

## 1-Line, Low-Capacitance, Uni-directional Transient Voltage Suppressors

### Descriptions

The ESD9\*\*\*L series are transient voltage suppressors (TVS) which provide a very high level protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). It is designed to replace multilayer varistors (MLV) in consumer equipments applications such as mobile phone, notebook, PAD, STB, LCD TV etc.

The ESD9\*\*\*L series are past ESD transient voltage up to  $\pm 8$ KV (contact) according to IEC61000-4-2 and will withstand peak current up to 2.5A for 8/20us pulse according to IEC61000-4-5.

The ESD9\*\*\*L series are available in FBP-02C, SOD-923 and DFN1006 packages. Standard products are Pb-free and Halogen-free...

### Features

- Working voltage : 5V
- Peak power ( $t_p=8/20\mu s$ ) : 35W
- Peak current ( $t_p=8/20\mu s$ ) : 2.5A
- ESD protection  
IEC61000-4-2 :  $\pm 8$ KV contact  
                              :  $\pm 15$ KV air
- Low clamping voltage
- Low leakage current
- Small package with 1.0 x 0.6mm

### Applications

- Cell phone
- PMP
- MID
- PDA
- Digital camera
- Other electronics equipments


**FBP-02C**

**SOD-923**

**DFN1006**

**Pin configuration (Top view)**

**FBP-02C**

**SOD-923**

**DFN1006**

\* = Month (A~Z)

.X = Device code

D = Device code

**Marking**

### Order information

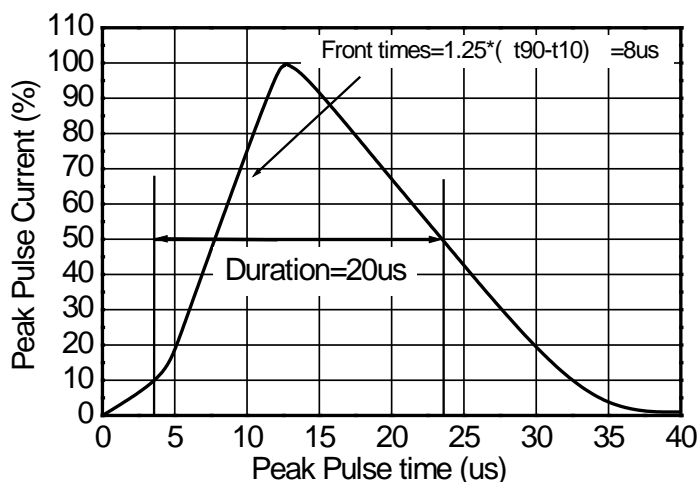
Device	Package	Shipping
ESD9X5VL-2/TR	FBP-02C	10000/Tape&Reel
ESD9D5VL-2/TR	SOD-923	5000/Tape&Reel
ESD9N5VL-2/TR	DFN1006	10000/Tape&Reel

**Absolute maximum ratings**

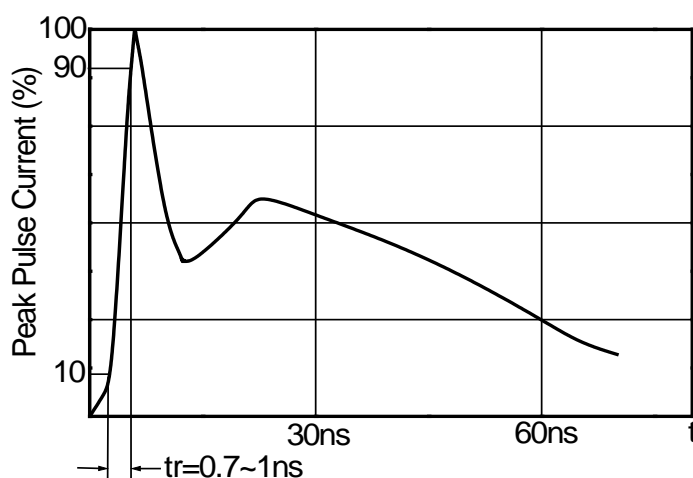
Parameter	Symbol	Rating	Unit
Peak pulse power (tp=8/20us)	Ppk	35	W
Peak pulse current (tp=8/20us)	Ipp	2.5	A
ESD voltage IEC61000-4-2 air	V <sub>ESD</sub>	±15	KV
ESD voltage IEC61000-4-2 contact		±8	
Operation junction temperature	T <sub>J</sub>	125	°C
Lead temperature	T <sub>L</sub>	260	°C
Storage temperature	T <sub>sg</sub>	-55~150	°C

**Electronics characteristics (Ta=25 °C, unless otherwise noted)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reveres maximum working voltage	V <sub>RWM</sub>				5.0	V
Reveres leakage current	I <sub>R</sub>	V <sub>RWM</sub> =5V			1.0	uA
Reveres breakdown voltage	V <sub>BR</sub>	I <sub>T</sub> =1mA	6.5	8.0	9.0	V
Forward voltage	V <sub>F</sub>	I <sub>F</sub> =10mA	0.4	0.7	1.4	V
Clamping voltage	V <sub>C</sub>	I <sub>pp</sub> =1A tp=8/20us			11	V
		I <sub>pp</sub> =2.5A tp=8/20us			14	V
Junction capacitance	C <sub>J</sub>	F=1MHz, V <sub>R</sub> =0V		1.2	1.6	pF

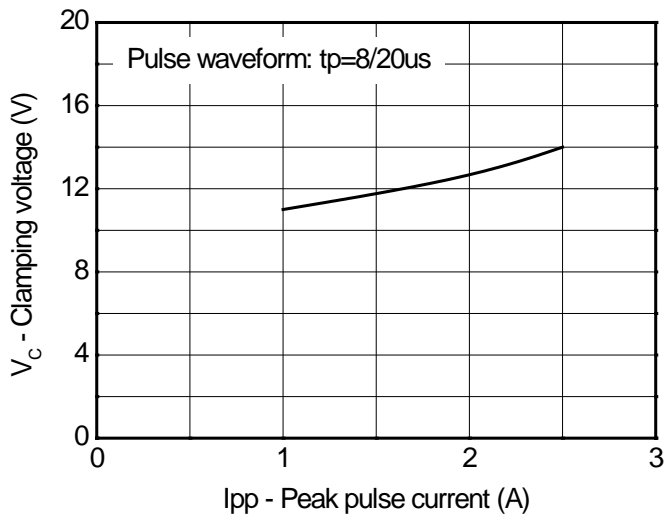


**8/20us waveform**

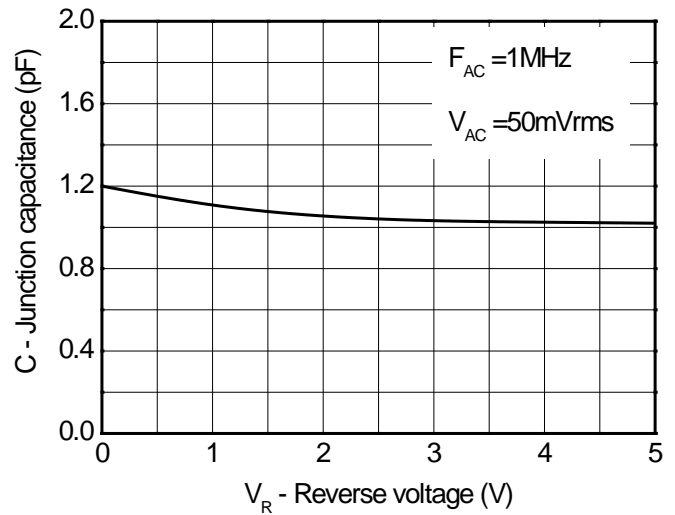


**IEC61000-4-2 waveform**

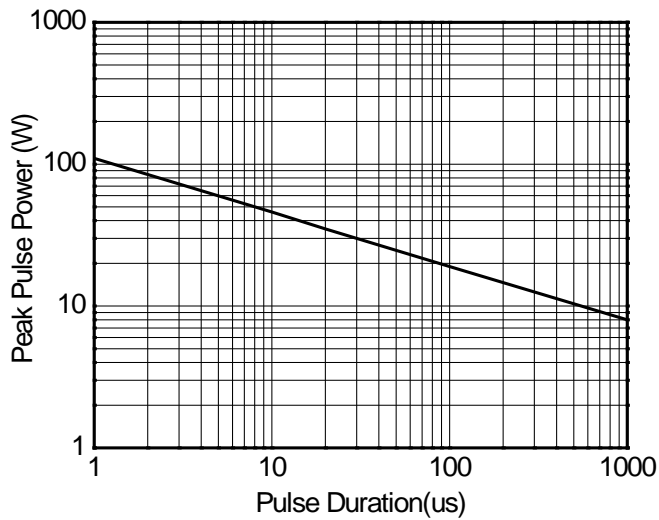
Typical characteristics (Ta=25°C, unless otherwise noted)



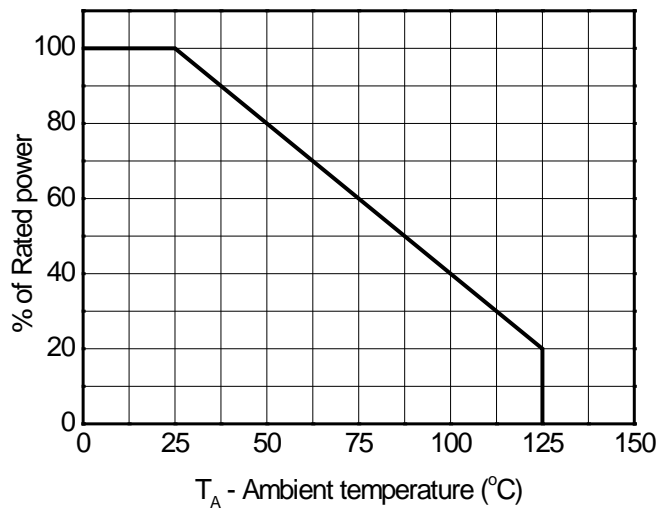
Clamping voltage vs. Peak pulse current



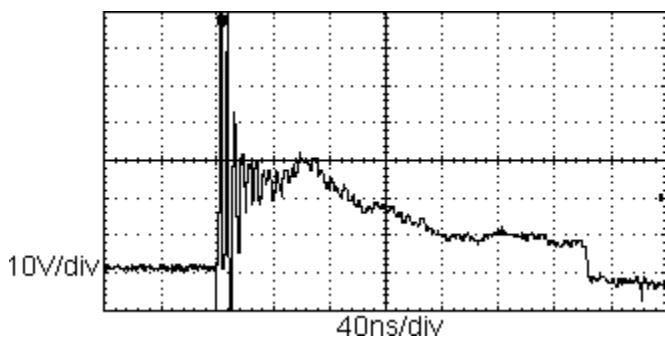
Capacitance vs. Reverse voltage



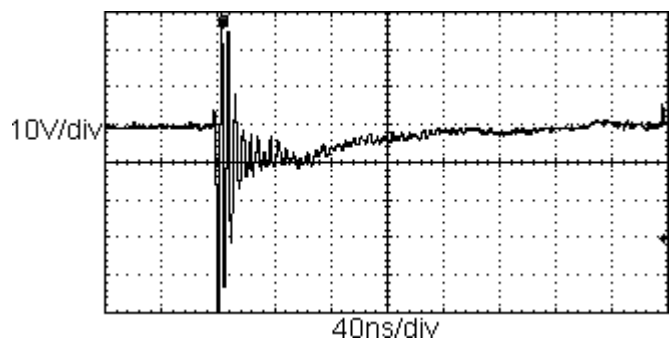
Non-Repetitive Peak Pulse Power vs. Pulse time



Power derating vs. Temperature



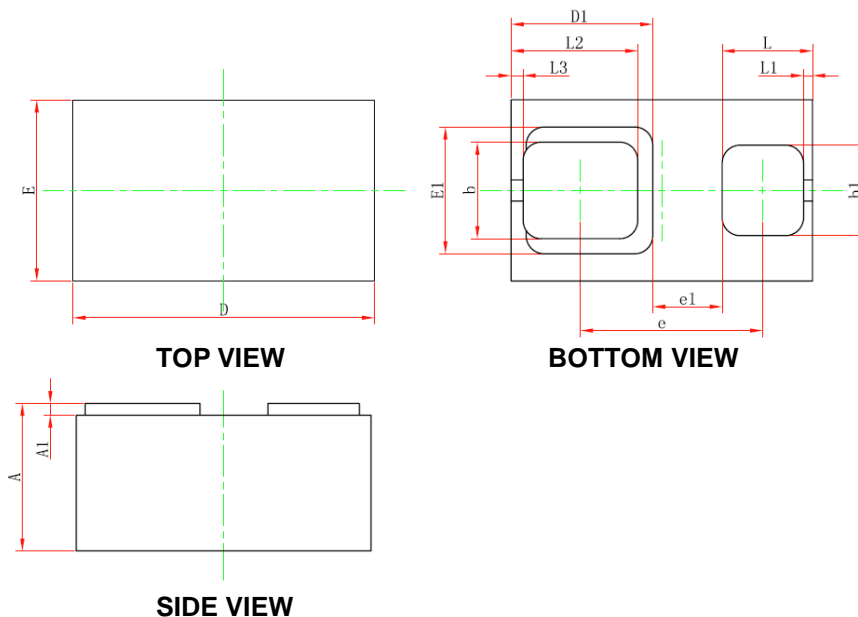
ESD clamping voltage  
(IEC61000-4-2 +8KV contact)



ESD clamping voltage  
(IEC61000-4-2 -8KV contact)

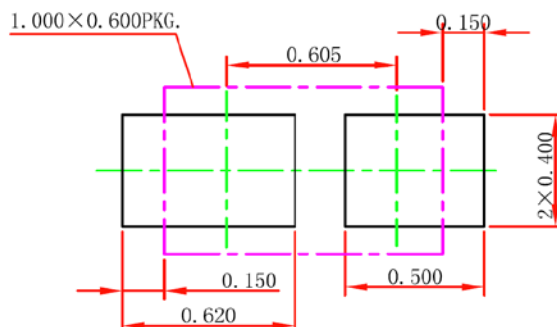
Package outline dimensions

FBP-02C



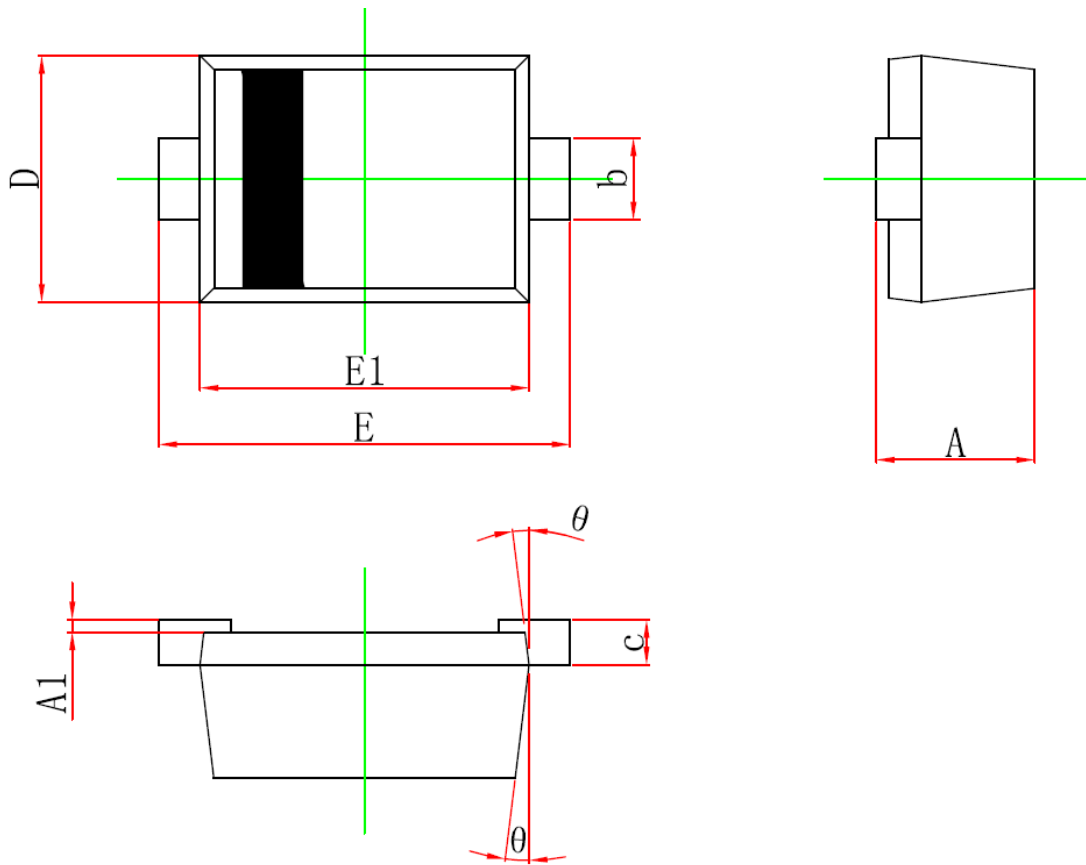
Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.450	0.500	0.550
A1	0.010	--	0.100
D	0.950	1.000	1.050
E	0.550	0.600	0.650
D1	0.470 Ref.		
E1	0.420 Ref.		
b	0.270	0.320	0.370
b1	0.250	0.300	0.350
e	0.555	0.605	0.655
e1	0.230 Ref.		
L	0.250	0.300	0.350
L1	0.030 Ref.		
L2	0.370	0.420	0.470
L3	0.040 Ref.		
备注:	其各个尺寸公差有所变动为正常情况		

Recommend PCB Layout (Unit: mm)



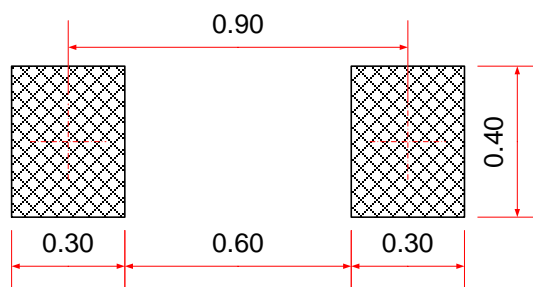
Package outline dimensions

SOD-923



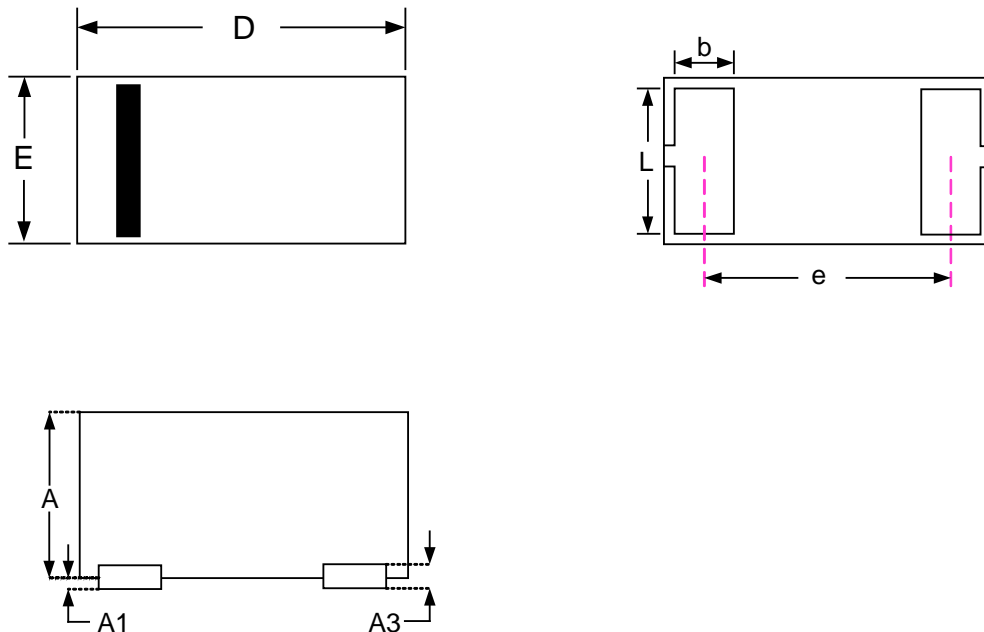
Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.350	-	0.450
A1	0.000	-	0.050
b	0.150	-	0.270
c			0.180
D	0.550	0.600	0.650
E	0.900	1.000	1.100
E1	0.750	0.800	0.850
$\theta$	7° Ref.		

Recommend PCB Layout (Unit: mm)



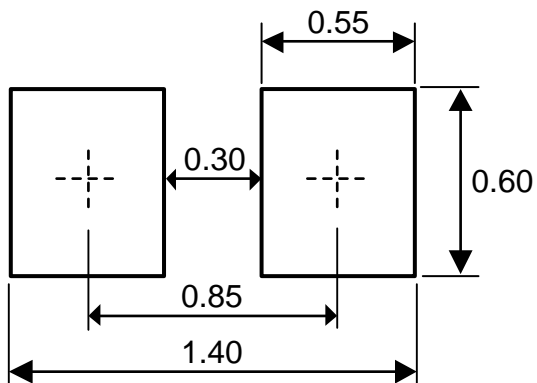
Package outline dimensions

DFN1006-2L



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.40	-	0.50
A1	0.00	-	0.05
A3	0.125 Ref.		
D	0.95	1.00	1.05
E	0.55	0.60	0.65
b	0.20	0.25	0.30
L	0.45	0.50	0.55
e	0.65 Typ.		

Recommend PCB Layout (Unit: mm)



Notes:

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.