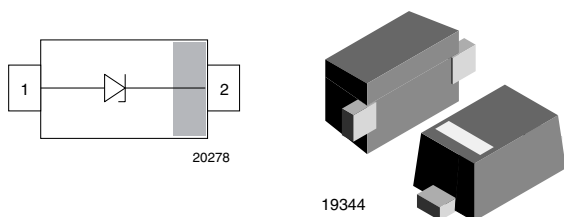


# Low Capacitance Single Line ESD-Protection Diode in SOD-523



## 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  $\mu$ 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](http://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 $\mu$ 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 $\mu$ 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	$\mu\text{A}$
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	-	$\Omega$

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

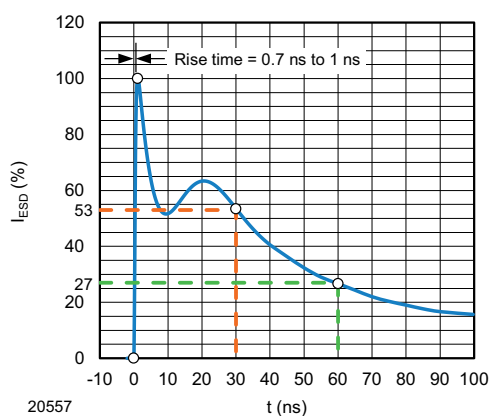


Fig. 1 - ESD Discharge Current Wave Form  
acc. IEC 61000-4-2 (330  $\Omega$  / 150 pF)

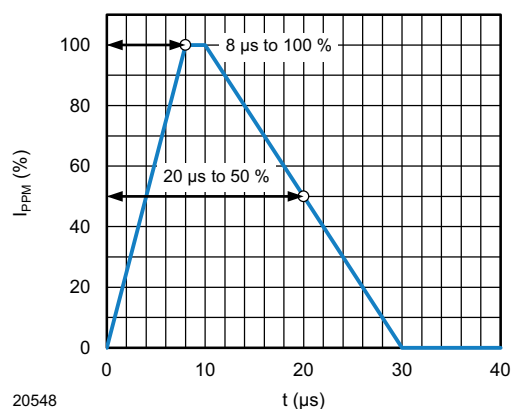


Fig. 2 - 8/20  $\mu\text{s}$  Peak Pulse Current Wave Form  
acc. IEC 61000-4-5

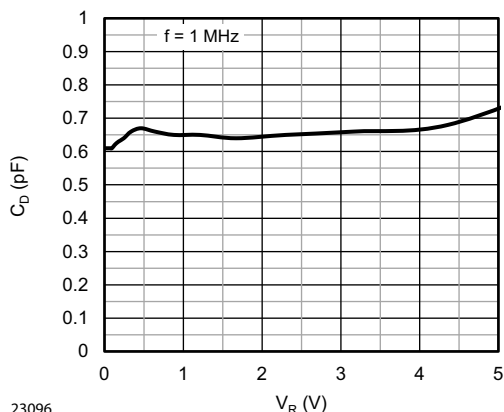


Fig. 3 - Typical Capacitance vs. Reverse Voltage

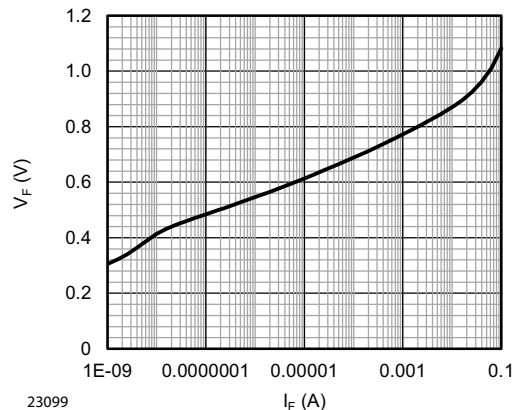


Fig. 6 - Typical Forward Voltage vs. Forward Current

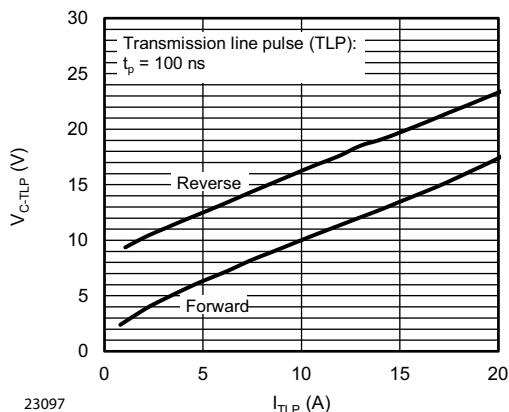


Fig. 4 - Typical Clamping Voltage vs. Peak Pulse Current

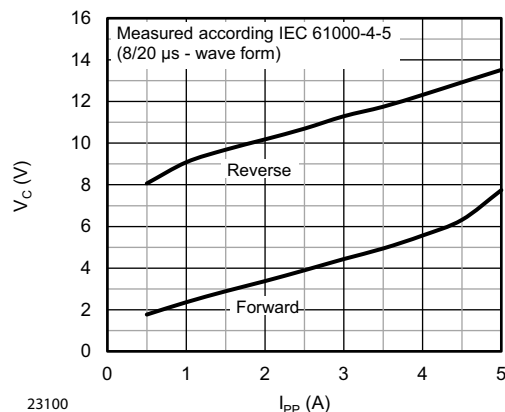


Fig. 7 - Typical Peak Clamping Voltage vs. Peak Pulse Current

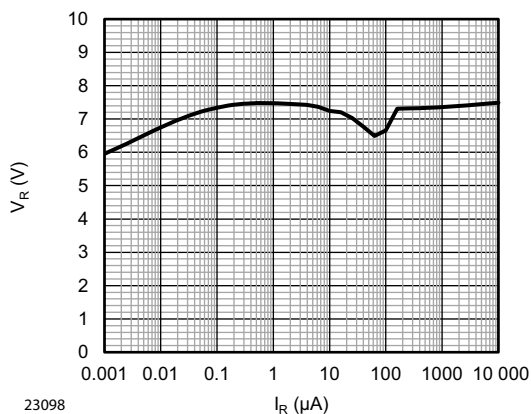
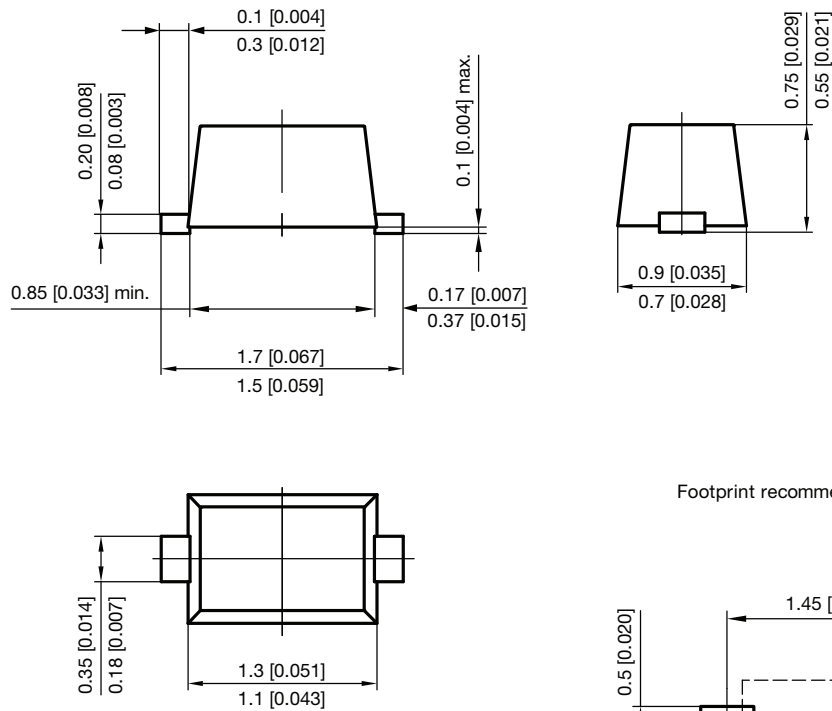
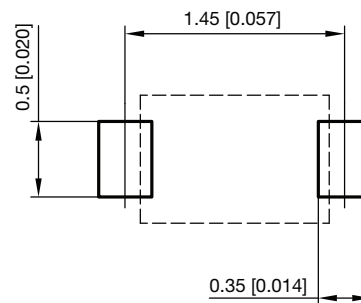


Fig. 5 - Typical Reverse Voltage vs. Reverse Current

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


Footprint recommendation:



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

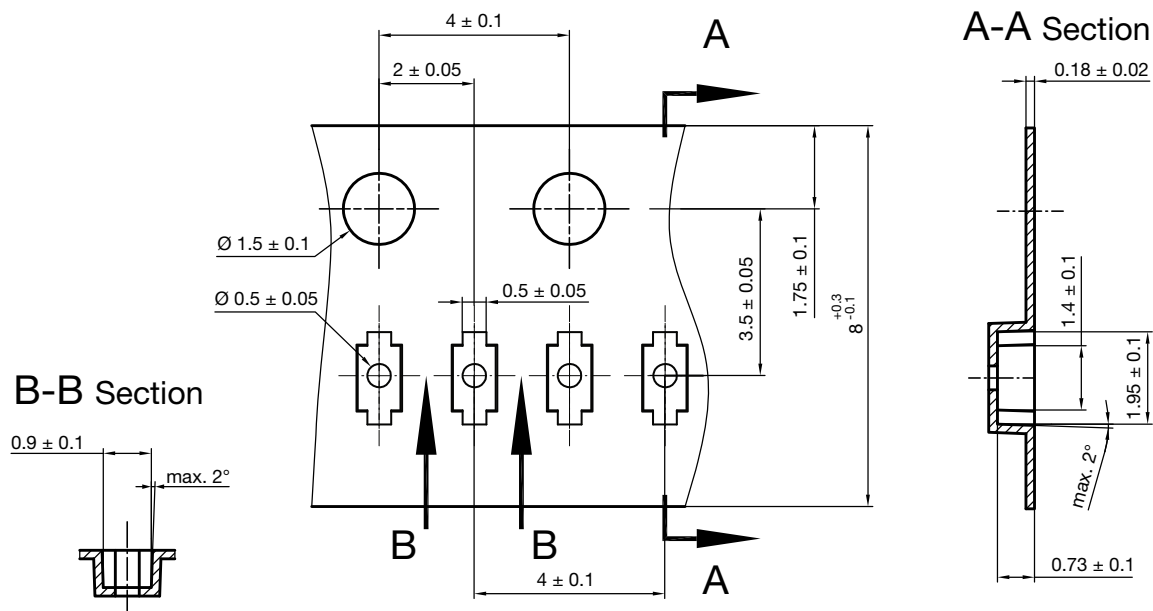
Created - Date: 04. April 2017

Rev. 4 - Date: 03. Aug. 2020

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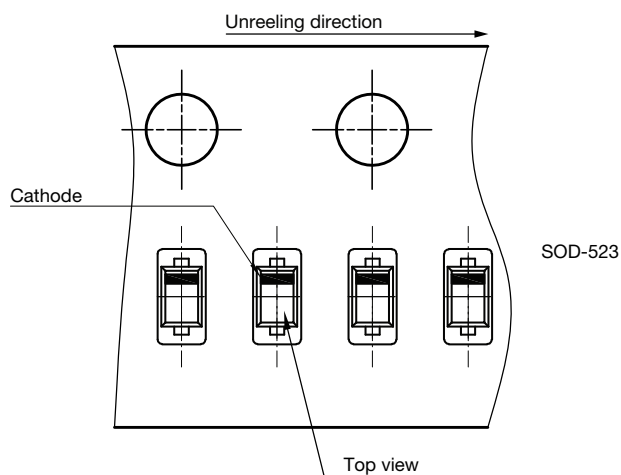


# CARRIER TAPE SOD-523



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



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