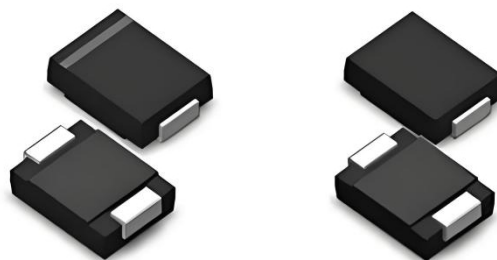


## Mechanical Data

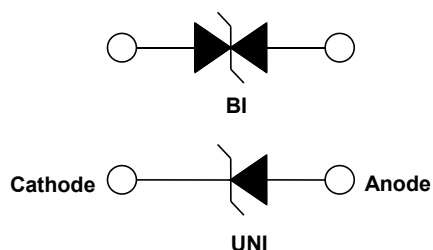
- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any

## Features

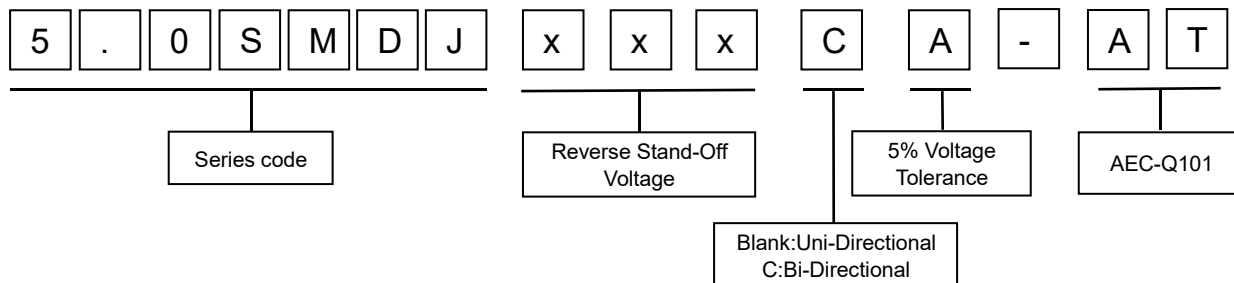
- Glass passivated chip
- 5000 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle): 0.01 %
- High reliability application and automotive grade
- Meet MSL level1, per J-STD-020
- AEC Q101 qualified
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



## Electrical symbol



## Part Number Code



## Mechanical Characteristics

| Rating                                                                                                            | Symbol          | Value      | Units                |
|-------------------------------------------------------------------------------------------------------------------|-----------------|------------|----------------------|
| Peak pulse power dissipation at 10/1000 $\mu$ s waveform (Note1, Note2, Fig.1)                                    | $P_{PPM}$       | 5000       | W                    |
| Peak pulse current of at 10/1000 $\mu$ s waveform (Note 1, Fig.3)                                                 | $I_{PPM}$       | See Table  | A                    |
| Steady state power dissipation at $T_A=50^{\circ}\text{C}$ (Fig.5)                                                | $P_{M(AV)}$     | 6.5        | W                    |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only                                             | $V_F$           | 3.5/5.0    | V                    |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6) | $I_{FSM}$       | 300        | A                    |
| Operating junction and Storage Temperature Ranges                                                                 | $T_J, T_{STG}$  | -55 to 150 | $^{\circ}\text{C}$   |
| Typical thermal resistance junction to lead                                                                       | $R_{\theta JL}$ | 15         | $^{\circ}\text{C/W}$ |
| Typical thermal resistance junction to ambient                                                                    | $R_{\theta JA}$ | 75         | $^{\circ}\text{C/W}$ |

Notes: 1. Non-repetitive current pulse, per Fig.3 and derating above  $T_A=25^{\circ}\text{C}$  per Fig.2.

2. Each terminal is surface Mounted on the 8.0mm $\times$ 8.0mm copper pads.

3. 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minutes maximum.

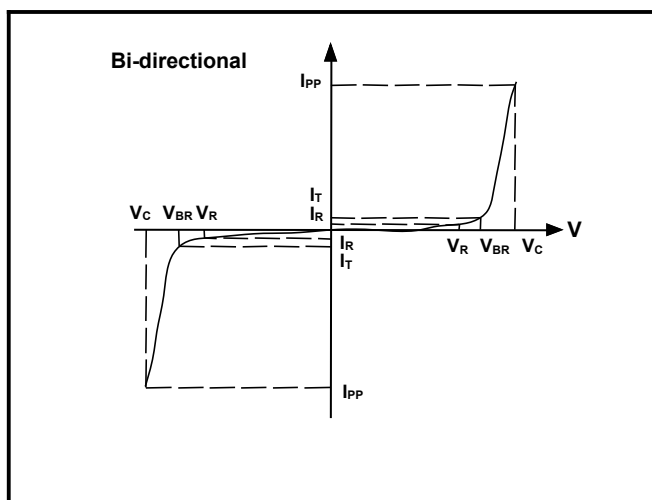
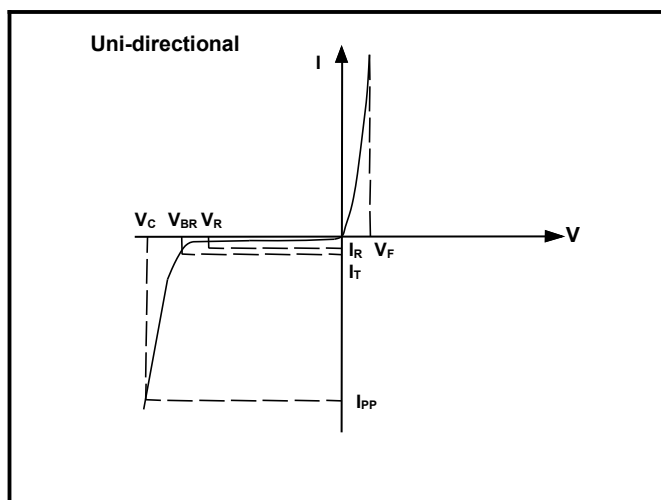
4.  $V_F < 3.5\text{V}$  for single die parts and  $V_F < 5.0\text{V}$  for stacked-die parts.

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

| Type Number   |                | Marking |      | Working Peak Reverse Voltage | Breakdown Voltage |       | Test Current | Max. Clamping Voltage | Max. Peak Pulse Current | Max. Reverse Leakage |
|---------------|----------------|---------|------|------------------------------|-------------------|-------|--------------|-----------------------|-------------------------|----------------------|
|               |                |         |      | $V_R$                        | $V_{BR} @ I_T$    |       | $I_T$        | $V_C @ I_{PP}$        | $I_{PP}$                | $I_R @ V_R$          |
|               |                |         |      |                              | Min               | Max   |              |                       |                         |                      |
| UNI           | BI             | UNI     | BI   | V                            | V                 | V     | mA           | V                     | A                       | $\mu\text{A}$        |
| 5.0SMDJ11A-AT | 5.0SMDJ11CA-AT | 5PEN    | 5BEN | 11.0                         | 12.20             | 13.50 | 10           | 18.2                  | 275.0                   | 800                  |
| 5.0SMDJ12A-AT | 5.0SMDJ12CA-AT | 5PEP    | 5BEP | 12.0                         | 13.30             | 14.70 | 10           | 19.9                  | 252.0                   | 800                  |
| 5.0SMDJ13A-AT | 5.0SMDJ13CA-AT | 5PEQ    | 5BEQ | 13.0                         | 14.40             | 15.90 | 10           | 21.5                  | 233.0                   | 500                  |
| 5.0SMDJ14A-AT | 5.0SMDJ14CA-AT | 5PER    | 5BER | 14.0                         | 15.60             | 17.20 | 10           | 23.2                  | 216.0                   | 200                  |
| 5.0SMDJ15A-AT | 5.0SMDJ15CA-AT | 5PES    | 5BES | 15.0                         | 16.70             | 18.50 | 1            | 24.4                  | 205.0                   | 100                  |
| 5.0SMDJ16A-AT | 5.0SMDJ16CA-AT | 5PET    | 5BET | 16.0                         | 17.80             | 19.70 | 1            | 26.0                  | 193.0                   | 50                   |
| 5.0SMDJ17A-AT | 5.0SMDJ17CA-AT | 5PEU    | 5BEU | 17.0                         | 18.90             | 20.90 | 1            | 27.6                  | 181.0                   | 20                   |
| 5.0SMDJ18A-AT | 5.0SMDJ18CA-AT | 5PEV    | 5BEV | 18.0                         | 20.00             | 22.10 | 1            | 29.2                  | 172.0                   | 10                   |
| 5.0SMDJ20A-AT | 5.0SMDJ20CA-AT | 5PEW    | 5BEW | 20.0                         | 22.20             | 24.50 | 1            | 32.4                  | 155.0                   | 5                    |
| 5.0SMDJ22A-AT | 5.0SMDJ22CA-AT | 5PEX    | 5BEX | 22.0                         | 24.40             | 26.90 | 1            | 35.5                  | 141.0                   | 5                    |
| 5.0SMDJ24A-AT | 5.0SMDJ24CA-AT | 5PEZ    | 5BEZ | 24.0                         | 26.70             | 29.50 | 1            | 38.9                  | 129.0                   | 2                    |
| 5.0SMDJ26A-AT | 5.0SMDJ26CA-AT | 5PFE    | 5BFE | 26.0                         | 28.90             | 31.90 | 1            | 42.1                  | 119.0                   | 2                    |
| 5.0SMDJ28A-AT | 5.0SMDJ28CA-AT | 5PFG    | 5BFG | 28.0                         | 31.10             | 34.40 | 1            | 45.4                  | 110.0                   | 2                    |
| 5.0SMDJ30A-AT | 5.0SMDJ30CA-AT | 5PFK    | 5BFK | 30.0                         | 33.30             | 36.80 | 1            | 48.4                  | 103.0                   | 2                    |
| 5.0SMDJ33A-AT | 5.0SMDJ33CA-AT | 5PFM    | 5BFM | 33.0                         | 36.7              | 40.6  | 1            | 53.3                  | 93.9                    | 2                    |
| 5.0SMDJ36A-AT | 5.0SMDJ36CA-AT | 5PFP    | 5BFP | 36.0                         | 40.0              | 44.2  | 1            | 58.1                  | 86.1                    | 2                    |
| 5.0SMDJ40A-AT | 5.0SMDJ40CA-AT | 5PFR    | 5BFR | 40.0                         | 44.4              | 49.1  | 1            | 64.5                  | 77.6                    | 2                    |
| 5.0SMDJ43A-AT | 5.0SMDJ43CA-AT | 5PFT    | 5BFT | 43.0                         | 47.8              | 52.8  | 1            | 69.4                  | 72.1                    | 2                    |
| 5.0SMDJ45A-AT | 5.0SMDJ45CA-AT | 5PFV    | 5BFV | 45.0                         | 50.0              | 55.3  | 1            | 72.7                  | 68.8                    | 2                    |
| 5.0SMDJ48A-AT | 5.0SMDJ48CA-AT | 5PFX    | 5BFX | 48.0                         | 53.3              | 58.9  | 1            | 77.4                  | 64.7                    | 2                    |
| 5.0SMDJ51A-AT | 5.0SMDJ51CA-AT | 5PFZ    | 5BFZ | 51.0                         | 56.7              | 62.7  | 1            | 82.4                  | 60.7                    | 2                    |
| 5.0SMDJ54A-AT | 5.0SMDJ54CA-AT | 5PGE    | 5BGE | 54.0                         | 60.0              | 66.3  | 1            | 87.1                  | 57.5                    | 2                    |
| 5.0SMDJ58A-AT | 5.0SMDJ58CA-AT | 5PGG    | 5BGG | 58.0                         | 64.4              | 71.2  | 1            | 93.6                  | 53.5                    | 2                    |
| 5.0SMDJ60A-AT | 5.0SMDJ60CA-AT | 5PGK    | 5BGK | 60.0                         | 66.7              | 73.7  | 1            | 96.8                  | 51.7                    | 2                    |
| 5.0SMDJ64A-AT | 5.0SMDJ64CA-AT | 5PGM    | 5BGM | 64.0                         | 71.1              | 78.6  | 1            | 103.0                 | 48.6                    | 2                    |
| 5.0SMDJ70A-AT | 5.0SMDJ70CA-AT | 5PGP    | 5BGP | 70.0                         | 77.8              | 86.0  | 1            | 113.0                 | 44.3                    | 2                    |
| 5.0SMDJ75A-AT | 5.0SMDJ75CA-AT | 5PGR    | 5BGR | 75.0                         | 83.3              | 92.1  | 1            | 121.0                 | 41.4                    | 2                    |
| 5.0SMDJ78A-AT | 5.0SMDJ78CA-AT | 5PGT    | 5BGT | 78.0                         | 86.7              | 95.8  | 1            | 126.0                 | 39.7                    | 2                    |
| 5.0SMDJ85A-AT | 5.0SMDJ85CA-AT | 5PGV    | 5BGV | 85.0                         | 94.4              | 104.0 | 1            | 137.0                 | 36.5                    | 2                    |

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

| Type Number    |                 | Marking |      | Working Peak Reverse Voltage | Breakdown Voltage |                | Test Current | Max. Clamping Voltage | Max. Peak Pulse Current | Max. Reverse Leakage |
|----------------|-----------------|---------|------|------------------------------|-------------------|----------------|--------------|-----------------------|-------------------------|----------------------|
|                |                 |         |      |                              |                   |                |              |                       |                         |                      |
|                |                 |         |      |                              | $V_R$             | $V_{BR} @ I_T$ |              |                       |                         |                      |
| UNI            | BI              | UNI     | BI   | V                            | Min               | Max            | $I_T$        | $V_C @ I_{PP}$        | $I_{PP}$                | $I_R @ V_R$          |
| 5.0SMDJ90A-AT  | 5.0SMDJ90CA-AT  | 5PGX    | 5BGX | 90.0                         | 100.0             | 111.0          | 1            | 146.0                 | 34.3                    | 2                    |
| 5.0SMDJ100A-AT | 5.0SMDJ100CA-AT | 5PGZ    | 5BGZ | 100.0                        | 111.0             | 123.0          | 1            | 162.0                 | 30.9                    | 2                    |
| 5.0SMDJ110A-AT | 5.0SMDJ110CA-AT | 5PHE    | 5BHE | 110.0                        | 122.0             | 135.0          | 1            | 177.0                 | 28.3                    | 2                    |
| 5.0SMDJ120A-AT | 5.0SMDJ120CA-AT | 5PHG    | 5BHG | 120.0                        | 133.0             | 147.0          | 1            | 193.0                 | 26.0                    | 2                    |
| 5.0SMDJ130A-AT | 5.0SMDJ130CA-AT | 5PHK    | 5BHK | 130.0                        | 144.0             | 159.0          | 1            | 209.0                 | 24.0                    | 2                    |
| 5.0SMDJ150A-AT | 5.0SMDJ150CA-AT | 5PHM    | 5BHM | 150.0                        | 167.0             | 185.0          | 1            | 243.0                 | 20.6                    | 2                    |
| 5.0SMDJ160A-AT | 5.0SMDJ160CA-AT | 5PHP    | 5BHP | 160.0                        | 178.0             | 197.0          | 1            | 259.0                 | 19.3                    | 2                    |
| 5.0SMDJ170A-AT | 5.0SMDJ170CA-AT | 5PHR    | 5BHR | 170.0                        | 189.0             | 209.0          | 1            | 275.0                 | 18.2                    | 2                    |

**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

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

Figure 1 - Peak Pulse Power Rating Curve

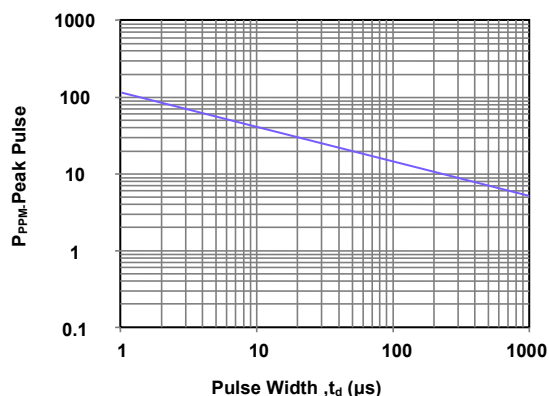


Figure 2 - Pulse Derating Curve

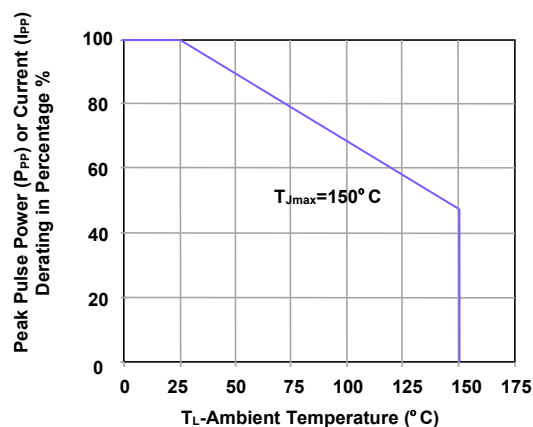


Figure 3 - Pulse Waveform

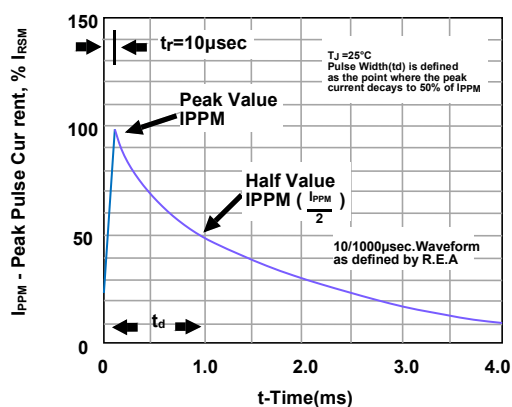


Figure 4 - Typical Junction Capacitance

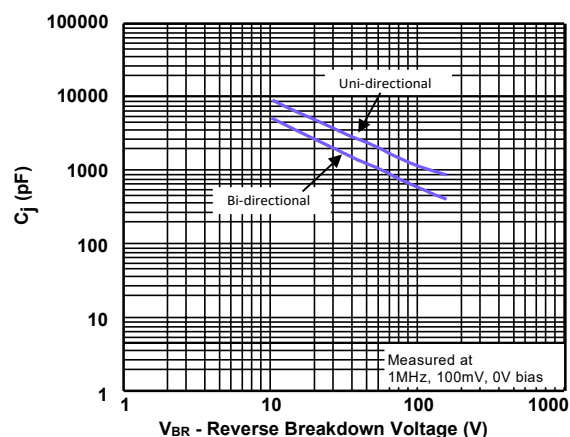


Figure 5 - Steady State Power Dissipation Derating Curve

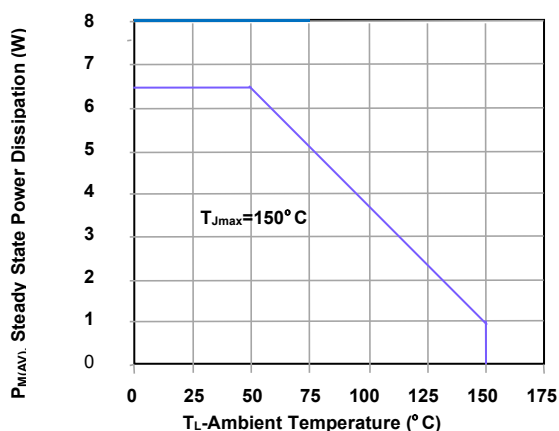
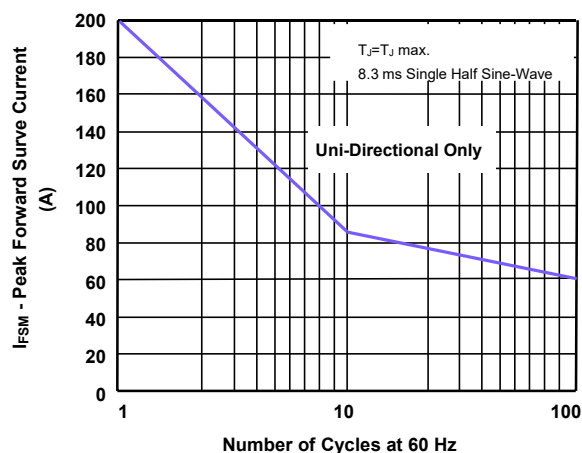
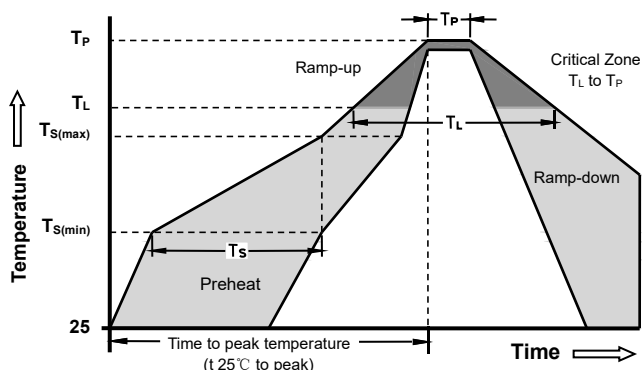


Figure 6 - Maximum Non-Repetitive Surge Current

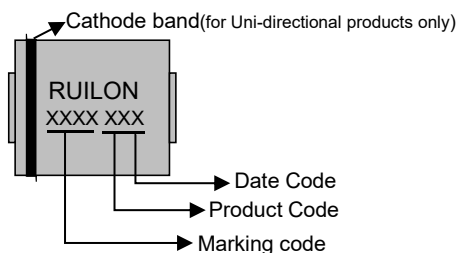


**Soldering Parameters - Reflow Soldering (Surface Mount Devices)**

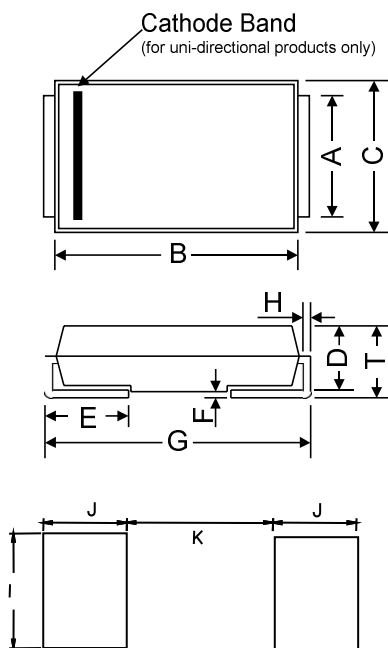


| Reflow Condition                                     |                                   | Pb - Free assembly |
|------------------------------------------------------|-----------------------------------|--------------------|
| Pre Heat                                             | -Temperature Min ( $T_{s(min)}$ ) | 150°C              |
|                                                      | -Temperature Max ( $T_{s(max)}$ ) | 200°C              |
|                                                      | - Time (min to max) ( $t_s$ )     | 60 -180 Seconds    |
| Average ramp up rate ( Liquids Temp $T_L$ ) to peak  |                                   | 3°C/second max     |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                 |                                   | 3°C/second max     |
| Reflow                                               | - Temperature ( $T_L$ ) (Liquids) | 217°C              |
|                                                      | - Time (min to max) ( $t_s$ )     | 60 -150 Seconds    |
| Peak Temperature ( $T_P$ )                           |                                   | 260 +0/-5°C        |
| Time within 5°C of actual peak Temperature ( $t_p$ ) |                                   | 20 - 40 Seconds    |
| Ramp-down Rate                                       |                                   | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )              |                                   | 8 minutes Max      |
| Do not exceed                                        |                                   | 260°C              |

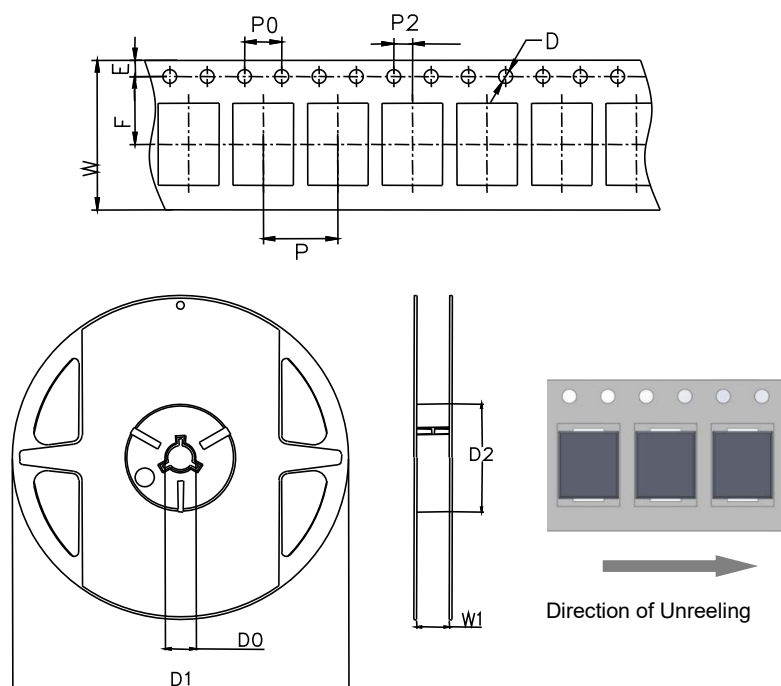
**Part Marking System**



**Dimensions**



| DIM | Millimeters |       | Inches |       |
|-----|-------------|-------|--------|-------|
|     | Min         | Max   | Min    | Max   |
| A   | 2.900       | 3.200 | 0.114  | 0.126 |
| B   | 6.600       | 7.110 | 0.260  | 0.280 |
| C   | 5.590       | 6.220 | 0.220  | 0.245 |
| D   | 2.060       | 2.620 | 0.079  | 0.103 |
| E   | 0.760       | 1.520 | 0.030  | 0.060 |
| F   | -           | 0.203 | -      | 0.008 |
| G   | 7.750       | 8.130 | 0.305  | 0.320 |
| H   | 0.152       | 0.305 | 0.006  | 0.012 |
| T   | 2.200       | 2.750 | 0.087  | 0.108 |
| I   | 3.300       | -     | 0.129  | -     |
| J   | 2.400       | -     | 0.094  | -     |
| K   | -           | 4.200 | -      | 0.165 |

**Taping and Reel Specifications**


| Symbol    | Millimeters  | Inches             |
|-----------|--------------|--------------------|
| <b>W</b>  | 16±0.3       | 0.630±0.012        |
| <b>P</b>  | 8±0.1        | 0.315±0.004        |
| <b>F</b>  | 7.25±0.1     | 0.285±0.004        |
| <b>E</b>  | 1.75±0.1     | 0.069±0.004        |
| <b>D</b>  | 1.5+0.1/-0.0 | 0.059+0.004/-0.0   |
| <b>P0</b> | 4±0.1        | 0.157±0.004        |
| <b>P2</b> | 2±0.1        | 0.079±0.004        |
| <b>D0</b> | 16.7±0.15    | 0.657±0.006        |
| <b>D1</b> | 330.2±2      | 13.0±0.079         |
| <b>D2</b> | 59.6+1/-2    | 2.346+0.039/-0.079 |
| <b>W1</b> | 17.2±0.4     | 0.677±0.016        |

| Part Number        | Component package | Quantity | Packaging option      | Packaging specification |
|--------------------|-------------------|----------|-----------------------|-------------------------|
| 5.0SMDJXXXXA/CA-AT | DO-214AB(SMC)     | 3000     | Tape&Reel-16mm/13"tap | EIA STD RS-481          |