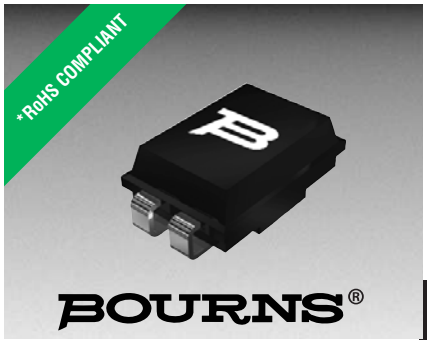


TISP3070T3BJ THRU TISP3395T3BJ

DUAL BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTORS

The TISP3xxxT3BJ series is obsolete and not recommended for new designs.

TISP3xxxT3BJ Overvoltage Protector Series

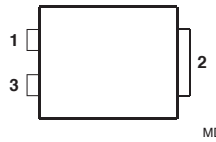
Dual High Current Protectors in a Space Efficient Package
- **2 x 100 A 10/560 Current Rating**
- **Modified 3-pin SMB (DO-214AA) Package**
  50 % Space Saving over Two SMBs
- **Y Configurations with Two SMB Packages**
  2 x 80 A, 10/1000 . . . .TISP3xxxT3BJ + TISP4xxxJ1BJ
  2 x 100 A, 10/700 . . . .TISP3xxxT3BJ + TISP4xxxH3BJ

Ion-Implanted Breakdown Region
- **Precise and Stable Voltage**
- **Low Voltage Overshoot under Surge**

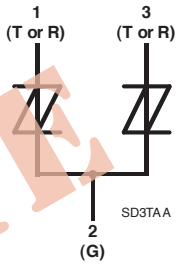
Device	V_{DRM} V	$V_{(BO)}$ V
TISP3070T3	58	70
TISP3080T3	65	80
TISP3095T3	75	95
TISP3115T3	90	115
TISP3125T3	100	125
TISP3145T3	120	145
TISP3165T3	135	165
TISP3180T3	145	180
TISP3200T3	155	200
TISP3219T3	180	219
TISP3250T3	190	250
TISP3290T3	220	290
TISP3350T3	275	350
TISP3395T3	320	395

.....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	250
8/20	IEC 61000-4-5	250
10/160	TIA/EIA-IS-968 (FCC Part 68)	150
10/700	ITU-T K.20/.21/.45	120
10/560	TIA/EIA-IS-968 (FCC Part 68)	100
10/1000	GR-1089-CORE	80

Description

These dual bidirectional thyristor devices protect central office, access and customer premise equipment against overvoltages on the telecom line. The TISP3xxxT3BJ is available in a wide range of voltages and has an 80 A 10/1000 current rating. These protectors have been specified mindful of the following standards and recommendations: GR-1089-CORE, TIA/EIA-IS-968, UL 60950, EN 60950, IEC 60950, ITU-T K.20, K.21 and K.45. The TISP3350T3BJ meets the FCC Part 68 “B” ringer voltage requirement (V_{DRM} = ±275 V). Housed in a 3-pin modified SMB (DO-214AA) package, the TISP3xxxT3BJ range is space efficient solution for protection designs of 80 A or less which use multiple SMBs.

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 device switches off and restores normal system operation.

How To Order

Device	Package	Carrier	Order As
TISP3xxxT3BJ	BJ (3-pin modified SMB/DO-214AA J-Bend)	R (Embossed Tape Reeled)	TISP3xxxT3BJR-S

Insert xxx value corresponding to protection voltages of 070, 080, 095, 115, etc.

*RoHS Directive 2002/95/EC Jan 27 2003 including Annex
SEPTEMBER 2001 - REVISED MAY 2011
Specifications are subject to change without notice.
Customers should verify actual device performance in their specific applications.

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

Rating		Symbol	Value	Unit
Repetitive peak off-state voltage, (terminals 1-2 and 3-2)	'3070	V_{DRM}	±58	V
	'3080		±65	
	'3095		±75	
	'3115		±90	
	'3125		±100	
	'3145		±120	
	'3165		±135	
	'3180		±145	
	'3200		±155	
	'3219		±180	
	'3250		±190	
	'3290		±220	
	'3350		±275	
	'3395		±320	
Non-repetitive peak on-state pulse current (see Notes 1 and 2)		I_{PPSM}		A
2/10 (Telcordia GR-1089-CORE, 2/10 voltage wave shape)			2x250	
8/20 (IEC 61000-4-5, combination wave generator, 1.2/50 voltage wave shape)			2x250	
10/160 (TIA/EIA-IS-968 (replaces FCC Part 68), 10/160 µs voltage wave shape)			2x150	
5/310 (ITU-T K.44, 10/700 µs voltage wave shape used in K.20/.45/.21)			2x120	
5/320 (TIA/EIA-IS-968 (replaces FCC Part 68), 9/720 µs voltage wave shape)			2x120	
10/560 (TIA/EIA-IS-968 (replaces FCC Part 68), 10/560 µs voltage wave shape)			2x100	
10/1000 (Telcordia GR-1089-CORE, 10/1000 voltage wave shape)			2x80	
Non-repetitive peak on-state current (see Notes 1 and 2)		I_{TSM}		A
50 Hz, 1 cycle			2x25	
60 Hz, 1 cycle			2x30	
1000 s 50 Hz/60 Hz a.c.			2x1.2	
Initial rate of rise of on-state current, Linear current ramp, Maximum ramp value < 50 A		di_T/dt	500	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 rated current values are applied to the terminals 1 and 3 simultaneously (in this case the terminal 2 return current will be the sum of the currents applied to the terminals 1 and 3). The surge may be repeated after the device returns to its initial conditions.

Recommended Operating Conditions

Component		Min	Typ	Max	Unit
R1, R2	Series resistor for GR-1089-CORE first-level surge survival	5			Ω
	Series resistor for ITU-T recommendation K.20/.45/.21 (coordination with 400 V GDT at 4 kV)	6.4			
	Series resistor for TIA/EIA-IS-968 (replaces FCC Part 68) 9/720 survival	0			
	Series resistor for TIA/EIA-IS-968 (replaces FCC Part 68) 10/560 survival	0			
	Series resistor for TIA/EIA-IS-968 (replaces FCC Part 68) 10/160 survival	2.5			

Electrical Characteristics for the 1 and 2 or the 3 and 2 Terminals, T_A = 25 °C

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	'3070			±70	V
			'3080			±80	
			'3095			±95	
			'3115			±115	
			'3125			±125	
			'3145			±145	
			'3165			±165	
			'3180			±180	
			'3200			±200	
			'3219			±219	
			'3250			±250	
			'3290			±290	
			'3350			±350	
			'3395			±395	
$V_{(BO)}$	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	'3070			±81	V
			'3080			±91	
			'3095			±107	
			'3115			±128	
			'3125			±138	
			'3145			±159	
			'3165			±179	
			'3180			±195	
			'3200			±215	
			'3219			±234	
			'3250			±265	
			'3290			±304	
			'3350			±361	
			'3395			±403	
$I_{(BO)}$	Breakover current	dv/dt = ± 250 V/ms, R_{SOURCE} = 300 Ω				±800	mA
I_H	Holding current	I_T = ±5A, di/dt = +/-30 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
I_D	Off-state current	V_D = ±50 V	T_A = 85 °C			±10	µA

Electrical Characteristics for the 1 and 2 or the 3 and 2 Terminals, T_A = 25 °C (Continued)

Parameter		Test Conditions		Min	Typ	Max	Unit
C_{off}	Off-state capacitance	f = 1 MHz, Vd = 1 V rms, V_D = 0,	'3070 thru '3095		95	114	pF
			'3115 thru '3219		69	83	
			'3250 thru '3395		51	62	
		f = 1 MHz, Vd = 1 V rms, V_D = -1 V	'3070 thru '3095		90	108	
			'3115 thru '3219		63	76	
			'3250 thru '3395		46	55	
		f = 1 MHz, Vd = 1 V rms, V_D = -2 V	'3070 thru '3095		83	100	
			'3115 thru '3219		59	70	
			'3250 thru '3395		42	51	
		f = 1 MHz, Vd = 1 V rms, V_D = -50 V	'3070 thru '3095		43	51	
			'3115 thru '3219		29	35	
			'3250 thru '3395		20	24	
		f = 1 MHz, Vd = 1 V rms, V_D = -100 V (see Note 3)	'3250 thru '3395		16	19	

NOTE 3: These capacitance measurements employ a three terminal capacitance bridge incorporating a guard circuit. The unmeasured third terminal is connected to the guard terminal of the bridge.

Thermal Characteristics

Parameter		Test Conditions	Min	Typ	Max	Unit
$R_{\theta JA}$	Junction to free air thermal resistance	EIA/JESD51-3 PCB, $I_T = I_{TSM(1000)}$, T_A = 25 °C, (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

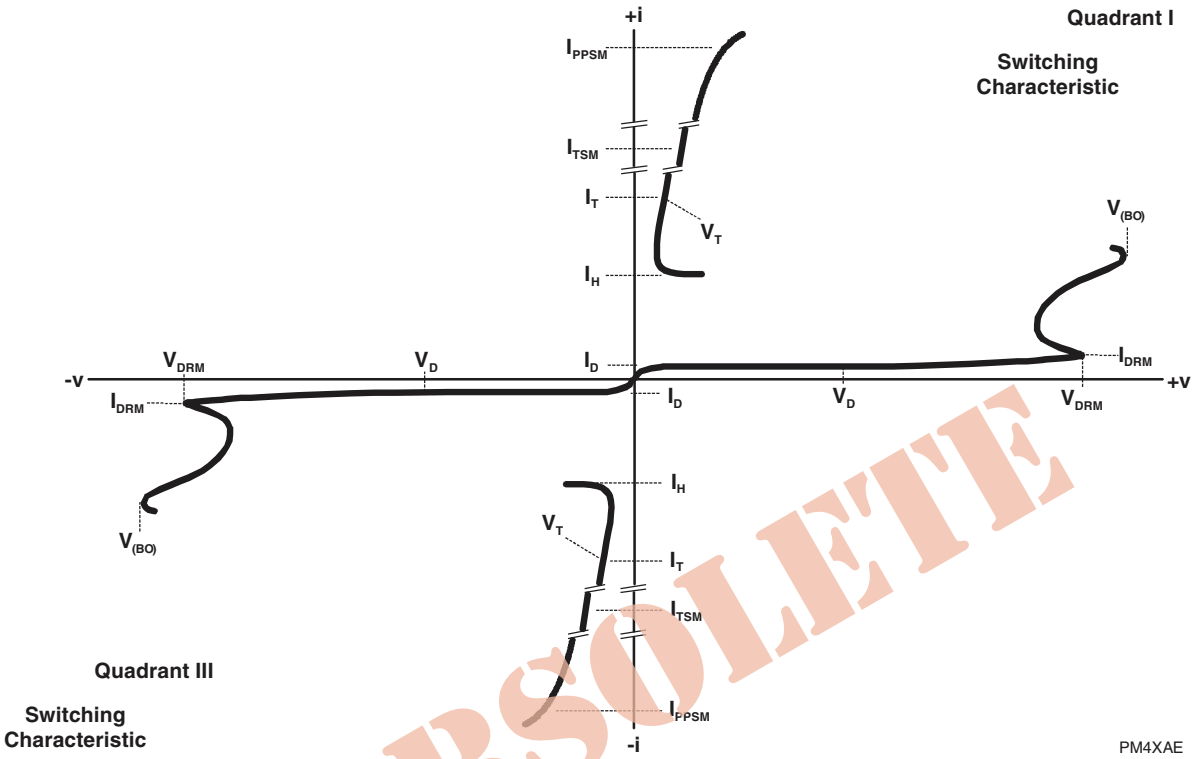


Figure 1. Voltage-Current Characteristic for Terminal Pairs 1-2 and 3-2
All Measurements are Referenced to Terminal 2

Typical Characteristics

OFF-STATE CURRENT vs JUNCTION TEMPERATURE

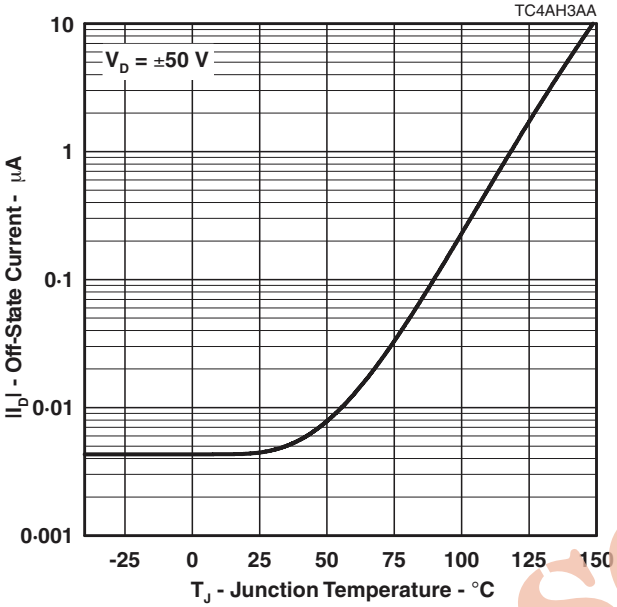


Figure 2.

NORMALIZED BREAKOVER VOLTAGE vs JUNCTION TEMPERATURE

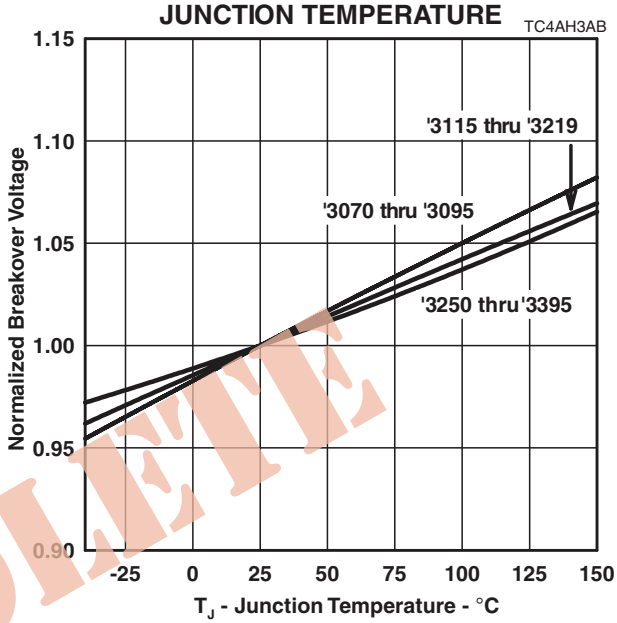


Figure 3.

ON-STATE CURRENT vs ON-STATE VOLTAGE

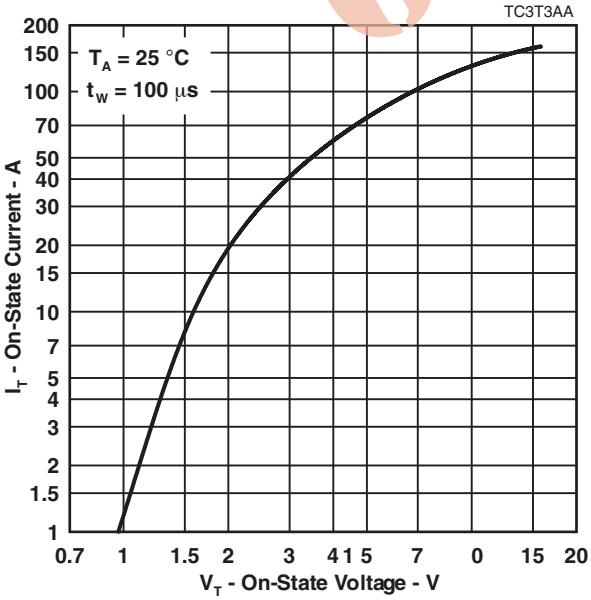


Figure 4.

NORMALIZED HOLDING CURRENT vs JUNCTION TEMPERATURE

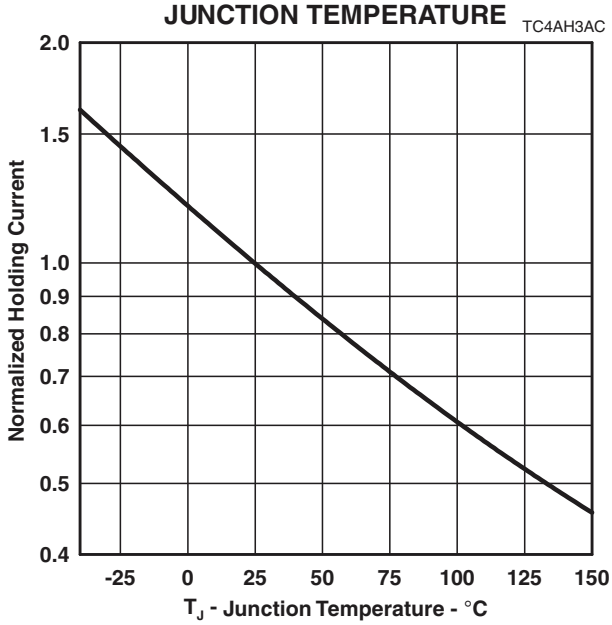


Figure 5.

Rating and Thermal Information

NON-REPETITIVE PEAK ON-STATE CURRENT vs CURRENT DURATION

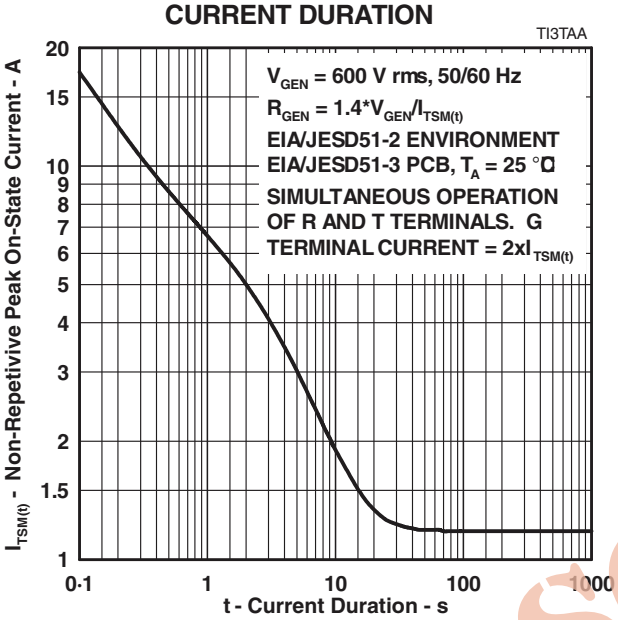


Figure 8.

V_{DRM} DERATING FACTOR vs MINIMUM AMBIENT TEMPERATURE

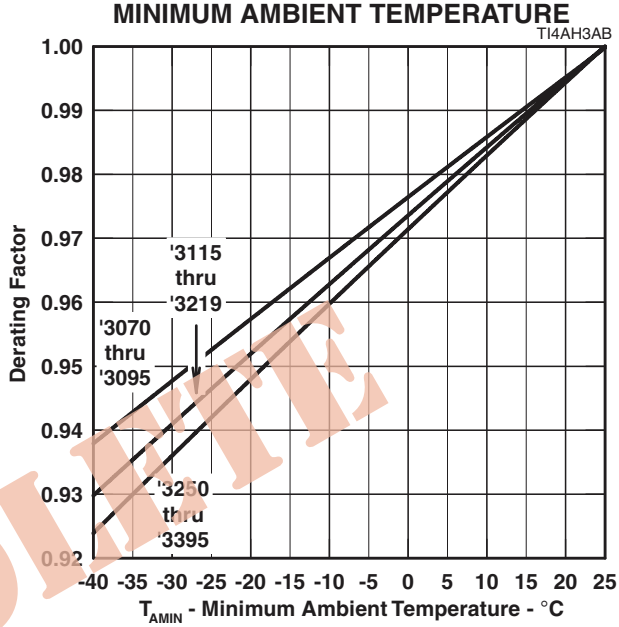
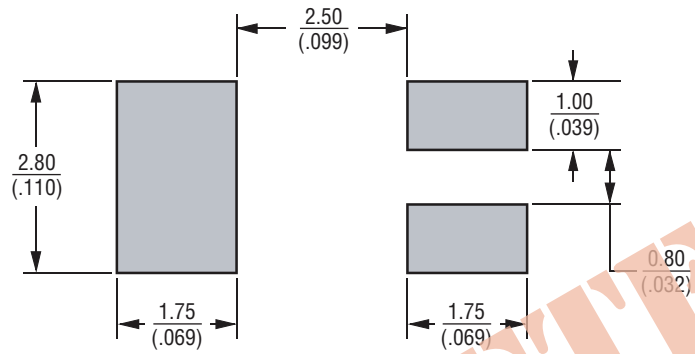


Figure 9.

MECHANICAL DATA

Recommended Printed Wiring Land Pattern Dimensions

SMB03 Pad Size



DIMENSIONS ARE: MILLIMETERS / (INCHES)

MD3BJAAA

Device Symbolization Code

Devices will be coded as below.

Device	Symbolization Code
TISP3070T3	3070T3
TISP3080T3	3080T3
TISP3095T3	3095T3
TISP3115T3	3115T3
TISP3125T3	3125T3
TISP3145T3	3145T3
TISP3165T3	3165T3
TISP3180T3	3180T3
TISP3200T3	3200T3
TISP3219T3	3219T3
TISP3250T3	3250T3
TISP3290T3	3290T3
TISP3350T3	3350T3
TISP3395T3	3395T3

Carrier Information

For production quantities, the carrier will be embossed tape reel pack. Evaluation quantities may be shipped in bulk pack or embossed tape.

Package	Carrier	Standard Quantity
SMB	Embossed Tape Reel Pack	3000

SEPTEMBER 2001 - REVISED MAY 2011

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