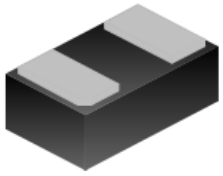
Bi-directional 3.3V Ultra Small Capacitance ESD Protector

Description

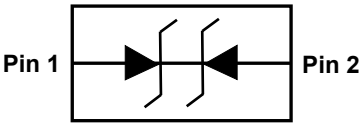
The PESDUC2FD3V3B ESD protector is designed to replace multilayer varistors(MLVs) in portable applications such as cell phones, notebook computers, and PDA's. They feature large cross-sectional area junctions for conducting high transient currents, offer desirable electrical characteristics for board level protection, such as fast response time, lower operating voltage, lower clamping voltage and no device degradation when compared to MLVs. The PESDUC2FD3V3B protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The PESDUC2FD3V3B is available in a DFN1006-2L package with working voltages of 3.3 volt. It gives designer the flexibility to protect one bidirectional line in applications where arrays are not practical. Additionally, it may be "sprinkled" around the board in applications where board space is at a premium.



DFN1006-2L(Bottom View)

Feature

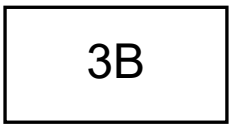
- Ultra low capacitance 0.35pF
- DFN1006-2L package
- Replacement for MLV(0402)
- Bidirectional configurations
- Response time is typically < 1ns
- Protect one I/O or power line
- Low clamping voltage
- RoHS compliant
- Transient protection for data lines to
  IEC61000-4-2(ESD) ±25kV(air), ±25kV(contact);
  IEC61000-4-4 (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



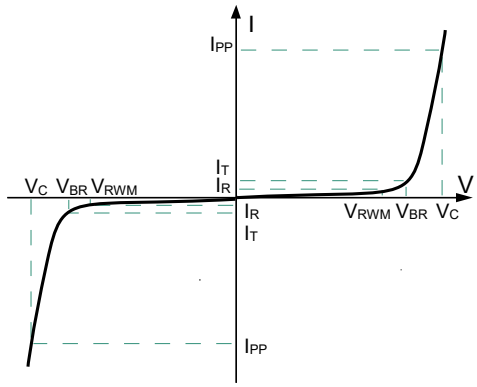
Marking (Top View)

Mechanical Characteristics

- DFN1006-2L without plating
- Mounting position: Any
- Qualified max reflow temperature:260℃
- Device meets MSL 1 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



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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Peak Reverse Working Voltage	V_{RWM}				3.3	V
Breakdown Voltage	V_{BR}	I_t = 1mA	4.8			V
Reverse Leakage Current	I_R	V_{RWM} =3.3V			1.0	μA
Clamping Voltage	V_C	I_{PP}=1A t_P = 8/20μS		9.5	11.0	V
Clamping Voltage	V_C	I_{PP}=3A t_P = 8/20μS		16.5	19.0	V
Junction Capacitance	C_j	V_R=0V f = 1MHz		0.2	0.35	pF

Absolute maximum rating@25℃

Rating	Symbol	Value	Units
Peak Pulse Power (t_p=8/20μs)	P_{pp}	45	W
Lead Soldering Temperature	T_L	260(10 sec)	℃
Operating Temperature	T_J	-55 to 125	℃
Storage Temperature	T_{STG}	-55 to 150	℃

Typical Characteristics

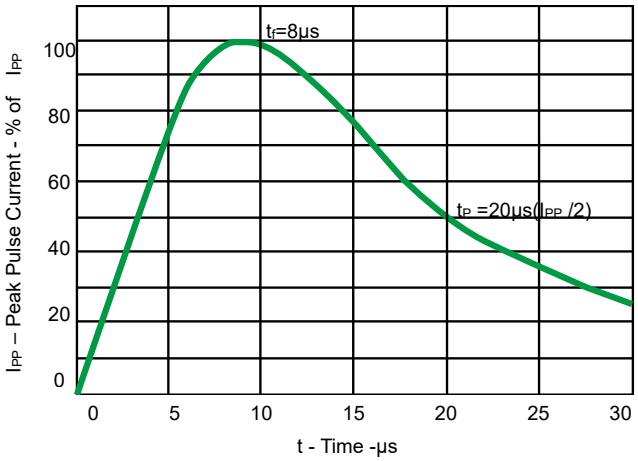


Fig 1.Pulse Waveform

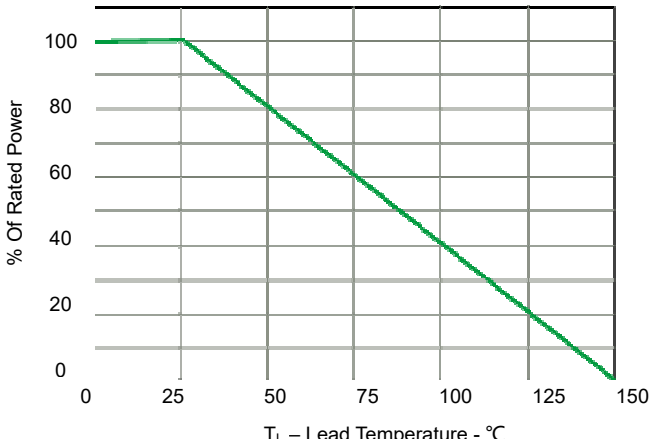


Fig 2.Power Derating Curve

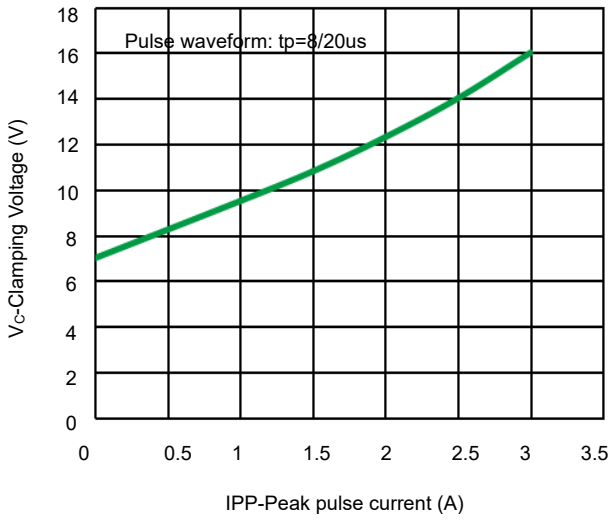


Fig 3. Clamping voltage vs. Peak pulse current

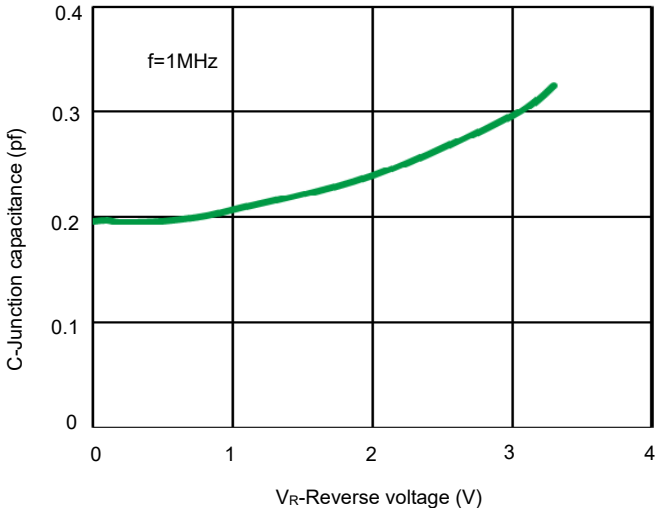


Fig 4. Capacitance vs. Reveres voltage

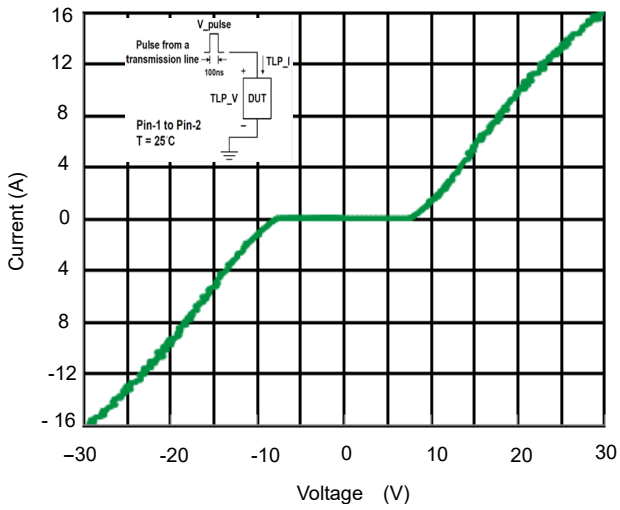


Fig 5. TLP Measurement

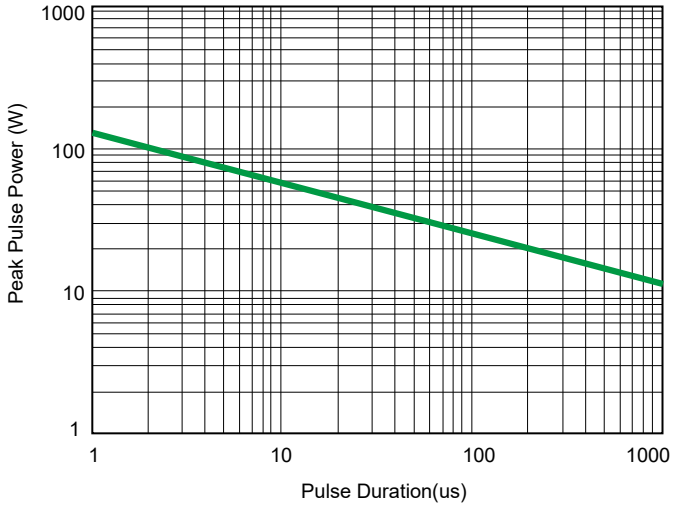


Fig 6 Non Repetitive Peak Pulse Power vs. Pulse time

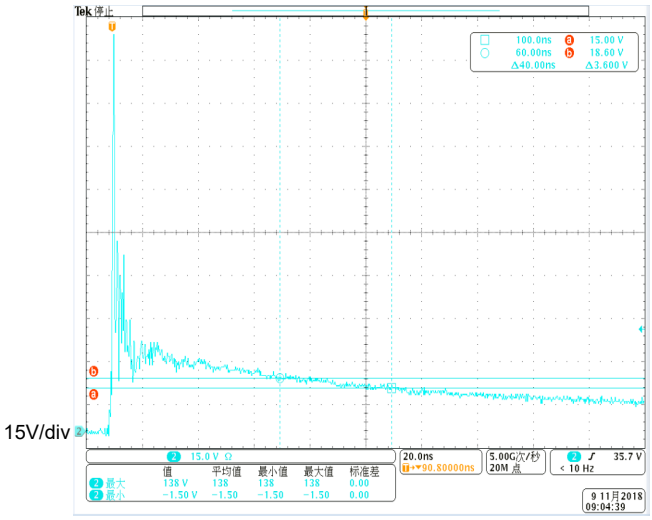


Fig 7 ESD clamping voltage
(IEC61000-4-2+8kv contact)

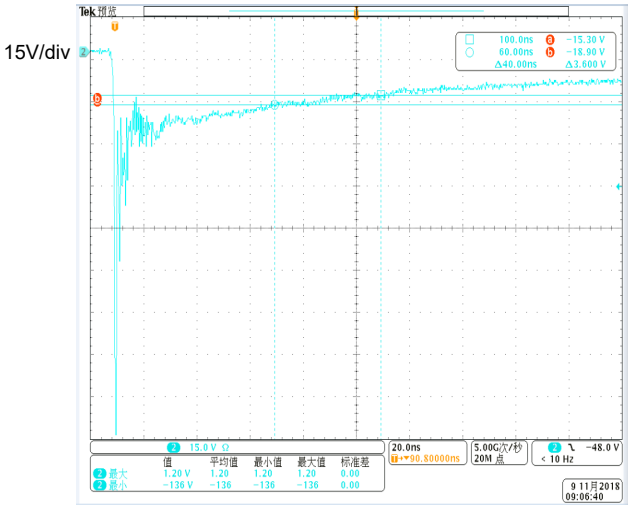
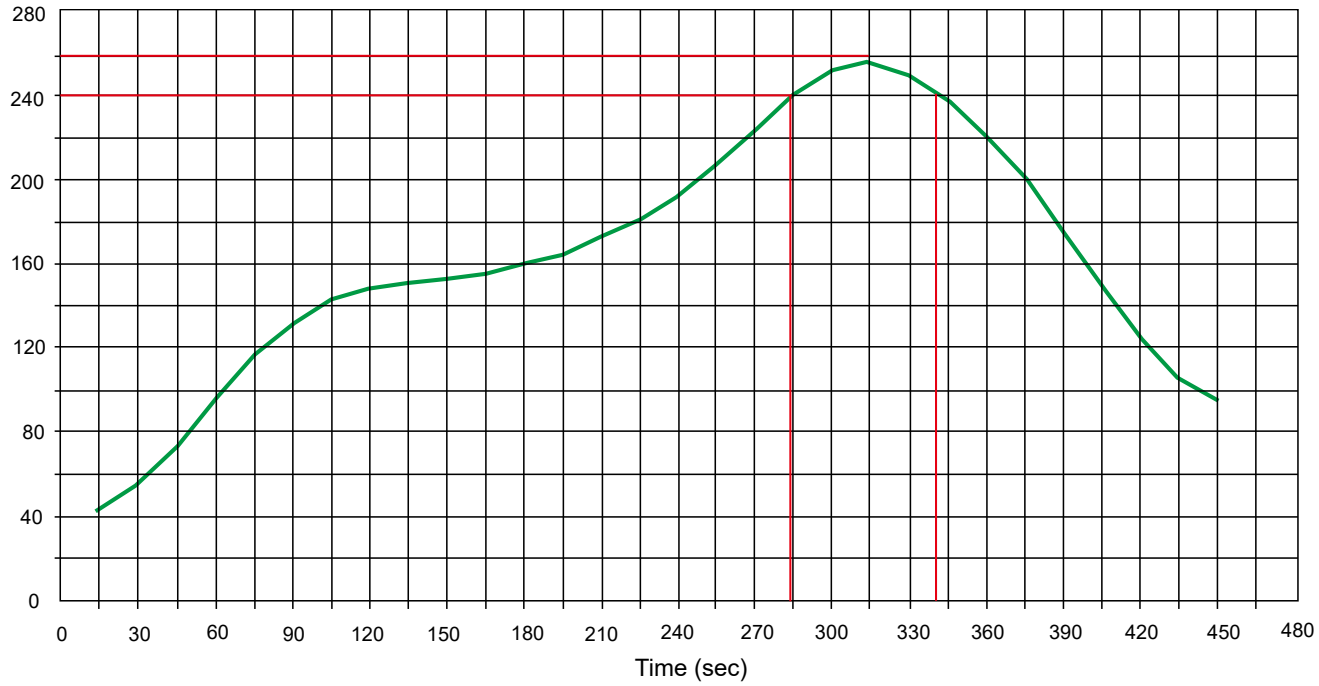


Fig 8 ESD clamping voltage
(IEC61000-4-2-8kv contact)

Solder Reflow Recommendation

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

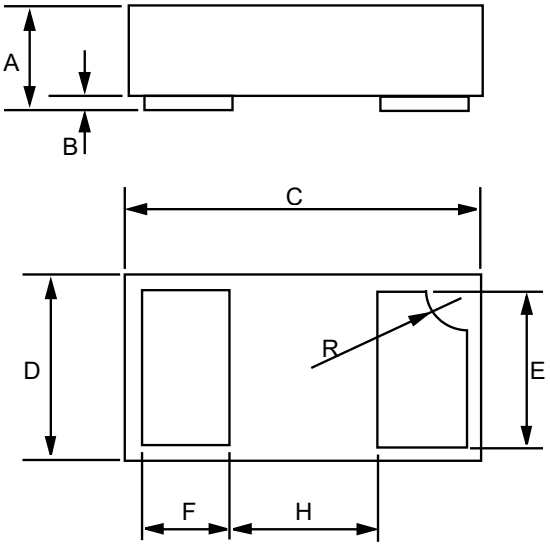


PCB Design

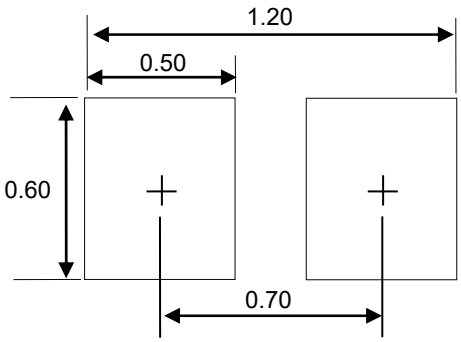
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- 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 (DFN1006-2L)



Dim	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.013	0.020	0.34	0.498
B	0.000	0.002	0.00	0.05
C	0.037	0.043	0.95	1.080
D	0.022	0.027	0.55	0.680
E	0.016	0.024	0.40	0.60
F	0.008	0.012	0.20	0.30
H	0.015Typ.		0.40Typ.	
R	0.001	0.005	0.05	0.15



Unit:mm

Suggested PCB Layout

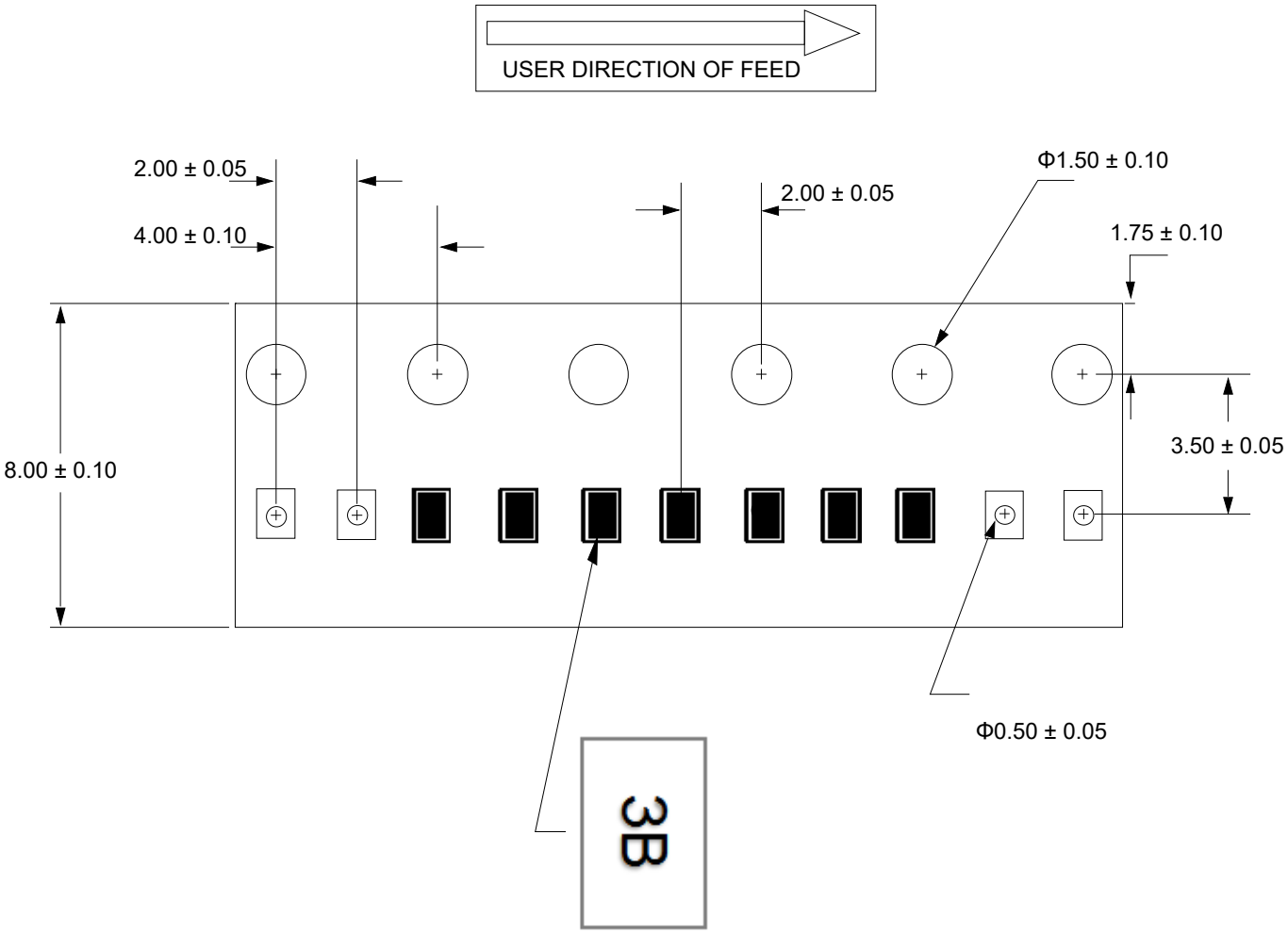
Notes:

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

Ordering information

Device	Package	Reel	Shipping
PESDUC2FD3V3B	DFN1006-2L (Pb-Free)	7"	10000 / Tape & Reel

Load with information



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