

## 2-Line Uni-directional Low Capacitance ESD

### Features

- Transient protection :
  - IEC 61000-4-2 (ESD)  $\pm 30\text{kV}$  (Air),  $\pm 30\text{kV}$  (Contact)
  - IEC 61000-4-5 (Lightning) 13A (8/20 $\mu\text{s}$ )
- Uni-directional ESD protection of two lines
- Reverse working voltage,  $V_{RWM}$ : 5V
- Capacitance: 0.65pF ( typical,I/O to GND )
- Clamping voltage: 5V (max)
- Reverse leakage current: 200nA max at  $V_R = 5\text{V}$
- Solid-state silicon-avalanche
- Designed for signal line protection only, not intended to be used under bias, not for application with a power line



**DFN1006-3B**




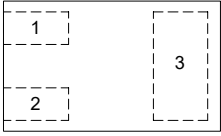
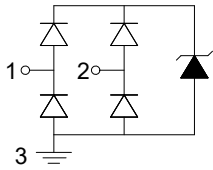
### Applications

- Cellular Handsets and Accessories
- DisplayPort interface
- USB2.0 and USB3.0
- Digital Visual Interface (DVI)
- PCI Express and Serial SATA Ports

### Mechanical Data

- Package: DFN1006-3B
- Moisture Sensitivity Level 1, per J-STD-020
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

### Body Marking and Pin Layout

Marking Code	Simplified Outline	Internal Structure
	 Transparent top view	

### Ordering Information

Product Name	Reel Size	Packing Type	Qty/Reel
ESDSBSLC5V0LT -TP	7"	Tape & Reel	10,000

For packaging details, visit our website at <https://www.mccsemi.com/Package/List>

**2-Line Uni-directional Low Capacitance ESD**

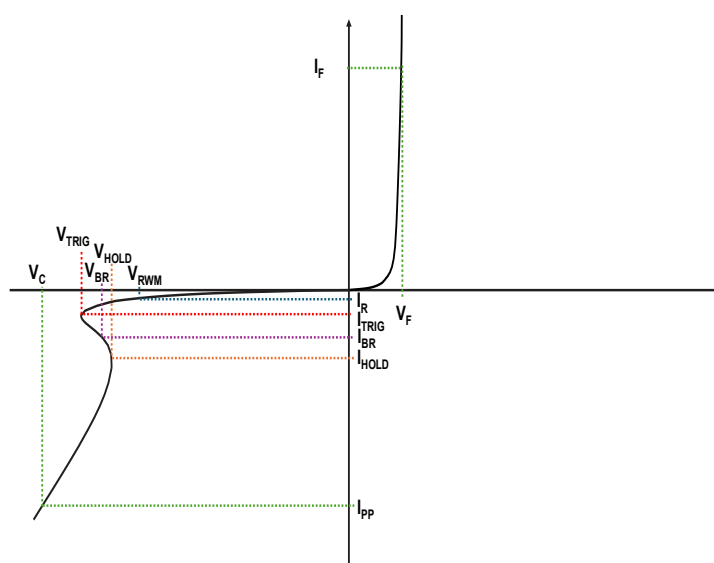
**Maximum Ratings (T<sub>A</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Rating	Unit	
IEC61000-4-2(ESD)	Air	V <sub>ESD</sub>	±30	kV
	Contact	V <sub>ESD</sub>	±30	kV
Peak Pulse Current (8/20µs) (Note 2)	I <sub>PP</sub>	13	A	
Peak Pulse Power (8/20µs) (Note 2)	P <sub>PK</sub>	65	W	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C	
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C	

- Note:
- Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and 1000ppm antimony compounds.
  - Non-repetitive current pulse 8/20µs exponential decay waveform according to IEC61000-4-5.

**Parameter Definition**

Symbol	Parameter
V <sub>RWM</sub>	Peak Reverse Working Voltage
I <sub>R</sub>	Reverse Leakage Current @ V <sub>RWM</sub>
V <sub>BR</sub>	Breakdown Voltage @ I <sub>T</sub>
I <sub>T</sub>	Test Current
I <sub>PP</sub>	Maximum Reverse Peak Pulse Current
V <sub>C</sub>	Clamping Voltage @ I <sub>PP</sub>
V <sub>TRIG</sub>	Reverse Trigger Voltage
I <sub>TRIG</sub>	Reverse Trigger Current
V <sub>HOLD</sub>	Reverse Holding Voltage
I <sub>HOLD</sub>	Reverse Holding Current
C <sub>J</sub>	Junction Capacitance
P <sub>PK</sub>	Peak Pulse Power
I <sub>F</sub>	Forward Current
V <sub>F</sub>	Forward Voltage @ I <sub>F</sub>



**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise specified)**

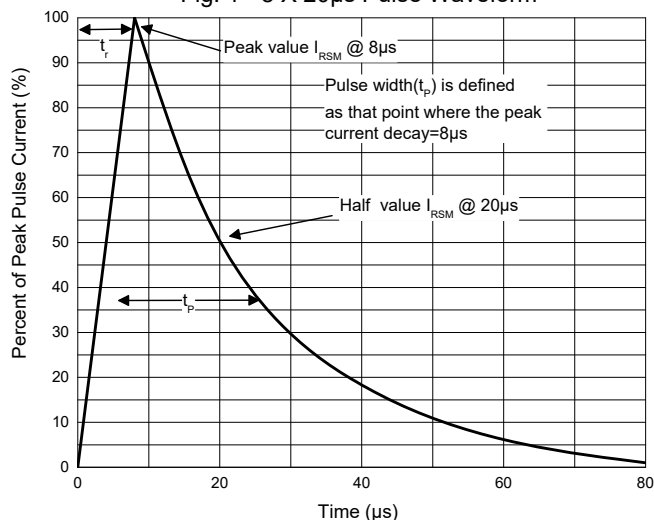
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V <sub>RWM</sub>				5	V
Reverse Breakdown Voltage	V <sub>BR</sub>	I <sub>T</sub> = 1mA	6			V
Reverse Leakage Current	I <sub>R</sub>	V <sub>RWM</sub> = 5V			0.2	µA
Clamping Voltage (Note3)	V <sub>C</sub>	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20µs			2	V
		I <sub>PP</sub> = 13A, t <sub>p</sub> = 8/20µs			5	
Clamping Voltage (Note4)	V <sub>C</sub>	I <sub>PP</sub> = 4A (TLP)		2.1		V
		I <sub>PP</sub> = 16A (TLP)		3.9		
ESD Trigger Voltage	V <sub>TRIG</sub>	t <sub>p</sub> = 100ns, T <sub>A</sub> = 25°C		8		V
Reverse Holding Voltage	V <sub>HOLD</sub>			1.2		V
Junction Capacitance	C <sub>J</sub>	V <sub>pin3</sub> = 0V, V <sub>R</sub> = 1.5V, f = 1MHz, I/O to GND		0.65	1	pF
Junction Capacitance	C <sub>J</sub>	V <sub>pin3</sub> = 0V, V <sub>R</sub> = 1.5V, f = 1MHz, I/O to I/O		0.2	0.5	pF
Dynamic Resistance (Note4)	R <sub>DYN</sub>	TLP, t <sub>p</sub> = 100ns		0.15		Ω

- Note:
- Non-repetitive current pulse 8/20µs exponential decay waveform according to IEC61000-4-5.
  - TLP parameter: Z<sub>0</sub> = 50Ω, t<sub>p</sub> = 100ns, t<sub>r</sub> = 2ns, averaging window from 60ns to 80ns. R<sub>DYN</sub> is calculated from 4A to 16A.

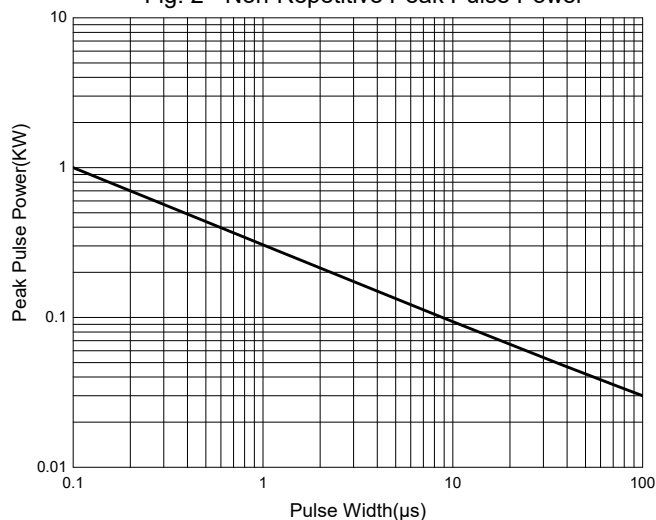
**2-Line Uni-directional Low Capacitance ESD**

**Curve Characteristics**

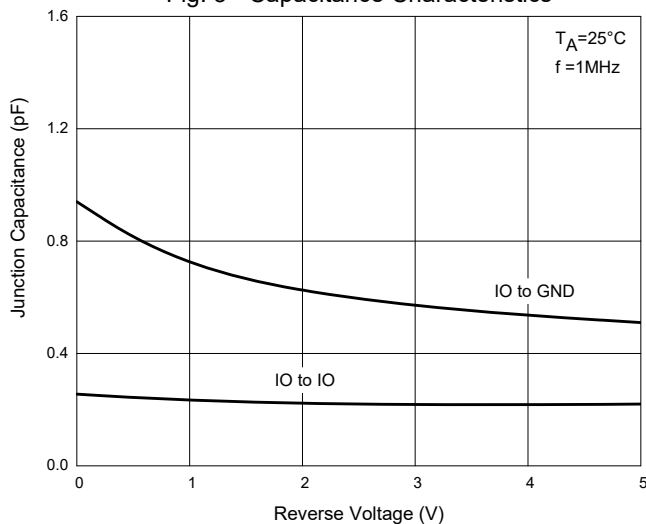
**Fig. 1 - 8 X 20µs Pulse Waveform**



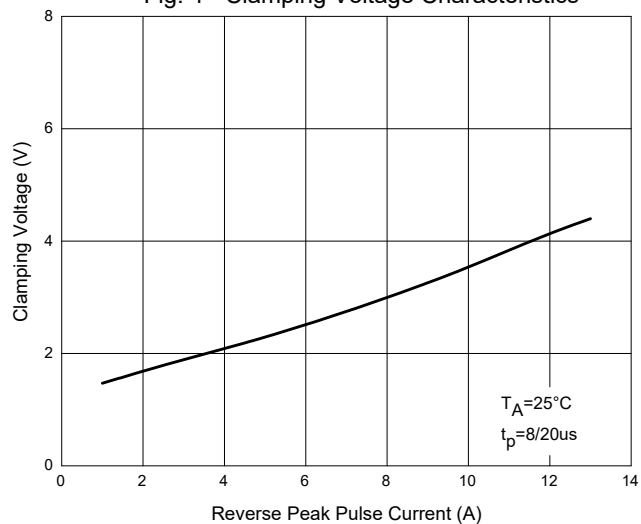
**Fig. 2 - Non-Repetitive Peak Pulse Power**



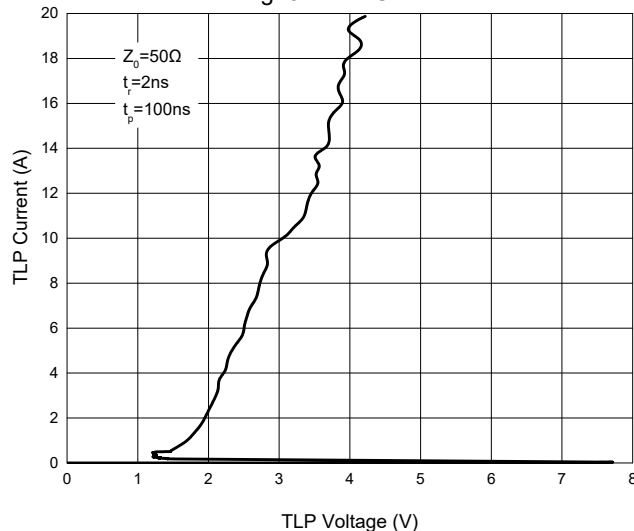
**Fig. 3 - Capacitance Characteristics**



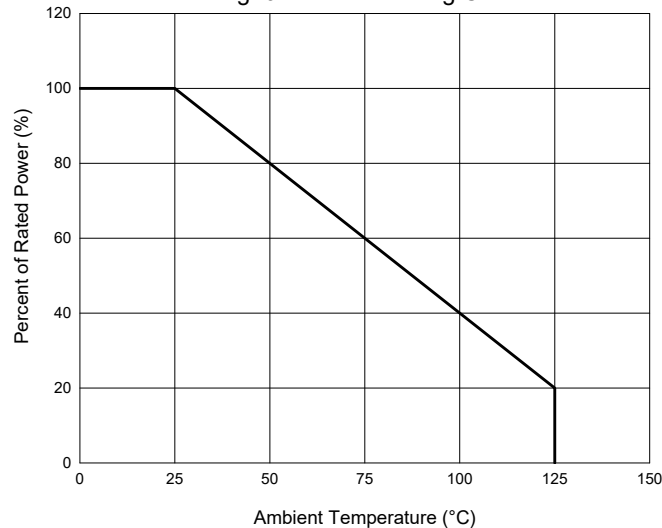
**Fig. 4 - Clamping Voltage Characteristics**



**Fig. 5 - TLP Curve**



**Fig. 6 - Pulse Derating Curve**



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**Curve Characteristics**

Fig. 7 - Insertion Loss VS.Frequency

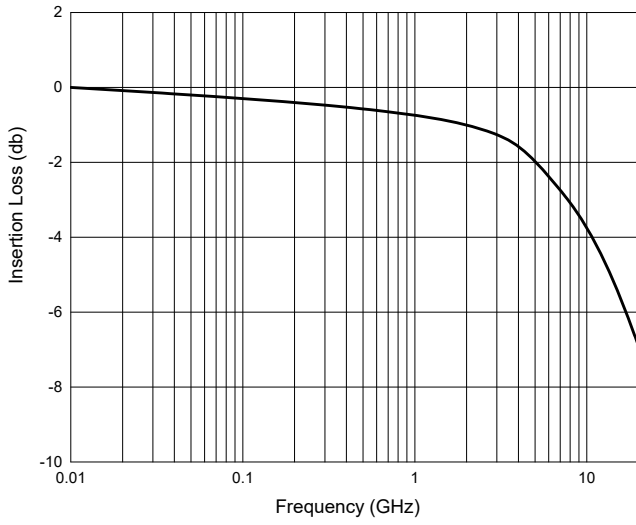
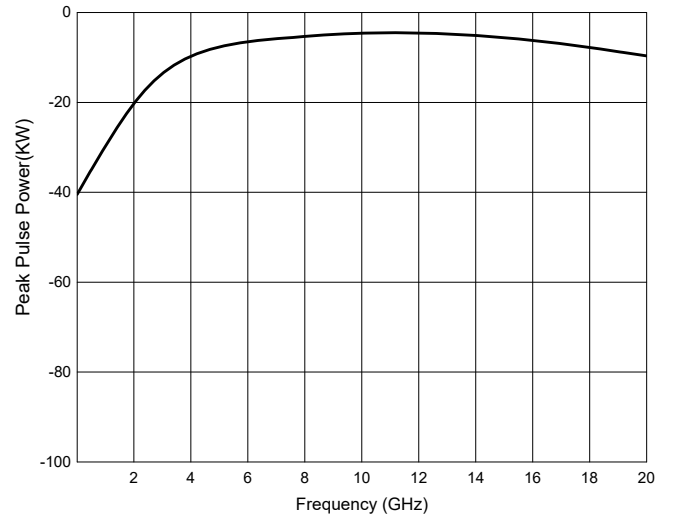
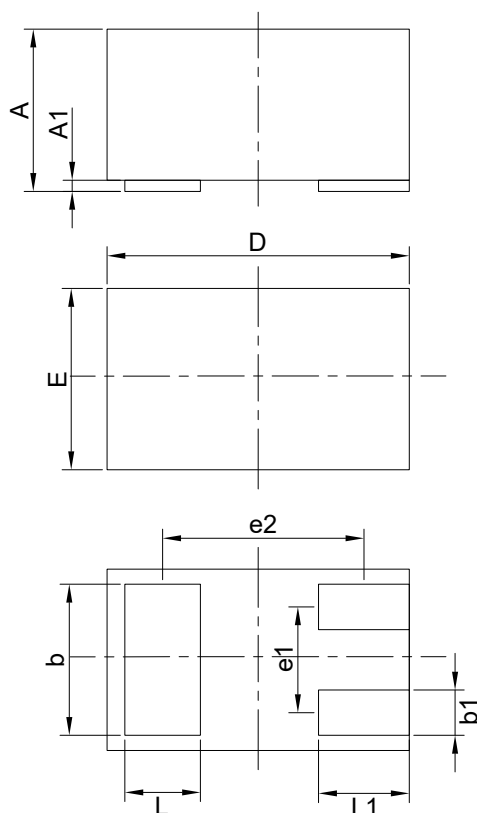


Fig. 8 - Return Loss VS.Frequency

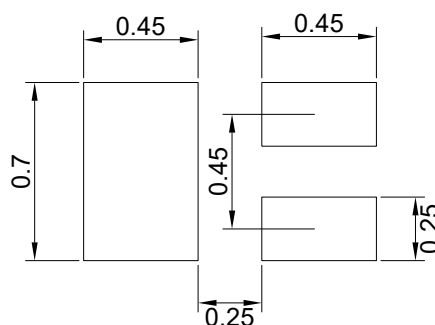


## Package Outline



DIM	INCH		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.018	0.022	0.45	0.55	
A1	0.000	0.002	0.00	0.05	
b	0.018	0.022	0.45	0.55	
b1	0.004	0.008	0.10	0.20	
D	0.037	0.041	0.95	1.05	
E	0.022	0.026	0.55	0.65	
e1	0.014		0.35		TYP
e2	0.027		0.675		TYP
L	0.008	0.012	0.20	0.30	
L1	0.010	0.014	0.25	0.35	

## Suggested Pad Layout (Unit:mm)



### Notes:

1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please refer to document IPC-7351A.

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