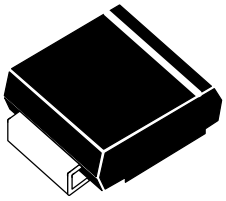
# WSxxP6SMB(-B)

**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



SMB
(JEDEC DO-214AA)

## 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℃ Unless otherwise specified)**

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power (tp =10/1000μs) (see Note1,2& 3) | $P_{PPM}$ | 600 | Watts |
| Peak pulse current (10/1000μs) (see Note2&3) | $I_{PPM}$ | See Electrical Characteristics | A |
| Peak Forward surge current (see Note4&5) | $I_{FSM}$ | 100 | A |
| Power Dissipation on infinite heat sink $T_L$ = 50 °C (Fig5) | $P_D$ | 5.0 | W |
| Operating Junction Temperature range | $T_J$ | -65 to + 150 | ℃ |
| Storage Temperature range | $T_{STG}$ | -65 to + 150 | ℃ |

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

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

**Note3:** Mounted on 5.0x5.0mm2 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.

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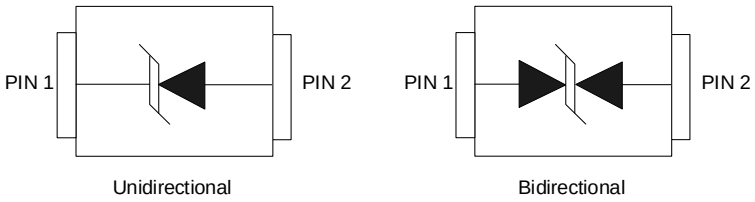
## Pin Configuration




## Electrical Characteristics

| Part Number | | Reverse Stand off Voltage $V_{RWM}$ (Volts) | Breakdown Voltage $V_{BR}$(Volts)@$I_T$ | | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_c$@$I_{PP}$ (Volts) | Maximum Peak Pulse Current $I_{pp}$ (Amps) | Maximum Reverse Leakage $I_R$@$V_{RWM}$ (μA) |
|---|---|---|---|---|---|---|---|---|
| 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 Stand off Voltage $V_{RWM}$ (Volts) | Breakdown Voltage $V_{BR}$(Volts)@$I_T$ | | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_c$@$I_{PP}$ (Volts) | Maximum Peak Pulse Current $I_{pp}$ (Amps) | Maximum Reverse Leakage $I_R$@$V_{RWM}$ (μA) |
|---|---|---|---|---|---|---|---|---|
| UNI-POLAR | BI-POLAR | | 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**

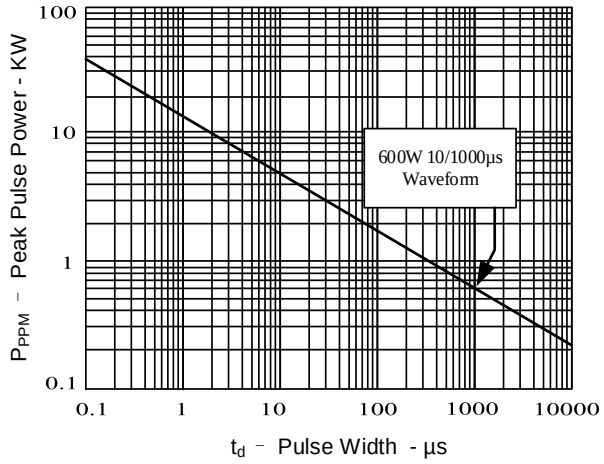



**Figure 2: Pulse Derating Curve**

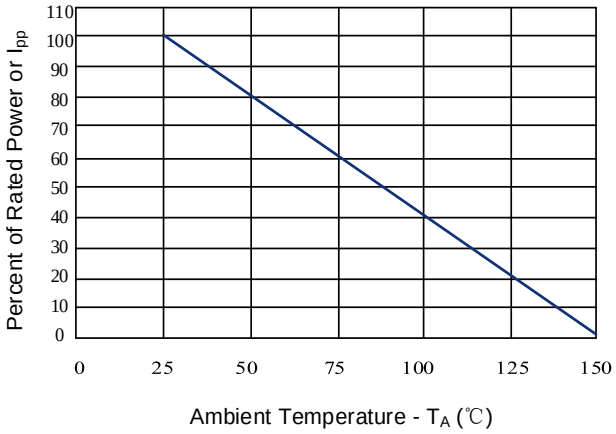



**Figure 3: Pulse Waveform**

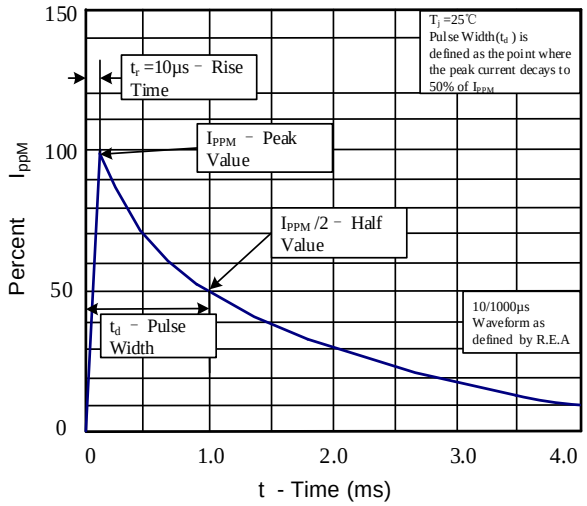



**Figure 4: Typical Junction Capacitance**

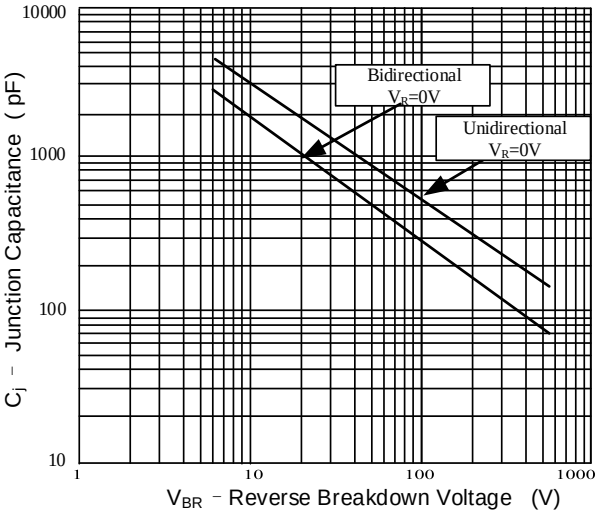



**Figure 5: Steady State Power Dissipation Derating Curve**

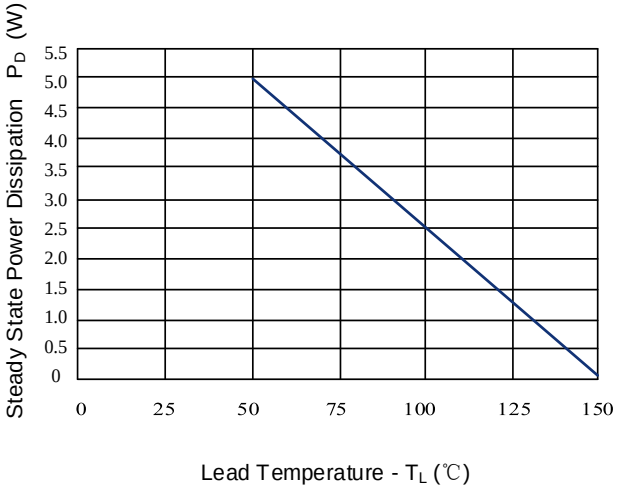
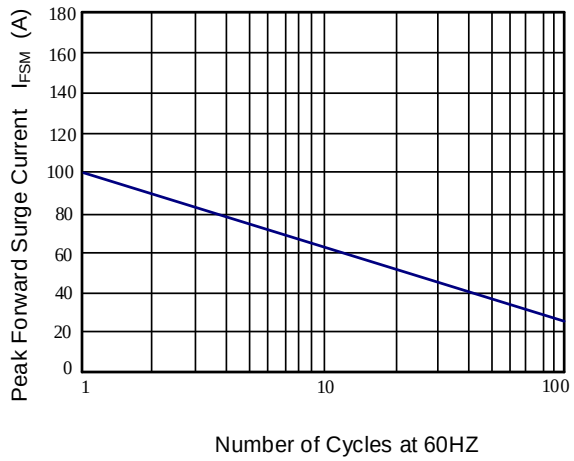


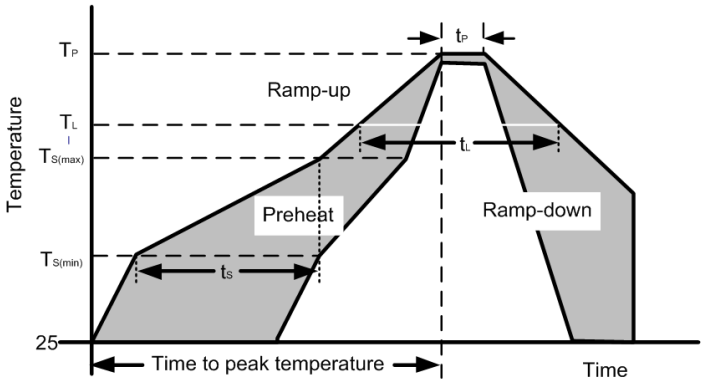

**Figure 6: Maximum Non-Repetitive Forward Surge Current Only Unidirectional**




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.

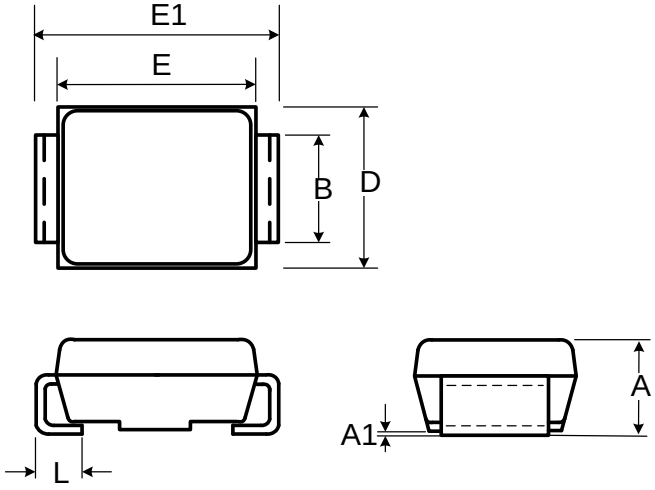
## Soldering Parameters

| 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 ($T_P$) | | $260^{+0/-5}$ °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 |

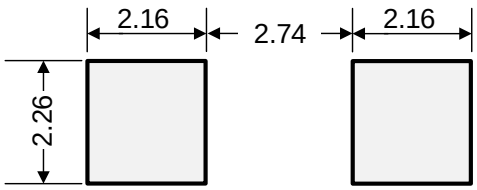



## Outline Drawing – SMB(DO-214AA)

| 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 |

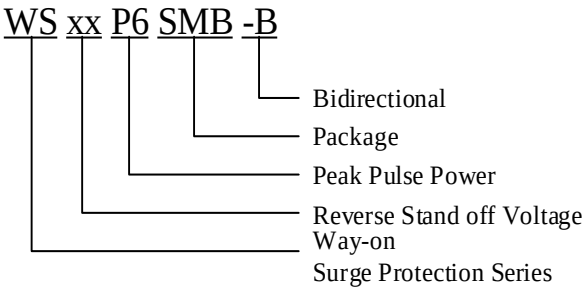



## Recommended Solder Pad Layout

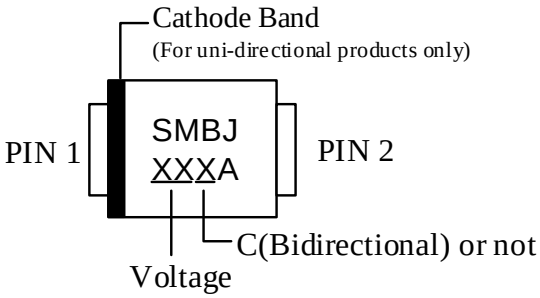



Dimensions in mm

## Part Numbering System




## Part Marking System



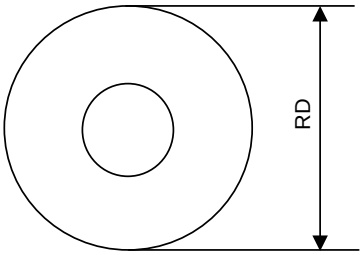

## Package Information

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

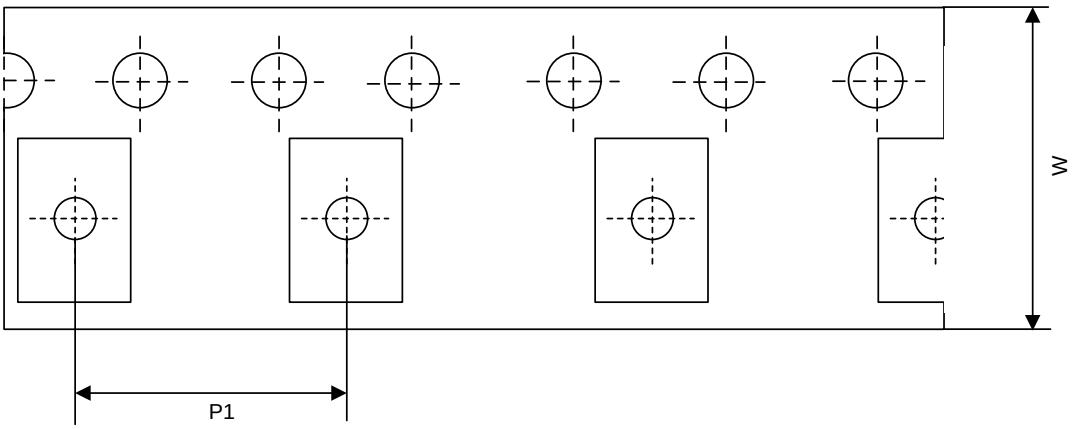
## Tape and Reel Information

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

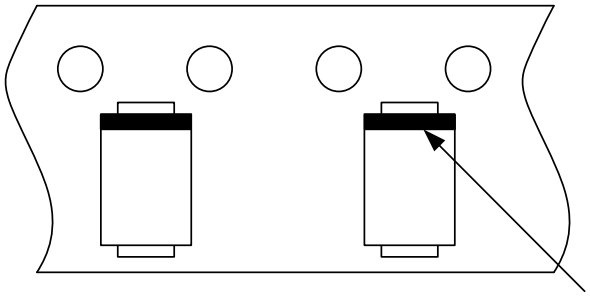
Reel Dimensions




Tape Dimensions




Quadrant Assignments for PIN1 Orientation in tape



User Direction of Feed

Top View

Uni-directional products only

## Contact Information

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# Product Specification Statement

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