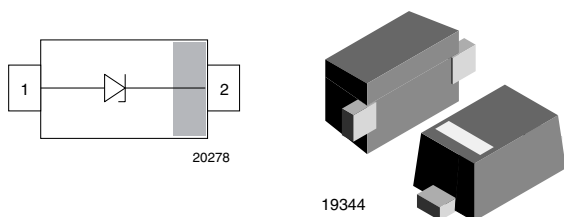


Low Capacitance Single Line ESD-Protection Diode in SOD-523



MARKING (example only)



Bar = cathode marking

X = date code

Y = type code (see table below)

LINKS TO ADDITIONAL RESOURCES



FEATURES

- Compact SOD-523 package
- Low package height < 0.75 mm
- 1-line ESD-protection
- AEC-Q101 qualified available
- Working range 5.5 V
- Low leakage current < 0.1 μ A
- Low load capacitance C_D = 0.7 pF typ.
- ESD-protection acc. IEC 61000-4-2
± 18 kV contact discharge
± 18 kV air discharge
- Lead plating: Sn (e3)
Soldering can be checked by standard vision inspection.
AOI = automated optical inspection
No X-ray necessary
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



ORDERING INFORMATION

PART NUMBER (EXAMPLE)	AEC-Q101 QUALIFIED	ENVIRONMENTAL AND QUALITY CODE			ORDERING CODE (EXAMPLE)
		RoHS COMPLIANT + LEAD (Pb)-FREE TERMINATIONS	TIN PLATED	8K PER 7" REEL (8 mm TAPE)	
		GREEN		MOQ = 8K/BOX	
VBUS05M1-02V	-	G	3	-08	VBUS05M1-02V-G3-08
VBUS05M1-02V	H	G	3	-08	VBUS05M1-02VHG3-08

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	PIN PLATING	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VBUS05M1-02V	SOD-523	e3	B	1.4 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	acc. IEC 61000-4-5, 8/20 μ s/single shot	I_{PPM}	4.5	A
Peak pulse power	Pin 1 to pin 2 acc. IEC 61000-4-5; t_p = 8/20 μ s; single shot	P_{PP}	70	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 18	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 18	
Operating temperature	Junction temperature	T_J	-55 to +150	°C
Storage temperature		T_{stg}	-55 to +150	°C

ESD-PROTECTION FOR HIGH-SPEED SIGNAL OR DATA LINES

The VBUS05M1-02V is a bidirectional but asymmetrical (BiAs) ESD-protection device which clamps positive and negative overvoltage transients to ground. Connected between the signal or data line and the ground the VBUS05M1-02V offers a high isolation (low leakage current, low capacitance) within the specified working range. Due to the short leads and small package size of the small SOD-523 package the line inductance is very low, so that fast transients like an ESD-strike can be clamped with minimal over- or undershoots. Due to the very low capacitance the VBUS05M1-02V can be used for high speed data ports like HDMI, USB, or Thunderbolt.

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

PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	5.5	V
Reverse voltage	At $I_R = 0.1\text{ }\mu\text{A}$	V_R	5.5	-	-	V
Reverse current	At $V_{RWM} = 5.5\text{ V}$	I_R	-	-	0.1	μA
Reverse breakdown voltage	At $I_R = 1\text{ mA}$	V_{BR}	6.5	7.5	8.5	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$	V_C	-	9	11	V
	At $I_{PP} = I_{PPM} = 4.5\text{ A}$	V_C	-	12.5	15	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	0.7	0.8	pF
	At $V_R = 3.3\text{ V}$; $f = 1\text{ MHz}$	C_D	-	0.7	-	pF
Clamping voltage	Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$ $I_{TLP} = 8\text{ A}$	V_{C-TLP}	-	15	-	V
	Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$ $I_{TLP} = 16\text{ A}$		-	21	-	
Dynamic resistance	Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$	R_{DYN}	-	0.7	-	Ω

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

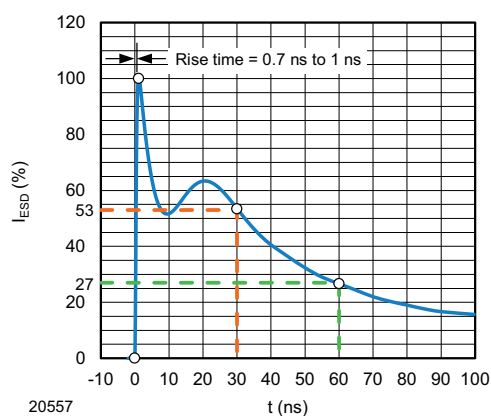


Fig. 1 - ESD Discharge Current Wave Form
acc. IEC 61000-4-2 (330 Ω / 150 pF)

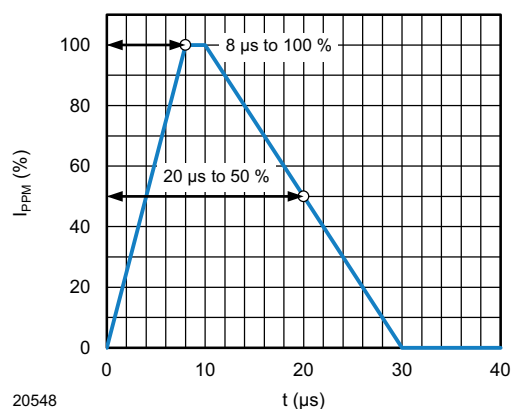


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form
acc. IEC 61000-4-5

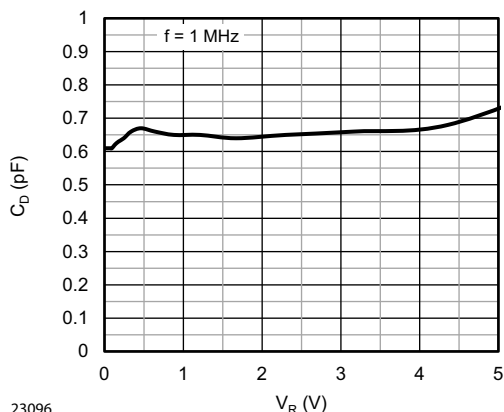


Fig. 3 - Typical Capacitance vs. Reverse Voltage

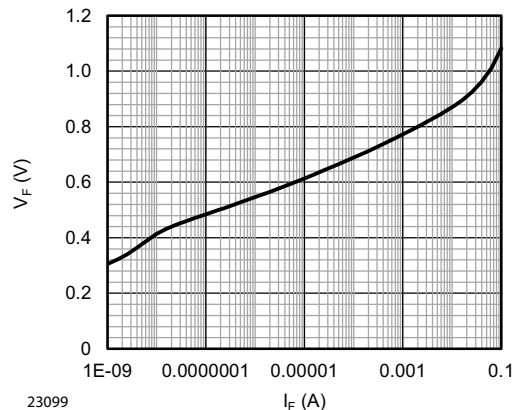


Fig. 6 - Typical Forward Voltage vs. Forward Current

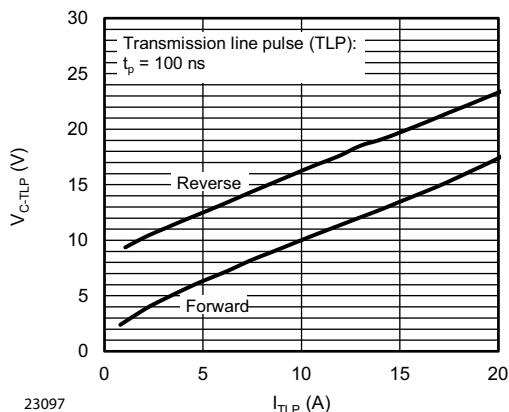


Fig. 4 - Typical Clamping Voltage vs. Peak Pulse Current

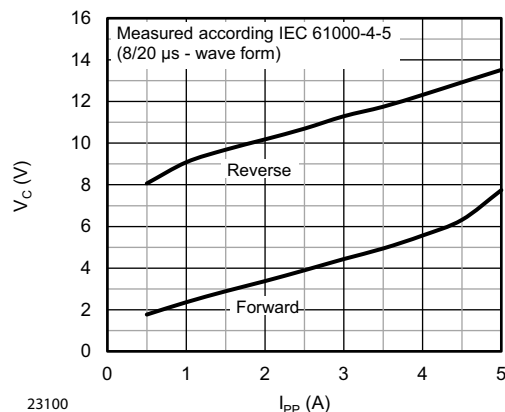


Fig. 7 - Typical Peak Clamping Voltage vs. Peak Pulse Current

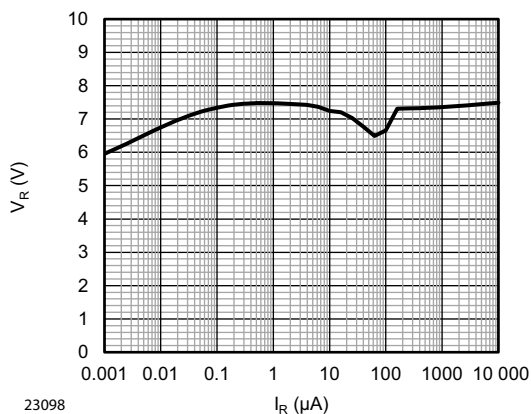
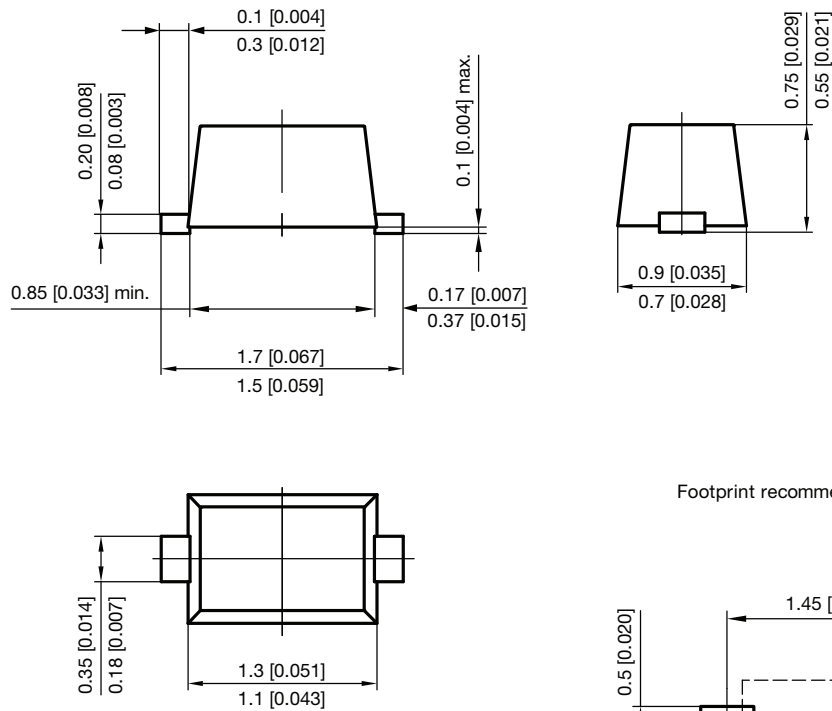
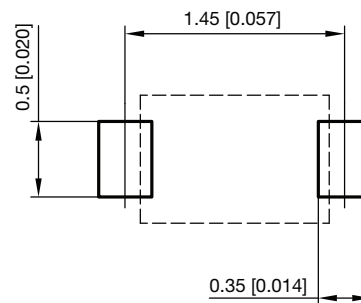


Fig. 5 - Typical Reverse Voltage vs. Reverse Current

PACKAGE DIMENSIONS in millimeters [inches]: **SOD-523**


Footprint recommendation:



Document no.: S8-V-3880.02-003 (4)

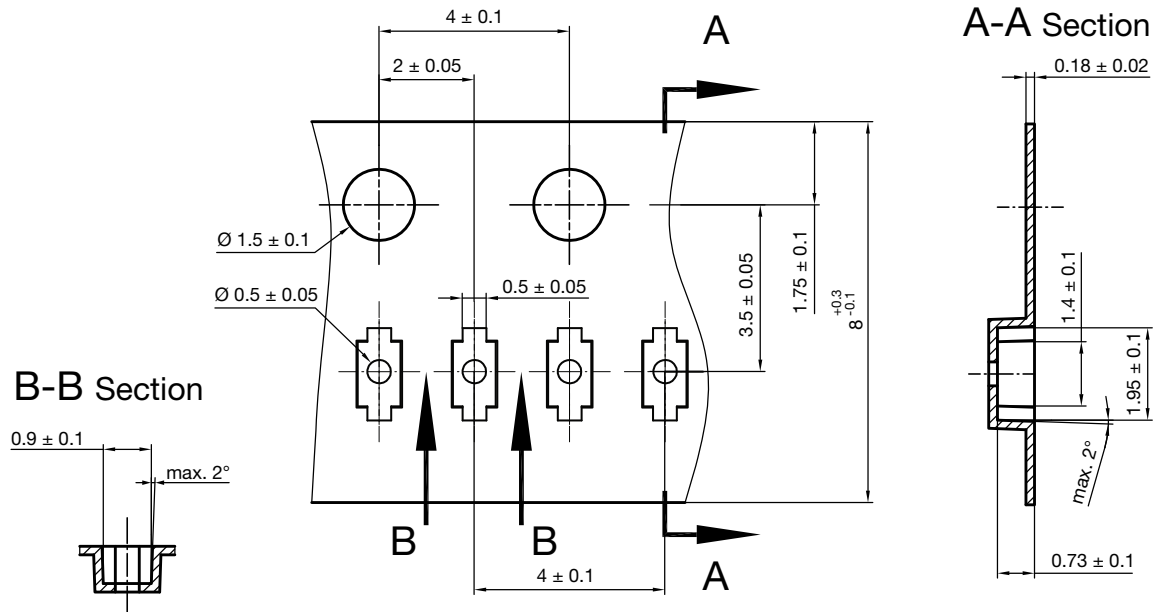
Created - Date: 04. April 2017

Rev. 4 - Date: 03. Aug. 2020

23093

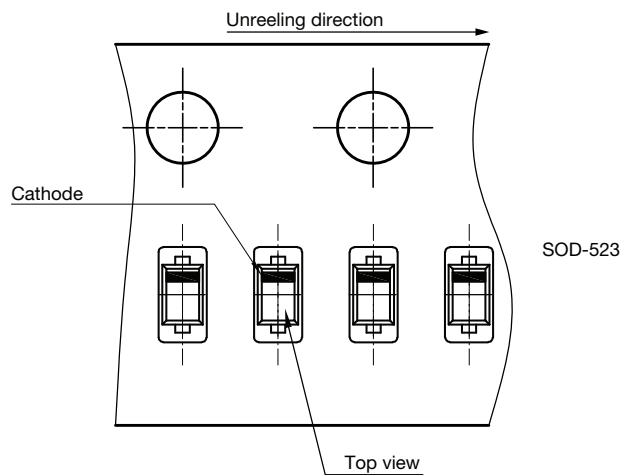


CARRIER TAPE SOD-523



S8-V-3717.03-005 (4)
05.07.2018
22959

ORIENTATION IN CARRIER TAPE SOD-523



S8-V-3717.03-006 (4)
05.07.2018
22958



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.