

# 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

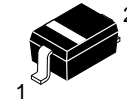
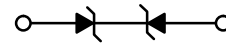
Device Meets MSL 1 Requirements

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



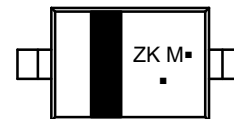
**ON Semiconductor®**

[www.onsemi.com](http://www.onsemi.com)



**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	$^\circ\text{C}$

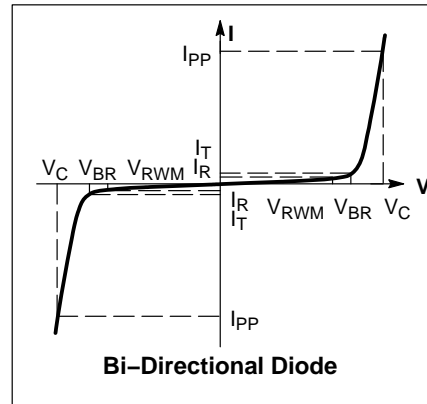
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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)

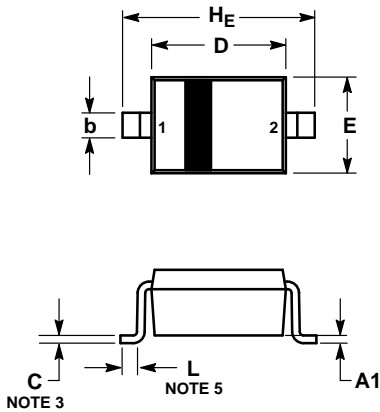
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Reverse Working Voltage	(Note 2)	$V_{RWM}$			12	V
Breakdown Voltage	$I_T = 1 \text{ mA}$ , (Note 3)	$V_{BR}$	13.3			V
Reverse Leakage Current	$V_{RWM} = 12 \text{ V}$	$I_R$			1.0	$\mu\text{A}$
Clamping Voltage Additional Clamping Voltage	$I_{PP} = 5 \text{ A}$ , (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  $I_T$ .

# SD12CT1

## PACKAGE DIMENSIONS

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



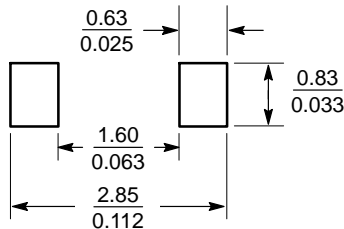
**NOTES:**

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

- 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.

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

**LITERATURE FULFILLMENT:**  
Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative