

1. Description

Ultra low capacitance unidirectional ElectroStatic Discharge (ESD) protection diode in a SOD-523 ultra small and flat lead Surface-Mounted Device (SMD) plastic package designed to protect one signal line from the damage caused by ESD and other transients. The combination of extremely low capacitance and ultra low clamping voltage makes the device ideal for high-speed data line protection applications.

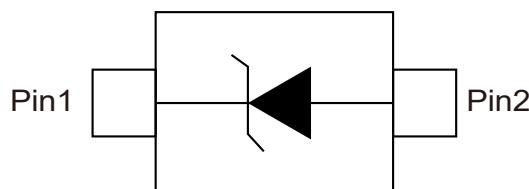
2. Features

- ESD protection of one line
- Ultra low diode capacitance
- $C_d=0.95\text{pF}$
- Ultra low clamping voltage: $V_{CL}=8\text{V}$
- Ultra low leakage current: $I_{RM}=1\text{nA}$
- ESD protection up to 8 kV

3. Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- 10/100/1000 Mbit/s Ethernet
- Communication systems
- Portable electronics
- Subscriber Identity Module (SIM) card protection
- USB, High-Definition Multimedia
- Interface (HDMI), FireWire
- High-speed data lines

4. Pinning information



SOD-523



5. Quick reference data

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|--------------------------|-----------|------------------|-----|------|-----|-------|
| reverse standoff voltage | V_{RWM} | | | | 5.5 | V |
| diode capacitance | C_d | $V_R=0V, f=1MHz$ | | 0.95 | 1.1 | pF |

6. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|----------------------|-----------|--------------------|-----|-----|------|-------|
| peak pulse current | I_{PP} | $t_p=8/20\mu s$ ①② | | | 1.5 | A |
| junction temperature | T_J | | | | 150 | °C |
| ambient temperature | T_{amb} | | -55 | | +150 | °C |
| storage temperature | T_{STG} | | -65 | | +150 | °C |

Notes:

① Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

② Measured from pin 1 to pin 2.

7. ESD maximum ratings

$T_{amb}=25^{\circ}C$ unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------|-----------|--------------------------------------|-----|-----|-----|-------|
| electrostatic discharge voltage | V_{ESD} | IEC 61000-4-2 (contact discharge) ①② | | | 8 | kV |
| | | machine model | | | 400 | V |
| | | MIL-STD-883 (human body model)② | | | 10 | kV |

Notes:

① Device stressed with ten non-repetitive ESD pulses.

② Measured from pin 1 to 2.



8. Electrical Characteristic ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|--------------------------|-----------|--------------------------------|-----|------|-----|----------|
| reverse standoff voltage | V_{RWM} | | | | 5 | V |
| reverse leakage current | I_{RM} | $V_{RWM}=5\text{V}$ | | 1 | 100 | nA |
| breakdown voltage | V_{BR} | $I_R=10\text{mA}$ | 5.8 | 7.5 | 10 | V |
| diode capacitance | C_d | $V_R=0\text{V}, f=1\text{MHz}$ | | 0.95 | 1.1 | pF |
| clamping voltage | V_{CL} | $I_{PP}=1.5\text{A}$ | ①② | 8 | | V |
| dynamic resistance | r_{dyn} | $I_R=10\text{A}$ | | 0.25 | | Ω |

Notes:

- ① Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.
- ② Measured from pin 1 to pin 2.
- ③ Non-repetitive current pulse, Transmission Line Pulse (TLP) $t_p = 100\text{ ns}$; square pulse.



9.1 Typical Characteristic

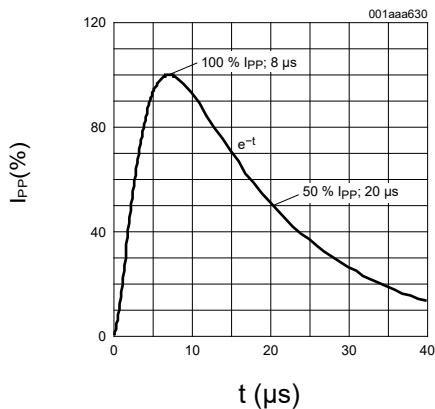


Figure 1: 8/20 μ s pulse waveform according to IEC 61000-4-5

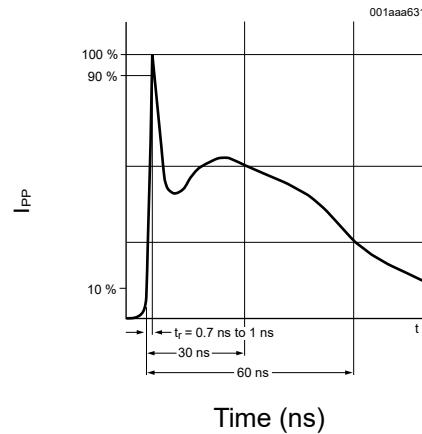


Figure 2: ESD pulse waveform according to IEC 61000-4-2

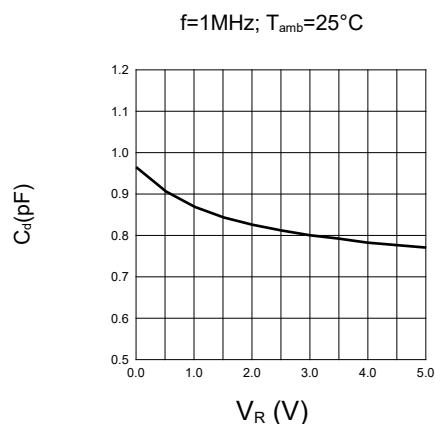


Figure 3: Diode capacitance as a function of reverse voltage; typical values

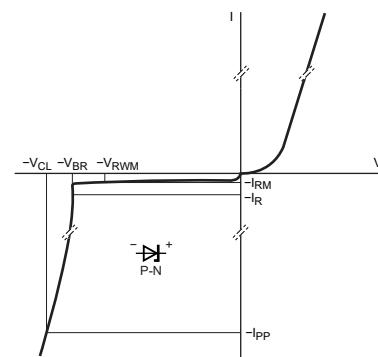
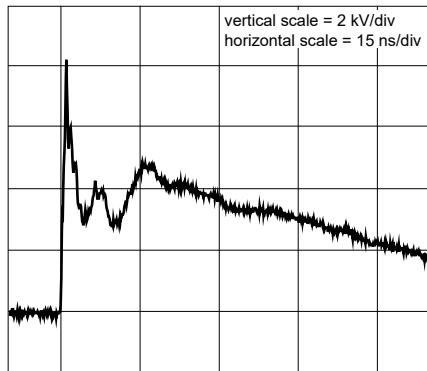


Figure 4: V-I characteristics for a unidirectional ESD protection diode

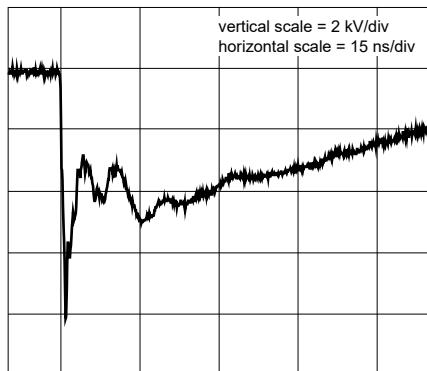


9.2 Typical Characteristic

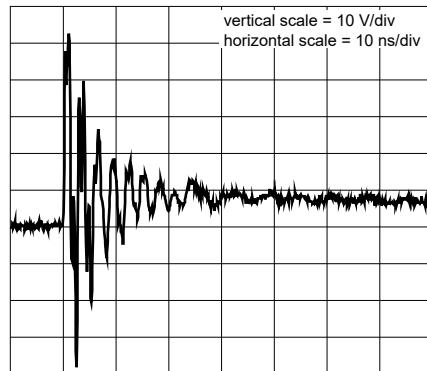
GND



GND



GND



GND

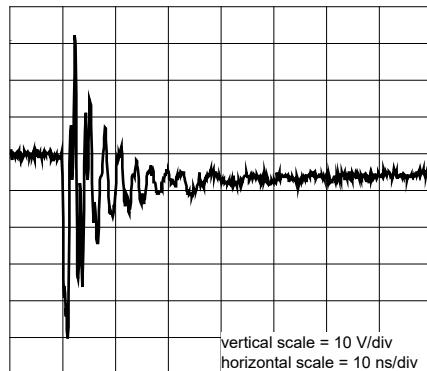


Figure 1: unclamped +8 kV ESD pulse waveform
(IEC 61000-4-2 network)

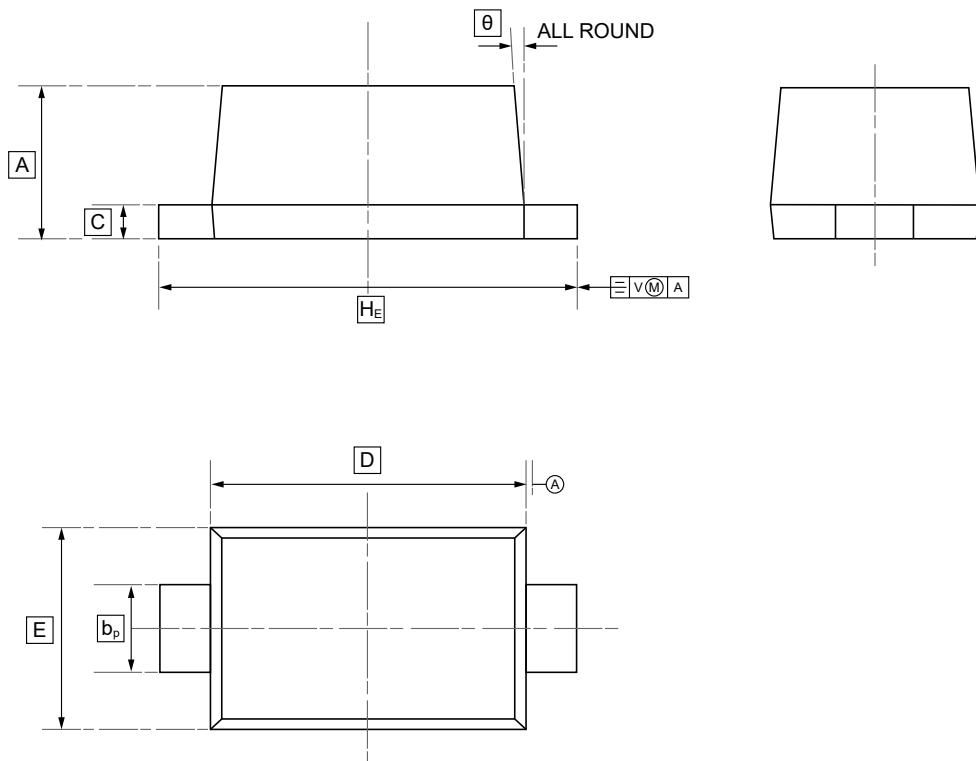
Figure 2: clamped +8 kV ESD pulse waveform
(IEC 61000-4-2 network) pin 1 to 2

Figure 3: unclamped -8 kV ESD pulse waveform
(IEC 61000-4-2 network)

Figure 4: clamped -8 kV ESD pulse waveform
(IEC 61000-4-2 network) pin 1 to 2



10.SOD-523 Package Outline Dimensions

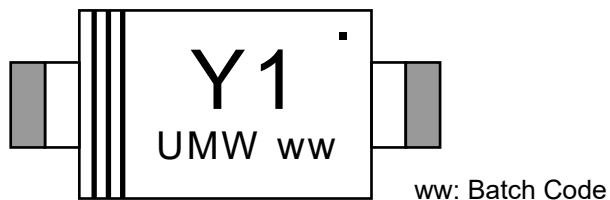


DIMENSIONS (mm are the original dimensions)

| Symbol | A | b_p | C | D | E | H_E | θ |
|------------|------|-------|-------|------|------|-------|-----------|
| Min | 0.58 | 0.3 | 0.100 | 1.15 | 0.75 | 1.5 | 5° |
| Max | 0.68 | 0.4 | 0.135 | 1.25 | 0.85 | 1.7 | |



11. Ordering Information



ww: Batch Code

| Order Code | Package | Base QTY | Delivery Mode |
|-----------------|---------|----------|---------------|
| UMW PESD5V0X1UB | SOD-523 | 3000 | Tape and reel |



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