

**PROTECTION PRODUCTS**
**Absolute Maximum Rating**

Rating	Symbol	Value	Units
Peak Pulse Power ( $t_p = 8/20\mu s$ )	$P_{pk}$	350	Watts
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**

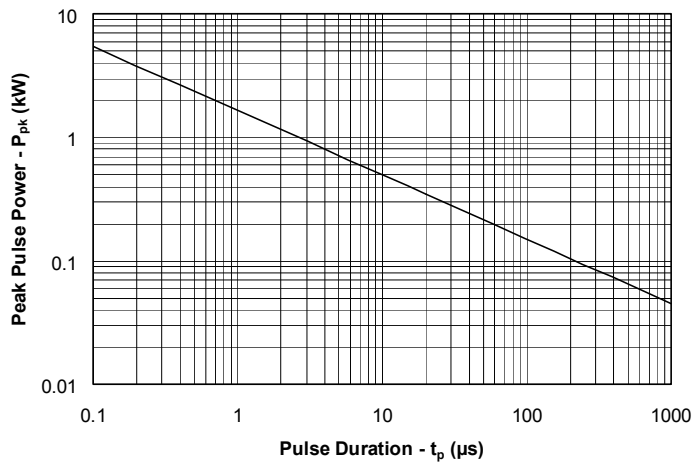
<b>SD05</b>						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	$V_{RWM}$				5	V
Reverse Breakdown Voltage	$V_{BR}$	$I_t = 1mA$	6			V
Reverse Leakage Current	$I_R$	$V_{RWM} = 5V, T=25^\circ C$			10	$\mu A$
Clamping Voltage	$V_C$	$I_{PP} = 5A, t_p = 8/20\mu s$			9.8	V
Clamping Voltage	$V_C$	$I_{PP} = 24A, t_p = 8/20\mu s$			14.5	V
Peak Pulse Current	$I_{PP}$	$t_p = 8/20\mu s$			24	A
Junction Capacitance	$C_J$	$V_R = 0V, f = 1MHz$			350	pF

<b>SD12</b>						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	$V_{RWM}$				12	V
Reverse Breakdown Voltage	$V_{BR}$	$I_t = 1mA$	13.3			V
Reverse Leakage Current	$I_R$	$V_{RWM} = 12V, T=25^\circ C$			1	$\mu A$
Clamping Voltage	$V_C$	$I_{PP} = 5A, t_p = 8/20\mu s$			19	V
Clamping Voltage	$V_C$	$I_{PP} = 15A, t_p = 8/20\mu s$			25	V
Peak Pulse Current	$I_{PP}$	$t_p = 8/20\mu s$			15	A
Junction Capacitance	$C_J$	$V_R = 0V, f = 1MHz$			150	pF

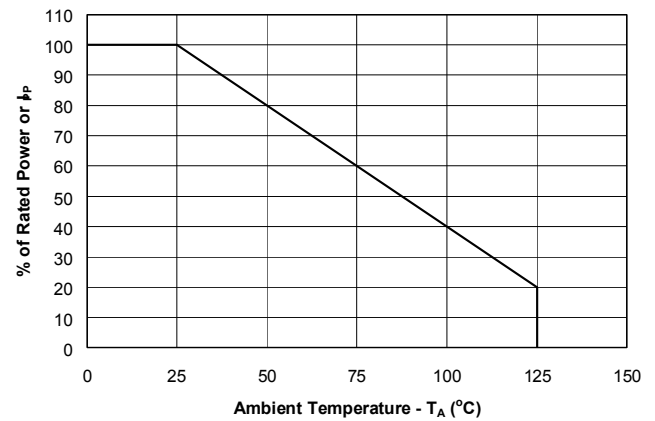
# PROTECTION PRODUCTS

## Typical Characteristics

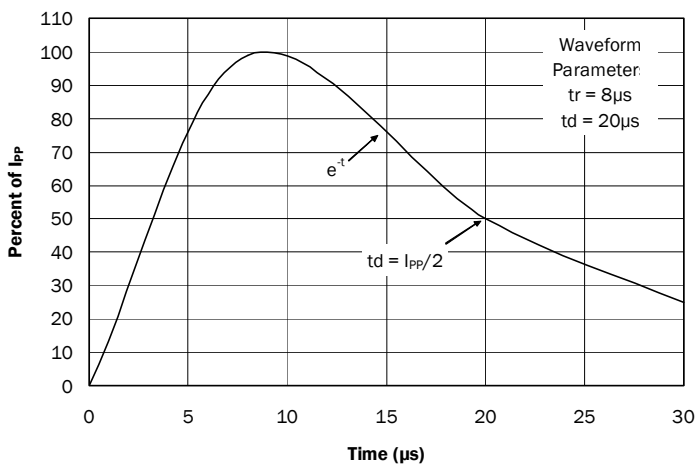
### Non-Repetitive Peak Pulse Power vs. Pulse Time



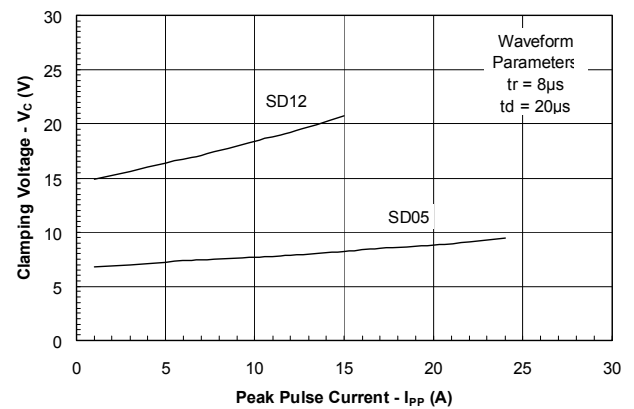
### Power Derating Curve



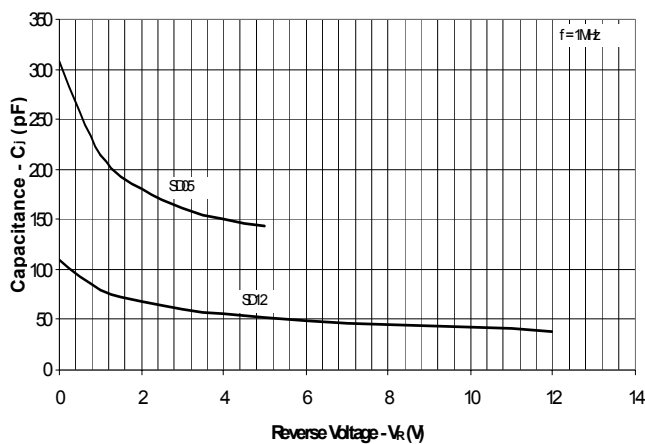
### Pulse Waveform



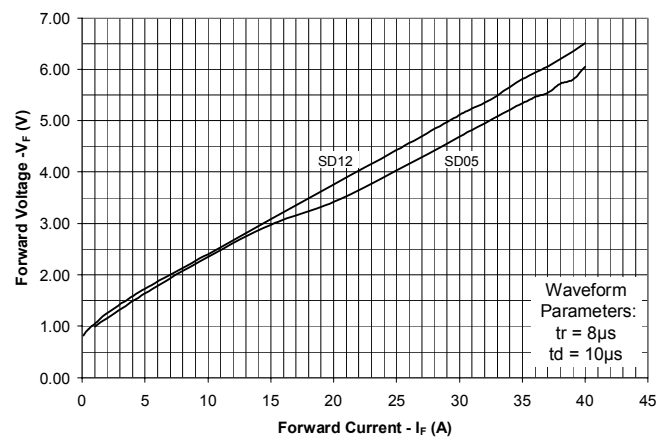
### Clamping Voltage vs. Peak Pulse Current



### Capacitance vs. Reverse Voltage



### Forward Voltage vs. Forward Current



## PROTECTION PRODUCTS

### Applications Information

#### Device Connection Options

The SDxx TVS diodes are designed to protect one data, I/O, or power supply line. The device is designed to replace multi-layer varistors (MLVs) in portable applications. It is easily implemented on existing 0805 MLV pads and is only slightly larger than 0603 MLV pads. The device is unidirectional and may be used on lines where the signal polarity is above ground. The cathode band should be placed towards the line that is to be protected.

#### Circuit Board Layout Recommendations for Suppression of ESD.

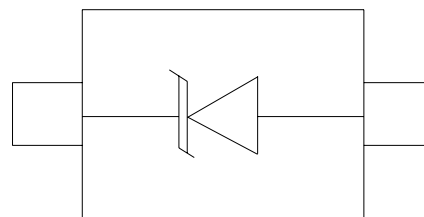
Good circuit board layout is critical for the suppression of fast rise-time transients such as ESD. The following guidelines are recommended (Refer to application note SI99-01 for more detailed information):

- Place the TVS near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the TVS and the protected line.
- The ESD transient return path to ground should be kept as short as possible.
- Place a TVS and decoupling capacitor between power and ground of components that may be vulnerable to electrostatic discharges to the ground plane.
- Minimize all conductive loops including power and ground loops.
- Use multilayer boards when possible.
- Minimize interconnecting line lengths.
- Never run critical signals near board edges.
- Fill unused portions of the PCB with ground plane.

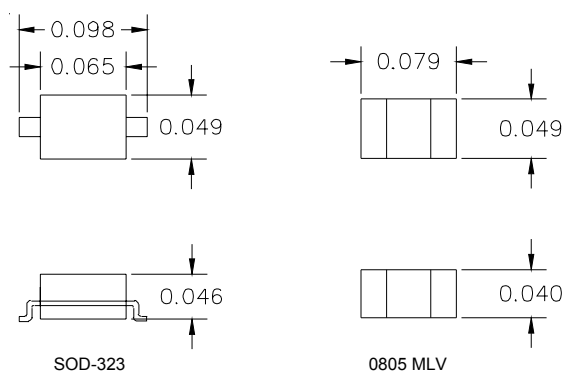
#### Matte Tin Lead Finish

Matte tin has become the industry standard lead-free replacement for SnPb lead finishes. A matte tin finish is composed of 100% tin solder with large grains. Since the solder volume on the leads is small compared to the solder paste volume that is placed on the land pattern of the PCB, the reflow profile will be determined by the requirements of the solder paste. Therefore, these devices are compatible with both lead-free and SnPb assembly techniques. In addition, unlike other lead-free compositions, matte tin does not have any added alloys that can cause degradation of the solder joint.

#### Device Schematic and Pin Configuration

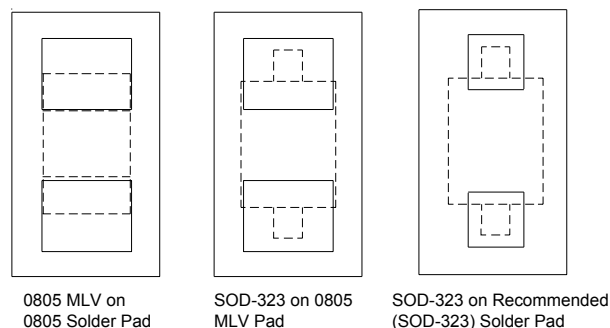


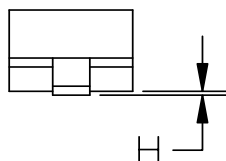
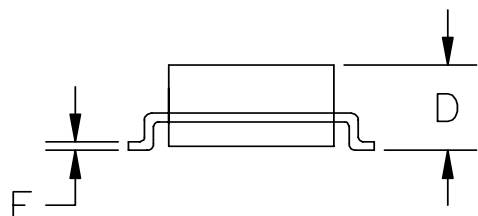
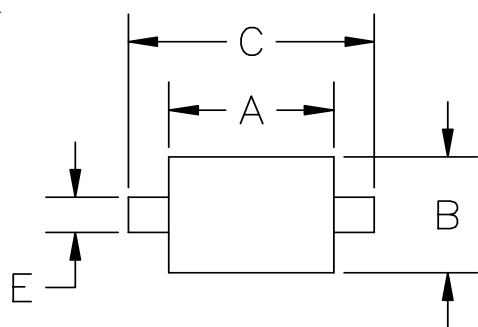
#### Size Comparison to 0805 MLV



Note: Nominal dimensions in inches

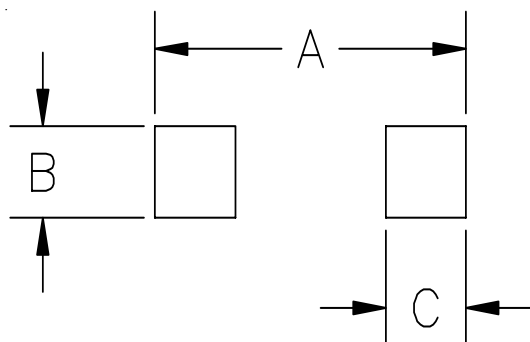
#### Component Placement Comparison



**PROTECTION PRODUCTS**
**Outline Drawing**


DIMENSIONS					
DIM <sup>N</sup>	INCHES		MM [1]		NOTE
	MIN	MAX	MIN	MAX	
A	.060	.071	1.5	1.8	—
B	.045	.054	1.2	1.4	—
C	.090	.107	2.3	2.7	—
D	—	.043	—	1.1	—
E	.012	.016	0.3	0.4	—
F	.004	.010	.10	.25	—
H	—	.004	—	.10	—

<sup>1</sup> CONTROLLING DIMENSION: MILLIMETERS

**Land Pattern**


DIMENSIONS					
DIM <sup>N</sup>	INCHES		MM <sup>1</sup>		NOTE
	MIN	MAX	MIN	MAX	
A	—	.120	—	3.05	—
B	—	.031	—	0.8	—
C	—	.031	—	0.8	—

<sup>1</sup> CONTROLLING DIMENSION: MILLIMETERS

**PROTECTION PRODUCTS****Marking Codes**

<b>Part Number</b>	<b>Marking Code</b>
SD05	5U
SD12	6U

**Ordering Information**

<b>Part Number</b>	<b>Lead Finish</b>	<b>Qty per Reel</b>	<b>Reel Size</b>
SD05.TC	SnPb	3,000	7"
SD12.TC	SnPb	3,000	7"
SD05.TCT	Pb free	3,000	7"
SD12.TCT	Pb free	3,000	7"

**Contact Information**

Semtech Corporation  
Protection Products Division  
200 Flynn Rd., Camarillo, CA 93012  
Phone: (805)498-2111 FAX (805)498-3804