# Transient Voltage Suppressor

## Description

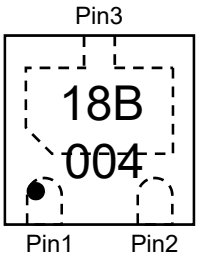
The PTVSHC3N18VB transient voltage suppressor is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's.

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.

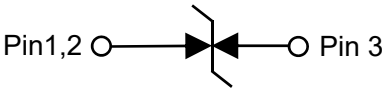
The PTVSHC3N18VB protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events.

The PTVSHC3N18VB is available in a DFN2020-3L package with working voltages of 18 volt.

It is used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±30kV air, ±30kV contact discharge)




**Marking (Top View)**




**Circuit Diagram**

## Feature

- 4500W Peak pulse power per line ($t_P$ = 8/20μs)
- DFN2020-3L package
- Response time is typically < 1 ns
- Protect one I/O or power line
- RoHS compliant
- Transient protection for data lines to
  IEC 61000-4-2(ESD) ±30kV(air), 30kV(contact);
  IEC 61000-4-5 (Lightning) 160A (8/20us)

## Applications

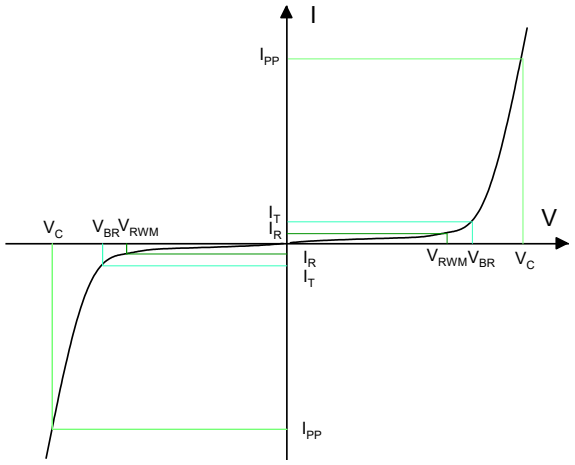
- Power Management
- Industrial Application
- Power Supply Protection
- Cell phone handsets and accessories
- Personal digital assistants (PDA's)
- Notebooks, desktops, and servers
- Portable instrumentation
- Cordless phones
- Peripherals

## Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260℃
- Pure tin plating: 7 ~ 17 um

## 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 | $V_{RWM}$ | - | -18 | - | 18 | V |
| Breakdown Voltage | $V_{BR}$ | $I_t$ = 1mA | 19 | 22.5 | 24 | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 18V | - | - | 1.0 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 140A,$t_P$ = 8/20μs | - | 23 | 25 | V |
| | | $I_{PP}$ = 160A,$t_P$ = 8/20μs | - | 25 | 28 | |
| Junction Capacitance | $C_J$ | $V_R$ = 0V,f = 1MHz | - | 420 | 500 | pF |

## Absolute maximum rating@25℃

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power ( $t_P$ = 8/20μs ) | $P_{PP}$ | 4500 | W |
| Peak Pulse Current ( $t_P$ = 8/20μs ) | $I_{PP}$ | 160 | A |
| Lead Soldering Temperature | $T_L$ | 260 (10 sec) | ℃ |
| Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55~+150 | ℃ |

## Typical Characteristics

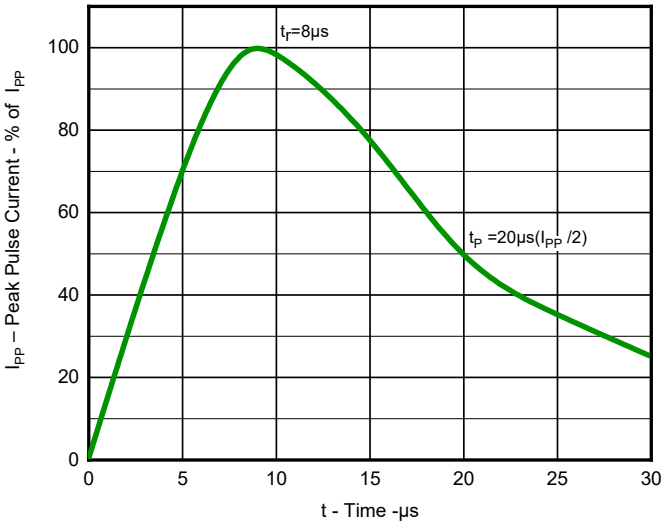



**Fig 1.Pulse Waveform(8/20μs)**

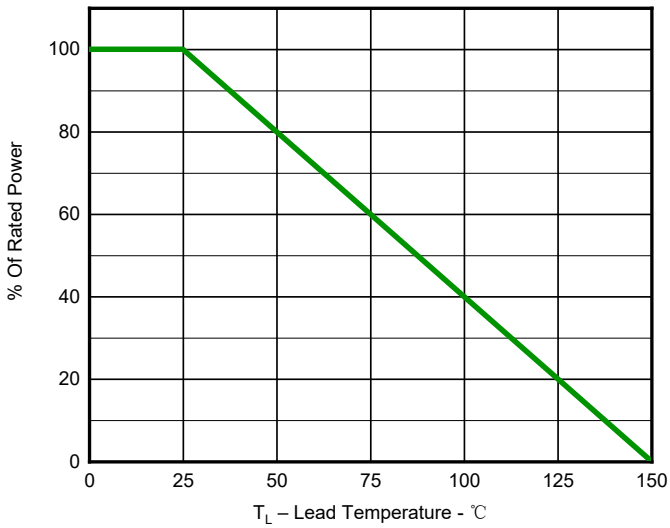



**Fig 2.Power Derating Curve**

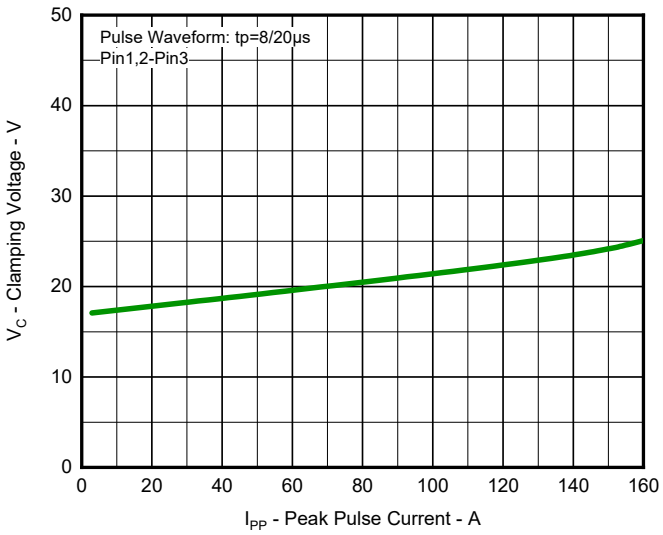



**Fig 3. Clamping Voltage vs. Peak Pulse Current**

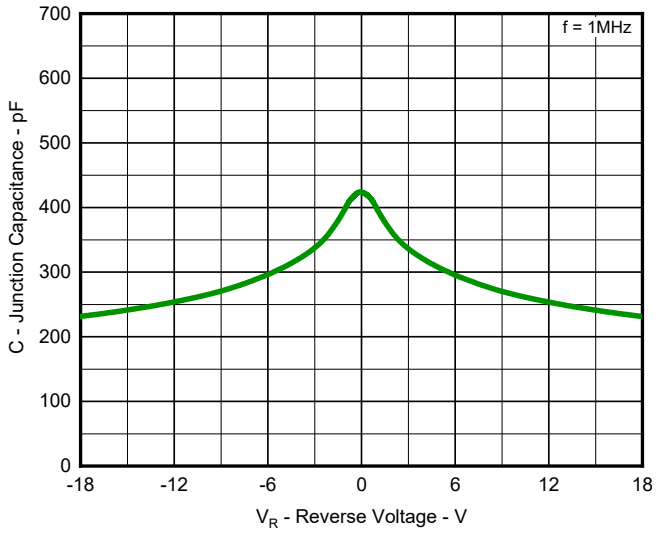



**Fig 4. Capacitance vs. Reveres Voltage**

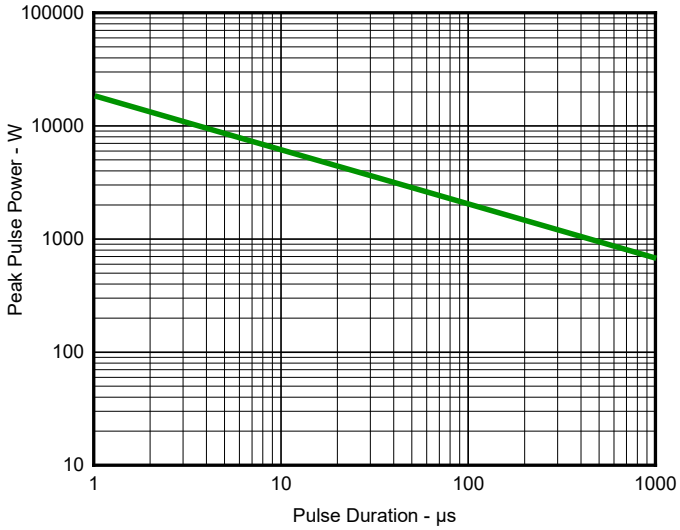



**Fig 5. Non Repetitive Peak Pulse Power vs. Pulse Time**

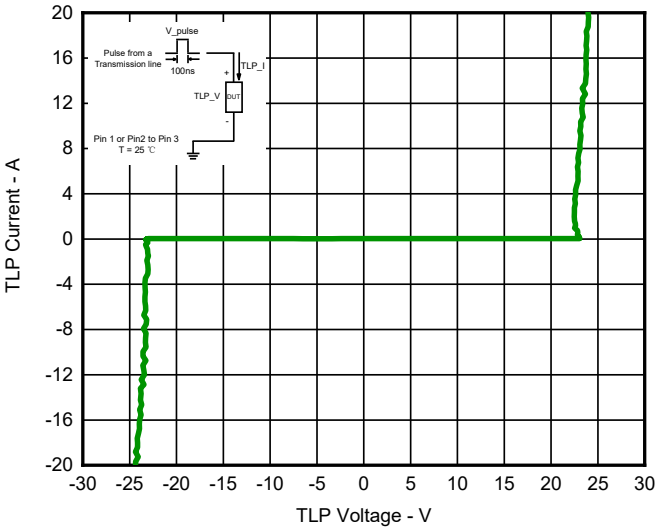
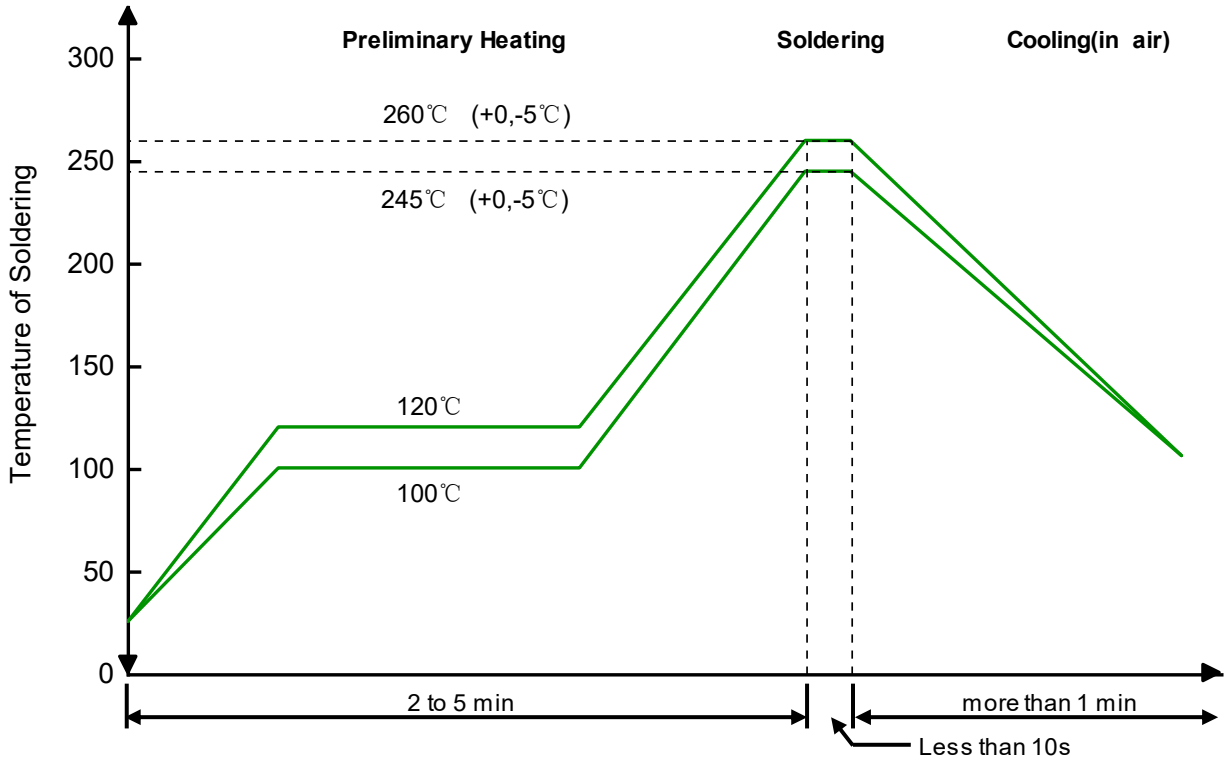



**Fig 6. TLP Measurement**

## Solder Reflow Recommendation




Remark: Pb free for 260℃; Pb for 245℃.

## PCB Design

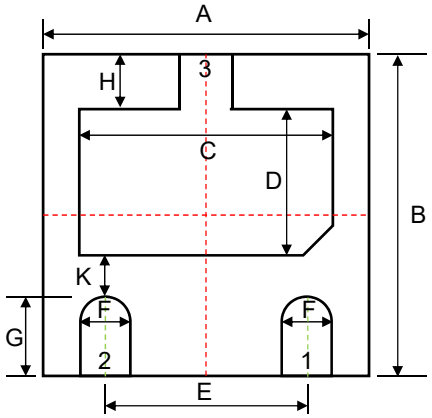
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- 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.

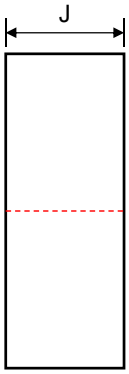
## Ordering information

| Device | Package | Reel | Shipping |
|---|---|---|---|
| PTVSHC3N18VB | DFN2020-3L (Pb-Free) | 7" | 3000 / Tape & Reel |

## Product dimension (DFN2020-3L)

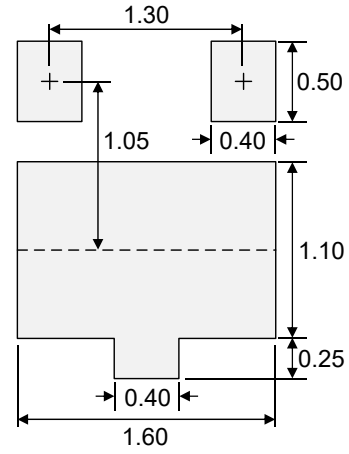



Bottom View




Side View

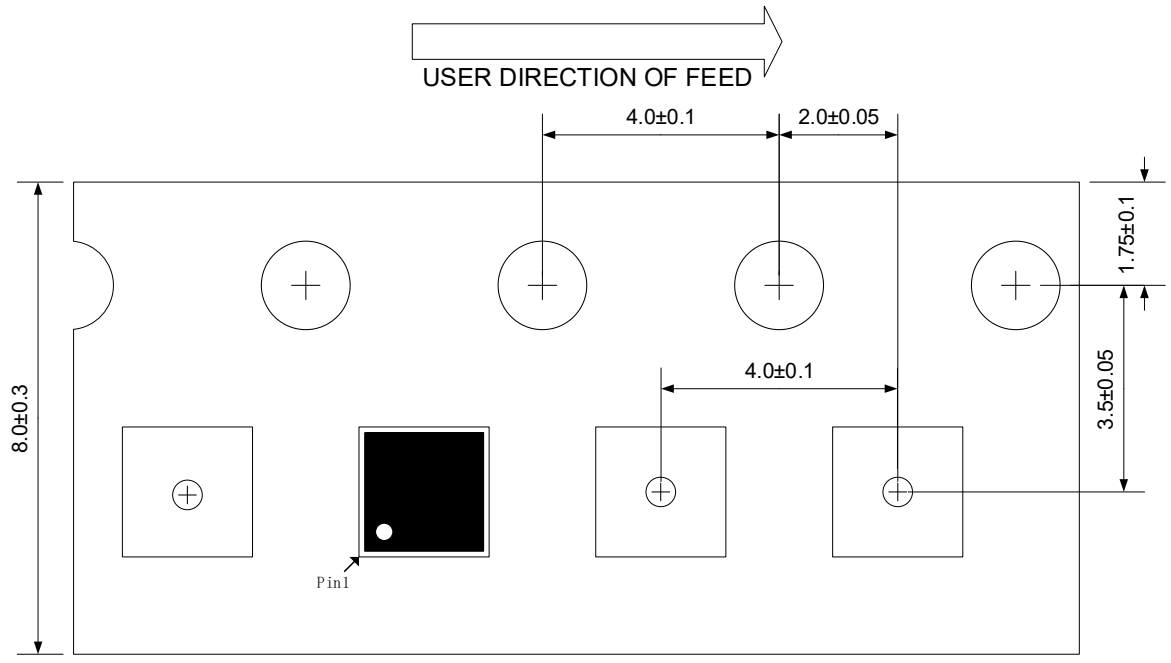
| Dim | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.90 | 2.10 | 0.075 | 0.083 |
| B | 1.90 | 2.10 | 0.075 | 0.083 |
| C | 1.40 | 1.60 | 0.055 | 0.063 |
| D | 0.90 | 1.15 | 0.035 | 0.045 |
| E | 1.30 BSC | | 0.051 BSC | |
| F | 0.25 | 0.35 | 0.010 | 0.014 |
| G | 0.35 | 0.45 | 0.014 | 0.018 |
| H | 0.15 | 0.30 | 0.006 | 0.012 |
| J | 0.50 | 0.60 | 0.020 | 0.024 |
| K | 0.30 BSC | | 0.012 BSC | |




Suggested PCB Layout

Unit: mm

## Load with information




Unit:mm

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