



TISP8250D

## UNIDIRECTIONAL P-GATE THYRISTOR OVERVOLTAGE AND OVERCURRENT PROTECTOR

### TISP8250D Overvoltage and Overcurrent Protector

Telecommunication System 30 A 10/1000 Protector

Ion-Implanted Breakdown Region  
- Precise and Stable Voltage

Device Name	$V_{DRM}$ V	$V_{(BO)}$ V
TISP8250D	250	340

Rated for International Surge Wave Shapes

Wave Shape	Standard	$I_{PPSM}$ A
2/10	GR-1089-CORE	75
0.5/700	CNET I 31-24	40
10/700	ITU-T K.20/21	40
10/1000	GR-1089-CORE	30

Functional Replacement for TPP25011



..... UL Recognized Component

#### Description

The TISP8250D is a P-gate reverse-blocking thyristor (SCR) designed for the protection of telecommunications equipment against overvoltages and overcurrents on the telephone line caused by lightning, a.c. power contact and induction. The fixed voltage and current triggered modes make the TISP8250D particularly suitable for the protection of ungrounded customer premise equipment. Connected across the d.c. side of a telephone set polarity bridge, in fixed voltage mode these devices can protect the ringer in the on-hook condition. In an off-hook condition, either the fixed voltage or current triggered modes can protect the following telephone electronics.

Without external gate activation, the TISP8250D is a fixed voltage protector. The maximum working voltage without clipping is 250 V and the protection voltage is 340 V. Lower values of protection voltage may be set by connecting an avalanche breakdown diode of less than 250 V between the TISP8250D gate and anode (see Figure 2.)

By connecting a small value resistor in series with the line conductor and connecting the TISP8250D gate cathode terminals in parallel with the resistor, conductor overcurrents can gate trigger the TISP8250D into conduction.

Overvoltages are initially clipped by breakdown clamping until the voltage rises to the breakover level, which causes the device to crowbar into a low-voltage on state. Overcurrents develop sufficient voltage across the external gate-cathode resistor to trigger the device into a low-voltage on state. This low-voltage on state causes the current resulting from the overstress to be safely diverted through the device. The high crowbar holding current helps prevent d.c. latchup as the diverted current subsides.

#### Additional Information

Click these links for more information:



[PRODUCT  
SELECTOR](#)



[TECHNICAL  
LIBRARY](#)



[INVENTORY](#)



[SAMPLES](#)

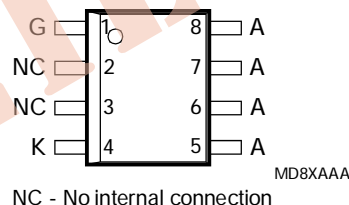


[CONTACT](#)

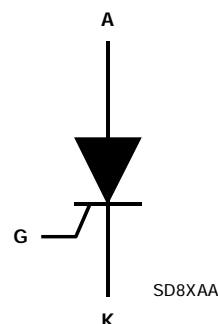
#### Agency Recognition

Description	
UL	File Number: <a href="#">E215609</a>

#### 8-SOIC Package (Top View)



#### Device Symbol



**BOURNS®**

**Asia-Pacific:** Tel: +886-2 2562-4117

Email: [asiacus@bourns.com](mailto:asiacus@bourns.com)

**EMEA:** Tel: +36 88 885 877

Email: [eurocus@bourns.com](mailto:eurocus@bourns.com)

**The Americas:** Tel: +1-951 781-5500

Email: [americus@bourns.com](mailto:americus@bourns.com)

[www.bourns.com](http://www.bourns.com)



**WARNING Cancer and Reproductive Harm**  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

JULY 2000 – REVISED APRIL 2023

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

# TISP8250D Overvoltage and Overcurrent Protector **BOURNS®**

## How To Order

Device	Package	Carrier	Order As	Marking Code	Standard Quantity
TISP8250D	8-SOIC	Embossed Tape Reeled	TISP8250DR-S	8250	2500

## Absolute Maximum Ratings, $T_A = 25\text{ }^{\circ}\text{C}$ (Unless Otherwise Noted)

Rating	Symbol	Value	Unit
Repetitive peak off-state voltage (see Note 1)	$V_{\text{DRM}}$	250	V
Non-repetitive peak impulse current (see Notes 2, 3 and 4) 2/10 $\mu\text{s}$ (Telcordia GR-1089-CORE, 2/10 $\mu\text{s}$ waveshape) 0.2/310 (CNET I 31-24, 0.5/700 $\mu\text{s}$ waveshape) 5/310 $\mu\text{s}$ (ITU-T K.20/21, 10/700 $\mu\text{s}$ voltage waveshape) 5/310 $\mu\text{s}$ (FTZ R12, 10/700 $\mu\text{s}$ voltage waveshape) 10/1000 $\mu\text{s}$ (Telcordia GR-1089-CORE, 10/1000 $\mu\text{s}$ voltage waveshape)	$I_{\text{PPSM}}$	75 40 40 40 30	A
Non-repetitive peak on-state current, 50 Hz (see Notes 2, 3 and 4) 10 ms half sine wave 1s rectified sine wave 1000 s rectified sine wave	$I_{\text{TSM}}$	5 3.5 0.7	A
Junction temperature	$T_J$	-40 to +150	$^{\circ}\text{C}$
Storage temperature range	$T_{\text{stg}}$	-65 to +150	$^{\circ}\text{C}$

- NOTES: 1. For voltage values at lower temperatures, derate at 0.13 %/ $^{\circ}\text{C}$ .  
2. Initially the device must be in thermal equilibrium, with  $T_J = 25\text{ }^{\circ}\text{C}$ .  
3. The surge may be repeated after the device returns to its initial conditions.  
4. EIA/JESD51-2 environment and EIA/JESD51-3 PCB with standard footprint dimensions connected with 5 A printed wiring track widths. Derate current values at -0.61 %/ $^{\circ}\text{C}$  for ambient temperatures above 25  $^{\circ}\text{C}$ .

## Electrical Characteristics, $T_A = 25\text{ }^{\circ}\text{C}$ (Unless Otherwise Noted)

Parameter	Test Conditions	Min	Typ	Max	Unit
$I_{\text{DRM}}$ Repetitive peak off-state current	$V_D = V_{\text{DRM}}$ $T_A = 25\text{ }^{\circ}\text{C}$ $T_A = 85\text{ }^{\circ}\text{C}$			5 10	$\mu\text{A}$
$V_{(\text{BO})}$ Breakover voltage	$dv/dt = 250\text{ V/ms}$ , $R_{\text{SOURCE}} = 300\text{ }\Omega$			340	V
$I_{(\text{BO})}$ Breakover current	$dv/dt = 250\text{ V/ms}$ , $R_{\text{SOURCE}} = 300\text{ }\Omega$	15		200	mA
$I_H$ Holding current	$I_T = 5\text{ A}$ , $di/dt = -30\text{ mA/ms}$	180			mA
$V_{\text{GK}}$ Gate-cathode voltage	$I_G = 30\text{ mA}$	0.6		1.2	V
$I_{\text{GT}}$ Gate trigger current	$V_{\text{AK}} = 100\text{ V}$			40	mA
$I_D$ Off-state current	$V_D = 60\text{ V}$			5	$\mu\text{A}$
$C_O$ Off-state capacitance	$f = 1\text{ MHz}$ , $V_d = 1\text{ V rms}$ , $V_D = 5\text{ V}$			100	pF

## Thermal Characteristics, $T_A = 25\text{ }^{\circ}\text{C}$ (Unless Otherwise Noted)

Parameter	Test Conditions	Min	Typ	Max	Unit
$R_{\theta\text{JA}}$ Junction to ambient thermal resistance	EIA/JESD51-3 PCB, $I_T = I_{\text{TSM}(1000)}$ (see Note 5)			170	$^{\circ}\text{C/W}$

- NOTE 5. EIA/JESD51-2 environment and PCB has standard footprint dimensions connected with 5A rated printed wiring track widths.

JULY 2000 – REVISED APRIL 2023

Specifications are subject to change without notice.

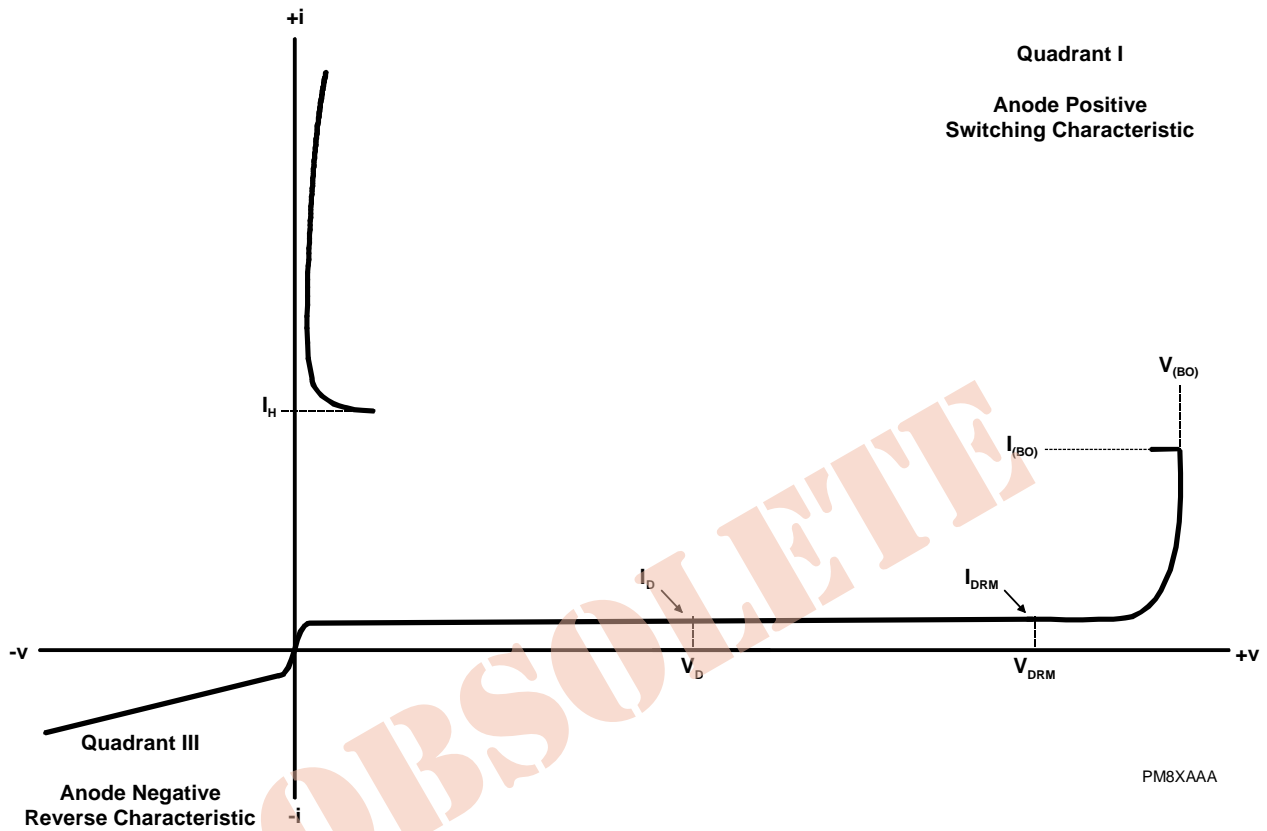
Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

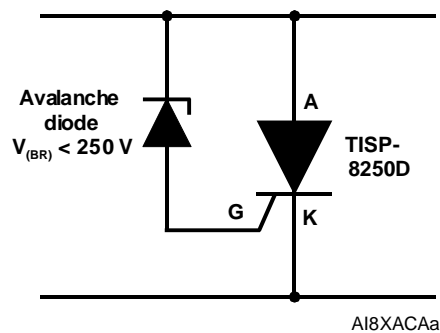
# TISP8250D Overvoltage and Overcurrent Protector

**BOURNS®**

## Parameter Measurement Information



**Figure 1. Voltage-Current Characteristic for A and K Terminals**  
All Measurements are Referenced to the K Terminal



**Figure 2. Overvoltage Protection Circuit**

"TISP" is a trademark of Bourns, Ltd., a Bourns Company, and is Registered in the U.S. Patent and Trademark Office.  
"Bourns" is a registered trademark of Bourns, Inc. in the U.S. and other countries.

JULY 2000 – REVISED APRIL 2023

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, "Bourns").

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain types of applications are based on Bourns' knowledge of typical requirements in generic applications. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Users should always verify the actual performance of the Bourns® product in their specific devices and applications, and make their own independent judgments regarding the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., ISO/TS 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification. Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in nuclear, lifesaving, life-critical or life-sustaining applications, nor in any other applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage. Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any Bourns® products in such unauthorized applications might not be safe and thus is at the user's sole risk. Life-critical applications include devices identified by the U.S. Food and Drug Administration as Class III devices and generally equivalent classifications outside of the United States.

Bourns expressly identifies those Bourns® standard products that are suitable for use in automotive applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard products in an automotive application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk. If Bourns expressly identifies a sub-category of automotive application in the data sheet for its standard products (such as infotainment or lighting), such identification means that Bourns has reviewed its standard product and has determined that if such Bourns® standard product is considered for potential use in automotive applications, it should only be used in such sub-category of automotive applications. Any reference to Bourns® standard product in the data sheet as compliant with the AEC-Q standard or "automotive grade" does not by itself mean that Bourns has approved such product for use in an automotive application.

Bourns® standard products are not tested to comply with United States Federal Aviation Administration standards generally or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aircraft or space applications. Bourns expressly identifies Bourns® standard products that are suitable for use in aircraft or space applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard product in an aircraft or space application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

Users shall not sell, transfer, export or re-export any Bourns® products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology in any facility which engages in activities relating to such devices. The foregoing restrictions apply to all uses and applications that violate national or international prohibitions, including embargos or international regulations. Further, Bourns® products and Bourns technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products may not, without prior authorization from Bourns and/or the U.S. Government, be resold, transferred, or re-exported to any party not eligible to receive U.S. commodities, software, and technical data.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties, including implied warranties of fitness for particular purpose, non-infringement and merchantability.

*For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:*

*Web Page:* <http://www.bourns.com/legal/disclaimers-terms-and-policies>

*PDF:* <http://www.bourns.com/docs/Legal/disclaimer.pdf>