# UMW PESD12VS1UJ

## 1.Description

Unidirectional ElectroStatic Discharge (ESD) protection diodes in a very small Surface Mounted Device (SMD) plastic package designed to protect one signal line from the damage caused by ESD and transient overvoltage.

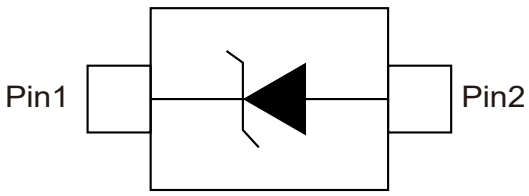
## 2.Applications

- Computers and peripherals
- Communication systems
- Audio and video equipment
- Portable electronics
- Cellular handsets and accessories
- Medical and industrial equipment

## 3.Features

- Transient Voltage Suppression (TVS) protection of one line
- Max. peak pulse power: $P_{PP}$=890W
- Low clamping voltage: $V_{CL}$=19V
- Low leakage current: $I_{RM}$=300nA
- ESD protection up to 30 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PP}$=47A
- AEC-Q101 qualified

## 4.Pinning information




**SOD-323**

## 5. Quick reference data

$T_{amb}$=25°C unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| reverse standoff voltage | $V_{RWM}$ | | | | | |
| PESD5VOS1UJ | | | | | 5 | V |
| PESD12VS1UJ | | | | | 12 | V |
| diode capacitance | $C_d$ | $V_R$=0V, f=1MHz | | | | |
| PESD5VOS1UJ | | | | 480 | 530 | pF |
| PESD12VS1UJ | | | | 160 | 180 | pF |

## 6.Limiting values

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

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| peak pulse power | $P_{PP}$ | $t_p$=8/20μs ①② | | | | |
| PESD5VOS1UJ | | | | | 890 | W |
| PESD12VS1UJ | | | | | 600 | W |
| peak pulse current | $I_{PP}$ | $t_p$=8/20μs ①② | | | | |
| PESD5VOS1UJ | | | | | 47 | A |
| PESD12VS1UJ | | | | | 22.5 | A |
| total power dissipation | $P_{tot}$ | $T_{amb}$≤ 25°C ③④ | | | 420 | mW |
| | | | | | 720 | mW |
| 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 Soldering point of cathode tab.

③ Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

④ Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 $cm^2$.

## 7.ESD maximum ratings

$T_{amb}$=25°C unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| electrostatic discharge voltage | $V_{ESD}$ | IEC 61000-4-2 (contact discharge) ① | | | 30 | kV |
| | | machine model | | | 400 | V |
| | | MIL-STD-883 (human body model) | | | 16 | kV |

Notes:

① Device stressed with ten non-repetitive ESD pulses.

## 8.ESD standards compliance

| Parameter | Conditions |
|---|---|
| IEC 61000-4-2; level 4 (ESD) | > 15 kV (air); > 8 kV (contact) |
| MIL-STD-883; class 3 (human body model) | > 4 kV |

## 7.ESD maximum ratings

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| thermal resistance from junction to ambient | $R_{th(j-a)}$ | in free air ① | | | 290 | KW |
| | | ② | | | 170 | KW |
| thermal resistance from junction to solder point | $R_{th(j-sp)}$ | ③ | | | 35 | KW |

Notes:

① Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

② Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 $cm^2$.

③ Soldering point of cathode tab.

## 9.Electrical Characteristic ($T_A$=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| reverse standoff voltage | $V_{RWM}$ | | | | | |
| PESD5VOS1UJ | | | | | 5 | V |
| PESD12VS1UJ | | | | | 12 | V |
| reverse leakage current | $I_{RM}$ | | | | | |
| PESD5VOS1UJ | | $V_{RWM}$=5V | | 0.3 | 4 | μA |
| PESD12VS1UJ | | $V_{RWM}$=12V | | <1 | 100 | nA |
| breakdown voltage | $V_{BR}$ | $I_R$=5mA | | | | |
| PESD5VOS1UJ | | | 6.2 | 6.8 | 7.3 | V |
| PESD12VS1UJ | | | 13.3 | 14.5 | 15.75 | V |
| diode capacitance | $C_d$ | $V_R$=0V, f=1MHz | | | | |
| PESD5VOS1UJ | | | | 480 | 530 | pF |
| PESD12VS1UJ | | | | 160 | 180 | pF |
| clamping voltage | | ① | | | | |
| PESD5VOS1UJ | $V_{CL}$ | $I_{PP}$=47A | | | 19 | V |
| | | $I_{PP}$=25A | | | 13.5 | V |
| | | $I_{PP}$=5A | | | 9.8 | V |
| PESD12VS1UJ | | $I_{PP}$=22.5A | | | 27 | V |
| | | $I_{PP}$=15A | | | 23.5 | V |
| | | $I_{PP}$=5A | | | 19 | V |
| differential resistance | $r_{dif}$ | $I_R$=5mA | | | | |
| PESD5VOS1UJ | | | | 2 | 100 | Ω |
| PESD12VS1UJ | | | | 5 | 100 | Ω |

Notes:

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

## 10.1Typical characteristic

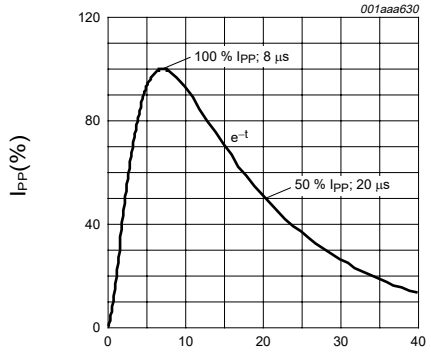



Figure 1: 8/20 µs pulse waveform according to IEC 61000-4-5

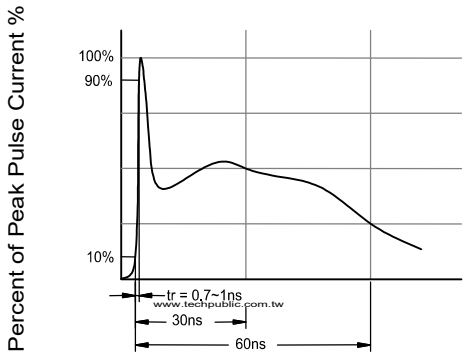



Figure 2: ESD pulse waveform according to IEC 61000-4-2

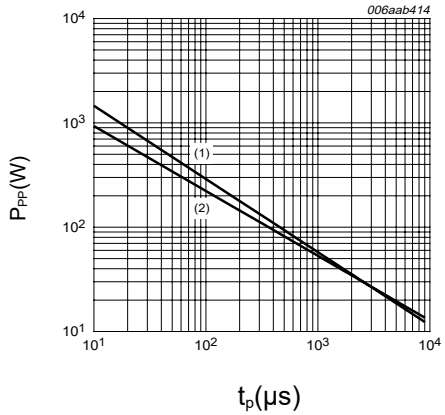



Figure 3: Peak pulse power as a function of exponential pulseduration; typical values

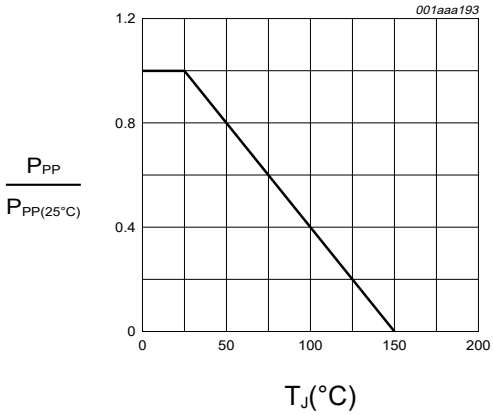



Figure 4: Relative variation of peak pulse power as a function of junction temperature; typical values

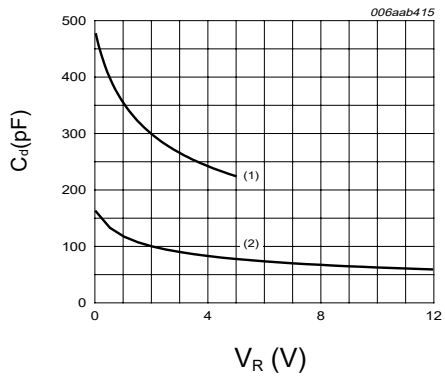



Figure 5: Diode capacitance as a function of reverse voltage; typical values

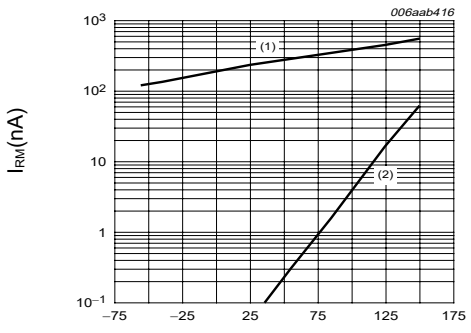



Figure 6: Reverse leakage current as a function of ambient temperature; typical va

## 10.2Typical characteristic

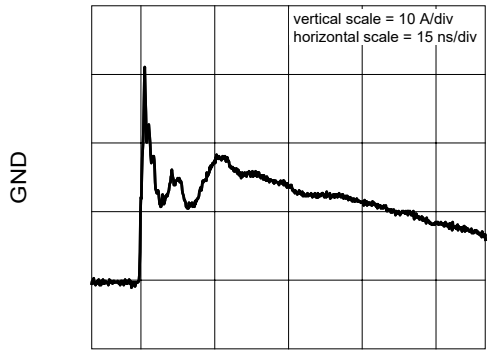



Figure 7: unclamped +8 kV ESD pulse waveform (IEC 61000-4-2 network)

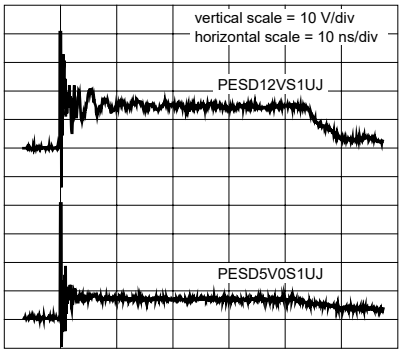
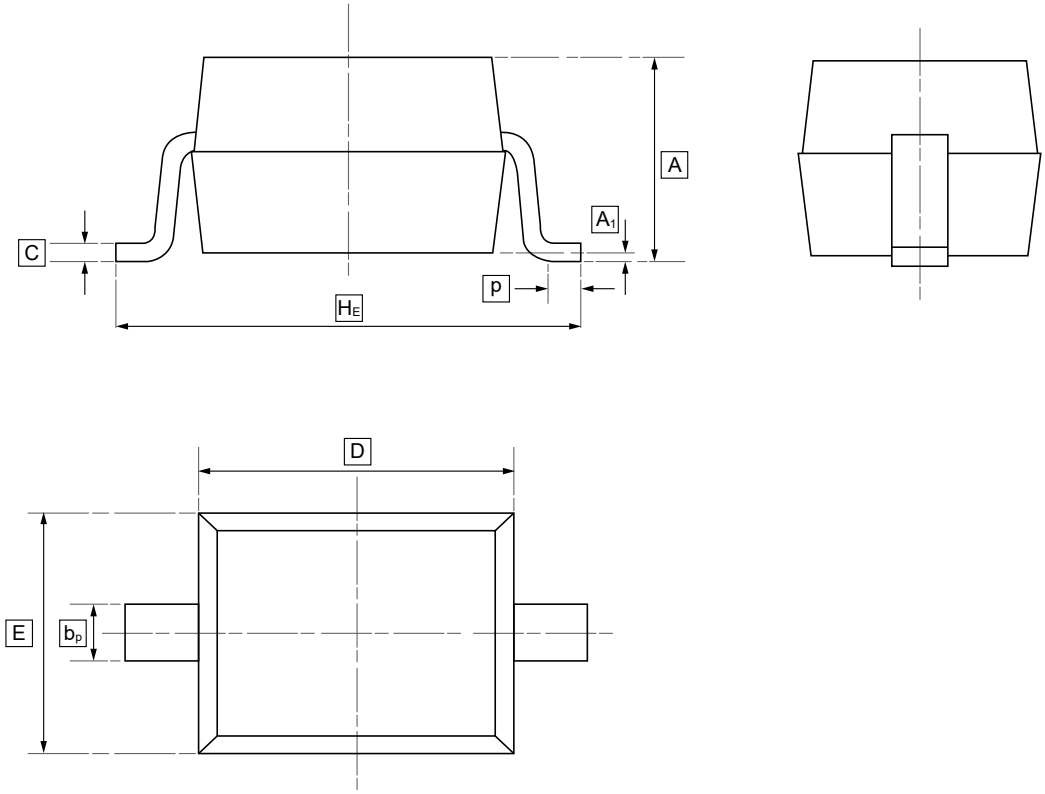



Figure 8: clamped +8 kV ESD pulse waveform (IEC 61000-4-2 network)

## 11.SOD-323 Package Outline Dimensions




**DIMENSIONS (mm are the original dimensions)**

| Symbol | A | $b_p$ | C | D | E | $H_E$ | $A_1$ | $L_p$ |
|---|---|---|---|---|---|---|---|---|
| **Min** | 0.90 | 0.25 | 0.10 | 1.60 | 1.15 | 2.30 | 0.01 | 0.20 |
| **Max** | 1.20 | 0.40 | 0.15 | 1.80 | 1.35 | 2.80 | 0.10 | 0.50 |

## 12.Ordering information


ww: Batch Code

| Order Code | Marking | Package | Base QTY | Delivery Mode |
|---|---|---|---|---|
| UMW PESD5V0S1UJ | 1Q | SOD-323F | 3000 | Tape and reel |
| UMW PESD12VS1UJ | 1R | SOD-323F | 3000 | Tape and reel |

## 13.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.