# Uni-directional 9V High Capacitance TVS Protector

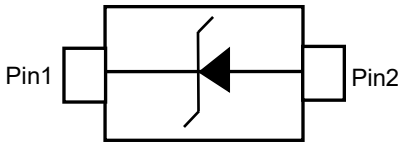
## Description

The PTVSHC3D9VU 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 PTVSHC3D9VU protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The PTVSHC3D9VU is available in a SOD-323 package with working voltages of 9 volt.

**SOD-323(Top View)**

## Feature

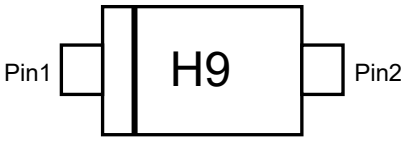
- 1600W Peak pulse power per line ($t_P$ = 8/20μs)
- SOD-323 package
- Response time is typically < 1 ns
- Protect one I/O or power line
- Low clamping Voltage
- RoHS compliant
- Transient protection for data lines to IEC 61000-4-2(ESD) ±30KV(air), ±30KV(contact); IEC 61000-4-4 (EFT) 40A (5/50ns)




**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



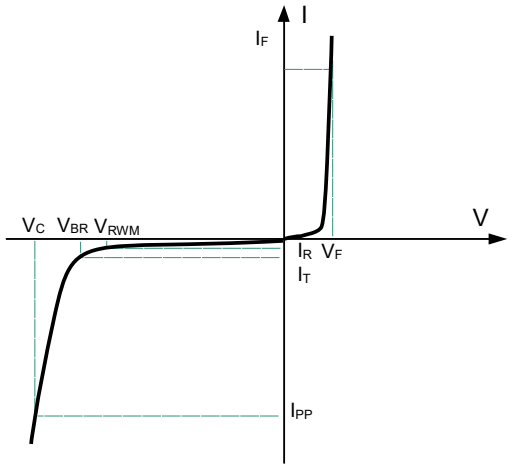

**Marking (Top View)**

## Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260℃
- 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 |
| $I_F$ | Forward Current |
| $V_F$ | Forward Voltage @ $I_F$ |




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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Peak Reverse Working Voltage | $V_{RWM}$ | | | | 9 | V |
| Breakdown Voltage | $V_{BR}$ | $I_t$ =1mA | 10 | 11 | 12 | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ =9V | | | 1 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$=40A $t_P$ = 8/20μs | | 16 | 17 | V |
| Clamping Voltage | $V_C$ | $I_{PP}$=80A $t_P$ = 8/20μs | | 20 | 25 | V |
| Junction Capacitance | $C_j$ | $V_R$=0V f = 1MHz | 500 | 550 | 600 | pF |

## Absolute maximum rating@25℃

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power ( $t_P$ = 8/20μS ) | $P_{pp}$ | 1600 | W |
| Lead Soldering Temperature | $T_L$ | 260 (10 sec) | ℃ |
| Operating Temperature | $T_{OP}$ | -55 to 125 | ℃ |
| Storage Temperature | $T_{STG}$ | -55 to 150 | ℃ |

## Typical Characteristics

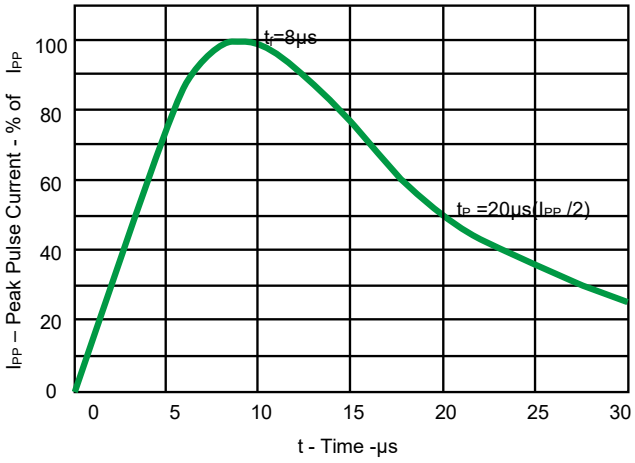



Fig 1.Pulse Waveform

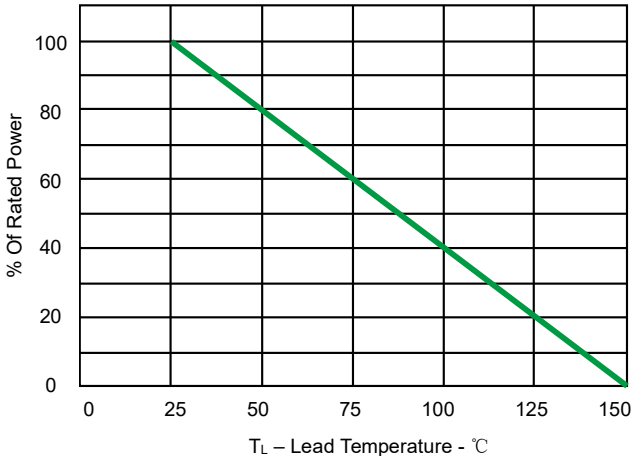



Fig 2.Power Derating Curve

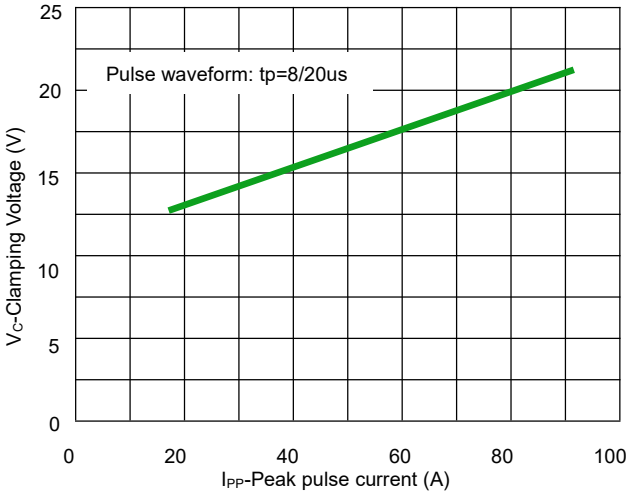



Fig 3. Clamping voltage vs. Peak pulse current

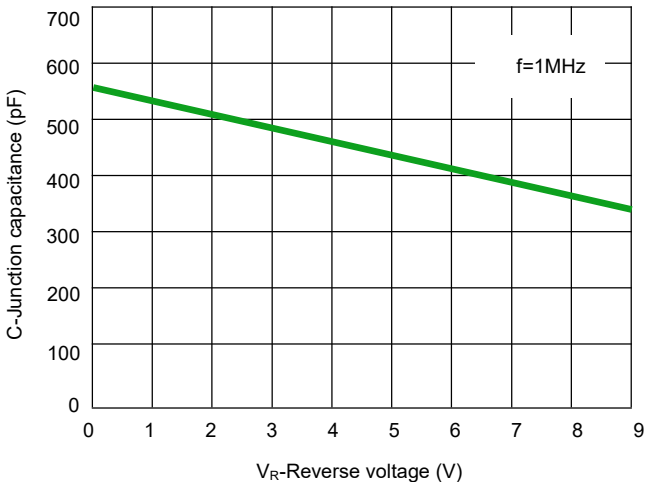



Fig 4. Capacitance vs. Reveres voltage

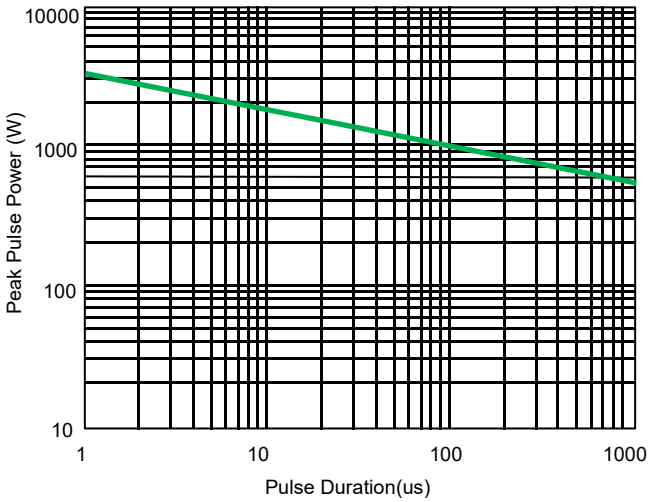
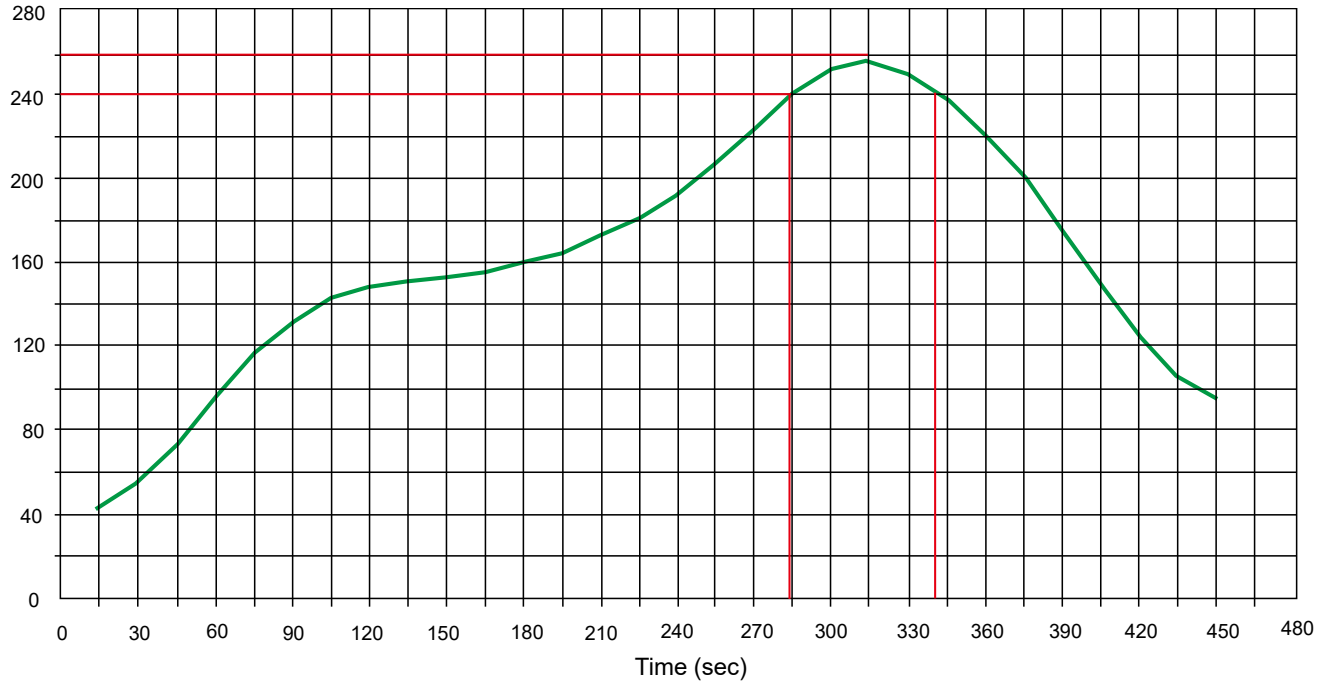



Fig 5. Non Repetitive Peak Pulse Power vs. Pulse time

## Solder Reflow Recommendation

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

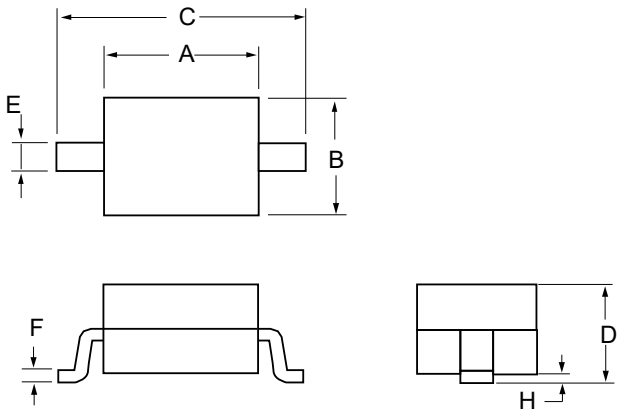



## PCB Design

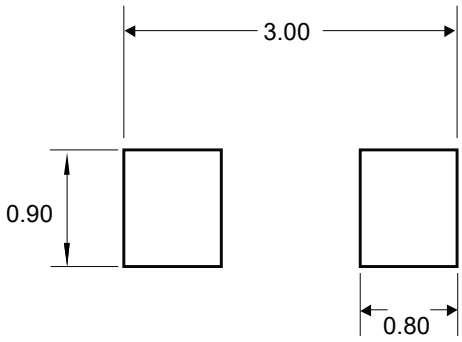
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- 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.

## 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 |



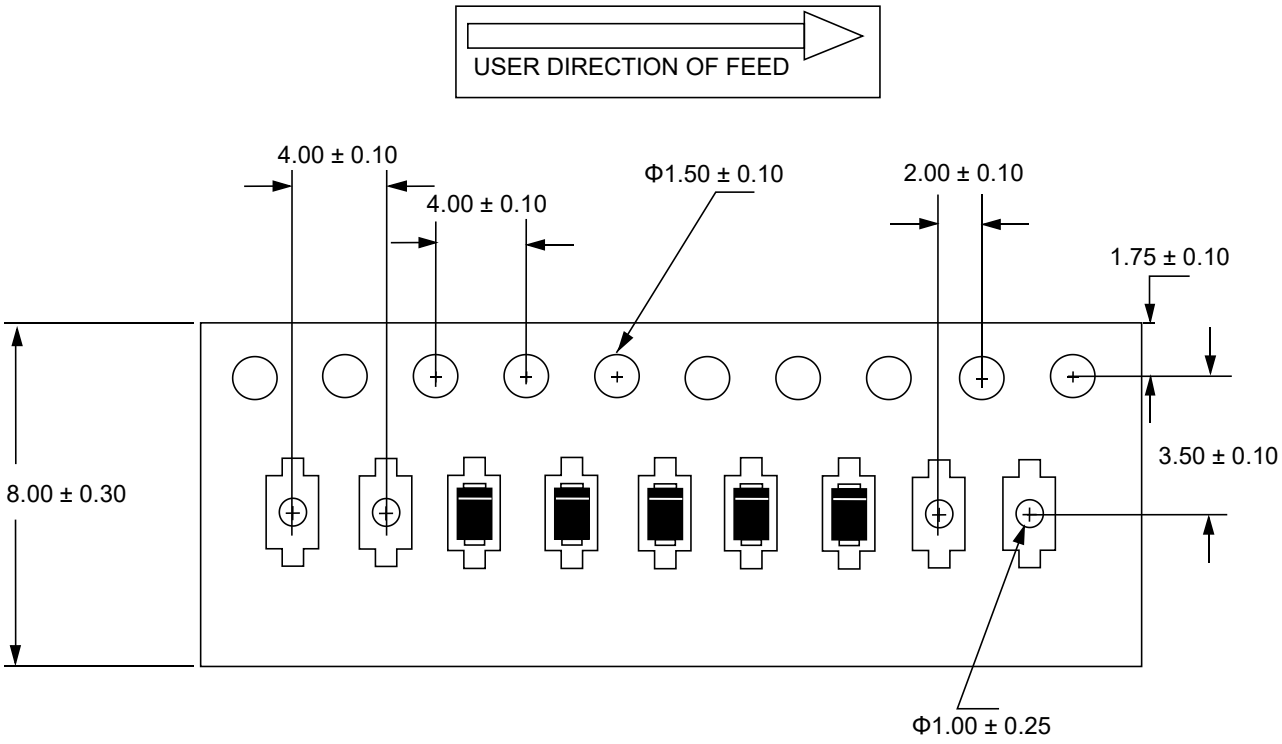

Unit:mm

**Suggested PCB Layout**

## Ordering information

| Device | Package | Reel | Shipping |
|---|---|---|---|
| PTVSHC3D9VU | SOD-323 (Pb-Free) | 7" | 3000 / Tape & Reel |

## Load with information




Unit：mm

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