

### »Features

- Excellent clamping capability
- Low leakage current
- Low capacitance
- High surge capability
- Glass passivated chip
- Epoxy resin package
- Built-in strain relief
- Will not fatigue
- RoHS Compliant
- Fast response time:  
typically less than 1.0ps from 0 Volts to  $V_{BR}$  min



SMC (DO-214AB)

### »Mechanical Characteristics

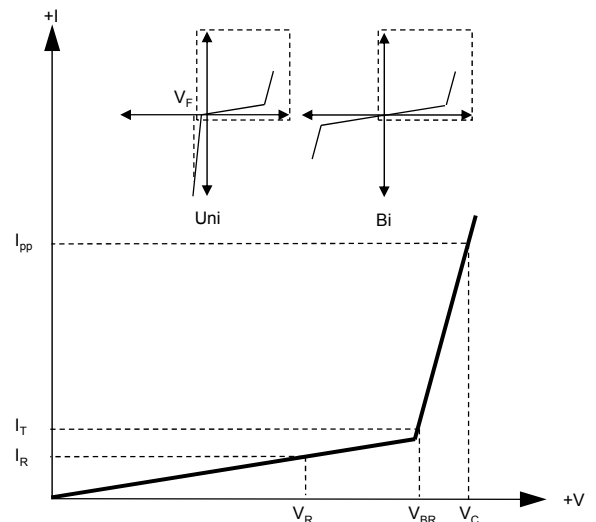
- Package: SMC plastic package.
- Lead Finish: Matte Tin
- Case Material: Epoxy Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020

### »Applications

- Telecom
- Computer
- Industrial electronic
- Consumer electronic

### »Electrical Parameters

| Parameter | Definition   |
|-----------|--|
| $C_J$     | Junction Capacitance - typical capacitance measured with 0V or $V_R$ bias                                      |
| $I_{PP}$  | Peak Pulse Current - maximum rated peak impulse current  |
| $V_C$     | Clamping Voltage - Peak voltage measured across the suppressor at a specified $I_{ppm}$ (peak impulse current) |
| $V_{BR}$  | Breakdown Voltage - Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )           |
| $I_R$     | Leakage Current - maximum peak off-state current measured at $V_R$   |
| $V_R$     | Peak Off-state Voltage - maximum voltage that can be applied while maintaining off state                       |



### »Summary of Packing Options

| Package | Packing Description | Packing Quantity | Industry Standard |
|---------|---------------------|------------------|-------------------|
| SMC     | Tape/Reel, 13" reel | 3000             | EIA-481-1         |
|         | Tape/Reel, 7" reel  | 500              | EIA-481-1         |

**»Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

| Parameter                                      | Symbol          | Value      | Units                       | Remarks        |
|--|-----------------|------------|-----------------------------|----------------|
| Peak Pulse Power Dissipation                   | $P_{PPM}$       | 3000       | W                           | (Note1)(Note2) |
| Steady State Power Dissipation                 | $P_D$           | 6.5        | W                           | (Note3)        |
| Peak Forward Surge Current                     | $I_{FSM}$       | 300        | A                           | (Note4)        |
| Maximum Instantaneous Forward Voltage at 100A  | $V_{FM}$        | 3.5/5      | V                           | (Note5)        |
| Typical Thermal Resistance Junction to Lead    | $R_{\theta JL}$ | 15         | $^{\circ}\text{C}/\text{W}$ |                |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 75         | $^{\circ}\text{C}/\text{W}$ |                |
| Operating Temperature Range                    | $T_J$           | -55 to 150 | $^{\circ}\text{C}$          |                |
| Storage Temperature Range                      | $T_{STG}$       | -55 to 150 | $^{\circ}\text{C}$          |                |

Notes1: Non-repetitive current pulse , 10/1000us Waveform.

Notes2: Mounted on copper pad area of 8×8mm to each terminal.

Notes3: Infinite HeatSink at  $T_A=50^{\circ}\text{C}$

Notes4: Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 perminute maximum.

Notes5: For UnidirectionalOnly,  $V_{FM}<3.5\text{V}$  for  $V_{BR} \leq 200\text{V}$  and  $V_{FM}<5.0\text{V}$  for  $V_{BR} \geq 201\text{V}$ .

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

| Part Number (Uni) | Part Number (Bi) | Marking Code |     | Reverse Stand off Voltage $V_R$ (V) | Breakdown Voltage $V_{BR} @ I_T$ (V) |      | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C @ I_{PP}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximun Reverse Leakage $I_R @ V_R$ ( $\mu\text{A}$ ) |
|-------------------|------------------|--------------|-----|-------------------------------------|--------------------------------------|------|-------------------------|---|---|---|
|                   |                  | Uni          | Bi  |                                     | Min                                  | Max  |                         |   |   |   |
| SMDJ5.0A          | SMDJ5.0CA        | HDE          | IDE | 5                                   | 6.4                                  | 7    | 10                      | 9.2   | 326.1                                   | 800   |
| SMDJ6.0A          | SMDJ6.0CA        | HDG          | IDG | 6                                   | 6.67                                 | 7.37 | 10                      | 10.3  | 291.3                                   | 800   |
| SMDJ6.5A          | SMDJ6.5CA        | HDK          | IDK | 6.5                                 | 7.22                                 | 7.98 | 10                      | 11.2  | 267.9                                   | 500   |
| SMDJ7.0A          | SMDJ7.0CA        | HDM          | IDM | 7                                   | 7.78                                 | 8.6  | 10                      | 12  | 250                                     | 200   |
| SMDJ7.5A          | SMDJ7.5CA        | HDP          | IDP | 7.5                                 | 8.33                                 | 9.21 | 1                       | 12.9  | 232.6                                   | 100   |
| SMDJ8.0A          | SMDJ8.0CA        | HDR          | IDR | 8                                   | 8.89                                 | 9.83 | 1                       | 13.6  | 220.6                                   | 50  |
| SMDJ8.5A          | SMDJ8.5CA        | HDT          | IDT | 8.5                                 | 9.44                                 | 10.4 | 1                       | 14.4  | 208.3                                   | 20  |
| SMDJ9.0A          | SMDJ9.0CA        | HDV          | IDV | 9                                   | 10                                   | 11.1 | 1                       | 15.4  | 194.8                                   | 10  |
| SMDJ10A           | SMDJ10CA         | HDX          | IDX | 10                                  | 11.1                                 | 12.3 | 1                       | 17  | 176.5                                   | 5   |
| SMDJ11A           | SMDJ11CA         | HDZ          | IDZ | 11                                  | 12.2                                 | 13.5 | 1                       | 18.2  | 164.8                                   | 2   |
| SMDJ12A           | SMDJ12CA         | HEE          | IEE | 12                                  | 13.3                                 | 14.7 | 1                       | 19.9  | 150.8                                   | 2   |
| SMDJ13A           | SMDJ13CA         | HEG          | IEG | 13                                  | 14.4                                 | 15.9 | 1                       | 21.5  | 139.5                                   | 2   |
| SMDJ14A           | SMDJ14CA         | HEK          | IEK | 14                                  | 15.6                                 | 17.2 | 1                       | 23.2  | 129.3                                   | 2   |
| SMDJ15A           | SMDJ15CA         | HEM          | IEM | 15                                  | 16.7                                 | 18.5 | 1                       | 24.4  | 123                                     | 2   |
| SMDJ16A           | SMDJ16CA         | HEP          | IEP | 16                                  | 17.8                                 | 19.7 | 1                       | 26  | 115.4                                   | 2   |
| SMDJ17A           | SMDJ17CA         | HER          | IER | 17                                  | 18.9                                 | 20.9 | 1                       | 27.6  | 108.7                                   | 2   |
| SMDJ18A           | SMDJ18CA         | HET          | IET | 18                                  | 20                                   | 22.1 | 1                       | 29.2  | 102.7                                   | 2   |
| SMDJ20A           | SMDJ20CA         | PEV          | IEV | 20                                  | 22.2                                 | 24.5 | 1                       | 32.4  | 92.6                                    | 2   |
| SMDJ22A           | SMDJ22CA         | HEX          | IEX | 22                                  | 24.4                                 | 26.9 | 1                       | 35.5  | 84.5                                    | 2   |
| SMDJ24A           | SMDJ24CA         | HEZ          | IEZ | 24                                  | 26.7                                 | 29.5 | 1                       | 38.9  | 77.1                                    | 2   |

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

| Part Number (Uni) | Part Number (Bi) | Marking Code |     | Reverse Stand off Voltage $V_R$ (V) | Breakdown Voltage $V_{BR} @ I_T$ (V) |       | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C @ I_{PP}$ (V) | Maximum Peak Pulse Current $I_{PP}$ (A) | Maximun Reverse Leakage $I_R @ V_R$ ( $\mu\text{A}$ ) |
|-------------------|------------------|--------------|-----|-------------------------------------|--------------------------------------|-------|-------------------------|---|---|---|
|                   |                  | Uni          | Bi  |                                     | Min                                  | Max   |                         |   |   |   |
| SMDJ26A           | SMDJ26CA         | HFE          | IFE | 26                                  | 28.9                                 | 31.9  | 1                       | 42.1  | 71.3                                    | 2   |
| SMDJ28A           | SMDJ28CA         | HFG          | IFG | 28                                  | 31.1                                 | 34.4  | 1                       | 45.4  | 66.1                                    | 2   |
| SMDJ30A           | SMDJ30CA         | HFK          | IFK | 30                                  | 33.3                                 | 36.8  | 1                       | 48.4  | 62                                      | 2   |
| SMDJ33A           | SMDJ33CA         | HFM          | IFM | 33                                  | 36.7                                 | 40.6  | 1                       | 53.3  | 56.3                                    | 2   |
| SMDJ36A           | SMDJ36CA         | HFP          | IFP | 36                                  | 40                                   | 44.2  | 1                       | 58.1  | 51.6                                    | 2   |
| SMDJ40A           | SMDJ40CA         | HFR          | IFR | 40                                  | 44.4                                 | 49.1  | 1                       | 64.5  | 46.5                                    | 2   |
| SMDJ43A           | SMDJ43CA         | HFT          | IFT | 43                                  | 47.8                                 | 52.8  | 1                       | 69.4  | 43.2                                    | 2   |
| SMDJ45A           | SMDJ45CA         | HFV          | IFV | 45                                  | 50                                   | 55.3  | 1                       | 72.7  | 41.3                                    | 2   |
| SMDJ48A           | SMDJ48CA         | HFX          | IFX | 48                                  | 53.3                                 | 58.9  | 1                       | 77.4  | 38.8                                    | 2   |
| SMDJ51A           | SMDJ51CA         | HFZ          | IFZ | 51                                  | 56.7                                 | 62.7  | 1                       | 82.4  | 36.4                                    | 2   |
| SMDJ54A           | SMDJ54CA         | HGE          | IGE | 54                                  | 60                                   | 66.3  | 1                       | 87.1  | 34.4                                    | 2   |
| SMDJ58A           | SMDJ58CA         | HGG          | IGG | 58                                  | 64.4                                 | 71.2  | 1                       | 93.6  | 32.1                                    | 2   |
| SMDJ60A           | SMDJ60CA         | HGK          | IGK | 60                                  | 66.7                                 | 73.7  | 1                       | 96.8  | 31                                      | 2   |
| SMDJ64A           | SMDJ64CA         | HGM          | IGM | 64                                  | 71.1                                 | 78.6  | 1                       | 103   | 29.1                                    | 2   |
| SMDJ70A           | SMDJ70CA         | HGP          | IGP | 70                                  | 77.8                                 | 86    | 1                       | 113   | 26.5                                    | 2   |
| SMDJ75A           | SMDJ75CA         | HGR          | IGR | 75                                  | 83.3                                 | 92.1  | 1                       | 121   | 24.8                                    | 2   |
| SMDJ78A           | SMDJ78CA         | HGT          | IGT | 78                                  | 86.7                                 | 95.8  | 1                       | 126   | 23.8                                    | 2   |
| SMDJ85A           | SMDJ85CA         | HGV          | IGV | 85                                  | 94.4                                 | 104   | 1                       | 137   | 21.9                                    | 2   |
| SMDJ90A           | SMDJ90CA         | HGX          | IGX | 90                                  | 100                                  | 111   | 1                       | 146   | 20.5                                    | 2   |
| SMDJ100A          | SMDJ100CA        | HGZ          | IGZ | 100                                 | 111                                  | 123   | 1                       | 162   | 18.5                                    | 2   |
| SMDJ110A          | SMDJ110CA        | HHE          | IHE | 110                                 | 122                                  | 135   | 1                       | 177   | 16.9                                    | 2   |
| SMDJ120A          | SMDJ120CA        | HHG          | IHG | 120                                 | 133                                  | 147   | 1                       | 193   | 15.5                                    | 2   |
| SMDJ130A          | SMDJ130CA        | HHK          | IHK | 130                                 | 144                                  | 159   | 1                       | 209   | 14.4                                    | 2   |
| SMDJ150A          | SMDJ150CA        | HHM          | IHM | 150                                 | 167                                  | 185   | 1                       | 243   | 12.3                                    | 2   |
| SMDJ160A          | SMDJ160CA        | HHP          | IHP | 160                                 | 178                                  | 197   | 1                       | 259   | 11.6                                    | 2   |
| SMDJ170A          | SMDJ170CA        | HHR          | IHR | 170                                 | 189                                  | 209   | 1                       | 275   | 10.9                                    | 2   |
| SMDJ180A          | SMDJ180CA        | HHT          | IHT | 180                                 | 198                                  | 230.4 | 1                       | 292   | 10.3                                    | 2   |
| SMDJ220A          | SMDJ220CA        | HIE          | IIE | 220                                 | 242                                  | 281.6 | 1                       | 356   | 8.4                                     | 2   |

»Rating And Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)

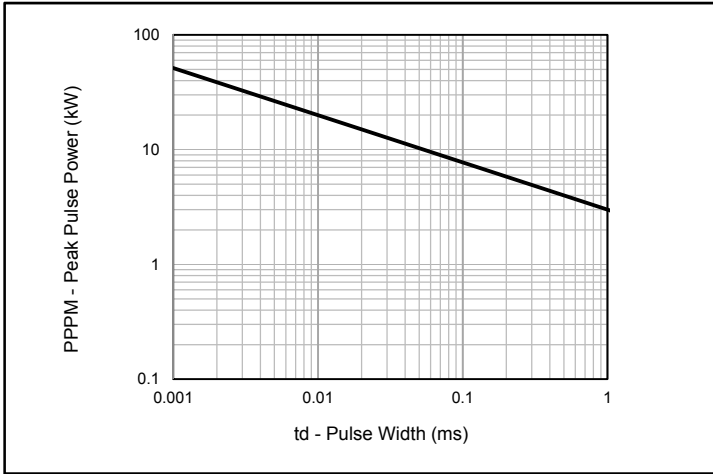


Fig.1 - Peak Pulse Power Rating



Fig.2 - Pulse Derating Curve

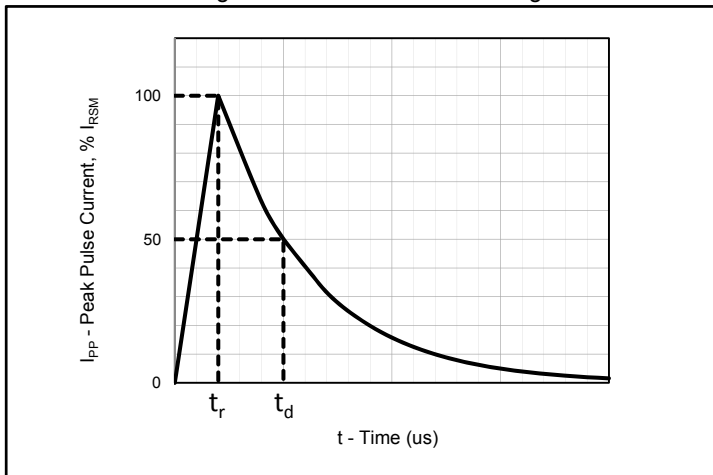


Fig.3 - Pulse Waveform

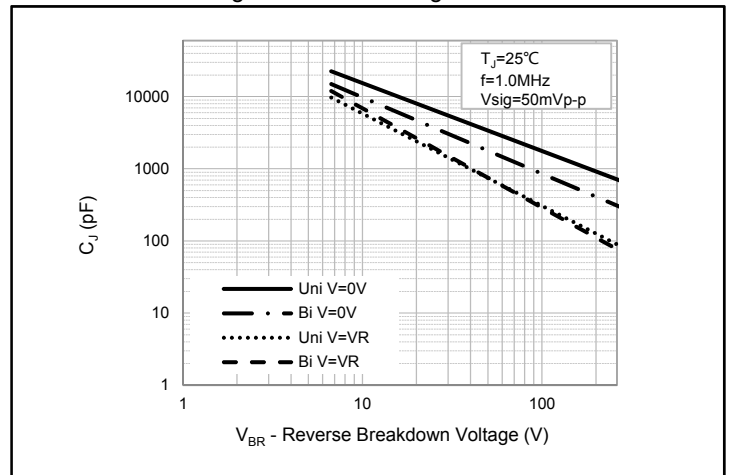


Fig.4 - Typical Junction Capacitance

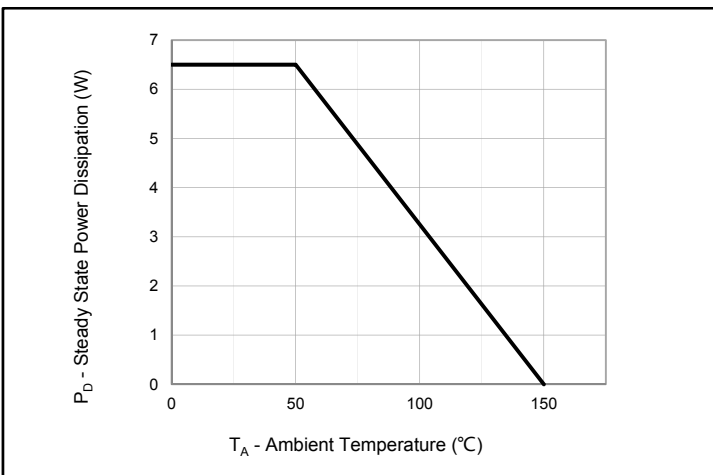


Fig.5 - Steady State Power Dissipation Derating Curve

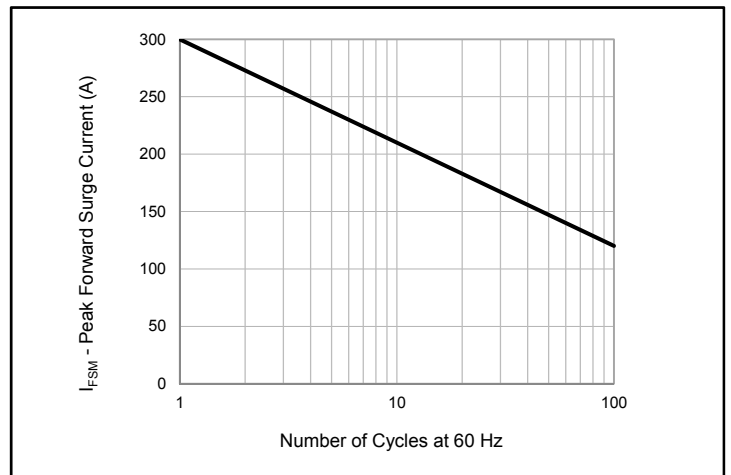
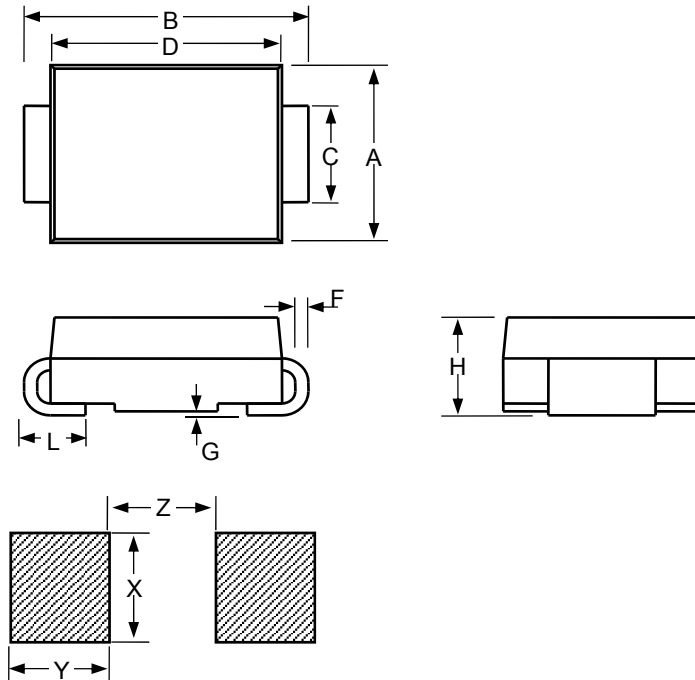


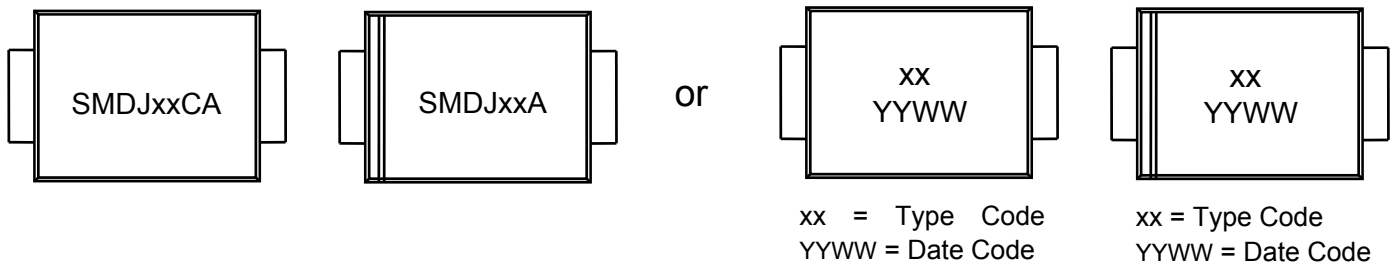
Fig.6 - Maximum Non-Repetitive Peak Forward Surge Current  
Uni-Directional Only

»Package Dimensions



| SMC       |        |       |       |             |      |       |
|-----------|--------|-------|-------|-------------|------|-------|
| Dimension | Inches |       |       | Millimeters |      |       |
|           | MIN    | NOM   | MAX   | MIN         | NOM  | MAX   |
| A         | 0.22   |       | 0.245 | 5.59        |      | 6.22  |
| B         | 0.305  |       | 0.32  | 7.75        |      | 8.13  |
| C         | 0.114  |       | 0.126 | 2.9         |      | 3.2   |
| D         | 0.26   |       | 0.28  | 6.6         |      | 7.11  |
| F         | 0.006  |       | 0.012 | 0.15        |      | 0.305 |
| G         | -      |       | 0.008 | -           |      | 0.203 |
| H         | 0.087  |       | 0.11  | 2.2         |      | 2.8   |
| L         | 0.03   |       | 0.06  | 0.76        |      | 1.52  |
| X         |        | 0.15  |       |             | 3.82 |       |
| Y         |        | 0.119 |       |             | 3.03 |       |
| Z         |        | 0.151 |       |             | 3.84 |       |

»Marking Information



»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 – 180 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 ( $t_L$ )                   | 60 – 150 secs           |
| Peak Temperature ( $T_P$ )                             |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )   |                                    | 20 – 40 secs            |
| Ramp-down Rate   |                                    | 6°C/second max          |
| Time 25°C to peak Temperature (t)                      |                                    | 8 minutes Max.          |
| Do not exceed  |                                    | 260°C                   |

»Tape and Reel Specification



| Dimension | Inches |       |     | Millimeters |       |     |
|-----------|--------|-------|-----|-------------|-------|-----|
|           | MIN    | NOM   | MAX | MIN         | NOM   | MAX |
| P         |        | 0.315 |     |             | 8     |     |
| P0        |        | 0.157 |     |             | 4     |     |
| W         |        | 0.63  |     |             | 16    |     |
| W1        |        | 0.646 |     |             | 16.4  |     |
| D1        |        | 7     |     |             | 177.8 |     |
| D2        |        | 13    |     |             | 330.2 |     |

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