

# SD05T1 Series

Preferred Device

## Transient Voltage Suppressor Diode

### SOD-323 Zeners for ESD Protection

These Zener diodes are designed for applications requiring transient overvoltage protection capability. They are intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment and other applications. These devices are ideal for situations where board space is at a premium.

#### Specification Features:

- Steady State Power Rating of 200 mW
- Peak Power – 350 W ( $8 \times 20 \mu\text{s}$ )
- Low Leakage
- Cathode Indicated by Polarity Band
- Package Weight: 4.507 mg/wmt
- Meets IEC61000-4-2 Level 4, 15 kV (Air), 8 kV (Contact)
- Meets IEC6100-4-4 Level 4, 40 A
- Meets IEC6100-4-5 (Lightning), 24 A
- Meets 16 kV Human Body Model ESD Requirements
- Pb-Free Packages are Available

#### Mechanical Characteristics:

**CASE:** Void-free, transfer-molded, thermosetting plastic  
Epoxy Meets UL 94, V-0

**LEAD FINISH:** 100% Matte Sn (Tin)

**MOUNTING POSITION:** Any

**QUALIFIED MAX REFLOW TEMPERATURE:** 260°C

Device Meets MSL 1 Requirements

Use the Device Number to order the 7 inch/3,000 unit reel.  
Replace the “T1” with “T3” in the Device Number to order the 13 inch/10,000 unit reel.



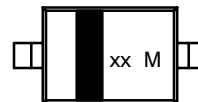
**ON Semiconductor®**

<http://onsemi.com>



**SOD-323  
CASE 477  
STYLE 1**

#### MARKING DIAGRAM



xx = Specific Device Code  
ZA = SD05T1  
ZC = SD12T1  
M = Date Code

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
SD05T1	SOD-323	3000/Tape & Reel
SD05T1G	SOD-323 (Pb-Free)	3000/Tape & Reel
SD12T1	SOD-323	3000/Tape & Reel
SD12T1G	SOD-323 (Pb-Free)	3000/Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

**Preferred** devices are recommended choices for future use and best overall value.

## SD05T1 Series

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation @ 20 $\mu$ s (Note 1) @ $T_L \leq 25^\circ\text{C}$	$P_{pk}$	350	Watts
IEC 61000-4-2 (ESD) <span style="float: right;">Air Contact</span>		$\pm 15$ $\pm 8.0$	kV
IEC 61000-4-4 (EFT)		40	A
ESD Voltage (Human Body Model (HBM) Waveform per IEC 61000-4-2)	$V_{pp}$	30	kV
Total Power Dissipation on FR-5 Board (Note 2) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	200 1.6	mW mW/ $^\circ\text{C}$
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	635	$^\circ\text{C/W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$
Lead Solder Temperature – Maximum (10 Second Duration)	$T_L$	260	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

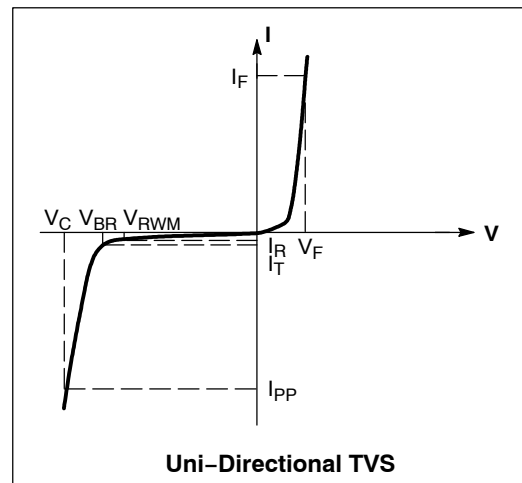
\*Other voltages may be available upon request.

1. Nonrepetitive current pulse, per Figure 6.
2. FR-5 = 1.0 x 0.75 x 0.62 in.

### ELECTRICAL CHARACTERISTICS

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$V_{RWM}$	Working Peak Reverse Voltage
$I_R$	Maximum Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_T$	Test Current
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$



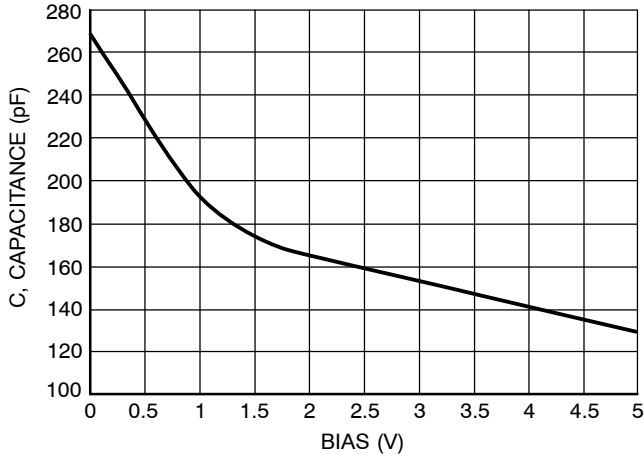
### ELECTRICAL CHARACTERISTICS

Device	$V_{RWM}$ (V)	$I_R$ @ $V_{RWM}$ ( $\mu$ A)	$V_{BR}$ , Breakdown Voltage (V)		$I_T$ mA	$V_C$ @ $I_{PP} = 5$ A (Note 3) (V)	Max $I_{PP}$ (Note 3) (A)	$V_C$ @ Max $I_{PP}$ (Note 3) (V)	Max Capacitance (pF)
			Min	Max					$V_R = 0$ V $f = 1.0$ MHz
SD05T1, G	5.0	10	6.2	7.3	1.0	9.8	24	14.5	350
SD12T1, G	12	1.0	13.3	15.75	1.0	19	15	25	150

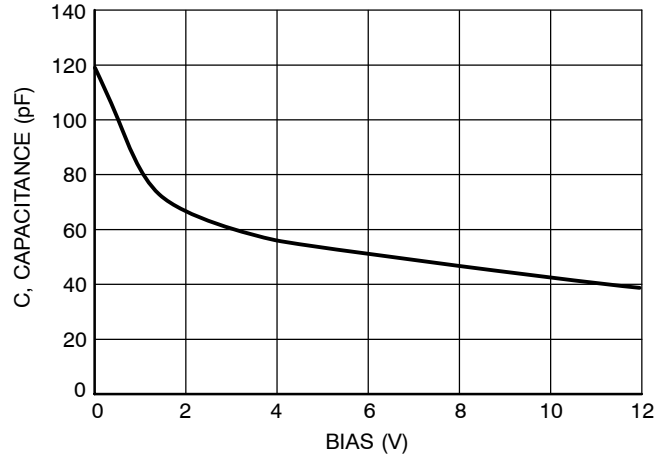
3.  $8 \times 20 \mu$ s pulse waveform.

# SD05T1 Series

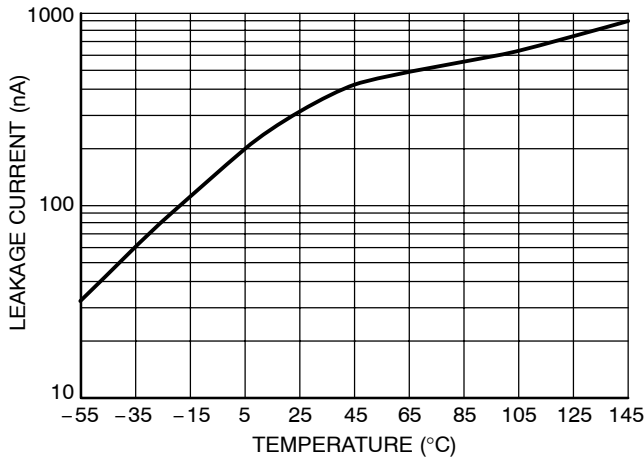
## TYPICAL CHARACTERISTICS



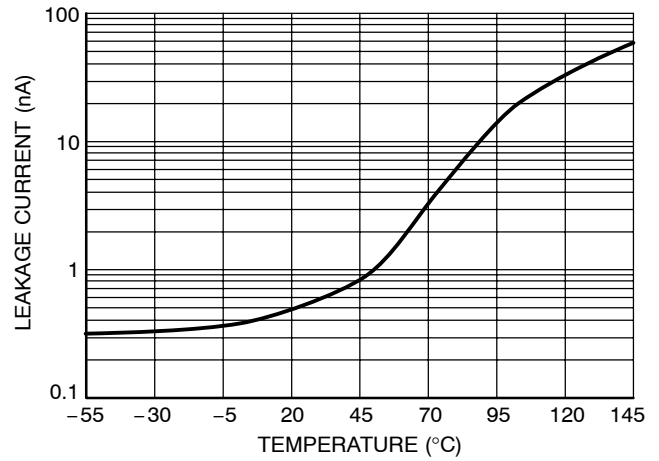
**Figure 1. SD05 Typical Capacitance versus Bias Voltage**



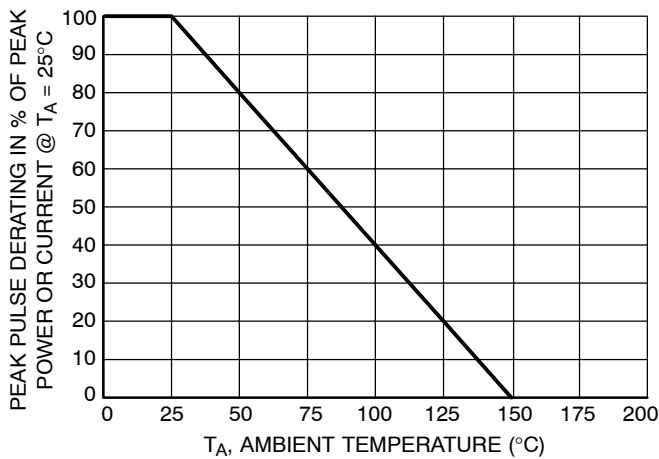
**Figure 2. SD12 Typical Capacitance versus Bias Voltage**



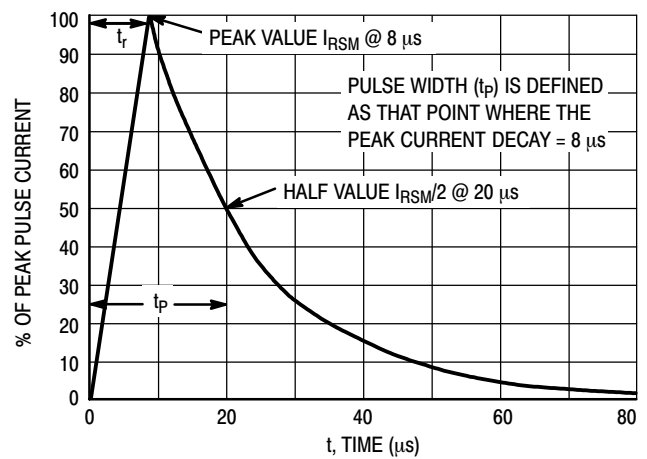
**Figure 3. SD05 Typical Leakage Current versus Temperature**



**Figure 4. SD12 Typical Leakage Current versus Temperature**



**Figure 5. Pulse Derating Curve**

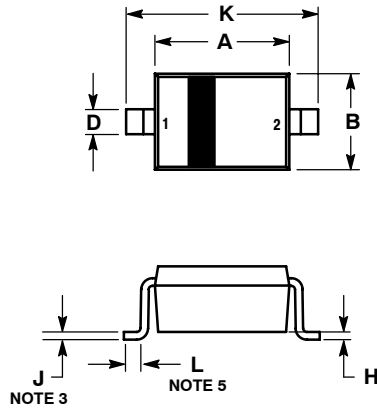


**Figure 6. 8 x 20  $\mu s$  Pulse Waveform**

# SD05T1 Series

## PACKAGE DIMENSIONS

**SOD-323**  
CASE 477-02  
ISSUE E



### NOTES:

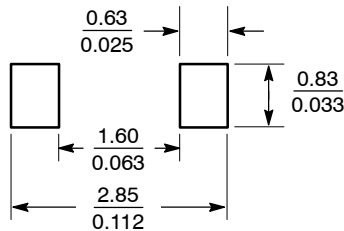
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS SPECIFIED PER L/F DRAWING WITH SOLDER PLATING.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DIMENSION L IS MEASURED FROM END OF RADIUS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.60	1.80	0.063	0.071
B	1.15	1.35	0.045	0.053
C	0.80	1.00	0.031	0.039
D	0.25	0.40	0.010	0.016
E	0.15 REF		0.006 REF	
H	0.00	0.10	0.000	0.004
J	0.089	0.177	0.0035	0.0070
K	2.30	2.70	0.091	0.106
L	0.075	---	0.003	---


### STYLE 1:

- PIN 1. CATHODE  
2. ANODE

## SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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