

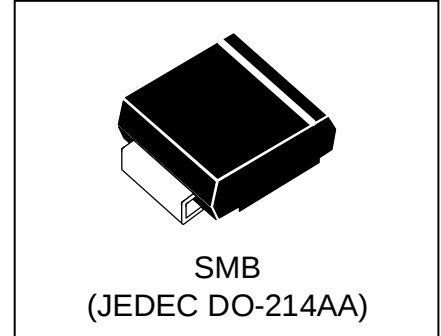


# WSxxP6SMB(-B)

## Power Transient Voltage Suppressor

### Features

- 600 watts Peak Pulse Power (10/1000μs)
- Unidirectional and Bidirectional Protection
- Fast Response Time : Typically < 1ns
- Excellent Clamping Capability
- Built-in Strain relief
- Low inductance
- Low profile package
- IEC 61000-4-2 (ESD) ±30kV(air), ±30kV(contact)
- MSL: Level 1



### Mechanical Characteristics

- JEDEC DO-214AA package
- Molding compound flammability rating: UL 94V-0
- Marking : Marking Code
- Packaging : Tape and Reel per EIA 481
- RoHS &HF &UL497B Compliant

### Applications

- I/O Interfaces
- Power lines
- Telecommunication
- Computers & Consumer Electronics
- Industrial Electronics

| Absolute Maximum Rating (Ta=25°C Unless otherwise specified)          |                  |                                |       |
|-----------------------------------------------------------------------|------------------|--------------------------------|-------|
| Rating                                                                | Symbol           | Value                          | Units |
| Peak Pulse Power (tp =10/1000μs) (see Note1,2& 3)                     | P <sub>PPM</sub> | 600                            | Watts |
| Peak pulse current (10/1000μs) (see Note2&3)                          | I <sub>PPM</sub> | See Electrical Characteristics | A     |
| Peak Forward surge current (see Note4&5)                              | I <sub>FSM</sub> | 100                            | A     |
| Power Dissipation on infinite heat sink T <sub>L</sub> = 50 °C (Fig5) | P <sub>D</sub>   | 5.0                            | W     |
| Operating Junction Temperature range                                  | T <sub>J</sub>   | -65 to + 150                   | °C    |
| Storage Temperature range                                             | T <sub>STG</sub> | -65 to + 150                   | °C    |

**Note1:** Peak Pulse Power Rating as Pulse Width, per Fig1.

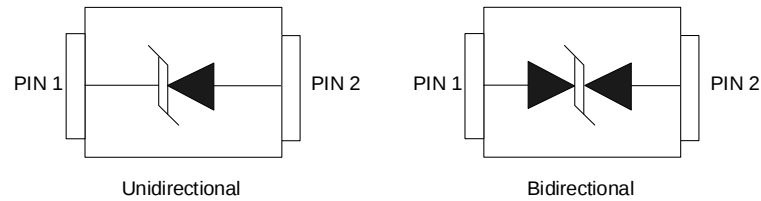
**Note2:** Peak Pulse Power or Current Derated above TA=25°C Per Fig. 2 and Non-Repetitive Current Pulse, Per Fig.3.

**Note3:** Mounted on 5.0x5.0mm<sup>2</sup> copper pad to each terminal.

**Note4:** 8.3ms Single Half Sine Wave or Equivalent Square Wave.

**Note5:** Maximum Forward Surge Current only for Unidirectional Device per Fig6.

## Pin Configuration



## Electrical Characteristics

| Part Number |              | Reverse<br>Stand off<br>Voltage<br>$V_{RWM}$<br>(Volts) | Breakdown<br>Voltage<br>$V_{BR}(\text{Volts})@I_T$ |       | Test<br>Current<br>$I_T$<br>(mA) | Maximum<br>Clamping<br>Voltage<br>$V_C@I_{PP}$<br>(Volts) | Maximum<br>Peak Pulse<br>Current<br>$I_{PP}$<br>(Amps) | Maximum<br>Reverse<br>Leakage<br>$I_R@V_{RWM}$<br>( $\mu A$ ) |
|-------------|--------------|---------------------------------------------------------|----------------------------------------------------|-------|----------------------------------|-----------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|
| UNI-POLAR   | BI-POLAR     |                                                         | MIN                                                | MAX   |                                  |                                                           |                                                        |                                                               |
| WS5.0P6SMB  | WS5.0P6SMB-B | 5.0                                                     | 6.40                                               | 7.07  | 10                               | 9.2                                                       | 65.2                                                   | 800                                                           |
| WS6.0P6SMB  | WS6.0P6SMB-B | 6.0                                                     | 6.67                                               | 7.37  | 10                               | 10.3                                                      | 58.3                                                   | 800                                                           |
| WS6.5P6SMB  | WS6.5P6SMB-B | 6.5                                                     | 7.22                                               | 7.98  | 10                               | 11.2                                                      | 53.6                                                   | 500                                                           |
| WS7.0P6SMB  | WS7.0P6SMB-B | 7.0                                                     | 7.78                                               | 8.60  | 10                               | 12.0                                                      | 50.0                                                   | 200                                                           |
| WS7.5P6SMB  | WS7.5P6SMB-B | 7.5                                                     | 8.33                                               | 9.21  | 1                                | 12.9                                                      | 46.5                                                   | 100                                                           |
| WS8.0P6SMB  | WS8.0P6SMB-B | 8.0                                                     | 8.89                                               | 9.83  | 1                                | 13.6                                                      | 44.1                                                   | 50                                                            |
| WS8.5P6SMB  | WS8.5P6SMB-B | 8.5                                                     | 9.44                                               | 10.40 | 1                                | 14.4                                                      | 41.7                                                   | 20                                                            |
| WS9.0P6SMB  | WS9.0P6SMB-B | 9.0                                                     | 10.00                                              | 11.10 | 1                                | 15.4                                                      | 39.0                                                   | 10                                                            |
| WS10P6SMB   | WS10P6SMB-B  | 10                                                      | 11.10                                              | 12.30 | 1                                | 17.0                                                      | 35.3                                                   | 5                                                             |
| WS11P6SMB   | WS11P6SMB-B  | 11                                                      | 12.20                                              | 13.50 | 1                                | 18.2                                                      | 33.0                                                   | 5                                                             |
| WS12P6SMB   | WS12P6SMB-B  | 12                                                      | 13.30                                              | 14.7  | 1                                | 19.9                                                      | 30.2                                                   | 5                                                             |
| WS13P6SMB   | WS13P6SMB-B  | 13                                                      | 14.40                                              | 15.90 | 1                                | 21.5                                                      | 27.9                                                   | 1                                                             |
| WS14P6SMB   | WS14P6SMB-B  | 14                                                      | 15.60                                              | 17.20 | 1                                | 23.2                                                      | 25.9                                                   | 1                                                             |
| WS15P6SMB   | WS15P6SMB-B  | 15                                                      | 16.70                                              | 18.50 | 1                                | 24.4                                                      | 24.6                                                   | 1                                                             |
| WS16P6SMB   | WS16P6SMB-B  | 16                                                      | 17.80                                              | 19.70 | 1                                | 26.0                                                      | 23.1                                                   | 1                                                             |
| WS17P6SMB   | WS17P6SMB-B  | 17                                                      | 18.90                                              | 20.90 | 1                                | 27.6                                                      | 21.7                                                   | 1                                                             |
| WS18P6SMB   | WS18P6SMB-B  | 18                                                      | 20.00                                              | 22.10 | 1                                | 29.2                                                      | 20.5                                                   | 1                                                             |
| WS20P6SMB   | WS20P6SMB-B  | 20                                                      | 22.20                                              | 24.50 | 1                                | 32.4                                                      | 18.5                                                   | 1                                                             |
| WS22P6SMB   | WS22P6SMB-B  | 22                                                      | 24.40                                              | 26.90 | 1                                | 35.5                                                      | 16.9                                                   | 1                                                             |
| WS24P6SMB   | WS24P6SMB-B  | 24                                                      | 26.70                                              | 29.50 | 1                                | 38.9                                                      | 15.4                                                   | 1                                                             |
| WS26P6SMB   | WS26P6SMB-B  | 26                                                      | 28.90                                              | 31.90 | 1                                | 42.1                                                      | 14.3                                                   | 1                                                             |
| WS28P6SMB   | WS28P6SMB-B  | 28                                                      | 31.10                                              | 34.40 | 1                                | 45.4                                                      | 13.2                                                   | 1                                                             |
| WS30P6SMB   | WS30P6SMB-B  | 30                                                      | 33.30                                              | 36.80 | 1                                | 48.4                                                      | 12.4                                                   | 1                                                             |
| WS33P6SMB   | WS33P6SMB-B  | 33                                                      | 36.70                                              | 40.60 | 1                                | 53.3                                                      | 11.3                                                   | 1                                                             |
| WS36P6SMB   | WS36P6SMB-B  | 36                                                      | 40.00                                              | 44.20 | 1                                | 58.1                                                      | 10.3                                                   | 1                                                             |
| WS40P6SMB   | WS40P6SMB-B  | 40                                                      | 44.40                                              | 49.10 | 1                                | 64.5                                                      | 9.3                                                    | 1                                                             |

## Electrical Characteristics (Cont.)

| Part Number |              | Reverse<br>Stand off<br>Voltage<br>$V_{RWM}$<br>(Volts) | Breakdown<br>Voltage<br>$V_{BR}(\text{Volts})@I_T$ |       | Test<br>Current<br>$I_T$<br>(mA) | Maximum<br>Clamping<br>Voltage<br>$V_C@I_{PP}$<br>(Volts) | Maximum<br>Peak Pulse<br>Current<br>$I_{PP}$<br>(Amps) | Maximum<br>Reverse<br>Leakage<br>$I_R@V_{RWM}$<br>( $\mu A$ ) |
|-------------|--------------|---------------------------------------------------------|----------------------------------------------------|-------|----------------------------------|-----------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|
|             |              |                                                         | MIN                                                | MAX   |                                  |                                                           |                                                        |                                                               |
| WS43P6SMB   | WS43P6SMB-B  | 43                                                      | 47.80                                              | 52.80 | 1                                | 69.4                                                      | 8.6                                                    | 1                                                             |
| WS45P6SMB   | WS45P6SMB-B  | 45                                                      | 50.00                                              | 55.30 | 1                                | 72.7                                                      | 8.3                                                    | 1                                                             |
| WS48P6SMB   | WS48P6SMB-B  | 48                                                      | 53.30                                              | 58.90 | 1                                | 77.4                                                      | 7.8                                                    | 1                                                             |
| WS51P6SMB   | WS51P6SMB-B  | 51                                                      | 56.70                                              | 62.70 | 1                                | 82.4                                                      | 7.3                                                    | 1                                                             |
| WS54P6SMB   | WS54P6SMB-B  | 54                                                      | 60.00                                              | 66.30 | 1                                | 87.1                                                      | 6.9                                                    | 1                                                             |
| WS58P6SMB   | WS58P6SMB-B  | 58                                                      | 64.40                                              | 71.20 | 1                                | 93.6                                                      | 6.4                                                    | 1                                                             |
| WS60P6SMB   | WS60P6SMB-B  | 60                                                      | 66.70                                              | 73.70 | 1                                | 96.8                                                      | 6.2                                                    | 1                                                             |
| WS64P6SMB   | WS64P6SMB-B  | 64                                                      | 71.10                                              | 78.60 | 1                                | 103                                                       | 5.8                                                    | 1                                                             |
| WS70P6SMB   | WS70P6SMB-B  | 70                                                      | 77.80                                              | 86.00 | 1                                | 113                                                       | 5.3                                                    | 1                                                             |
| WS75P6SMB   | WS75P6SMB-B  | 75                                                      | 83.30                                              | 92.10 | 1                                | 121                                                       | 5.0                                                    | 1                                                             |
| WS78P6SMB   | WS78P6SMB-B  | 78                                                      | 86.70                                              | 95.80 | 1                                | 126                                                       | 4.8                                                    | 1                                                             |
| WS85P6SMB   | WS85P6SMB-B  | 85                                                      | 94.40                                              | 104   | 1                                | 137                                                       | 4.4                                                    | 1                                                             |
| WS90P6SMB   | WS90P6SMB-B  | 90                                                      | 100                                                | 111   | 1                                | 146                                                       | 4.1                                                    | 1                                                             |
| WS100P6SMB  | WS100P6SMB-B | 100                                                     | 111                                                | 123   | 1                                | 162                                                       | 3.7                                                    | 1                                                             |
| WS110P6SMB  | WS110P6SMB-B | 110                                                     | 122                                                | 135   | 1                                | 177                                                       | 3.4                                                    | 1                                                             |
| WS120P6SMB  | WS120P6SMB-B | 120                                                     | 133                                                | 147   | 1                                | 193                                                       | 3.1                                                    | 1                                                             |
| WS130P6SMB  | WS130P6SMB-B | 130                                                     | 144                                                | 159   | 1                                | 209                                                       | 2.9                                                    | 1                                                             |
| WS150P6SMB  | WS150P6SMB-B | 150                                                     | 167                                                | 185   | 1                                | 243                                                       | 2.5                                                    | 1                                                             |
| WS160P6SMB  | WS160P6SMB-B | 160                                                     | 178                                                | 197   | 1                                | 259                                                       | 2.3                                                    | 1                                                             |
| WS170P6SMB  | WS170P6SMB-B | 170                                                     | 189                                                | 209   | 1                                | 275                                                       | 2.2                                                    | 1                                                             |
| WS180P6SMB  | WS180P6SMB-B | 180                                                     | 201                                                | 222   | 1                                | 292                                                       | 2.1                                                    | 1                                                             |
| WS200P6SMB  | WS200P6SMB-B | 200                                                     | 224                                                | 247   | 1                                | 324                                                       | 1.9                                                    | 1                                                             |
| WS220P6SMB  | WS220P6SMB-B | 220                                                     | 246                                                | 272   | 1                                | 356                                                       | 1.7                                                    | 1                                                             |
| WS250P6SMB  | WS250P6SMB-B | 250                                                     | 279                                                | 309   | 1                                | 405                                                       | 1.5                                                    | 1                                                             |
| WS300P6SMB  | WS300P6SMB-B | 300                                                     | 335                                                | 371   | 1                                | 486                                                       | 1.3                                                    | 1                                                             |
| WS350P6SMB  | WS350P6SMB-B | 350                                                     | 391                                                | 432   | 1                                | 567                                                       | 1.1                                                    | 1                                                             |
| WS400P6SMB  | WS400P6SMB-B | 400                                                     | 447                                                | 494   | 1                                | 648                                                       | 0.9                                                    | 1                                                             |
| WS440P6SMB  | WS440P6SMB-B | 440                                                     | 492                                                | 543   | 1                                | 713                                                       | 0.9                                                    | 1                                                             |

## Typical Characteristics

Figure 1: Peak Pulse Power Rating Curve

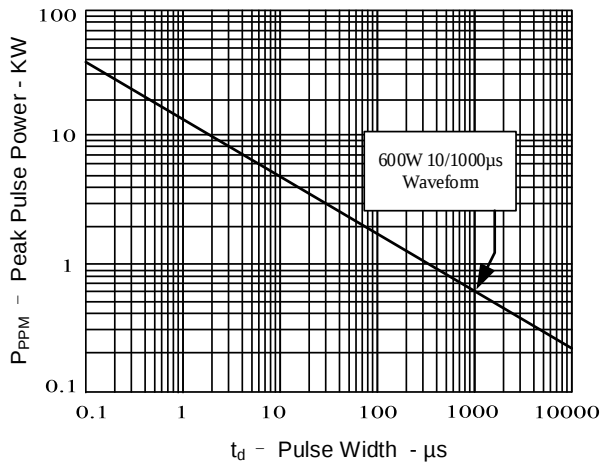


Figure 2: Pulse Derating Curve

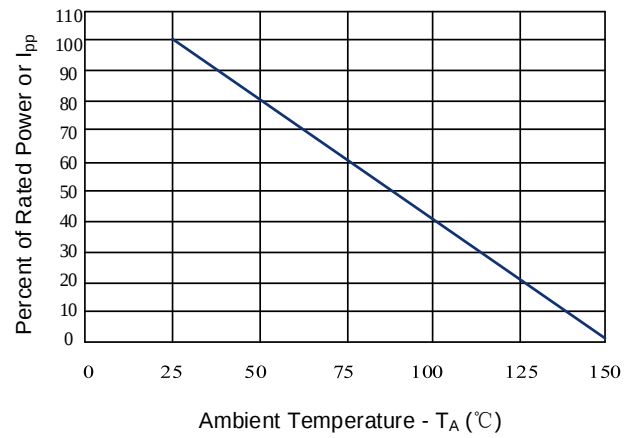


Figure 3: Pulse Waveform

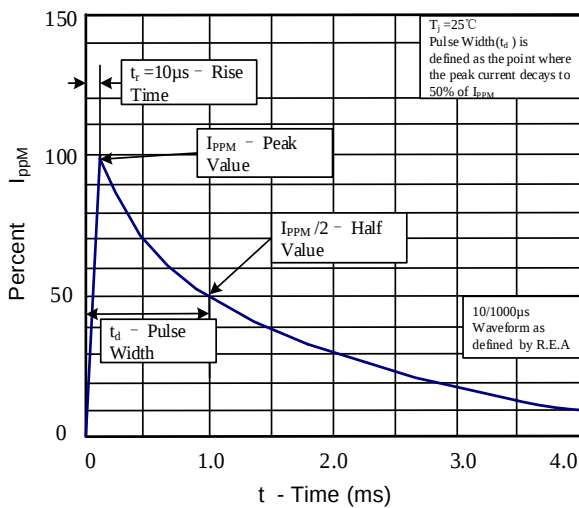


Figure 4: Typical Junction Capacitance

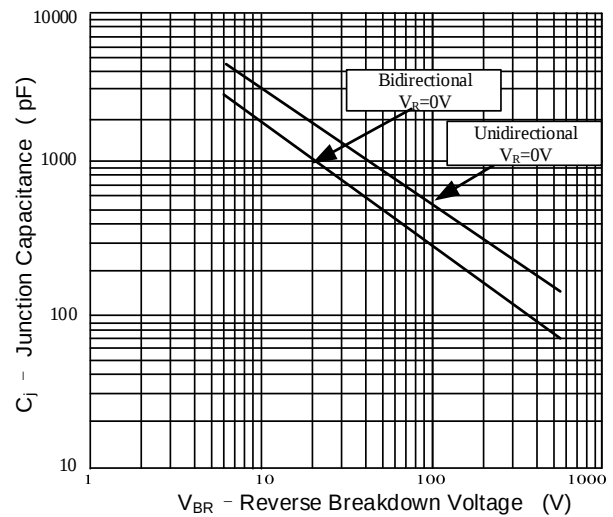


Figure 5: Steady State Power Dissipation Derating Curve

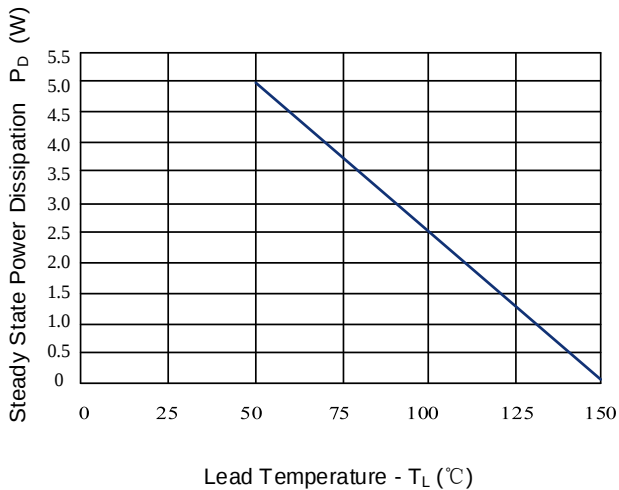
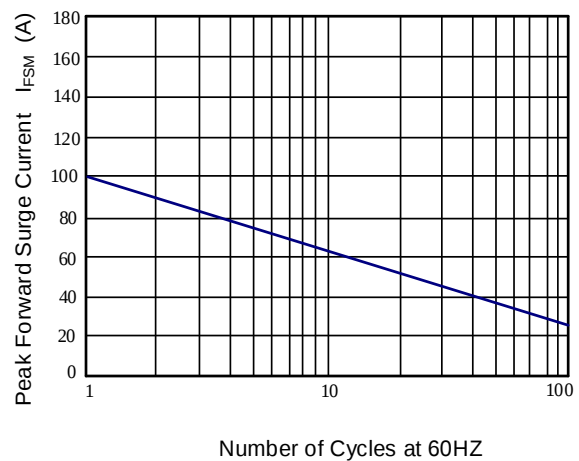


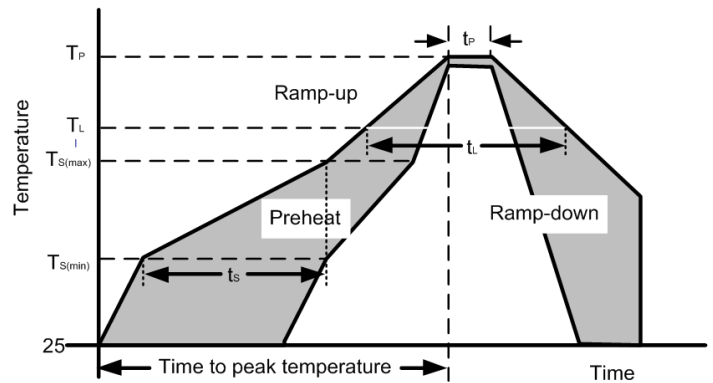
Figure 6: Maximum Non-Repetitive Forward Surge Current Only Unidirectional



Note: The above typical parameters or typical characteristics are only indicative and do not make specific guarantees. If detailed values are required, additional communication and provision are required.

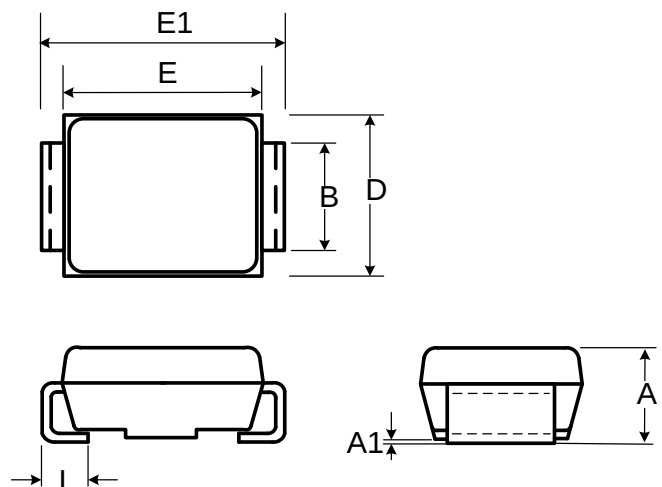
## Soldering Parameters

| Reflow Condition                                       |                                  |                         |
|--------------------------------------------------------|----------------------------------|-------------------------|
| Pre Heat                                               | Temperature min ( $T_{s(min)}$ ) | 150°C                   |
|                                                        | Temperature max ( $T_{s(max)}$ ) | 200°C                   |
|                                                        | Time (min to max) ( $t_s$ )      | 60-190 s                |
| Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak |                                  | 3°C/s max               |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                   |                                  | 3°C/s max               |
| Reflow                                                 | Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|                                                        | Temperature ( $t_L$ )            | 60-150 s                |
| Peak Temperature ( $T_P$ )                             |                                  | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                  | 20-40 s                 |
| Ramp-down Rate                                         |                                  | 5°C/s max               |
| Time 25°C to peak Temperature ( $T_P$ )                |                                  | 8 minutes max           |
| Do not exceed                                          |                                  | 260°C                   |

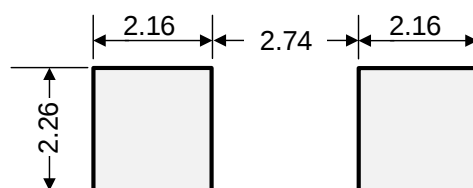


## Outline Drawing – SMB(DO-214AA)

| Ref. (mm) | Millimeters |       |
|-----------|-------------|-------|
|           | Min.        | Max.  |
| A         | 2.130       | 2.600 |
| A1        | -           | 0.300 |
| B         | 1.900       | 2.200 |
| E         | 4.100       | 4.750 |
| E1        | 5.210       | 5.590 |
| D         | 3.300       | 3.940 |
| L         | 0.760       | 1.520 |

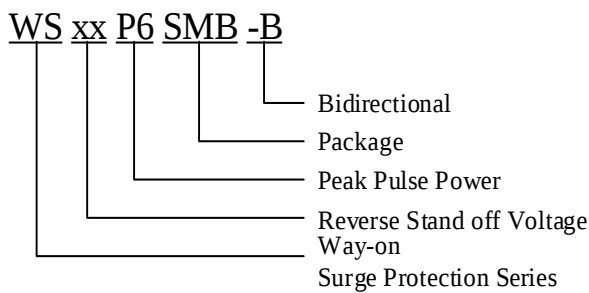


## Recommended Solder Pad Layout

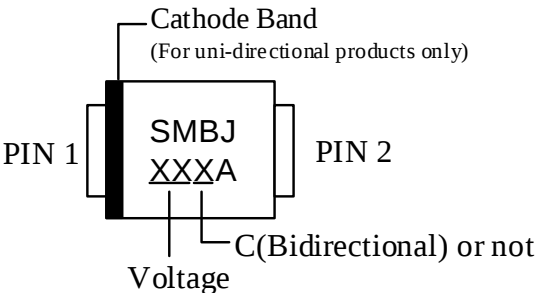


Dimensions in mm

Part Numbering System



Part Marking System



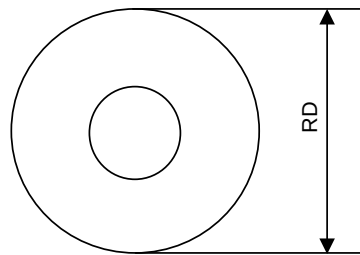
Package Information

| Package Type  | Description                | Quantity (pcs) | Standard  |
|---------------|----------------------------|----------------|-----------|
| SMB(DO-214AA) | Tape & Reel -12mm/13" tape | 3000           | EIA-481-D |

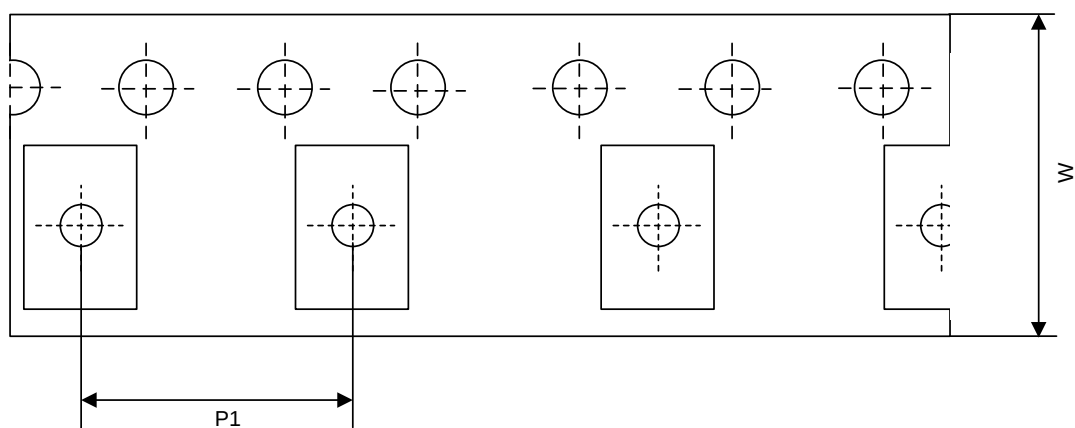
Tape and Reel Information

|    |                                         |         |
|----|-----------------------------------------|---------|
| RD | Reel Dimensions                         | 13 inch |
| W  | Overall width of the carrier tape       | 12 mm   |
| P1 | Pitch between successive cavity centers | 8 mm    |

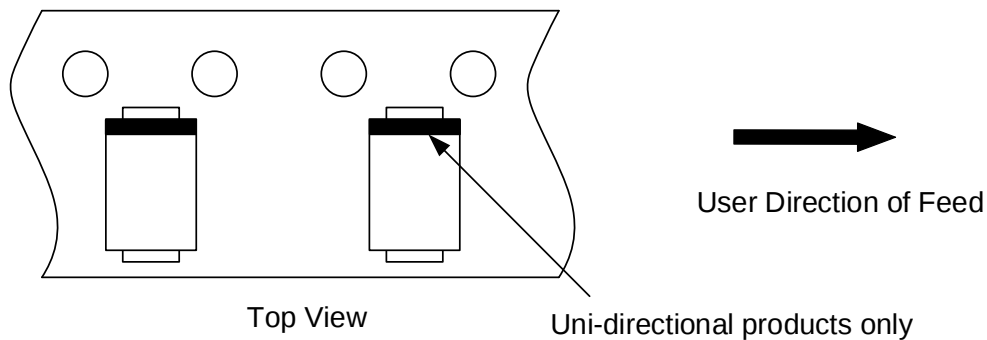
Reel Dimensions



Tape Dimensions



Quadrant Assignments for PIN1 Orientation in tape



## Contact Information

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For additional information, please contact your local Sales Representative.

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## Product Specification Statement

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.

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.

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Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.

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