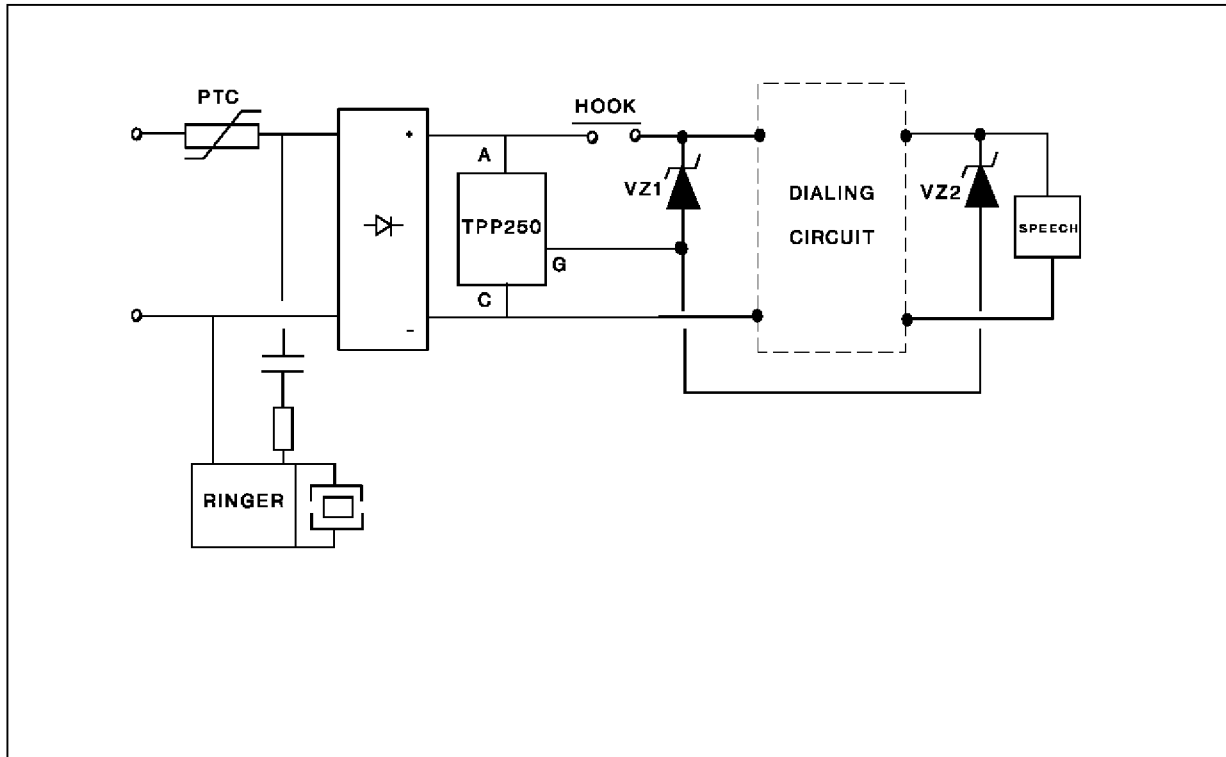


Table below gives the tolerance of the limited current  $I_T$  for each standardized resistor value.

CURRENT TOLERANCE		
R Ω ( ± 5%)	$I_T$ mA min	$I_T$ mA max
3.00	338	514
3.30	308	471
3.60	283	435
3.90	261	404
4.30	238	370
4.70	218	342
5.10	201	319
5.60	184	294
6.20	166	269
6.80	152	249
7.50	138	229
8.20	127	213
9.10	115	196
10.10	104	181
11.00	96	169
12.00	88	158
13.00	82	149
15.00	72	135
16.00	68	129
18.00	61	119
20.00	55	111
22.00	50	105
24.00	47	99
27.00	42	93
30.00	38	87



Ground key telephone set protection

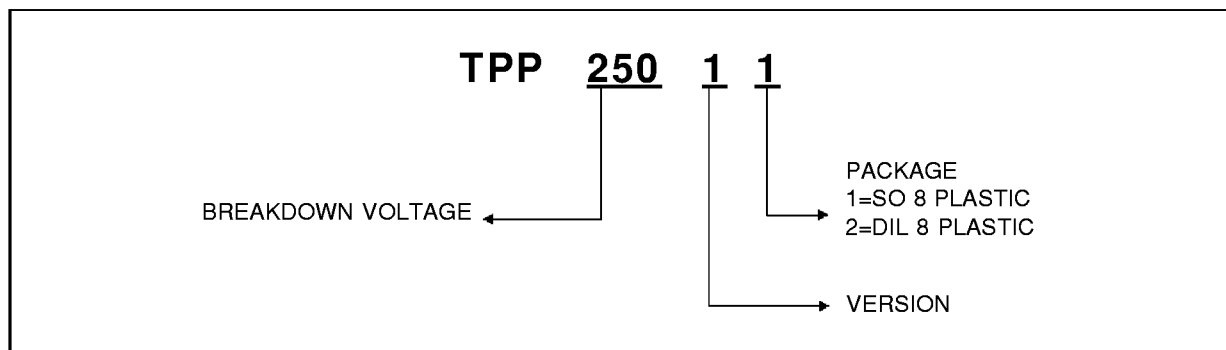


**PROTECTION MODES :**

**OFF HOOK** = Ringer circuit protection is insured with breakdown voltage at 250 V.

**ON HOOK** = In dialing mode and in conversation mode, the breakdown voltage of TPP250 can be adapted at different levels with two zener diodes.

**ORDER CODE**

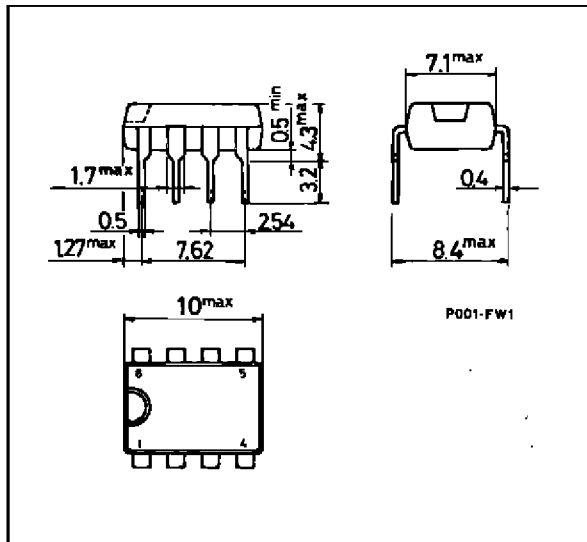


**MARKING**

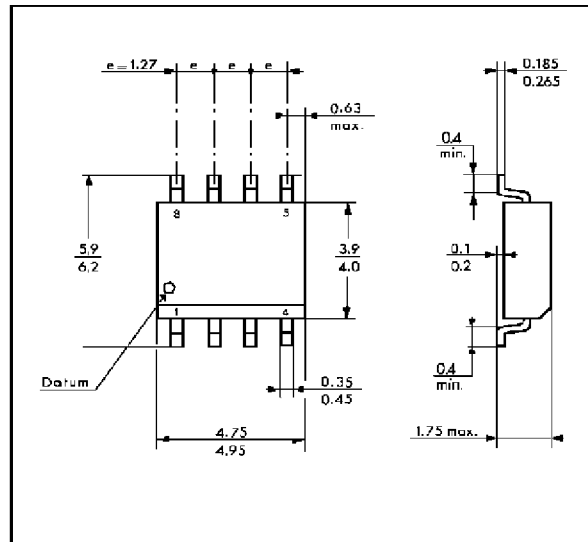
Package	Type	Marking
SO 8 DIL 8	TPP25011 TPP25012	TPP250 TPP250

**PACKAGE MECHANICAL DATA** (in millimeters)

DIL 8 Plastic

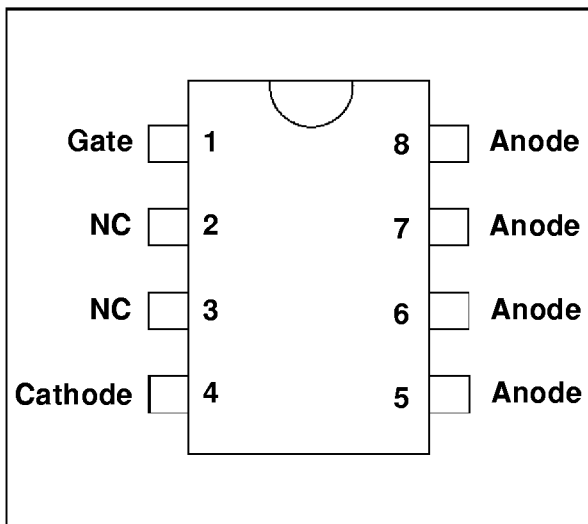


SO 8 Plastic

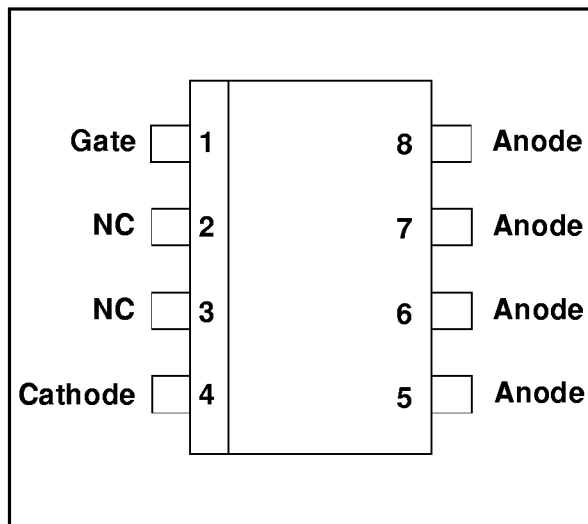


**CONNECTION DIAGRAM**

DIL 8 Plastic



SO 8 Plastic



**Packaging** : Products supplied in antistatic tubes.

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

Purchase of I<sup>2</sup>C Components by SGS-THOMSON Microelectronics, conveys a licence under the Philips I<sup>2</sup>C Patent. Rights to use these components in an I<sup>2</sup>C system, is granted provided that the system conforms to the I<sup>2</sup>C Standard Specification as defined by Philips.

SGS-THOMSON Microelectronics GROUP OF COMPANIES  
Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -  
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A