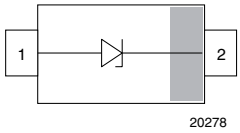
Low Capacitance Single Line ESD-Protection Diode in SOD-523



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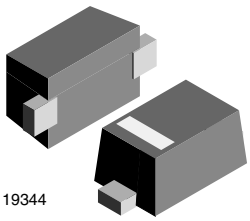

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FEATURES

- 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 µA
- 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

AUTOMOTIVE GRADE Available

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

MARKING (example only)

20279

Bar = cathode marking
X = date code
Y = type code (see table below)

LINKS TO ADDITIONAL RESOURCES

3D Models

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 µs/single shot	I_{PPM}	4.5	A
Peak pulse power	Pin 1 to pin 2 acc. IEC 61000-4-5; t_p = 8/20 µs; 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 °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 µA	V_R	5.5	-	-	V
Reverse current	At V_{RWM} = 5.5 V	I_R	-	-	0.1	µA
Reverse breakdown voltage	At I_R = 1 mA	V_{BR}	6.5	7.5	8.5	V
Reverse clamping voltage	At I_{PP} = 1 A	V_C	-	9	11	V
	At I_{PP} = I_{PPM} = 4.5 A	V_C	-	12.5	15	V
Capacitance	At V_R = 0 V; f = 1 MHz	C_D	-	0.7	0.8	pF
	At V_R = 3.3 V; f = 1 MHz	C_D	-	0.7	-	pF
Clamping voltage	Transmission Line Pulse (TLP); t_p = 100 ns I_{TLP} = 8 A	V_{C-TLP}	-	15	-	V
	Transmission Line Pulse (TLP); t_p = 100 ns I_{TLP} = 16 A		-	21	-	
Dynamic resistance	Transmission Line Pulse (TLP); t_p = 100 ns	R_{DYN}	-	0.7	-	Ω

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

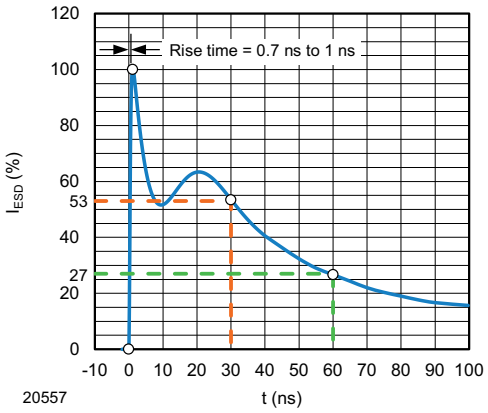


Fig. 1 - ESD Discharge Current Wave Form
acc. IEC 61000-4-2 (330 Ω / 150 pF)

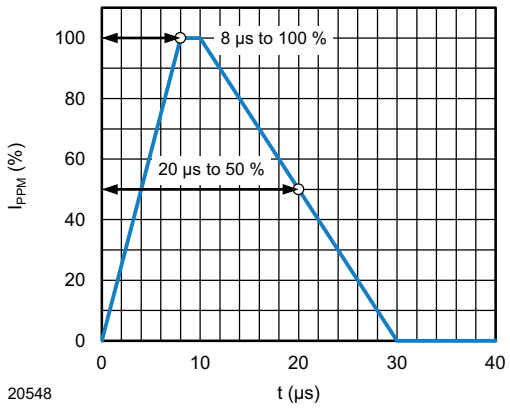


Fig. 2 - 8/20 µs Peak Pulse Current Wave Form
acc. IEC 61000-4-5

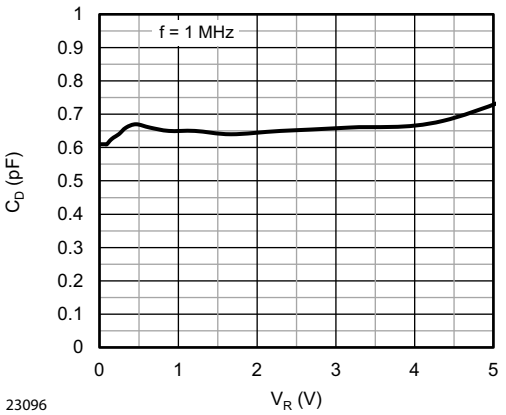


Fig. 3 - Typical Capacitance vs. Reverse Voltage

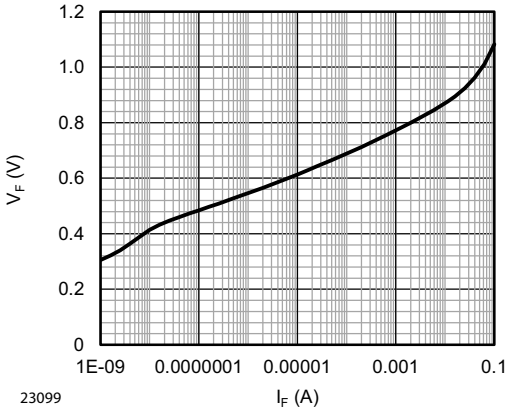


Fig. 6 - Typical Forward Voltage vs. Forward Current

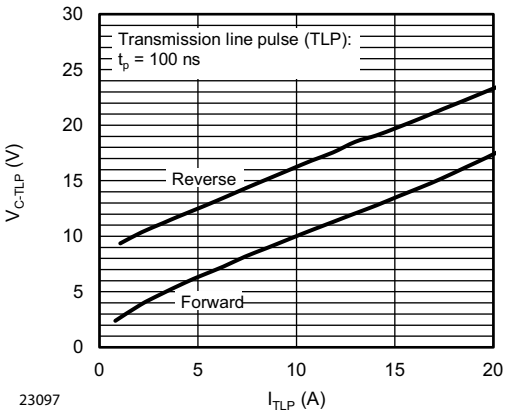


Fig. 4 - Typical Clamping Voltage vs. Peak Pulse Current

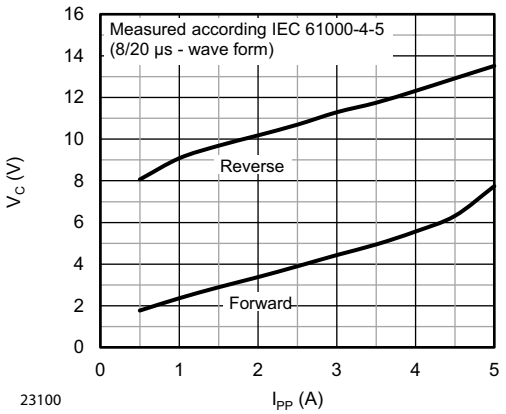


Fig. 7 - Typical Peak Clamping Voltage vs. Peak Pulse Current

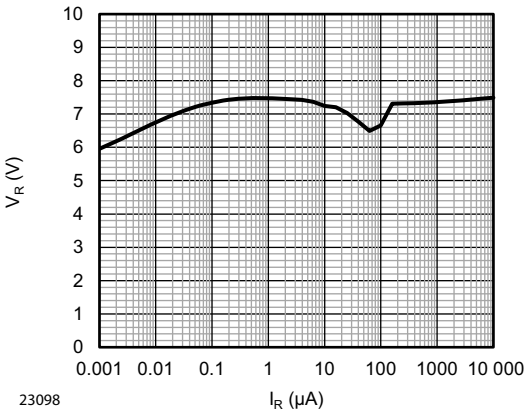
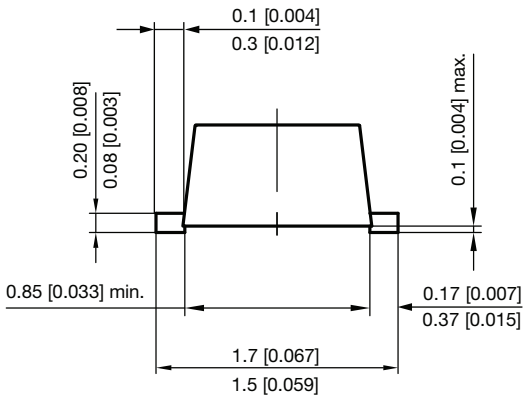
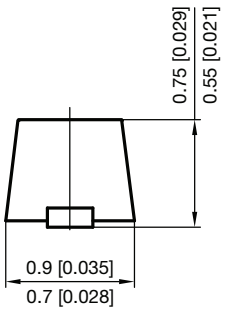
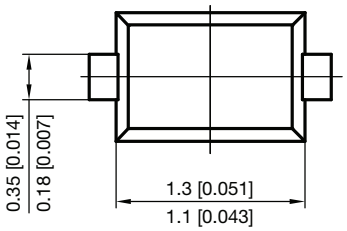


Fig. 5 - Typical Reverse Voltage vs. Reverse Current

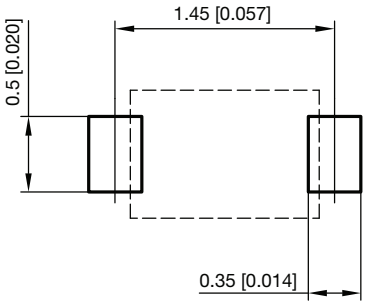
PACKAGE DIMENSIONS in millimeters [inches]: **SOD-523**







Footprint recommendation:



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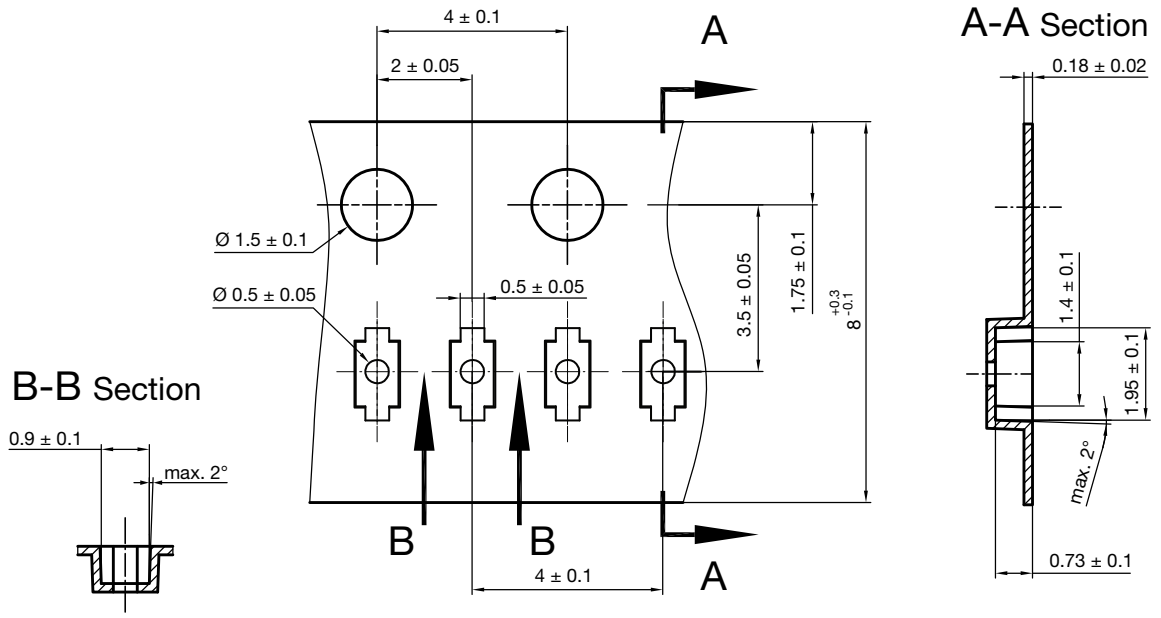
CARRIER TAPE SOD-523



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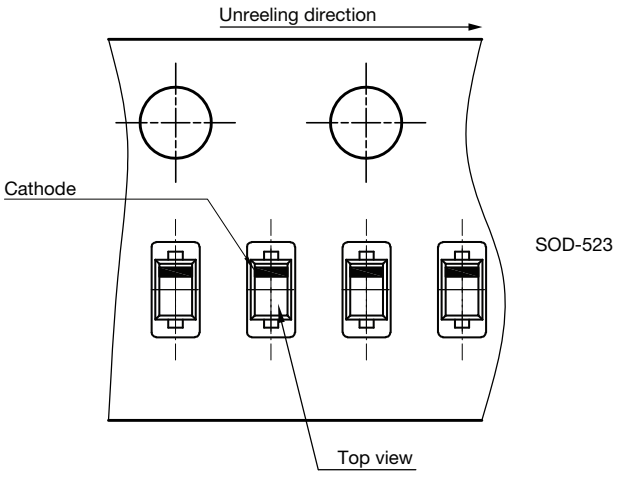
ORIENTATION IN CARRIER TAPE SOD-523



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