BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTORS

TISP4500H3BJ Overvoltage Protector

Non-Conductive During K.20/21/45 Power Contact Test
- Off-State Voltage ..... >245 V rms
- For Controlled Environment ..... 0 °C to 70 °C

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

Device	V_{DRM} V @ 0 °C	$V_{(BO)}$ V @ 70 °C
TISP4500H3BJ	350	500

Rated for International Surge Wave Shapes

Wave Shape	Standard	I_{PPSM} A
2/10	GR-1089-CORE	500
10/250	GR-1089-CORE	230
10/700	ITU-T K.20/21/45	200
10/1000	GR-1089-CORE	100

..... UL Recognized Component

SMBJ Package (Top View)

MD-SMB-004-a

Device Symbol

SD-TISP4xxx-001-a

Description

This device is designed to limit overvoltages on the telephone line to ±500 V over the temperature range. The minimum off-state voltage of ±350 V allows a.c. power contact voltages of up to 245 V rms to occur without clipping. The combination of these two voltages gives protection for components having ratings of 500 V or above and ensures the protector is non-conducting for the ITU-T recommendations K.20/21/45 230 V rms power cross test condition (test number 2.3.1).

The protector consists of a symmetrical voltage-triggered bidirectional thyristor. Overvoltages are initially clipped by breakdown clamping until the voltage rises to the breakover level, which causes the device to crowbar into a low-voltage on state. This low-voltage on state causes the current resulting from the overvoltage to be safely diverted through the device. The high crowbar holding current helps prevent d.c. latchup as the diverted current subsides.

How To Order

Device	Package	Carrier	Order As	Marking Code	Std. Qty.
TISP4500H3BJ	SMB (DO-214AA)	Embossed Tape Reeled	TISP4500H3BJR-S	4500H3	3000

*RoHS Directive 2002/95/EC Jan 27 2003 including Annex

APRIL 2001 - REVISED JANUARY 2007

Absolute Maximum Ratings, 0 °C ≤ T_A ≤ 70 °C (Unless Otherwise Noted)

Rating		Symbol	Value	Unit
Repetitive peak off-state voltage		V_{DRM}	±350	V
Non-repetitive peak on-state pulse current (see Notes 1 and 2)		I_{PPSM}		A
2/10 (Telcordia GR-1089-CORE, 2/10 µs voltage wave shape)	T_A = 25 °C		500	
10/250 (Telcordia GR-1089-CORE, 10/250 µs voltage wave shape)	T_A = 25 °C		230	
10/700 (ITU-T K.20/21/45, 5/310 µs current wave shape)			200	
10/1000 (Telcordia GR-1089-CORE, 10/1000 µs voltage wave shape)	T_A = 25 °C		100	
Non-repetitive peak on-state current (see Notes 1, 2 and 3)		I_{TSM}		A
50 Hz, 20 ms (1 cycle)			±55	
50 Hz, 1000 s			±2.0	
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.
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.

Electrical Characteristics, 0 °C ≤ T_A ≤ 70 °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 = 70 °C			±10	
$V_{(BO)}$	Breakover voltage	dv/dt = ±250 V/ms, R_{SOURCE} = 300 Ω				±500	V
$V_{(BO)}$	Impulse breakover voltage	ITU-T recommendation K.44 (02/2000) Figure A.3-1/K.44 10/700 impulse generator Charge Voltage = ±4 kV				±500	V
$I_{(BO)}$	Breakover current	dv/dt = ±250 V/ms, R_{SOURCE} = 300 Ω				±0.6	A
I_H	Holding current	I_T = ±5 A, di/dt = -/+30 mA/ms		±0.15			A
I_D	Off-state current	V_D = ±50 V	T_A = 70 °C			±10	µA
C_{off}	Off-state capacitance	f = 1 MHz, Vd = 1 V rms, V_D = 0				84	pF
		f = 1 MHz, Vd = 1 V rms, V_D = -1 V				67	
		f = 1 MHz, Vd = 1 V rms, V_D = -2 V				62	
		f = 1 MHz, Vd = 1 V rms, V_D = -50 V				31	

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 5)			113	°C/W
		265 mm x 210 mm populated line card, 4-layer PCB, $I_T = I_{TSM(1000)}$, T_A = 25 °C		50		

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

Parameter Measurement Information

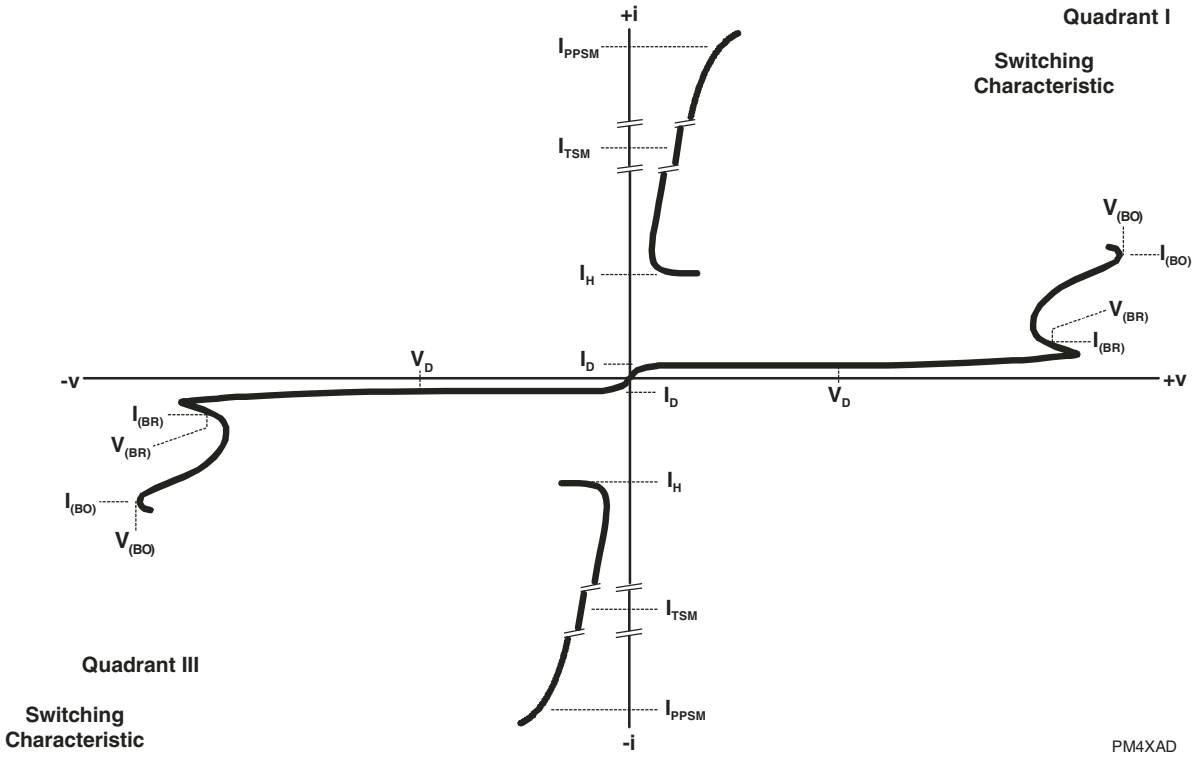
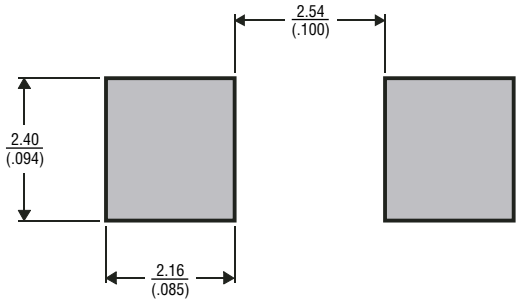


Figure 1. Voltage-current Characteristic for T and R Terminals
All Measurements are Referenced to the R Terminal

MECHANICAL DATA

Recommended Printed Wiring Land Pattern Dimensions

SMB Land Pattern



DIMENSIONS ARE: MM / (INCHES)

MDXXBIB

Device Symbolization Code

Devices will be coded as below. As the device parameters are symmetrical, terminal 1 is not identified.

Device	Symbolization Code
TISP4500H3BJ	4500H3