# SPE0311
## Single-Line ESD Protection Array

**DESCRIPTION**

The SPE0311 are designed by TVS device that is to protect sensitive electronics from damage or latch-up due to ESD. They are designed for use in applications where board space is at a premium. SPE0311 will protect single line, and may be used on line where the signal polarities swing above and below ground.

SPE0311 offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

SPE0311 may be used to meet the immunity requirements of IEC 61000-4-2, level 4. The small SOD-523 package makes them ideal for use in portable electronics such as cell phones, PDA's, notebook computers, and digital cameras.

**APPLICATIONS**

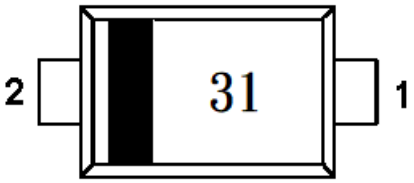
- Cellular Handsets and Accessories
- Cordless Phone
- PDA
- Notebooks and Handhelds
- Portable Instrumentation
- Digital Cameras
- MP3 Player

**FEATURES**

- Transient protection for data lines to
  IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
  IEC 61000-4-4 (EFT) 40A (5/50ns)
- Protects single I/O lines
- Working voltage: 3.3V
- Low leakage current
- Low operating and clamping voltages

**PIN CONFIGURATION ( SOD-523 )**


**PART MARKING**



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## Single-Line ESD Protection Array

**ORDERING INFORMATION**

| Part Number | Package | Part Marking |
|---|---|---|
| SPE0311D52RGB | SOD-523 | 31 |

※ SPE0311D52RGB : Tape Reel ; Pb – Free ; Halogen – Free

**ABSOULTE MAXIMUM RATINGS**

($T_A$=25℃ Unless otherwise noted)

| Parameter | Symbol | Typical | Unit |
|---|---|---|---|
| Peak Pulse Power ( tp = 8/20 μs ) | Ppk | 250 | W |
| Maximum Peak Pulse Current ( tp = 8/20 μs ) | Ipp | 15 | A |
| ESD per IEC 61000 – 4 – 2 (Air ) | Vpp | ±15 | KV |
| ESD per IEC 61000 – 4 – 2 (Contact ) | Vpp | ±8 | KV |
| Operating Junction Temperature | $T_J$ | -65 ~ 150 | ℃ |
| Storage Temperature Range | $T_{STG}$ | -65 ~ 150 | ℃ |
| Lead Soldering Temperature | $T_L$ | 260 ( 10sec ) | ℃ |

**ELECTRICAL CHARACTERISTICS**

($T_A$=25℃ Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| Reverse Stand – Off Voltage | $V_{RWM}$ | | | | 3.3 | V |
| Reverse Breakdown Voltage | $V_{BR}$ | It=5mA | 5.8 | 6.4 | 6.9 | V |
| Reverse Leakage Current | $I_{RM}$ | $V_{RWM}$=3.3V , $T_A$=25℃ | | 0.09 | 2 | μA |
| Differential Resistance | rdif | $I_R$=1mA | | | 400 | Ω |
| Clamping Voltage | $V_{CL}$ | Ipp=1A , tp = 8/20 μs | | | 8 | V |
| Clamping Voltage | $V_{CL}$ | Ipp=15A , tp = 8/20 μs | | | 26 | V |
| Junction Capacitance | Cj | Between I/O Pin and GND $V_R$=0V , f=1MHz | | 202 | | pF |

## TYPICAL CHARACTERISTICS

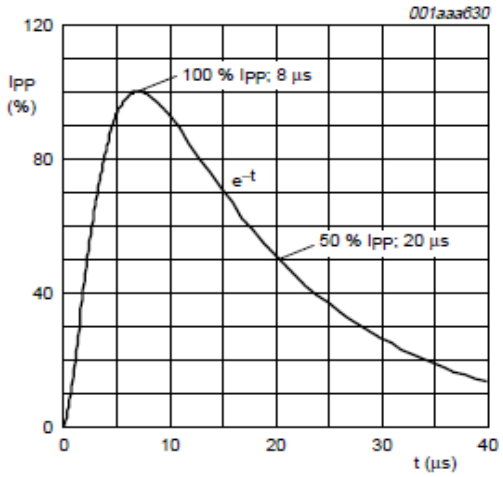



Fig 1. 8/20 µs pulse waveform according to IEC 61000-4-5

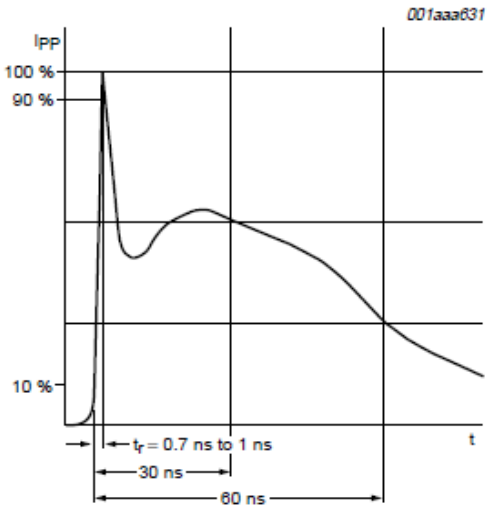
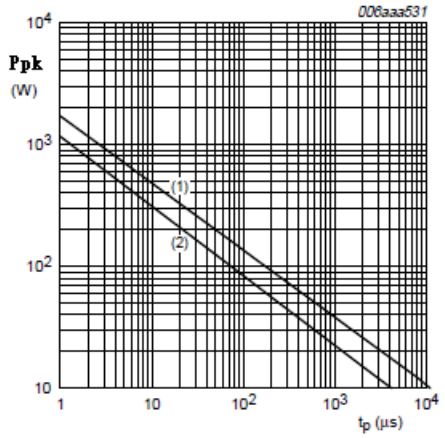



Fig 2. ESD pulse waveform according to IEC 61000-4-2

## TYPICAL CHARACTERISTICS




$T_{amb}$ = 25 °C

Fig 3. Peak pulse power as a function of exponential pulse duration $t_p$; typical values

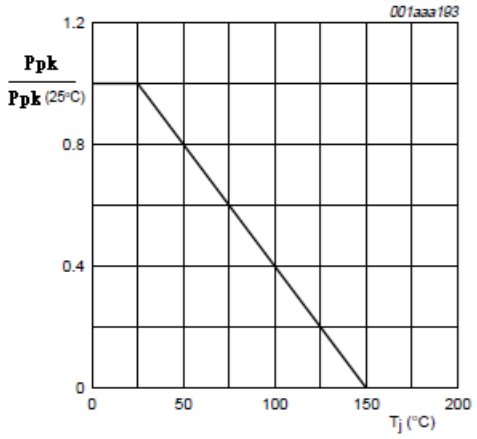
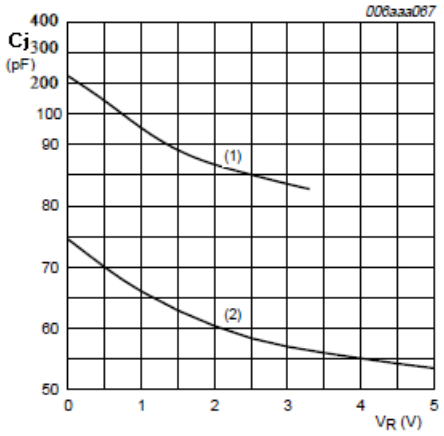


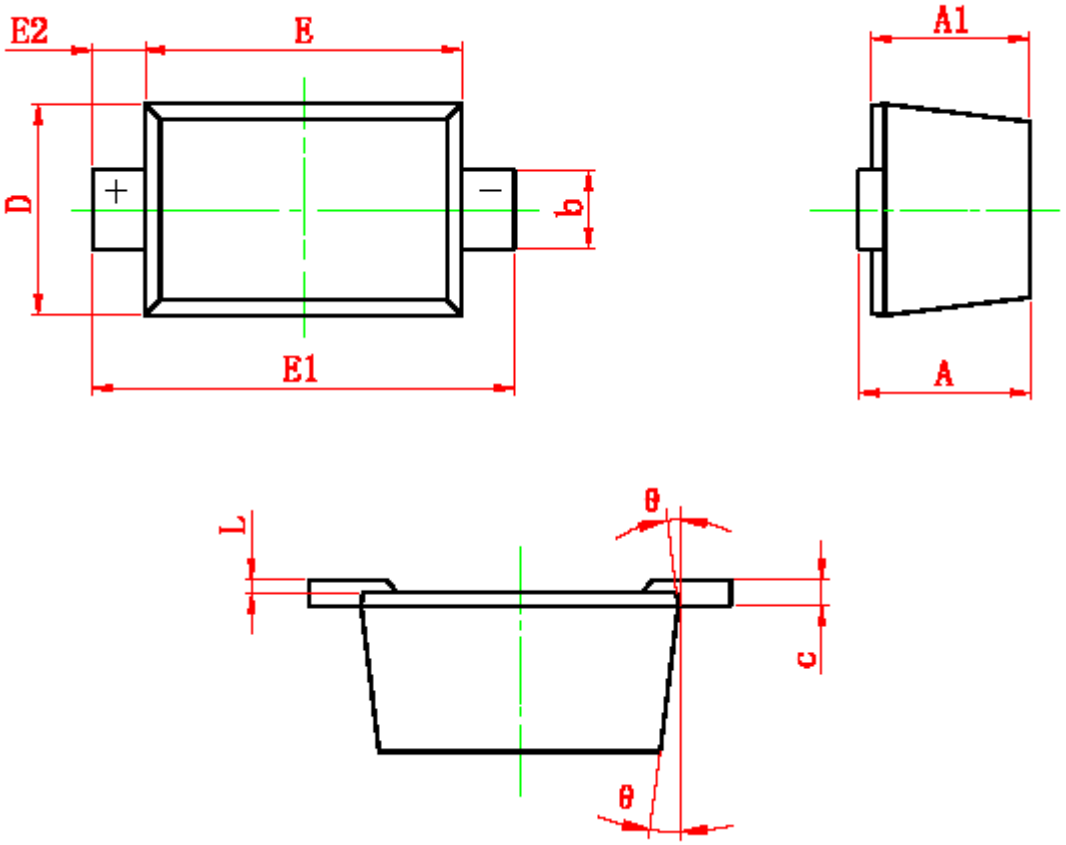

Fig 4. Relative variation of peak pulse power as a function of junction temperature; typical values




$T_{amb}$ = 25 °C; f = 1 MHz

Fig 5. Diode capacitance as a function of reverse voltage; typical values

**SOD-523 PACKAGE OUTLINE**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.510 | 0.770 | 0.020 | 0.031 |
| A1 | 0.500 | 0.700 | 0.020 | 0.028 |
| b | 0.250 | 0.350 | 0.010 | 0.014 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 0.750 | 0.850 | 0.030 | 0.033 |
| E | 1.100 | 1.300 | 0.043 | 0.051 |
| E1 | 1.500 | 1.700 | 0.059 | 0.067 |
| E2 | 0.200 REF | | 0.008 REF | |
| L | 0.010 | 0.070 | 0.001 | 0.003 |
| θ | 7° REF | | 7° REF | |

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