

SMAG Plastic-Encapsulate Diodes

Transient Voltage Suppressor Diodes

Features

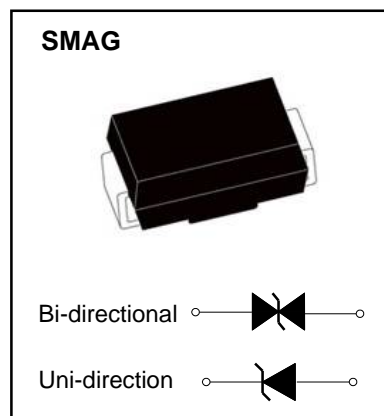
- P_{PP} 400W
- V_{RWM} 5.0V- 440V
- Glass passivated chip

Applications

- Clamping Voltage

Marking

- SMAJ
XXCA/XXA/XX
XX : From 5.0 To 440



Limiting Values (Absolute Maximum Rating)

| Item | Symbol | Unit | Conditions | Max |
|--|----------------|------------------|--|----------------|
| Peak pulse power dissipation | P_{PPM} | W | with a 10/1000us waveform | 400 |
| Peak pulse current (1) | I_{PPM} | A | with a 10/1000us waveform | See Next Table |
| Power dissipation | P_D | W | On infinite heat sink at $T_L=75^\circ\text{C}$ | 1.0 |
| Peak forward surge current(2) | I_{FSM} | A | 8.3 ms single half sine-wave unidirectional only | 40 |
| Operating junction and storage temperature range | T_J, T_{STG} | $^\circ\text{C}$ | | -55 to +150 |

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

| Item | Symbol | Unit | Conditions | Max |
|---|-----------------|--------------------|---|---------|
| Maximum instantaneous forward Voltage (3) | V_F | V | at 25A for unidirectional only | 3.5/5.0 |
| Thermal resistance | $R_{\theta JL}$ | $^\circ\text{C/W}$ | junction to lead | 30 |
| | $R_{\theta JA}$ | $^\circ\text{C/W}$ | junction to ambient, $L_{Lead} = 10 \text{ mm}$ | 120 |

Notes:

- (1) Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^\circ\text{C}$ per Fig.2.
- (2) Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) copper pads to each terminal
- (3) $V_F < 3.5\text{V}$ for devices of $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR} > 201\text{V}$

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

| Part Number(Uni) | Part Number(Bi) | $V_{BR}@I_T$ Breakdown Voltage $V_{BR}@I_T$ | | | $I_R@V_{WM}$ Maximum Reverse Leakage I_R ⁽³⁾ (μA) | V_{RWM} Working Peak Reverse Voltage V_{RWM} (V) | IPP Maximum Reverse Surge Current IPP ⁽²⁾ (A) | Maximum Clamping Voltage V_c @ I_{PP} (V) |
|------------------|--------------------------|--|---------|---------------------------|---|---|--|---|
| | | Min(V) | Max (V) | I_T ⁽¹⁾ (mA) | | | | |
| SMAJ5.0 | SMAJ5.0C | 6.40 | 7.30 | 10 | 800 | 5.0 | 41.7 | 9.6 |
| SMAJ5.0A | SMAJ5.0CA ⁽⁴⁾ | 6.40 | 7.07 | 10 | 800 | 5.0 | 43.5 | 9.2 |
| SMAJ6.0 | SMAJ6.0C | 6.67 | 8.15 | 10 | 800 | 6.0 | 35.1 | 11.4 |
| SMAJ6.0A | SMAJ6.0CA | 6.67 | 7.37 | 10 | 800 | 6.0 | 38.8 | 10.3 |
| SMAJ6.5 | SMAJ6.5C | 7.22 | 8.82 | 10 | 500 | 6.5 | 32.5 | 12.3 |
| SMAJ6.5A | SMAJ6.5CA | 7.22 | 7.98 | 10 | 500 | 6.5 | 35.7 | 11.2 |
| SMAJ7.0 | SMAJ7.0C | 7.78 | 9.51 | 10 | 200 | 7.0 | 30.1 | 13.3 |
| SMAJ7.0A | SMAJ7.0CA | 7.78 | 8.60 | 10 | 200 | 7.0 | 33.3 | 12.0 |
| SMAJ7.5 | SMAJ7.5C | 8.33 | 10.20 | 1.0 | 100 | 7.5 | 28.0 | 14.3 |
| SMAJ7.5A | SMAJ7.5CA | 8.33 | 9.21 | 1.0 | 100 | 7.5 | 31.0 | 12.9 |
| SMAJ8.0 | SMAJ8.0C | 8.89 | 10.90 | 1.0 | 50 | 8.0 | 26.7 | 15.0 |
| SMAJ8.0A | SMAJ8.0CA | 8.89 | 9.83 | 1.0 | 50 | 8.0 | 29.4 | 13.6 |
| SMAJ8.5 | SMAJ8.5C | 9.44 | 11.50 | 1.0 | 10 | 8.5 | 25.1 | 15.9 |
| SMAJ8.5A | SMAJ8.5CA | 9.44 | 10.4 | 1.0 | 10 | 8.5 | 27.8 | 14.4 |
| SMAJ9.0 | SMAJ9.0C | 10.0 | 12.2 | 1.0 | 5.0 | 9.0 | 23.6 | 16.9 |
| SMAJ9.0A | SMAJ9.0CA | 10.0 | 11.1 | 1.0 | 5.0 | 9.0 | 26.0 | 15.4 |
| SMAJ10 | SMAJ10C | 11.1 | 13.6 | 1.0 | 5.0 | 10.0 | 21.3 | 18.8 |
| SMAJ10A | SMAJ10CA | 11.1 | 12.3 | 1.0 | 5.0 | 10.0 | 23.5 | 17.0 |
| SMAJ11 | SMAJ11C | 12.2 | 14.9 | 1.0 | 5.0 | 11.0 | 19.9 | 20.1 |
| SMAJ11A | SMAJ11CA | 12.2 | 13.5 | 1.0 | 5.0 | 11.0 | 22.0 | 18.2 |
| SMAJ12 | SMAJ12C | 13.3 | 16.3 | 1.0 | 5.0 | 12.0 | 18.2 | 22.0 |
| SMAJ12A | SMAJ12CA | 13.3 | 14.7 | 1.0 | 5.0 | 12.0 | 20.1 | 19.9 |
| SMAJ13 | SMAJ13C | 14.4 | 17.6 | 1.0 | 5.0 | 13.0 | 16.8 | 23.8 |
| SMAJ13A | SMAJ13CA | 14.4 | 15.9 | 1.0 | 5.0 | 13.0 | 18.6 | 21.5 |
| SMAJ14 | SMAJ14C | 15.6 | 19.1 | 1.0 | 5.0 | 14.0 | 15.5 | 25.8 |
| SMAJ14A | SMAJ14CA | 15.6 | 17.2 | 1.0 | 5.0 | 14.0 | 17.2 | 23.2 |
| SMAJ15 | SMAJ15C | 16.7 | 20.4 | 1.0 | 5.0 | 15.0 | 14.8 | 26.9 |
| SMAJ15A | SMAJ15CA | 16.7 | 18.5 | 1.0 | 5.0 | 15.0 | 16.4 | 24.4 |
| SMAJ16 | SMAJ16C | 17.8 | 21.8 | 1.0 | 5.0 | 16.0 | 13.9 | 28.8 |
| SMAJ16A | SMAJ16CA | 17.8 | 19.7 | 1.0 | 5.0 | 16.0 | 15.4 | 26.0 |
| SMAJ17 | SMAJ17C | 18.9 | 23.1 | 1.0 | 5.0 | 17.0 | 13.1 | 30.5 |
| SMAJ17A | SMAJ17CA | 18.9 | 20.9 | 1.0 | 5.0 | 17.0 | 14.5 | 27.6 |
| SMAJ18 | SMAJ18C | 20.0 | 24.4 | 1.0 | 5.0 | 18.0 | 12.4 | 32.2 |
| SMAJ18A | SMAJ18CA | 20.0 | 22.1 | 1.0 | 5.0 | 18.0 | 13.7 | 29.2 |
| SMAJ19 | SMAJ19C | 21.1 | 25.7 | 1.0 | 5.0 | 19.0 | 11.7 | 30.8 |
| SMAJ19A | SMAJ19CA | 21.1 | 23.3 | 1.0 | 5.0 | 19.0 | 13.0 | 30.8 |
| SMAJ20 | SMAJ20C | 22.2 | 27.1 | 1.0 | 5.0 | 20.0 | 11.1 | 35.8 |
| SMAJ20A | SMAJ20CA | 22.2 | 24.5 | 1.0 | 5.0 | 20.0 | 12.3 | 32.4 |
| SMAJ22 | SMAJ22C | 24.4 | 29.8 | 1.0 | 5.0 | 22.0 | 10.1 | 39.4 |
| SMAJ22A | SMAJ22CA | 24.4 | 26.9 | 1.0 | 5.0 | 22.0 | 11.3 | 35.5 |

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

| Part Number(Uni) | Part Number(Bi) | $V_{BR}@I_T$ Breakdown Voltage $V_{BR}@I_T$ | | | $I_R@V_{WM}$ Maximum Reverse Leakage $I_R^{(3)}$ (μA) | V_{RWM} Working Peak Reverse Voltage V_{RWM} (V) | IPP Maximum Reverse Surge Current IPP ⁽²⁾ (A) | Maximum Clamping Voltage V_C @ I_{PP} (V) |
|------------------|-----------------|--|---------|------------------|--|---|--|---|
| | | Min(V) | Max (V) | $I_T^{(1)}$ (mA) | | | | |
| SMAJ24 | SMAJ24C | 26.7 | 32.6 | 1.0 | 5.0 | 24.0 | 9.3 | 43.0 |
| SMAJ24A | SMAJ24CA | 26.7 | 29.5 | 1.0 | 5.0 | 24.0 | 10.3 | 38.9 |
| SMAJ26 | SMAJ26C | 28.9 | 35.3 | 1.0 | 5.0 | 26.0 | 8.6 | 46.6 |
| SMAJ26A | SMAJ26CA | 28.9 | 31.9 | 1.0 | 5.0 | 26.0 | 9.5 | 42.1 |
| SMAJ28 | SMAJ28C | 31.1 | 38.0 | 1.0 | 5.0 | 28.0 | 8.0 | 50.0 |
| SMAJ28A | SMAJ28CA | 31.1 | 34.4 | 1.0 | 5.0 | 28.0 | 8.8 | 45.4 |
| SMAJ30 | SMAJ30C | 33.3 | 40.7 | 1.0 | 5.0 | 30.0 | 7.5 | 53.5 |
| SMAJ30A | SMAJ30CA | 33.3 | 36.8 | 1.0 | 5.0 | 30.0 | 8.3 | 48.4 |
| SMAJ33 | SMAJ33C | 36.7 | 44.9 | 1.0 | 5.0 | 33.0 | 6.8 | 59.0 |
| SMAJ33A | SMAJ33CA | 36.7 | 40.6 | 1.0 | 5.0 | 33.0 | 7.5 | 53.3 |
| SMAJ36 | SMAJ36C | 40.0 | 48.9 | 1.0 | 5.0 | 36.0 | 6.2 | 64.3 |
| SMAJ36A | SMAJ36CA | 40.0 | 44.2 | 1.0 | 5.0 | 36.0 | 6.9 | 58.1 |
| SMAJ40 | SMAJ40C | 44.4 | 54.3 | 1.0 | 5.0 | 40.0 | 5.6 | 71.4 |
| SMAJ40A | SMAJ40CA | 44.4 | 49.1 | 1.0 | 5.0 | 40.0 | 6.2 | 64.5 |
| SMAJ43 | SMAJ43C | 47.8 | 58.4 | 1.0 | 5.0 | 43.0 | 5.2 | 76.7 |
| SMAJ43A | SMAJ43CA | 47.8 | 52.8 | 1.0 | 5.0 | 43.0 | 5.8 | 69.4 |
| SMAJ45 | SMAJ45C | 50.0 | 61.1 | 1.0 | 5.0 | 45.0 | 5.0 | 80.3 |
| SMAJ45A | SMAJ45CA | 50.0 | 55.3 | 1.0 | 5.0 | 45.0 | 5.5 | 72.7 |
| SMAJ48 | SMAJ48C | 53.3 | 65.1 | 1.0 | 5.0 | 48.0 | 4.6 | 85.5 |
| SMAJ48A | SMAJ48CA | 53.3 | 58.9 | 1.0 | 5.0 | 48.0 | 5.2 | 77.4 |
| SMAJ51 | SMAJ51C | 56.7 | 69.3 | 1.0 | 5.0 | 51.0 | 4.4 | 91.1 |
| SMAJ51A | SMAJ51CA | 56.7 | 62.7 | 1.0 | 5.0 | 51.0 | 4.9 | 82.4 |
| SMAJ54 | SMAJ54C | 60.0 | 73.3 | 1.0 | 5.0 | 54.0 | 4.1 | 96.3 |
| SMAJ54A | SMAJ54CA | 60.0 | 66.3 | 1.0 | 5.0 | 54.0 | 4.6 | 87.1 |
| SMAJ58 | SMAJ58C | 64.4 | 78.7 | 1.0 | 5.0 | 58.0 | 3.9 | 103.0 |
| SMAJ58A | SMAJ58CA | 64.4 | 71.2 | 1.0 | 5.0 | 58.0 | 4.3 | 93.6 |
| SMAJ60 | SMAJ60C | 66.7 | 81.5 | 1.0 | 5.0 | 60.0 | 3.7 | 107.0 |
| SMAJ60A | SMAJ60CA | 66.7 | 73.7 | 1.0 | 5.0 | 60.0 | 4.1 | 96.8 |
| SMAJ64 | SMAJ64C | 71.1 | 86.9 | 1.0 | 5.0 | 64.0 | 3.5 | 114.0 |
| SMAJ64A | SMAJ64CA | 71.1 | 78.6 | 1.0 | 5.0 | 64.0 | 3.9 | 103.0 |
| SMAJ70 | SMAJ70C | 77.8 | 95.1 | 1.0 | 5.0 | 70.0 | 3.2 | 125.0 |
| SMAJ70A | SMAJ70CA | 77.8 | 86.0 | 1.0 | 5.0 | 70.0 | 3.5 | 113.0 |
| SMAJ75 | SMAJ75C | 83.3 | 102.0 | 1.0 | 5.0 | 75.0 | 3.0 | 134.0 |
| SMAJ75A | SMAJ75CA | 83.3 | 92.1 | 1.0 | 5.0 | 75.0 | 3.3 | 121.0 |
| SMAJ78 | SMAJ78C | 86.7 | 106.0 | 1.0 | 5.0 | 78.0 | 2.9 | 139.0 |
| SMAJ78A | SMAJ78CA | 86.7 | 95.8 | 1.0 | 5.0 | 78.0 | 3.2 | 126.0 |
| SMAJ80 | SMAJ80C | 88.9 | 108.8 | 1.0 | 5.0 | 80.0 | 2.8 | 143.2 |
| SMAJ80A | SMAJ80CA | 88.8 | 97.6 | 1.0 | 5.0 | 80.0 | 3.1 | 129.0 |
| SMAJ85 | SMAJ85C | 94.4 | 115 | 1.0 | 5.0 | 85.0 | 2.6 | 151.0 |
| SMAJ85A | SMAJ85CA | 94.4 | 104 | 1.0 | 5.0 | 85.0 | 2.9 | 137.0 |

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

| Part Number (Uni) | Part Number (Bi) | $V_{BR}@I_T$ Breakdown Voltage $V_{BR}@I_T$ | | | $I_R@V_{WM}$ Maximum Reverse Leakage $I_R^{(3)}$ (μA) | V_{RWM} Working Peak Reverse Voltage V_{RWM} (V) | IPP Maximum Reverse Surge Current IPP ⁽²⁾ (A) | Maximum Clamping Voltage V_c @ I_{PP} (V) |
|-------------------|------------------|--|---------|------------------|--|---|--|---|
| | | Min(V) | Max (V) | $I_T^{(1)}$ (mA) | | | | |
| SMAJ90 | SMAJ90C | 100 | 122 | 1.0 | 5.0 | 90.0 | 2.5 | 160.0 |
| SMAJ90A | SMAJ90CA | 100 | 111 | 1.0 | 5.0 | 90.0 | 2.7 | 146.0 |
| SMAJ100 | SMAJ100C | 111 | 136 | 1.0 | 5.0 | 100.0 | 2.2 | 179.0 |
| SMAJ100A | SMAJ100CA | 111 | 123 | 1.0 | 5.0 | 100.0 | 2.4 | 162.0 |
| SMAJ110 | SMAJ110C | 122 | 149 | 1.0 | 5.0 | 110.0 | 2.0 | 196.0 |
| SMAJ110A | SMAJ110CA | 122 | 135 | 1.0 | 5.0 | 110.0 | 2.2 | 177.0 |
| SMAJ120 | SMAJ120C | 133 | 163 | 1.0 | 5.0 | 120.0 | 1.8 | 214.0 |
| SMAJ120A | SMAJ120CA | 133 | 147 | 1.0 | 5.0 | 120.0 | 2.1 | 193.0 |
| SMAJ130 | SMAJ130C | 144 | 176 | 1.0 | 5.0 | 130.0 | 1.7 | 231.0 |
| SMAJ130A | SMAJ130CA | 144 | 159 | 1.0 | 5.0 | 130.0 | 1.9 | 209.0 |
| SMAJ140 | SMAJ140C | 155 | 190 | 1.0 | 5.0 | 140.0 | 1.6 | 250.6 |
| SMAJ140A | SMAJ140CA | 155 | 171 | 1.0 | 5.0 | 140.0 | 1.7 | 226.8 |
| SMAJ150 | SMAJ150C | 167 | 204 | 1.0 | 5.0 | 150.0 | 1.5 | 268.0 |
| SMAJ150A | SMAJ150CA | 167 | 185 | 1.0 | 5.0 | 150.0 | 1.6 | 243.0 |
| SMAJ160 | SMAJ160C | 178 | 218 | 1.0 | 5.0 | 160.0 | 1.4 | 287.0 |
| SMAJ160A | SMAJ160CA | 178 | 197 | 1.0 | 5.0 | 160.0 | 1.5 | 259.0 |
| SMAJ170 | SMAJ170C | 189 | 231 | 1.0 | 5.0 | 170.0 | 1.3 | 304.0 |
| SMAJ170A | SMAJ170CA | 189 | 209 | 1.0 | 5.0 | 170.0 | 1.4 | 275.0 |
| SMAJ180 | SMAJ180C | 200 | 244 | 1.0 | 5.0 | 180.0 | 1.2 | 322.2 |
| SMAJ180A | SMAJ180CA | 200 | 220 | 1.0 | 5.0 | 180.0 | 1.3 | 291.6 |
| SMAJ190 | SMAJ190C | 211 | 258 | 1.0 | 5.0 | 190.0 | 1.2 | 340.1 |
| SMAJ190A | SMAJ190CA | 211 | 232 | 1.0 | 5.0 | 190.0 | 1.3 | 307.8 |
| SMAJ200A | SMAJ200CA | 224 | 247 | 1.0 | 1.0 | 200.0 | 1.2 | 324.0 |
| SMAJ220A | SMAJ220CA | 246 | 272 | 1.0 | 1.0 | 220.0 | 1.1 | 356.0 |
| SMAJ250A | SMAJ250CA | 279 | 309 | 1.0 | 1.0 | 250.0 | 1.0 | 405.0 |
| SMAJ300A | SMAJ300CA | 335 | 371 | 1.0 | 1.0 | 300.0 | 0.8 | 486.0 |
| SMAJ350A | SMAJ350CA | 391 | 432 | 1.0 | 1.0 | 350.0 | 0.7 | 567.0 |
| SMAJ400A | SMAJ400CA | 447 | 494 | 1.0 | 1.0 | 400.0 | 0.6 | 648.0 |
| SMAJ440A | SMAJ440CA | 492 | 543 | 1.0 | 1.0 | 440.0 | 0.5 | 713.0 |

Notes:

- (1) $t_p \leq 50\text{ms}$ Pulse test: $t_p \leq 50\text{ms}$
- (2) Surge current waveform per Fig. 3 and derated per Fig.2.
- (3) For bi-directional types having VWM of 10 V and less, the I_R limit is doubled
- (4) For the bi-directional SMAJ5.0CA, the maximum V_{BR} is 7.25 V

Typical Characteristics

FIG1: Peak Pulse Power Rating Curve

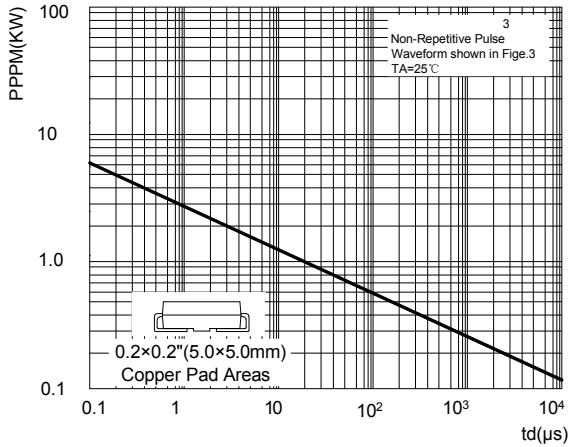


FIG2: Pulse Power or Current vs. Initial Junction Temperature

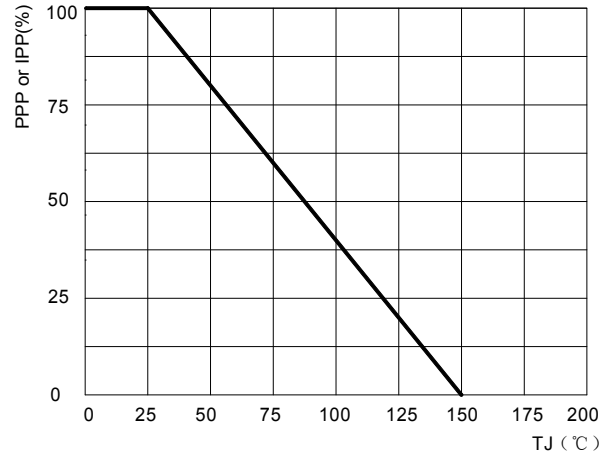


FIG3: Pulse Waveform

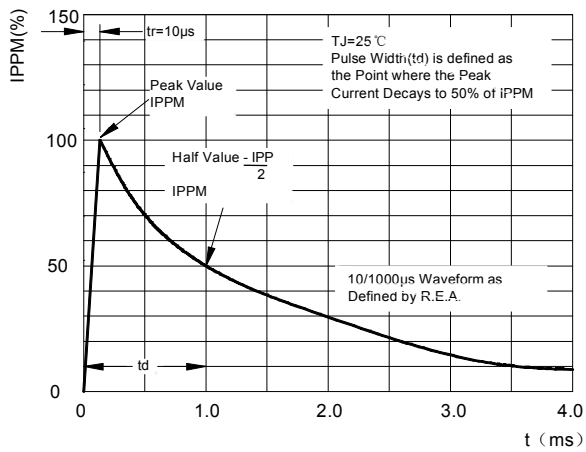


FIG4: Typical Transient Thermal Impedance

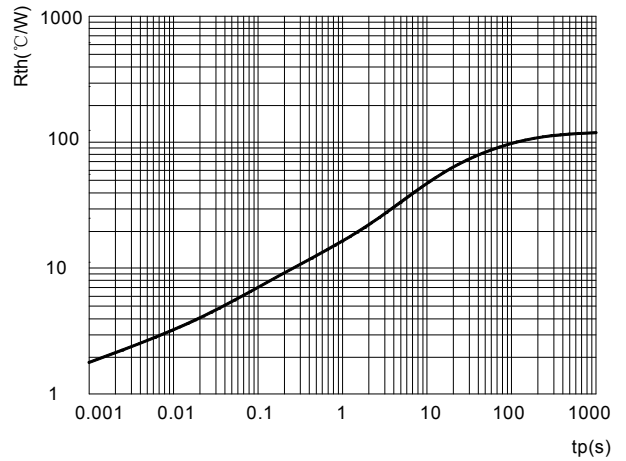


FIG5: Maximum Non-Repetitive Surge Current

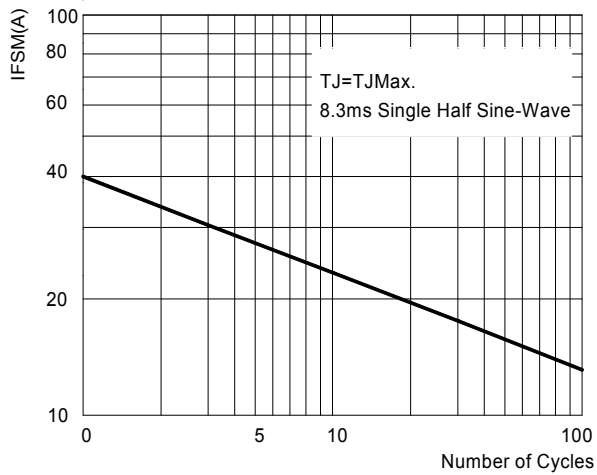
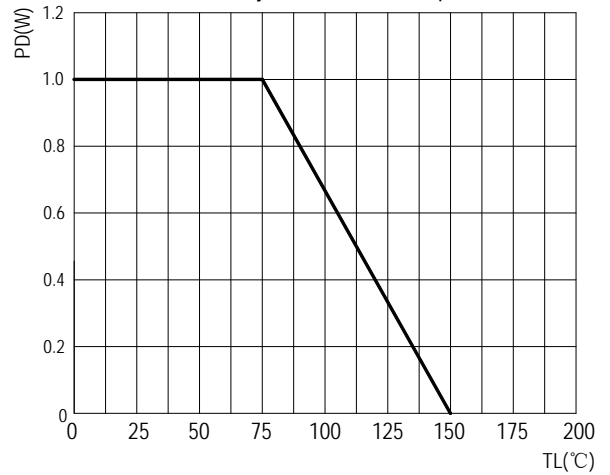
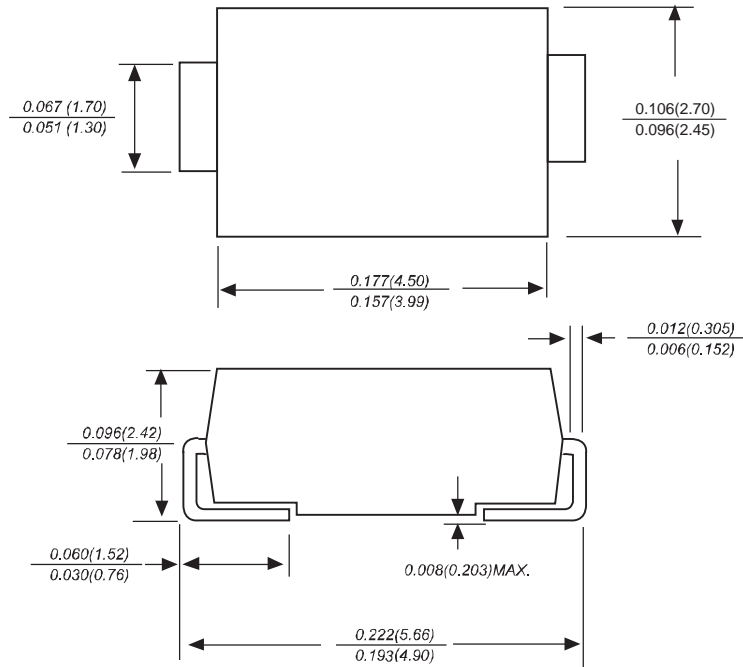


FIG6: Steady State Power Dissipation



SMAG Package Outline Dimensions



Dimensions in inches and (millimeters)

SMAG Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.

NOTICE

JSHD reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. JSHD does not assume any liability arising out of the application or use of any product described herein.

Reel Taping Specifications For Surface Mount Devices- SMAG

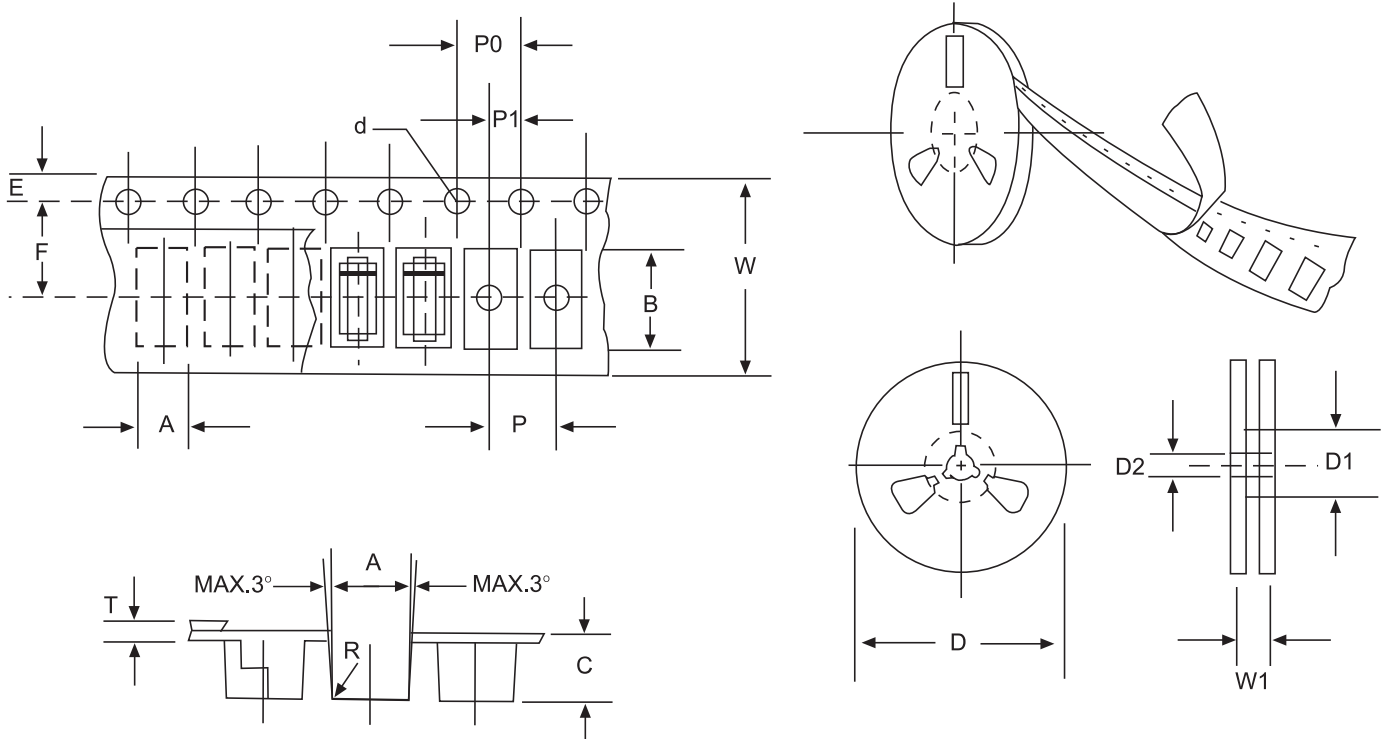


Fig:CONFIGURATION OF FLAT MELF TAPING

| ITEM | SYMBOL | SMAG mm(inch) |
|------------------------|--------|---------------------------|
| Carrier width | A | 2.79±0.1(0.110±0.004) |
| Carrier length | B | 5.33±0.1(0.210±0.004) |
| Carrier depth | C | 2.36±0.1(0.093±0.004) |
| Sprocket hole | d | 1.55±0.05(0.061±0.002) |
| Reel outside diameter | D | 279±2.0 (11± 0.079) |
| Reel inner diameter | D1 | 75±1.0 (2.95 ±0.039) |
| Feed hole diameter | D2 | 13±0.5(0.512±0.020) |
| Sprocket hole position | E | 1.75±0.1(0.069±0.004) |
| Punch hole position | F | 5.5±0.05(0.217±0.002) |
| Punch hole pitch | P | 4.0±0.1(0.157±0.004) |
| Sprocket hole pitch | P0 | 4.0±0.1(0.157±0.004) |
| Embossment center | P1 | 2.0±0.1(0.079±0.004) |
| Totall tape thickness | T | 0.28±0.02(0.011 ±0.0008) |
| Tape width | W | 12.0±0.2(0.472±0.008) |
| Reel width | W1 | 16.8±2.0(0.661±0.079) |

NOTE:Devices are packde in accordance with EIA standard RS-481-A and specification given above.