SELV TELECOMMUNICATION LINE OVERVOLTAGE PROTECTION

- **Digital Line Protection**
  - **— ISDN**
  - **— xDSL**
- **Safety Extra Low Voltage, SELV, values**
  - **— Ultra-Low & Very-Low Voltage Parts**

DEVICE	V_{DRM} V	$V_{(BO)}$ V
‘4015	± 5	± 15
‘4020	± 8	± 20

- **High Current “H” Series for ITU-T K20, FCC Part 68 and GR-1089-CORE**

WAVE SHAPE	STANDARD	I_{TSP} A
2/10 µs	GR-1089-CORE	500
8/20 µs	IEC 61000-4-5	400
10/160 µs	FCC Part 68	200
10/700 µs	ITU-T K20/21 FCC Part 68	150
10/560 µs	FCC Part 68	125
10/1000 µs	GR-1089-CORE	100

- **Functional Replacements for**

DEVICE TYPE	FUNCTIONAL REPLACEMENT
P0080Sx (1998 version)	TISP4015H1BJ
P0080Sx (1999 version)	TISP4020H1BJ
SMP100-8, SMP75-8 (See Note 1)	TISP4020H1BJ

NOTE 1. The TISP4020H1BJ has a higher a.c. $V_{(BO)}$ than SMP75-8, but has the same impulse $V_{(BO)}$.

SMBJ PACKAGE
(TOP VIEW)

MDXXBG

device symbol

SD4XAA

Terminals T and R correspond to the alternative line designators of A and B

ADVANCE INFORMATION

description

This device is designed to limit overvoltages on digital lines. Overvoltages are normally caused by a.c. power system or lightning flash disturbances which are induced or conducted on to the telephone line. A single device provides 2-point protection and is typically used for the protection of transformer windings and low voltage electronics.

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 device switches off when the diverted current subsides falls below the holding current value.

absolute maximum ratings, T_A = 25 °C (unless otherwise noted)

RATING		SYMBOL	VALUE	UNIT
Repetitive peak off-state voltage	'4015	V_{DRM}	±5	V
	'4020		± 8	
Non-repetitive peak on-state pulse current (see Notes 2 and 3)				
2/10 µs		I_{TSP}	± 500	A
8/20 µs			± 400	
10/160 µs			± 200	
5/310 µs			± 150	
10/560 µs			± 125	
10/1000 µs			± 100	
Non-repetitive peak on-state current (see Notes 2 and 3)				
20 ms (50 Hz) full sine wave		I_{TSM}	55	A
16.7 ms (60 Hz) full sine wave			60	
0.2 s 50 Hz a.c.			25	
2 s 50 Hz a.c.			12	
Initial rate of rise of on-state current		di_T/dt	500	A/µs
Maximum junction temperature		T_{JM}	150	°C
Storage temperature range		T_{stg}	-65 to +150	°C

NOTES: 2. Initially the device must be in thermal equilibrium with T_J = 25 °C.
3. The surge may be repeated after the device returns to its initial conditions.

electrical characteristics for the R and T terminals, T_A = 25 °C

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
I_{DRM}	Repetitive peak off-state current	$V_D = V_{DRM}$				± 5	µA
$V_{(BO)}$	Breakover voltage	di/dt = ±0.8 A/ms	'4015			±15	V
			'4020			± 20	
$V_{(BO)}$	Impulse breakover voltage	di/dt = ±10 A/µs	'4015			±20	V
			'4020			± 25	
$I_{(BO)}$	Breakover current	di/dt = ±0.8 A/ms				± 0.8	A
I_D	Off-state current	V_D = ± 4 V	'4015			±2	µA
		V_D = ± 6 V	'4020			± 2	
I_H	Holding current			± 0.05			A
C_{off}	Off-state capacitance	f = 1 MHz, V_d = 1 Vrms, V_D = 1 V,			100		pF

thermal characteristics

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
$R_{\theta JL}$	Junction to leads thermal resistance				20	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance				100	°C/W

PARAMETER MEASUREMENT INFORMATION

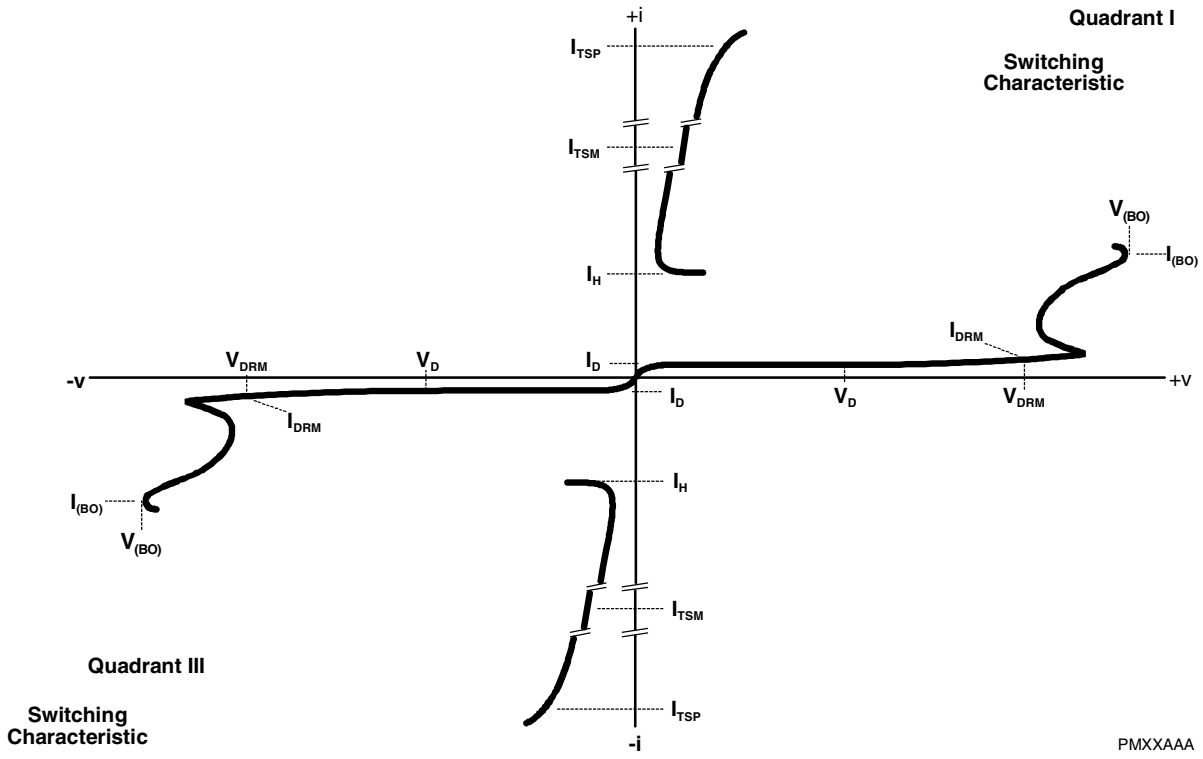


Figure 1. VOLTAGE-CURRENT CHARACTERISTIC FOR TERMINAL PAIR
T and R measurements are referenced to the R terminal

ADVANCE INFORMATION

DEVICE STATUS

samples

The current samples of the TISP4015H1BJ and TISP4020H1BJ are experimental units made at the end of 1999. These samples are suitable for circuit evaluation by customers and should not be used for long term reliability testing. It is considered that the electrical circuit performance of these samples is reasonably representative of the final production design.

It is intended that the final production parts of the TISP4015H1BJ will use a modified leadframe. The final production parts of the TISP4020H1BJ will have a modified breakdown region.

Customer samples of the TISP4015H1BJ have all been verified with a ±500 A 2/10 impulse at 25 °C. Customer samples of the TISP4020H1BJ have all been verified with a ±400 A 2/10 impulse at 25 °C.

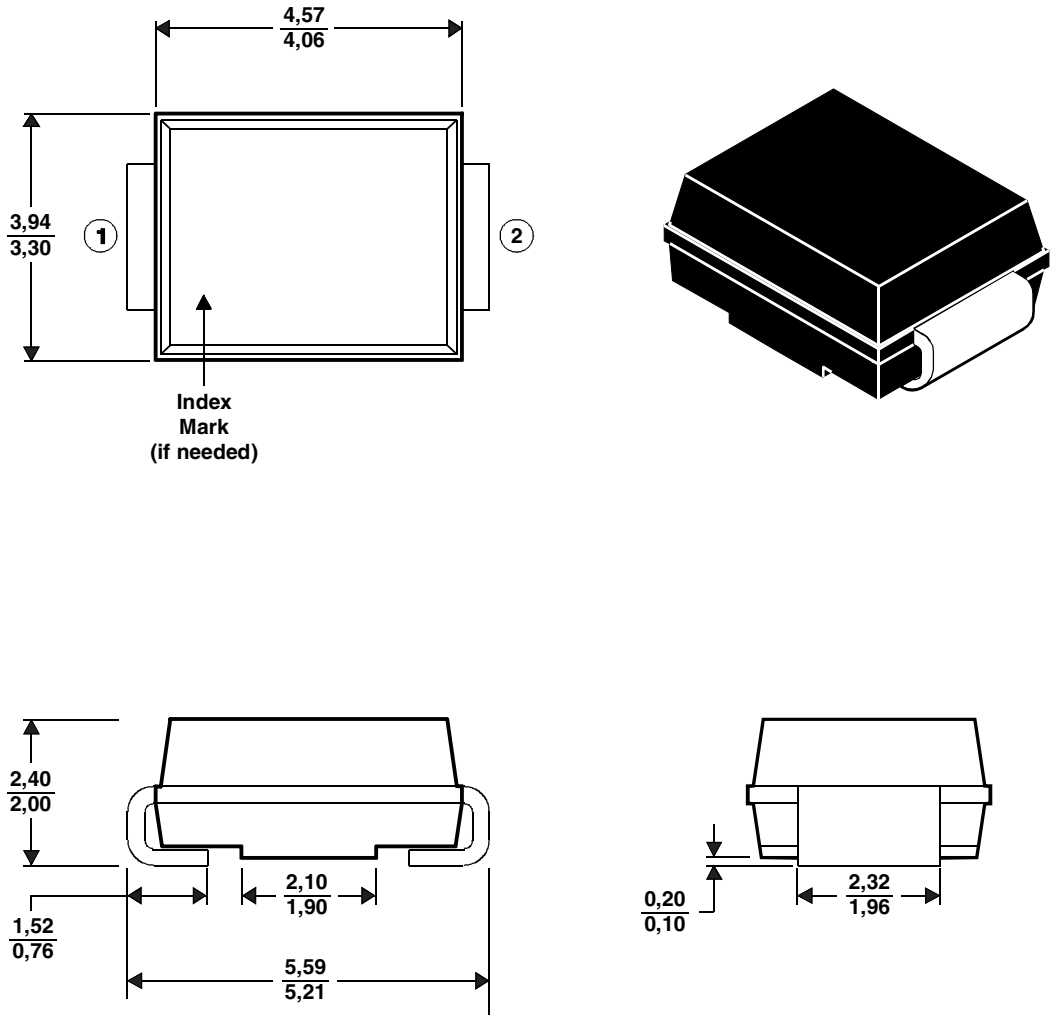
MECHANICAL DATA

SMBJ (DO-214AA)

plastic surface mount diode package

This surface mount package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.

SMB



ALL LINEAR DIMENSIONS IN MILLIMETERS

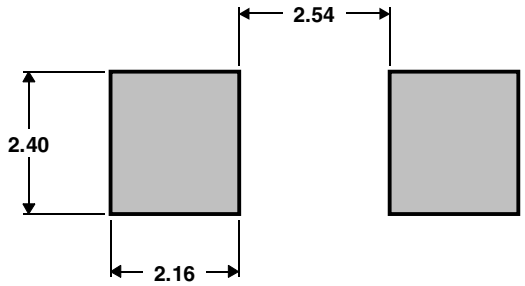
MDXXBHA

ADVANCE INFORMATION

MECHANICAL DATA

recommended printed wiring footprint.

SMB Pad Size



ALL LINEAR DIMENSIONS IN MILLIMETERS

MDXXBI

device symbolization

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

DEVICE	SYMOBLIZATION
TISP4015H1BJ	**LT214**
TISP4020H1BJ	**LT240**

carrier information

Devices are shipped in one of the carriers below. Unless a specific method of shipment is specified by the customer, devices will be shipped in the most practical carrier. For production quantities the carrier will be embossed tape reel pack. Evaluation quantities may be shipped in bulk pack or embossed tape.

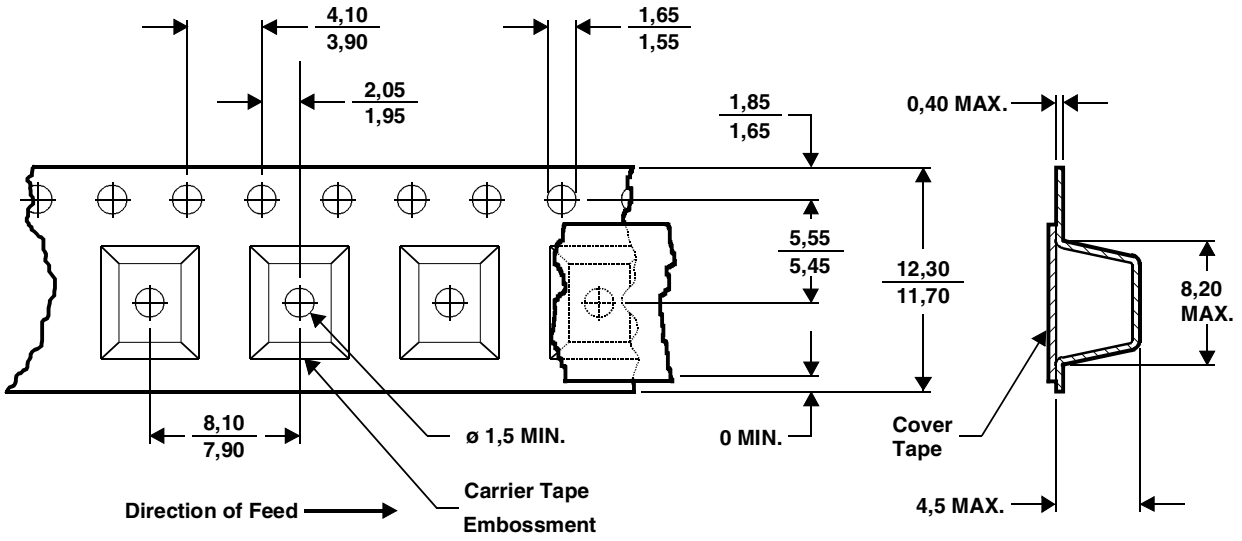
CARRIER	ORDER #
Embossed Tape Reel Pack	TISP40xxH1BJR
Bulk Pack	TISP40xxH1BJ

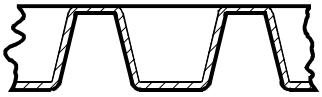
ADVANCE INFORMATION

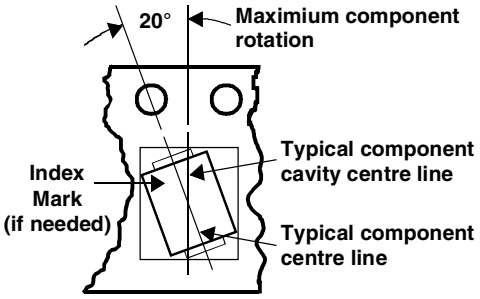
MECHANICAL DATA

tape dimensions

SMB Package Single-Sprocket Tape







ALL LINEAR DIMENSIONS IN MILLIMETERS

NOTES: A. The clearance between the component and the cavity must be within 0,05 mm MIN. to 0,65 mm MAX. so that the component cannot rotate more than 20° within the determined cavity. MDXXBJ

B. Taped devices are supplied on a reel of the following dimensions:-

Reel diameter:	330 ±3,0 mm
Reel hub diameter	75 mm MIN.
Reel axial hole:	13,0 ±0,5 mm

C. 3000 devices are on a reel.

ADVANCE INFORMATION

ADVANCE INFORMATION

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Certain applications using semiconductor products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications").

TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used.

TEXAS INSTRUMENTS