

ESD Protection Diode

SOD-323 Diodes for ESD Protection

SD05T1 Series, SZSD05T1 Series

These surge protection 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 300 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
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

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.



MARKING DIAGRAM



SOD-323
CASE 477
STYLE 1



xx = Specific Device Code
 ZA = SD05T1
 ZC = SD12T1
 M = Month Code
 ■ = Pb-Free Package
 (Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping [†]
SD05T1G	SOD-323 (Pb-Free)	3000 / Tape & Reel
SD12T1G		

DISCONTINUED (Note 1)

SZSD05T1G	SOD-323 (Pb-Free)	3000 / Tape & Reel
SZSD12T1G		

[†] For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

1. **DISCONTINUED:** These devices are not available. Please contact your onsemi representative for information. The most current information on these devices may be available on www.onsemi.com.

SD05T1 Series, SZSD05T1 Series

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation @ 20 μ s (Note 1) @ $T_L \leq 25^\circ\text{C}$	P_{pk}	350	Watts
IEC 61000-4-2 (ESD) Air Contact		± 15 ± 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-4 Board (Note 2) @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	416	$^\circ\text{C}/\text{W}$
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	$^\circ\text{C}$

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.

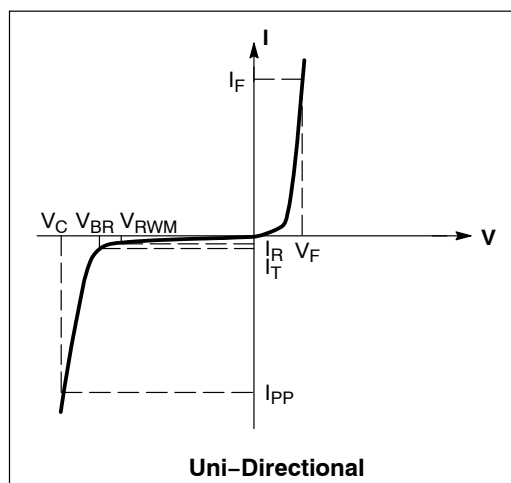
* Other voltages may be available upon request.

- Non-repetitive current pulse, per Figure 6.
- FR-4 printed circuit board, single-sided copper, mounting pad 1 cm^2 .

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} (μA)	V_{BR} , Breakdown Voltage (V)		I_T mA	V_C @ $I_{PP} = 5\text{ A}$ (Note 3) (V)	Max I_{PP} (Note 3) (A)	V_C @ Max I_{PP} (Note 3) (V)	Max Capacitance (pF)
			Min	Max					$V_R = 0\text{ V}$ $f = 1.0\text{ MHz}$
SD05T1G	5.0	10	6.2	7.3	1.0	9.8	24	14.5	350
SD12T1G	12	1.0	13.3	15.75	1.0	19	15	25	150

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

- 8 $\times$ 20 μs pulse waveform.

* Include SZ-prefix devices where applicable.

SD05T1 Series, SZSD05T1 Series

TYPICAL CHARACTERISTICS

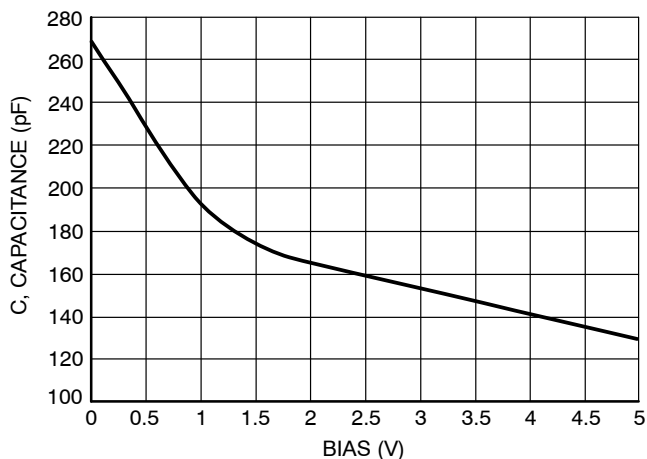


Figure 1. SD05 Typical Capacitance versus Bias Voltage

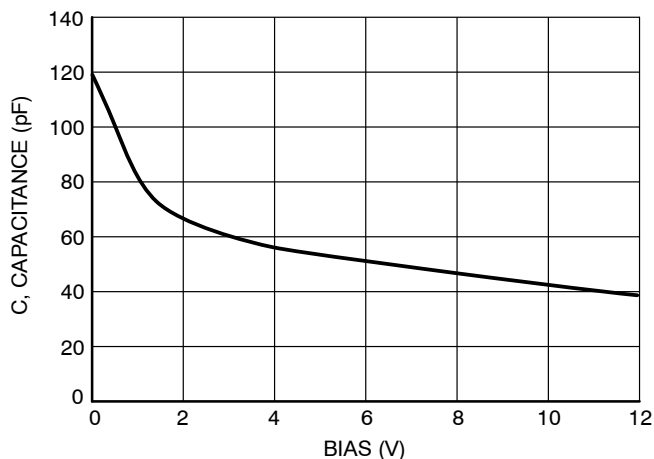


Figure 2. SD12 Typical Capacitance versus Bias Voltage

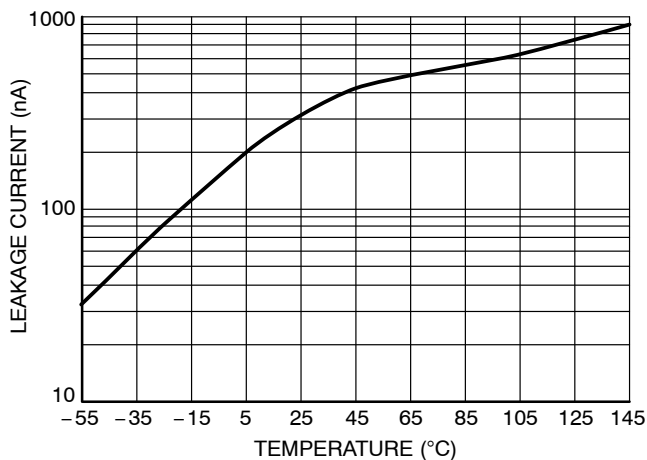


Figure 3. SD05 Typical Leakage Current versus Temperature

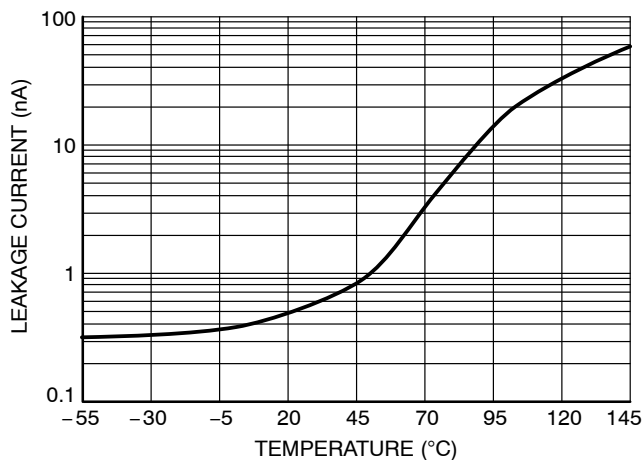


Figure 4. SD12 Typical Leakage Current versus Temperature

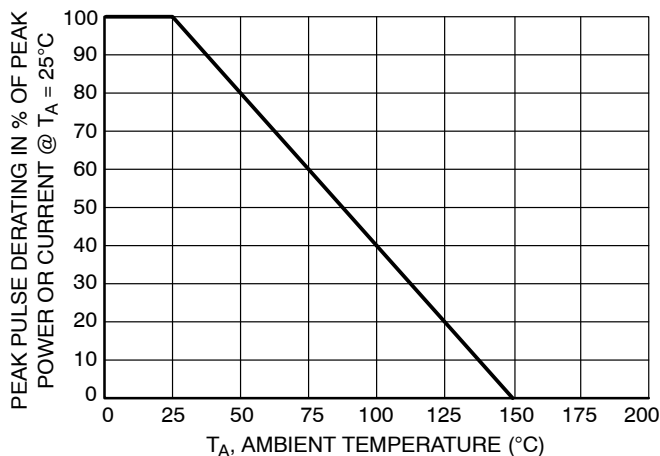


Figure 5. Pulse Derating Curve

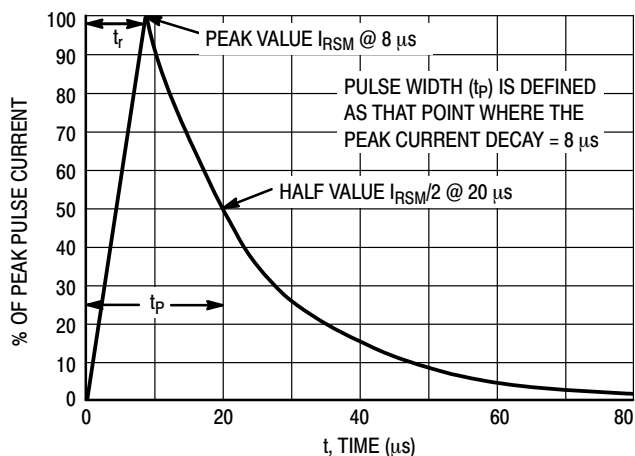


Figure 6. 8 x 20 μs Pulse Waveform

SD05T1 Series, SZSD05T1 Series

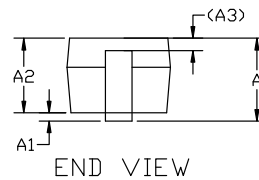
REVISION HISTORY

Revision	Description of Changes	Date
6	Rebranded the Data Sheet to onsemi format. SZSD05T1G, SZSD12T1G OPNs Marked as Discontinued.	09/11/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.


SOD-323 1.70x1.25x0.85
CASE 477
ISSUE K

DATE 11 MAR 2024



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

NOTES:

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
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 MEASURE FROM END OF RADIUS.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.80	0.90	1.00
A1	0.00	0.05	0.10
A2	0.75	0.85	0.95
A3	0.15 (REF)		
b	0.25	0.32	0.4
c	0.09	0.12	0.18
D	1.60	1.70	1.80
E	1.15	1.25	1.35
H	2.30	2.50	2.70
L	0.08	---	---
L1	0.40 (REF)		

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. Some products may not follow the Generic Marking.

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

STYLE 2:
NO POLARITY

DOCUMENT NUMBER:	98ASB17533C	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	SOD-323 1.70x1.25x0.85	PAGE 1 OF 1

onsemi and Onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales