

1-Line Bi-directional TVS Diode

Description

The SDxxC-2/TR 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 SDxxC-2/TR complies with the IEC 61000-4-2 (ESD) standard with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a lead-free SOD-323 package and will protect one bidirectional line. These devices will fit on the same PCB pad area as an 0805 MLV device.

Features

- ◆ 150W peak pulse power (8/20 μs)
- ◆ Protects one data or power line
- ◆ Ultra low leakage : nA level
- ◆ Operating voltage : 3V, 5V, 8V, 12V, 15V, 24V, 36V
- ◆ Ultra low clamping voltage
- ◆ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$
 - Contact discharge: $\pm 30\text{kV}$
 - IEC 61000-4-4 (EFT) 40A (5/50ns)
- ◆ RoHS Compliant

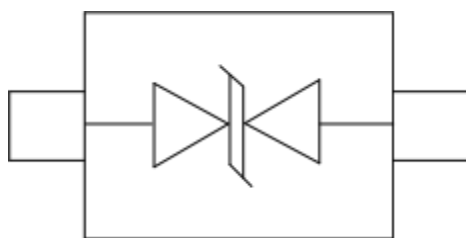
Mechanical Characteristics

- ◆ 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



Circuit and Pin Schematic

Ordering Information

Part Number	Packaging	Reel Size
SDxxC-2/TR	3000/Tape & Reel	7 inch

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

Parameter	Symbol	Value	Unit
ESD per IEC 61000-4-2 (Air)	VESD	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

SD03C-2/TR						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			3.3	V	
Breakdown Voltage	VBR	4			V	$I_T = 1\text{mA}$
Reverse Leakage Current	IR			0.5	μA	$VRWM = 3.3\text{V}$
Clamping Voltage	VC		5		V	$I_{PP} = 1\text{A}$ (8 x 20 μs pulse)
Clamping Voltage	VC		10		V	$I_{PP} = 10\text{A}$ (8 x 20 μs pulse)
Peak Pulse Current	IPP			10	A	$t_p=8/20\mu\text{s}$
Junction Capacitance	CJ			16	pF	$VR = 0\text{V}$, $f = 1\text{MHz}$

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SD05C-2/TR						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			5	V	
Breakdown Voltage	VBR	6			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 5V
Clamping Voltage	VC		7		V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC		11		V	I _{PP} = 8.5A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			8.5	A	tp=8/20μs
Junction Capacitance	CJ			16	pF	VR = 0V, f = 1MHz

SD08C-2/TR						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			8	V	
Breakdown Voltage	VBR	8.5			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 8V
Clamping Voltage	VC		10		V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC		15		V	I _{PP} = 7A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			7	A	tp=8/20μs
Junction Capacitance	CJ			20	pF	VR = 0V, f = 1MHz

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SD12C-2/TR

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
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		15		V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC		24		V	I _{PP} = 5A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			5	A	tp=8/20μs
Junction Capacitance	CJ			10	pF	VR = 0V, f = 1MHz

SD15C-2/TR

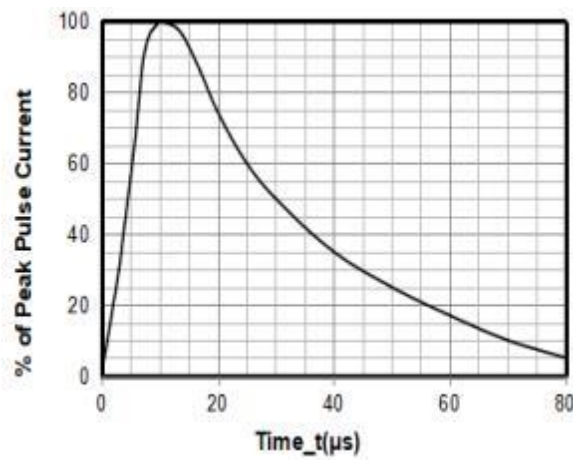
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			15	V	
Breakdown Voltage	VBR	16.7			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 15V
Clamping Voltage	VC		20		V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC		30		V	I _{PP} = 3A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			3	A	tp=8/20μs
Junction Capacitance	CJ			8	pF	VR = 0V, f = 1MHz

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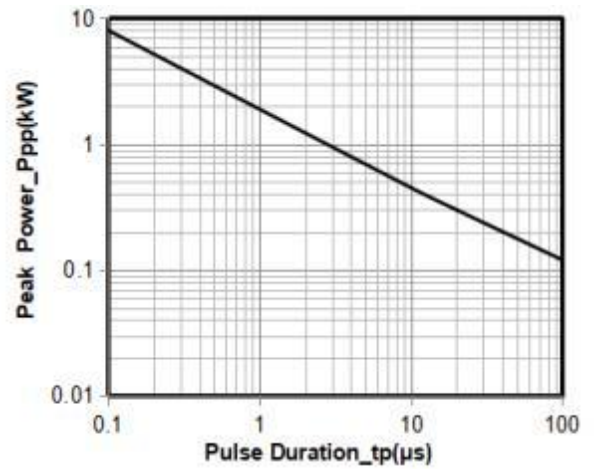
SD24C-2/TR						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			24	V	
Breakdown Voltage	VBR	26.7			V	IT = 1mA
Reverse Leakage Current	IR			0.5	μA	VRWM = 24V
Clamping Voltage	VC		33		V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC		45		V	I _{PP} = 2A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			2	A	tp=8/20μs
Junction Capacitance	CJ			6	pF	VR = 0V, f = 1MHz

SD36C-2/TR						
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			50	V	I _{PP} = 1A (8 x 20μs pulse)
	VC			75	V	I _{PP} = 4A (8 x 20μs pulse)
Junction Capacitance	CJ		15	20	pF	VR = 0V, f = 1MHz

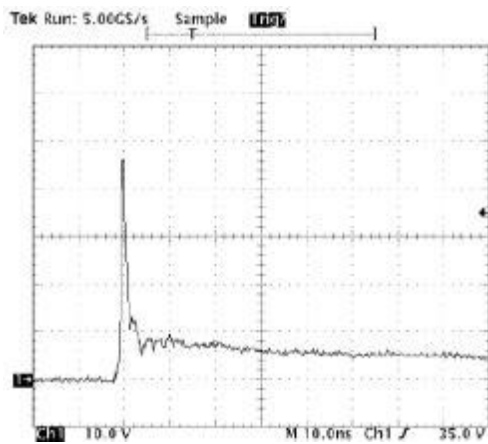
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



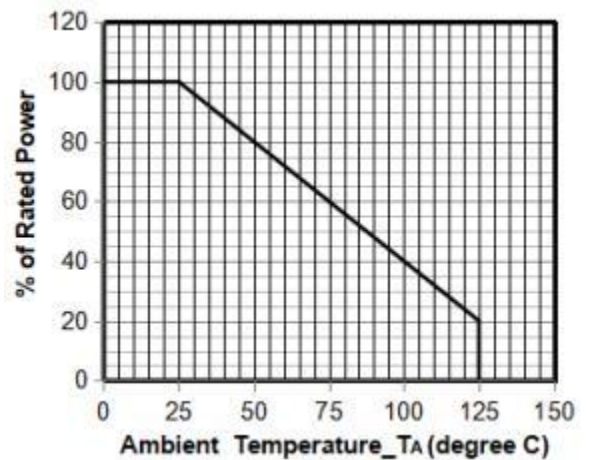
8 X 20μs Pulse Waveform



Peak Pulse Power vs. Pulse Time

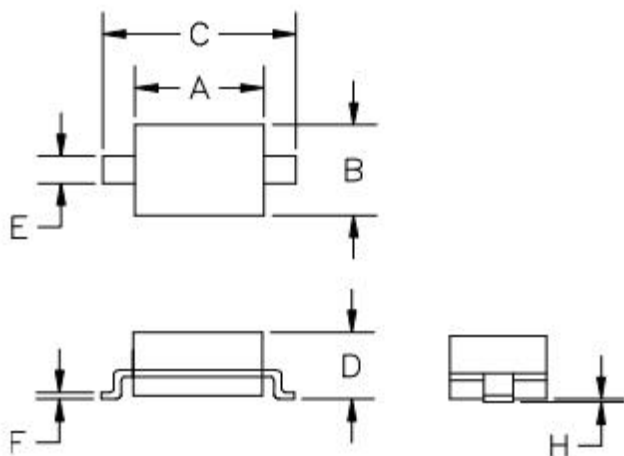


Note: Data is taken with a 10x attenuator
ESD Clamping Voltage
8 kV Contact per IEC61000-4-2



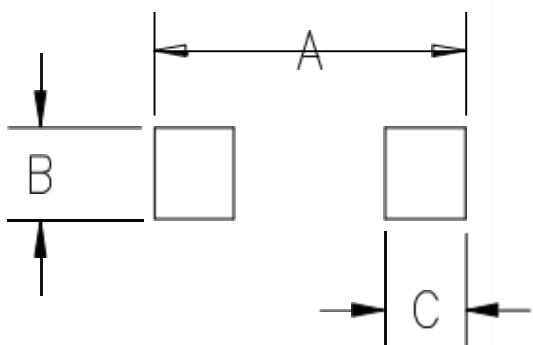
Power Derating Curve

SOD-323 Package Outline Drawing



SYM	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.50	1.80	0.060	0.071
B	1.20	1.40	0.045	0.054
C	2.30	2.70	0.090	0.107
D	-	1.10	-	0.043
E	0.30	0.40	0.012	0.016
F	0.10	0.25	0.004	0.010
H	-	0.10	-	0.004

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
A	3.15	0.120
B	0.80	0.031
C	0.80	0.031