# UMW UCLAMP3301D

## 1.Description

The UCIAMP3301D is in a SOD-323 package and will protect one Bidirectional line. They give the designer the flexibility to protect one line in applications where arrays are not practical. They may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge)

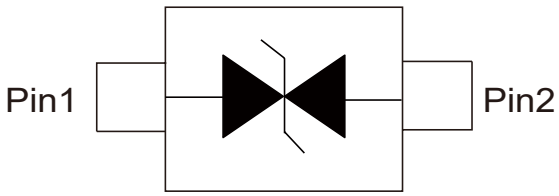
## 2.Applications

- Cell Phone Handsets and Accessories
- Laser Diode Protection
- Notebooks, Desktops, & Servers
- Portable Instrumentation
- Analog Inputs

## 3.Features

- 100 Watts peak pulse power (tp = 8/20μs) Transient protection for data lines to
- IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- IEC 61000-4-4 (EFT) 40A (tp = 5/50ns)
- IEC 61000-4-5 (Lightning) 10A (tp = 8/20μs)
- Small package for use in portable electronics
- Solid-state silicon-avalanche technology
- Suitable replacement for MLVs in ESD protectionapplications
- Protects one line
- Low clamping voltage
- Working voltages: 3.3V
- Low leakage current

## 4.Pinning information




**SOD-323**

## 5.Absolute Maximum Rating

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power (tp=8/20μs) | $P_{PK}$ | 100 | Watts |
| Peak Pulse Current (tp=8/20μs) | $I_{PP}$ | 10 | A |
| ESD Voltage (HBM Waveform per IEC 61000-4-2) | $V_{PP}$ | 30 | kV |
| Junction Temperature | $T_J$ | -55 to 125 | °C |
| Storage Temperature | $T_{STG}$ | -55 to 150 | °C |

## 6.Electrical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Reverse Stand-Off Voltage | $V_{RWM}$ | | | | 3.3 | V |
| Punch-Through Voltage | $V_{PT}$ | $I_{PT}$=2μA | 3.5 | | | V |
| Snap-Back Voltage | $V_{SB}$ | $I_{SB}$=50mA | 2.8 | | | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$=3.3V, T=25°C | | | 0.5 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$=1A, tp=8/20μs | | | 4.5 | V |
| | | $I_{PP}$=5A, tp=8/20μs | | | 5.5 | V |
| | | $I_{PP}$=10A, tp=8/20μs | | | 9.5 | V |
| Junction Capacitance | $C_J$ | $V_R$=0V, f=1MHz | | | 50 | pF |

## 7.Typical Characteristic

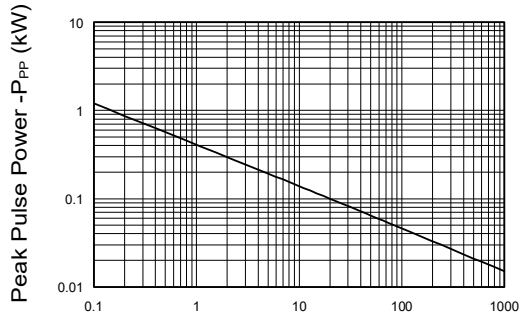



Figure 1: Clamping Voltage vs. Peak Pulse Current

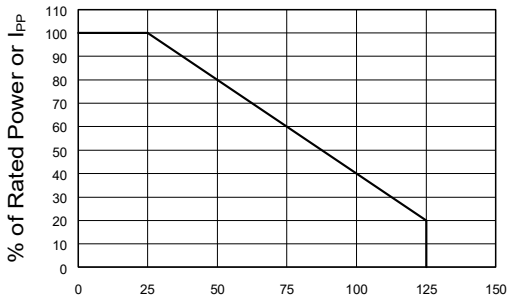



Figure 2: Power Derating Curve

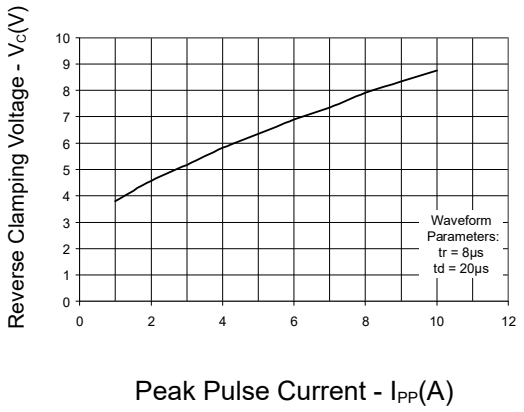



Figure 3: Insertion Loss S21

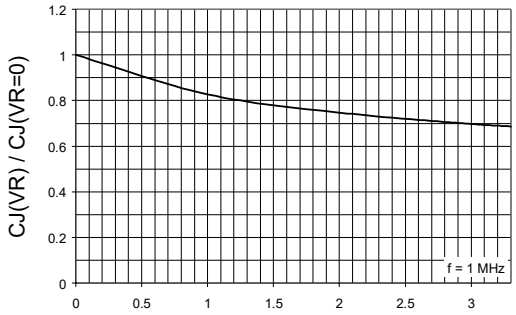



Figure 4: Normalized Capacitance vs. Reverse Voltage

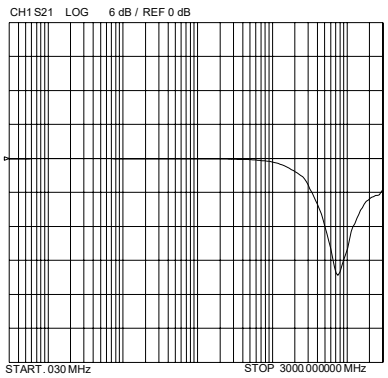


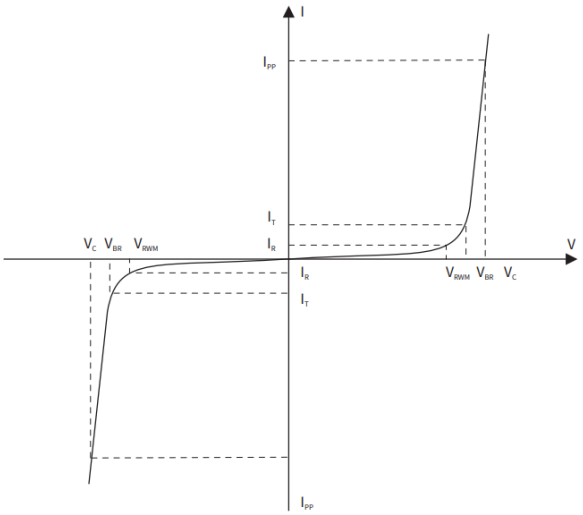

Figure 5: Insertion Loss S21

## 8.Applications Information

**Device Connection Options**

The ULCAMP3301Dis designed to protect one I/O,or power supply line. It will present a high impedance to the protected line up to 3.3 volts. It will “turn on” when the line voltage exceeds 3.5 volts. The device is Bidirectional and may be used on lines where the signal polarity is above ground. Due to the “snap-back” characteristics of the low voltage TVS, it is not recommended that the I/O line be directly connected to a DC source greater than snapback votlage (VSB) as the device can latch on as described below.

EPD TVS IV Characteristic Curve



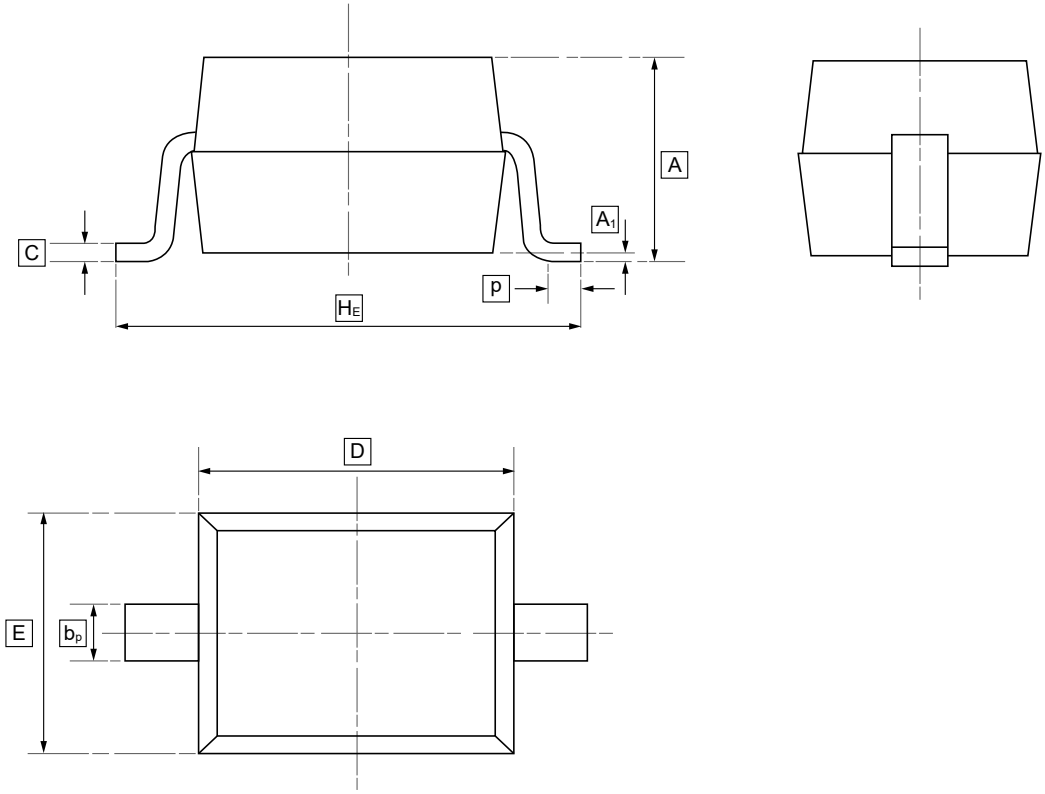

**EPD TVS Characteristics**

The ULCAMP3301D is constructed using proprietary EPD technology. The structure of the EPD TVS is vastly different from the traditional pn-junction devices. At voltages below 5V, high leakage current and junction capacitance render conventional ava-lanche technology impractical for most applications. However, by utilizing the EPD technology, the ULCAMP3301D can effective□ly operate at 3.3V while maintaining excellent electrical characteristics.

The EPD TVS employs a complex nppn structure in contrast to the pn structure normally found in traditional silicon-avalanche TVS diodes. Since the EPD TVS devices use a 4-layer structure, they exhibit a slightly different IV characteristic curve when compared to conventional devices. During normal operation, the device represents a high impedance to the circuit up to the device working voltage ($V_{RWM}$). During an ESD event, the device will begin to conduct and will enter a low impedance state when the punch through voltage ($V_{PT}$) is exceeded. Unlike a conventional device, the low voltage TVS will exhibit a slight negative resistance characteristic as it conducts current. This characteristic aids in lowering the clamping voltage of the device, but must be considered in applications where DC voltages are present.

When the TVS is conducting current, it will exhibit a slight “snap-back” or negative resistance characteristics due to its structures. This point is defined on the curve by the snap-back voltage ($V_{SB}$) and snap-backcurrent ($I_{SB}$). To return to a non-conducting state, the current through the device must fall below the ISB (approximately <50mA) and the voltage must fall below the $V_{SB}$ (normally 2.8 volts for a 3.3V device). If a 3.3V TVS is connected to 3.3V DC source, it will never fall below the snap-back voltage of 2.8V and will therefore stay in a conducting state.

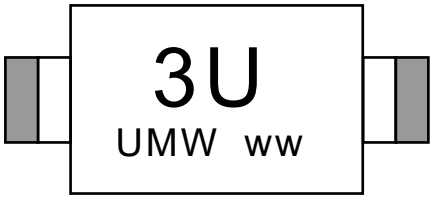
## 9.SOD-323 Package Outline Dimensions




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

| Symbol | A | $b_p$ | C | D | E | $H_E$ | $A_1$ | p |
|---|---|---|---|---|---|---|---|---|
| **Min** | 0.80 | 0.25 | 0.10 | 1.50 | 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 |

## 10.Ordering Information




ww: Batch Code

| Order Code | Package | Base QTY | Delivery Mode |
|---|---|---|---|
| UMW UCLAMP3301D | SOD-323 | 3000 | Tape and reel |

## 11.Disclaimer

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