

Transient Voltage Suppressors for ESD Protection

Low Capacitance

ESD92DE005M03-C

Description

The ESD92DE005M03-C is designed to protect voltage sensitive components that require ultra-low capacitance from ESD and transient voltage events. Excellent clamping capability, low capacitance, low leakage, and fast response time, make these parts ideal for ESD protection on designs where board space is at a premium. Because of its low capacitance, it is suited for use in high frequency designs such as USB 2.0 high speed and antenna line applications.

Feature

- u Ultra Low Capacitance 0.5 pF
- u Low Clamping Voltage
- u Small Body Outline Dimensions: 0.039"x0.024"(1.00 mm x0.60 mm)
- u Low Body Height: 0.016" (0.4 mm)
- u Stand-off Voltage: 3.3 V
- u Low Leakage
- u Response Time is Typically < 1.0 ns
- u IEC61000-4-2 Level 4 ESD Protection
- u IEC61000-4-2 (ESD) ±15kV (air), ±10kV (contact)

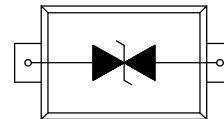
Applications

- u Cellular phones
- u Portable devices
- u Digital cameras
- u Power supplies

SOD-923



Functional Diagram



Mechanical Characteristics

- u SOD-923 Package
- u Molding Compound Flammability Rating : UL 94V-0
- u Quantity Per Reel : 8,000pcs
- u Reel Size : 7 inch
- u Lead Finish : Lead Free

Mechanical Characteristics

Symbol	Parameter	Value	Units
P _D	Total Power Dissipation on FR-5 Board (Note 1) @ T _A = 25°C	150	mW
T _L	Lead Soldering Temperature	260 (10sec)	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C
T _J	Maximum Junction Temperature	-55 to +125	°C
	IEC61000-4-2 (ESD)		
	Air Discharge	±15	KV
	Contact Discharge	±10	

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to stresses above the recommended operating conditions may affect device reliability.

1. FR-5 = 1.0 x 0.75 x 0.62 in.

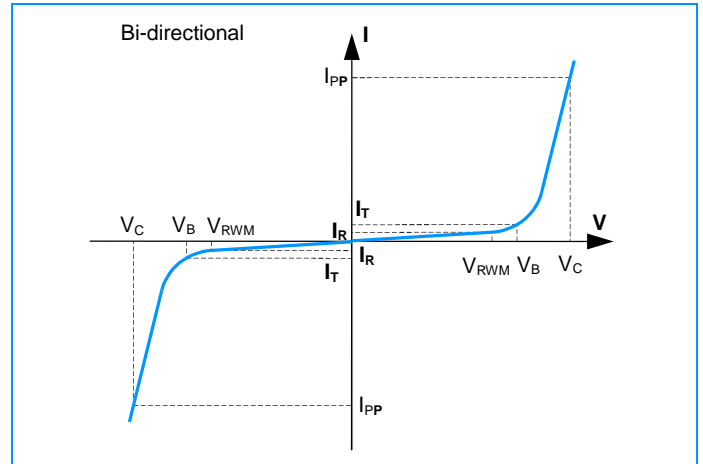
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I-V Curve Characteristics

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse leakage Current @ V_{RWM}
I_T	Test Current
V_B	Breakdown Voltage @ I_T



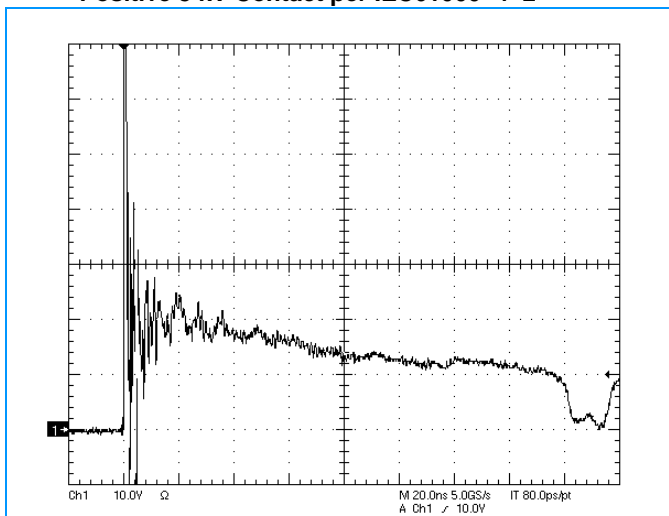
Electrical Characteristics (Ratings at 25°C ambient temperature unless otherwise specified)

Part Number	Device Marking	V_{RWM} (V) (Max.)	V_B @ I_T (V) (Note 2) (Min.)	I_T (mA)	V_C @ $I_{PP} = 1A$ (V) (Note 3) (Max.)	I_R @ V_{RWM} (μA) (Max.)	C (pF)		V_C Per IEC61000-4-2 (Note 4)
							Typ.	Max.	
ESD92DE005M03-C	S	3.3	4.8	1	10	1	0.5	0.9	Fig1 and 2 See Below

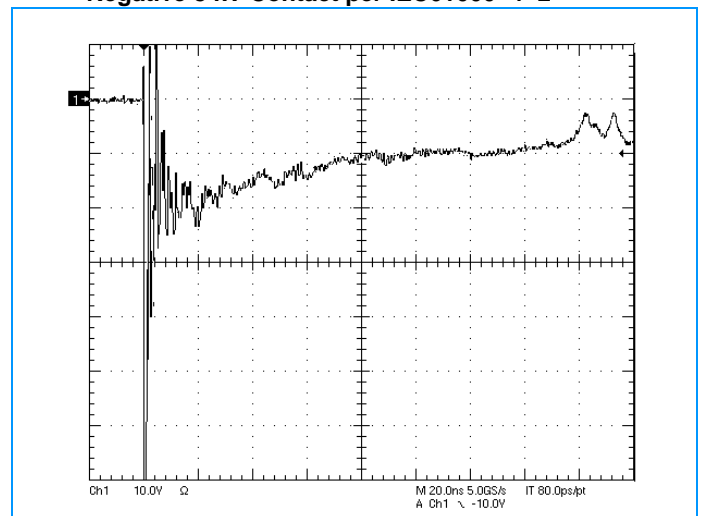
- V_B is measured with a pulse test current I_T at an ambient temperature of 25°C.
- Surge current waveform per Figure 5.
- For test procedure see Figures 3 and 4

Characteristic Curves

**Fig1. ESD Clamping Voltage Screenshot
Positive 8 kV Contact per IEC61000-4-2**



**Fig2. ESD Clamping Voltage Screenshot
Negative 8 kV Contact per IEC61000-4-2**



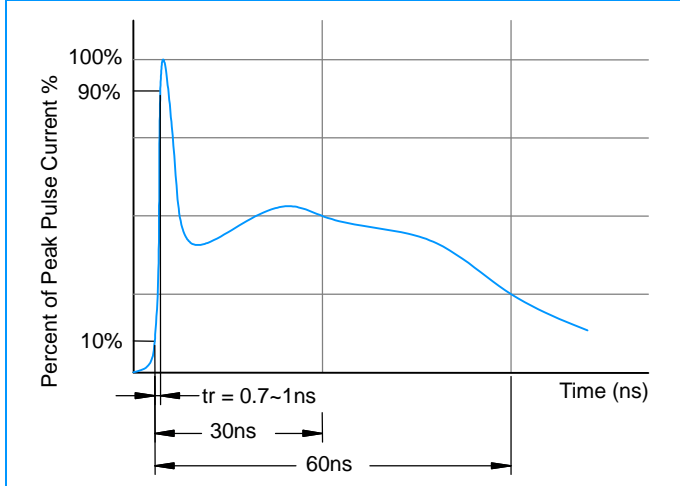
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Test Waveforms & Setup

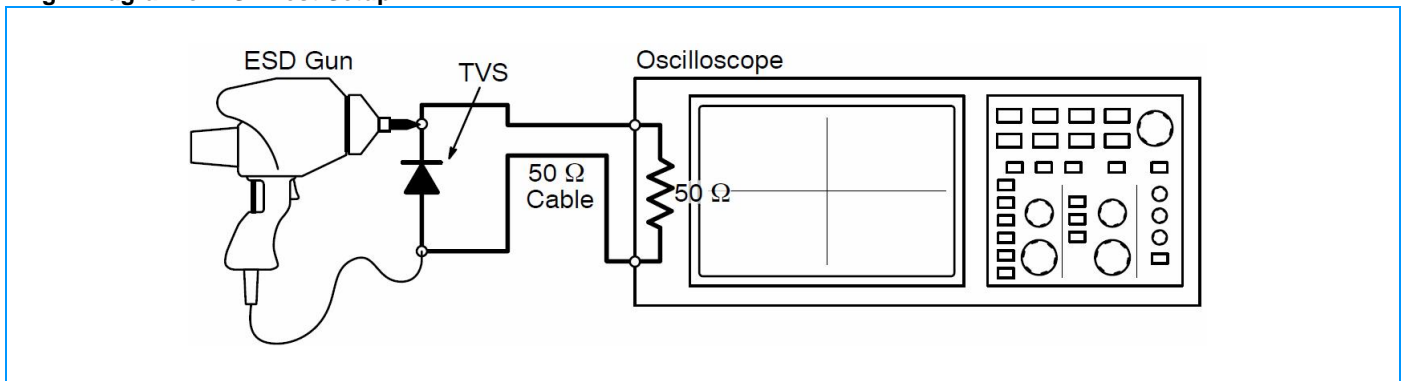
Fig3. ESD Pulse Waveform (according to IEC 61000-4-2)



IEC 61000-4-2 Spec.

Level	Test Voltage (kV)	First Peak Current (A)	Current at 30 ns (A)	Current at 60 ns (A)
1	2	7.5	4	2
2	4	15	8	4
3	6	22.5	12	6
4	8	30	16	8

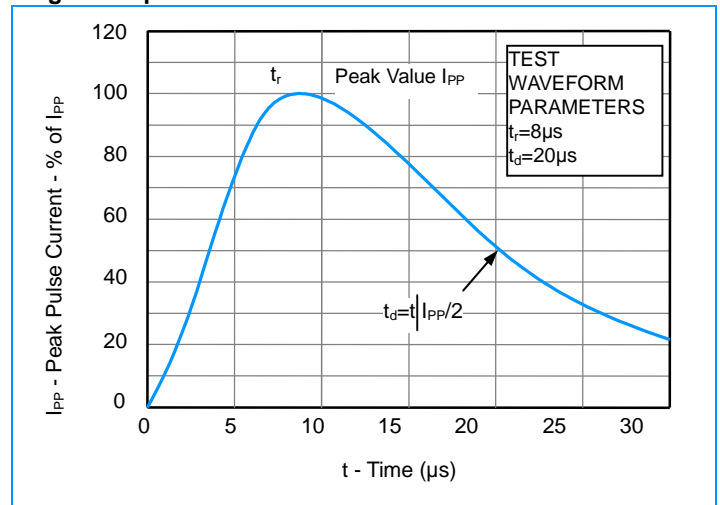
Fig4. Diagram of ESD Test Setup



ESD Voltage Clamping

For sensitive circuit elements it is important to limit the voltage that an IC will be exposed to during an ESD event to as low a voltage as possible. The ESD clamping voltage is the voltage drop across the ESD protection diode during an ESD event per the IEC61000-4-2 waveform. Since the IEC61000-4-2 was written as a pass/fail spec for larger systems such as cell phones or laptop computers it is not clearly defined in the spec how to specify a clamping voltage at the device level.

Fig5. 8x20 μ s Pulse Waveform

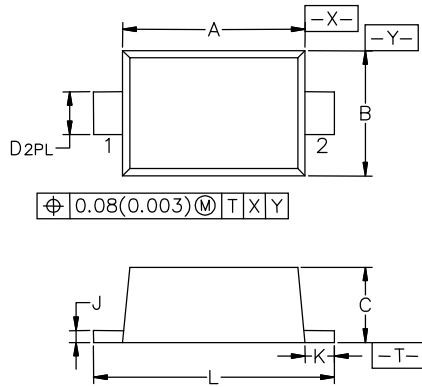


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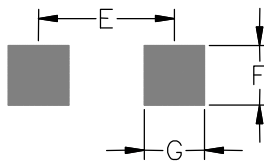
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SOD-923 Package Outline & Dimensions



Symbol	Millimeters			Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.75	0.80	0.85	0.030	0.031	0.033
B	0.55	0.60	0.65	0.022	0.024	0.026
C	0.34	0.37	0.40	0.013	0.015	0.016
D	0.15	0.20	0.25	0.006	0.008	0.010
J	0.07	0.12	0.17	0.0028	0.0047	0.0067
K	0.05	0.10	0.15	0.002	0.004	0.006
L	0.95	1.00	1.05	0.037	0.040	0.041

Soldering Footprint



Symbol	Millimeters	Inches
E	0.90	0.0354
F	0.40	0.0157
G	0.30	0.0118