

TPSMC-E Series

Surface Mount – 1500 W



Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | E230531 |

Maximum Ratings and Thermal Characteristics

($T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---------------------------|-------------|--------------------|
| Peak Pulse Power Dissipation with 10/1000 μs exponential pulse | P_{PPM} | 1500 | W |
| Peak Forward Surge Current 8.3 ms. (Jedec Method) (Note 1)(Note 2) | I_{FSM} | 200 | A |
| Max. Forward Voltage Drop at $I_F = 100\text{ A}$ | V_F | 3.5 | V |
| Operating Temperature Range (Note 3)(Note 4) | $V_{BR} \leq 43\text{ V}$ | -65 to 175 | $^\circ\text{C}$ |
| | $V_{BR} > 43\text{ V}$ | -65 to 150 | |
| Storage Temperature Range | T_{STG} | -65 to 175 | $^\circ\text{C}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{th(j-A)}$ | 140 (Note3) | $^\circ\text{C/W}$ |
| | $R_{th(j-l)}$ | 75 (Note4) | |
| Typical Thermal Resistance Junction to Lead | $R_{th(j-l)}$ | 15 | $^\circ\text{C/W}$ |

Notes:

- Only for Unidirectional
- Mounted on 0.31×0.31 " ($8.0 \times 8.0\text{ mm}$) copper pads to each terminal
- Device mounted on an FR4 PCB, standard footprint
- Device mounted on an Al2O3 PCB, standard footprint

Functional Diagram



Bi-directional



Uni-directional

Description

Littelfuse TPSMC-E Series of Transient Voltage Suppression (TVS) Diodes can provide secondary transient voltage protection from transients induced by load dump and other transient voltage events for sensitive electronics. The TPSMC-E Series offers superior electrical performance in a small footprint DO-214AB package, allowing designers to upgrade their circuit protection without altering their existing design footprint or provide more robust protection in new circuit layouts.

Features

- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of $260\text{ }^\circ\text{C}$
- Meets ESD HBM: 8 kV and M4 machine model: 400 V
- Low profile package
- Ideal for automated placement
- 1500 peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle): 0.01%
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Available in uni-directional and bi-directional
- AEC-Q101 qualified
- Component in accordance to RoHS 2011/65/EU and WEEE 2002/96/EC

Applications

Used in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for industrial, automotive and telecommunication.


Physical Specifications

| | |
|-----------------|--|
| Weight | 0.007 ounce, 0.211 grams |
| Case | DO-214AB (SMC). Epoxy meets UL 94V-0 flammability rating. |
| Polarity | For unidirectional types color band denotes cathode end. No marking on bidirectional types. |
| Terminal | Matte tin plated leads, solderable per MIL-ED-750 Method 2026, J-ED-002 and JESD22-B102. Consumer grade, meets JESD 201 class 1A whisker test. |

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Electrical Characteristics ($T_A=25\text{ }^\circ\text{C}$ unless otherwise noted)

| Part Number (Uni) | Marking Code | Maximum Reverse Leakage Current I_{RM} at V_{RM} | | Breakdown Voltage V_{BR} at I_R (V) ⁽¹⁾ | | | | Max. Clamping Voltage V_{CL} at I_{PP} max. 1ms. Expo. | | Agency Approval  |
|-------------------|--------------|---|--------|---|--------|--------|------|--|-------|--|
| | | (μA) | (V) | Min. | Nom. | Max. | (mA) | (V) | (A) | |
| TPSMC6.8A-E | UAB | 1000 | 5.80 | 6.45 | 6.80 | 7.14 | 10 | 10.5 | 143.0 | - |
| TPSMC7.5A-E | UAD | 500 | 6.40 | 7.13 | 7.50 | 7.88 | 10 | 11.3 | 132.0 | - |
| TPSMC8.2A-E | UAF | 200 | 7.02 | 7.79 | 8.20 | 8.61 | 10 | 12.1 | 124.0 | - |
| TPSMC9.1A-E | UAH | 50 | 7.78 | 8.65 | 9.10 | 9.55 | 1 | 13.4 | 112.0 | - |
| TPSMC10A-E | UAL | 10 | 8.55 | 9.50 | 10.00 | 10.50 | 1 | 14.5 | 103.0 | - |
| TPSMC11A-E | UAN | 5 | 9.40 | 10.50 | 11.00 | 11.60 | 1 | 15.6 | 96.0 | X |
| TPSMC12A-E | UAR | 5 | 10.20 | 11.40 | 12.00 | 12.60 | 1 | 16.7 | 90.0 | X |
| TPSMC13A-E | UAT | 5 | 11.10 | 12.40 | 13.00 | 13.70 | 1 | 18.2 | 82.0 | X |
| TPSMC15A-E | UAV | 5 | 12.80 | 14.30 | 15.00 | 15.80 | 1 | 21.2 | 71.0 | X |
| TPSMC16A-E | UAX | 5 | 13.60 | 15.20 | 16.00 | 16.80 | 1 | 22.5 | 67.0 | X |
| TPSMC18A-E | UAZ | 5 | 15.30 | 17.10 | 18.00 | 18.90 | 1 | 25.5 | 59.5 | X |
| TPSMC20A-E | UBB | 5 | 17.10 | 19.00 | 20.00 | 21.00 | 1 | 27.7 | 54.0 | X |
| TPSMC22A-E | UBD | 5 | 18.80 | 20.90 | 22.00 | 23.10 | 1 | 30.6 | 49.0 | X |
| TPSMC24A-E | UBF | 5 | 20.50 | 22.80 | 24.00 | 25.20 | 1 | 33.2 | 45.0 | X |
| TPSMC27A-E | UBH | 5 | 23.10 | 25.70 | 27.00 | 28.40 | 1 | 37.5 | 40.0 | X |
| TPSMC30A-E | UBL | 5 | 25.60 | 28.50 | 30.00 | 31.50 | 1 | 41.4 | 36.0 | X |
| TPSMC33A-E | UBN | 5 | 28.20 | 31.40 | 33.00 | 34.70 | 1 | 45.7 | 33.0 | X |
| TPSMC36A-E | UBR | 5 | 30.80 | 34.20 | 36.00 | 37.80 | 1 | 49.9 | 30.0 | X |
| TPSMC39A-E | UBT | 5 | 33.30 | 37.10 | 39.00 | 41.00 | 1 | 53.9 | 28.0 | X |
| TPSMC43A-E | UBV | 5 | 36.80 | 40.90 | 43.00 | 45.20 | 1 | 59.3 | 25.3 | X |
| TPSMC47A-E | UBX | 5 | 40.20 | 44.70 | 47.00 | 49.40 | 1 | 64.8 | 23.2 | X |
| TPSMC51A-E | UBZ | 5 | 43.60 | 48.50 | 51.00 | 53.60 | 1 | 70.1 | 21.4 | X |
| TPSMC56A-E | UCB | 5 | 47.80 | 53.20 | 56.00 | 58.80 | 1 | 77.0 | 19.5 | X |
| TPSMC62A-E | UCD | 5 | 53.00 | 58.90 | 62.00 | 65.10 | 1 | 85.0 | 17.7 | X |
| TPSMC68A-E | UCF | 5 | 58.10 | 64.60 | 68.00 | 71.40 | 1 | 92.0 | 16.3 | X |
| TPSMC75A-E | UCH | 5 | 64.10 | 71.30 | 75.00 | 78.80 | 1 | 103.0 | 14.6 | X |
| TPSMC82A-E | UCL | 5 | 70.10 | 77.90 | 82.00 | 86.10 | 1 | 113.0 | 13.3 | X |
| TPSMC91A-E | UCN | 5 | 77.80 | 86.50 | 91.00 | 95.50 | 1 | 125.0 | 12.0 | X |
| TPSMC100A-E | UCR | 5 | 85.50 | 95.00 | 100.00 | 105.00 | 1 | 137.0 | 11.0 | X |
| TPSMC110A-E | UCT | 5 | 94.00 | 105.00 | 110.00 | 116.00 | 1 | 152.0 | 9.9 | X |
| TPSMC120A-E | UCV | 5 | 102.00 | 114.00 | 120.00 | 126.00 | 1 | 165.0 | 9.1 | X |
| TPSMC130A-E | UCX | 5 | 111.00 | 124.00 | 130.00 | 137.00 | 1 | 179.0 | 8.4 | X |
| TPSMC150A-E | UCZ | 5 | 128.00 | 143.00 | 150.00 | 158.00 | 1 | 207.0 | 7.2 | X |
| TPSMC160A-E | UDB | 5 | 136.00 | 152.00 | 160.00 | 168.00 | 1 | 219.0 | 6.8 | X |
| TPSMC170A-E | UDD | 5 | 145.00 | 162.00 | 170.00 | 179.00 | 1 | 234.0 | 6.4 | X |
| TPSMC180A-E | UDF | 5 | 154.00 | 171.00 | 180.00 | 189.00 | 1 | 246.0 | 6.1 | X |
| TPSMC200A-E | UDH | 5 | 171.00 | 190.00 | 200.00 | 210.00 | 1 | 274.0 | 5.5 | X |
| TPSMC220A-E | UDL | 5 | 185.00 | 209.00 | 220.00 | 231.00 | 1 | 328.0 | 4.6 | X |
| TPSMC250A-E | UDI | 5 | 214.00 | 237.00 | 250.00 | 262.00 | 1 | 344.0 | 4.4 | X |
| TPSMC300A-E | UDJ | 5 | 256.00 | 285.00 | 300.00 | 315.00 | 1 | 414.0 | 3.6 | X |
| TPSMC350A-E | UDQ | 5 | 300.00 | 333.00 | 350.00 | 368.00 | 1 | 482.0 | 3.1 | X |
| TPSMC400A-E | UDU | 5 | 342.00 | 380.00 | 400.00 | 420.00 | 1 | 548.0 | 2.7 | X |
| TPSMC440A-E | UDV | 5 | 376.00 | 418.00 | 440.00 | 482.00 | 1 | 602.0 | 2.5 | X |
| TPSMC480A-E | UDM | 5 | 408.00 | 456.00 | 480.00 | 504.00 | 1 | 658.0 | 2.3 | X |
| TPSMC510A-E | UDN | 5 | 434.00 | 485.00 | 510.00 | 535.00 | 1 | 698.0 | 2.2 | X |
| TPSMC540A-E | UDP | 5 | 459.00 | 513.00 | 540.00 | 567.00 | 1 | 740.0 | 2.0 | X |

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Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Part Number (Bi) | Marking Code | Maximum Reverse Leakage Current I_{RM} at V_{RM} | | Breakdown Voltage V_{BR} at I_R (V) ⁽¹⁾ | | | | Max. Clamping Voltage V_{CL} at I_{PP} max. 1ms. Expo. | | Agency Approval  |
|------------------|--------------|---|--------|---|--------|--------|------|--|-------|--|
| | | (μA) | (V) | Min. | Nom. | Max. | (mA) | (V) | (A) | |
| TPSMC6.8CA-E | BGB | 1000 | 5.80 | 6.45 | 6.80 | 7.14 | 10 | 10.5 | 143.0 | - |
| TPSMC7.5CA-E | BGD | 500 | 6.40 | 7.13 | 7.50 | 7.88 | 10 | 11.3 | 132.0 | - |
| TPSMC8.2CA-E | BGF | 200 | 7.02 | 7.79 | 8.20 | 8.61 | 10 | 12.1 | 124.0 | - |
| TPSMC9.1CA-E | BGH | 50 | 7.78 | 8.65 | 9.10 | 9.55 | 1 | 13.4 | 112.0 | - |
| TPSMC10CA-E | BGL | 10 | 8.55 | 9.50 | 10.00 | 10.50 | 1 | 14.5 | 103.0 | - |
| TPSMC11CA-E | BGN | 5 | 9.40 | 10.50 | 11.00 | 11.60 | 1 | 15.6 | 96.0 | X |
| TPSMC12CA-E | BGR | 5 | 10.20 | 11.40 | 12.00 | 12.60 | 1 | 16.7 | 90.0 | X |
| TPSMC13CA-E | BGT | 5 | 11.10 | 12.40 | 13.00 | 13.70 | 1 | 18.2 | 82.0 | X |
| TPSMC15CA-E | BGV | 5 | 12.80 | 14.30 | 15.00 | 15.80 | 1 | 21.2 | 71.0 | X |
| TPSMC16CA-E | BGX | 5 | 13.60 | 15.20 | 16.00 | 16.80 | 1 | 22.5 | 67.0 | X |
| TPSMC18CA-E | BGZ | 5 | 15.30 | 17.10 | 18.00 | 18.90 | 1 | 25.5 | 59.5 | X |
| TPSMC20CA-E | BHB | 5 | 17.10 | 19.00 | 20.00 | 21.00 | 1 | 27.7 | 54.0 | X |
| TPSMC22CA-E | BHD | 5 | 18.80 | 20.90 | 22.00 | 23.10 | 1 | 30.6 | 49.0 | X |
| TPSMC24CA-E | BHF | 5 | 20.50 | 22.80 | 24.00 | 25.20 | 1 | 33.2 | 45.0 | X |
| TPSMC27CA-E | BHH | 5 | 23.10 | 25.70 | 27.00 | 28.40 | 1 | 37.5 | 40.0 | X |
| TPSMC30CA-E | BHL | 5 | 25.60 | 28.50 | 30.00 | 31.50 | 1 | 41.4 | 36.0 | X |
| TPSMC33CA-E | BHN | 5 | 28.20 | 31.40 | 33.00 | 34.70 | 1 | 45.7 | 33.0 | X |
| TPSMC36CA-E | BHR | 5 | 30.80 | 34.20 | 36.00 | 37.80 | 1 | 49.9 | 30.0 | X |
| TPSMC39CA-E | BHT | 5 | 33.30 | 37.10 | 39.00 | 41.00 | 1 | 53.9 | 28.0 | X |
| TPSMC43CA-E | BHV | 5 | 36.80 | 40.90 | 43.00 | 45.20 | 1 | 59.3 | 25.3 | X |
| TPSMC47CA-E | BHX | 5 | 40.20 | 44.70 | 47.00 | 49.40 | 1 | 64.8 | 23.2 | X |
| TPSMC51CA-E | BHZ | 5 | 43.60 | 48.50 | 51.00 | 53.60 | 1 | 70.1 | 21.4 | X |
| TPSMC56CA-E | BKB | 5 | 47.80 | 53.20 | 56.00 | 58.80 | 1 | 77.0 | 19.5 | X |
| TPSMC62CA-E | BKD | 5 | 53.00 | 58.90 | 62.00 | 65.10 | 1 | 85.0 | 17.7 | X |
| TPSMC68CA-E | BKF | 5 | 58.10 | 64.60 | 68.00 | 71.40 | 1 | 92.0 | 16.3 | X |
| TPSMC75CA-E | BKH | 5 | 64.10 | 71.30 | 75.00 | 78.80 | 1 | 103.0 | 14.6 | X |
| TPSMC82CA-E | BKL | 5 | 70.10 | 77.90 | 82.00 | 86.10 | 1 | 113.0 | 13.3 | X |
| TPSMC91CA-E | BKN | 5 | 77.80 | 86.50 | 91.00 | 95.50 | 1 | 125.0 | 12.0 | X |
| TPSMC100CA-E | BKR | 5 | 85.50 | 95.00 | 100.00 | 105.00 | 1 | 137.0 | 11.0 | X |
| TPSMC110CA-E | BKT | 5 | 94.00 | 105.00 | 110.00 | 116.00 | 1 | 152.0 | 9.9 | X |
| TPSMC120CA-E | BKV | 5 | 102.00 | 114.00 | 120.00 | 126.00 | 1 | 165.0 | 9.1 | X |
| TPSMC130CA-E | BKX | 5 | 111.00 | 124.00 | 130.00 | 137.00 | 1 | 179.0 | 8.4 | X |
| TPSMC150CA-E | BKZ | 5 | 128.00 | 143.00 | 150.00 | 158.00 | 1 | 207.0 | 7.2 | X |
| TPSMC160CA-E | BLB | 5 | 136.00 | 152.00 | 160.00 | 168.00 | 1 | 219.0 | 6.8 | X |
| TPSMC170CA-E | BLD | 5 | 145.00 | 162.00 | 170.00 | 179.00 | 1 | 234.0 | 6.4 | X |
| TPSMC180CA-E | BLF | 5 | 154.00 | 171.00 | 180.00 | 189.00 | 1 | 246.0 | 6.1 | X |
| TPSMC200CA-E | BLH | 5 | 171.00 | 190.00 | 200.00 | 210.00 | 1 | 274.0 | 5.5 | X |
| TPSMC220CA-E | BLL | 5 | 185.00 | 209.00 | 220.00 | 231.00 | 1 | 328.0 | 4.6 | X |
| TPSMC250CA-E | BHJ | 5 | 214.00 | 237.00 | 250.00 | 262.00 | 1 | 344.0 | 4.4 | X |

Notes:

1. Tested with pulses Pulse test: $t_p \leq 50$ ms; $\delta < 2\%$

TPSMC-E Series

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

Figure 1 - Pulse Waveform

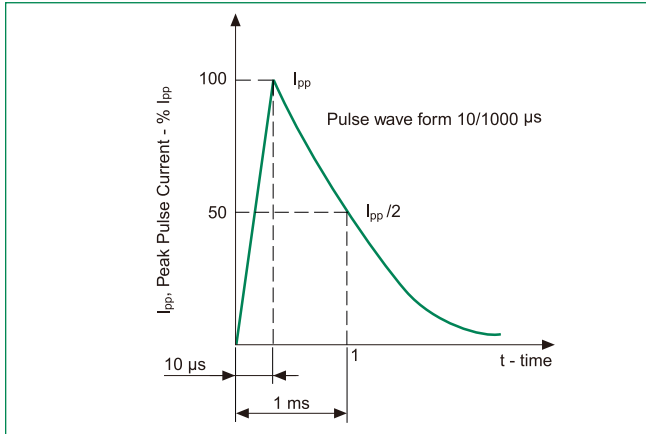


Figure 2 - Pulse Power or Current vs. Initial Junction Temperature

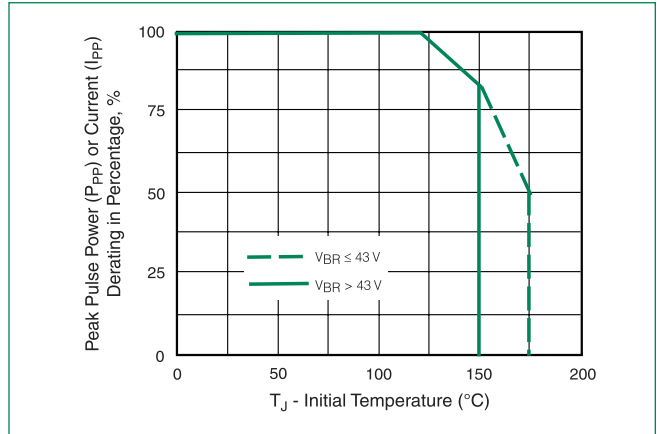


Figure 3 - Peak Pulse Power Rating Curve

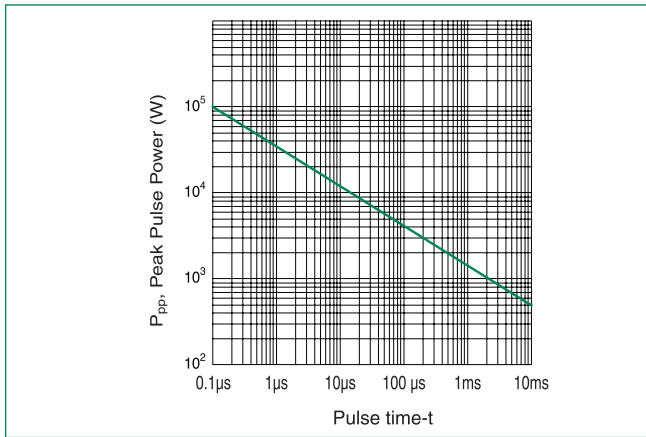
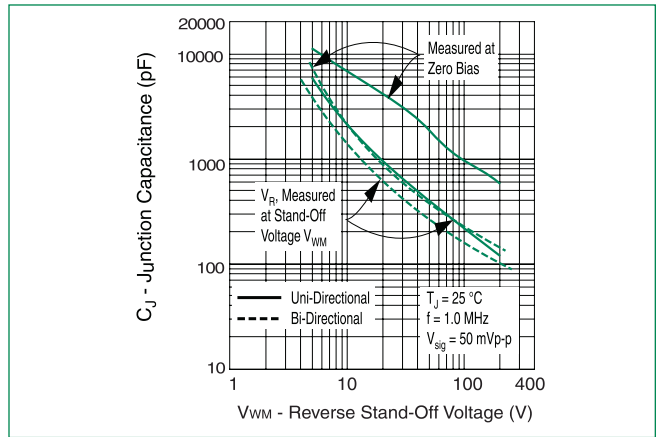
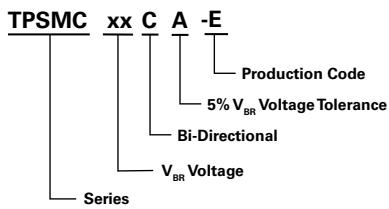


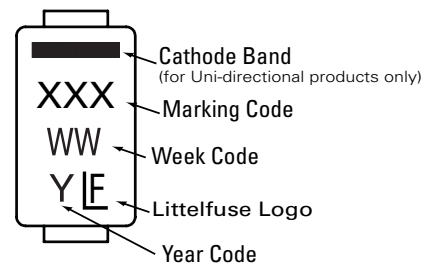
Figure 4 - Typical Junction Capacitance



Part Numbering System



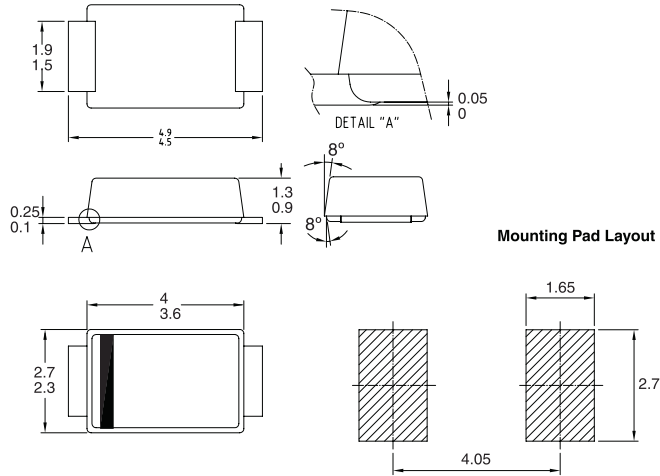
Part Marking System



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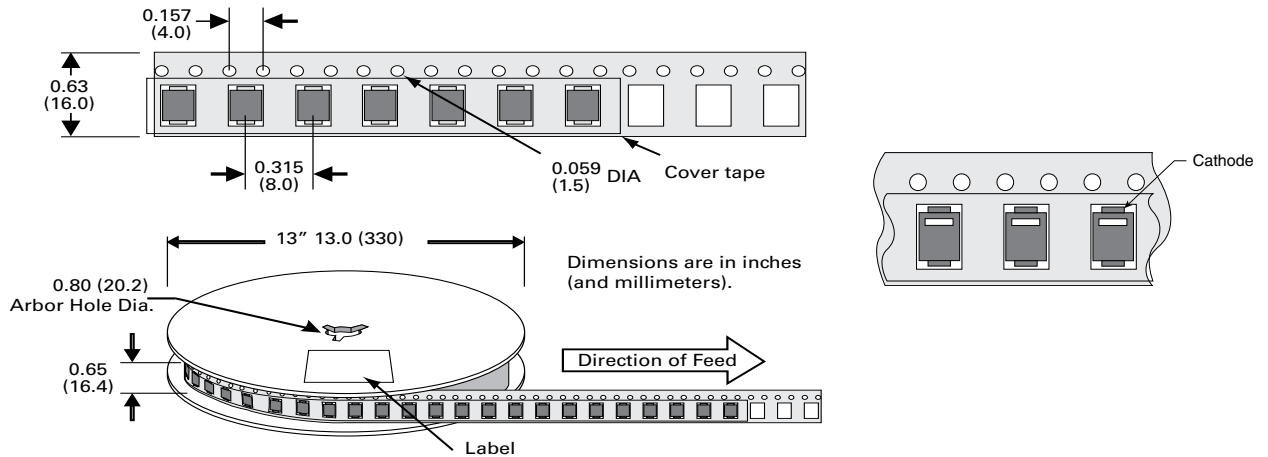
Dimensions - DO-214AB Package



Packaging Options

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-------------|-------------------|----------|----------------------------|-------------------------|
| TPSMCxxXX-E | DO-214AB | 3500 | 13" diameter tape and reel | EIA RS-481 |

Tape and Reel Specification



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.