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_{DRM} V	$V_{(BO)}$ 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

..UL Recognized Component

SMB Package (Top View)

Device Symbol

Rated for International Surge Wave Shapes

Wave Shape	Standard	I_{PPSM} 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

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_{DRM}, see Figure 1. Voltages above V_{DRM} are limited and will not exceed the breakover voltage, $V_{(BO)}$, 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_H, 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

Absolute Maximum Ratings, T_A = 25 °C (Unless Otherwise Noted)

Rating		Symbol	Value	Unit
Repetitive peak off-state voltage	'4070J3BJ	V_{DRM}	±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)		I_{PPSM}		A
2/10 µs (GR-1089-CORE, 2/10 µs voltage wave shape)			±1000	
8/20 µs (IEC 61000-4-5, combination wave generator, 1.2/50 µsvoltage wave shape)			±800	
10/160 µs (TIA-968-A, 10/160 µs voltage wave shape)			±400	
4/250 µs (ITU-T K.20/21, 10/700 µs voltage waveshape, simultaneous)			±370	
5/310 µs (ITU-T K.20/21, 10/700 µs voltage wave shape, single)			±350	
5/320 µs (TIA-968-A, 9/720 µs voltage waveshape, single)			±350	
10/560 µs (TIA-968-A, 10/560 µs voltage wave shape)			±250	
10/1000 µs (GR-1089-CORE, 10/1000 µs voltage wave shape)			±200	
Non-repetitive peak on-state current (see Notes 1 and 2)		I_{TSM}		A
20 ms, 50 Hz (full sine wave)			50	
Initial rate of rise of on-state current. Linear current ramp. Maximum ramp value < 50 A		di_T/dt	800	A/µs
Junction temperature		T_J	-40 to +150	°C
Storage temperature range		T_{stg}	-65 to +150	°C

NOTES: 1. Initially the device must be in thermal equilibrium with T_J = 25 °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 °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 °C			±5	µA
			T_A = 85 °C			±10	
$V_{(BO)}$	AC Breakover voltage	dv/dt = ±250 V/ms, R_{SOURCE} = 300 Ω	'4070J3BJ			±70	V
			'4080J3BJ			±80	
			'4095J3BJ			±95	
			'4115J3BJ			±115	
			'4125J3BJ			±125	
			'4145J3BJ			±145	
			'4165J3BJ			±165	
			'4180J3BJ			±180	
			'4200J3BJ			±200	
			'4219J3BJ			±219	
			'4250J3BJ			±250	
			'4290J3BJ			±290	
			'4350J3BJ			±350	
			'4395J3BJ			±395	

Electrical Characteristics, T_A = 25 °C (Unless Otherwise Noted) (Continued)

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

Thermal Characteristics

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

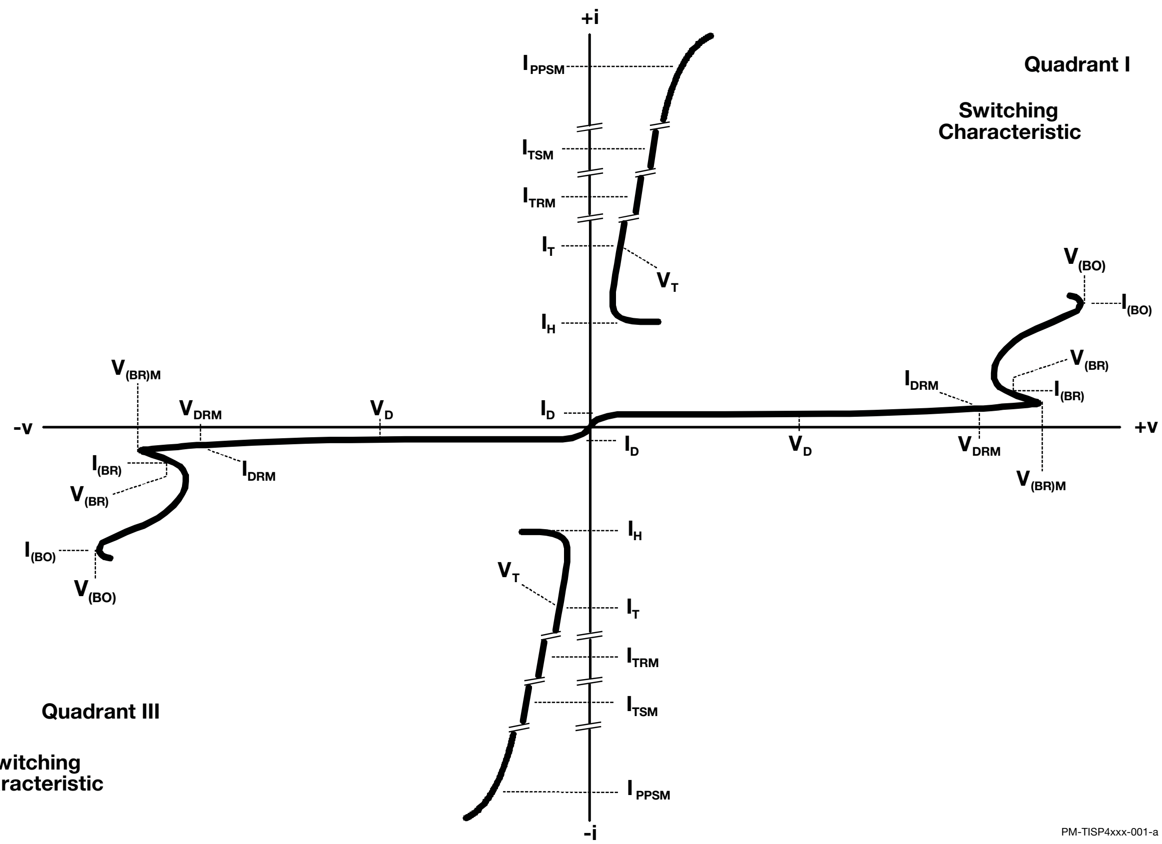

Figure 1. Voltage-Current Characteristic for T and R Terminals
All Measurements are Referenced to the R Terminal

Typical Characteristics

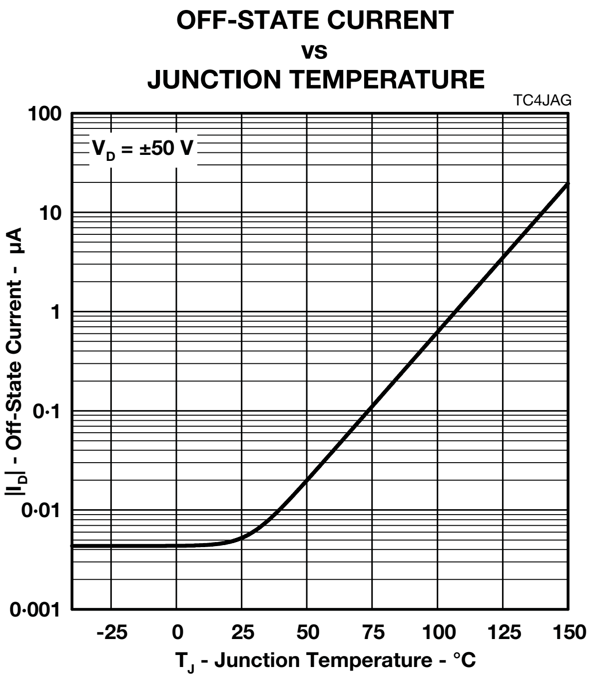

Figure 2.

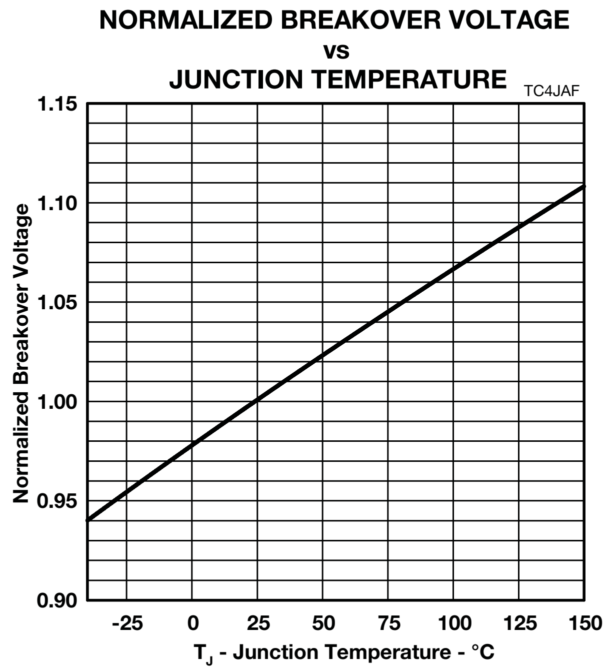

Figure 3.

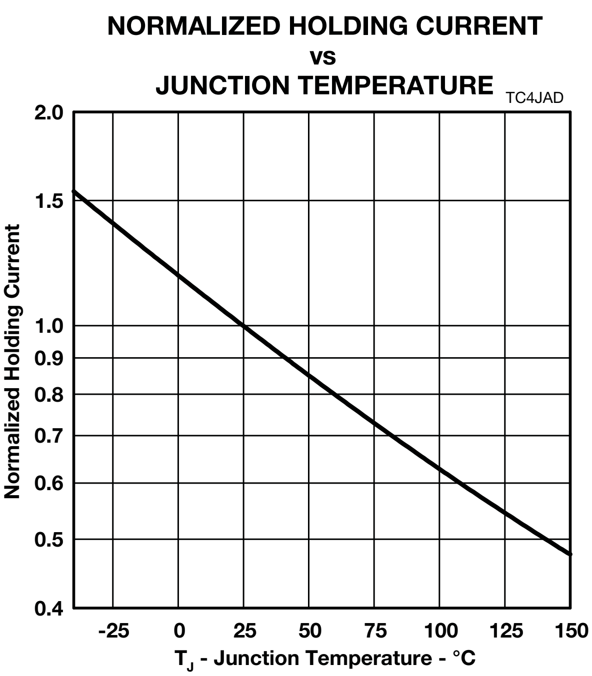

Figure 4.

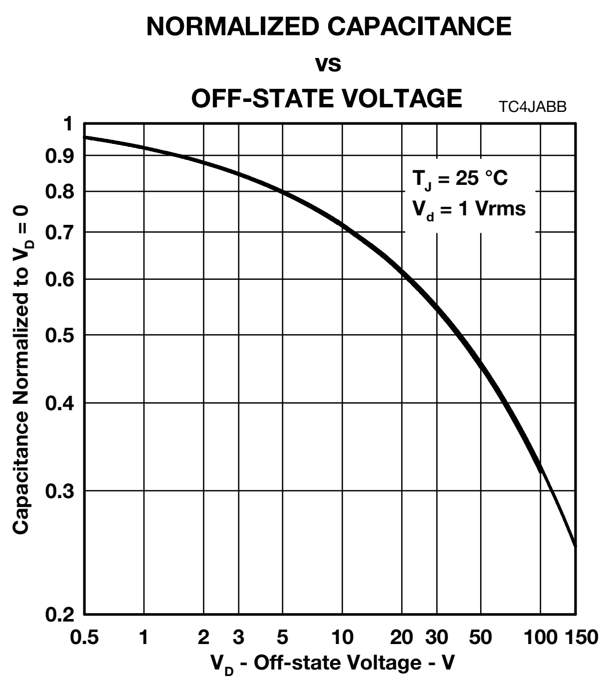

Figure 5.

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

Rating and Thermal Information

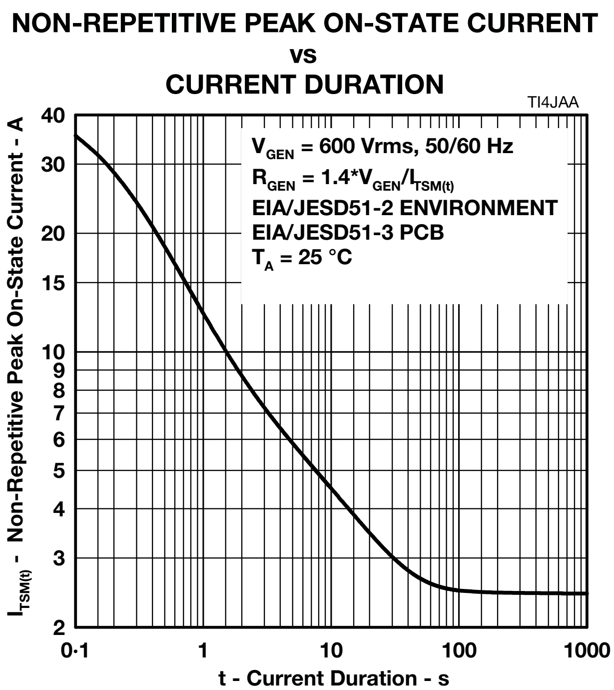

Figure 6.

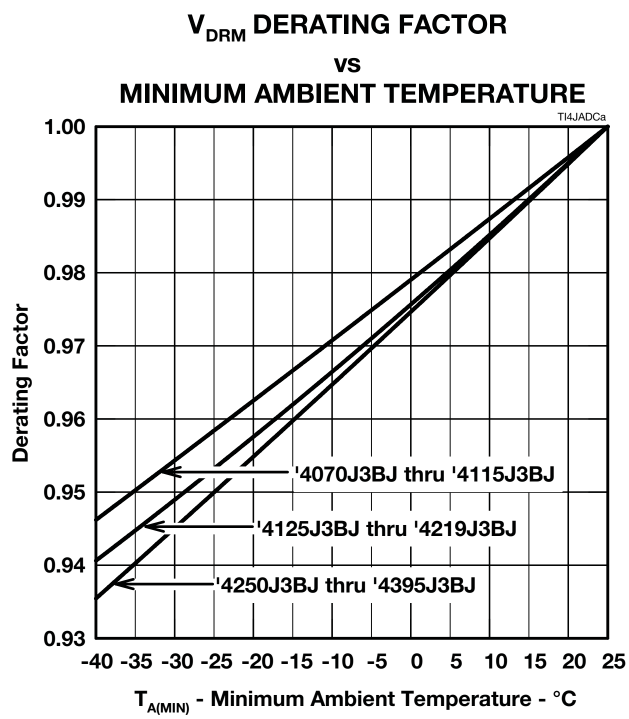

Figure 7.

Applications Information

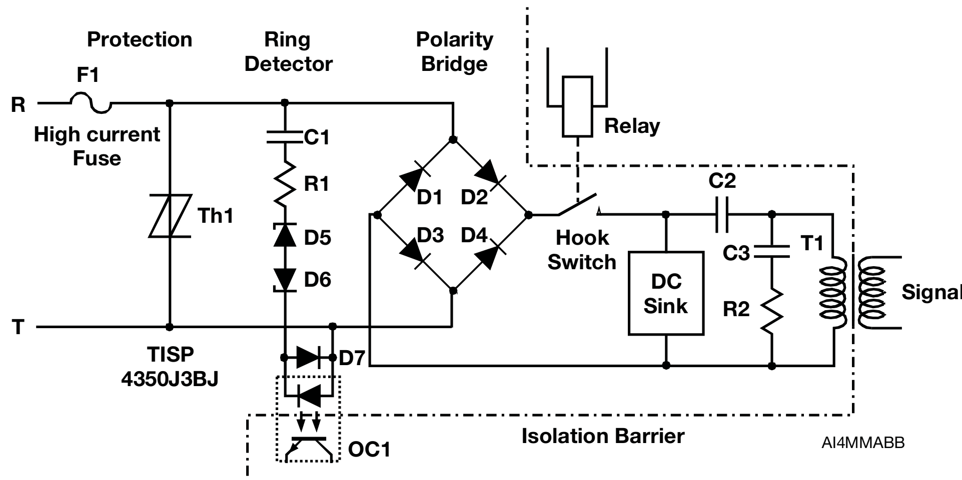

Figure 8. Typical Application Circuit

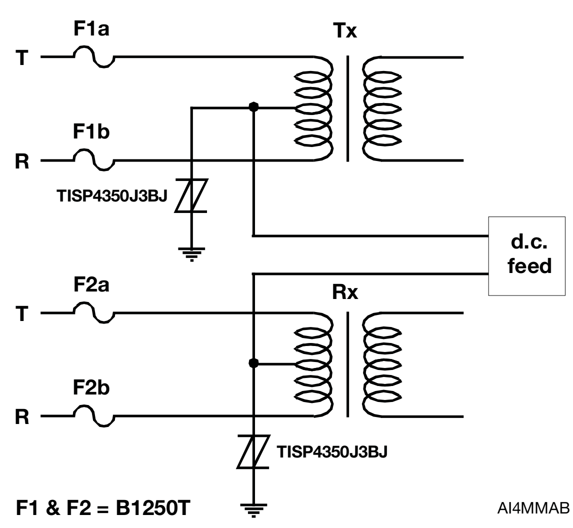

Figure 9. Typical Application Circuit

Bourns Sales Offices

Region	Phone	Fax
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

Region	Phone	Fax
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

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.

BOURNS®

Reliable Electronic Solutions