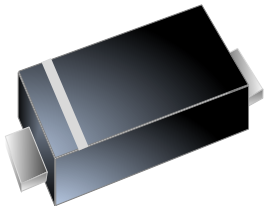
# WS4.5D3HV

**Transient Voltage Suppressor**

## Features

- 2550 Watts Peak Pulse Power per Line ($t_p$ = 8/20μs)
- Protects one I/O or power line
- Low Clamping Voltage
- Working Voltage: 4.7 V
- Low Leakage Current



SOD-323F

## IEC COMPATIBILITY (EN61000-4)

- **IEC 61000-4-2 (ESD) ±30kV (air), ±30kV (contact)**
- **IEC 61000-4-4 (EFT) 40A (5/50ns)**
- **IEC 61000-4-5 (Lightning) 170A (8/20μs)**

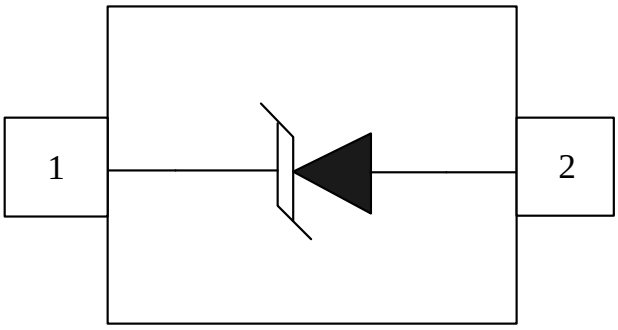
## Mechanical Characteristics

- JEDEC SOD-323F package
- Marking : Marking Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant & HF
- Device meets MSL3 requirement

## Applications

- Laptop Computers
- Cellular Phones
- Digital Cameras
- Personal Digital Assistants (PDAs)

## Schematic & PIN Configuration

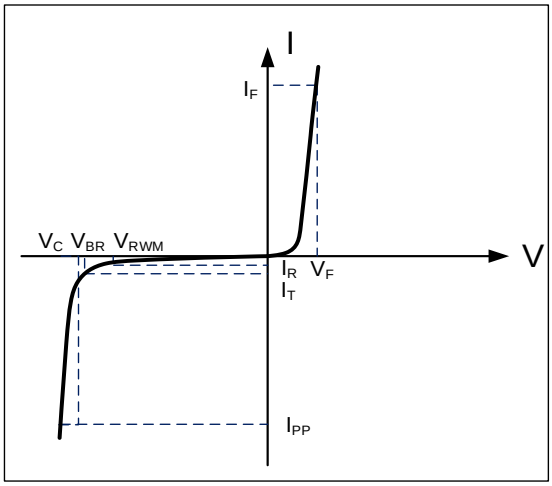



SOD-323F (Top View)

| Absolute Maximum Rating | | | |
|---|---|---|---|
| **Rating** | **Symbol** | **Value** | **Units** |
| Peak Pulse Power（$t_p$ =8/20μs） | $P_{PP}$ | 2550 | Watts |
| Peak Pulse Current（$t_p$ =8/20μs） | $I_{PP}$ | 170 | 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 |
| $I_F$ | Forward Current |
| $V_F$ | Forward Voltage @ $I_F$ |




## Electrical Characteristics(T=25℃ unless otherwise noted)

| WS4.5D3HV | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Conditions** | **Minimum** | **Typical** | **Maximum** | **Units** |
| Reverse Stand-Off Voltage | $V_{RWM}$ | | | | 4.7 | V |
| Reverse Breakdown Voltage | $V_{BR}$ | $I_T$=1mA | 4.8 | | 7.0 | V |
| Forward Voltage | $V_F$ | $I_F$=10 mA | 0.6 | | 1.0 | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$=4.7V | | | 500 | nA |
| Clamping Voltage | $V_C$ | $I_{PP}$=1A, $t_p$=8/20μs | | | 8.5 | V |
| Clamping Voltage | $V_C$ | $I_{PP}$=170A, $t_p$=8/20μs | | | 15 | V |
| Dynamic Resistance[1,2] | $R_{DYN}$ | TLP=0.2/100ns | | 0.04 | | Ω |
| ESD Clamping Voltage[1] | $V_C$ | IPP = 4A,<br>tp = 0.2/100ns (TLP) | | 6.1 | | V |
| ESD Clamping Voltage[1] | $V_C$ | IPP = 16A,<br>tp = 0.2/100ns (TLP) | | 6.6 | | V |
| Junction Capacitance | $C_j$ | $V_R$ = 0V, f= 1MHz | | 485 | 600 | pF |

Notes：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**

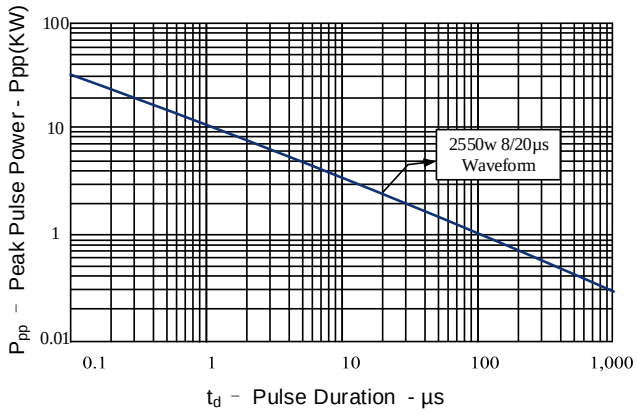



**Figure 2: Power Derating Curve**

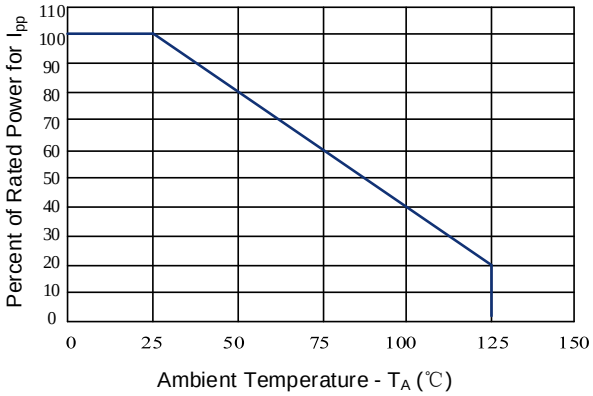



**Figure 3: Clamping Voltage vs. Peak Pulse Current**

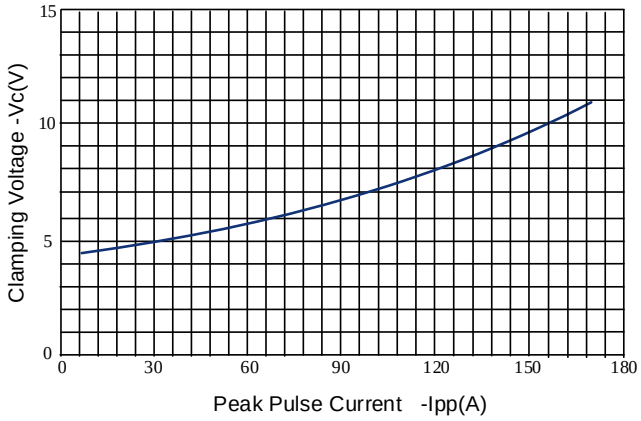



**Figure 4: Normalized Junction Capacitance vs. Reverse Voltage**

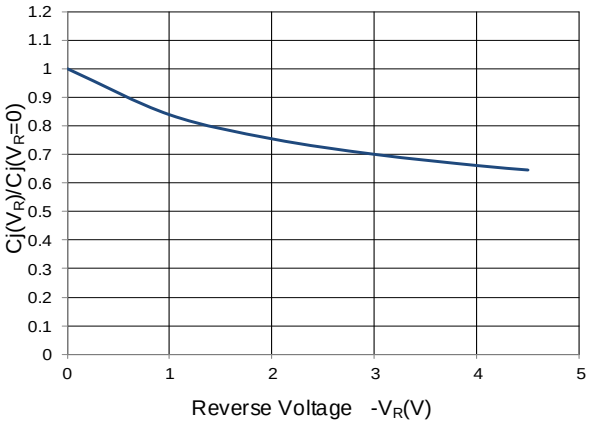



**Figure 5: Pulse Waveform**

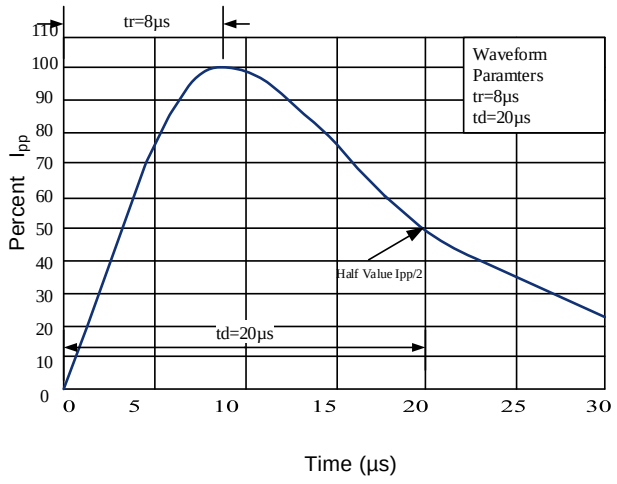
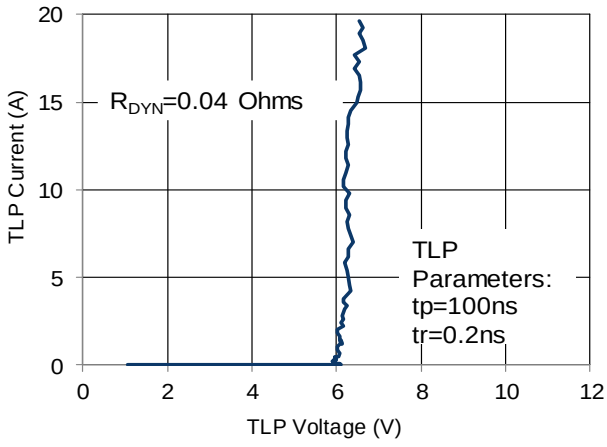
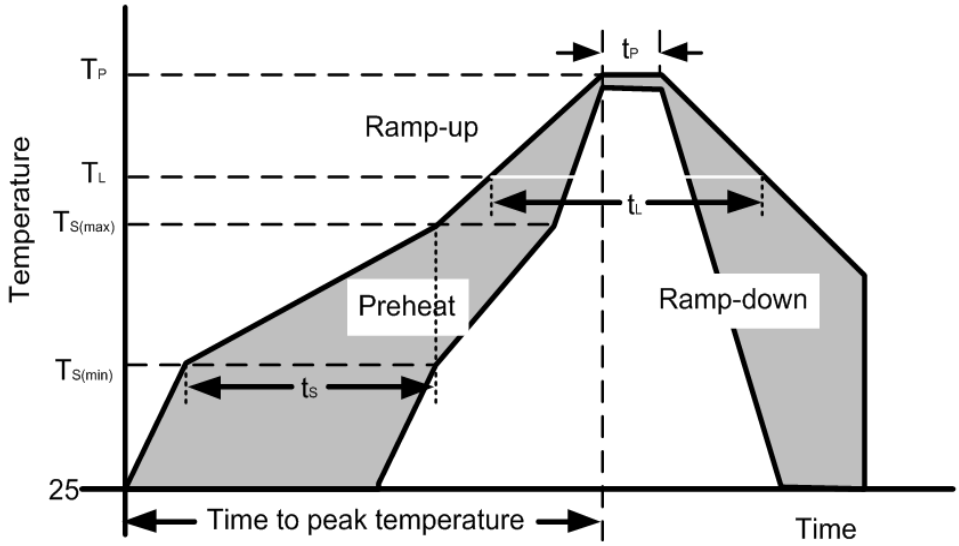



**Figure 6: TLP Curve**



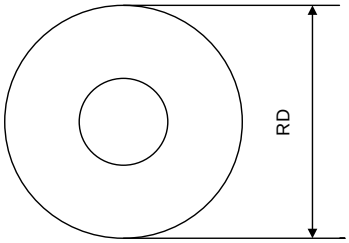
## Soldering Parameters

| 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) (ts ) | 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 |

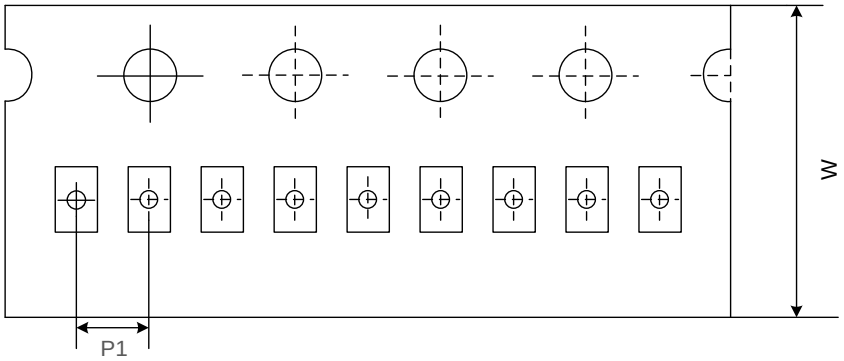


## Tape And Reel Information

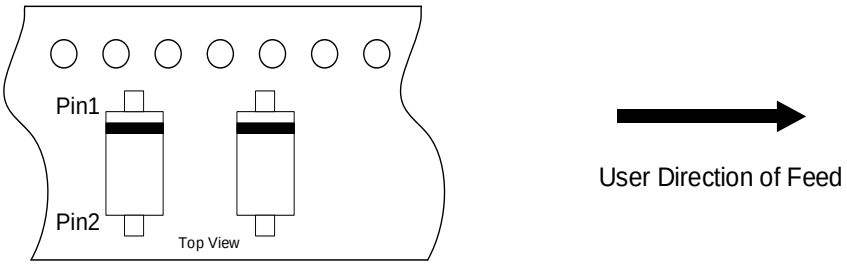
**Reel Dimensions**




**Tape Dimensions**



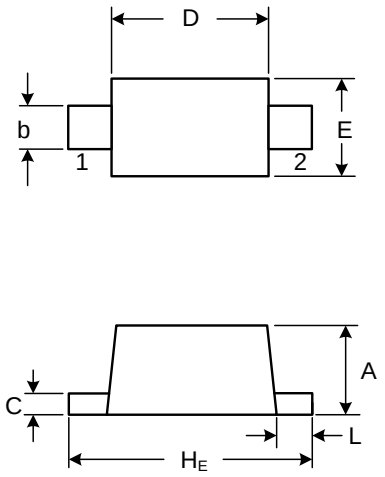

**Quadrant Assignments For PIN1 Orientation In Tape**

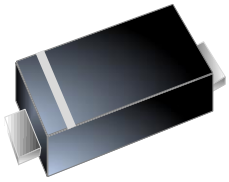



| | | |
|---|---|---|
| RD | Reel Dimensions | 7 inch |
| W | Overall width of the carrier tape | 8 mm |
| P1 | Pitch between successive cavity centers | 4mm |

## Outline Drawing – SOD-323F

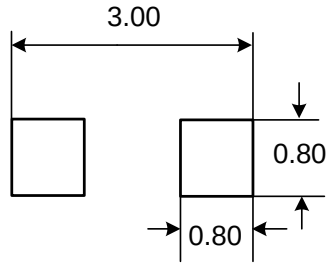
### PACKAGE OUTLINE



SOD-323F

| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | TYP | MAX |
| A | 0.60 | 0.65 | 0.75 |
| b | 0.25 | 0.30 | 0.40 |
| C | 0.06 | 0.13 | 0.21 |
| D | 1.60 | 1.70 | 1.80 |
| E | 1.15 | 1.25 | 1.35 |
| $H_E$ | 2.30 | 2.50 | 2.70 |
| L | 0.30 | 0.40 | 0.50 |




DIMENSIONS: MILLIMETERS

**Notes:**
Controlling Dimension: Millimeter.

## Marking Codes

| Part Number | Marking Code |
|---|---|
| WS4.5D3HV |  |



HQ=Specific Device Code
X=Annual production times

## Package Information

Qty：3k/Reel

### CONTACT INFORMATION

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WAYON website: **http://www.way-on.com**
For additional information, please contact your local Sales Representative.

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## Product Specification Statement

1. The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

2. The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.

3. WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

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