Bi-directional 4.5V High Capacitance TVS Protector

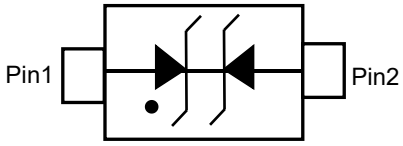
Description

The PTVSHC3D4V5B transient voltage suppressor 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.

SOD-323(Top View)

Feature

- 2000W Peak pulse power per line (t_P = 8/20μs)
- SOD-323 package
- Response time is typically < 1 ns
- Protect one I/O or power line
- Low clamping Voltage
- RoHS compliant
- Transient protection for data lines to IEC 61000-4-2(ESD) ±30KV(air), ±30KV(contact); IEC 61000-4-4 (EFT) 40A (5/50ns)



Circuit Diagram

Applications

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

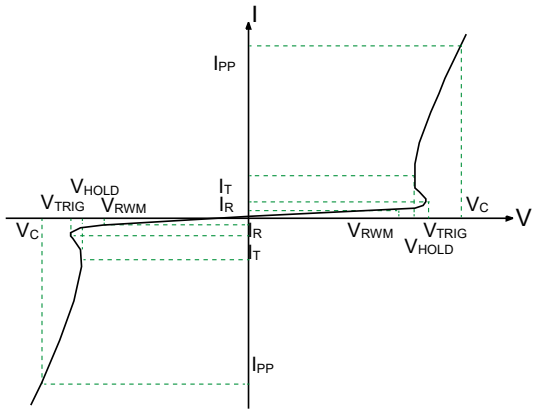
Marking (Top View)

Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260℃
- Device meets MSL 1 requirements
- Pure tin plating: 7 ~ 17 um
- Pin flatness：≤3mil

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℃(unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage(1)	V_{RWM}				4.5	V
Breakdown Voltage(Pin1 to Pin2)	V_{BR}	I_t =1mA	4.6			V
Reverse Leakage Current (Pin1 to Pin2)	I_R	V_{RWM} =4.5V			2	μA
Clamping Voltage(Pin1 to Pin2)	V_C	I_{PP}=20A t_P = 8/20μs		7.5	8.5	V
Clamping Voltage(Pin1 to Pin2)	V_C	I_{PP}=45A t_P = 8/20μs		8.8	10	V
Clamping Voltage(Pin1 to Pin2)	V_C	I_{PP}=90A t_P = 8/20μs		11	12.5	V
Clamping Voltage(Pin1 to Pin2)	V_C	I_{PP}=130A t_P = 8/20μs		14	16	V
Junction Capacitance	C_j	V_R=0V f = 1MHz		320	360	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℃

Rating	Symbol	Value	Units
Peak Pulse Power (t_P = 8/20μS)	P_{pp}	2000	W
Total Device Dissipation FR-5 Board	P_D	500	mW
Lead Soldering Temperature	T_L	260 (10 sec)	℃
Operating Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃

Typical Characteristics

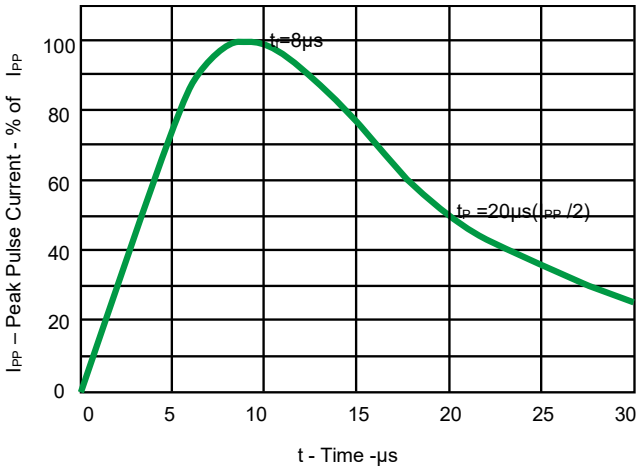


Fig 1.Pulse Waveform

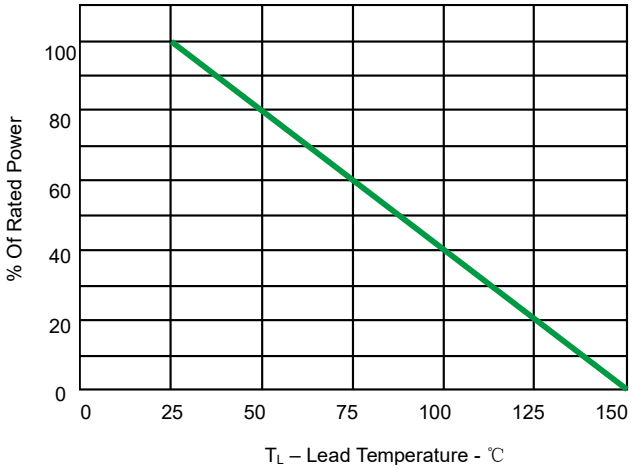


Fig 2.Power Derating Curve

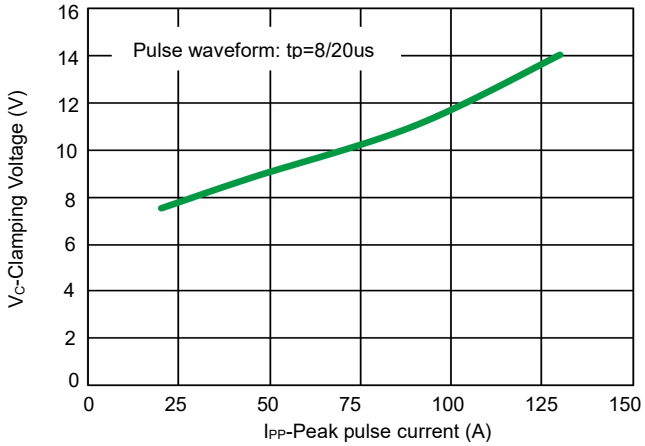


Fig 3. Clamping voltage vs. Peak pulse current

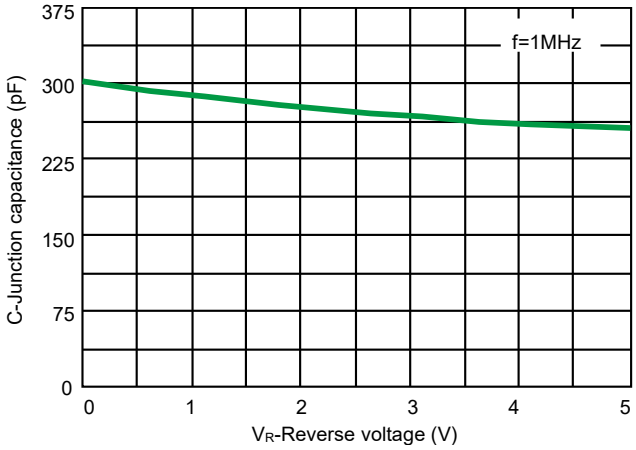


Fig 4. Capacitance vs. Reveres voltage

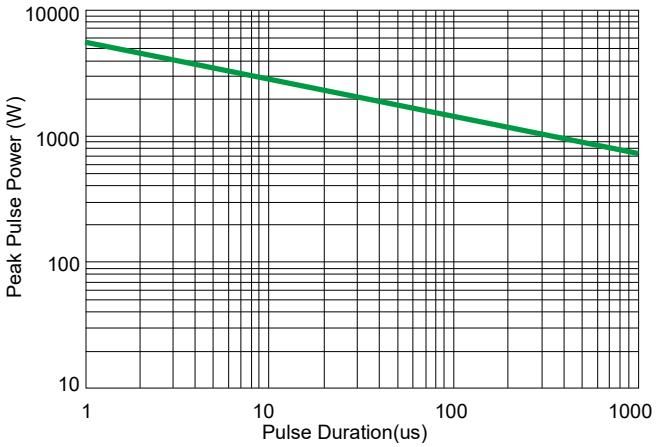
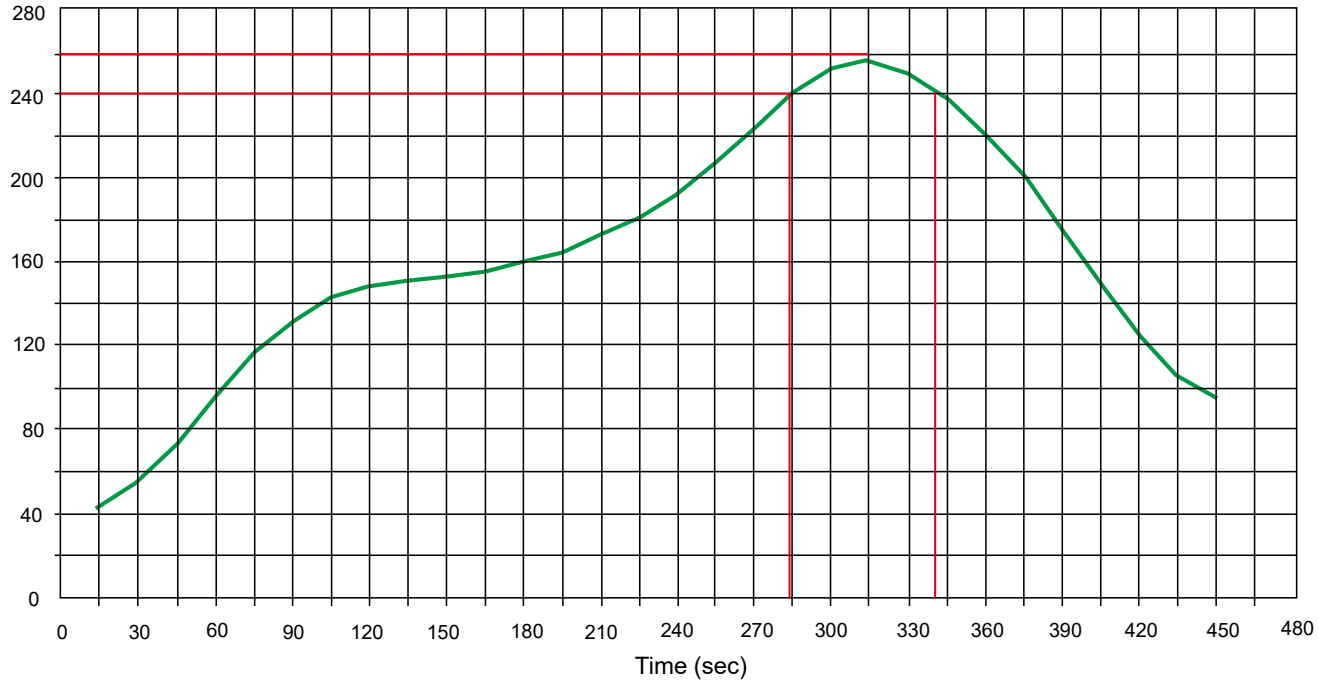


Fig 5. Non Repetitive Peak Pulse Power vs. Pulse time

Solder Reflow Recommendation

Peak Temp=257℃, Ramp Rate=0.802deg. ℃/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.

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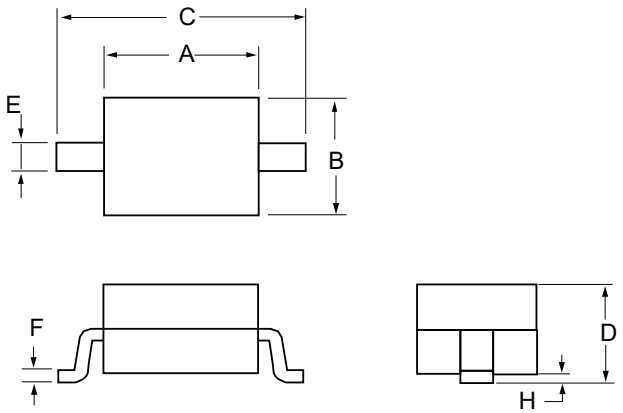
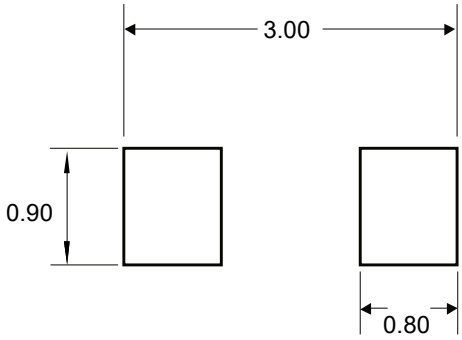
Product dimension (SOD-323)



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	1.10
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



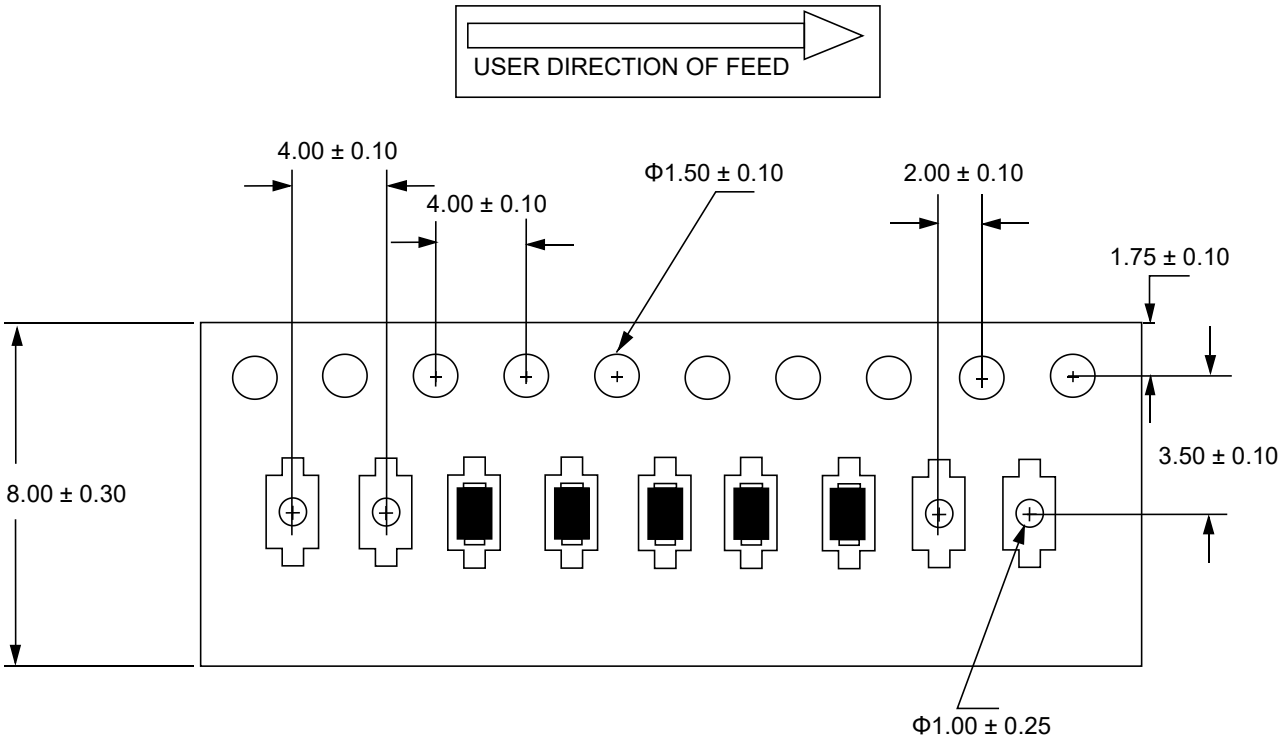
Unit:mm

Suggested PCB Layout

Ordering information

Device	Package	Reel	Shipping
PTVSHC3D4V5B	SOD-323 (Pb-Free)	7"	3000 / Tape & Reel

Load with information



Unit：mm

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