



# SOD-123FL Plastic-Encapsulate Diodes

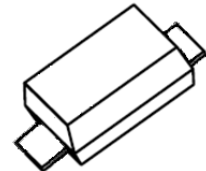
## ESDBE12VD1 Bi-direction Transient Voltage Suppressor

### DESCRIPTION

Designed to protect voltage sensitive electronic components from ESD and other transients. Excellent clamping capability, low leakage, and fast response time provide best in class protection on designs that are exposed to ESD.

The combination of small size, high level of ESD protection makes them a flexible solution for applications such as Digital cameras,cellular phones, and MP3 Players. It is designed to replace multiplayer varistors (MLV) in consumer equipments applications such as mobile phone, notebook, PAD, STB, LCD TV etc.

SOD-123FL



### FEATURES

- Bi-directional ESD protection of one line
- Reverse stand-off voltage: 12V
- Low reverse clamping voltage
- Low leakage current
- Excellent package:2.80mm × 1.90mm × 1.10mm
- Peak pulse power:6000W (IEC61000-4-5 8/20μs)
- Fast response time
- JESD22-A114-B ESD Rating of class 3B per human body model
- IEC 61000-4-2 Level 4 ESD protection
- Surge protection according to IEC61000-4-5 8/20μs waveform: I<sub>PPM</sub> 200A

### APPLICATIONS

- Computers and peripherals
- Digital Cameras
- Audio and video equipment
- Cellular handsets and accessories
- Portable electronics
- Mp3 Players
- Other electronics equipments communication systems

### MARKING



B12 = Device code

Front side

**MAXIMUM RATINGS (  $T_a=25^{\circ}\text{C}$  unless otherwise noted )**

| Parameter  | Symbol                 | Limit      | Unit               |
|--|------------------------|------------|--------------------|
| IEC 61000-4-2 ESD Voltage                              | Air Model              | $\pm 30$   | kV                 |
|  | Contact Model          | $\pm 30$   |                    |
|  | Per Human Body Model   | $\pm 20$   |                    |
|  | Machine Model          | $\pm 0.4$  |                    |
| JESD22-A114-B ESD Voltage                              | $V_{\text{ESD}}^{(1)}$ |            |                    |
| ESD Voltage  | $P_{\text{PP}}^{(2)}$  | 6000       | W                  |
| Peak Pulse Power                                       | $I_{\text{PP}}^{(2)}$  | 200        | A                  |
| Peak Pulse Current                                     | $T_L$                  | 260        | $^{\circ}\text{C}$ |
| Lead Solder Temperature - Maximum (10 Second Duration) | $T_J, T_{\text{stg}}$  | -55 ~ +150 | $^{\circ}\text{C}$ |
| Operation Junction and Storage Temperature Range       |                        |            |                    |

(1).Device stressed with ten non-repetitive ESD pulses.

(2).Non-repetitive current pulse 8/20 $\mu\text{s}$  exponential decay waveform according to IEC61000-4-5.

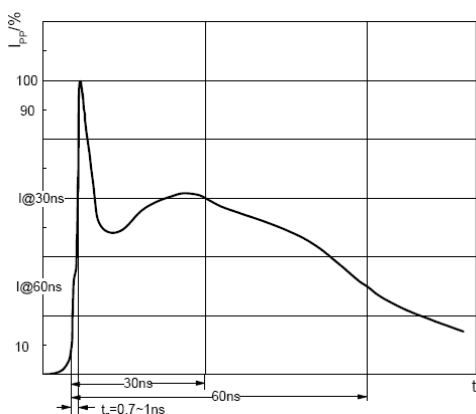
**ESD standards compliance**

**IEC61000-4-2 Standard**

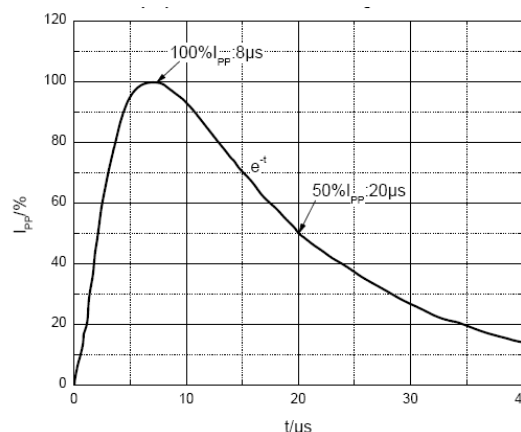
| Contact Discharge |                 | Air Discharge |                 |
|-------------------|-----------------|---------------|-----------------|
| Level             | Test Voltage kV | Level         | Test Voltage kV |
| 1                 | 2               | 1             | 2               |
| 2                 | 4               | 2             | 4               |
| 3                 | 6               | 3             | 8               |
| 4                 | 8               | 4             | 15              |

**JESD22-A114-B Standard**

| ESD Class | Human Body Discharge V |
|-----------|------------------------|
| 0         | 0~249                  |
| 1A        | 250~499                |
| 1B        | 500~999                |
| 1C        | 1000~1999              |
| 2         | 2000~3999              |
| 3A        | 4000~7999              |
| 3B        | 8000~15999             |



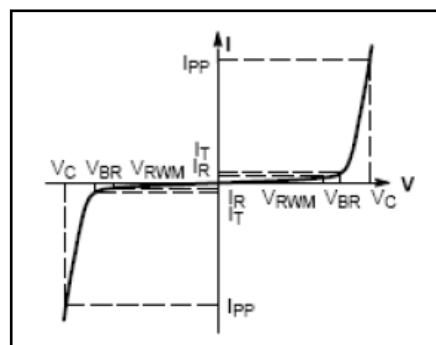
ESD pulse waveform according to IEC61000-4-2



8/20 $\mu\text{s}$  pulse waveform according to IEC 61000-4-5

**ELECTRICAL PARAMETER**

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $I_{PP}$  | Peak Pulse Current                  |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{RWM}$ | Reverse Standoff Voltage            |
| $V_F$     | Forward Voltage@ $I_F$              |
| $I_F$     | Forward Current                     |



V-I characteristics for a uni-directional TVS

**ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}C$  unless otherwise specified)**

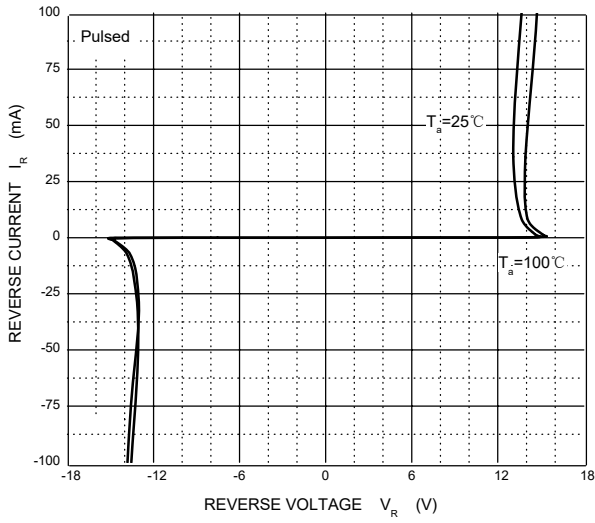
| Parameter                 | Symbol          | Test conditions  | Min  | Typ | Max  | Unit    |
|---------------------------|-----------------|------------------|------|-----|------|---------|
| Reverse stand off voltage | $V_{RWM}^{(1)}$ |                  |      |     | 12   | V       |
| Reverse leakage current   | $I_R$           | $V_{RWM}=12V$    |      |     | 3    | $\mu A$ |
| Breakdown voltage         | $V_{(BR)}$      | $I_T=1mA$        | 13.3 |     | 16.2 | V       |
| Clamping voltage          | $V_C^{(1)}$     | $I_{PP}=100A$    |      | 25  |      | V       |
| Clamping voltage          | $V_C^{(2)}$     | $I_{PP}=200A$    |      | 32  |      | V       |
| Junction capacitance      | $C_J$           | $V_R=0V, f=1MHz$ |      | 480 |      | pF      |

(1).Other voltages available upon request.

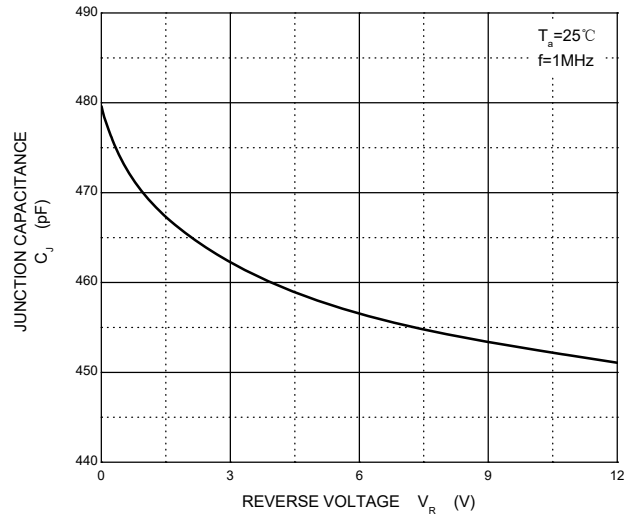
(2).Non-repetitive current pulse 8/20 $\mu s$  exponential decay waveform according to IEC61000-4-5

TYPICAL CHARACTERISTICS

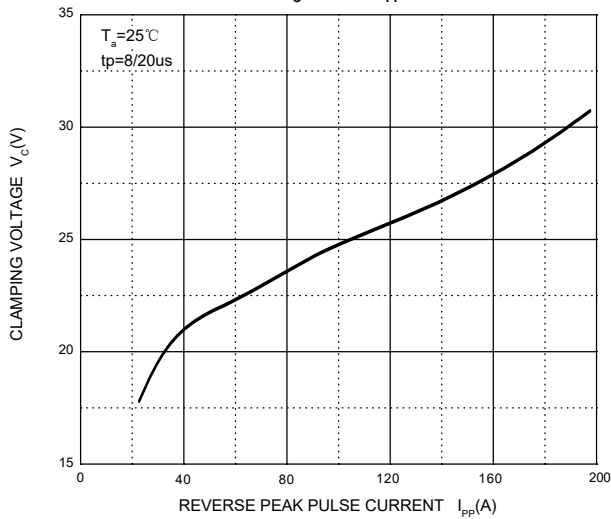
Reverse Characteristics



Capacitance Characteristics

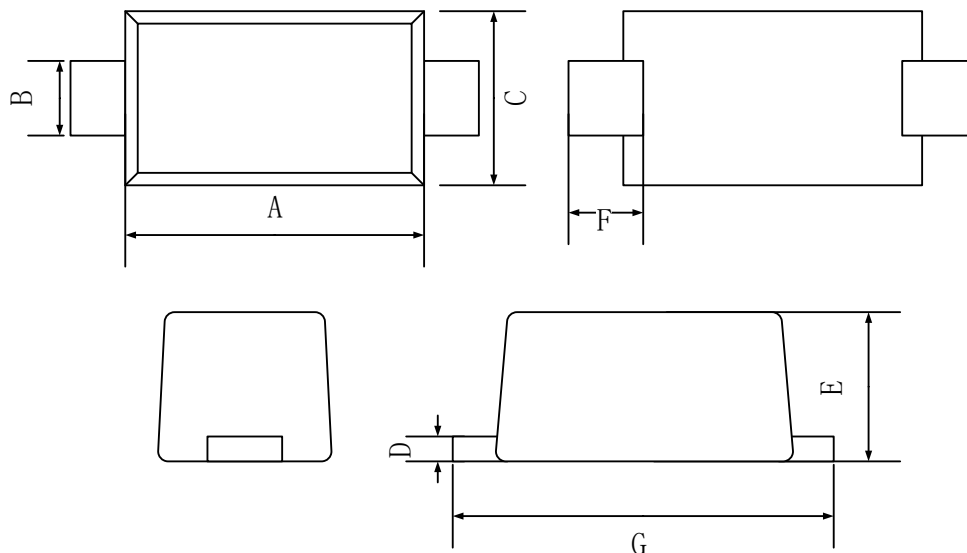


$V_C$  —  $I_{PP}$



**PACKAGE OUTLINE AND PAD LAYOUT INFORMATION**

**SOD-123FL Package Outline Dimensions**



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | Min.                      | Max. |
| A      | 2.60                      | 3.00 |
| B      | 0.80                      | 1.20 |
| C      | 1.70                      | 2.10 |
| D      | 0.10                      | 0.30 |
| E      | 0.90                      | 1.10 |
| F      | 0.30                      | 0.90 |
| G      | 3.45                      | 3.95 |

**SOD-123FL Suggested Pad Layout**



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

**NOTICE**

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