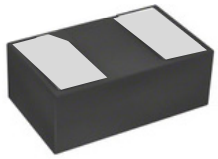
Bi-directional 3.3V Ultra Small Capacitance ESD Protector

Description

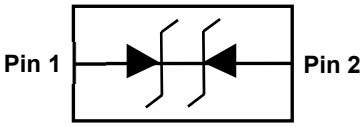
The PESDUC2XD3V3BF protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. They feature large cross-sectional area junctions for conducting high transient currents, offer desirable electrical characteristics for 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)

Feature

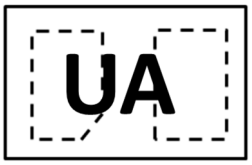
- DFN0603-2L package
- Replacement for MLV(0201)
- Bidirectional configurations
- Response time is typically < 1 ns
- Low clamping voltage
- RoHS compliant
- Transient protection for data lines to
  IEC 61000-4-2(ESD) ±25kV(air), ±25kV(contact);
  IEC 61000-4-4 (EFT) 40A (5/50ns)



Circuit Diagram

Applications

- Cellular phones
- Portable devices
- Digital cameras
- Power supplies



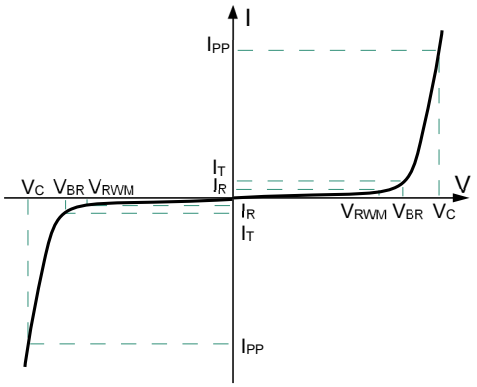
Marking (Top View)

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}				3.3	V
Breakdown Voltage	V_{BR}	I_t = 1mA	4.8			V
Reverse Leakage Current	I_R	V_{RWM} = 3.3V T=25℃			1	μA
Clamping Voltage[1)]	V_C	TLP = 16A t_P = 100ns		24		V
Dynamic Resistance[1)]	R_{DYN}			0.9		Ω
Clamping Voltage[2)]	V_C	I_{PP} = 1A t_P = 8/20μs		9.5	11	V
Clamping Voltage[2)]	V_C	I_{PP} = 5A t_P = 8/20μs		19	21	V
Junction Capacitance	C_j	V_R=0V f = 1MHz		0.25	0.45	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 (tp=8/20 μ s)	P_{PP}	90	W
Peak Pulse Current (tp=8/20 μ s)	I_{PP}	5	A
Operating Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
ESD Protection-Contact Discharge	V_{ESD}	±25	kV
ESD Protection-Air Discharge	V_{ESD}	±25	kV

Typical Characteristics

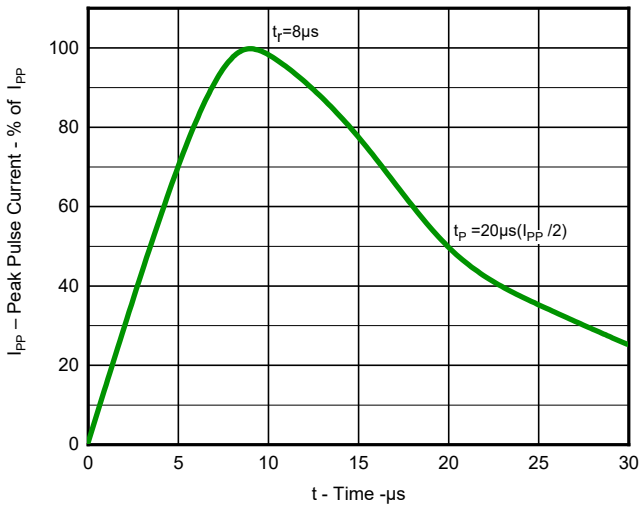


Fig 1.Pulse Waveform(8/20μs)

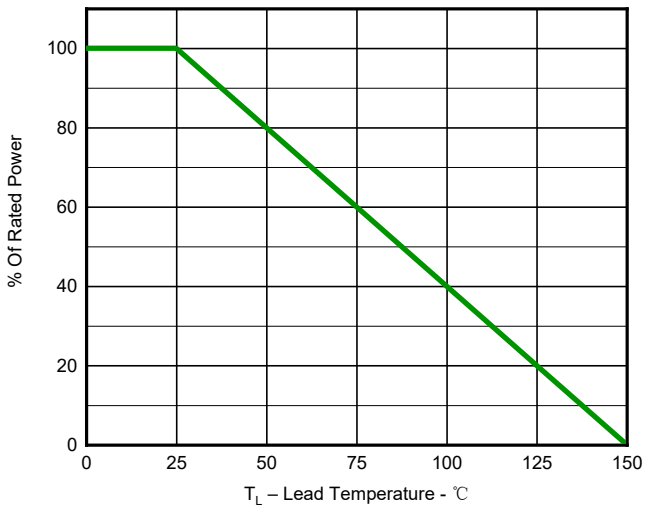


Fig 2.Power Derating Curve

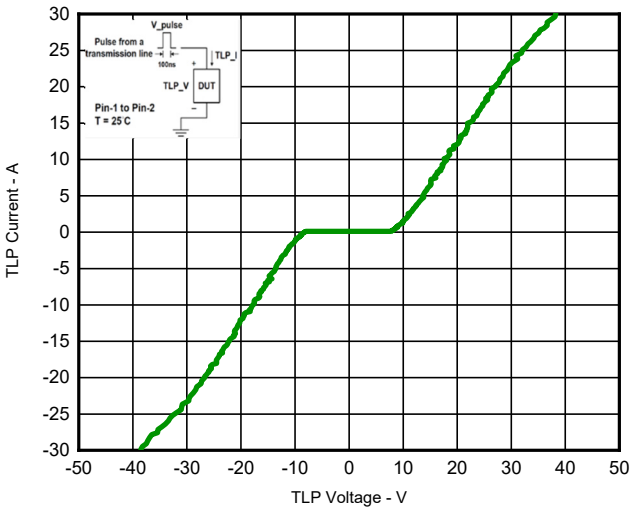


Fig 3. TLP Measurement

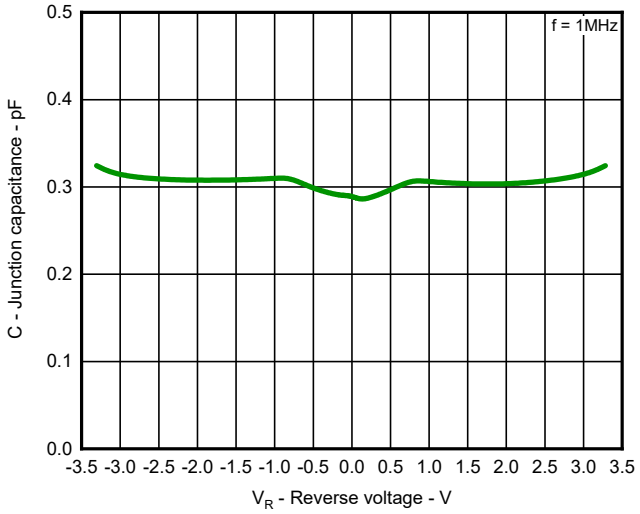


Fig 4. Capacitance vs. Reveres voltage

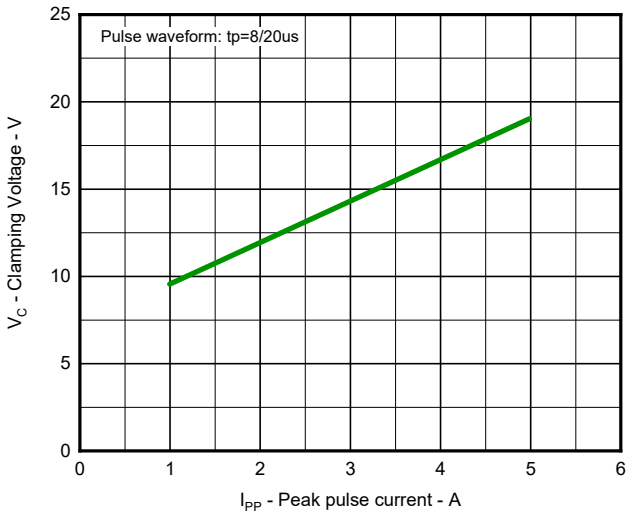


Fig 5. Clamping voltage vs. Peak pulse current

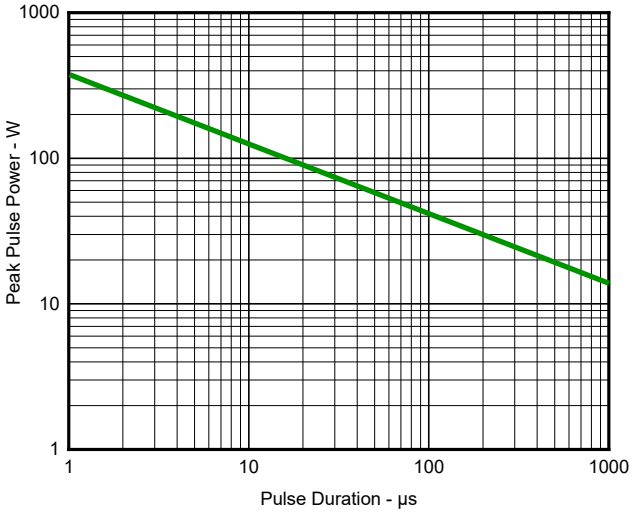


Fig 6. Non Repetitive Peak Pulse Power vs. Pulse time

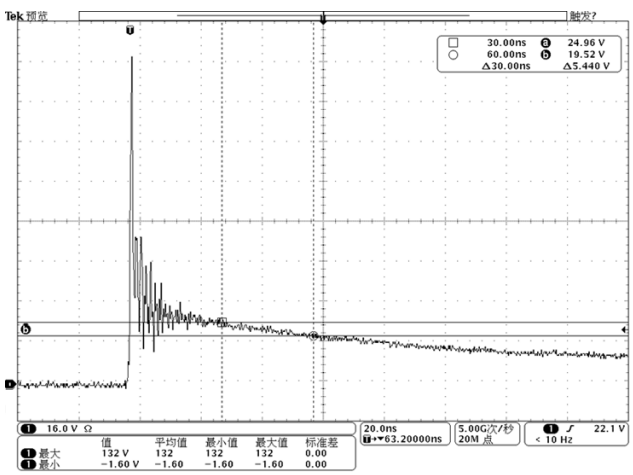


Fig 7.ESD Clamping voltage
(IEC61000-4-2 +8kV contact)

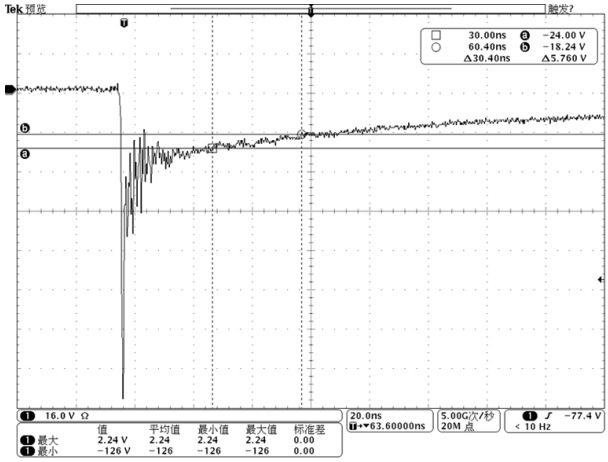
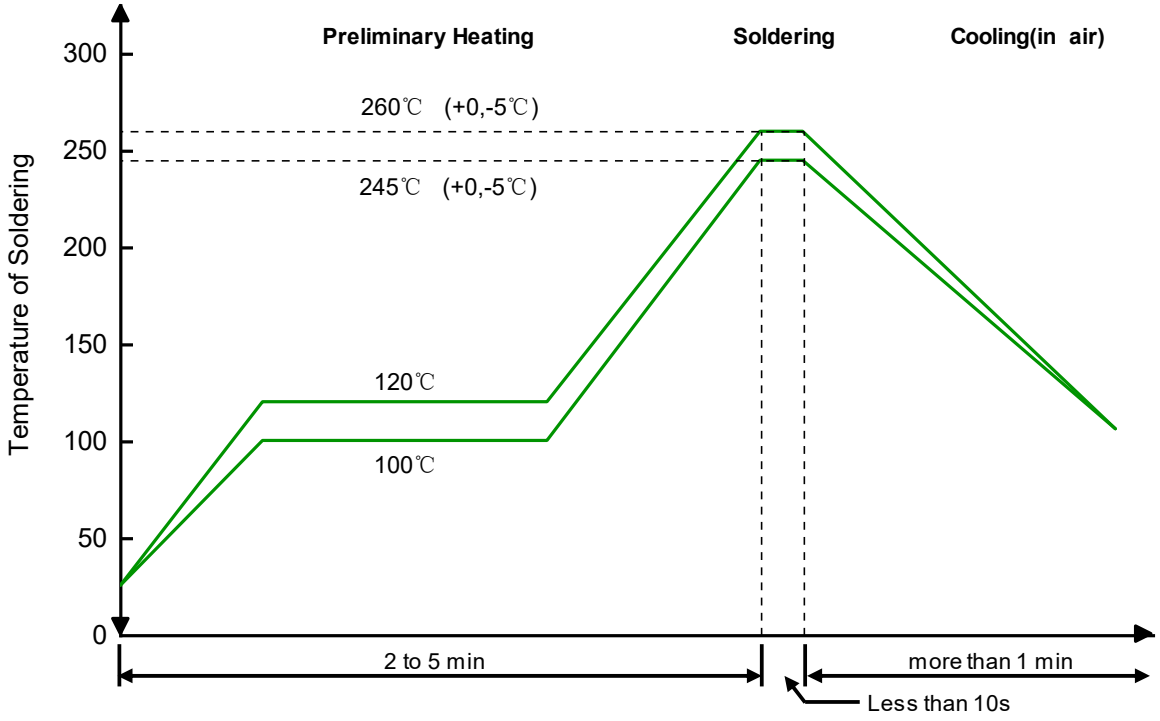


Fig 8.ESD Clamping voltage
(IEC61000-4-2 -8kV contact)

Solder Reflow Recommendation



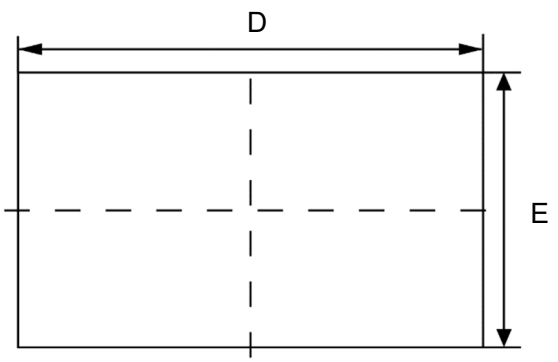
Remark: Pb free for 260℃; Pb for 245℃.

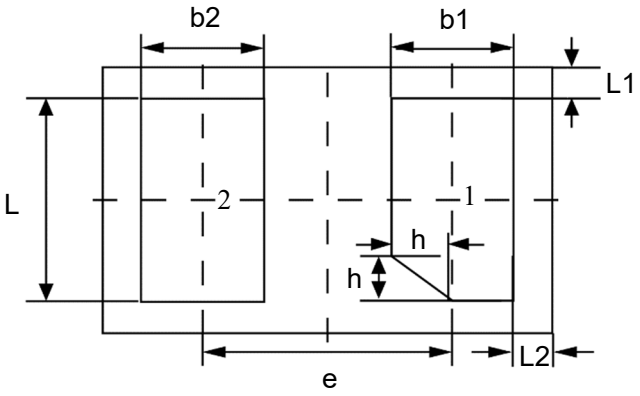
PCB Design

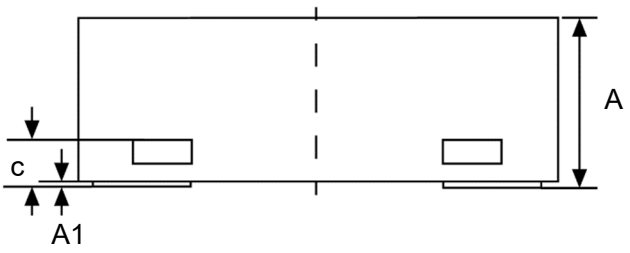
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

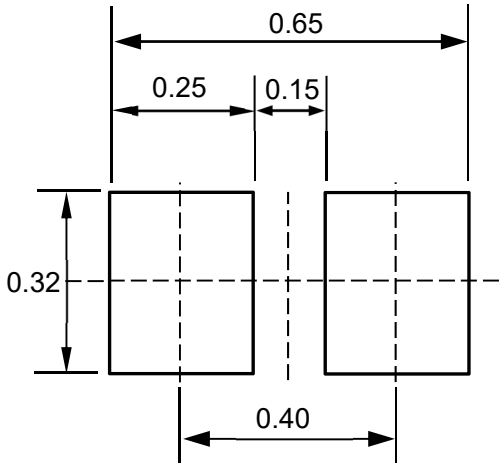
- Do not use stubs, but place the cathode of the TVS diode directly on the signal trace.
- Do not make false economies and save copper for the ground connection.
- Place via holes to ground as close as possible to the anode of the TVS diode.
- Use as many via holes as possible for the ground connection.
- Keep the length of via holes in mind! The longer the more inductance they will have.

Product dimension (DFN0603-2L)









Dim	Millimeters		
	MIN	Typ.	MAX
A	0.28	0.30	0.35
A1	0	0.02	0.05
b1	0.13	0.18	0.23
b2	0.14	0.19	0.24
c	0.05	0.1	0.15
D	0.55	0.60	0.65
e	0.35BSC		
L1	0.025BSC		
L2	0.035BSC		
E	0.25	0.30	0.35
L	0.20	0.25	0.30
h	0	0.05	0.10

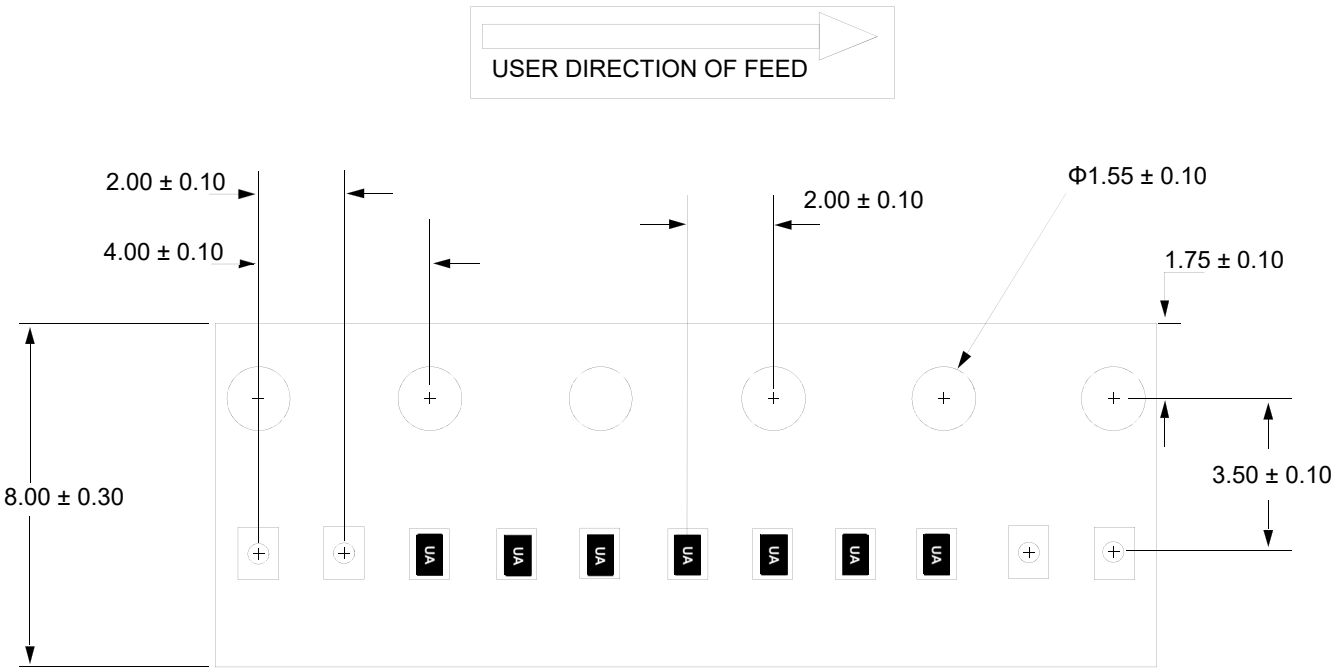
Unit:mm

Suggested PCB Layout

Ordering information

Device	Package	Reel	Shipping
PESDUC2XD3V3BF	DFN0603-2L (Pb-Free)	7"	12000 / Tape & Reel

Load with information



Unit：mm

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