



# TISP4070J3BJ THRU TISP4395J3BJ

## BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTORS

### TISP4xxxJ3BJ Overvoltage Protector Series

**Ion-Implanted Breakdown Region**  
- Precise and Stable Voltage

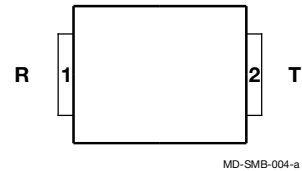
**Low Voltage Overshoot Under Surge**

**Designed for Transformer Center Tap (Ground Return) Overvoltage Protection**  
- Enables GR-1089-CORE Compliance  
- High Holding Current Allows Protection of Data Lines with d.c Power Feed

**Can be Used to Protect Rugged Modems Designed for Exposed Applications Exceeding TIA-968-A**

| Device Name  | V <sub>DRM</sub><br>V | V <sub>(BO)</sub><br>V |
|--------------|-----------------------|------------------------|
| TISP4070J3BJ | 58                    | 70                     |
| TISP4080J3BJ | 65                    | 80                     |
| TISP4095J3BJ | 75                    | 95                     |
| TISP4115J3BJ | 90                    | 115                    |
| TISP4125J3BJ | 100                   | 125                    |
| TISP4145J3BJ | 120                   | 145                    |
| TISP4165J3BJ | 135                   | 165                    |
| TISP4180J3BJ | 145                   | 180                    |
| TISP4200J3BJ | 155                   | 200                    |
| TISP4219J3BJ | 180                   | 219                    |
| TISP4250J3BJ | 190                   | 250                    |
| TISP4290J3BJ | 220                   | 290                    |
| TISP4350J3BJ | 275                   | 350                    |
| TISP4395H3BJ | 320                   | 395                    |

#### SMB Package (Top View)



#### Device Symbol



#### Rated for International Surge Wave Shapes

| Wave Shape | Standard         | I <sub>PPSM</sub><br>A |
|------------|------------------|------------------------|
| 2/10       | GR-1089-CORE     | 1000                   |
| 8/20       | IEC 61000-4-5    | 800                    |
| 10/160     | TIA-968-A        | 400                    |
| 10/700     | ITU-T K.20/21/45 | 350                    |
| 10/560     | TIA-968-A        | 250                    |
| 10/1000    | GR-1089-CORE     | 200                    |

**UL Recognized Component**

#### Description

The range of TISP4xxxJ3BJ devices is designed to limit overvoltages on telecom lines. The TISP4xxxJ3BJ is primarily designed to address GR-1089-CORE compliance on data transmission lines with d.c. power feeding. When overvoltage protection is applied to transformer coupled lines from the transformer center tap to ground, the total ground return current can be 200 A, 10/1000 and 1000 A, 2/10. The high 150 mA holding current is set above common d.c. feed system levels to allow the TISP4xxxJ3BJ to reset following a disturbance.

These devices allow signal voltages, without clipping, up to the maximum off-state voltage value, V<sub>DRM</sub>, see Figure 1. Voltages above V<sub>DRM</sub> are limited and will not exceed the breakover voltage, V<sub>(BO)</sub>, level. If sufficient current flows due to the overvoltage, the device switches into a low voltage on-state condition, which diverts the current from the overvoltage through the device. When the diverted current falls below the holding current, I<sub>H</sub>, level the devices switches off and restores normal system operation.

#### How to Order

| Device       | Package | Carrier              | Order As        | Marking Code | Standard Quantity |
|--------------|---------|----------------------|-----------------|--------------|-------------------|
| TISP4xxxJ3BJ | SMB     | Embossed Tape Reeled | TISP4xxxJ3BJR-S | 4xxxJ3       | 3000              |

Insert xxx corresponding to device name.

\*RoHS Directive 2002/95/EC Jan 27 2003 including Annex  
JULY 2003 – REVISED MAY 2007  
Specifications are subject to change without notice.  
Customers should verify actual device performance in their specific applications.

# TISP4xxxJ3BJ Overvoltage Protector Series

# BOURNS®

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

| Rating  | Symbol     | Value   | Unit             |
|---|------------|---|------------------|
| Repetitive peak off-state voltage   | '4070J3BJ  | ±58   | V                |
|   | '4080J3BJ  | ±65   |                  |
|   | '4095J3BJ  | ±75   |                  |
|   | '4115J3BJ  | ±90   |                  |
|   | '4125J3BJ  | ±100  |                  |
|   | '4145J3BJ  | ±120  |                  |
|   | '4165J3BJ  | ±135  |                  |
|   | '4180J3BJ  | ±145  |                  |
|   | '4200J3BJ  | ±155  |                  |
|   | '4219J3BJ  | ±180  |                  |
|   | '4250J3BJ  | ±190  |                  |
|   | '4290J3BJ  | ±220  |                  |
|   | '4350J3BJ  | ±275  |                  |
|   | '4395J3BJ  | ±320  |                  |
| Non-repetitive peak impulse current (see Notes 1 and 2)<br>2/10 $\mu\text{s}$ (GR-1089-CORE, 2/10 $\mu\text{s}$ voltage wave shape)<br>8/20 $\mu\text{s}$ (IEC 61000-4-5, combination wave generator, 1.2/50 $\mu\text{s}$ voltage wave shape)<br>10/160 $\mu\text{s}$ (TIA-968-A, 10/160 $\mu\text{s}$ voltage wave shape)<br>4/250 $\mu\text{s}$ (ITU-T K.20/21, 10/700 $\mu\text{s}$ voltage waveshape, simultaneous)<br>5/310 $\mu\text{s}$ (ITU-T K.20/21, 10/700 $\mu\text{s}$ voltage wave shape, single)<br>5/320 $\mu\text{s}$ (TIA-968-A, 9/720 $\mu\text{s}$ voltage waveshape, single)<br>10/560 $\mu\text{s}$ (TIA-968-A, 10/560 $\mu\text{s}$ voltage wave shape)<br>10/1000 $\mu\text{s}$ (GR-1089-CORE, 10/1000 $\mu\text{s}$ voltage wave shape) | $I_{PPSM}$ | ±1000<br>±800<br>±400<br>±370<br>±350<br>±350<br>±250<br>±200 | A                |
| Non-repetitive peak on-state current (see Notes 1 and 2)<br>20 ms, 50 Hz (full sine wave)   | $I_{TSM}$  | 50  | A                |
| Initial rate of rise of on-state current. Linear current ramp. Maximum ramp value < 50 A  | $di_T/dt$  | 800   | A/ $\mu\text{s}$ |
| 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. These non-repetitive rated currents are peak values of either polarity. The surge may be repeated after the device returns to its initial conditions.

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

| Parameter                                   | Test Conditions   | Min | Typ | Max   | Unit          |
|---|---|-----|-----|---|---------------|
| $I_{DRM}$ Repetitive peak off-state current | $V_D = V_{DRM}$<br>$T_A = 25\text{ }^\circ\text{C}$<br>$T_A = 85\text{ }^\circ\text{C}$ |     |     | ±5<br>±10   | $\mu\text{A}$ |
| $V_{(BO)}$ AC Breakover voltage             | $dv/dt = \pm 250\text{ V/ms}$ , $R_{SOURCE} = 300\ \Omega$                              |     |     | ±70<br>±80<br>±95<br>±115<br>±125<br>±145<br>±165<br>±180<br>±200<br>±219<br>±250<br>±290<br>±350<br>±395 | V             |

JULY 2003 – REVISED MAY 2007

Specifications are subject to change without notice.  
Customers should verify actual device performance in their specific applications.

# TISP4xxxJ3BJ Overvoltage Protector Series

**BOURNS®**

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

| Parameter   | Test Conditions  | Min       | Typ | Max  | Unit                                |                   |     |
|---|--|-----------|-----|--|-------------------------------------|-------------------|-----|
| $V_{(BO)}$ Ramp breakover voltage   | dv/dt $\leq$ $\pm 1000\text{ V}/\mu\text{s}$ , Linear voltage ramp,<br>Maximum ramp value = $\pm 500\text{ V}$<br>di/dt = $\pm 20\text{ A}/\mu\text{s}$ , Linear current ramp,<br>Maximum ramp value = $\pm 10\text{ A}$ |           |     | '4070J3BJ  | $\pm 77$                            |                   |     |
|   |  |           |     | '4080J3BJ  | $\pm 88$                            |                   |     |
|   |  |           |     | '4095J3BJ  | $\pm 104$                           |                   |     |
|   |  |           |     | '4115J3BJ  | $\pm 125$                           |                   |     |
|   |  |           |     | '4125J3BJ  | $\pm 135$                           |                   |     |
|   |  |           |     | '4145J3BJ  | $\pm 156$                           |                   |     |
|   |  |           |     | '4165J3BJ  | $\pm 177$                           |                   |     |
|   |  |           |     | '4180J3BJ  | $\pm 192$                           |                   |     |
|   |  |           |     | '4200J3BJ  | $\pm 212$                           |                   |     |
|   |  |           |     | '4219J3BJ  | $\pm 231$                           |                   |     |
|   |  |           |     | '4250J3BJ  | $\pm 263$                           |                   |     |
|   |  |           |     | '4290J3BJ  | $\pm 303$                           |                   |     |
| '4350J3BJ   | $\pm 364$  |           |     |  |                                     |                   |     |
| '4395J3BJ   | $\pm 409$  |           |     |  |                                     |                   |     |
| $I_{(BO)}$ Breakover current  | dv/dt = $\pm 250\text{ V}/\text{ms}$ , $R_{SOURCE} = 300\ \Omega$  |           |     | '4070J3BJ thru '4115J3BJ<br>'4125J3BJ thru '4219J3BJ<br>'4250J3BJ thru '4395J3BJ | $\pm 900$<br>$\pm 800$<br>$\pm 600$ | mA                |     |
| $I_H$ Holding current   | $I_T = \pm 5\text{ A}$ , di/dt = $\pm 30\text{ mA}/\text{ms}$  | $\pm 150$ |     |  | $\pm 600$                           | mA                |     |
| dv/dt Critical rate of rise of off-state voltage                          | Linear voltage ramp<br>Maximum ramp value $< 0.85V_{DRM}$  | $\pm 5$   |     |  |                                     | kV/ $\mu\text{s}$ |     |
| $I_D$ Off-state current   | $V_D = \pm 50\text{ V}$  |           |     |  | $\pm 10$                            | $\mu\text{A}$     |     |
| $C_O$ Off-state capacitance   | f = 1 MHz, $V_d = 1\text{ V rms}$ , $V_D = 0$  |           |     | '4070J3BJ thru '4115J3BJ   | 195                                 | 235               |     |
|   |  |           |     | '4125J3BJ thru '4219J3BJ   | 120                                 | 145               |     |
|   |  |           |     | '4250J3BJ thru '4395J3BJ   | 105                                 | 125               |     |
|   | f = 1 MHz, $V_d = 1\text{ V rms}$ , $V_D = -1\text{ V}$  |           |     |  | '4070J3BJ thru '4115J3BJ            | 180               | 215 |
|   |  |           |     |  | '4125J3BJ thru '4219J3BJ            | 110               | 132 |
|   |  |           |     |  | '4250J3BJ thru '4395J3BJ            | 95                | 115 |
|   | f = 1 MHz, $V_d = 1\text{ V rms}$ , $V_D = -2\text{ V}$  |           |     |  | '4070J3BJ thru '4115J3BJ            | 165               | 200 |
|   |  |           |     |  | '4125J3BJ thru '4219J3BJ            | 100               | 120 |
|   |  |           |     |  | '4250J3BJ thru '4395J3BJ            | 90                | 105 |
|   | f = 1 MHz, $V_d = 1\text{ V rms}$ , $V_D = -50\text{ V}$   |           |     |  | '4070J3BJ thru '4115J3BJ            | 85                | 100 |
|   |  |           |     |  | '4125J3BJ thru '4219J3BJ            | 50                | 60  |
|   |  |           |     |  | '4250J3BJ thru '4395J3BJ            | 42                | 50  |
| f = 1 MHz, $V_d = 1\text{ V rms}$ , $V_D = -100\text{ V}$<br>(see Note 3) |  |           |     | '4125J3BJ thru '4219J3BJ   | 40                                  | 50                |     |
|   |  |           |     | '4250J3BJ thru '4395J3BJ   | 35                                  | 40                |     |

NOTE: 3. To avoid possible clipping, the TISP4125J3BJ is tested with  $V_D = -98\text{ V}$ .

## Thermal Characteristics

| Parameter  | Test Conditions   | Min | Typ | Max | Unit                      |
|--|---|-----|-----|-----|---------------------------|
| $R_{\theta JA}$ Junction to ambient thermal resistance | EIA/JESD51-3 PCB, $I_T = I_{TSM(1000)}$<br>(see Note 4) |     |     | 90  | $^\circ\text{C}/\text{W}$ |

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

## Parameter Measurement Information



PM-TISP4xxx-001-a

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

## Typical Characteristics

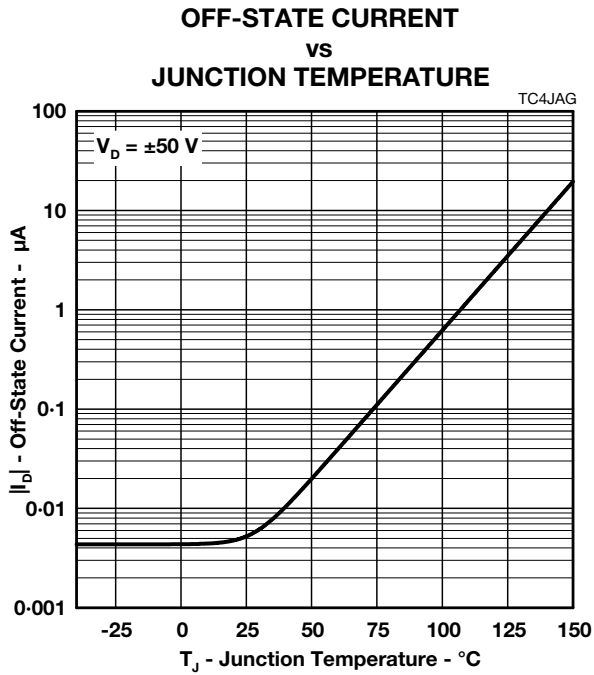


Figure 2.

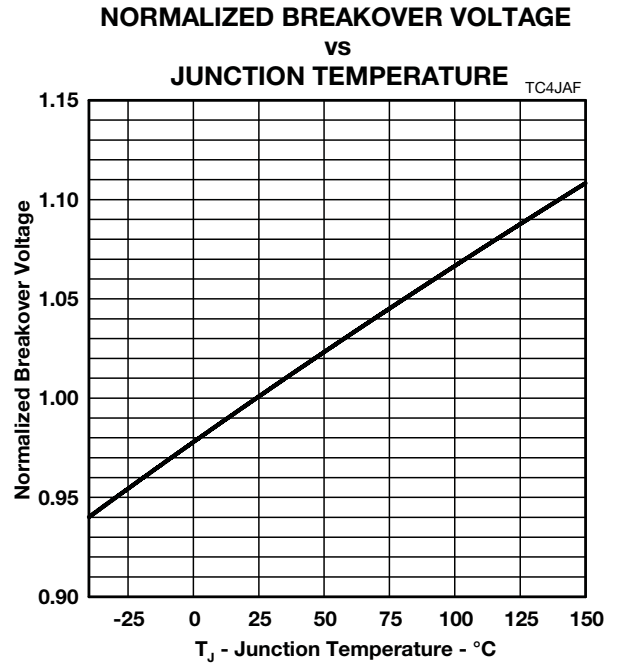


Figure 3.

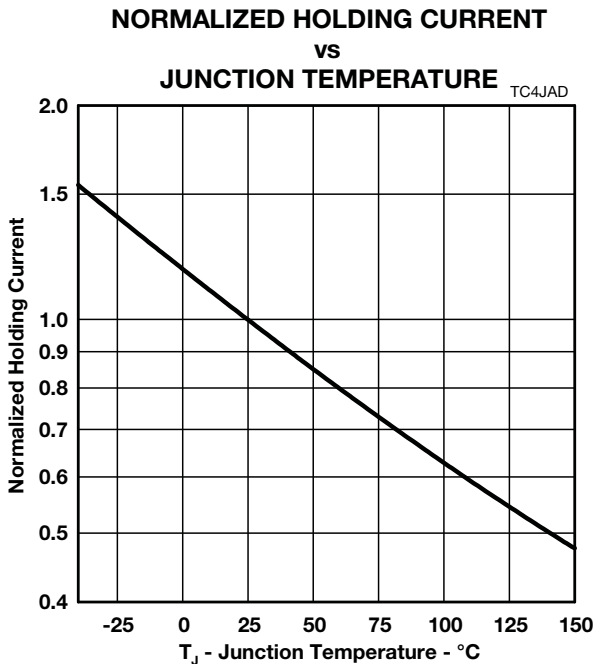


Figure 4.

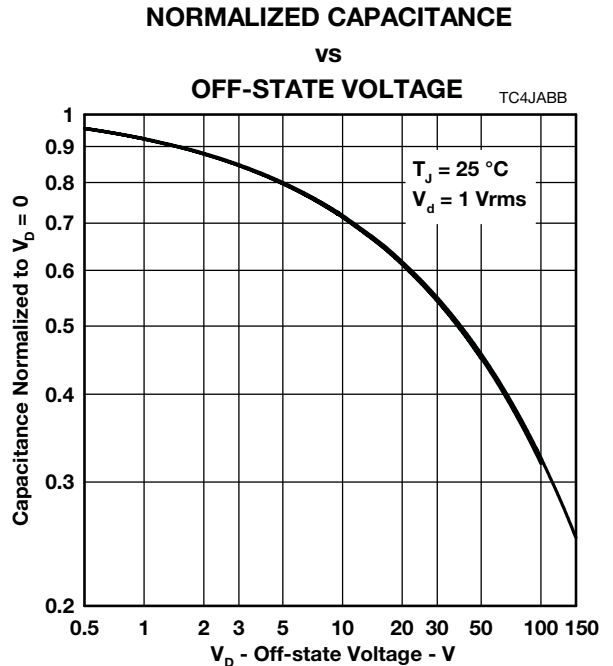


Figure 5.

## Rating and Thermal Information

### NON-REPETITIVE PEAK ON-STATE CURRENT vs CURRENT DURATION



Figure 6.

### $V_{DRM}$ DERATING FACTOR vs MINIMUM AMBIENT TEMPERATURE

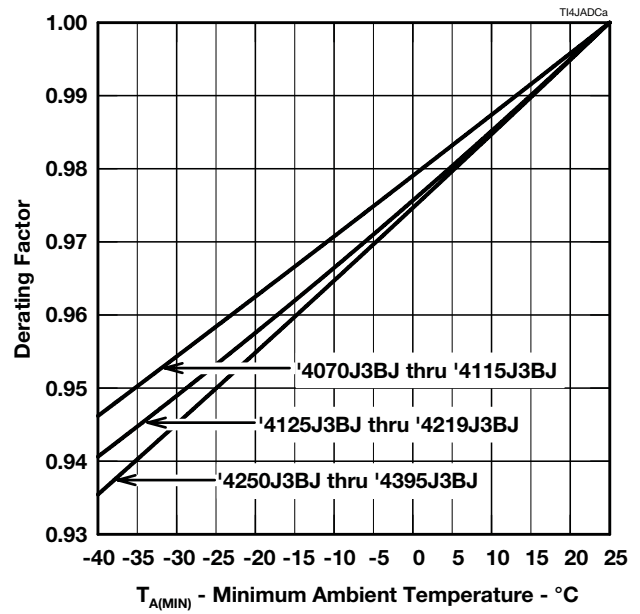


Figure 7.

# TISP4xxxJ3BJ Overvoltage Protector Series

**BOURNS®**

## Applications Information



Figure 8. Typical Application Circuit

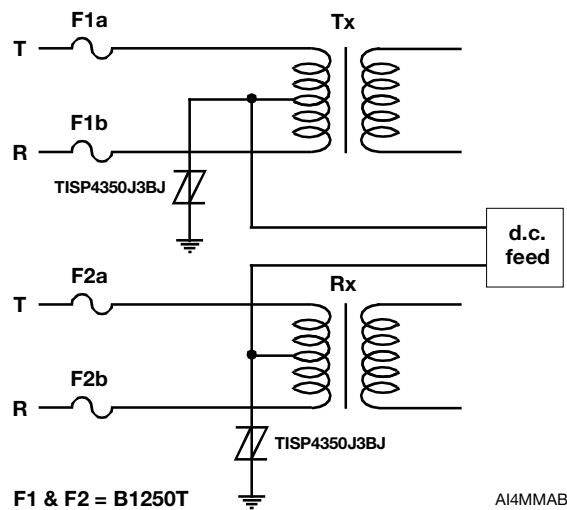


Figure 9. Typical Application Circuit

### **Bourns Sales Offices**

| <u>Region</u> | <u>Phone</u>    | <u>Fax</u>      |
|---------------|-----------------|-----------------|
| The Americas: | +1-951-781-5500 | +1-951-781-5700 |
| Europe:       | +41-41-7685555  | +41-41-7685510  |
| Asia-Pacific: | +886-2-25624117 | +886-2-25624116 |

### **Technical Assistance**

| <u>Region</u> | <u>Phone</u>    | <u>Fax</u>      |
|---------------|-----------------|-----------------|
| The Americas: | +1-951-781-5500 | +1-951-781-5700 |
| Europe:       | +41-41-7685555  | +41-41-7685510  |
| Asia-Pacific: | +886-2-25624117 | +886-2-25624116 |

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

Bourns® products are available through an extensive network of manufacturer's representatives, agents and distributors. To obtain technical applications assistance, a quotation, or to place an order, contact a Bourns representative in your area.



*Reliable Electronic Solutions*

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

JULY 2003 – REVISED MAY 2007  
Specifications are subject to change without notice.  
Customers should verify actual device performance in their specific applications.



## Данный компонент на территории Российской Федерации

### Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9