

**Description**

The ASDXXC is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers and PDA's, using monolithic silicon technology to provide fast response time and ultra low ESD clamping voltage, making this device an ideal solution for protecting sensitive semiconductor components from damage. The ASDXXC complies with the IEC 61000-4-2 (ESD) with  $\pm 30\text{kV}$  air and  $\pm 30\text{kV}$  contact discharge. The ASDXXC is assembled into a lead-free SOD-323 package and will protect one unidirectional line. These devices will fit on the same PCB pad area as an 0805 MLV device.

**Features**

- 500W peak pulse power (8/20 $\mu\text{s}$ )
- Protects one data or power line
- Ultra low leakage: nA level
- Operating voltage: 3.3V, 5V, 8V, 12V, 15V, 24V, 36V, 40V
- Ultra low clamping voltage
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge:  $\pm 30\text{kV}$
    - Contact discharge:  $\pm 30\text{kV}$
- RoHS Compliant


**Mechanical Characteristics**

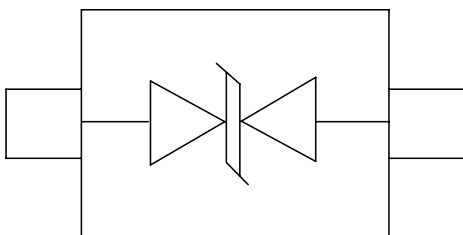
- Package: SOD-323
- Lead Finish: Matte Tin
- Case Material: "Green" Molding Compound.
- Terminal Connections: See Diagram Below
- Marking Information: See Below

**Applications**

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

**Marking Information**

	Part Number	Marking
	ASD33C	33
	ASD05C	05
	ASD08C	08
	ASD12C	12
	ASD15C	15
	ASD18C	18
	ASD24C	24
	ASD36C	36
	ASD40C	40

**Dimensions and Pin Configuration**

SOD-323

**Ordering Information**

Part Number	Packaging	Reel Size
ASDXXC	3000/Tape & Reel	7 inch

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

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	Ppk	500	W
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	VESD	±30 ±30	kV
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)

ASD33C						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			3.3	V	
Breakdown Voltage	V <sub>BR</sub>	3.8			V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			0.2	μA	V <sub>RWM</sub> = 3.3V
Clamping Voltage	V <sub>C</sub>			5	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	V <sub>C</sub>			12.5	V	I <sub>PP</sub> = 40A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			40	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>		120	200	pF	V <sub>R</sub> = 0V, f = 1MHz

ASD05C						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			5	V	
Breakdown Voltage	V <sub>BR</sub>	6			V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			0.2	μA	V <sub>RWM</sub> = 5V
Clamping Voltage	V <sub>C</sub>			9.5	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	V <sub>C</sub>			15	V	I <sub>PP</sub> = 34A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			34	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>		110	200	pF	V <sub>R</sub> = 0V, f = 1MHz

<b>ASD08C</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			8	V	
Breakdown Voltage	VBR	8.5			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 8V
Clamping Voltage	VC			10	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			16	V	I <sub>PP</sub> = 32A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			32	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>		100	200	pF	VR = 0V, f = 1MHz

<b>ASD12C</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			0.2	μA	VRWM = 12V
Clamping Voltage	VC			19	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			25	V	I <sub>PP</sub> = 20A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			20	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>		60	100	pF	VR = 0V, f = 1MHz

<b>ASD15C</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			0.2	μA	VRWM = 15V
Clamping Voltage	VC			20	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			25	V	I <sub>PP</sub> = 16A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			16	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>		30	80	pF	VR = 0V, f = 1MHz

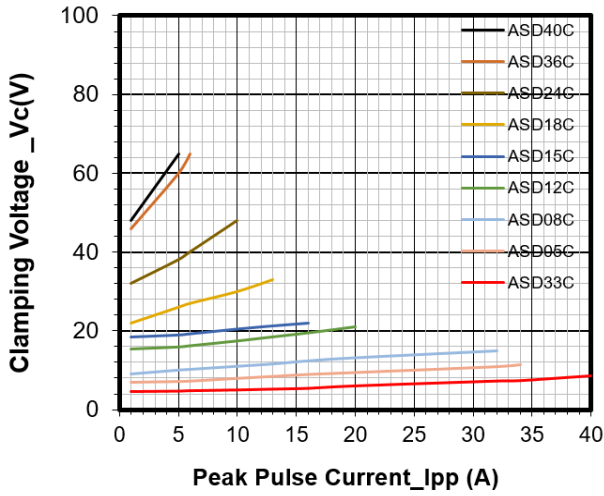
<b>ASD18C</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			18	V	
Breakdown Voltage	VBR	19.8			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 18V
Clamping Voltage	VC			25	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			38	V	I <sub>PP</sub> = 13A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			13	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>		30	60	pF	VR = 0V, f = 1MHz

<b>ASD24C</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			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			50	V	I <sub>PP</sub> = 10A (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>		30	50	pF	VR = 0V, f = 1MHz

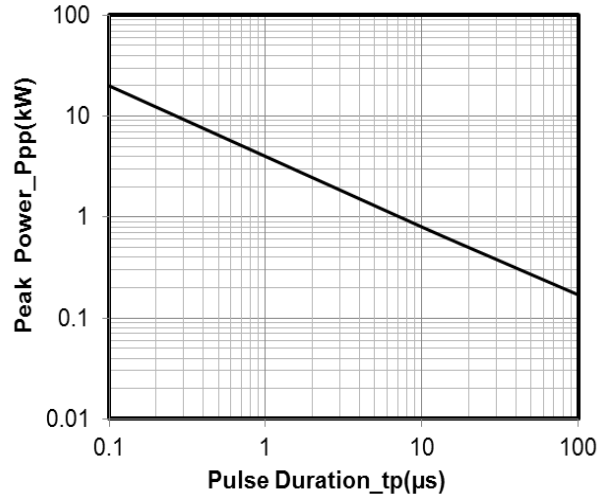
ASD36C						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			36	V	
Breakdown Voltage	VBR	38			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 36V
Clamping Voltage	VC			48	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			83	V	I <sub>PP</sub> = 6A (8 x 20μs pulse)
Peak Pulse Current	I <sub>pp</sub>			6	A	t <sub>p</sub> = 8/20μs
Junction Capacitance	C <sub>J</sub>		20	30	pF	VR = 0V, f = 1MHz

ASD40C						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			40	V	
Breakdown Voltage	VBR	44			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 40V
Clamping Voltage	VC			50	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			100	V	I <sub>PP</sub> = 5A (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>		20		pF	VR = 0V, f = 1MHz

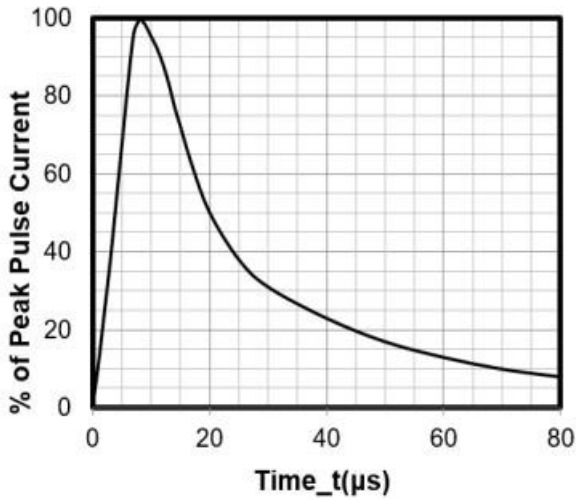
### Typical Performance Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise Specified)



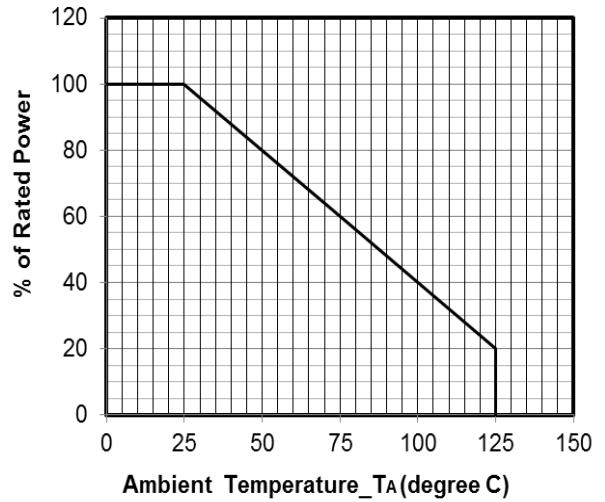
Clamping Voltage vs. Peak Pulse Current



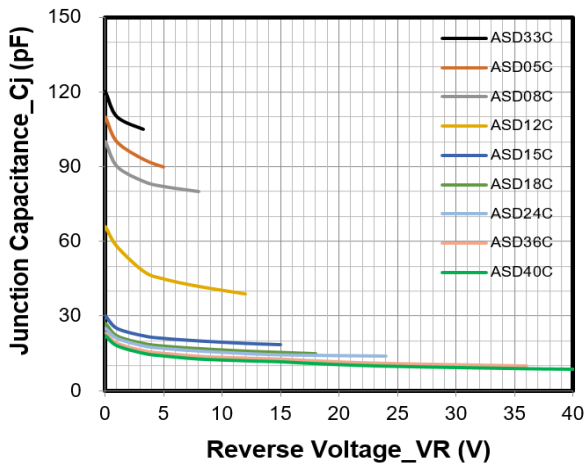
Peak Pulse Power vs. Pulse Time



8 X 20 $\mu\text{s}$  Pulse Waveform

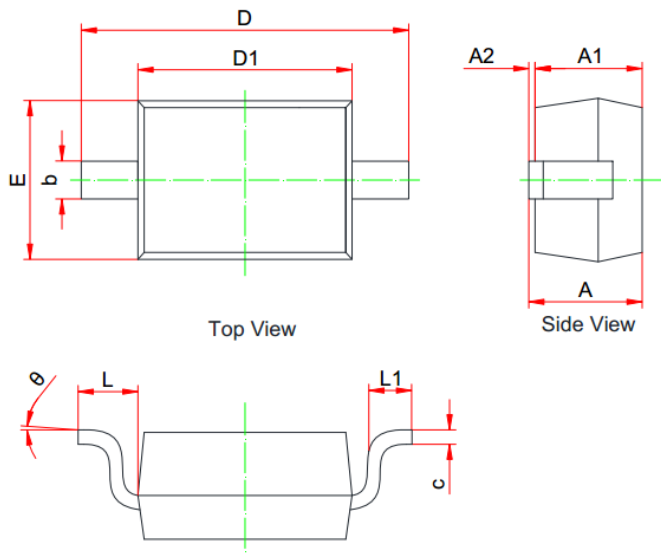


Power Derating Curve



Junction Capacitance vs. Reverse Voltage

### SOD-323 Package Outline Drawing



SYM	MILLIMETERS		
	MIN	NOM	MAX
A	0.800	--	1.100
A1	0.800	--	0.900
A2	0.000	--	0.100
b	0.250	--	0.400
c	0.080	--	0.177
D1	1.600	1.700	1.800
D	2.300	--	2.800
E	1.150	--	1.400
L	0.475REF		
L1	0.100	--	0.500
$\Theta$	0°	--	8°

### Suggested Land Pattern



Unit: mm