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 suitablefor 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 to30 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.

Main applications

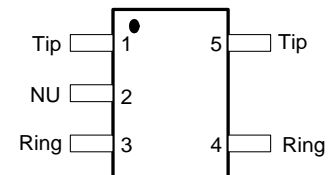Designed for ADSL, ADSL2, VDSL, VDSL2 protection

Features

- Ion-Implanted Breakdown Region- Precise and Stable Voltage Wide
- Low Voltage Overshoot Under Surge
- Low Off-State Capacitance
- Rated for International Surge Wave Shapes

Wave Shape	Standard	IPPSM A
8/20	IEC 61000-4-5	30
10/1000	GR-1089-CORE	18

Production diagram

SOT23-5 Package (Top View)

Device Symbol

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

Parameter		Symbol	Value	Unit
Repetitive peak off-state voltage	P008A	V_{DRM}	± 8	V
	P012A		± 12	
	P016A		± 16	
	P024A		± 24	
Non-repetitive peak impulse current (see Notes 1, 2, 3)	8/20 μs	I_{PPSM}	± 30	A
	10/100 μs		± 18	
Junction temperature		T_J	-40-150	°C
Storage temperature range		T_{stg}	-65-150	°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.
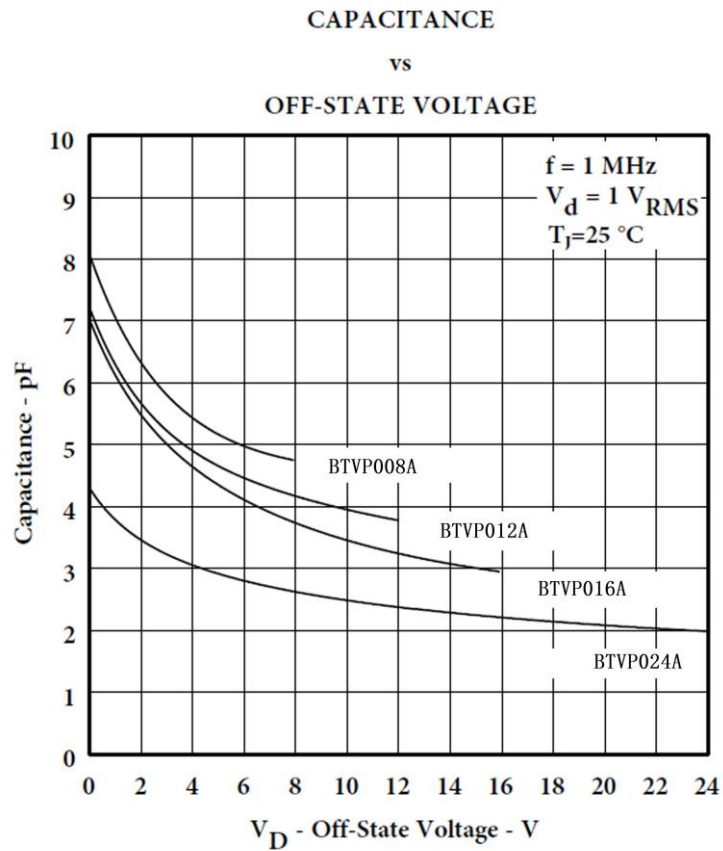
Parameter Measurement Information

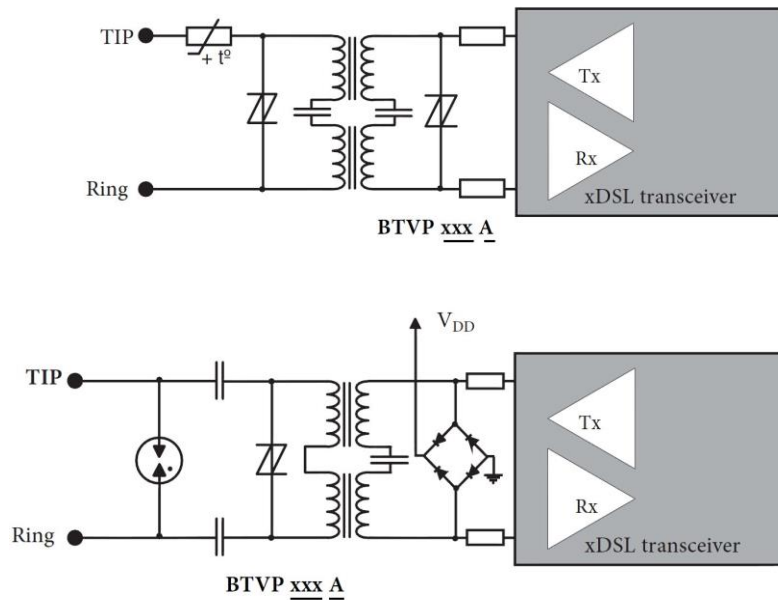| Parameter	Symbol
Holding current	I_H
Non-repetitive peak impulse current	I_{PPSM}
Leakage current	I_{RM}
Non repetitive peak on-state current	I_{TSM}
Breakover current	I_{BO}
Breakover voltage	V_{BO}
Stand-off voltage	V_{RM}
Breakdown voltage	V_{BR}
Line-ground off-state capacitance	C_0
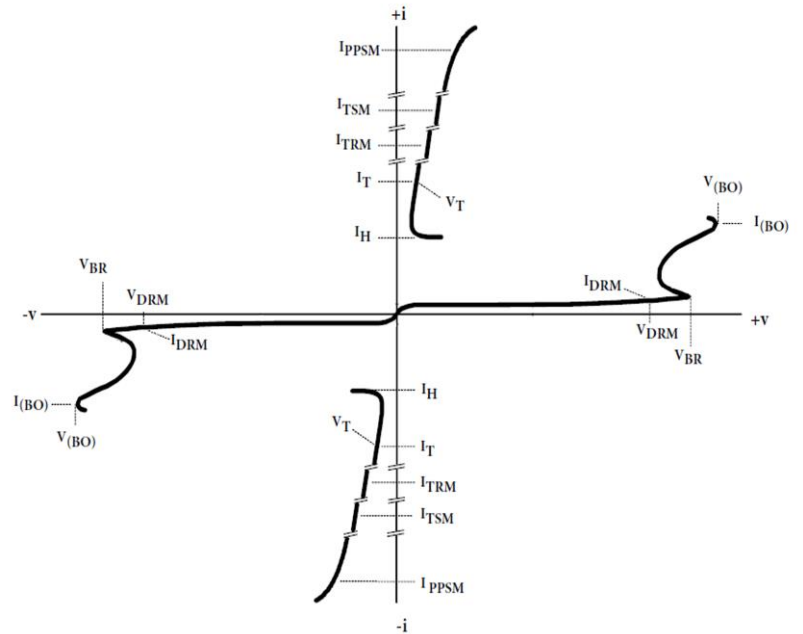
Electrical Characteristics, T_A= 25 °C (Unless Otherwise Noted)

Symbol		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, RSOURCE= 300Ω	P008A			±15	V
			P012A			±20	
			P016A			±25	
			P024A			±35	
I_H	Holding current	I_T=+5A ,di/dt = ±30mA/ms	P008A		±30		mA
			P012A		±10		
			P016A		±30		
			P024A		±30		
C_O	Off-state capacitance	f = 1 MHz, V_d= 1 V rms, V_D= 1 V to V_{DRM}	P008A		6.5		pF
			P012A		6		
			P016A		5.5		
			P024A		3.5		

Typical Characteristics

CAPACITANCE

vs

OFF-STATE VOLTAGE

$f = 1\ MHz$
$V_d = 1\ V_{RMS}$
$T_J = 25\ °C$

BTVP008A

BTVP012A

BTVP016A

BTVP024A

Capacitance - pF

V_D - Off-State Voltage - V

VDSL Application Examples

TIP

Ring

Tx

Rx

xDSL transceiver

BTVP xxx A

V_{DD}

TIP

Ring

Tx

Rx

xDSL transceiver

BTVP xxx A

Recommended PCB Layout
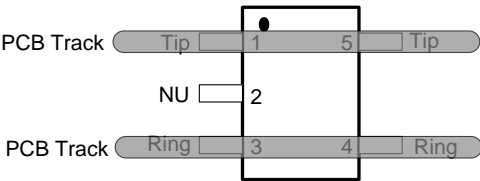
How To Order

Device	Package	Carrier	Marking Code	Standard Quantity
BTVP xxx A	SOT23-5	Tape	P xxx A	3000pcs