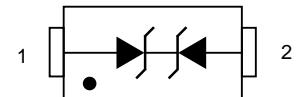


## Description

The PTVSHC3D4V5B ESD protector is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's. They feature large cross-sectional area junctions for conducting high transient currents, offer desirable electrical characteristics for board level protection, such as fast response time, lower operating voltage, lower clamping voltage and no device degradation when compared to MLVs. The PTVSHC3D4V5B protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The PTVSHC3D4V5B is available in a SOD-323 package with working voltages of 4.5 volt. It is used to meet the ESD immunity requirements of IEC 61000-4-2, ( $\pm 30\text{kV}$  air,  $\pm 30\text{kV}$  contact discharge)



## Feature

- 2400W Peak pulse power per line ( $t_p = 8/20\mu\text{s}$ )
- SOD-323 package
- Response time is typically  $< 1 \text{ ns}$
- Protect one I/O or power line
- Low clamping Voltage
- RoHS compliant
- Transient protection for data lines to IEC 61000-4-2(ESD)  
 $\pm 30\text{KV}(\text{air}), \pm 30\text{KV}(\text{contact})$ ; IEC 61000-4-4 (EFT) 40A (5/50ns)

## Applications

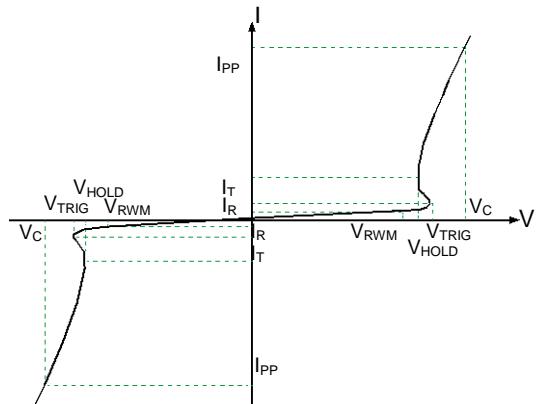
- Cell phone handsets and accessories
- Personal digital assistants (PDA's)
- Notebooks, desktops, and servers
- Portable instrumentation
- Cordless phones
- Digital cameras
- Peripherals
- MP3 players

## Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260°C
- Pure tin plating: 7 ~ 17 um
- Pin flatness: $\leq 3\text{mil}$

## Electronics Parameter

Symbol	Parameter
$V_{RWM}$	Peak Reverse Working Voltage
$I_R$	Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_T$	Test Current
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$P_{PP}$	Peak Pulse Power
$C_J$	Junction Capacitance



## Electrical characteristics per line@25°C( unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Zener Voltage	$V_Z$	$I_{ZT} = 5\text{mA}$		5.1		V
Reverse Working Voltage <sup>(1)</sup>	$V_{RWM}$				4.5	V
Breakdown Voltage(Pin1 to Pin2)	$V_{BR}$	$I_t = 1\text{mA}$	4.6			V
Reverse Leakage Current (Pin1 to Pin2)	$I_R$	$V_{RWM} = 4.5\text{V}$			2	$\mu\text{A}$
Clamping Voltage(Pin1 to Pin2)	$V_C$	$I_{PP}=20\text{A}$ $t_P = 8/20\mu\text{s}$		8.5	11	V
Clamping Voltage(Pin1 to Pin2)	$V_C$	$I_{PP}=45\text{A}$ $t_P = 8/20\mu\text{s}$		11	14	V
Clamping Voltage(Pin1 to Pin2)	$V_C$	$I_{PP}=90\text{A}$ $t_P = 8/20\mu\text{s}$		18	21	V
Clamping Voltage(Pin1 to Pin2)	$V_C$	$I_{PP}=130\text{A}$ $t_P = 8/20\mu\text{s}$		21	24	V
Junction Capacitance	$C_J$	$V_R=0\text{V}$ $f = 1\text{MHz}$		260	300	$\text{pF}$

Note 1:  $V_{RWM}$  is the maximum reverse working voltage, or reverse stand-off voltage. ESD can protect signal line properly within its rated voltage. If the signal line's voltage is over  $V_{RWM}$ , ESD will change to other state.

## Absolute maximum rating@25°C

Rating	Symbol	Value	Units
Peak Pulse Power ( $t_P = 8/20\mu\text{s}$ )	$P_{pp}$	2400	W
Total Device Dissipation FR-5 Board	$P_D$	500	mW
Lead Soldering Temperature	$T_L$	260 (10 sec)	°C
Operating Temperature	$T_J$	-55 to +150	°C
Storage Temperature	$T_{STG}$	-55 to +150	°C

## Typical Characteristics

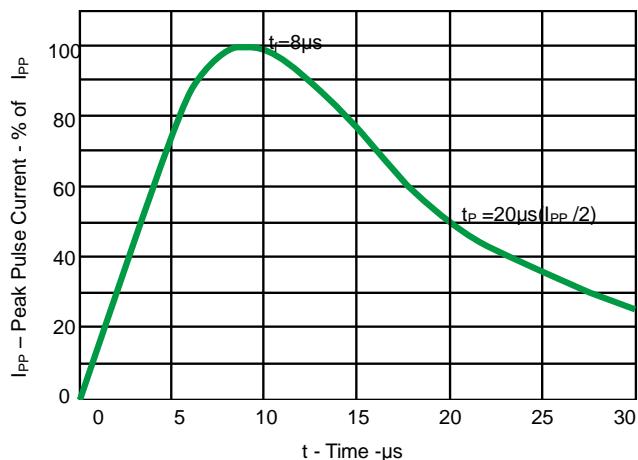


Fig 1. Pulse Waveform

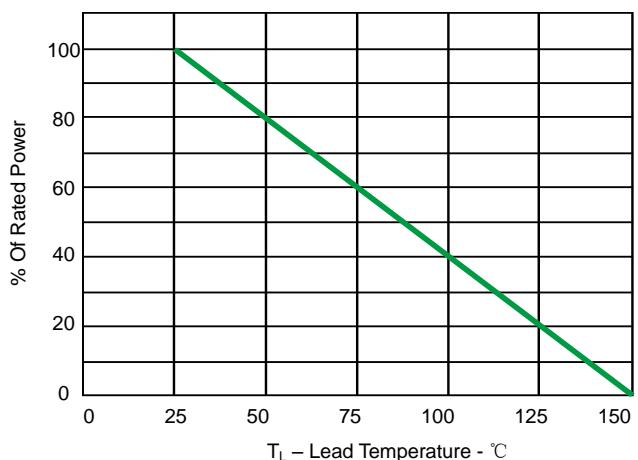


Fig 2. Power Derating Curve

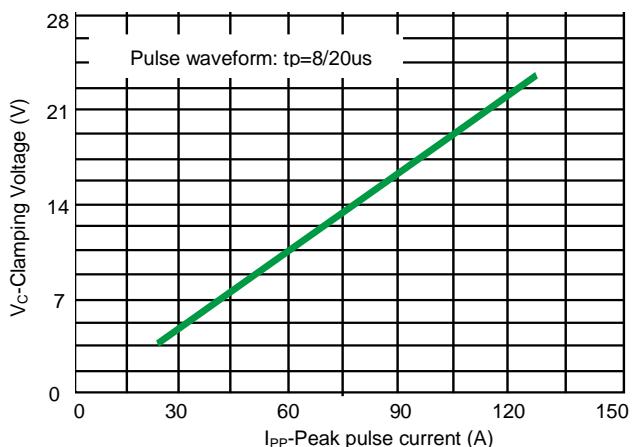


Fig 3. Clamping voltage vs. Peak pulse current

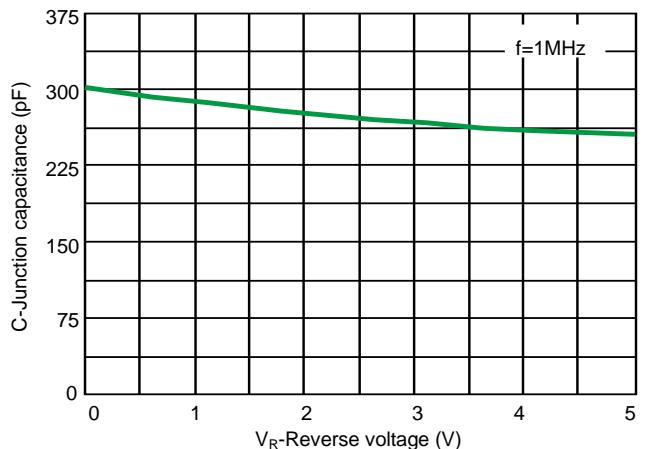


Fig 4. Capacitance vs. Reverse voltage

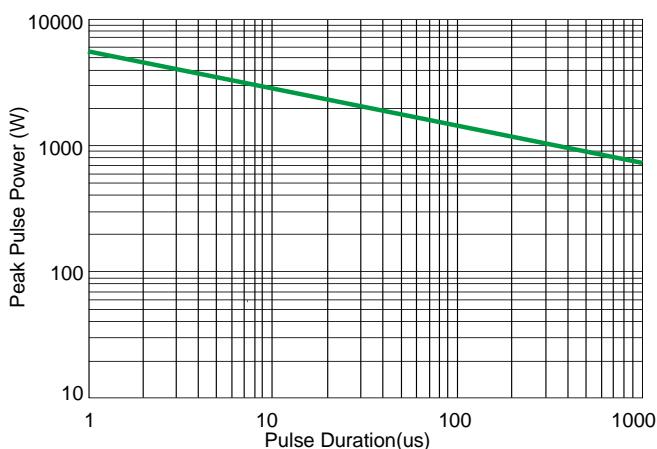
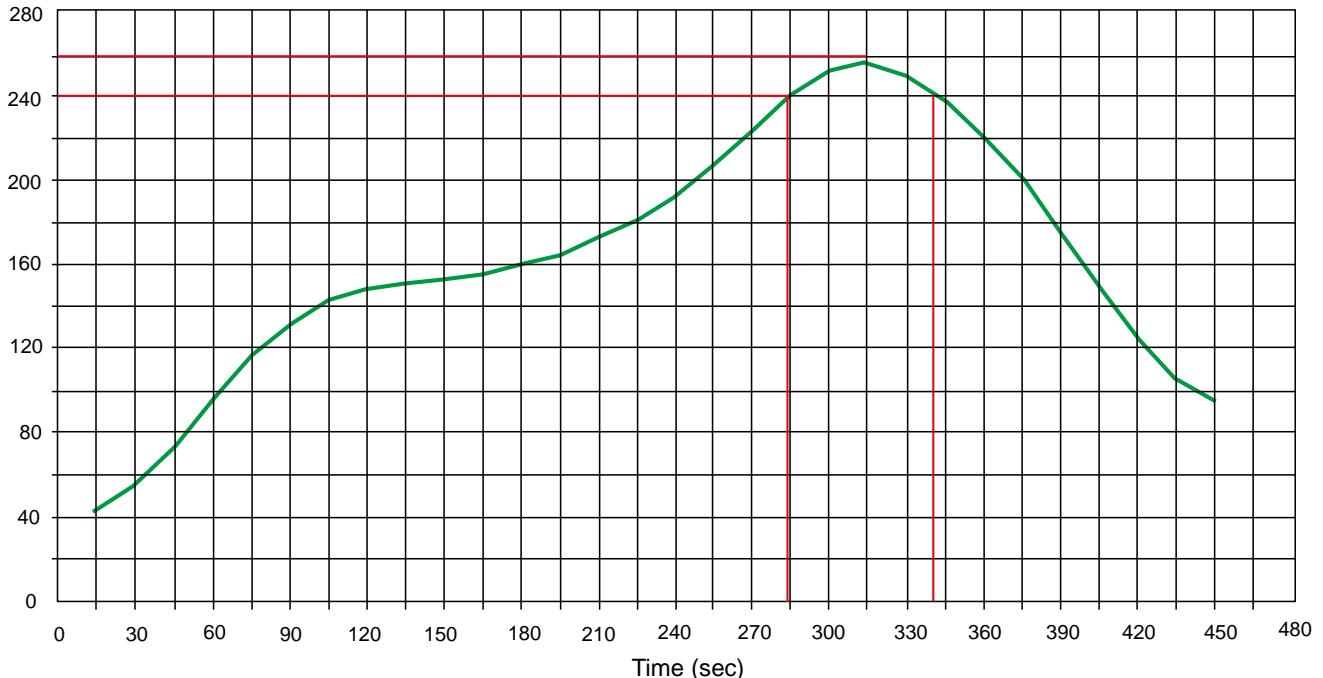


Fig 5. Non Repetitive Peak Pulse Power vs. Pulse time

## Solder Reflow Recommendation

Peak Temp=257°C, Ramp Rate=0.802deg. °C/sec

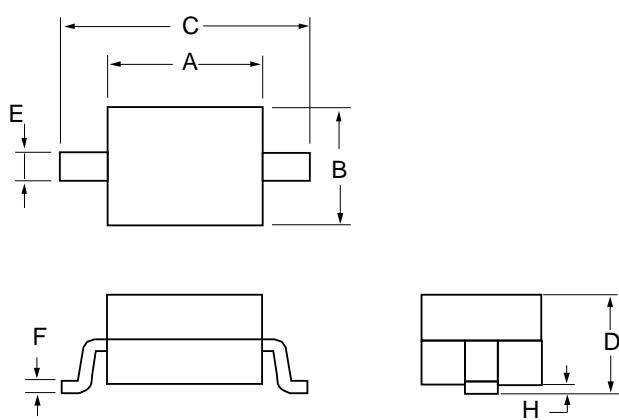


## PCB Design

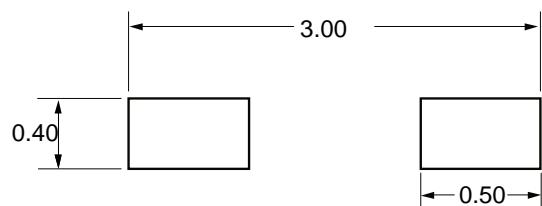
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- Do not use stubs, but place the cathode of the TVS diode directly on the signal trace.
- Do not make false economies and save copper for the ground connection.
- Place via holes to ground as close as possible to the anode of the TVS diode.
- Use as many via holes as possible for the ground connection.
- Keep the length of via holes in mind! The longer the more inductance they will have.

## Product dimension (SOD-323)



Dim	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.063	0.075	1.60	1.90
B	0.045	0.057	1.15	1.45
C	0.090	0.106	2.30	2.70
D	0.031	0.043	0.80	1.00
E	0.010	0.01	0.25	0.40
F	0.004	0.007	0.09	0.18
H	0.000	0.004	0.00	0.10



Unit:mm

## Ordering information

Device	Package	Shipping
PTVSHC3D4V5B	SOD-323 (Pb-Free)	3000 / Tape & Reel

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