

## 1-Line, Bi-directional, Transient Voltage Suppressors

### Descriptions

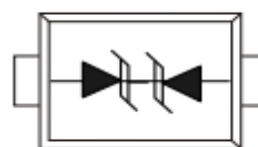
The ESD5A121TA is a bi-directional TVS (Transient Voltage Suppressor). It is specifically designed to protect sensitive electronic components that may be subjected to ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning. It is particularly well-suited for cellular phones, portable device, digital cameras, power supplies and many other portable applications because of its small package and low weight.

The ESD5A121TA may be used to provide ESD protection up to  $\pm 30\text{kV}$  air discharge  $\pm 30\text{kV}$  contact discharge according to IEC61000-4-2, and withstand peak pulse current up to 30 A (8/20 $\mu\text{s}$ ) according to IEC61000-4-5.

The ESD5A121TA is available in SOD-323 package. Standard products are Pb-free and Halogen-free.



**SOD-323**



**Circuit diagram**

### Features

- Stand-off voltage:  $\pm 5\text{V}$  Max
- Transient protection for each line according to IEC61000-4-2 (ESD):  $\pm 30\text{kV}$  air discharge  $\pm 30\text{kV}$  contact discharge IEC61000-4-5 (surge): 30 A (8/20 $\mu\text{s}$ )
- Solid-state silicon technology

### Applications

- Cell phone handsets and accessories
- Personal Digital Assistants (PDAs)
- Notebooks, Desktops, and Servers
- Portable Instrumentation
- Digital Cameras
- MID/CAR DVD/MP3/MP4/PMP Players

### Order information

| Device     | Package | Shipping       | Mark |
|------------|---------|----------------|------|
| ESD5A121TA | SOD-323 | 3000/Tape&Reel | 2B   |

### Absolute maximum ratings

| Parameter                                       | Symbol    | Rating   | Unit        |
|-------------------------------------------------|-----------|----------|-------------|
| Peak pulse power ( $t_p = 8/20\mu s$ )          | $P_{pk}$  | 420      | W           |
| Peak pulse current ( $t_p = 8/20\mu s$ )        | $I_{pp}$  | 30       | A           |
| ESD according to IEC61000-4-2 air discharge     | $V_{ESD}$ | $\pm 30$ | kV          |
| ESD according to IEC61000-4-2 contact discharge |           | $\pm 30$ |             |
| Operation junction temperature                  | $T_J$     | -55~150  | $^{\circ}C$ |
| Lead temperature                                | $T_L$     | 260      | $^{\circ}C$ |
| Storage temperature                             | $T_{STG}$ | -55~150  | $^{\circ}C$ |

### Electrical characteristics (TA=25 $^{\circ}C$ ,unless otherwise noted)

| Parameter                 | Symbol     | Condition                        | Min. | Typ.  | Max.      | Unit    |
|---------------------------|------------|----------------------------------|------|-------|-----------|---------|
| Reverse stand-off voltage | $V_{RWM}$  |                                  |      |       | $\pm 5.0$ | V       |
| Reverse leakage current   | $I_R$      | $V_{RWM} = 5.0V$                 |      |       | 0.2       | $\mu A$ |
| Reveres breakdown voltage | $V_{BR12}$ | $I_T = 1mA$                      | 5.8  |       | 8.5       | V       |
| Clamping voltage          | $V_C$      | $I_{pp} = 1A$ $t_p = 8/20\mu s$  |      | 9.0   |           | V       |
|                           |            | $I_{pp} = 30A$ $t_p = 8/20\mu s$ |      |       | 14.0      | V       |
| Junction capacitance      | $C_J$      | $V_R = 0V$ , $f = 1MHz$          |      | 120.0 |           | pF      |

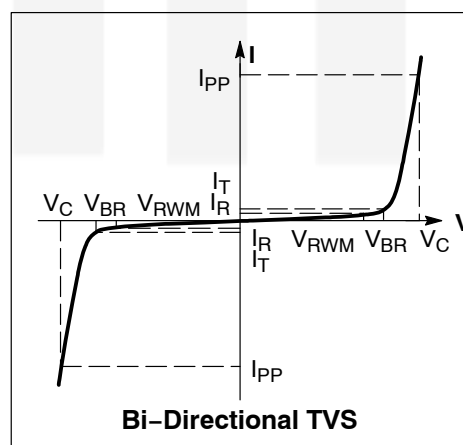
### Electrical performance curve

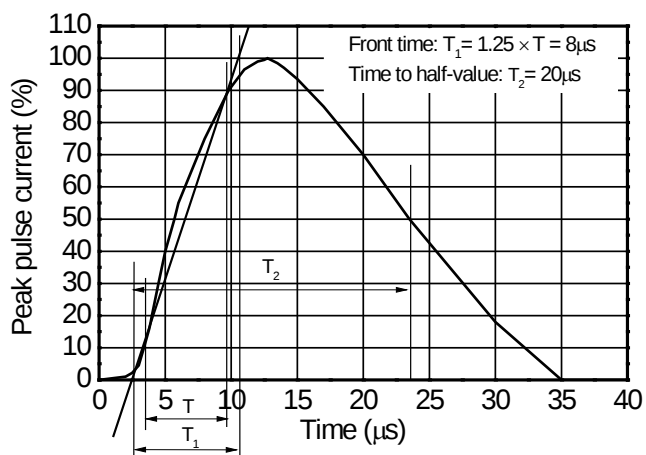
$V_C$ : Maximum clamping voltage

$V_{br}$ : Reverse breakdown voltage

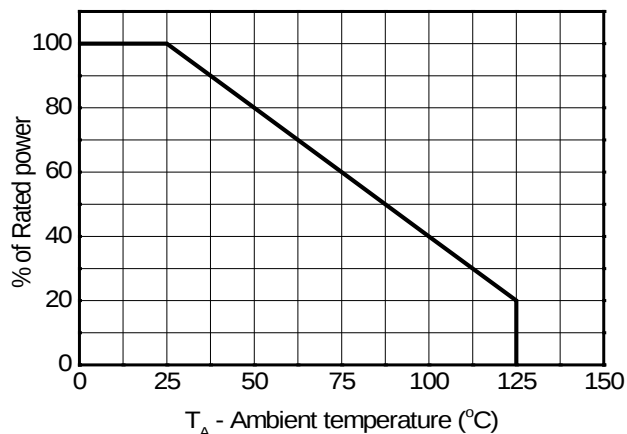
$V_{RWM}$ : Working voltage

$I_{pp}$ : Maximum peak current

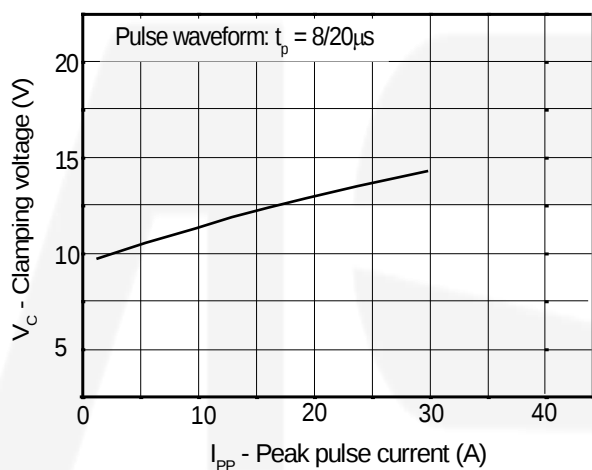




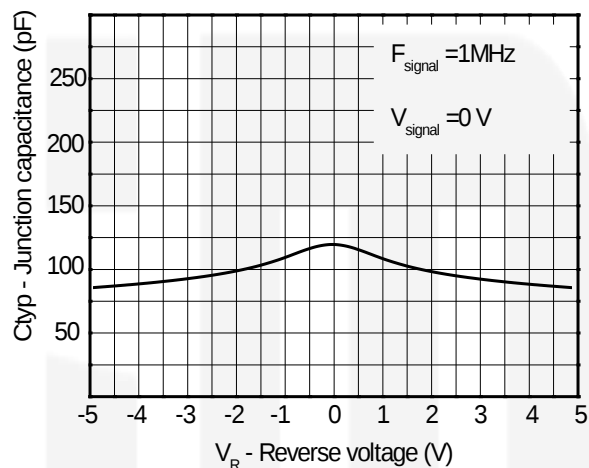
8/20 $\mu\text{s}$  waveform per IEC61000-4-5



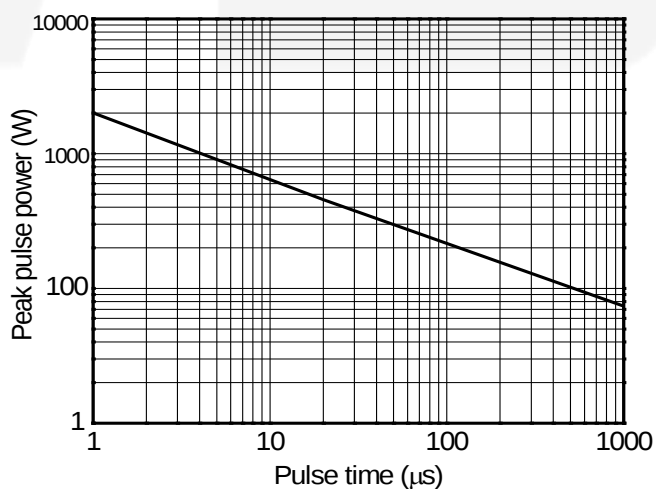
Power derating vs. Ambient temperature



Clamping voltage vs. Peak pulse current

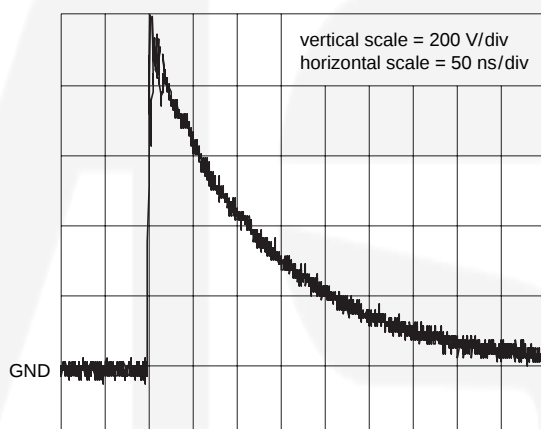
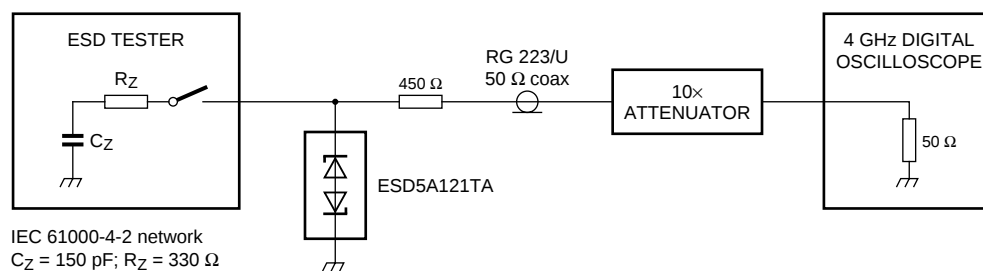


Capacitance vs. Reverse voltage

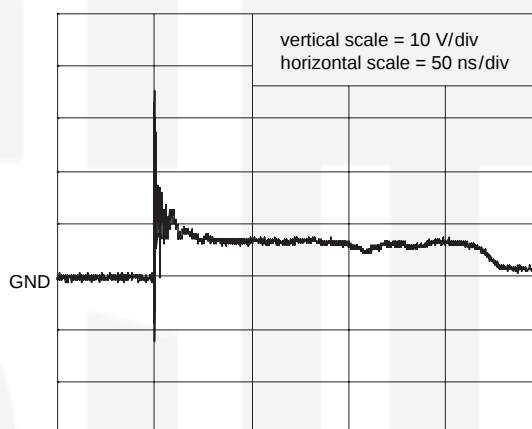


Non-repetitive peak pulse power vs. Pulse time

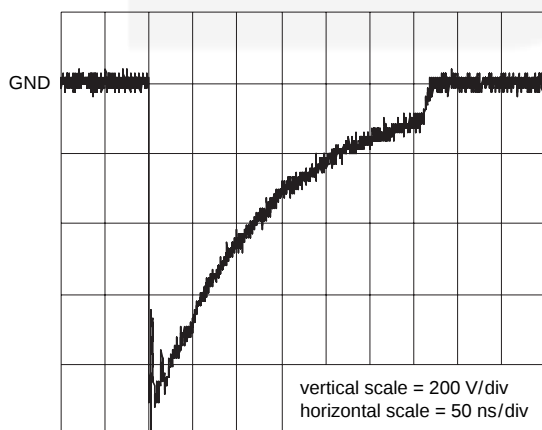
## ESD clamping test setup and waveforms



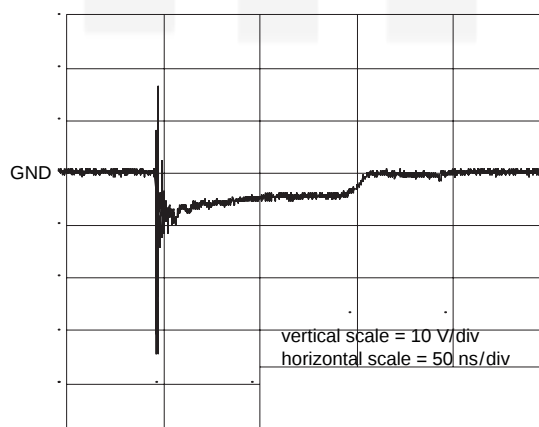
unclamped +1 kV ESD voltage waveform  
(IEC61000-4-2 network)



clamped +1 kV ESD voltage waveform  
(IEC61000-4-2 network)



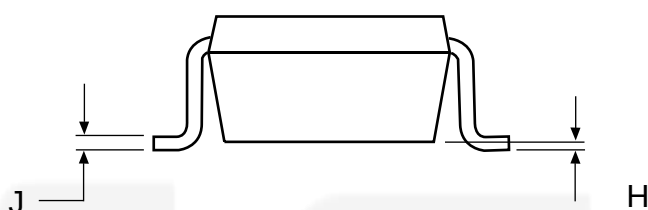
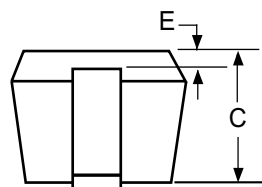
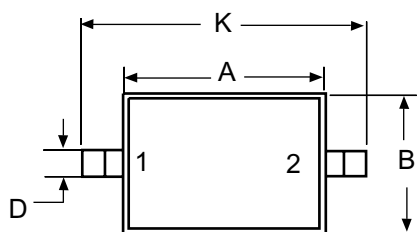
unclamped -1 kV ESD voltage waveform  
(IEC61000-4-2 network)



clamped -1 kV ESD voltage waveform  
(IEC61000-4-2 network)

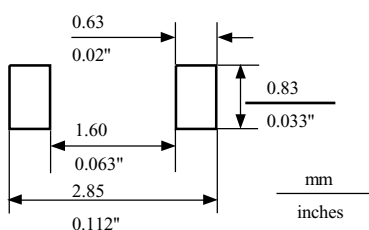
## Package outline dimensions

## SOD-323



| Symbol | Millimeter |       | Inches    |        |
|--------|------------|-------|-----------|--------|
|        | Min.       | Max.  | Min.      | Max.   |
| A      | 1.60       | 1.80  | 0.063     | 0.071  |
| B      | 1.15       | 1.35  | 0.045     | 0.053  |
| C      | 0.80       | 1.00  | 0.031     | 0.039  |
| D      | 0.25       | 0.40  | 0.010     | 0.016  |
| E      | 0.15 REF   |       | 0.006 REF |        |
| H      | 0.00       | 0.10  | 0.000     | 0.004  |
| J      | 0.089      | 0.177 | 0.0035    | 0.0070 |
| K      | 2.30       | 2.70  | 0.091     | 0.106  |

## Recommend land pattern (Unit: mm)



Note: This land pattern is for your reference only. Actual pad layouts may vary depending on application.