

# SD12CT1

## ESD Protection Diode

### Bi-directional ESD Protection with Ultra Low Clamping Voltage

The SD12C is designed to protect voltage sensitive components from ESD and transient events. Excellent clamping capability, low leakage, and fast response time, make this part ideal for ESD protection on designs where board space is at a premium. Because of its small size, it is suited for use in cellular phones, portable devices, digital cameras, power supplies and many other portable applications.

#### Specification Features:

- Peak Power – 350 W ( $8 \times 20 \mu\text{s}$ )
- Low Leakage
- Low Clamping Voltage
- Small Package for use in Portable Electronics
- Meets IEC61000-4-2 Level 4
- Meets IEC6100-4-4 Level 4
- Meets 16 kV Human Body Model ESD Requirements
- These Devices are Pb-Free and are RoHS Compliant

#### Mechanical Characteristics:

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

**MOUNTING POSITION:** Any

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

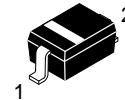
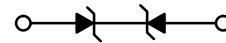
Device Meets MSL 1 Requirements

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



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**SOD-323  
CASE 477  
STYLE 1**

#### MARKING DIAGRAM



ZK = Specific Device Code

M = Date Code\*

■ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation may vary depending upon manufacturing location.

#### ORDERING INFORMATION

Device	Package	Shipping†
SD12CT1G	SOD-323 (Pb-Free)	3000/Tape & Reel

†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.

# SD12CT1

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation @ 20 $\mu$ s @ $T_L \leq 25^\circ\text{C}$	$P_{pk}$	350	W
IEC 61000-4-2 (ESD) Air Contact		$\pm 30$ $\pm 30$	kV
IEC 61000-4-4 (EFT)		40	A
Total Device Dissipation FR-5 Board, (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	200 1.5	mW mW/ $^\circ\text{C}$
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	635	$^\circ\text{C/W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$
Lead Solder Temperature – Maximum (10 Second Duration)	$T_L$	260	$^\circ\text{C}$

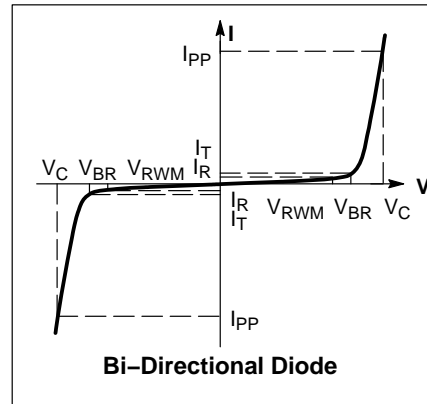
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Minimum Solder Footprint.

## 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
$\Delta V_{BR}$	Maximum Temperature Variation of $V_{BR}$



## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Reverse Working Voltage	(Note 2)	$V_{RWM}$			12	V
Breakdown Voltage	$I_T = 1 \text{ mA}$ , (Note 3)	$V_{BR}$	13.3			V
Reverse Leakage Current	$V_{RWM} = 12 \text{ V}$	$I_R$			1.0	$\mu\text{A}$
Clamping Voltage Additional Clamping Voltage	$I_{PP} = 5 \text{ A}$ , (8 x 20 $\mu\text{sec}$ Waveform) $I_{PP} = 15 \text{ A}$ , (8 x 20 $\mu\text{sec}$ Waveform)	$V_C$			19 24	V
Maximum Peak Pulse Current	8 x 20 $\mu\text{sec}$ Waveform	$I_{PP}$			15	A
Capacitance	$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$	$C_j$		64		pF
	$V_R = 12 \text{ V}$ , $f = 1 \text{ MHz}$			36		

2. TVS devices are normally selected according to the working peak reverse voltage ( $V_{RWM}$ ), which should be equal or greater than the DC or continuous peak operating voltage level.
3.  $V_{BR}$  is measured at pulse test current  $I_T$ .

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



SOD-323  
CASE 477-02  
ISSUE H

DATE 13 MAR 2007



SCALE 4:1



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	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.031	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3	0.15 REF			0.006 REF		
b	0.25	0.32	0.4	0.010	0.012	0.016
C	0.089	0.12	0.177	0.003	0.005	0.007
D	1.60	1.70	1.80	0.062	0.066	0.070
E	1.15	1.25	1.35	0.045	0.049	0.053
L	0.08			0.003		
HE	2.30	2.50	2.70	0.090	0.098	0.105

### GENERIC MARKING DIAGRAM\*



XX = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

### 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.

STYLE 1:  
PIN 1. CATHODE (POLARITY BAND)  
2. ANODE

STYLE 2:  
NO POLARITY

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