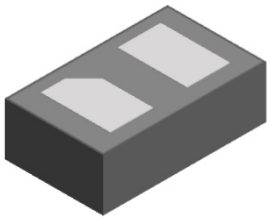
Prisemi®

# PESDNC2XD12VB

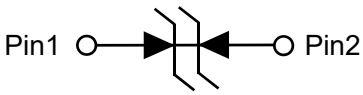
## Bi-directional 12V Normal Capacitance ESD Protector

## Description

The PESDNC2XD12VB protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. 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, low operating voltage. It gives designer the flexibility to protect one unidirectional line in applications where arrays are not practical.



**DFN0603-2L(Bottom View)**




**Circuit Diagram**

## Feature

- 130W peak pulse power per line ($t_P$ = 8/20μs)
- DFN0603-2L package
- Response time is typically < 1 ns
- Bidirectional configurations
- Low clamping voltage
- RoHS compliant
- Transient protection for data lines to
  IEC 61000-4-2(ESD) ±30kV(air), ± 30kV(contact);
  IEC 61000-4-5 (Lightning) 5A (8/20us)


**Marking (Top View)**

## Applications

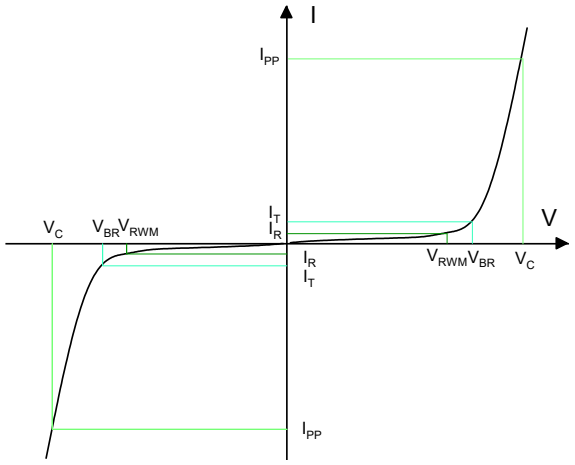
- Cell phone handsets and accessories
- Personal digital assistants (PDA's)
- Notebooks, desktops, and servers
- Portable instrumentation
- Cordless phones
- Digital cameras
- Peripherals

## Mechanical Characteristics

- Mounting position: Any
- Qualified max reflow temperature:260℃
- Device meets MSL 1 requirements
- DFN0603-2L without plating

## 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 | $V_{RWM}$ | - | - | - | 12 | V |
| Breakdown Voltage | $V_{BR}$ | $I_t$ = 1mA | 13 | 15 | 17 | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 12V | - | - | 1.0 | μA |
| Clamping Voltage[1)] | $V_C$ | TLP = 16A, $t_p$ = 100ns | - | 22.5 | - | V |
| Dynamic resistance[1)] | $R_{DYN}$ | - | - | 0.35 | - | Ω |
| Clamping Voltage[2)] | $V_C$ | $I_{PP}$ = 1A,$t_P$ = 8/20μs | - | 18 | 20 | V |
| | | $I_{PP}$ = 5A,$t_P$ = 8/20μs | - | 25 | 27 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V,f = 1MHz | - | 12 | 18 | pF |

Notes:
1.TLP parameter: $Z_0$=50Ω, $t_p$=100ns, $t_r$=2ns, averaging window from 60ns to 80ns. $R_{DYN}$ is calculated from 4A to 16A.
2.Non-repetitive current pulse, according to IEC61000-4-5.

## Absolute maximum rating@25℃

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power ( $t_P$ = 8/20μs ) | $P_{PP}$ | 130 | W |
| Peak Pulse Current ( $t_P$ = 8/20μs ) | $I_{PP}$ | 5 | A |
| Lead Soldering Temperature | $T_L$ | 260 (10 sec) | ℃ |
| Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55~+150 | ℃ |
| ESD Protection-Contact Discharge | $V_{ESD}$ | ±30 | kV |
| ESD Protection-Air Discharge | $V_{ESD}$ | ±30 | kV |

## Typical Characteristics

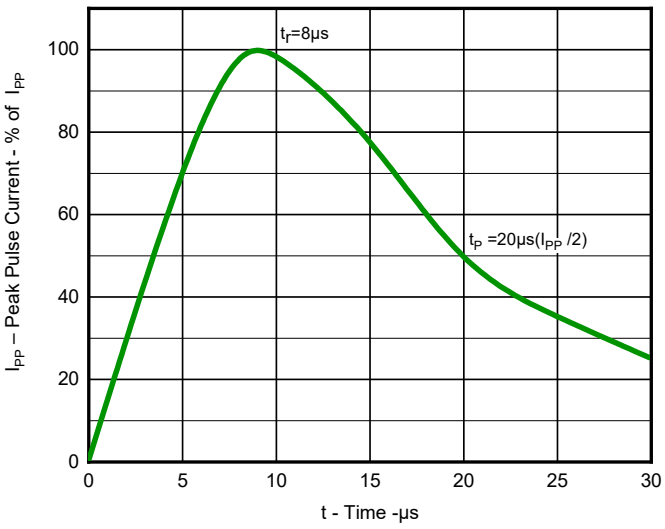



**Fig 1.Pulse Waveform(8/20μs)**

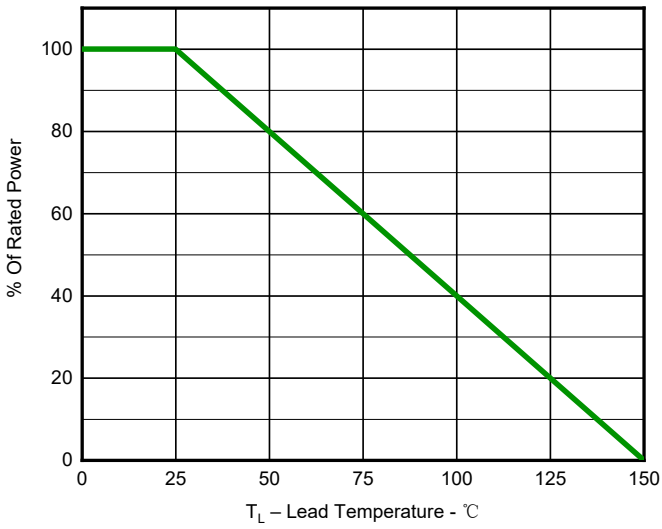



**Fig 2.Power Derating Curve**

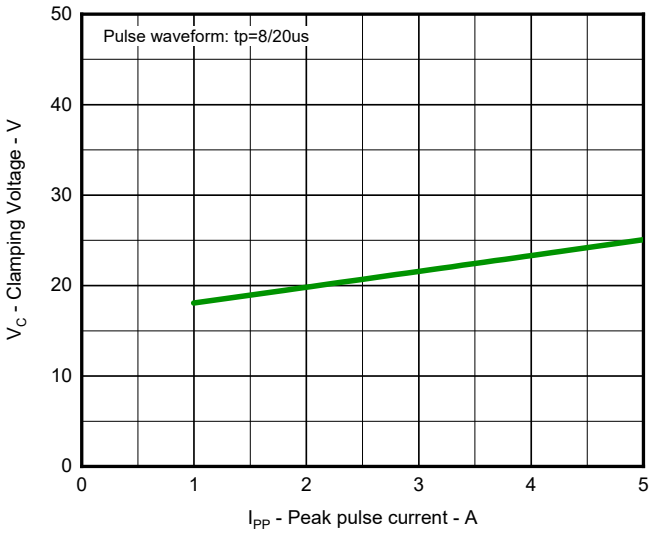



**Fig 3. Clamping voltage vs. Peak pulse current**

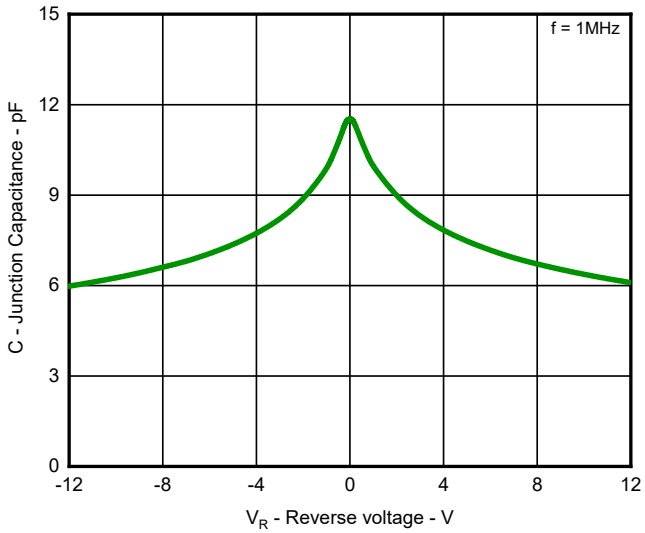



**Fig 4. Capacitance vs. Reveres voltage**

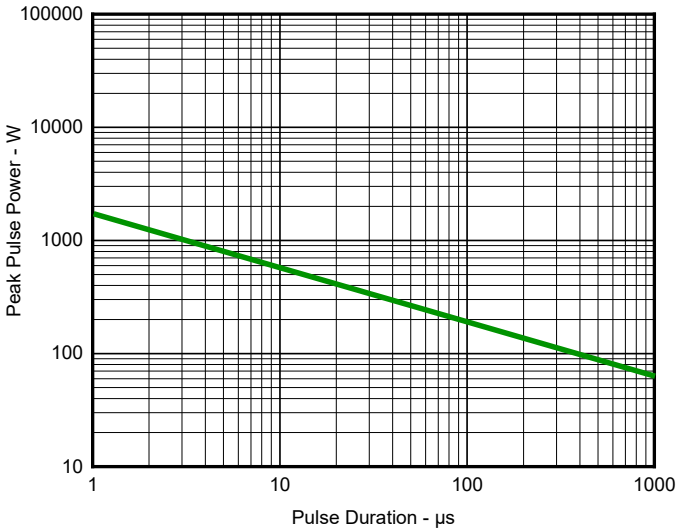



**Fig 5. Non Repetitive Peak Pulse Power vs. Pulse time**

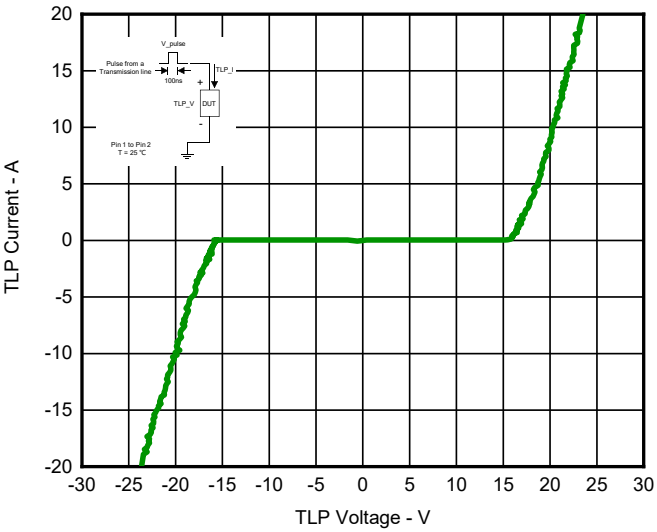



**Fig 6. TLP Measurement**

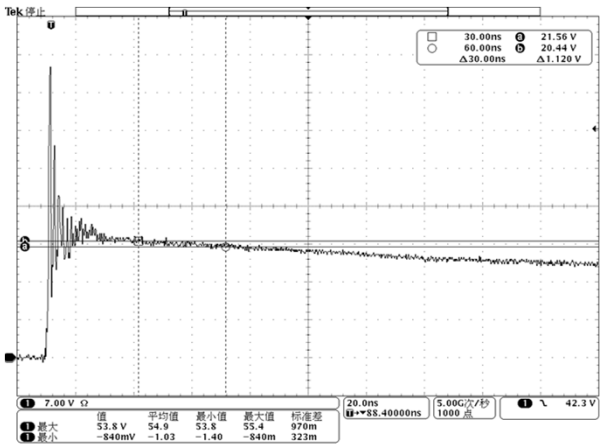


Fig 7. Clamping Voltage at IEC61000-4-2 +8kV Pulse Waveform

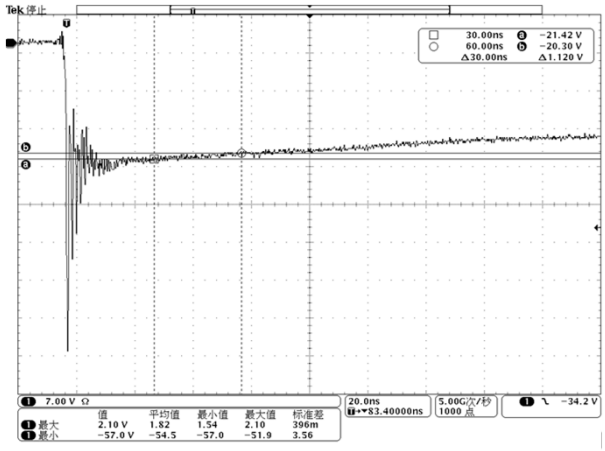
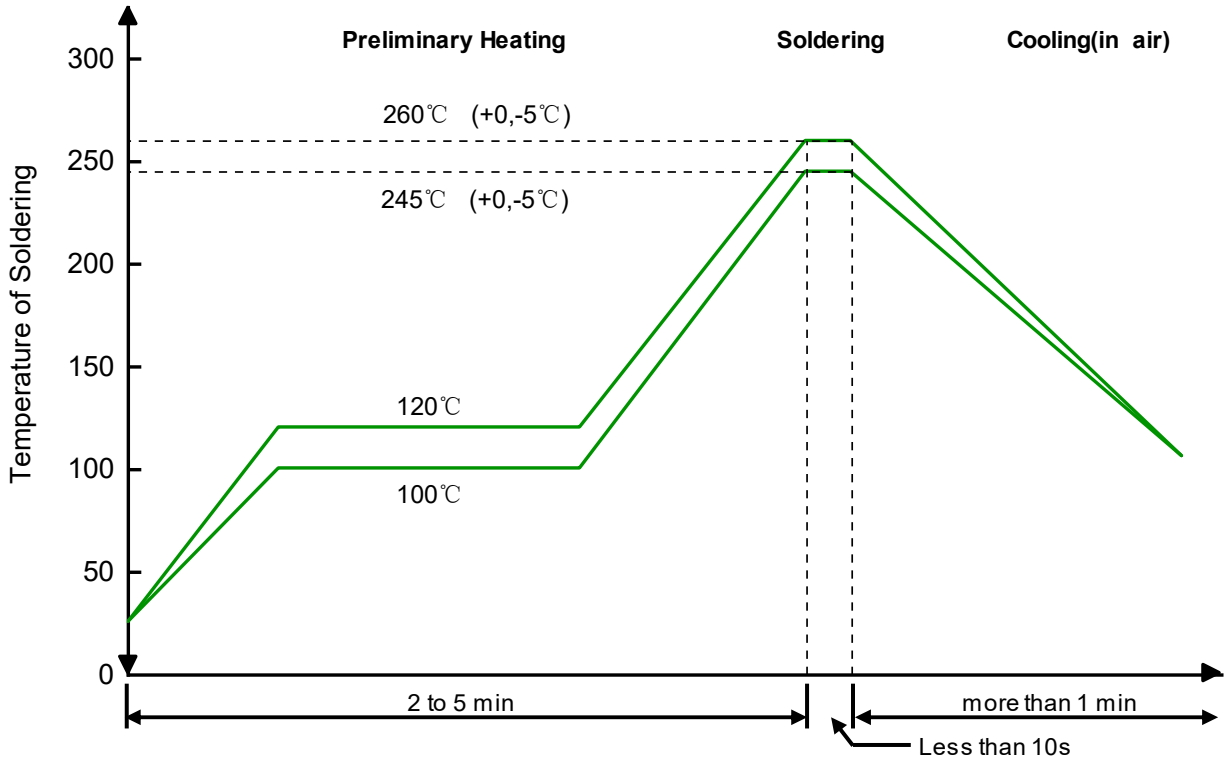


Fig 8. Clamping Voltage at IEC61000-4-2 -8kV Pulse Waveform

## Solder Reflow Recommendation




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

## PCB Design

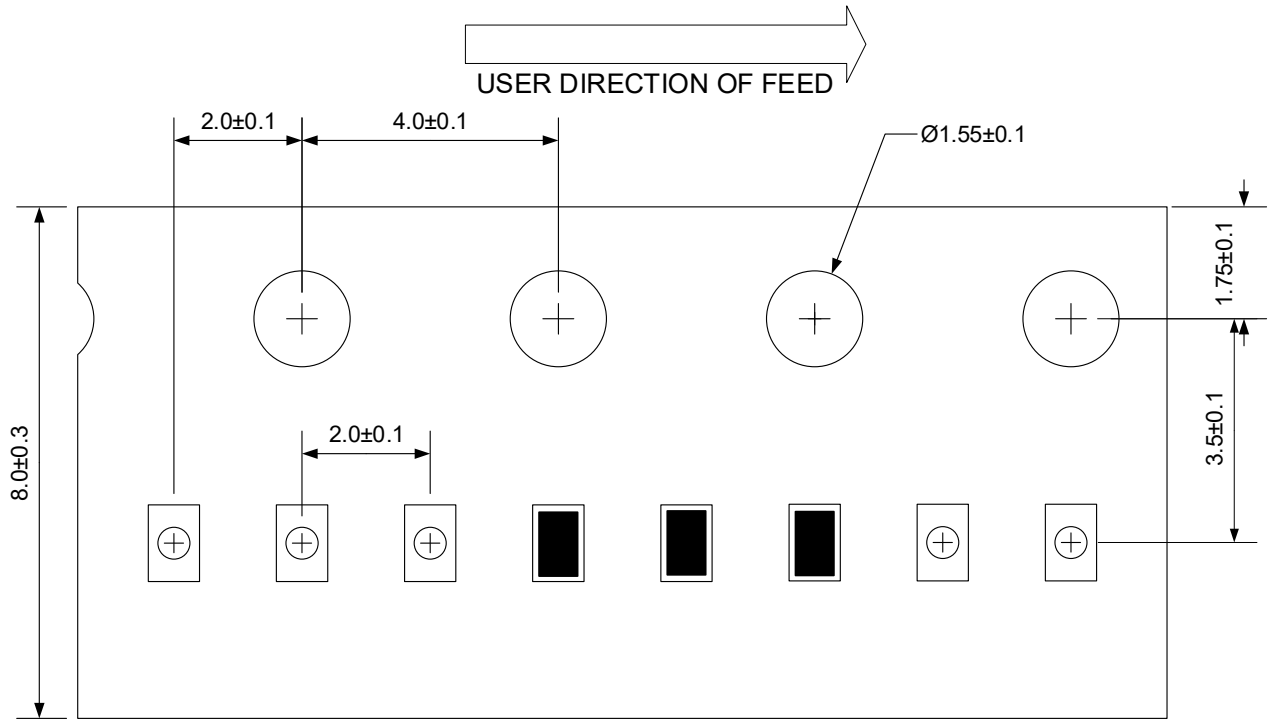
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- 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

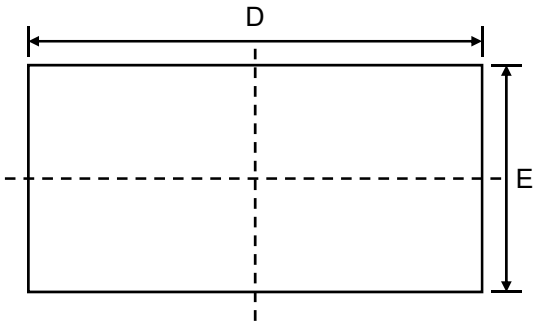
| Device | Package | Reel | Shipping |
|---|---|---|---|
| PESDNC2XD12VB | DFN0603-2L (Pb-Free) | 7" | 10000 / Tape & Reel |

## Load with information

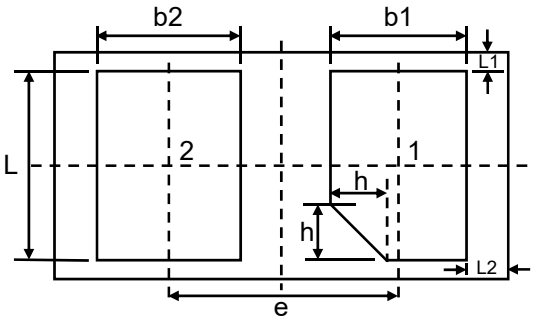



Unit:mm

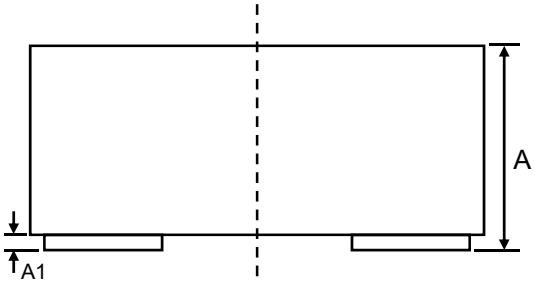
## Product dimension (DFN0603-2L)




Top View

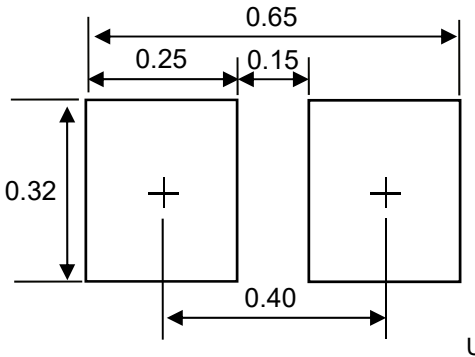



Bottom View




Side View

| Dim | Millimeters | | | Inches | | |
|---|---|---|---|---|---|---|
| | Min | Nom | Max | Min | Nom | Max |
| A | 0.28 | 0.31 | 0.34 | 0.011 | 0.012 | 0.013 |
| A1 | 0.00 | 0.025 | 0.05 | 0.000 | 0.001 | 0.002 |
| b1 | 0.155 | 0.18 | 0.205 | 0.006 | 0.007 | 0.008 |
| b2 | 0.155 | 0.18 | 0.205 | 0.006 | 0.007 | 0.008 |
| D | 0.59 | 0.62 | 0.64 | 0.023 | 0.024 | 0.025 |
| E | 0.29 | 0.32 | 0.34 | 0.011 | 0.013 | 0.013 |
| e | 0.36 BSC | | | 0.014 BSC | | |
| L | 0.215 | 0.24 | 0.265 | 0.008 | 0.009 | 0.010 |
| L1 | 0.04 BSC | | | 0.002 BSC | | |
| L2 | 0.04 BSC | | | 0.002 BSC | | |
| h | 0.05 | 0.075 | 0.10 | 0.002 | 0.003 | 0.004 |




Unit:mm

Suggested PCB Layout

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