



## SOD-123FL Plastic-Encapsulate Diodes

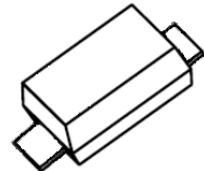
### ESDBE24VD1 Bi-direction Transient Voltage Suppressor

#### 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: 24V
- Low reverse clamping voltage
- Low leakage current
- Excellent package: 2.80mm × 1.90mm × 1.10mm
- Peak pulse power: 5000W (IEC61000-4-5 8/20 $\mu$ s)
- 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 8/20 $\mu$ s waveform:  $I_{PPM}$  150A

#### APPLICATIONS

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

#### MARKING



Front side

BD = Device Code

\* \* = Date Code

**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			
Peak Pulse Power	$P_{\text{PP}}^{(2)}$	5000	W
Peak Pulse Current	$I_{\text{PP}}^{(2)}$	150	A
Lead Solder Temperature - Maximum (10 Second Duration)	$T_L$	260	$^{\circ}\text{C}$
Operation Junction and Storage Temperature Range	$T_J, T_{\text{stg}}$	-55 ~ +150	$^{\circ}\text{C}$

(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.

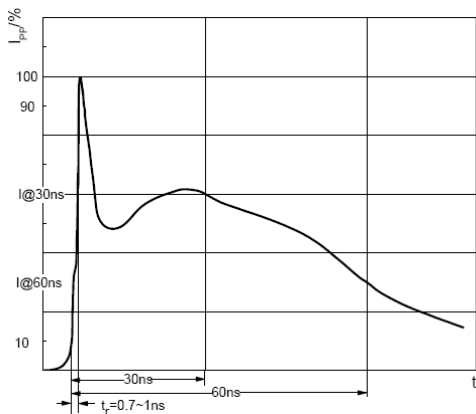
**ESD standards compliance**

**IEC61000-4-2 Standard**

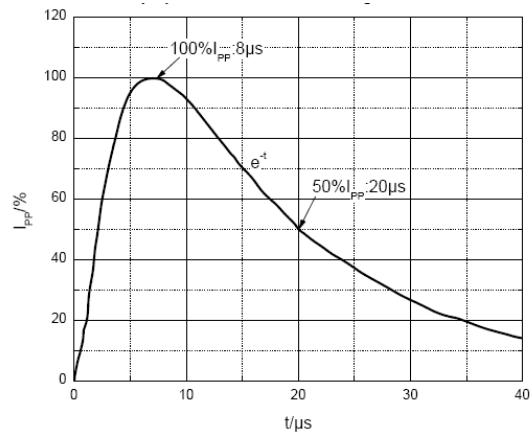
Contact Discharge		Air Discharge	
Level	Test Voltage kV	Level	Test Voltage kV
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15

**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



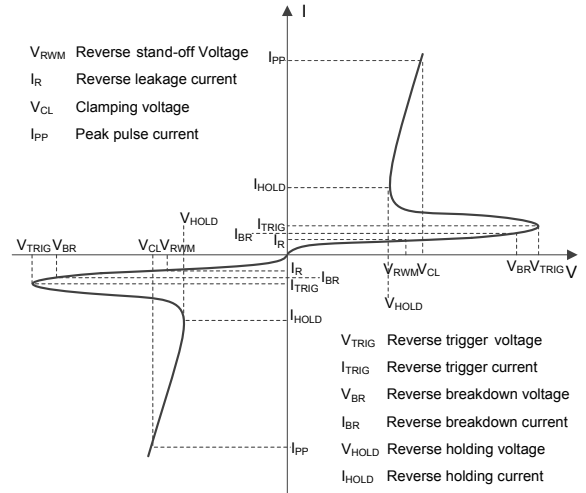
ESD pulse waveform according to IEC61000-4-2



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

**ELECTRICAL PARAMETER**

Symbol	Parameter
V <sub>CL</sub>	Clamping Voltage @ IPP
I <sub>PP</sub>	Peak Pulse Current
V <sub>TRIG</sub>	Reverse trigger voltage
I <sub>TRIG</sub>	Reverse trigger current
V <sub>BR</sub>	Reverse breakdown Voltage
I <sub>BR</sub>	Reverse breakdown current
V <sub>RWM</sub>	Reverse Standoff Voltage
I <sub>R</sub>	Reverse Leakage Current @ V <sub>RWM</sub>
V <sub>HOLD</sub>	Reverse Holding Voltage
I <sub>HOLD</sub>	Reverse Holding Current



**V-I characteristics for a Bi-direction TVS**

**ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)**

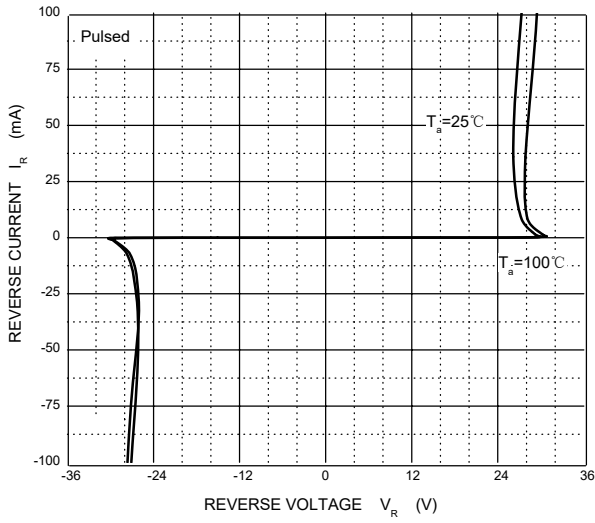
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Reverse stand off voltage	V <sub>RWM</sub> <sup>(1)</sup>				24	V
Reverse leakage current	I <sub>R</sub>	V <sub>RWM</sub> =24V			1	μA
Breakdown voltage	V <sub>(BR)</sub>	I <sub>T</sub> =1mA	26.7		32	V
Clamping voltage	V <sub>C</sub> <sup>(1)</sup>	I <sub>PP</sub> =100A			33	V
Clamping voltage	V <sub>C</sub> <sup>(2)</sup>	I <sub>PP</sub> =150A			35	V
Junction capacitance	C <sub>J</sub>	V <sub>R</sub> =0V, f=1MHz			350	pF

(1). Other voltages available upon request.

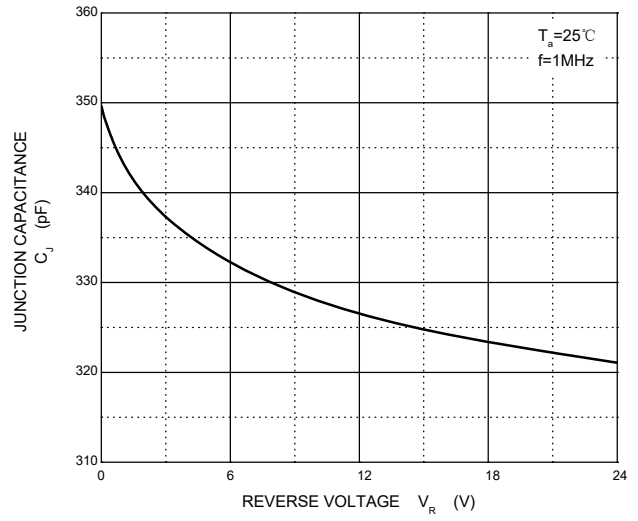
(2). Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC61000-4-5

TYPICAL CHARACTERISTICS

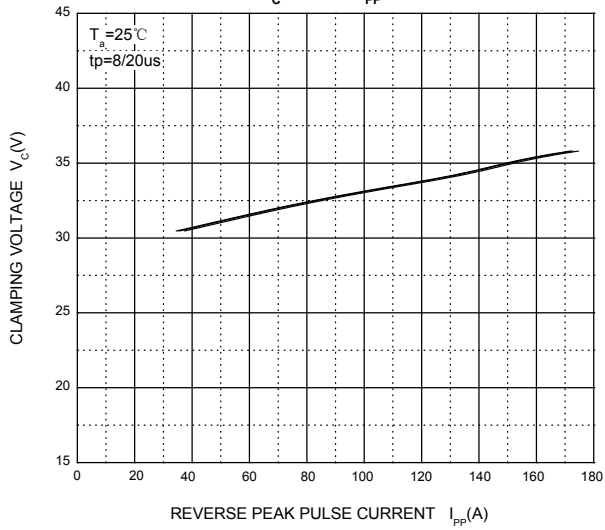
Reverse Characteristics



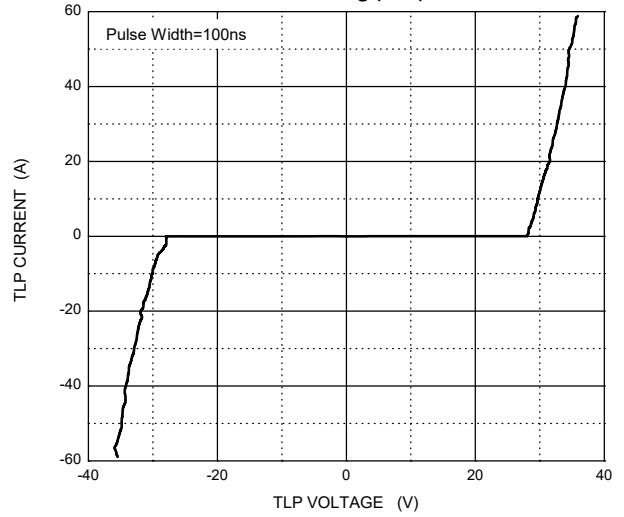
Capacitance Characteristics



$V_C$  —  $I_{PP}$

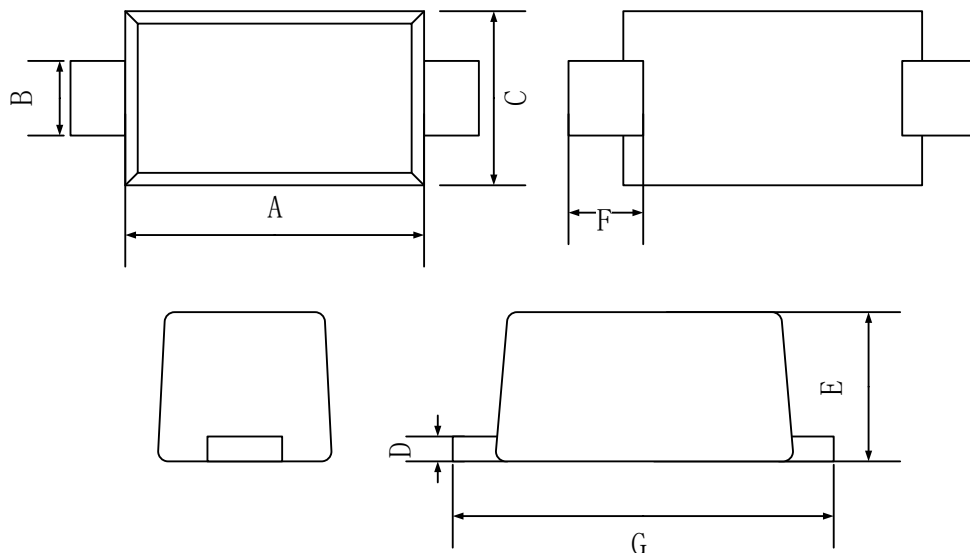


Transmission Line Pulsing (TLP) Measurement



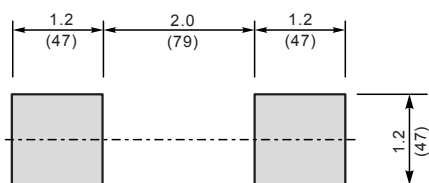
**PACKAGE OUTLINE AND PAD LAYOUT INFORMATION**

**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	1.20
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.