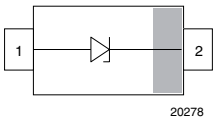
Single ESD-Protection Diode in SOD-523



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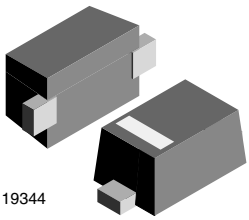
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FEATURES

- Compact SOD-523 package
- Low package height < 0.7 mm
- 1-line ESD-protection
- AEC-Q101 qualified
- Working range 5 V
- Low leakage current I_R < 0.1 µA
- Capacitance typical C_D = 12 pF
- ESD-protection acc. IEC 61000-4-2
  ± 30 kV contact discharge
  ± 30 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

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	
VESD05B1-02V	-	G	3	-08	VESD05B1-02V-G3-08
VESD05B1-02V	H	G	3	-08	VESD05B1-02VHG3-08

PACKAGE DATA

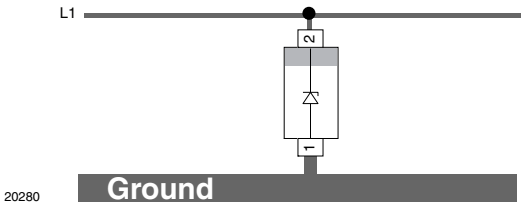
DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VESD05B1-02V	SOD-523	. H	1.32 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

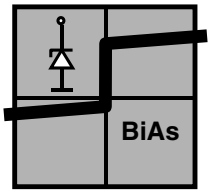
ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Acc. IEC 61000-4-5, 8/20 µs/single shot	I_{PPM}	3.5	A
Peak pulse power	Acc. IEC 61000-4-5, 8/20 µs/single shot	P_{PP}	40	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	°C
Storage temperature		T_{stg}	-55 to +150	°C

BiAs-MODE (bidirectional asymmetrical protection mode)

With the VESD05B1-02V one signal- or data-lines (L1) can be protected against voltage transients. With pin 1 connected to ground and pin 2 connected to a signal- or data-line which has to be protected. As long as the voltage level on the data- or signal-line is between 0 V (ground level) and the specified maximum reverse working voltage (V_{RWM}) the protection diode between data line and ground offers a high isolation to the ground line. The protection device behaves like an open switch.
As soon as any positive transient voltage signal exceeds the break down voltage level of the protection diode, the diode becomes conductive and shorts the transient current to ground. Now the protection device behaves like a closed switch. The clamping voltage (V_C) is defined by the break down voltage (V_{BR}) level plus the voltage drop at the series impedance (resistance and inductance) of the protection device.
Any negative transient signal will be clamped accordingly. The negative transient current is flowing in the forward direction of the protection diode. The low forward voltage (V_F) clamps the negative transient close to the ground level.
Due to the different clamping levels in forward and reverse direction the VESD05B1-02V clamping behavior is bidirectional and asymmetrical (BiAs).





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	V
Reverse voltage	At I_R = 0.1 µA	V_R	5	-	-	V
Reverse current	At V_R = 5 V	I_R	-	0.01	0.1	µA
Reverse breakdown voltage	At I_R = 1 mA	V_{BR}	6	6.8	7.5	V
Reverse clamping voltage	At I_{PP} = 1 A, t_p = 300 µs	V_C	-	7.2	9.5	V
	At I_{PP} = I_{PPM} = 3.5 A, t_p = 8/20 µs	V_C	-	8.6	11	V
Forward clamping voltage	At I_{PP} = 0.2 A, t_p = 300 µs	V_F	-	0.95	1.2	V
	At I_{PP} = 1 A, t_p = 300 µs	V_F	-	1.3	-	V
	At I_{PP} = I_{PPM} = 3.5 A, t_p = 300 µs	V_F	-	1.9	-	V
Dynamic resistance	t_p = 100 ns (TLP); pin 1-2	r_{dyn}	-	0.2	-	Ω
	t_p = 100 ns (TLP); pin 2-1		-	0.31	-	Ω
Capacitance	At V_R = 0 V; f = 1 MHz	C_D	-	19	23	pF
	At V_R = 2.5 V; f = 1 MHz	C_D	-	12	-	pF

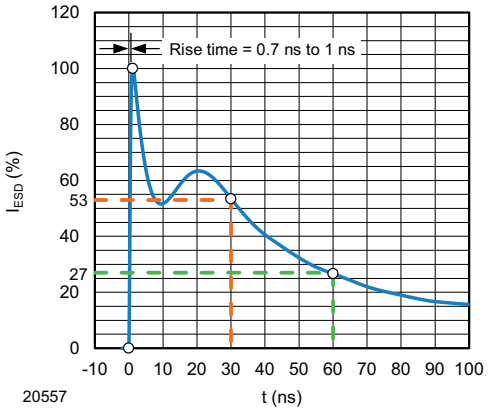


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω / 150 pF)

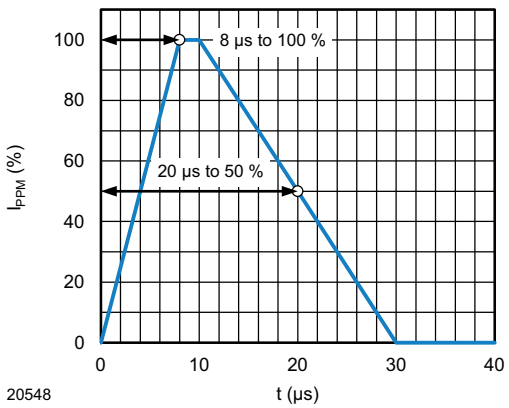


Fig. 2 - 8/20 µs Peak Pulse Current Wave Form acc. IEC 61000-4-5

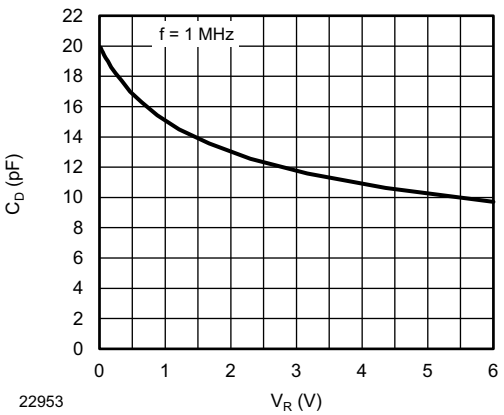


Fig. 3 - Typical Capacitance vs. Reverse Voltage

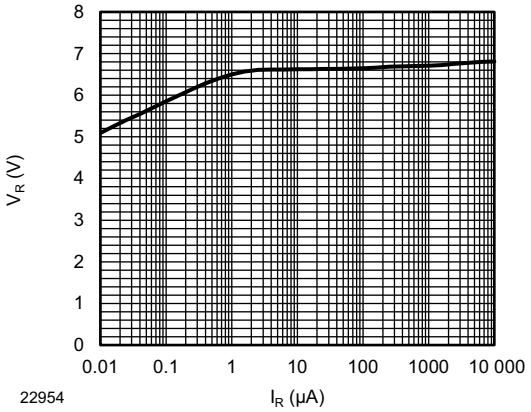


Fig. 4 - Typical Reverse Voltage vs. Reverse Current

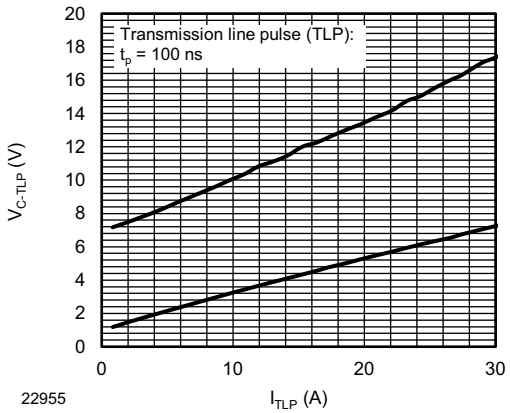


Fig. 5 - Typical Clamping Voltage vs. Peak Pulse Current

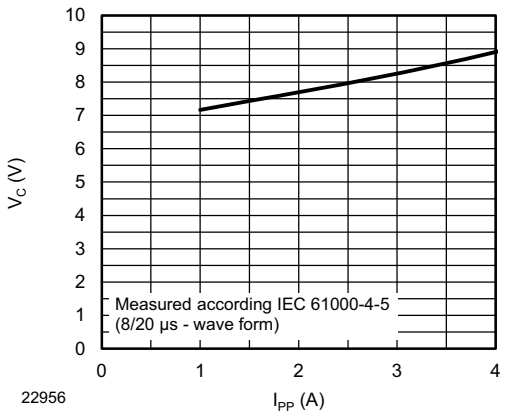
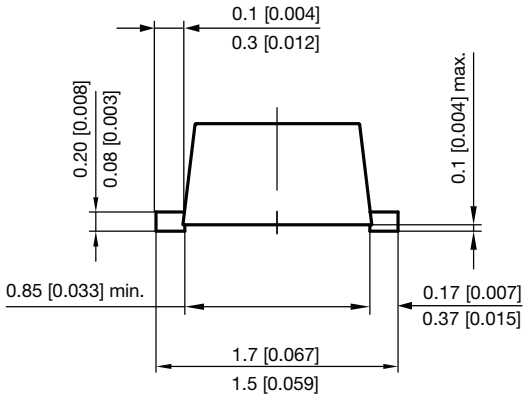
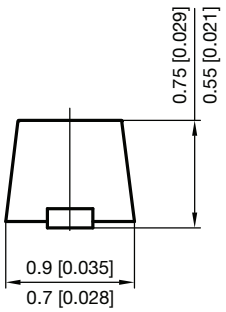
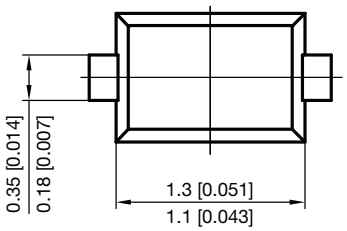


Fig. 6 - Typical Peak Clamping Voltage vs. Peak Pulse Current

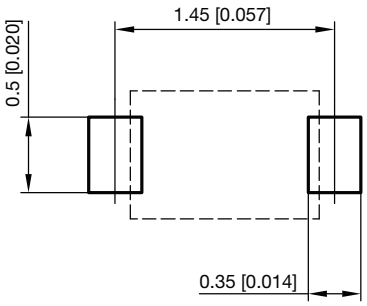
PACKAGE DIMENSIONS in millimeters [inches]: **SOD-523**







Footprint recommendation:



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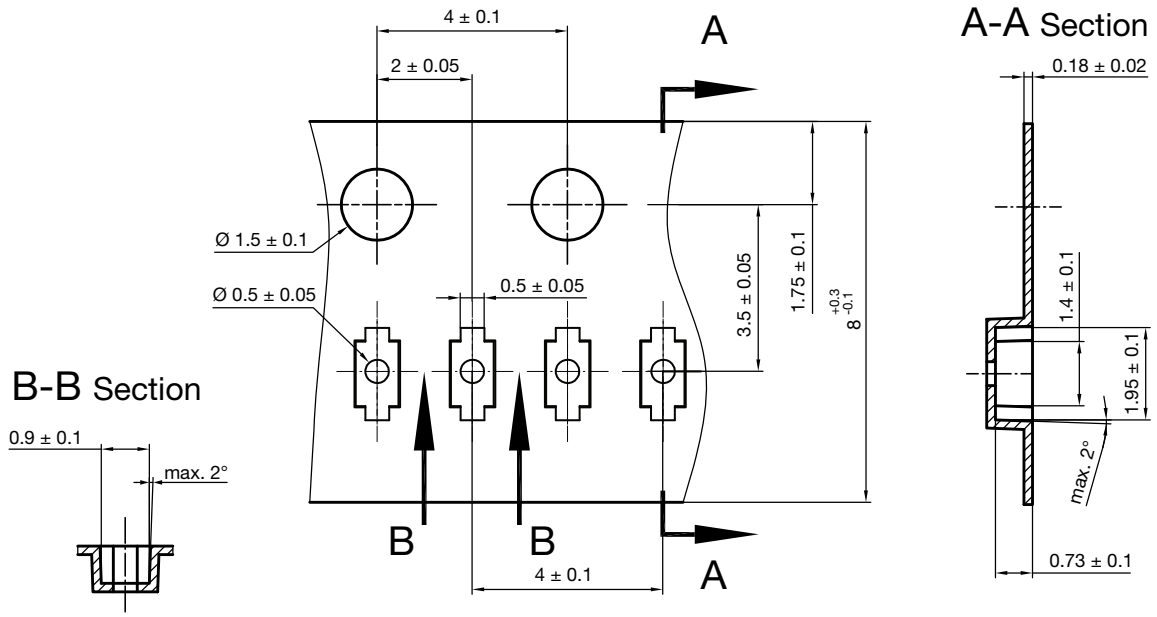
CARRIER TAPE SOD-523



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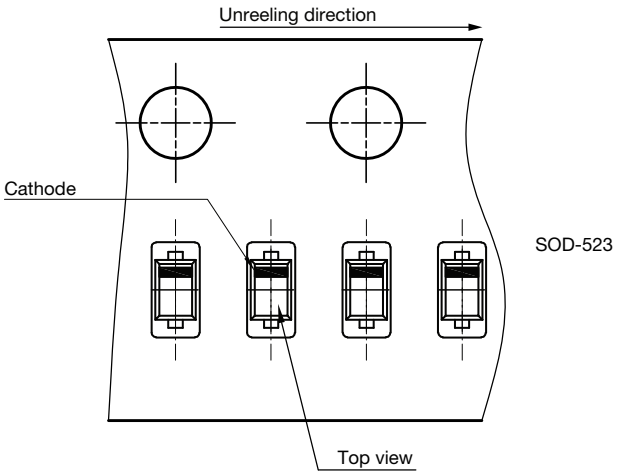
ORIENTATION IN CARRIER TAPE SOD-523



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