

BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTORS



TISP4310T3BJ Overvoltage Protector

Industry-Leading V_{DRM} to $V_{(BO)}$ Ratio

Modem Protection Against:

- TIA-968-A Type A & B Surge
- UL 60950, Clause 6. Power Cross
- CSA 22.2 No. 60950, Clause 6. Power Cross

Ion-Implanted Breakdown Region

- Precise and Stable Voltage

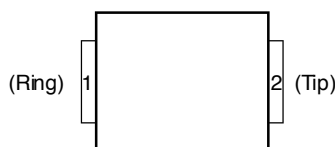
Low Voltage Overshoot Under Surge

Device Name	V_{DRM} V	$V_{(BO)}$ V
TISP4310T3BJ	269	310

Rated for International Surge Wave Shapes

Wave Shape	Standard	I_{PPSM} A
10/160 μ s	TIA-968-A	150
10/700 μ s	ITU-T K.20/21/45	120
9/720 μ s	TIA-968-A	120
10/560 μ s	TIA-968-A	100
10/1000 μ s	GR-1089-CORE	80

SMB Package (Top View)



Terminal typical application names shown in parenthesis

MD-SMB-007-a

Device Symbol

(Ring)



(Tip)

SD-TISP4-001-a

Additional Information

Click these links for more information:



[PRODUCT SELECTOR](#) [TECHNICAL LIBRARY](#) [INVENTORY](#) [SAMPLES](#) [CONTACT](#)

Agency Recognition

Description	
UL	File Number: E215609



..... UL Recognized Component

How to Order

Device	Package	Carrier	Order As	Marking Code	Standard Quantity
TISP4310T3BJ	SMB	Embossed Tape Reeled	TISP4310T3BJR-S	4310T3	3000

Description

This device is designed to limit overvoltages on the telephone line. Overvoltages are normally caused by a.c. power system or lightning flash disturbances which are induced or conducted on to the telephone line. A single device provides 2-point protection and is typically used for the protection of 2-wire telecommunication equipment (e.g. between the Ring and Tip wires for telephones and modems). Combinations of devices can be used for multi-point protection (e.g. 3-point protection between Ring, Tip and Ground).

The device consists of a symmetrical voltage-triggered bidirectional thyristor. Overvoltages are initially clipped by breakdown clamping. If sufficient current is available from the overvoltage, the breakdown voltage will rise to the breakover level, which causes the device to switch into a low-voltage on-state condition. This switching action removes the high-voltage stress from the following circuitry and causes the current resulting from the overvoltage to be safely diverted through the device. The high holding (switch off) current helps prevent d.c. latchup as the diverted current subsides. This device is designed to voltage limit and withstand the listed lightning surges in both polarities.



WARNING Cancer and Reproductive Harm
www.P65Warnings.ca.gov

JUNE 2007 – REVISED JULY 2019

*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.

TISP4310T3BJ Overvoltage Protector

BOURNS®

Description (Continued)

After a TIA-968-A Type A surge, the equipment can be faulty, provided that the fault mode causes the equipment to be unusable. There are two wave shapes used: 10/160 for longitudinal surges and 10/560 for metallic surges. For modems with a TISP4310T3BJ connected between the Ring and Tip wires (and without overvoltage protection to ground), the longitudinal 10/160 surge applied to both Ring and Tip will not activate the TISP4310T3BJ, giving an operational pass. The metallic 10/560 surge is applied between Ring and Tip wires and will operate the TISP4310T3BJ. As the TISP4310T3BJ has a current rating of 100 A 10/560, it will survive the TIA-968-A Type A 100 A 10/560 metallic surge, giving an operational pass.

After a TIA-968-A Type B surge, the equipment must be operational. The 9/720 wave shape is used for both longitudinal surges and metallic surges. For modems with a TISP4310T3BJ connected between the Ring and Tip wires (and without overvoltage protection to ground), the longitudinal 9/720 surge applied to both Ring and Tip will not activate the TISP4310T3BJ, giving an operational pass. The metallic 9/720 surge is applied between Ring and Tip wires and will operate the TISP4310T3BJ. As the TISP4310T3BJ has a current rating of 120 A 9/720, it will survive the TIA-968-A Type B 25 A 9/720 metallic surge, giving an operational pass.

The TIA-968-A B-type ringer has voltages of 56.5 V d.c. and up to 150 V rms a.c., giving a peak voltage of 269 V. The TISP4310T3BJ will not clip the B-type ringing voltage, as it has a high impedance up to 269 V.

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_{DRM}	± 269	V
Non-repetitive peak impulse current (see Notes 1 and 2) 10/160 μs (TIA-968-A, 10/160 μs voltage wave shape) 5/310 μs (ITU-T K.44, 10/700 μs voltage wave shape used in K.20/21/45) 5/320 μs (TIA-968-A, 9/720 μs voltage wave shape) 10/560 μs (TIA-968-A, 10/560 μs voltage wave shape) 10/1000 μs (GR-1089-CORE, 10/1000 μs voltage wave shape)	I_{PPSM}	± 150 ± 120 ± 120 ± 100 ± 80	A
Non-repetitive peak on-state current (see Notes 1, 2 and 3) 20 ms, 50 Hz (full sine wave) 16.7 ms, 60 Hz (full sine wave) 1000 s, 50 Hz or 60 Hz a.c.	I_{TSM}	25 30 2.1	A
Initial rate of rise of on-state current, exponential current ramp. Maximum ramp value < 50 A	di_T/dt	500	A/ μs
Junction temperature	T_J	-40 to +150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-65 to +150	$^\circ\text{C}$

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

Recommended Operating Conditions

Component		Min	Typ	Max	Unit
R_S	Series resistor for TIA-968-A, 10/160 type A surge survival (T-G or R-G connection)	2.5			Ω
	Series resistor for TIA-968-A, 10/560 type A surge survival	0			
	Series resistor for TIA-968-A, 9/720 type B surge survival	0			
	Series resistor for GR-1089-CORE first-level surge survival	5			
	Series resistor for K.20, K.21 and K.45 1.5 kV, 10/700 surge survival	0			
	Series resistor for K.20, K.21 and K.45 co-ordination with a 400 V primary protector	6			

JUNE 2007 – REVISED JULY 2019

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.

TISP4310T3BJ Overvoltage Protector

BOURNS®

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

Parameter		Test Conditions	Min	Typ	Max	Unit
I_{DRM}	Repetitive peak off-state current	$V_D = V_{DRM}$ $T_A = 25\text{ °C}$ $T_A = 85\text{ °C}$			± 5 ± 10	μA
$V_{(BO)}$	Breakover voltage	$dv/dt = \pm 250\text{ V/ms}$, $R_{SOURCE} = 300\ \Omega$			± 310	V
$I_{(BO)}$	Breakover current	$dv/dt = \pm 250\text{ V/ms}$, $R_{SOURCE} = 300\ \Omega$			± 800	mA
V_T	On-state voltage	$I_T = \pm 5\text{ A}$, $t_w = 100\ \mu s$			± 3	V
I_H	Holding current	$I_T = \pm 5\text{ A}$, $di/dt = \pm 30\text{ mA/ms}$	± 150			mA
dv/dt	Critical rate of rise of off-state voltage	Linear voltage ramp Maximum ramp value $< 0.85V_{DRM}$	± 5			kV/ μs
C_O	Off-state capacitance	$f = 1\text{ MHz}$, $V_d = 1\text{ V rms}$ $V_D = 0$ $V_D = -1\text{ V}$ $V_D = -2\text{ V}$ $V_D = -50\text{ V}$ $V_D = -100\text{ V}$		54 48 43 20 16	65 58 52 24 19	pF

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

Parameter		Test Conditions	Min	Typ	Max	Unit
$R_{\theta JA}$	Junction to ambient thermal resistance	EIA/JESD51-3 PCB, $I_T = I_{TSM(1000)}$ (see Note 4)			115	$^{\circ}C/W$
		265 mm x 210 mm populated line card, 4-layer PCB, $I_T = I_{TSM(1000)}$		52		

NOTE: 4. EIA/JESD51-2 environment and PCB has standard footprint dimensions connected with 5 A rated printed wiring track widths.

JUNE 2007 – REVISED JULY 2019

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.

Parameter Measurement Information

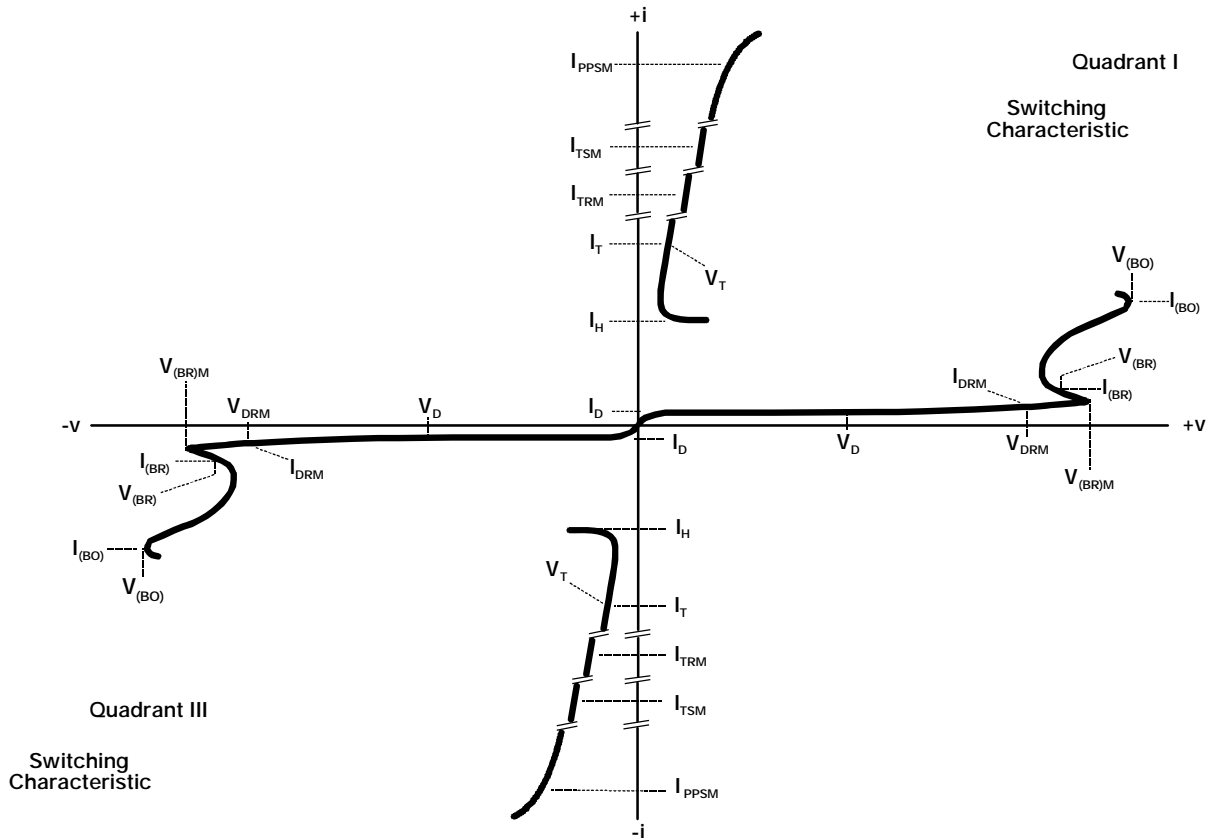


Figure 1. Voltage-Current Characteristic for the Ring and Tip Terminals
All Measurements are Referenced to the Ring Terminal

BOURNS®

Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

EMEA: Tel: +36 88 885 877 • Email: eurocus@bourns.com

The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com

www.bourns.com

"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.

JUNE 2007 – REVISED JULY 2019

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.

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>

单击下面可查看定价，库存，交付和生命周期等信息

[>>Bourns\(伯恩斯\)](#)