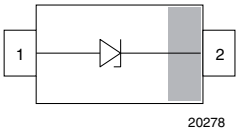
ESD-Protection Diode in SOD-923



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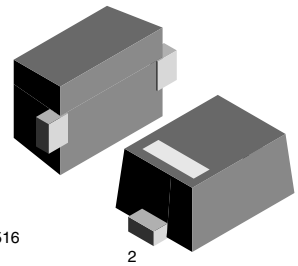
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2

FEATURES

- Single-line ESD-protection device
- ESD-immunity acc. IEC 61000-4-2
  > 20 kV contact discharge
  > 30 kV air discharge
- Tiny SOD-923 package
- Package height = 0.4 mm
- Typ. capacitance 12 pF
  (V_R = 2.5 V; f = 1 MHz)
- Leakage current < 0.1 µA (V_R = 5 V)
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

GREEN (5-2008)**

MARKING (example only)

20279

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

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE on 7" REEL)	MINIMUM ORDER QUANTITY
VESD05A1B-02Z	VESD05A1B-02Z-GS08	8000	8000

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VESD05A1B-02Z	SOD-923	H	0.45 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	acc. IEC 61000-4-5; t_P = 8/20 µs; single shot	I_{PPM}	3	A
Peak pulse power	acc. IEC 61000-4-5; t_P = 8/20 µs; single shot	P_{PP}	33	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 20	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{stg}	- 55 to + 150	°C

** Please see document “Vishay Material Category Policy”: www.vishay.com/doc?99902

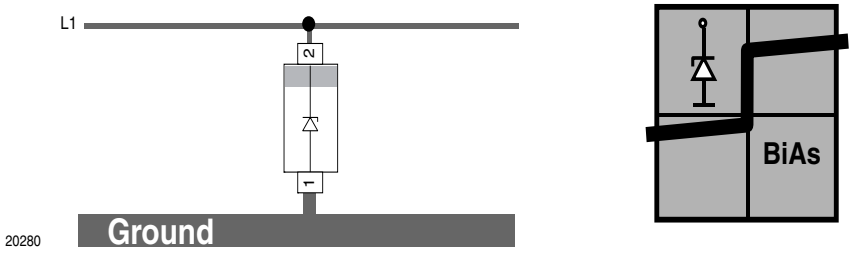
ELECTRICAL CHARACTERISTICS VESD05A1B-02Z BIAS mode (between pin 1 and pin 2)						
PARAMETER	**TEST CONDITIONS/REMARKS**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Protection paths	Number of lines which can be protected	N_{lines}	-	-	1	lines
Reverse stand off voltage	at I_R = 0.1 µA	V_{RWM}	5	-	-	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	V_C	-	8	9.5	V
	at I_{PP} = I_{PPM} = 3 A	V_C	-	8.9	11	V
Forward clamping voltage	at I_{PP} = 0.2 A	V_F	-	0.95	1.2	V
	at I_{PP} = 1 A	V_F	-	1.3	-	V
	at I_{PP} = I_{PPM} = 3 A	V_F	-	1.9	-	V
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

Note

- Ratings at 25 °C, ambient temperature unless otherwise specified

BIAS-MODE (BIDIRECTIONAL ASYMMETRICAL PROTECTION MODE)

With the **VESD05A1B-02Z** 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 **M**aximum **R**everse **W**orking **V**oltage (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 through 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 **C**lamping **V**oltage (V_C) is defined by the **BR**eakthrough **V**oltage (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 **F**orward **V**oltage (V_F) clamps the negative transient close to the ground level.
Due to the different clamping levels in forward and reverse direction the **VESD05A1B-02Z** clamping behaviour is **Bi**directional and **As**ymmetrical (**BiAs**).



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

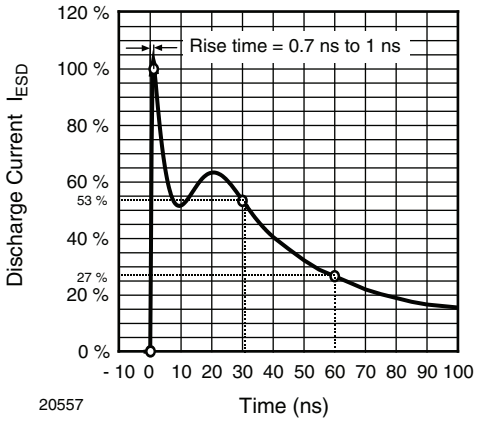


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω/150 pF)

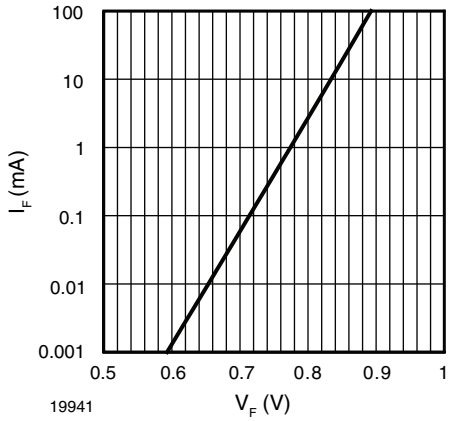


Fig. 4 - Typical Forward Current I_F vs. Forward Voltage V_F

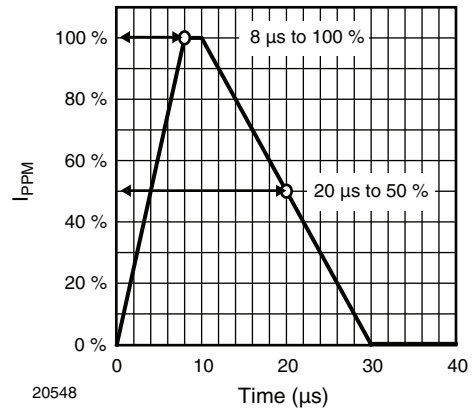


Fig. 2 - 8/20 µs Peak Pulse Current Wave Form acc. IEC 61000-4-5

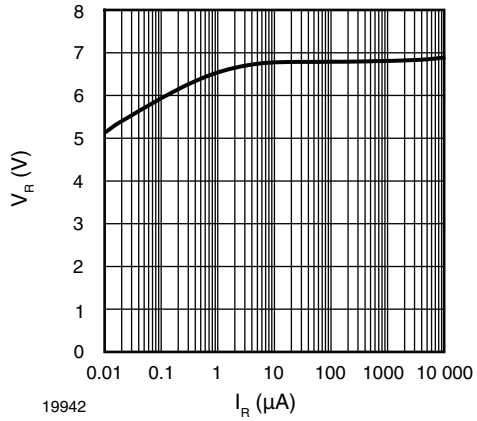


Fig. 5 - Typical Reverse Voltage V_R vs. Reverse Current I_R

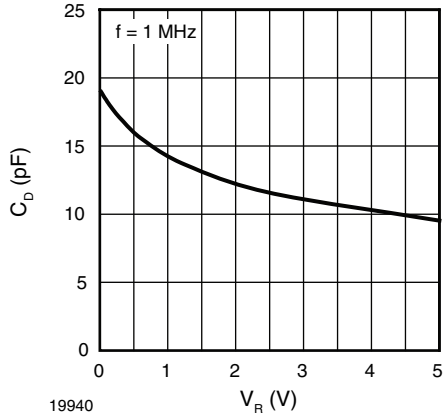


Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

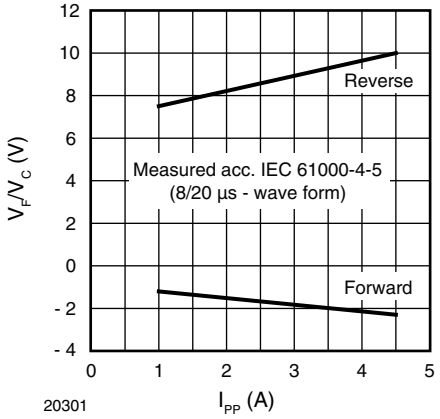


Fig. 6 - Typical Clamping Voltage vs. Peak Pulse Current I_{PP}

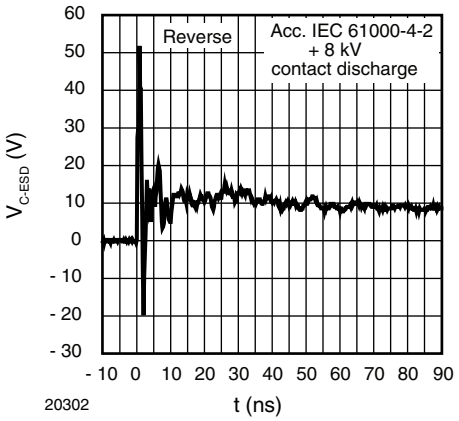


Fig. 7 - Typical Clamping Performance at + 8 kV
Contact Discharge (acc. IEC 61000-4-2)

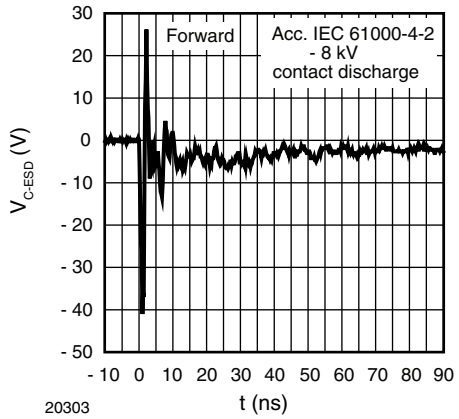


Fig. 8 - Typical Clamping Performance at - 8 kV
Contact Discharge (acc. IEC 61000-4-2)

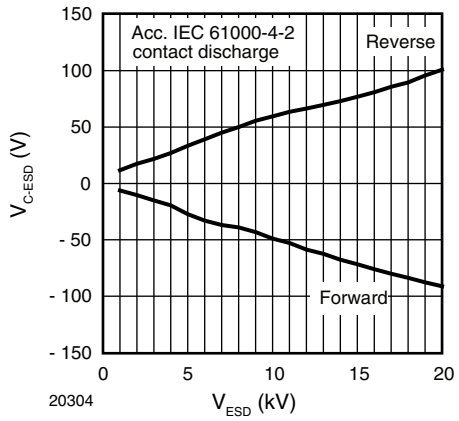
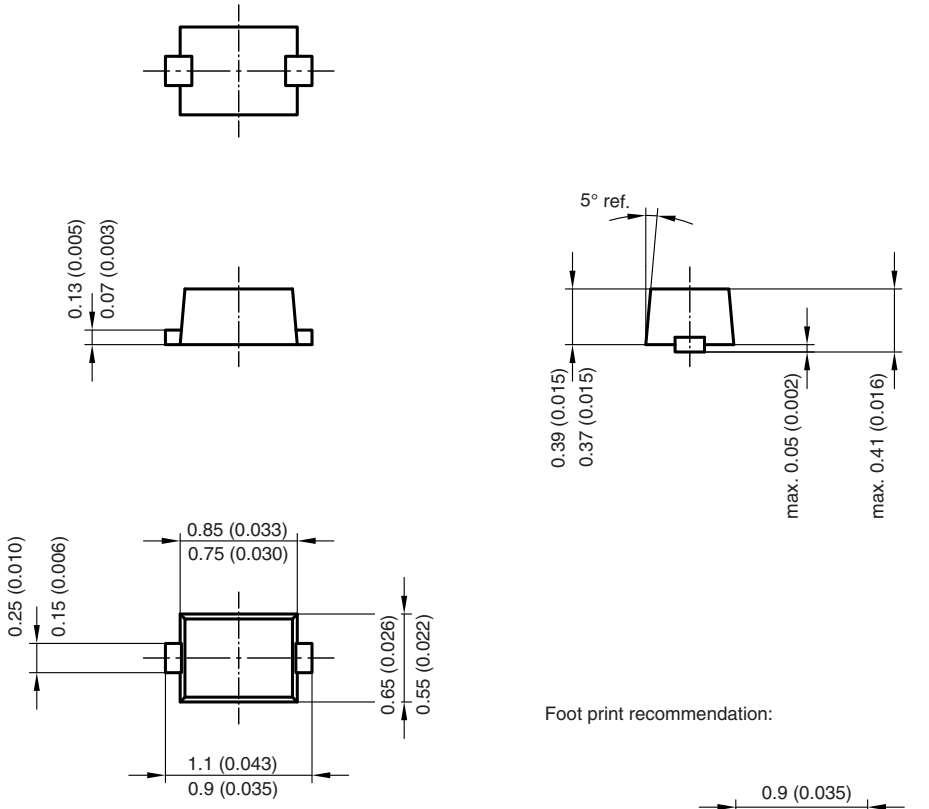
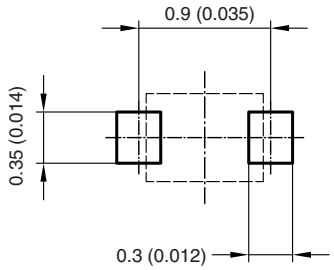


Fig. 9 - Typical Clamping Voltage at ± ESD
Contact Discharge (acc. IEC 61000-4-2)

PACKAGE DIMENSIONS in millimeters (inches): **SOD-923**



Foot print recommendation:



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Rev. 1 - Date: 05.July.2006
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