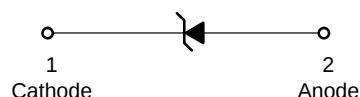


The ESD7371 Series is designed to protect voltage sensitive components that require ultra-low capacitance from ESD and transient voltage events. Excellent clamping capability, low capacitance, high breakdown voltage, high linearity, low leakage, and fast response time make these parts ideal for ESD protection on designs where board space is at a premium. It has industry leading capacitance linearity over voltage making it ideal for RF applications. This capacitance linearity combined with the extremely small package and low insertion loss makes this part well suited for use in antenna line applications for wireless handsets and terminals.



## Features

- Industry Leading Capacitance Linearity Over Voltage
- Low Capacitance (0.7 pF Max, I/O to GND)
- Stand-off Voltage: 5.3 V
- Low Leakage: < 1 nA
- Low Dynamic Resistance < 1
- 1000 ESD IEC61000-4-2 Strikes  $\pm 8$  kV Contact / Air Discharged

## Typical Applications

- RF Signal ESD Protection
- RF Switching, PA, and Antenna ESD Protection
- Near Field Communications
- USB 2.0, USB 3.0

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

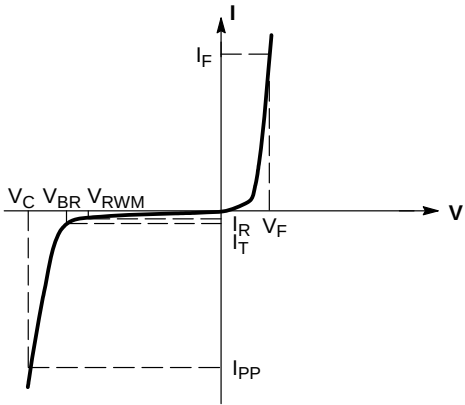
| Rating                                                                                                 | Symbol                   | Value       | Unit                     |
|--------------------------------------------------------------------------------------------------------|--------------------------|-------------|--------------------------|
| IEC 61000-4-2 (ESD) (Note 1)                                                                           |                          | 20          | kV                       |
| IEC 61000-4-5 (ESD) (Note 2)                                                                           |                          | 3.0         | A                        |
| Total Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$<br>Thermal Resistance, Junction-to-Ambient | $P_D$<br>$R_{\theta JA}$ | 300<br>400  | mW<br>$^\circ\text{C/W}$ |
| Junction and Storage Temperature Range                                                                 | $T_J, T_{stg}$           | -55 to +150 | $^\circ\text{C}$         |
| Lead Solder Temperature – Maximum<br>(10 Second Duration)                                              | $T_L$                    | 260         | $^\circ\text{C}$         |

1. Non-repetitive current pulse at  $T_A = 25^\circ\text{C}$ , per IEC61000-4-2 waveform.
2. Non-repetitive current pulse at  $T_A = 25^\circ\text{C}$ , per IEC61000-4-5 waveform.
3. Mounted with recommended minimum pad size, DC board FR-4

**ELECTRICAL CHARACTERISTICS**

(T<sub>A</sub> = 25°C unless otherwise noted)

| Symbol           | Parameter                                          |
|------------------|----------------------------------------------------|
| I <sub>PP</sub>  | Maximum Reverse Peak Pulse Current                 |
| V <sub>C</sub>   | Clamping Voltage @ I <sub>PP</sub>                 |
| V <sub>RWM</sub> | Working Peak Reverse Voltage                       |
| I <sub>R</sub>   | Maximum Reverse Leakage Current @ V <sub>RWM</sub> |
| V <sub>BR</sub>  | Breakdown Voltage @ I <sub>T</sub>                 |
| I <sub>T</sub>   | Test Current                                       |



Uni-Directional

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

| Parameter                  | Symbol           | Conditions                                                         | Min | Typ          | Max        | Unit |
|----------------------------|------------------|--------------------------------------------------------------------|-----|--------------|------------|------|
| Reverse Working Voltage    | V <sub>RWM</sub> |                                                                    |     |              | 5.3        | V    |
| Breakdown Voltage (Note 4) | V <sub>BR</sub>  | I <sub>T</sub> = 1 mA                                              | 7.0 |              |            | V    |
| Reverse Leakage Current    | I <sub>R</sub>   | V <sub>RWM</sub> = 5.3 V                                           |     | < 1.0        | 50         | nA   |
| Clamping Voltage (Note 5)  | V <sub>C</sub>   | I <sub>PP</sub> = 1 A                                              |     | 11           | 15         | V    |
| Clamping Voltage (Note 5)  | V <sub>C</sub>   | I <sub>PP</sub> = 3 A                                              |     | 14           | 20         | V    |
| Junction Capacitance       | C <sub>J</sub>   | V <sub>R</sub> = 0 V, f = 1 MHz<br>V <sub>R</sub> = 0 V, f < 1 GHz |     | 0.43<br>0.39 | 0.7<br>0.7 | pF   |
| Dynamic Resistance         | R <sub>DYN</sub> | TLP Pulse                                                          |     | 0.45         |            | Ω    |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

- Breakdown voltage is tested from pin 1 to 2 and pin 2 to 1.
- Non-repetitive current pulse at T<sub>A</sub> = 25°C, per IEC61000-4-5 waveform.

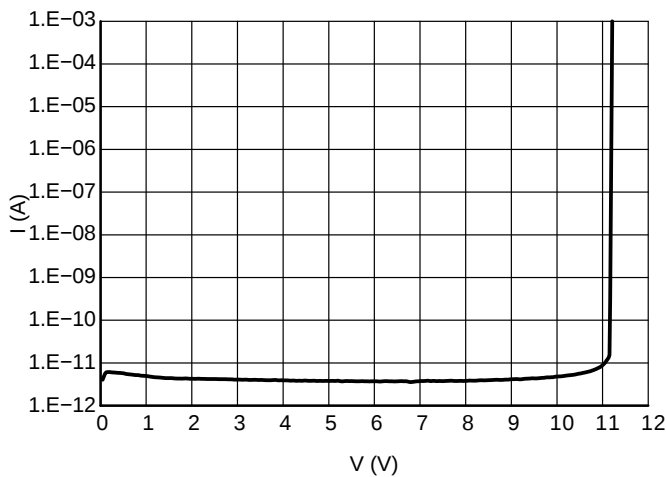


Figure 1. IV Characteristics

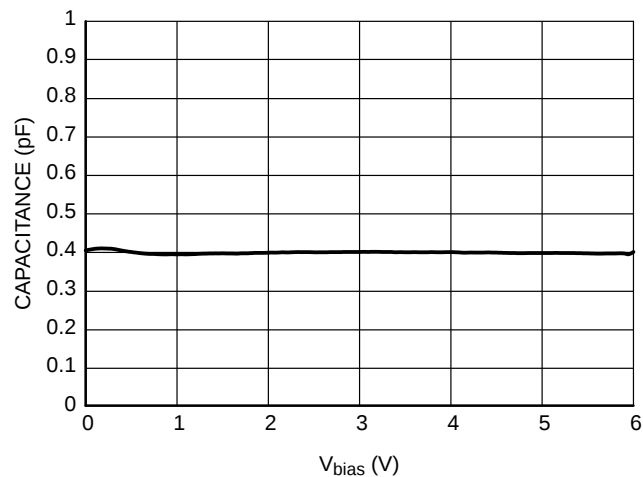


Figure 2. CV Characteristics

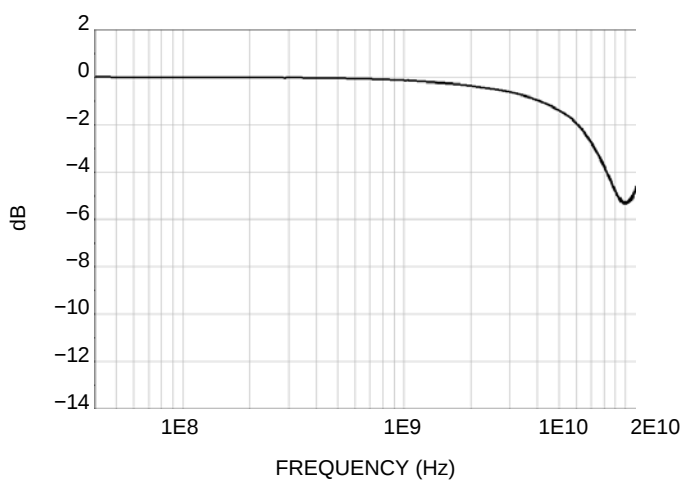


Figure 3. RF Insertion Loss

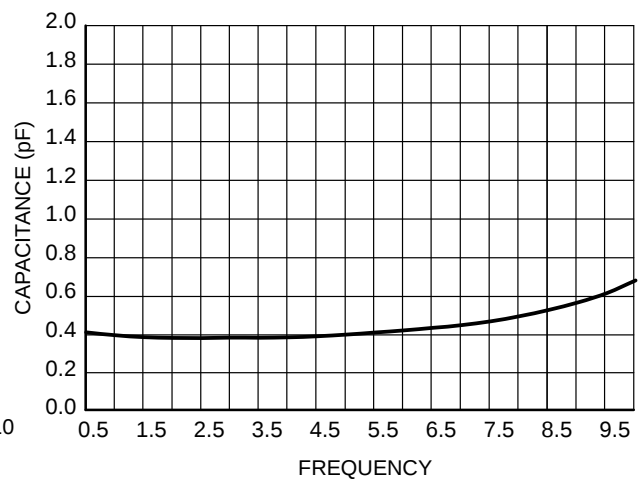


Figure 4. Capacitance over Frequency

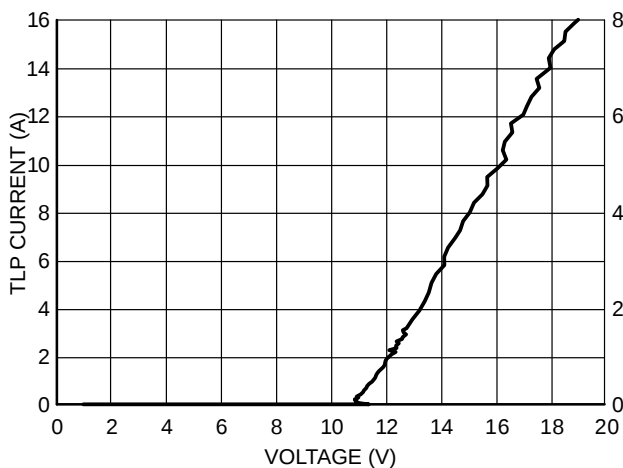


Figure 5. Positive TLP I-V Curve

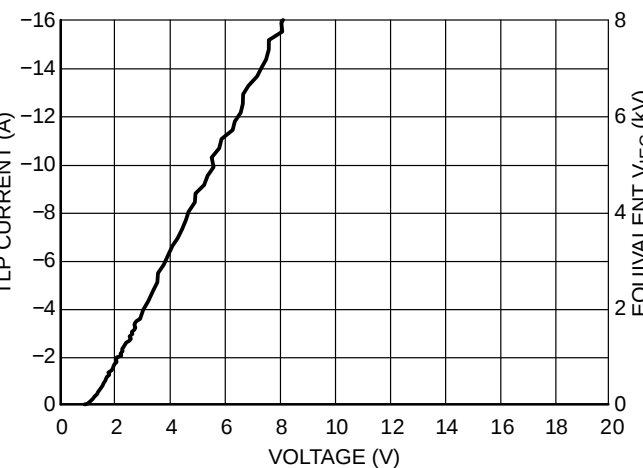


Figure 6. Negative TLP I-V Curve

IEC 61000-4-2 Spec.

| Level | Test Voltage (kV) | First Peak Current (A) | Current at 30 ns (A) | Current at 60 ns (A) |
|-------|-------------------|------------------------|----------------------|----------------------|
| 1     | 2                 | 7.5                    | 4                    | 2                    |
| 2     | 4                 | 15                     | 8                    | 4                    |
| 3     | 6                 | 22.5                   | 12                   | 6                    |
| 4     | 8                 | 30                     | 16                   | 8                    |

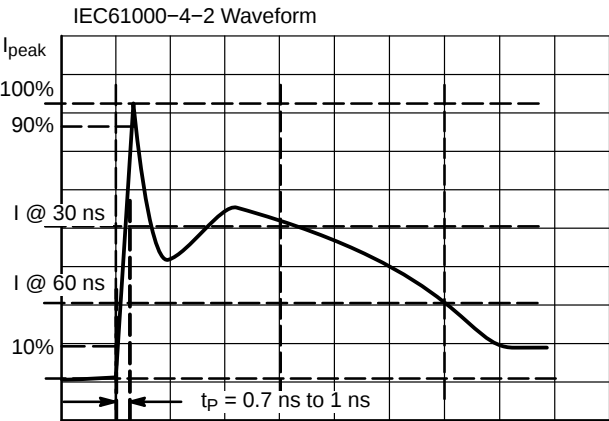


Figure 7. IEC61000-4-2 Spec

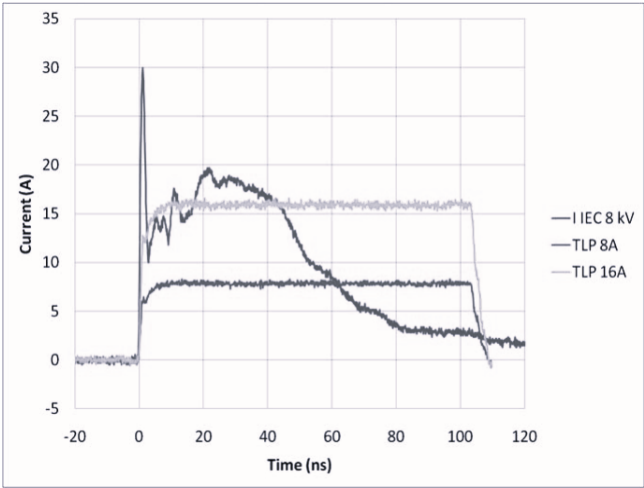
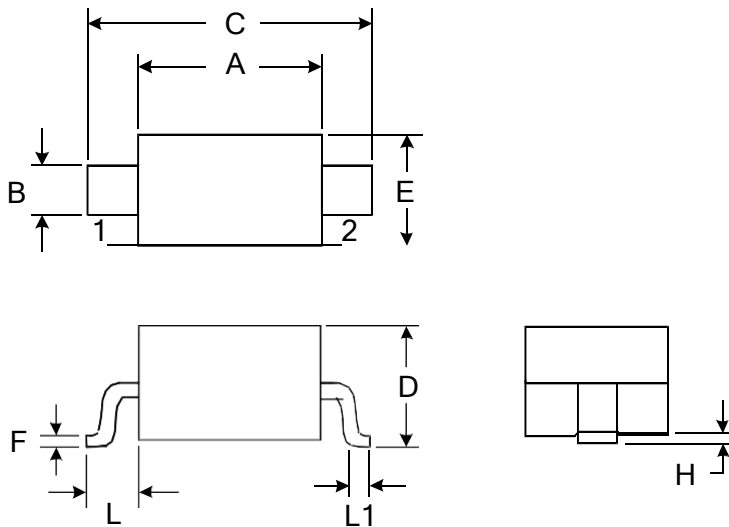


Figure 10. Comparison Between 8 kV IEC 61000-4-2 and 8 A and 16 A TLP Waveforms

## Outline Drawing – SOD323



| DIMENSIONS |            |       |          |       |
|------------|------------|-------|----------|-------|
| SYMBOL     | MILLIMETER |       | INCHES   |       |
|            | MIN        | MAX   | MIN      | MAX   |
| A          | 1.600      | 1.800 | 0.063    | 0.071 |
| B          | 0.250      | 0.350 | 0.010    | 0.014 |
| C          | 2.500      | 2.700 | 0.098    | 0.106 |
| D          |            | 1.000 |          | 0.039 |
| E          | 1.200      | 1.400 | 0.047    | 0.055 |
| F          | 0.080      | 0.150 | 0.003    | 0.006 |
| L          | 0.475 REF  |       | 0.019REF |       |
| L1         | 0.250      | 0.400 | 0.010    | 0.016 |
| H          | 0.000      | 0.100 | 0.000    | 0.004 |

## Marking



## Ordering information

| Order code      | Package | Baseqty | Delivery mode |
|-----------------|---------|---------|---------------|
| UMW ESD7371HT1G | SOD-323 | 3000    | Tape and reel |