

# TISP4xxxJ3BJ Overvoltage Protector Series

**BOURNS®**

## Absolute Maximum Ratings, $T_A = 25\text{ °C}$ (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) 2/10 $\mu\text{s}$ (GR-1089-CORE, 2/10 $\mu\text{s}$ voltage wave shape) 8/20 $\mu\text{s}$ (IEC 61000-4-5, combination wave generator, 1.2/50 $\mu\text{s}$ voltage wave shape) 10/160 $\mu\text{s}$ (TIA-968-A, 10/160 $\mu\text{s}$ voltage wave shape) 4/250 $\mu\text{s}$ (ITU-T K.20/21, 10/700 $\mu\text{s}$ voltage waveshape, simultaneous) 5/310 $\mu\text{s}$ (ITU-T K.20/21, 10/700 $\mu\text{s}$ voltage wave shape, single) 5/320 $\mu\text{s}$ (TIA-968-A, 9/720 $\mu\text{s}$ voltage waveshape, single) 10/560 $\mu\text{s}$ (TIA-968-A, 10/560 $\mu\text{s}$ voltage wave shape) 10/1000 $\mu\text{s}$ (GR-1089-CORE, 10/1000 $\mu\text{s}$ voltage wave shape)	$I_{PPSM}$	±1000 ±800 ±400 ±370 ±350 ±350 ±250 ±200	A
Non-repetitive peak on-state current (see Notes 1 and 2) 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	°C
Storage temperature range	$T_{stg}$	-65 to +150	°C

- NOTES: 1. Initially the device must be in thermal equilibrium with  $T_J = 25\text{ °C}$ .  
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, $T_A = 25\text{ °C}$ (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	$\mu\text{A}$
$V_{(BO)}$ AC Breakover voltage	$dv/dt = \pm 250\text{ V/ms}$ , $R_{SOURCE} = 300\ \Omega$			±70 ±80 ±95 ±115 ±125 ±145 ±165 ±180 ±200 ±219 ±250 ±290 ±350 ±395	V

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# TISP4xxxJ3BJ Overvoltage Protector Series

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

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, Maximum ramp value = $\pm 500\text{ V}$ $di/dt = \pm 20\text{ A}/\mu\text{s}$ , Linear current ramp, 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 $\pm 409$	V
$I_{(BO)}$ Breakover current	$dv/dt = \pm 250\text{ V}/\text{ms}$ , $R_{SOURCE} = 300\ \Omega$			'4070J3BJ thru '4115J3BJ $\pm 900$ '4125J3BJ thru '4219J3BJ $\pm 800$ '4250J3BJ thru '4395J3BJ $\pm 600$	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 Maximum ramp value $< 0.85V_{DRM}$	$\pm 5$			kV/ $\mu\text{s}$
$I_D$ Off-state current	$V_D = \pm 50\text{ V}$ $T_A = 85\text{ }^\circ\text{C}$			$\pm 10$	$\mu\text{A}$
$C_O$ Off-state capacitance	$f = 1\text{ MHz}$ , $V_d = 1\text{ V rms}$ , $V_D = 0$		195	235	pF
			120	145	
			105	125	
	$f = 1\text{ MHz}$ , $V_d = 1\text{ V rms}$ , $V_D = -1\text{ V}$		180	215	
			110	132	
			95	115	
	$f = 1\text{ MHz}$ , $V_d = 1\text{ V rms}$ , $V_D = -2\text{ V}$		165	200	
			100	120	
			90	105	
	$f = 1\text{ MHz}$ , $V_d = 1\text{ V rms}$ , $V_D = -50\text{ V}$		85	100	
			50	60	
			42	50	
	$f = 1\text{ MHz}$ , $V_d = 1\text{ V rms}$ , $V_D = -100\text{ V}$ (see Note 3)		40	50	
			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, $I_T = I_{TSM(1000)}$ (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.

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## Parameter Measurement Information

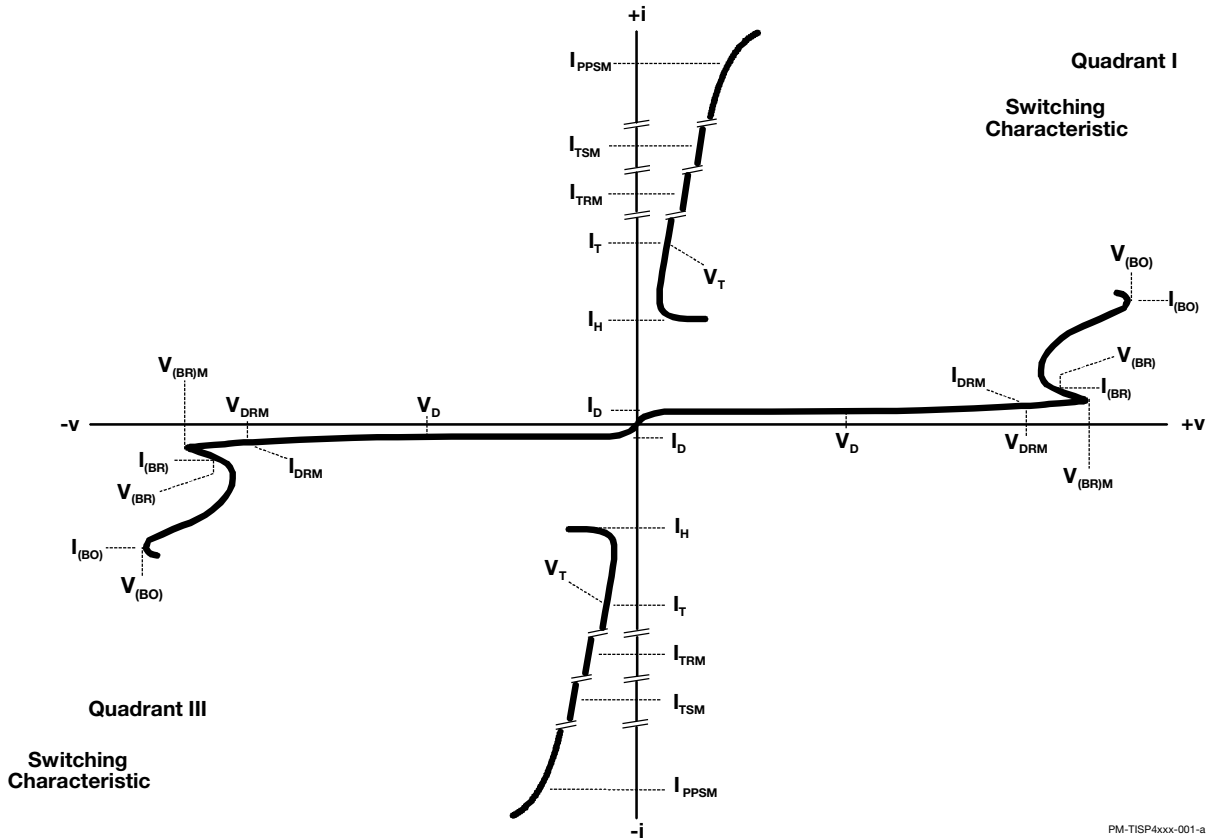


Figure 1. Voltage-Current Characteristic for T and R Terminals  
All Measurements are Referenced to the R Terminal

PM-TISP4xxx-001-a

## Typical Characteristics

**OFF-STATE CURRENT  
VS  
JUNCTION TEMPERATURE**

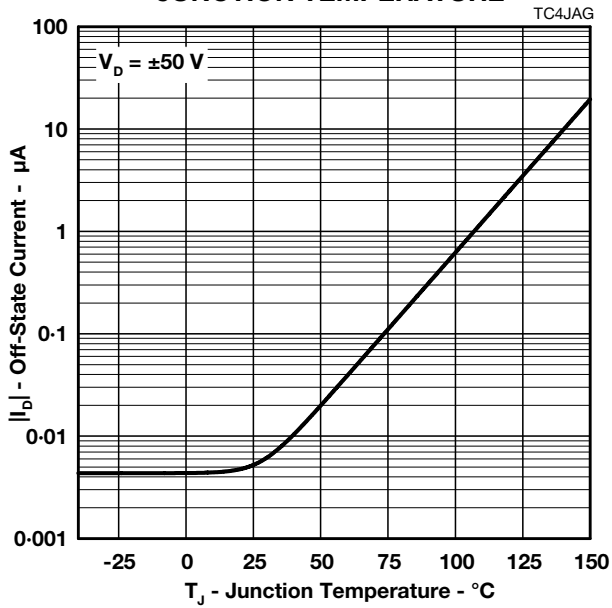


Figure 2.

**NORMALIZED BREAKOVER VOLTAGE  
VS  
JUNCTION TEMPERATURE**

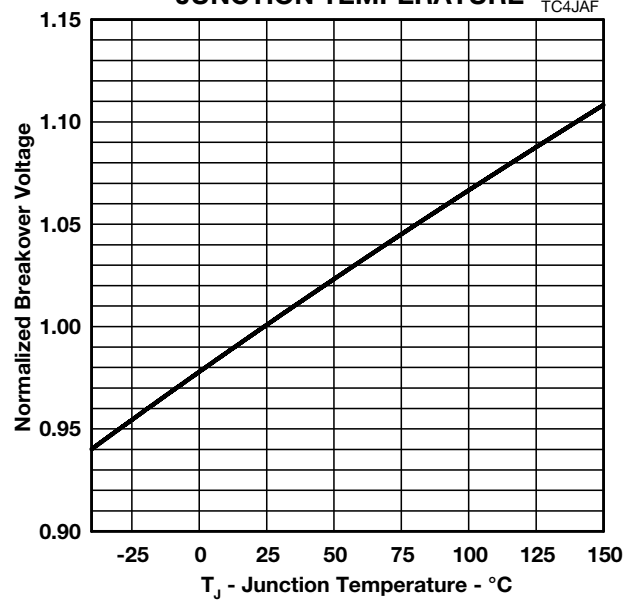


Figure 3.

**NORMALIZED HOLDING CURRENT  
VS  
JUNCTION TEMPERATURE**

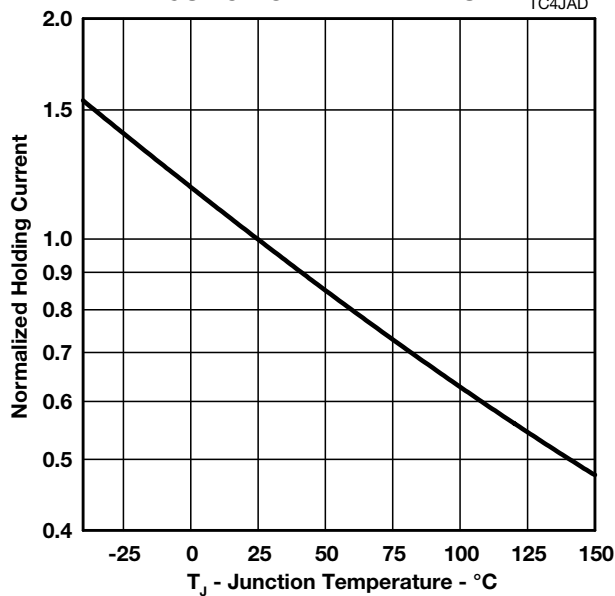


Figure 4.

**NORMALIZED CAPACITANCE  
VS  
OFF-STATE VOLTAGE**

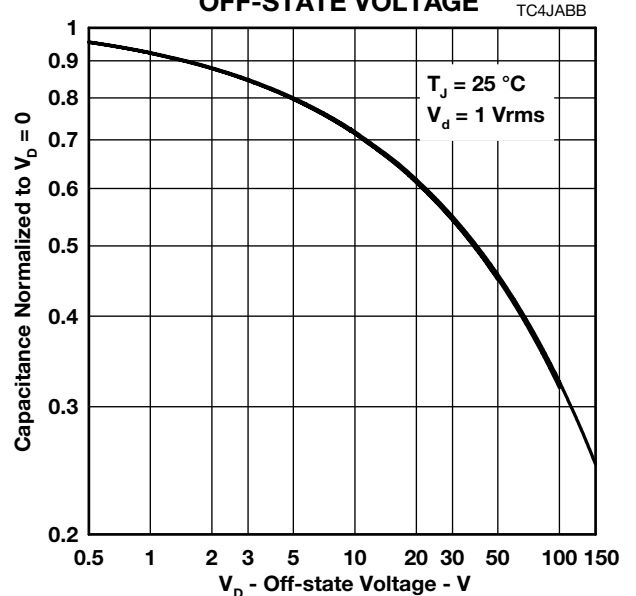


Figure 5.

## Rating and Thermal Characteristics

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

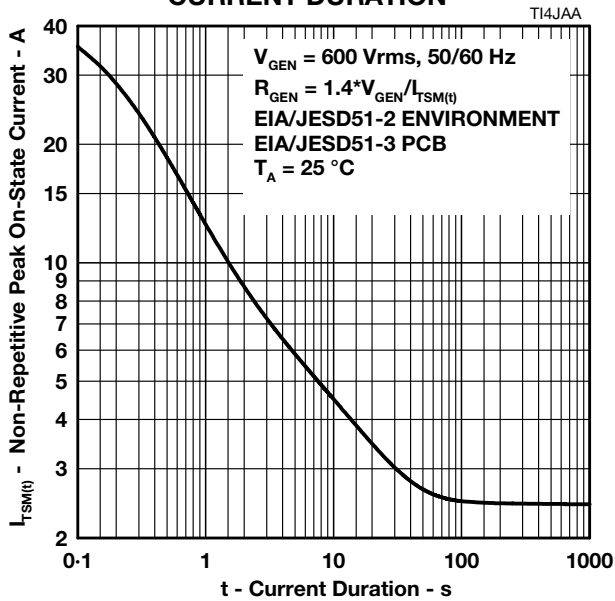


Figure 6.

### V<sub>DRM</sub> DERATING FACTOR VS MINIMUM AMBIENT TEMPERATURE

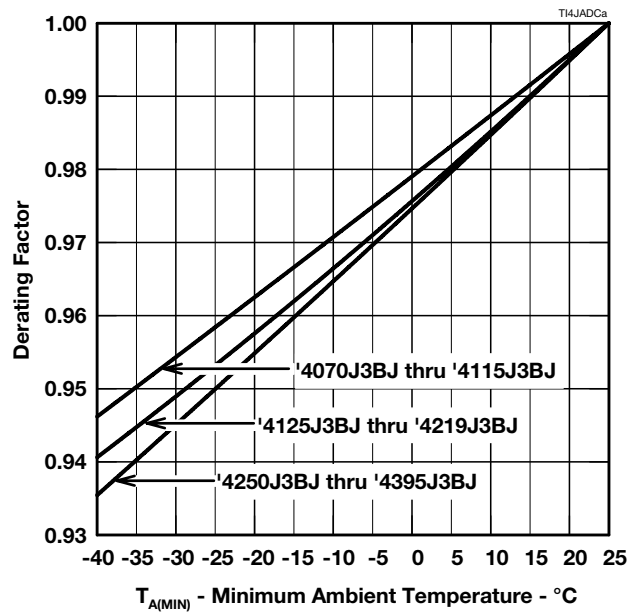


Figure 7.

## Applications Information

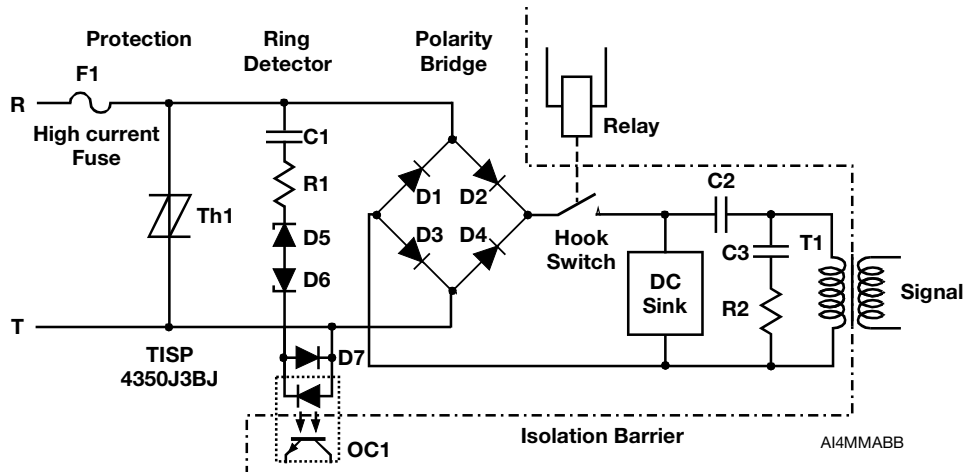


Figure 8. Typical Application Circuit

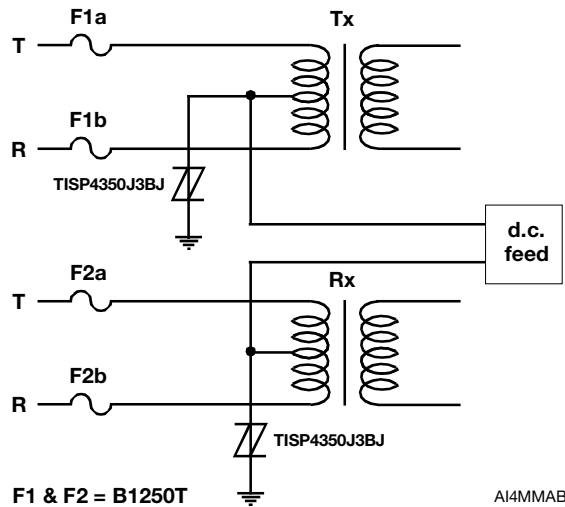


Figure 9. Typical Application Circuit

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