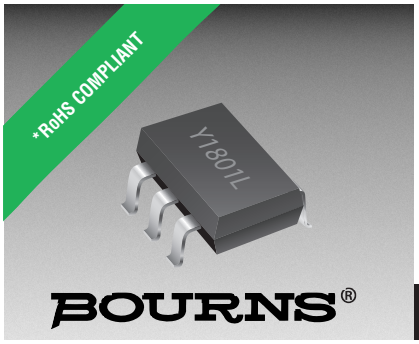


TISP4P015L1N THRU TISP4P035L1N

LOW CAPACITANCE BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTOR

TISP4P0xxL1N Overvoltage Protector Series

Designed for ADSL, ADSL2, VDSL, VDSL2 protection

Ion-Implanted Breakdown Region
- Precise and Stable Voltage

Low Voltage Overshoot Under Surge

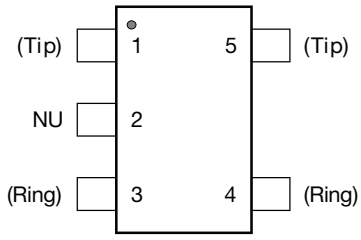
Low Off-State Capacitance

Device Name	V_{DRM} V	$V_{(BO)}$ V
TISP4P015L1N	8	15
TISP4P020L1N	12	20
TISP4P025L1N	16	25
TISP4P035L1N	24	35

Rated for International Surge Wave Shapes

Wave Shape	Standard	I_{PPSM} A
8/20	IEC 61000-4-5	30
10/1000	GR-1089-CORE	18

SOT23-5 Package (Top View)



Terminal typical application names shown in parenthesis.
NU - Non-usable; no external electrical connection should be made to this terminal.

MD-SOT23-5-001-a

Device Symbol

SD-TISP4-002-a

Description

This range of devices is designed to protect xDSL line-driver interfaces from overvoltages up to rated limits. Overvoltages are normally caused by a.c. power-system or lightning-flash disturbances which are induced or conducted onto the telephone line. These symmetrical protectors are two-terminal thyristor-crowbar devices. They can be used to protect between conductors, or a pair of devices can be deployed to protect from line to ground. When placed between the xDSL line driver IC and the transformer, this protector will clamp and switch into a low-impedance state, safely diverting the energy transferred by the xDSL coupling transformer. The low capacitance design makes this device suitable for designs from ADSL all the way up to 30 MHz VDSL2.

Telecom ports need protection against Common Mode (Longitudinal) and Differential (Metallic) surges, to comply with international standards such as ITU-T K.20, K.21 or K.45, Telcordia GR-1089-CORE and YD/T. Common Mode surges are resisted by the galvanic isolation of the coupling transformer which is commonly rated to 2 kV or greater. Differential surges can be transmitted by the transformer, and can stress the Line Driver Interface IC. As the xDSL interface circuit is designed to operate from 3 kHz to to 30 MHz, nearby high frequency events - such as cable flashover or primary protection activation - can generate damaging conditions for the interface requiring this type of protection.

Please contact your Bourns representative if the protection voltage you require is not listed.

How to Order

Device	Package	Carrier	Order As	Reel Quantity
TISP4P0xxL1N	SOT23-5	Embossed Tape Reeled	TISP4P0xxL1NR-S	10,000

Insert xx corresponding to device name.

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*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.
Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.

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

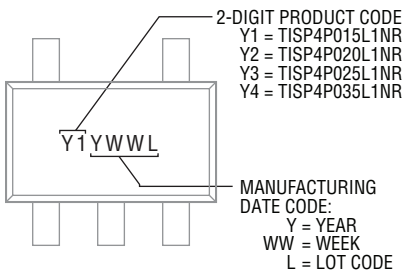
Rating		Symbol	Value	Unit
Repetitive peak off-state voltage	‘4P015L1N ‘4P020L1N ‘4P025L1N ‘4P035L1N	V_{DRM}	±8 ±12 ±16 ±24	V
Non-repetitive peak impulse current (see Notes 1, 2 and 3) 8/20 µs (IEC 61000-4-5, 1.2/50 µs voltage, 8/20 current combination wave generator) 10/1000 µs (GR-1089-CORE, 10/1000 µs voltage wave shape)		I_{PPSM}	 ±30 ±18	A
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. The surge may be repeated after the device returns to its initial conditions.
3. Rated currents only apply if pins 1 & 5 (Tip) are connected together and pins 3 & 4 (Ring) are connected together.

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

Parameter		Test Conditions		Min	Typ	Max	Unit
I_{DRM}	Repetitive peak off-state current	$V_D = V_{DRM}$				±1	µA
$V_{(BO)}$	Breakover voltage	dv/dt = ±250 V/ms, R_{SOURCE} = 300 Ω	‘4P015L1N ‘4P020L1N ‘4P025L1N ‘4P035L1N			±15 ±20 ±25 ±35	V
I_H	Holding current	I_T = ±5 A, di/dt = ±30 mA/ms	‘4P015L1N ‘4P020L1N ‘4P025L1N ‘4P035L1N		±30 ±10 ±30 ±30		mA
C_O	Off-state capacitance	f = 1 MHz, V_d = 1 V rms, V_D = 2 V	‘4P015L1N ‘4P020L1N ‘4P025L1N ‘4P035L1N		6.5 6 5.5 3.5		pF
ΔC	Delta-capacitance	f = 1 MHz, V_d = 1 V rms, V_D = 1 V to V_{DRM}	‘4P015L1N ‘4P020L1N ‘4P025L1N ‘4P035L1N		2 2.5 3 2		pF

Typical Part Marking



Environmental Specifications

Moisture Sensitivity Level 1
ESD Classification (HBM) 3B

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Parameter Measurement Information

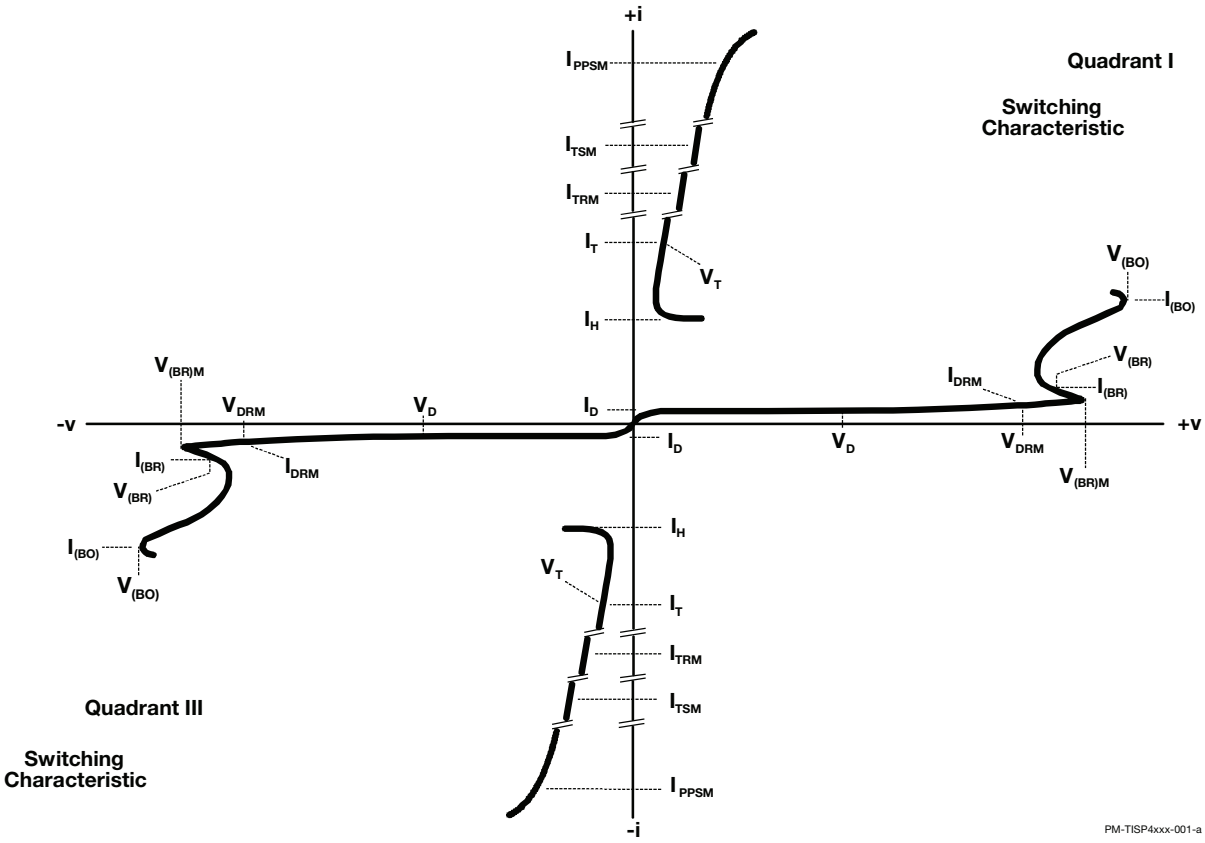

Figure 1. Voltage-Current Characteristic for Tip and Ring Terminals
All Measurements are Referenced to the Ring Terminal

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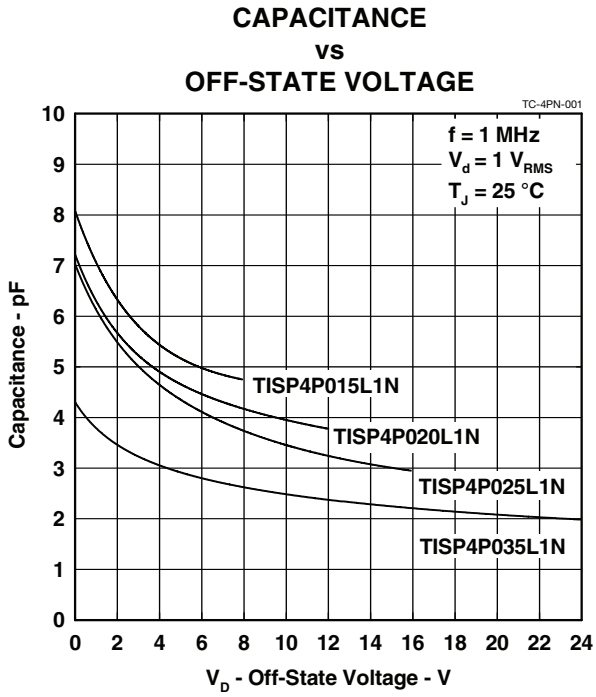
Typical Characteristics



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VDSL Application Examples

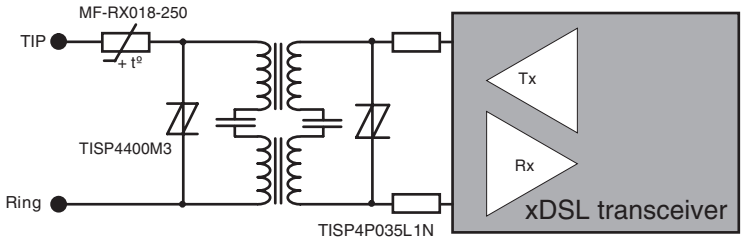


Figure 3.

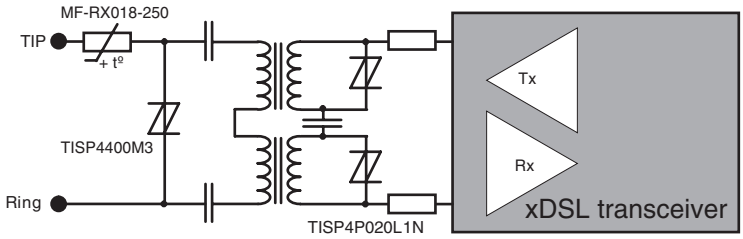


Figure 4.

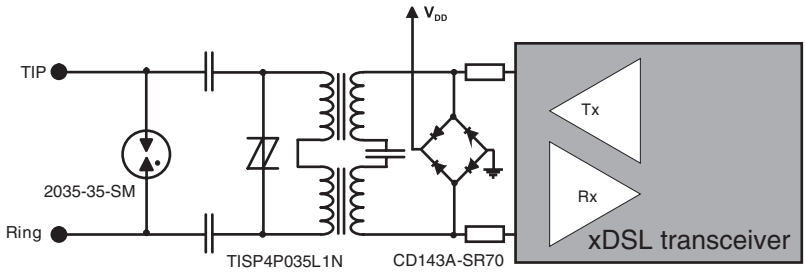
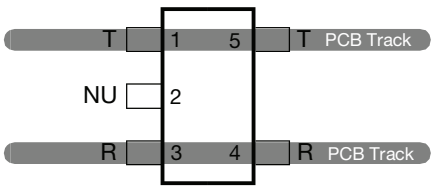


Figure 5.

Recommended PCB Layout



MD-SOT223-5-xxx

Figure 6.

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