

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 μs)
- 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_A=25° C unless otherwise specified

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

Electrical Characteristics@T_A=25° C unless otherwise specified

| SD05 | Marking code | 5U | | | | |
|---------------------------|------------------|---|------|------|------|-------|
| Characteristics | Symbol | Condition | Min. | Typ. | Max. | Units |
| Reverse Stand-Off Voltage | V _{RWM} | - | - | - | 5 | V |
| Reverse Breakdown Voltage | V _{BR} | @ I _t =1mA | 6 | - | - | V |
| Reverse Leakage Current | I _R | @V _{RWM} = 5V, T = 25 °C | - | - | 10 | μA |
| Clamping Voltage | V _C | @I _{PP} = 5A, tp=8/20μs | - | - | 9.8 | V |
| Clamping Voltage | V _C | @I _{PP} = 24A, tp=8/20μs | - | - | 14.5 | V |
| Junction Capacitance | C _j | @V _R = 0V, f _{SIG} = 1MHz | - | - | 350 | pF |

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

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

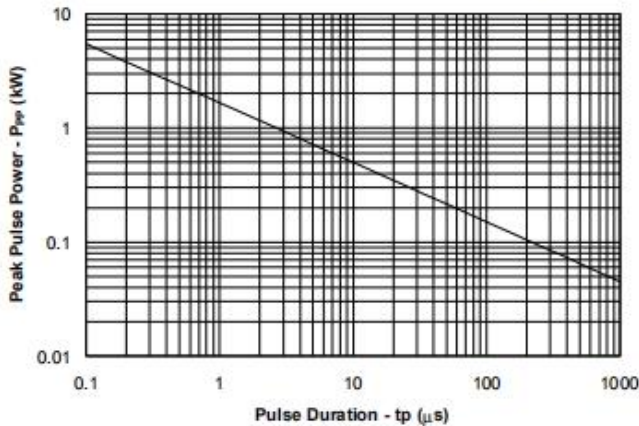


| SD18 | Marking code | 18U | | | | |
|---------------------------|--------------|-----------------------------------|------|------|------|---------|
| Characteristics | Symbol | Condition | Min. | Typ. | Max. | Units |
| Reverse Stand-Off Voltage | V_{RWM} | - | - | - | 18 | V |
| Reverse Breakdown Voltage | V_{BR} | @ $I_t=1mA$ | 20 | - | 24 | V |
| Reverse Leakage Current | I_R | @ $V_{RWM} = 18V, T = 25^\circ C$ | - | - | 1 | μA |
| 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 |

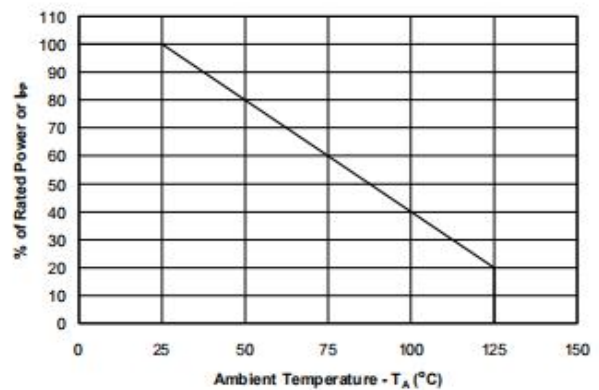
| SD24 | Marking code | 24U | | | | |
|---------------------------|--------------|-----------------------------------|------|------|------|---------|
| Characteristics | Symbol | Condition | Min. | Typ. | Max. | Units |
| Reverse Stand-Off Voltage | V_{RWM} | - | - | - | 24 | V |
| Reverse Breakdown Voltage | V_{BR} | @ $I_t=1mA$ | 26.7 | - | - | V |
| Reverse Leakage Current | I_R | @ $V_{RWM} = 24V, T = 25^\circ C$ | - | - | 1 | μA |
| 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

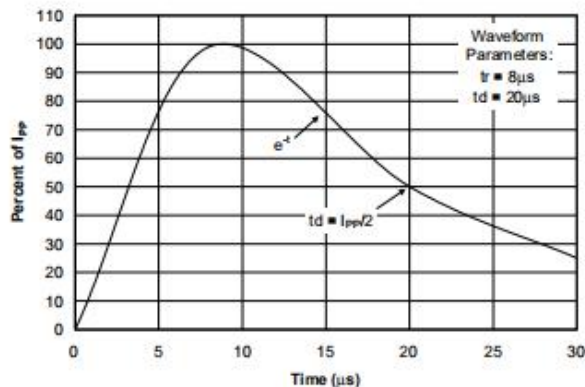
Non-Repetitive Peak Pulse Power vs. Pulse Time



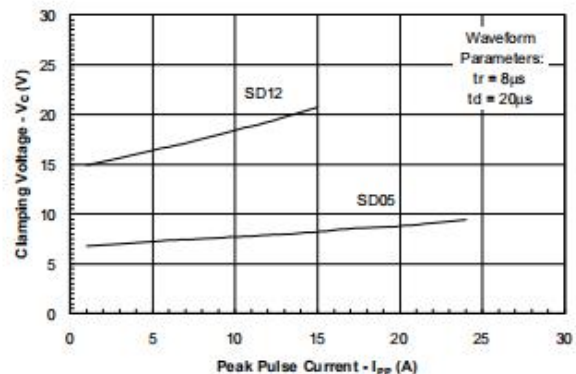
Power Derating Curve



Pulse Waveform



Clamping Voltage vs. Peak Pulse Current



Ordering Information **Marking Diagram**

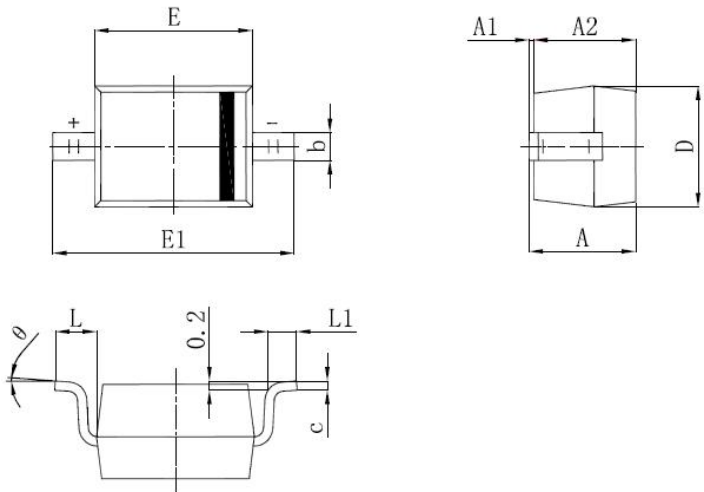
| Device | Package | Shipping |
|----------------------|----------------------|----------------|
| SD05 THRU SD24 | SOD-323 (Pb-Free) | 3000pcs / reel |



Marking code = 5U

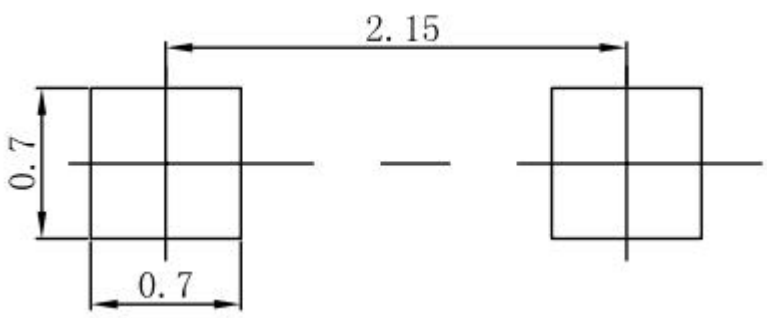
For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

Mechanical Dimensions SOD-323

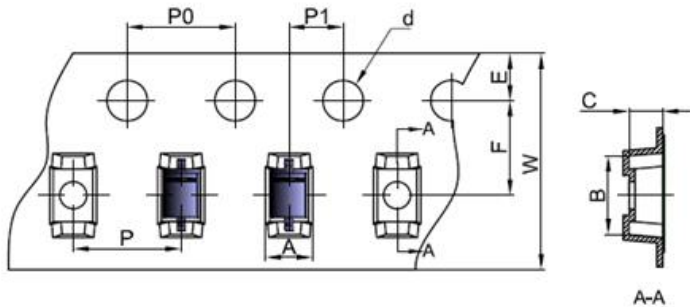


| SYMBOL | Millimeters | | Inches | |
|--------|-------------|-------|------------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | - | 1.000 | - | 0.039 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.800 | 0.900 | 0.031 | 0.035 |
| b | 0.250 | 0.350 | 0.010 | 0.014 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| 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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