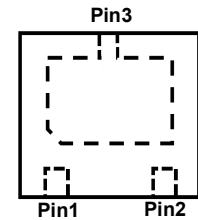


### Description

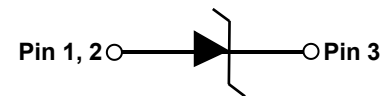
The PTVSHC3N12VUL1 Transient Voltage Suppressor is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's. They feature large cross-sectional area junctions for conducting high transient currents, offer desirable electrical characteristics for board level protection, such as fast response time, lower operating voltage, lower clamping voltage and no device degradation when compared to MLVs. The PTVSHC3N12VUL1 protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The PTVSHC3N12VUL1 is available in a DFN2 × 2-3L package with working voltages of 12 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)



Pin configuration

### Feature

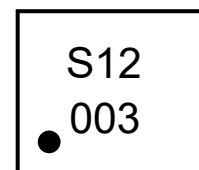
- 3000W Peak pulse power per line ( $t_p = 8/20\mu\text{s}$ )
- DFN2×2-3L package
- Response time is typically  $< 1 \text{ ns}$
- Protect one I/O or power line
- Low clamping Voltage
- RoHS compliant
- Transient protection for data lines to IEC 61000-4-2(ESD)  $\pm 30\text{KV}$ (air),  $\pm 30\text{KV}$ (contact); IEC 61000-4-4 (EFT) 40A (5/50ns), IEC 61000-4-5 (Lightning) 80A (8/20us)



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



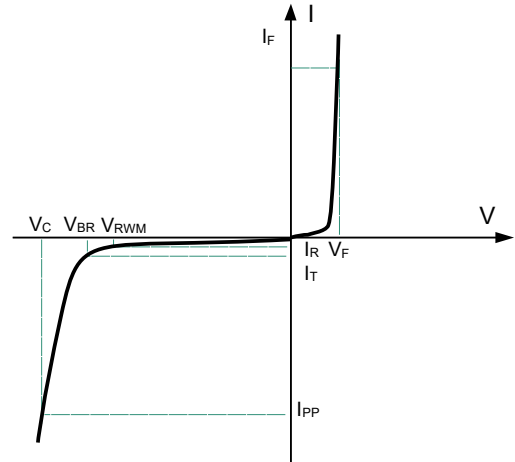
Marking (Top View)

### Mechanical Characteristics

- Lead finish: 100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:  $260^\circ\text{C}$
- Pure tin plating: 7 ~ 17  $\mu\text{m}$
- 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
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$



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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Peak Reverse Working Voltage	$V_{RWM}$				12	V
Breakdown Voltage	$V_{BR}$	$I_t = 1\text{mA}$	13	14.5		V
Reverse Leakage Current	$I_R$	$V_{RWM} = 12\text{V}$			1	$\mu\text{A}$
Maximum Reverse Peak Pulse Current	$I_{PP}$			130		A
Clamping Voltage	$V_C$	$I_{PP} = 20\text{A}$ $t_p = 8/20\mu\text{s}$		17	19	V
Clamping Voltage	$V_C$	$I_{PP} = 40\text{A}$ $t_p = 8/20\mu\text{s}$		19	21	V
Clamping Voltage	$V_C$	$I_{PP} = 90\text{A}$ $t_p = 8/20\mu\text{s}$		21	23	V
Clamping Voltage	$V_C$	$I_{PP} = 130\text{A}$ $t_p = 8/20\mu\text{s}$		23	25	V
Junction Capacitance	$C_j$	$V_R = 0\text{V}$ $f = 1\text{MHz}$		700	800	pF

Notes : Measured from pin 3 to pin 1 and pin 2.

Absolute maximum rating@25°C

Rating	Symbol	Value	Units
Peak Pulse Power ( $t_p = 8/20\mu\text{s}$ )	$P_{PP}$	3000	W
Lead Soldering Temperature	$T_L$	260 (10 sec)	°C
Operating Temperature	$T_J$	-55 to 125	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C

Typical Characteristics

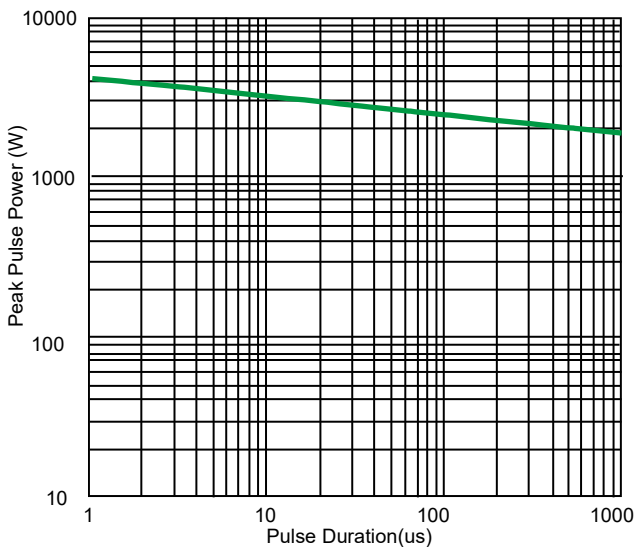
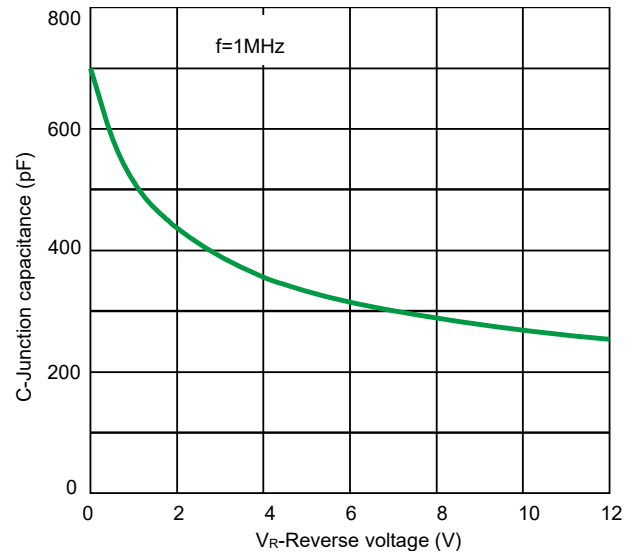
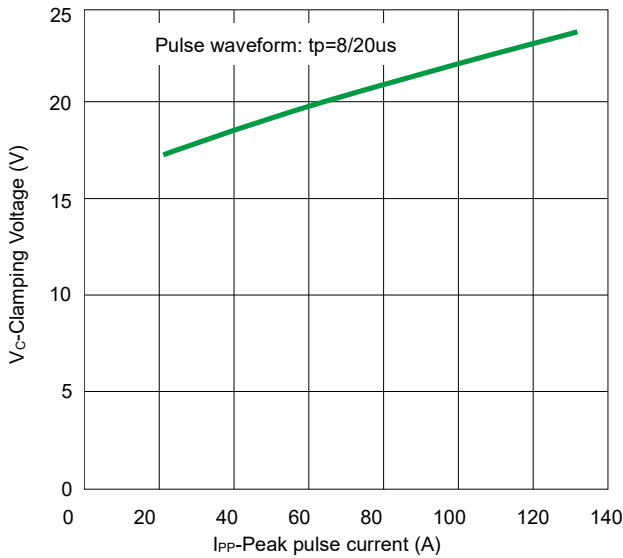
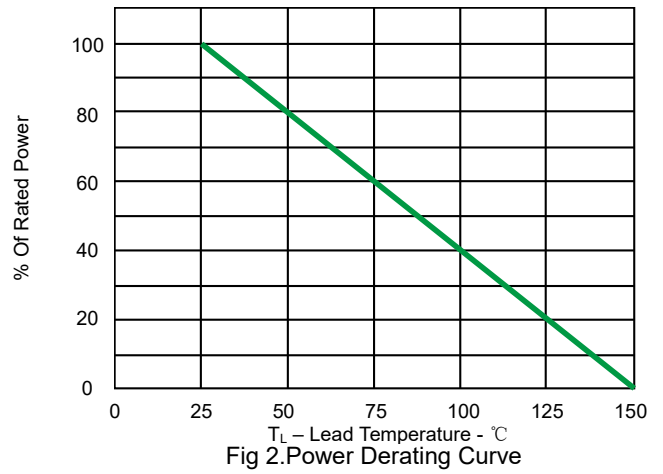
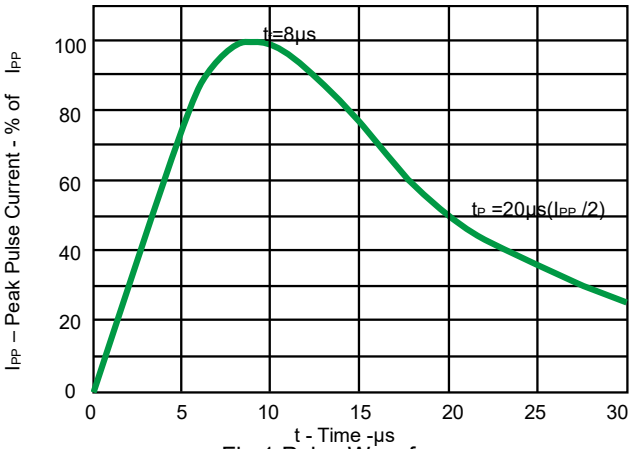
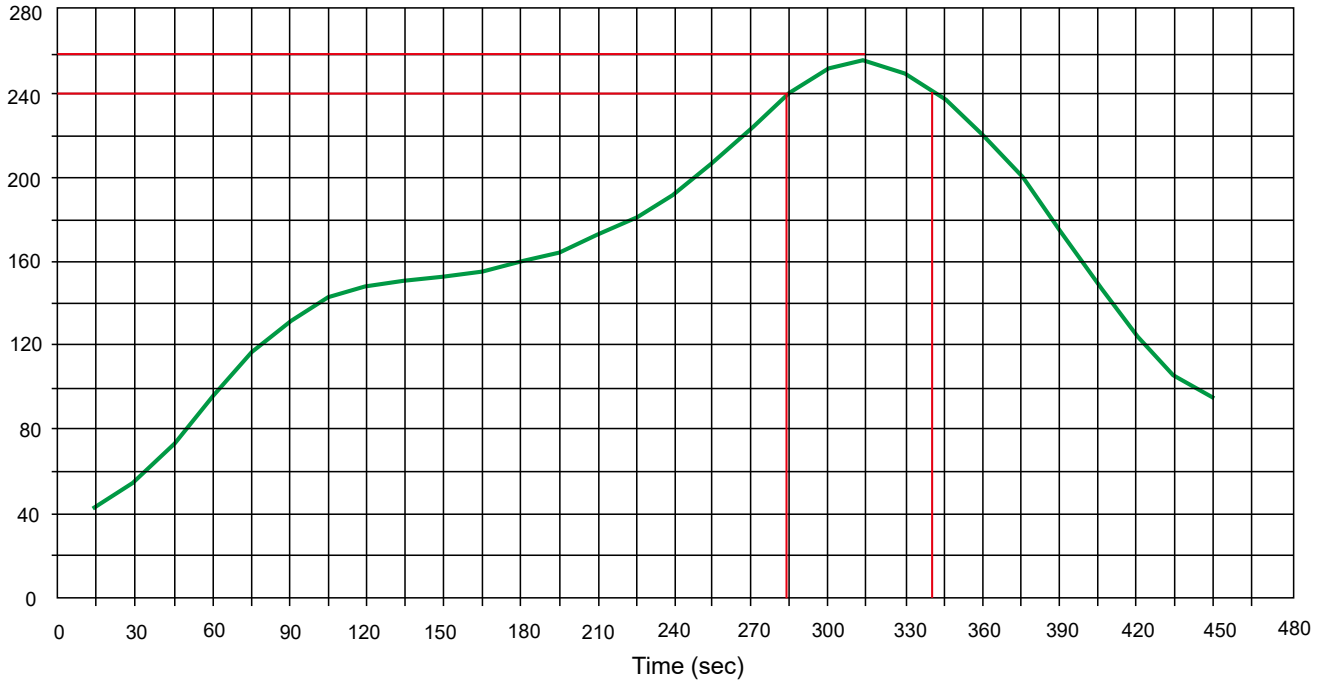


Fig 5. Non Repetitive Peak Pulse Power vs. Pulse time

## Solder Reflow Recommendation

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

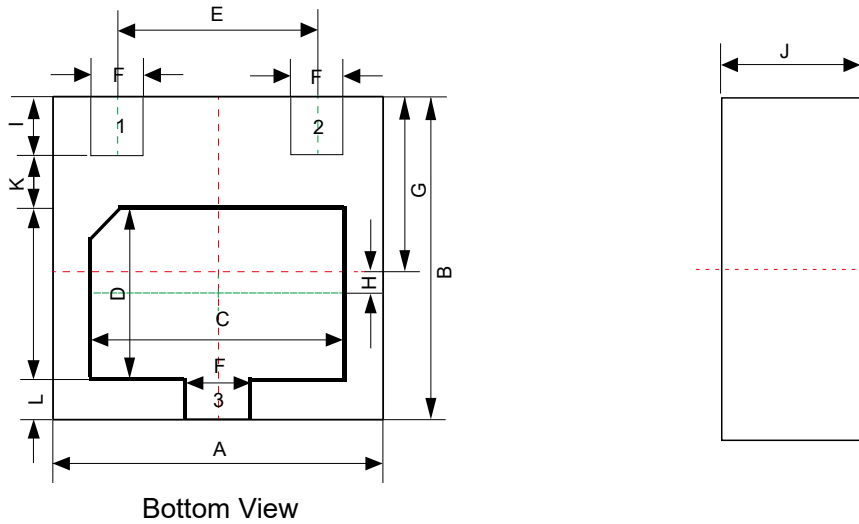


## PCB Design

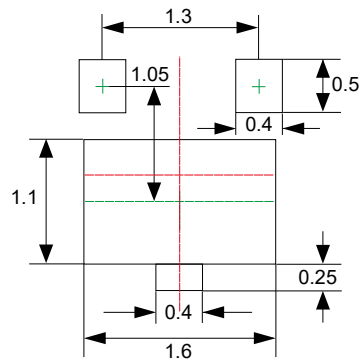
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- 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 (DFN2×2-3L)



Dim	Millimeters	
	MIN	MAX
A	1.90	2.10
B	1.90	2.10
C	1.40	1.60
D	0.90	1.15
E	1.30BSC	
F	0.25	0.40
G	0.90	1.10
H	0.20	0.30
I	0.32	0.48
J	0.50	0.65
K	0.20	0.45
L	0.15	0.30



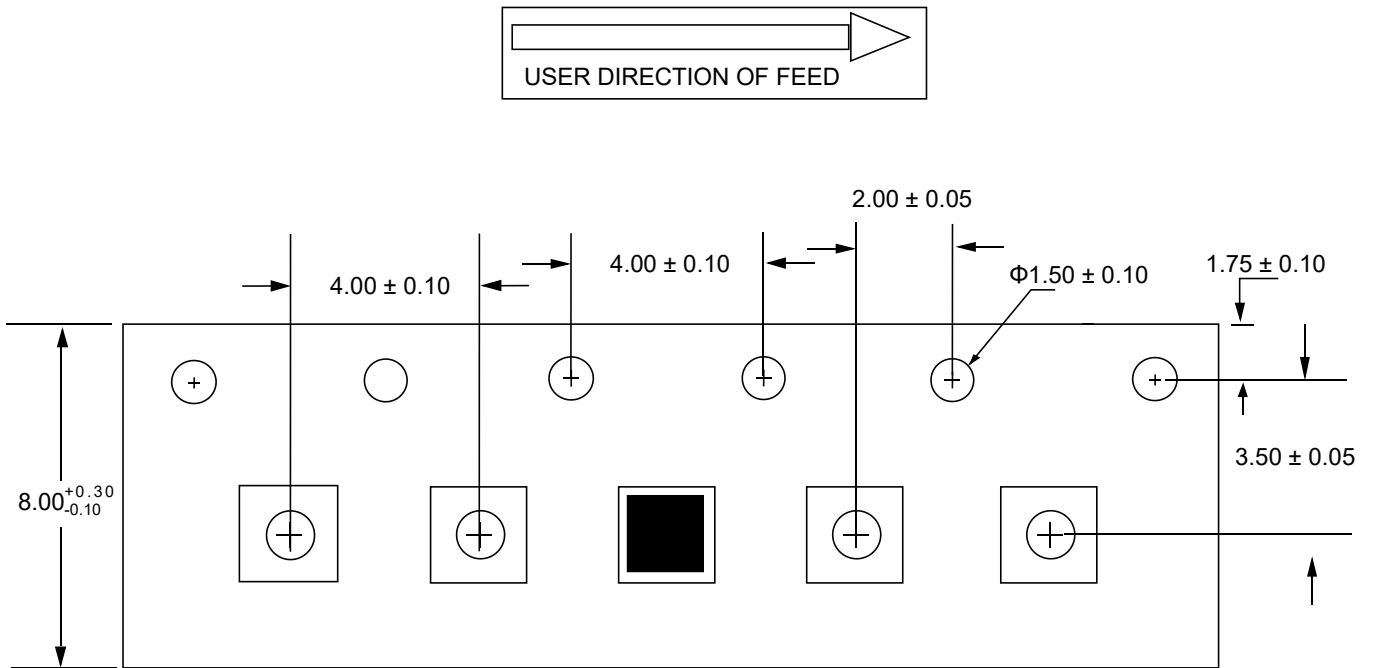
Recommended Soldering Pad

Unit:mm


Ordering information

Device	Package	Reel	Shipping
PTVSHC3N12VUL1	DFN2×2-3L (Pb-Free)	7"	3000 / Tape & Reel

Load with information




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