

## SD05 THRU SD24 TVS ARRAY



### Schematic & Pin Configuration



### Description

The SDxx TVS diodes are designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's. They offer superior electrical characteristics such as lower clamping voltage and no device degradation when compared to MLVs. The SDxx series TVS diodes are designed to protect sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events.

The SDxx is in a SOD-323 package and will protect one unidirectional line. These devices will fit on the same PCB pad area as an 0805 MLV device. They give the designer the flexibility to protect one line in applications where arrays are not practical. Additionally, it may be "sprinkled" around the board in applications where board space is at a premium. They may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge).

### Application

- Cell Phone Handsets and Accessories
- Microprocessor based equipment
- Personal Digital Assistants (PDA' s)
- Notebooks, Desktops, and Servers
- Portable Instrumentation
- Pagers Peripherals

### Mechanical Characteristics

- SOD-323 package
- Molding compound flammability rating: UL 94V-0
- Marking : Marking code, cathode band
- Packaging : Tape and Reel

### Features

- 350 Watts peak pulse power ( $t_p = 8/20 \mu\text{s}$ )
- Transient protection for data lines to  
IEC 61000-4-2 (ESD)  $\pm 25\text{kV}$  (air),  $\pm 10\text{kV}$  (contact)  
IEC 61000-4-4 (EFT) 40A (5/50ns)  
IEC 61000-4-5 (Lightning) 24A (8/20  $\mu\text{s}$ )
- Small package for use in portable electronics
- Suitable replacement for MLV' s in ESD protection applications
- Protects one I/O or power line
- Low clamping voltage
- Working voltages: 5V and 24V
- Low leakage current
- Solid-state silicon-avalanche technology
- Terminals finish: 100% Pure Tin

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

Parameter	Symbol	Value	Units
Peak Pulse Power (tp =8/20 μ s)	P <sub>PK</sub>	350	W
Peak Pulse Current (tp =8/20 μ s)	I <sub>PP</sub>	24	A
ESD Voltage (HBM Waveform per IEC 61000-4-2)	V <sub>ESD</sub>	30	KV
Lead Soldering Temperature	T <sub>L</sub>	260(10 sec.)	°C
Operating Temperature	T <sub>J</sub>	-55 to + 125	°C
Storage Temperature	T <sub>STG</sub>	-55 to + 150	°C

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

SD05	Marking code	5U				
Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Reverse Stand-Off 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, T = 25 °C	-	-	10	μA
Clamping Voltage	V <sub>C</sub>	@I <sub>PP</sub> = 5A, tp=8/20μs	-	-	9.8	V
Clamping Voltage	V <sub>C</sub>	@I <sub>PP</sub> = 24A, tp=8/20μs	-	-	14.5	V
Junction Capacitance	C <sub>j</sub>	@V <sub>R</sub> = 0V, f <sub>SIG</sub> = 1MHz	-	-	350	pF

SD12	Marking code	12U				
Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V <sub>RWM</sub>	-	-	-	12	V
Reverse Breakdown Voltage	V <sub>BR</sub>	@ I <sub>t</sub> =1mA	13.3	-	-	V
Reverse Leakage Current	I <sub>R</sub>	@V <sub>RWM</sub> = 12V, T = 25 °C	-	-	1	μA
Clamping Voltage	V <sub>C</sub>	@I <sub>PP</sub> = 5A, tp=8/20μs	-	-	19	V
Clamping Voltage	V <sub>C</sub>	@I <sub>PP</sub> = 15A, tp=8/20μs	-	-	24	V
Junction Capacitance	C <sub>j</sub>	@V <sub>R</sub> = 0V, f <sub>SIG</sub> = 1MHz	-	-	150	pF

SD15	Marking code	15U				
Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V <sub>RWM</sub>	-	-	-	15	V
Reverse Breakdown Voltage	V <sub>BR</sub>	@ I <sub>t</sub> =1mA	16.7	-	-	V
Reverse Leakage Current	I <sub>R</sub>	@V <sub>RWM</sub> = 15V, T = 25 °C	-	-	1	μA
Clamping Voltage	V <sub>C</sub>	@I <sub>PP</sub> = 5A, tp=8/20μs	-	-	24	V
Clamping Voltage	V <sub>C</sub>	@I <sub>PP</sub> = 12A, tp=8/20μs	-	-	29	V
Junction Capacitance	C <sub>j</sub>	@V <sub>R</sub> = 0V, f <sub>SIG</sub> = 1MHz	-	-	130	pF

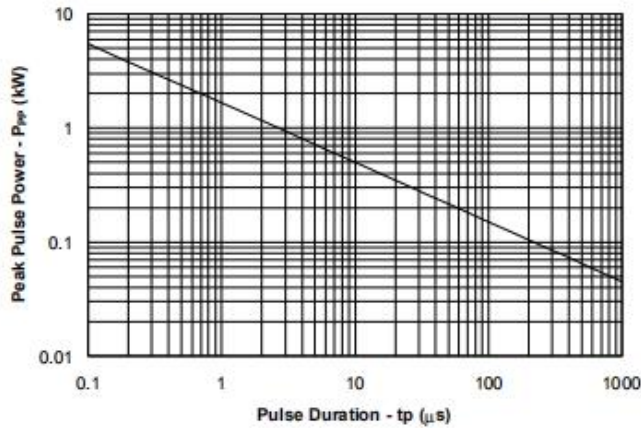


SD18	Marking code	18U				
Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	$V_{RWM}$	-	-	-	18	V
Reverse Breakdown Voltage	$V_{BR}$	@ $I_t=1mA$	20	-	24	V
Reverse Leakage Current	$I_R$	@ $V_{RWM} = 18V, T = 25^\circ C$	-	-	1	$\mu A$
Clamping Voltage	$V_C$	@ $I_{PP} = 1A, t_p=8/20\mu s$	-	-	29	V
Clamping Voltage	$V_C$	@ $I_{PP} = 9A, t_p=8/20\mu s$	-	-	40	V
Junction Capacitance	$C_j$	@ $V_R = 0V, f_{SIG} = 1MHz$	-	-	120	pF

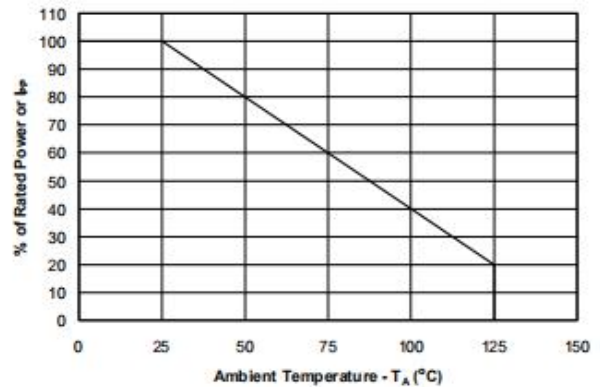
SD24	Marking code	24U				
Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	$V_{RWM}$	-	-	-	24	V
Reverse Breakdown Voltage	$V_{BR}$	@ $I_t=1mA$	26.7	-	-	V
Reverse Leakage Current	$I_R$	@ $V_{RWM} = 24V, T = 25^\circ C$	-	-	1	$\mu A$
Clamping Voltage	$V_C$	@ $I_{PP} = 5A, t_p=8/20\mu s$	-	-	40	V
Clamping Voltage	$V_C$	@ $I_{PP} = 8A, t_p=8/20\mu s$	-	-	44	V
Junction Capacitance	$C_j$	@ $V_R = 0V, f_{SIG} = 1MHz$	-	-	100	pF

### Ratings and Characteristics Curves

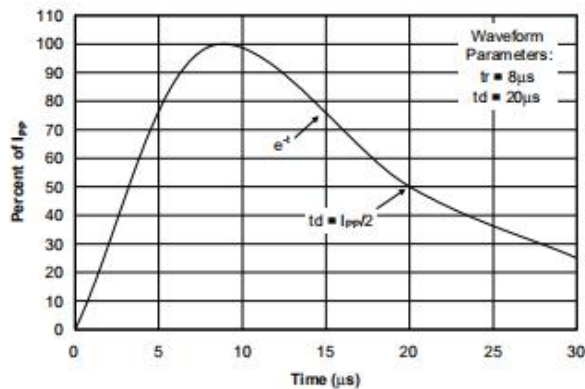
Non-Repetitive Peak Pulse Power vs. Pulse Time



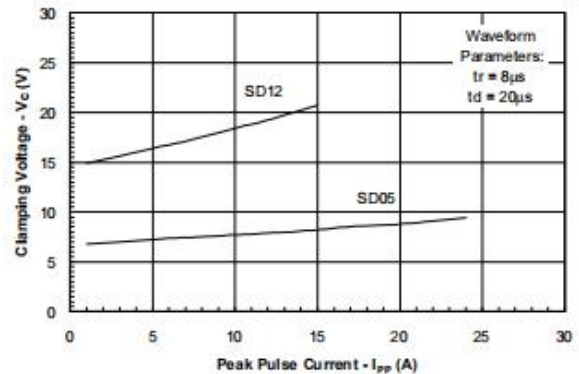
Power Derating Curve



Pulse Waveform



Clamping Voltage vs. Peak Pulse Current



**Ordering Information**

Device	Package	Shipping
SD05 THRU SD24	SOD-323 (Pb-Free)	3000pcs / reel

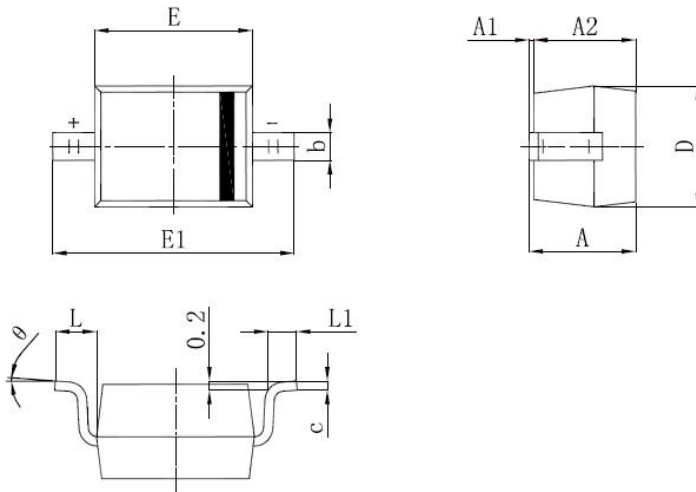
For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

**Marking Diagram**



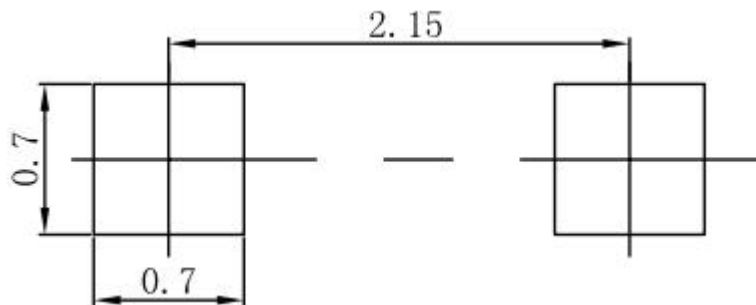
Marking code = 5U

**Mechanical Dimensions SOD-323**

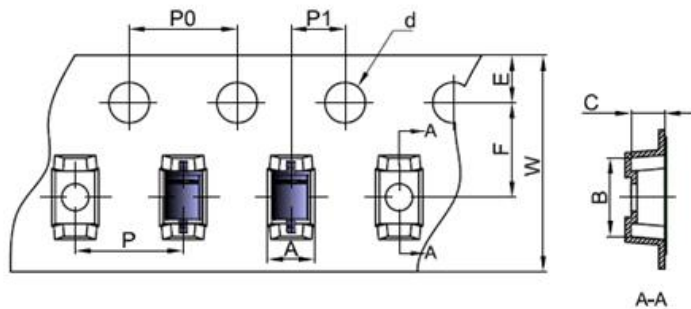


SYMBOL	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
A	-	1.000	-	0.039
A1	0.000	0.100	0.000	0.004
A2	0.800	0.900	0.031	0.035
b	0.250	0.350	0.010	0.014
c	0.080	0.150	0.003	0.006
D	1.200	1.400	0.047	0.055
E	1.600	1.800	0.063	0.071
E1	2.500	2.700	0.098	0.106
L	0.475 REF.		0.019 REF.	
L1	0.250	0.400	0.010	0.016
θ	0°	8°	0°	8°

**Soldering Pad Layout (Millimeters )**



## Carrier Tape Specification SOD-323



SYMB OL	Millimeters	
	Min.	Max.
B	2.85	2.95
C	1.20	1.30
d	1.40	1.60
E	1.65	1.85
F	3.40	3.60
P	3.90	4.10
P0	3.90	4.10
P1	1.90	2.10
W	7.90	8.30

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