

# MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

Product data sheet

[www.msksemi.com](http://www.msksemi.com)

## Mechanical Characteristics

- Package: SOD-323
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

## Applications

- Cellular Handsets and Accessories
- Personal Digital Assistants
- Notebooks and Handhelds
- Portable Instrumentation
- Peripherals
- Pagers Peripherals
- Desktop and Servers

## Dimensions and Pin Configuration

SOD-323

## Features

- 500W peak pulse power (8/20 $\mu$ s)
- Protects one data or power line
- Ultra low leakage: nA level
- Operating voltage: 3.3V, 5V, 12V, 15, 24V
- Ultra low clamping voltage
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test  
Air discharge:  $\pm 30$ kV  
Contact discharge:  $\pm 30$ kV
  - IEC61000-4-4 (EFT) 40A (5/50ns)
- RoHS Compliant

## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu$ s)	Ppk	500	W
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Temperature Range	TJ	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^\circ\text{C}$

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

<b>ESD3V3L1BA-MS</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			3.3	V	
Breakdown Voltage	VBR	4			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 5V
Clamping Voltage	VC		5		V	I <sub>PP</sub> = 5A (8 x 20μs pulse)
Clamping Voltage	VC		10		V	I <sub>PP</sub> = 36A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			18	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>			200	pF	VR = 0V, f = 1MHz

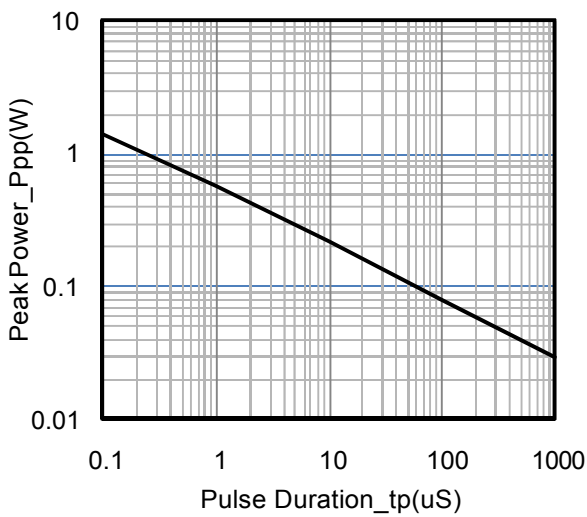
<b>ESD5V0L1BA-MS</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			5	V	
Breakdown Voltage	VBR	8.5			V	IT = 1mA
Reverse Leakage Current	IR			1	μA	VRWM = 8V
Clamping Voltage	VC			11	V	I <sub>PP</sub> = 5A (8 x 20μs pulse)
Clamping Voltage	VC			15	V	I <sub>PP</sub> = 34A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			15	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>			180	pF	VR = 0V, f = 1MHz

<b>ESD12VL1BA-MS</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			12	V	
Breakdown Voltage	VBR	13.3			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 12V
Clamping Voltage	VC			19	V	I <sub>PP</sub> = 5A (8 x 20μs pulse)
Clamping Voltage	VC			28	V	I <sub>PP</sub> = 18A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			10	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>			100	pF	VR = 0V, f = 1MHz

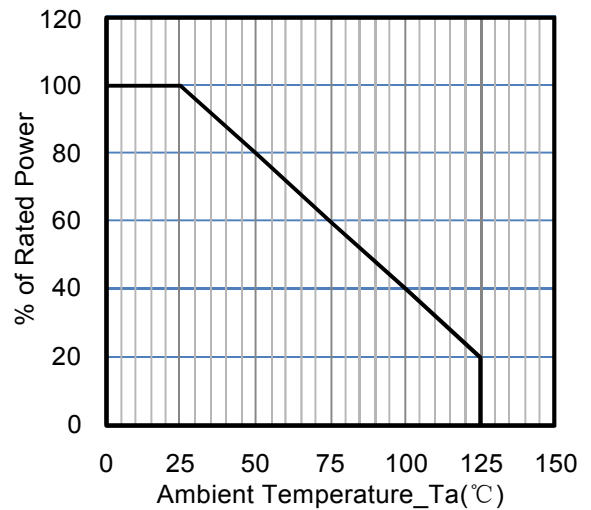
<b>ESD15VL1BA-MS</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			15	V	
Breakdown Voltage	VBR	16.7			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 12V
Clamping Voltage	VC			19	V	I <sub>PP</sub> = 5A (8 x 20μs pulse)
Clamping Voltage	VC			28	V	I <sub>PP</sub> = 18A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			10	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>			100	pF	VR = 0V, f = 1MHz

ESD24VL1BA-MS						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			24	V	
Breakdown Voltage	VBR	27			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 24V
Clamping Voltage	VC			40	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			62	V	I <sub>PP</sub> = 8A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			5	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>			50	pF	VR = 0V, f = 1MHz

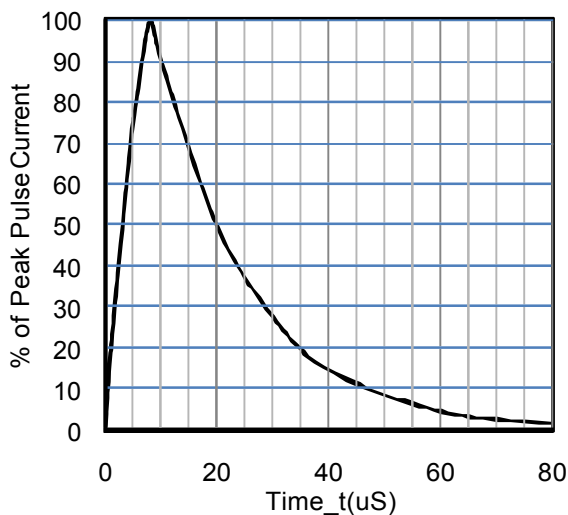
**Typical Performance Characteristics (T<sub>A</sub>=25°C unless otherwise Specified)**



**Peak Pulse Power vs. Pulse Time**

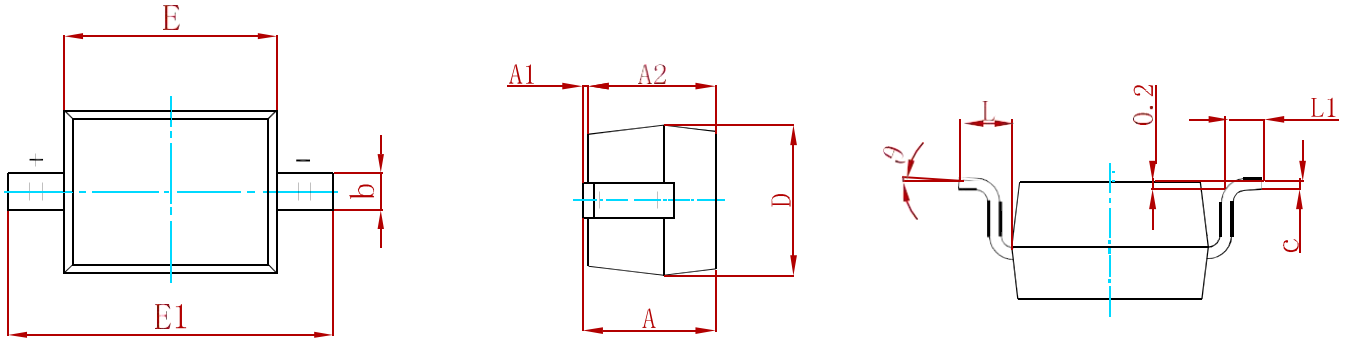


**Power Derating Curve**



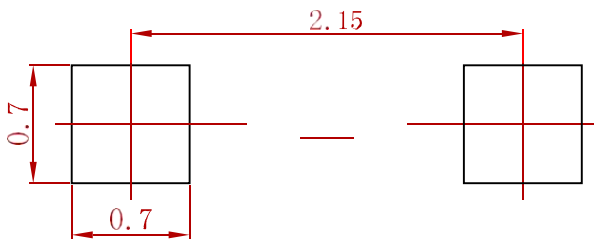
**8 X 20uS Pulse Waveform**

**PACKAGE MECHANICAL DATA**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A		1.000		0.039
A1	0.000	0.100	0.000	0.004
A2	0.800	0.900	0.031	0.035
b	0.250	0.350	0.010	0.014
c	0.080	0.150	0.003	0.006
D	1.200	1.400	0.047	0.055
E	1.600	1.800	0.063	0.071
E1	2.550	2.750	0.100	0.108
L	0.475 REF.		0.019 REF.	
L1	0.250	0.400	0.010	0.016
θ	0°	8°	0°	8°

**Suggested Pad Layout**



- Note:**
1. Controlling dimension: in millimeters.
  2. General tolerance: ± 0.05mm.
  3. The pad layout is for reference purposes only.

**REEL SPECIFICATION**

P/N	PKG	QTY
ESDXXXL1BA-MS	SOD-323	3000

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