

# MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT

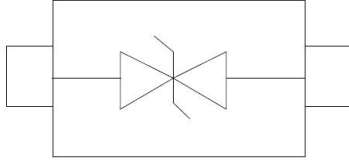


PLED

Product data sheet

### 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



SOD-323

### Applications

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

### Features

- 500W peak pulse power (8/20µs)
- 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: ±30kV  
Contact discharge: ±30kV
  - IEC61000-4-4 (EFT) 40A (5/50ns)
- RoHS Compliant

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

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20µs)	P <sub>pk</sub>	500	W
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	±30	kV
ESD per IEC 61000-4-2 (Contact)		±30	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	°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

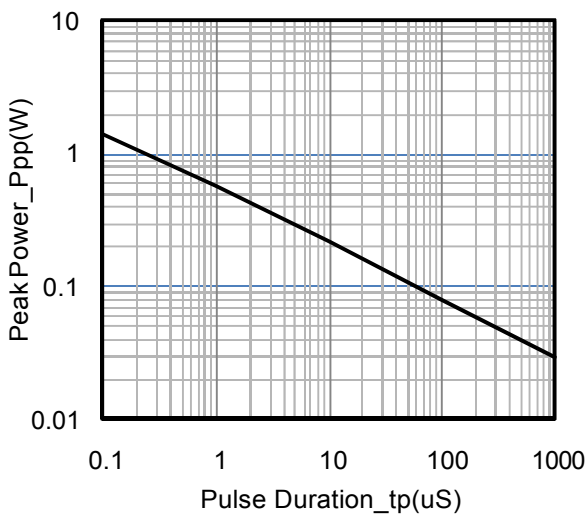
<b>ESD5V0L1BA-MS</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			5	V	
Breakdown Voltage	VBR	8.5			V	IT = 1mA
Reverse Leakage Current	IR			1	μA	VRWM = 8V
Clamping Voltage	VC			11	V	I <sub>PP</sub> = 5A (8 x 20μs 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

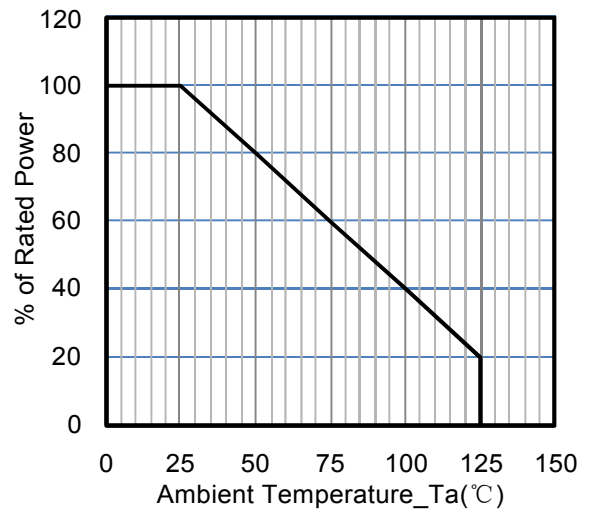
<b>ESD15VL1BA-MS</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			15	V	
Breakdown Voltage	VBR	16.7			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 12V
Clamping Voltage	VC			19	V	I <sub>PP</sub> = 5A (8 x 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

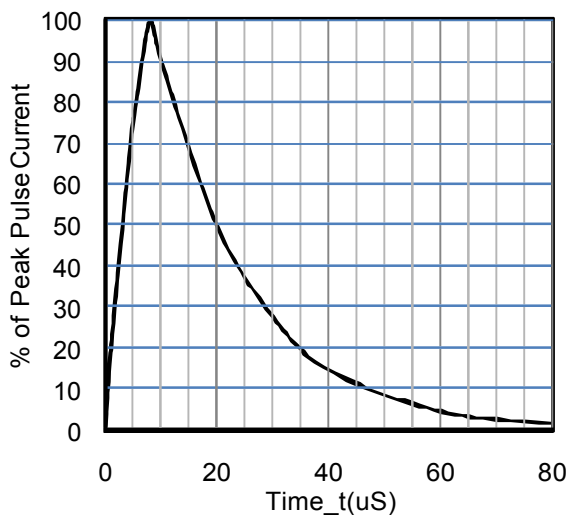
**Typical Performance Characteristics (T<sub>A</sub>=25°C unless otherwise Specified)**



**Peak Pulse Power vs. Pulse Time**

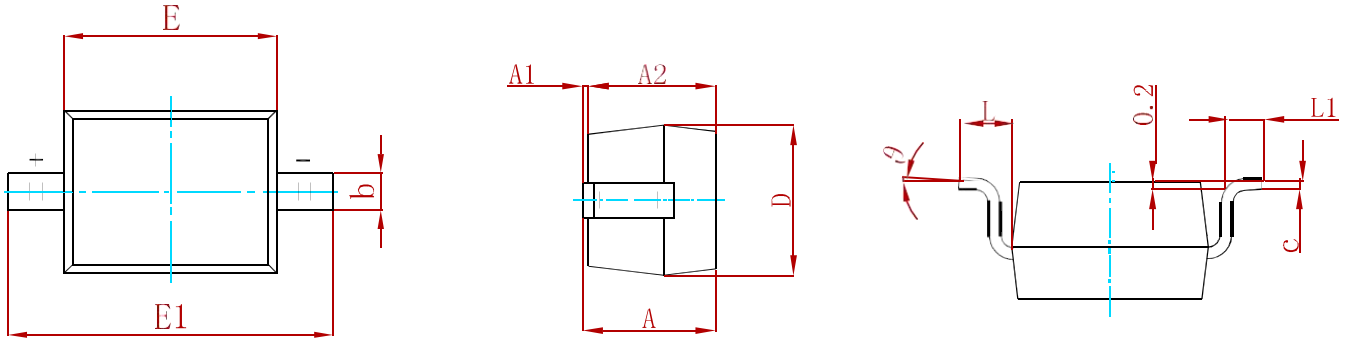


**Power Derating Curve**



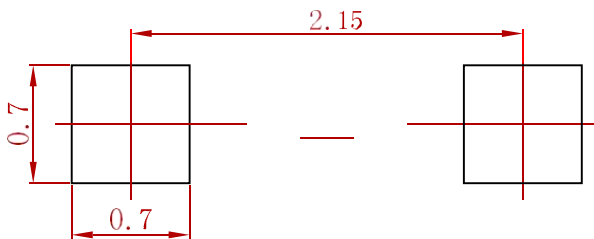
**8 X 20uS Pulse Waveform**

**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

## **Attention**

- Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.
- MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all MSKSEMI Semiconductor products described or contained herein.
- Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all MSKSEMI Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the MSKSEMI Semiconductor product that you intend to use.