

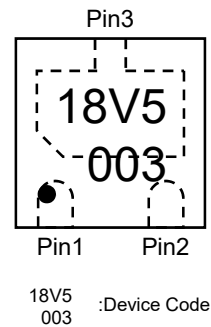
Description

The PTVSHC3N18V5 transient voltage suppressor is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's.

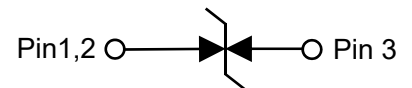
They feature large cross-sectional area junctions for conducting high transient currents, offer desirable electrical characteristics for board level protection, such as fast response time, lower operating voltage, lower clamping voltage and no device degradation when compared to MLVs.

The PTVSHC3N18V5 protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events.

It is used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ($\pm 30\text{kV}$ air, $\pm 30\text{kV}$ contact discharge)



Marking (Top View)



Circuit Diagram

Feature

- Peak pulse power ($t_p=8/20\mu\text{s}$) :
 - Pin1,2 to Pin3: 2750W
 - Pin3 to Pin1,2: 6500W
- DFN2020-3L package
- Response time is typically $< 1\text{ ns}$
- Protect one I/O or power line
- RoHS compliant
- Transient protection for data lines to
 - IEC 61000-4-2(ESD) $\pm 30\text{kV}$ (air), 30kV (contact);
 - IEC 61000-4-5 (Lightning)
 - 220A (8/20us, Pin1,2 to Pin3);
 - 200A (8/20us, Pin3 to Pin1,2)

Applications

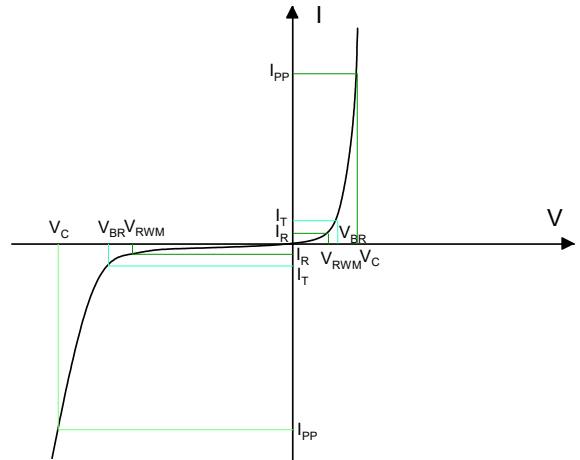
- Power Management
- Industrial Application
- Power Supply Protection
- Cell phone handsets and accessories
- Personal digital assistants (PDA's)
- Notebooks, desktops, and servers
- Portable instrumentation
- Cordless phones
- Peripherals

Mechanical Characteristics

- Lead finish: 100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature: 260°C
- Pure tin plating: $7 \sim 17\text{ }\mu\text{m}$
- Device meets MSL 3 requirements

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}	Pin 1,2 to Pin 3	-	-	5.0	V
		Pin 3 to Pin 1,2	-	-	18	
Breakdown Voltage	V_{BR}	$I_T = 1\text{mA}$, Pin 1,2 to Pin 3	5.6	7.6	8.0	V
		$I_T = 1\text{mA}$, Pin 3 to Pin 1,2	21	22.3	25	
Reverse Leakage Current	I_R	$V_{RWM}=5\text{V}$, Pin 1,2 to Pin 3	-	-	300	nA
		$V_{RWM}=18\text{V}$, Pin 3 to Pin 1,2	-	-	300	
Clamping Voltage ¹⁾	V_C	TLP = 16A, $t_p = 100\text{ns}$, Pin 1,2 to Pin 3	-	10	-	V
		TLP = 16A, $t_p = 100\text{ns}$, Pin 3 to Pin 1,2	-	22	-	
Dynamic resistance ¹⁾	R_{DYN}	Pin 1,2 to Pin 3	-	0.08	-	Ω
		Pin 3 to Pin 1,2	-	0.06	-	
Clamping Voltage ²⁾	V_C	$t_p = 8/20\mu\text{s}$, Pin 1,2 to Pin 3, $I_{PP} = 150\text{A}$	-	9.5	11.5	V
		$t_p = 8/20\mu\text{s}$, Pin 1,2 to Pin 3, $I_{PP} = 220\text{A}$	-	12.5	14	
		$t_p = 8/20\mu\text{s}$, Pin 3 to Pin 1,2, $I_{PP} = 150\text{A}$	-	28	32	
		$t_p = 8/20\mu\text{s}$, Pin 3 to Pin 1,2, $I_{PP} = 200\text{A}$	-	32.5	34	
Junction Capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$	-	565	800	pF

Notes:

1. TLP parameter: $Z_0=50\Omega$, $t_p=100\text{ns}$, $t_r=2\text{ns}$, averaging window from 70ns to 90ns. R_{DYN} is calculated from 4A to 16A.

2. Non-repetitive current pulse, according to IEC61000-4-5.

Absolute maximum rating@25°C

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PP} , Pin 1,2 to Pin 3	2750	W
	P_{PP} , Pin 3 to Pin 1,2	6500	
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP} , Pin 1,2 to Pin 3	220	A
	I_{PP} , Pin 3 to Pin 1,2	200	
Lead Soldering Temperature	T_L	260 (10 sec)	°C
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	°C
ESD Protection-Contact Discharge	V_{ESD}	± 30	kV
ESD Protection-Air Discharge	V_{ESD}	± 30	kV

Typical Characteristics

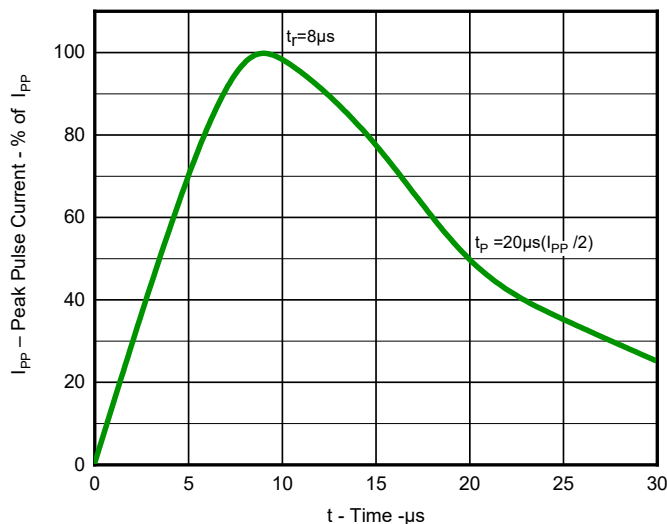


Fig 1. Pulse Waveform(8/20 μs)

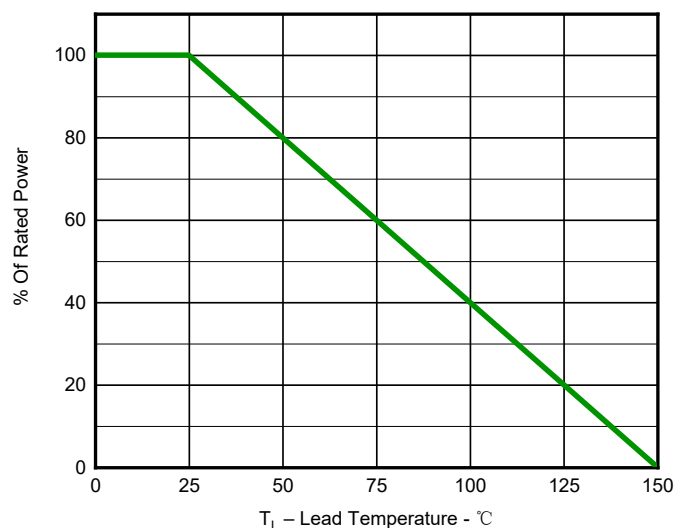


Fig 2. Power Derating Curve

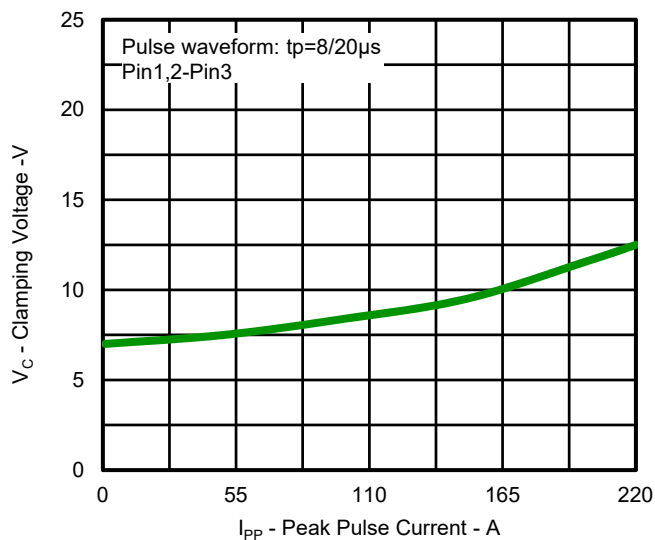


Fig.3 Clamping Voltage vs. Peak Pulse Current

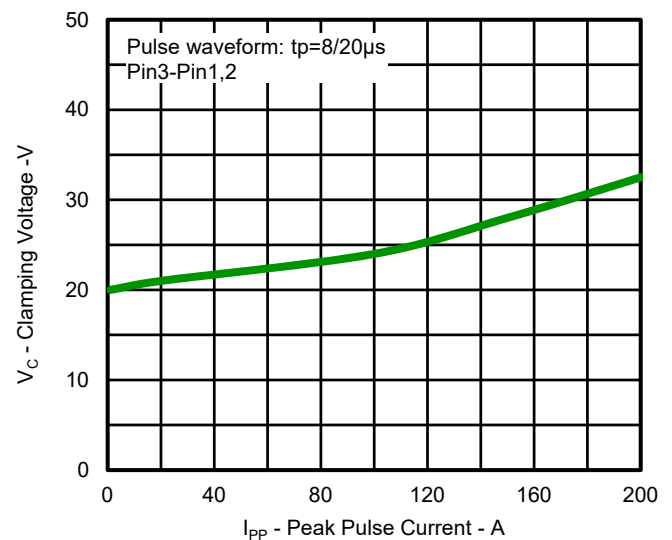


Fig.4 Clamping Voltage vs. Peak Pulse Current

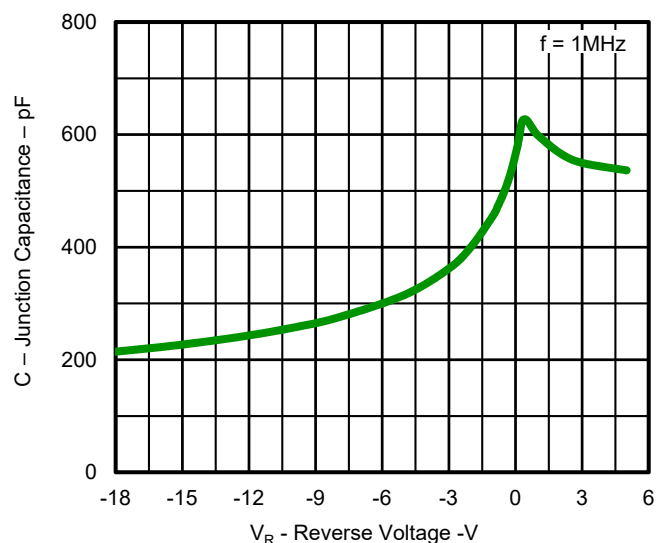


Fig.5 Capacitance vs. Reverse Voltage

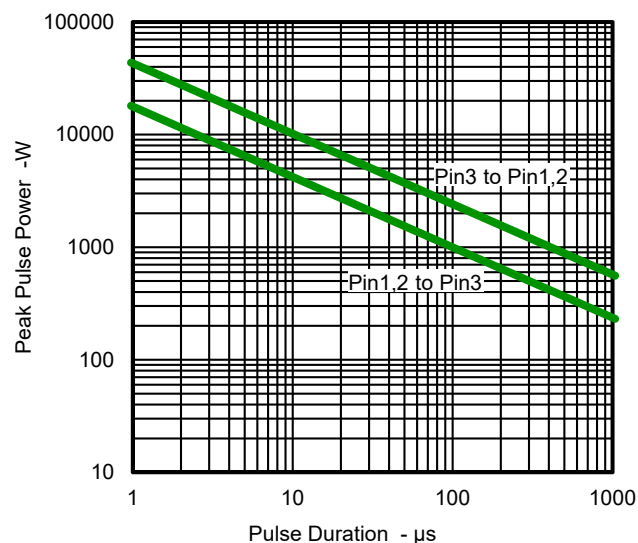


Fig.6 Non-Repetitive Peak Pulse Power vs. Pulse Time

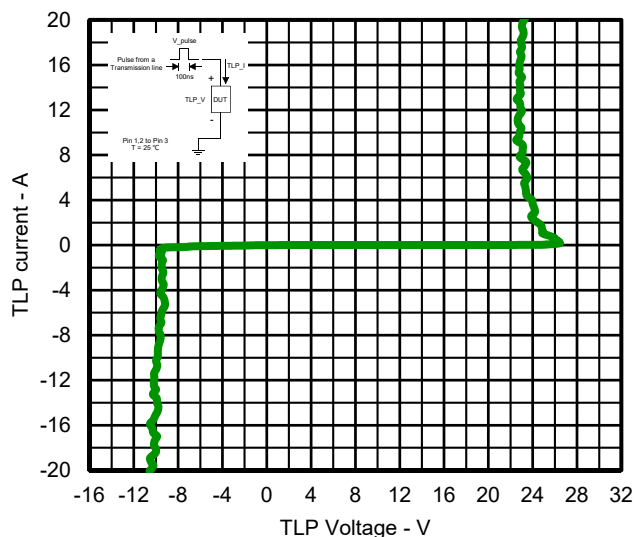
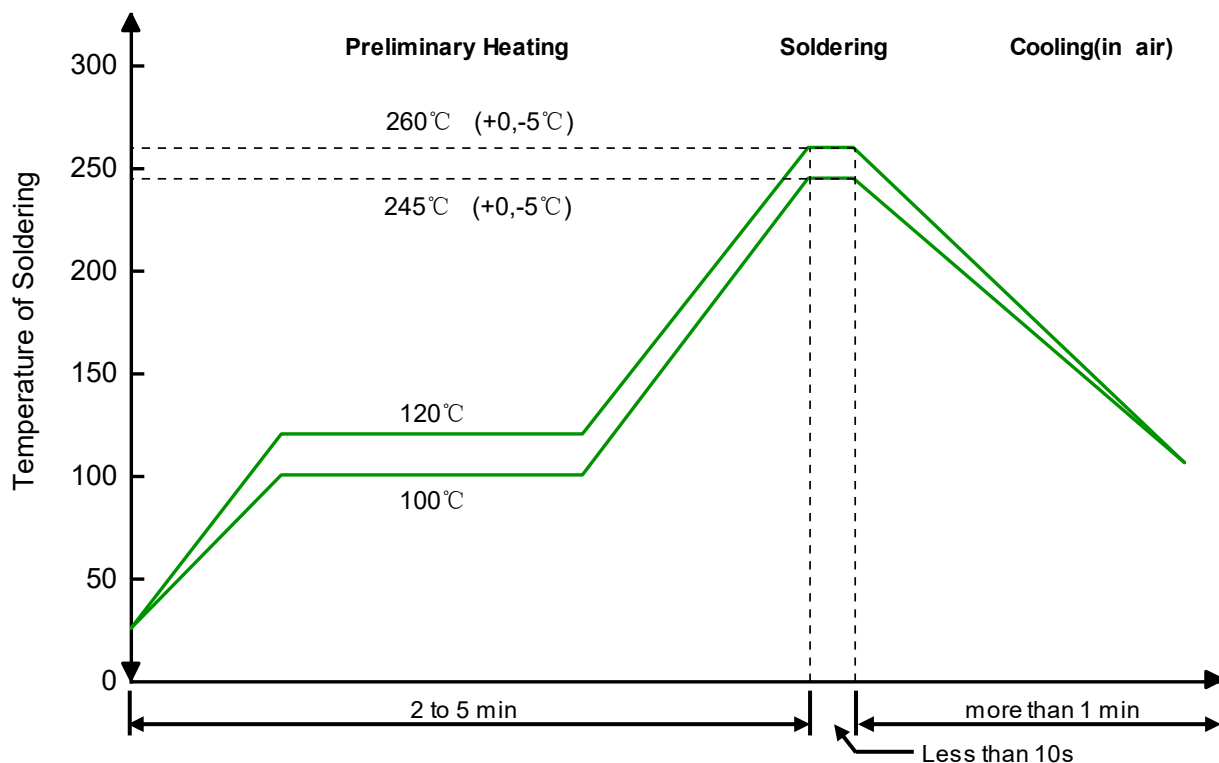


Fig.7 TLP Measurement

Solder Reflow Recommendation



Remark: Pb free for 260°C; Pb for 245°C.

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.

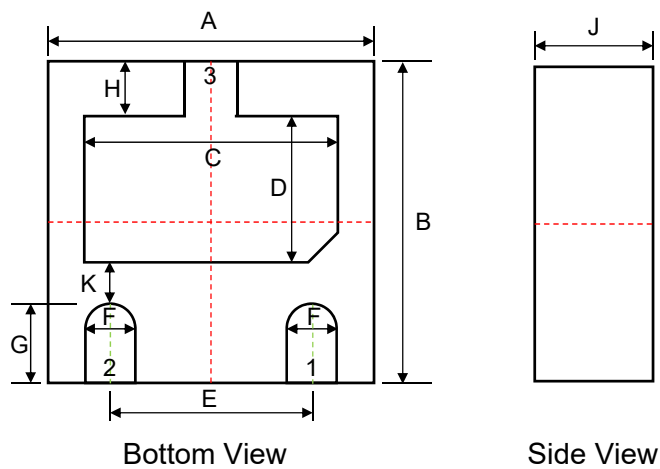
Ordering information

Package	Reel	Shipping
DFN2020-3L	7"	3000 / Tape & Reel

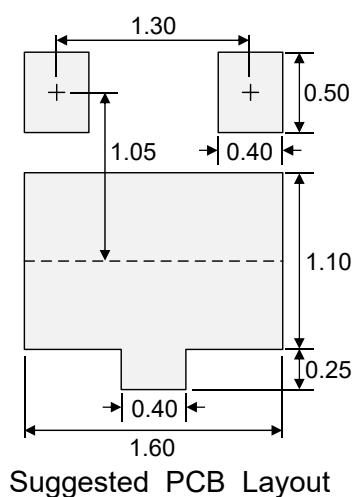
Transient Voltage Suppressor

PTVSHC3N18V5

Product dimension (DFN2020-3L)

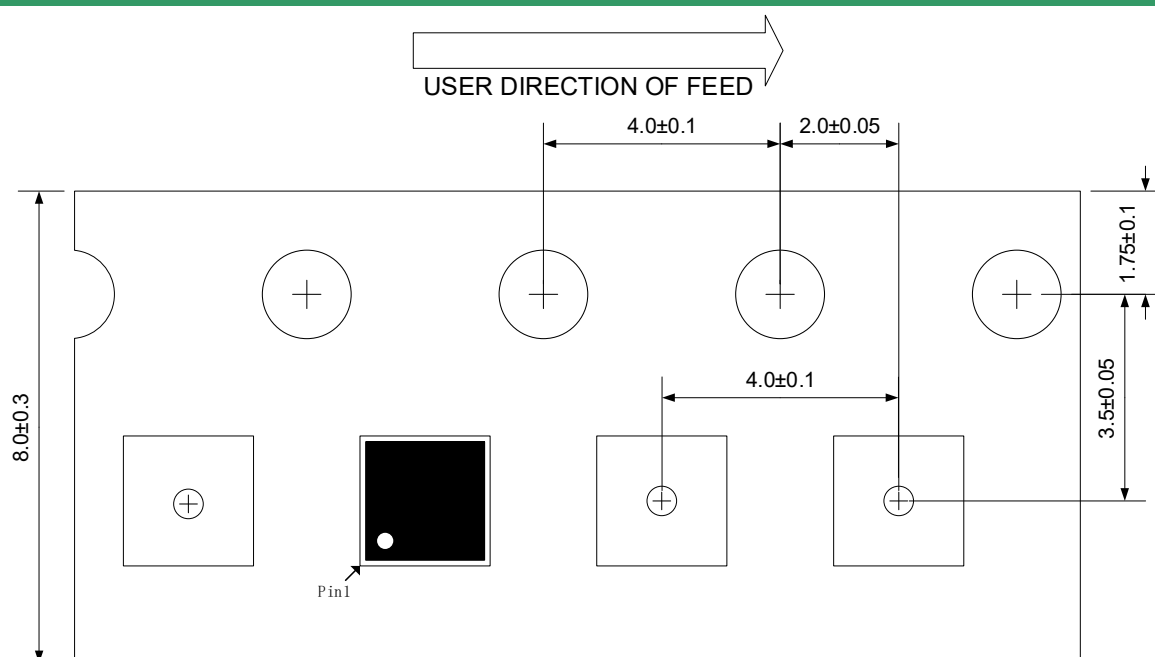


Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	1.90	2.10	0.075	0.083
B	1.90	2.10	0.075	0.083
C	1.40	1.60	0.055	0.063
D	0.90	1.15	0.035	0.045
E	1.30 BSC		0.051 BSC	
F	0.25	0.35	0.010	0.014
G	0.35	0.45	0.014	0.018
H	0.15	0.30	0.006	0.012
J	0.50	0.60	0.020	0.024
K	0.30 BSC		0.012 BSC	



Unit: mm

Load with information



Unit:mm

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