



## WS12DUC-B

### Transient Voltage Suppressor

#### Features

- 216Watts Peak Pulse Power per Line ( $t_p = 8/20\mu s$ )
- Protects one I/O or power line
- Low Clamping Voltage
- Working Voltage: 12 V
- Bidirectional Configuration



#### IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD)  $\pm 30kV$  (air),  $\pm 30kV$  (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 8A (8/20 $\mu s$ )

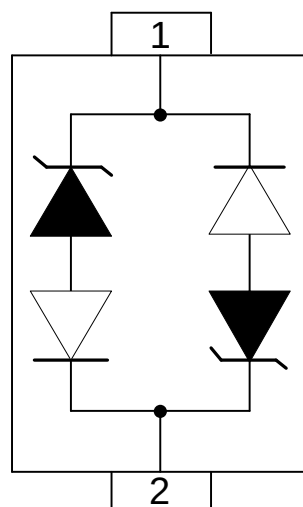
#### Mechanical Characteristics

- JEDEC SOD-323 package
- Marking : Marking Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant

#### Applications

- Ethernet - 10/100/1000 Base T
- Cellular Phones
- Handheld - Wireless Systems
- Personal Digital Assistant (PDA)
- USB Interface

#### Schematic & PIN Configuration



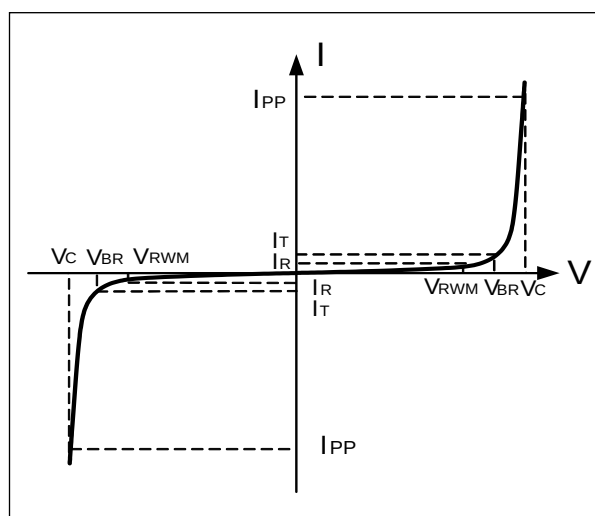
**BIDIRECTIONAL**

## Absolute Maximum Rating

| Rating                                   | Symbol    | Value        | Units |
|------------------------------------------|-----------|--------------|-------|
| Peak Pulse Power ( $t_p = 8/20\mu s$ )   | $P_{PP}$  | 216          | Watts |
| Peak Pulse Current ( $t_p = 8/20\mu s$ ) | $I_{PP}$  | 8            | A     |
| Operating Temperature                    | $T_J$     | -55 to + 125 | °C    |
| Storage Temperature                      | $T_{STG}$ | -55 to +150  | °C    |

## Electrical Parameters

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $I_{PP}$  | Reverse Peak Pulse Current          |
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $V_{RWM}$ | Reverse Stand-Off Voltage           |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |



## Electrical Characteristics(T=25°C unless otherwise noted)

| WS12DUC-B                         |           |                                       |         |         |         |          |
|-----------------------------------|-----------|---------------------------------------|---------|---------|---------|----------|
| Parameter                         | Symbol    | Conditions                            | Minimum | Typical | Maximum | Units    |
| Reverse Stand-Off Voltage         | $V_{RWM}$ |                                       |         |         | 12      | V        |
| Reverse Breakdown Voltage         | $V_{BR}$  | $I_T = 1mA$                           | 13.3    |         |         | V        |
| Reverse Leakage Current           | $I_R$     | $V_{RWM} = 12V$                       |         |         | 200     | nA       |
| Clamping Voltage                  | $V_C$     | $I_{PP} = 8A, t_p = 8/20\mu s$        |         | 25.4    | 27      | V        |
| Dynamic Resistance <sup>1,2</sup> | $R_{DYN}$ | TLP=0.2/100ns                         |         | 0.58    |         | $\Omega$ |
| ESD Clamping Voltage <sup>1</sup> | $V_C$     | $I_{PP} = 4A, t_p = 0.2/100ns$ (TLP)  |         | 18.3    |         | V        |
| ESD Clamping Voltage <sup>1</sup> | $V_C$     | $I_{PP} = 16A, t_p = 0.2/100ns$ (TLP) |         | 25.3    |         | V        |
| Junction Capacitance              | $C_j$     | $V_R = 0V, f = 1MHz$                  |         | 0.36    | 0.6     | pF       |

**Note:** 1、TLP Setting :  $t_p = 100ns, t_r = 0.2ns, I_{TLP}$  and  $V_{TLP}$  sample window:  $t_1 = 70ns$  to  $t_2 = 90ns$ .

2、Dynamic resistance calculated from  $I_{PP} = 4A$  to  $I_{PP} = 16A$  using "Best Fit"

# Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

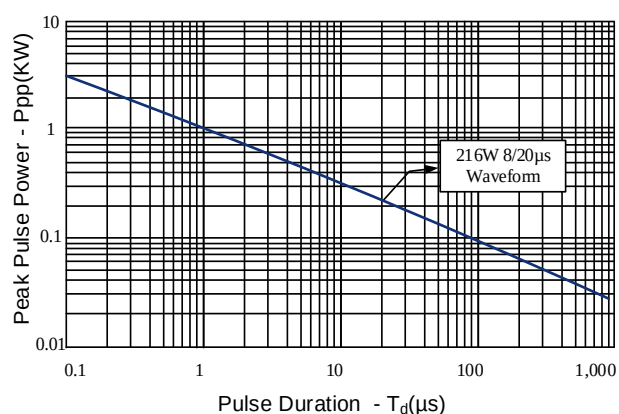


Figure 2: Power Derating Curve

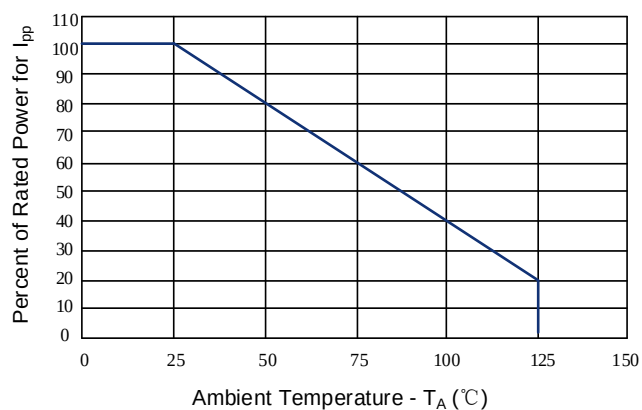


Figure 3: Clamping Voltage vs. Peak Pulse Current

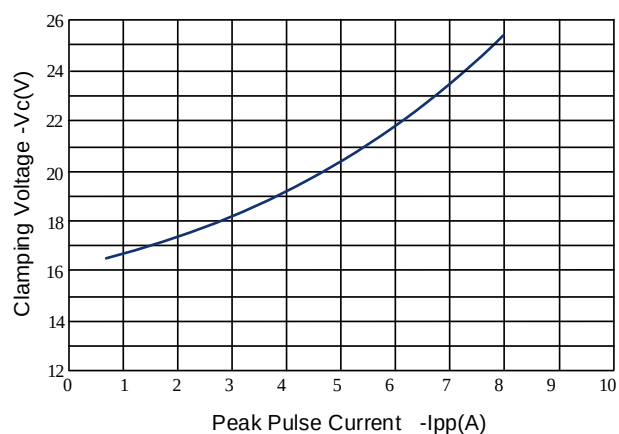


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

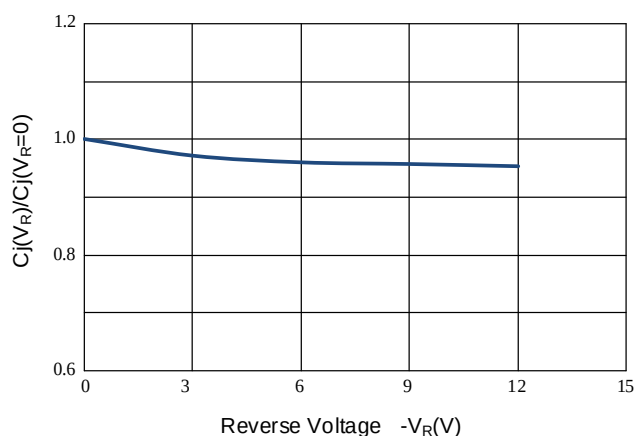


Figure 5: TLP Positive I-V Curve

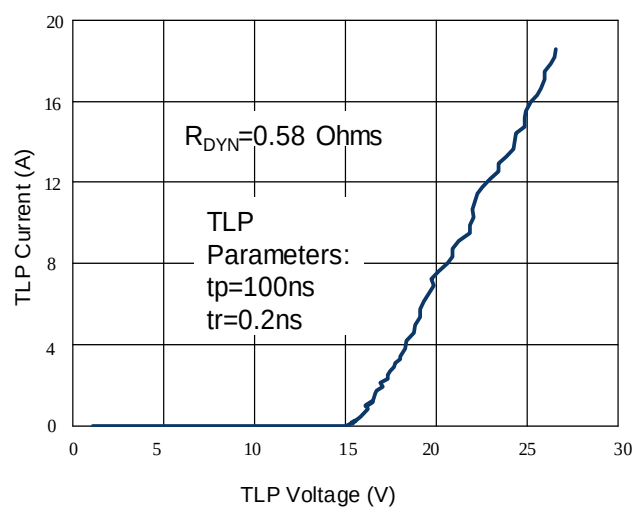
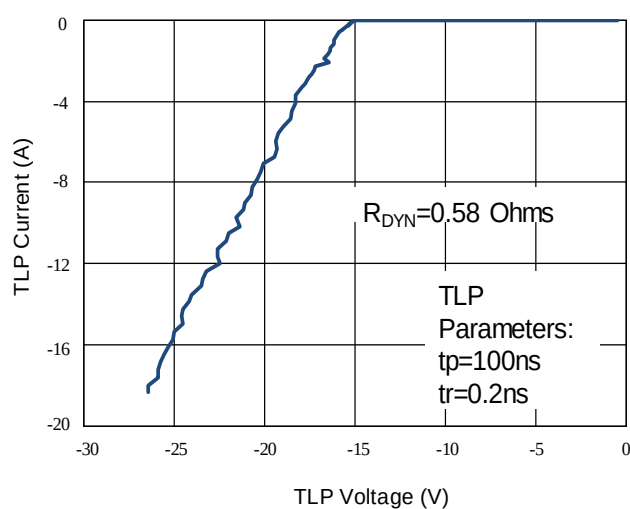
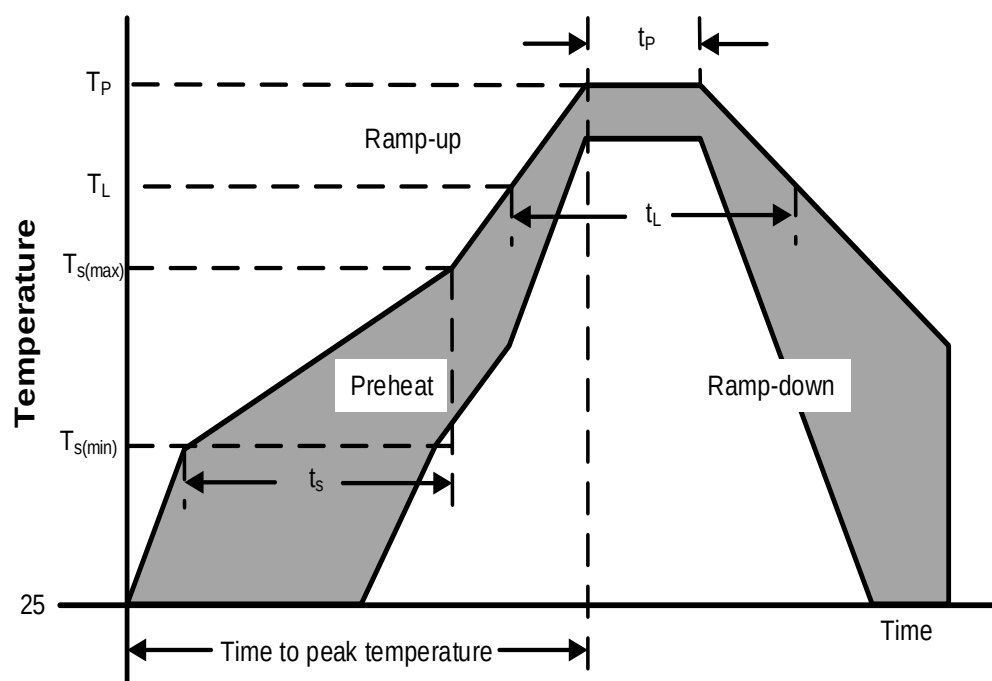


Figure 6: TLP Negative I-V Curve



## Soldering Parameters

| Reflow Condition                                       |                                  | Pb – Free assembly |
|--------------------------------------------------------|----------------------------------|--------------------|
| Pre Heat                                               | Temperature Min ( $T_{s(min)}$ ) | 150°C              |
|                                                        | Temperature Max ( $T_{s(max)}$ ) | 200°C              |
|                                                        | Time (min to max) ( $t_s$ )      | 60 – 190 secs      |
| Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak |                                  | 5°C/second max     |
| $T_{s(max)}$ to $T_L$ — Ramp-up Rate                   |                                  | 5°C/second max     |
| Reflow                                                 | Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                        | Temperature ( $t_L$ )            | 60 – 150 seconds   |
| Peak Temperature ( $T_P$ )                             |                                  | 260+0/-5 °C        |
| Time within actual peak Temperature ( $t_p$ )          |                                  | 20 – 40 seconds    |
| Ramp-down Rate                                         |                                  | 5°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )                |                                  | 8 minutes Max.     |
| Do not exceed                                          |                                  | 280°C              |



## Outline Drawing – SOD-323

Package Drawing SOD-323

PACKAGE OUTLINE

The image shows three views of the SOD-323 package: a top view, a side view, and a cross-sectional view. The top view shows a central rectangle with two smaller rectangles on either side, labeled 1 and 2. Dimensions A, B, and C are indicated. The side view shows the package profile with dimensions D, E, and F. The cross-sectional view shows the internal structure with dimensions L, L1, and H.

SOD-323

| SYMBOL | MILLIMETERS |      |
|--------|-------------|------|
|        | MIN         | MAX  |
| A      | 1.52        | 1.80 |
| B      | 0.25        | 0.40 |
| C      | 2.46        | 2.71 |
| D      | 0.80        | 1.16 |
| E      | 1.11        | 1.40 |
| F      | 0.08        | 0.20 |
| L      | 0.475 REF   |      |
| L1     | 0.25        | 0.40 |
| H      | 0.00        | 0.10 |

MOUNTING PAD

The image shows a technical drawing of the mounting pad. It consists of two square pads. The distance between the centers of the pads is 0.118" (3.00mm). The width of each pad is 0.031" (0.80mm). The height of each pad is 0.031" (0.80mm).

**Notes:**  
Controlling Dimension: Millimeter.

## Marking Codes

|              |                                                                                     |
|--------------|-------------------------------------------------------------------------------------|
| Part Number  | WS12DUC-B                                                                           |
| Marking Code |  |

## Package Information

Qty: 3k/Reel

## CONTACT INFORMATION

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For additional information, please contact your local Sales Representative.

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Specifications are subject to change without notice.  
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.  
Users should verify actual device performance in their specific applications.