

# TPSMC Series

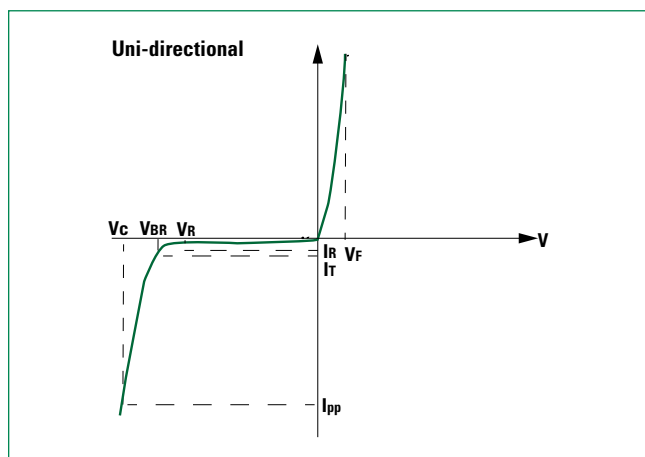
## Surface Mount - 1500W

### Electrical Characteristics

| Part Number (Uni) | Part Number (Bi) | Marking |       | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ |        | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{PP}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu A$ ) | Agency Approval |
|-------------------|------------------|---------|-------|-----------------------------------------|--------------------------------------------|--------|-------------------------|-----------------------------------------------|-----------------------------------------|---------------------------------------------------|-----------------|
|                   |                  | UNI     | BI    |                                         | MIN                                        | MAX    |                         |                                               |                                         |                                                   |                 |
| TPSMC12A          | TPSMC12CA        | 12AA    | 12CA  | 10.20                                   | 11.40                                      | 12.60  | 1                       | 16.7                                          | 91.0                                    | 5                                                 | X               |
| TPSMC13A          | TPSMC13CA        | 13AA    | 13CA  | 11.10                                   | 12.40                                      | 13.70  | 1                       | 18.2                                          | 83.5                                    | 1                                                 | X               |
| TPSMC15A          | TPSMC15CA        | 15AA    | 15CA  | 12.80                                   | 14.30                                      | 15.80  | 1                       | 21.2                                          | 71.7                                    | 1                                                 | X               |
| TPSMC16A          | TPSMC16CA        | 16AA    | 16CA  | 13.60                                   | 15.20                                      | 16.80  | 1                       | 22.5                                          | 67.6                                    | 1                                                 | X               |
| TPSMC18A          | TPSMC18CA        | 18AA    | 18CA  | 15.30                                   | 17.10                                      | 18.90  | 1                       | 25.2                                          | 60.3                                    | 1                                                 | X               |
| TPSMC20A          | TPSMC20CA        | 20AA    | 20CA  | 17.10                                   | 19.00                                      | 21.00  | 1                       | 27.7                                          | 54.9                                    | 1                                                 | X               |
| TPSMC22A          | TPSMC22CA        | 22AA    | 22CA  | 18.80                                   | 20.90                                      | 23.10  | 1                       | 30.6                                          | 49.7                                    | 1                                                 | X               |
| TPSMC24A          | TPSMC24CA        | 24AA    | 24CA  | 20.50                                   | 22.80                                      | 25.20  | 1                       | 33.2                                          | 45.8                                    | 1                                                 | X               |
| TPSMC27A          | TPSMC27CA        | 27AA    | 27CA  | 23.10                                   | 25.70                                      | 28.40  | 1                       | 37.5                                          | 40.5                                    | 1                                                 | X               |
| TPSMC30A          | TPSMC30CA        | 30AA    | 30CA  | 25.60                                   | 28.50                                      | 31.50  | 1                       | 41.4                                          | 36.7                                    | 1                                                 | X               |
| TPSMC33A          | TPSMC33CA        | 33AA    | 33CA  | 28.20                                   | 31.40                                      | 34.70  | 1                       | 45.7                                          | 33.3                                    | 1                                                 | X               |
| TPSMC36A          | TPSMC36CA        | 36AA    | 36CA  | 30.80                                   | 34.20                                      | 37.80  | 1                       | 49.9                                          | 30.5                                    | 1                                                 | X               |
| TPSMC39A          | TPSMC39CA        | 39AA    | 39CA  | 33.30                                   | 37.10                                      | 41.00  | 1                       | 53.9                                          | 28.2                                    | 1                                                 | X               |
| TPSMC43A          | TPSMC43CA        | 43AA    | 43CA  | 36.80                                   | 40.90                                      | 45.20  | 1                       | 59.3                                          | 25.6                                    | 1                                                 | X               |
| TPSMC47A          | TPSMC47CA        | 47AA    | 47CA  | 40.20                                   | 44.70                                      | 49.40  | 1                       | 64.8                                          | 23.5                                    | 1                                                 | X               |
| TPSMC51A          | TPSMC51CA        | 51AA    | 51CA  | 43.60                                   | 48.50                                      | 53.60  | 1                       | 70.1                                          | 21.7                                    | 1                                                 | X               |
| TPSMC56A          | TPSMC56CA        | 56AA    | 56CA  | 47.80                                   | 53.20                                      | 58.80  | 1                       | 77.0                                          | 19.7                                    | 1                                                 | X               |
| TPSMC62A          | TPSMC62CA        | 62AA    | 62CA  | 53.00                                   | 58.90                                      | 65.10  | 1                       | 85.0                                          | 17.9                                    | 1                                                 | X               |
| TPSMC68A          | TPSMC68CA        | 68AA    | 68CA  | 58.10                                   | 64.60                                      | 71.40  | 1                       | 92.0                                          | 16.5                                    | 1                                                 | X               |
| TPSMC75A          | TPSMC75CA        | 75AA    | 75CA  | 64.10                                   | 71.30                                      | 78.80  | 1                       | 103.0                                         | 14.8                                    | 1                                                 | X               |
| TPSMC82A          | TPSMC82CA        | 82AA    | 82CA  | 70.10                                   | 77.90                                      | 86.10  | 1                       | 113.0                                         | 13.5                                    | 1                                                 | X               |
| TPSMC91A          | TPSMC91CA        | 91AA    | 91CA  | 77.80                                   | 86.50                                      | 95.50  | 1                       | 125.0                                         | 12.2                                    | 1                                                 | X               |
| TPSMC100A         | TPSMC100CA       | 100AA   | 100CA | 85.50                                   | 95.00                                      | 105.26 | 1                       | 137.0                                         | 11.1                                    | 1                                                 | X               |
| TPSMC110A         | TPSMC110CA       | 110AA   | 110CA | 94.50                                   | 104.50                                     | 115.79 | 1                       | 152.0                                         | 10                                      | 1                                                 | X               |
| TPSMC120A         | TPSMC120CA       | 120AA   | 120CA | 102.60                                  | 114.00                                     | 126.32 | 1                       | 165.0                                         | 9.2                                     | 1                                                 | X               |
| TPSMC130A         | TPSMC130CA       | 130AA   | 130CA | 111.15                                  | 123.50                                     | 136.84 | 1                       | 179.0                                         | 8.5                                     | 1                                                 | X               |
| TPSMC150A         | TPSMC150CA       | 150AA   | 150CA | 128.25                                  | 142.50                                     | 157.89 | 1                       | 207.0                                         | 7.3                                     | 1                                                 | X               |
| TPSMC160A         | TPSMC160CA       | 160AA   | 160CA | 136.80                                  | 152.00                                     | 168.42 | 1                       | 219.0                                         | 6.9                                     | 1                                                 | X               |
| TPSMC170A         | TPSMC170CA       | 170AA   | 170CA | 145.35                                  | 161.50                                     | 178.95 | 1                       | 234.0                                         | 6.5                                     | 1                                                 | X               |
| TPSMC180A         | TPSMC180CA       | 180AA   | 180CA | 153.90                                  | 171.00                                     | 189.47 | 1                       | 246.0                                         | 6.2                                     | 1                                                 | X               |
| TPSMC200A         | TPSMC200CA       | 200AA   | 200CA | 171.00                                  | 190.00                                     | 210.53 | 1                       | 274.0                                         | 5.5                                     | 1                                                 | X               |
| TPSMC220A         | TPSMC220CA       | 220AA   | 220CA | 188.10                                  | 209.00                                     | 231.58 | 1                       | 328.0                                         | 4.6                                     | 1                                                 | X               |
| TPSMC250A         | TPSMC250CA       | 250AA   | 250CA | 213.75                                  | 237.50                                     | 263.16 | 1                       | 344.0                                         | 4.4                                     | 1                                                 | X               |

For bidirectional type having  $V_R$  of 10 volts and less, the  $I_R$  limit is double.

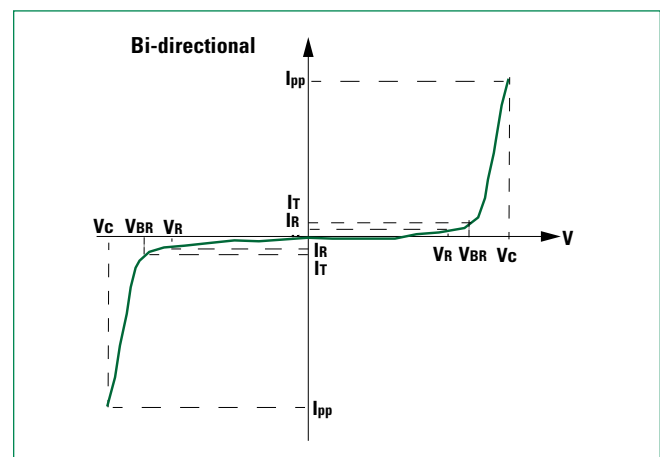
### I-V Curve Characteristics



**$P_{PPM}$  Peak Pulse Power Dissipation** -- Max power dissipation

**$V_R$  Stand-off Voltage** -- Maximum voltage that can be applied to the TVS without operation

**$V_{BR}$  Breakdown Voltage** -- Maximum voltage that flows though the TVS at a specified test current ( $I_T$ )



**$V_C$  Clamping Voltage** -- Peak voltage measured across the TVS at a specified  $I_{PPM}$  (peak impulse current)

**$I_R$  Reverse Leakage Current** -- Current measured at  $V_R$

**$V_F$  Forward Voltage Drop for Uni-directional**

# TPSMC Series

## Surface Mount - 1500W

### Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

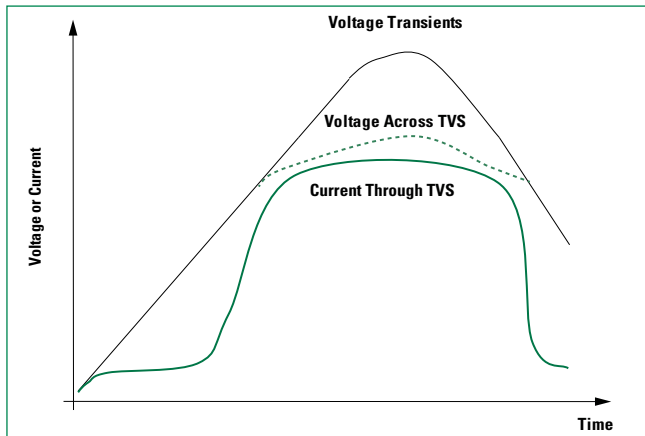


Figure 2 - Peak Pulse Power Rating

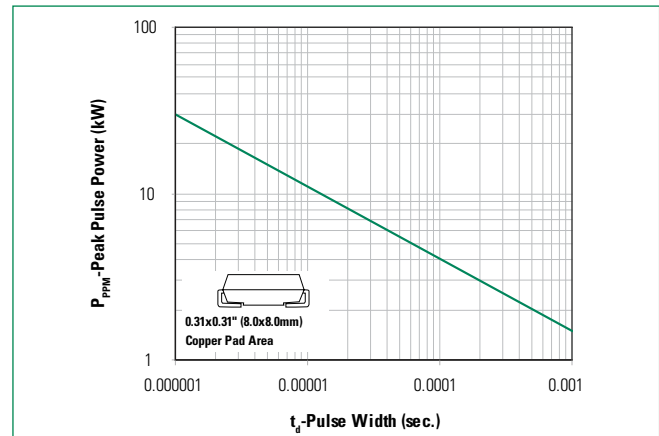


Figure 3 - Peak Pulse Power Derating Curve

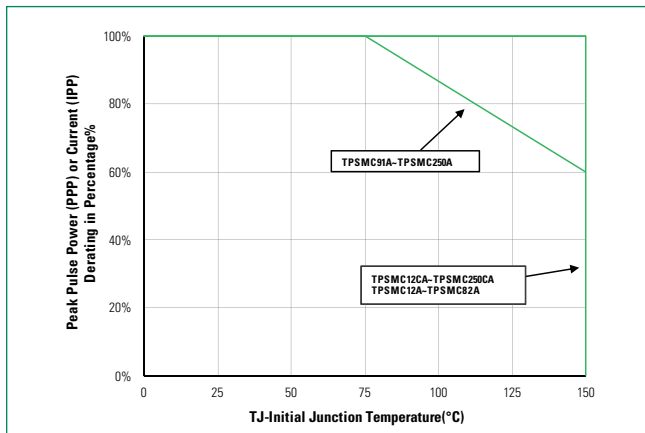


Figure 4 - Pulse Waveform

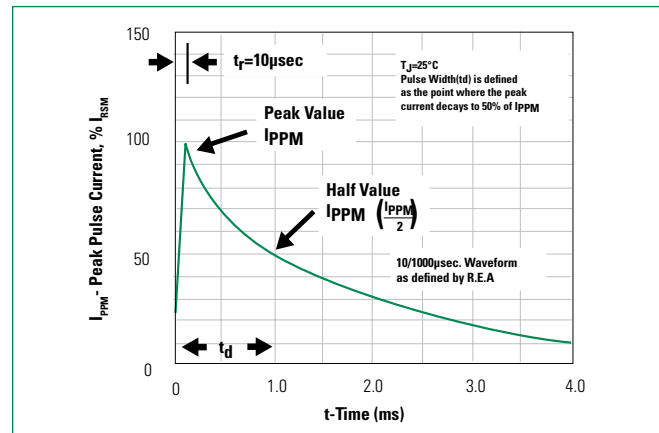


Figure 5 - Typical Junction Capacitance

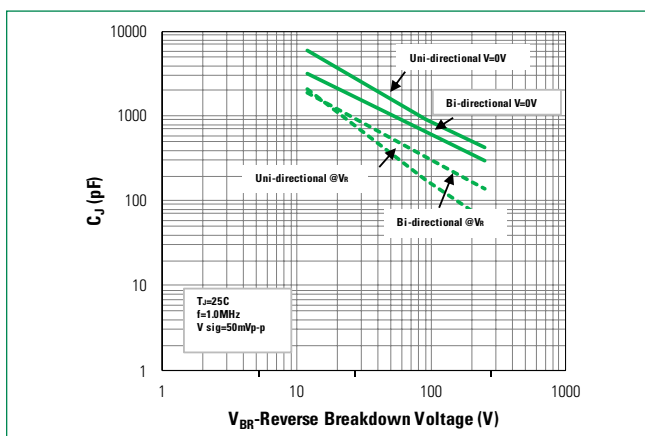
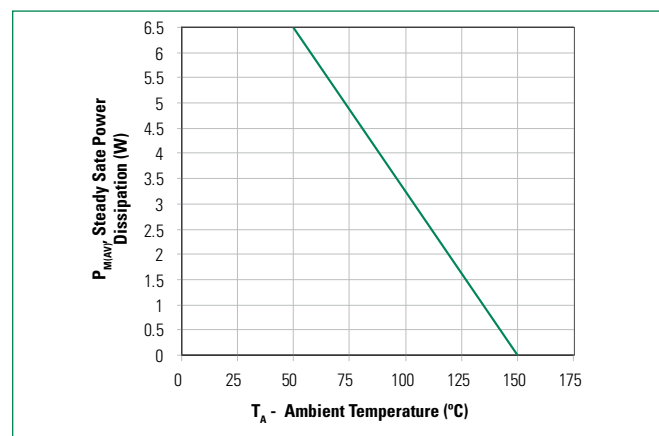


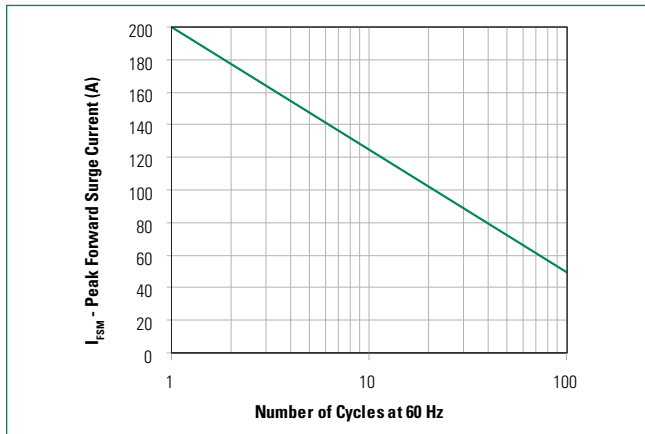
Figure 6 - Steady State Power Dissipation Derating Curve



# TPSMC Series

## Surface Mount - 1500W

**Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only**



### Physical Specifications

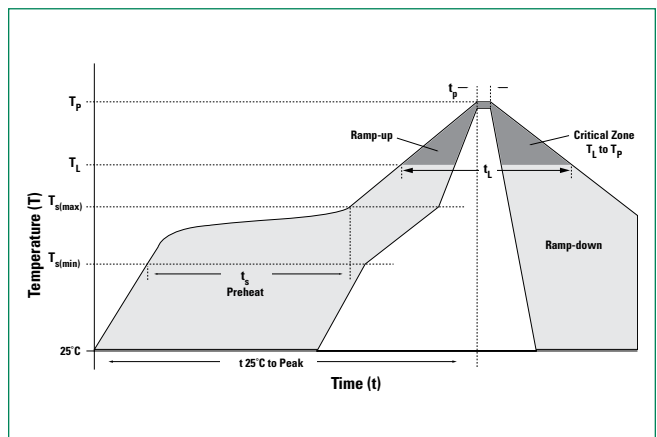
|                 |                                                                   |
|-----------------|-------------------------------------------------------------------|
| <b>Weight</b>   | 0.007 ounce, 0.21 grams                                           |
| <b>Case</b>     | JEDEC DO214AB. Molded plastic body over glass passivated junction |
| <b>Polarity</b> | Color band denotes positive end (cathode) except Bidirectional.   |
| <b>Terminal</b> | Matte Tin-plated leads, Solderable per JESD22-B102                |

### Environmental Specifications

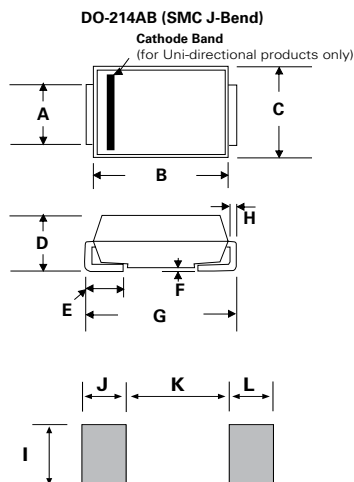
|                            |                          |
|----------------------------|--------------------------|
| <b>High Temp. Storage</b>  | JESD22-A103              |
| <b>HTRB</b>                | JESD22-A108              |
| <b>Temperature Cycling</b> | JESD22-A104              |
| <b>MSL</b>                 | JEDEC-J-STD-020, Level 1 |
| <b>H3TRB</b>               | JESD22-A101              |
| <b>RSH</b>                 | JESD22-A111              |

### Soldering Parameters

|                                                       |                                    |                         |
|-------------------------------------------------------|------------------------------------|-------------------------|
| Reflow Condition                                      |                                    | Lead-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 – 120 secs           |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak |                                    | 3°C/second max          |
| $T_{S(max)}$ to $T_L$ - Ramp-up Rate                  |                                    | 3°C/second max          |
| Reflow                                                | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|                                                       | - Time (min to max) ( $t_s$ )      | 60 – 150 seconds        |
| Peak Temperature ( $T_p$ )                            |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )  |                                    | 30 seconds max          |
| Ramp-down Rate                                        |                                    | 6°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )               |                                    | 8 minutes max.          |
| Do not exceed                                         |                                    | 260°C                   |



### Dimensions

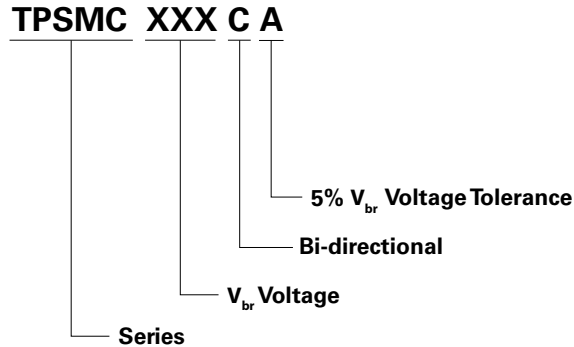


| Dimensions | Inches |       | Millimeters |       |
|------------|--------|-------|-------------|-------|
|            | Min    | Max   | Min         | Max   |
| <b>A</b>   | 0.114  | 0.126 | 2.900       | 3.200 |
| <b>B</b>   | 0.260  | 0.280 | 6.600       | 7.110 |
| <b>C</b>   | 0.220  | 0.245 | 5.590       | 6.220 |
| <b>D</b>   | 0.079  | 0.103 | 2.060       | 2.620 |
| <b>E</b>   | 0.030  | 0.060 | 0.760       | 1.520 |
| <b>F</b>   | -      | 0.008 | -           | 0.203 |
| <b>G</b>   | 0.305  | 0.320 | 7.750       | 8.130 |
| <b>H</b>   | 0.006  | 0.012 | 0.152       | 0.305 |
| <b>I</b>   | 0.129  | -     | 3.300       | -     |
| <b>J</b>   | 0.094  | -     | 2.400       | -     |
| <b>K</b>   | -      | 0.165 | -           | 4.200 |
| <b>L</b>   | 0.094  | -     | 2.400       | -     |

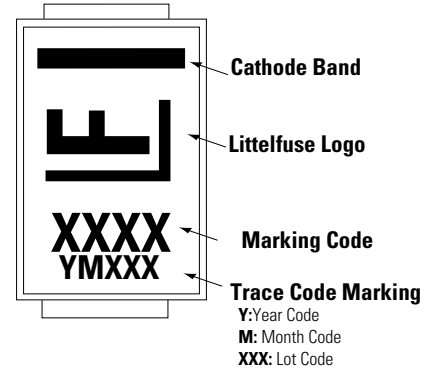
# TPSMC Series

## Surface Mount - 1500W

### Part Numbering System



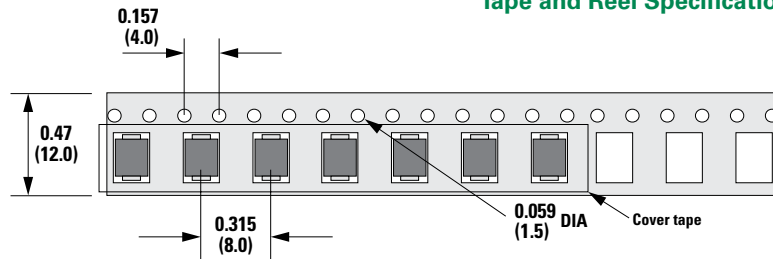
### Part Marking System



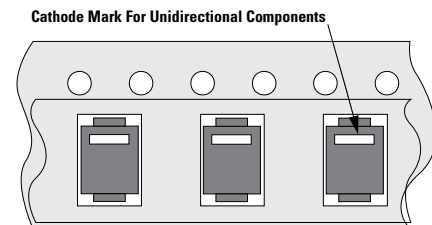
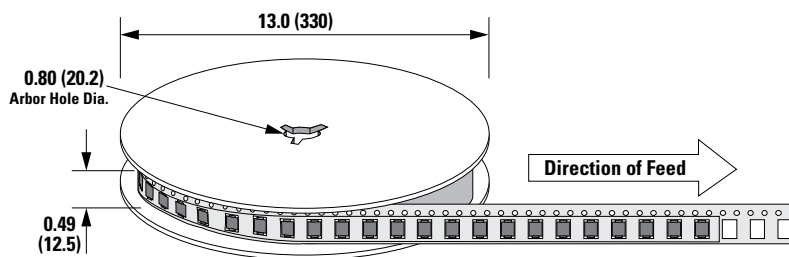
### Packaging

| Part number | Component Package | Quantity | Packaging Option                 | Packaging Specification |
|-------------|-------------------|----------|----------------------------------|-------------------------|
| TPSMCxxxXX  | DO-214AB          | 3000     | Tape & Reel - 16mm tape/13" reel | EIA STD RS-481          |

### Tape and Reel Specification



Note: Dimensions are in inches (and millimeters).



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