

**»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



SOD-123F

**»Mechanical Characteristics**

- Package: SOD-123F 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**

- Cellular phones
- Portable devices
- Business machines
- Power supplies
- Consumer applications

**»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 |
|----------|---------------------|------------------|-------------------|
| SOD-123F | Tape/Reel, 7" reel  | 3000             | EIA-481-1         |
|          | Tape/Reel, 13" reel | 10000            | EIA-481-1         |

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

| Parameter                                      | Symbol          | Value      | Units                       | Remarks        |
|--|-----------------|------------|-----------------------------|----------------|
| Peak Pulse Power Dissipation                   | $P_{PPM}$       | 200        | W                           | (Note1)(Note2) |
| Steady State Power Dissipation                 | $P_D$           | 1          | W                           | (Note3)        |
| Peak Forward Surge Current                     | $I_{FSM}$       | 20         | A                           | (Note4)        |
| Maximum Instantaneous Forward Voltage at 10A   | $V_{FM}$        | 3.5        | V                           | (Note5)        |
| Typical Thermal Resistance Junction to Lead    | $R_{\theta JL}$ | 100        | $^{\circ}\text{C}/\text{W}$ |                |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 220        | $^{\circ}\text{C}/\text{W}$ |                |
| 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 3×3mm 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.

**»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  |                         |   |   |   |
| SMFJ5.0A          | SMFJ5.0CA        | 5.0A         | 5.0CA | 5                                   | 6.4                                  | 7    | 10                      | 9.2   | 21.7                                    | 400   |
| SMFJ6.0A          | SMFJ6.0CA        | 6.0A         | 6.0CA | 6                                   | 6.67                                 | 7.37 | 10                      | 10.3  | 19.4                                    | 400   |
| SMFJ6.5A          | SMFJ6.5CA        | 6.5A         | 6.5CA | 6.5                                 | 7.22                                 | 7.98 | 10                      | 11.2  | 17.9                                    | 250   |
| SMFJ7.0A          | SMFJ7.0CA        | 7.0A         | 7.0CA | 7                                   | 7.78                                 | 8.6  | 10                      | 12  | 16.7                                    | 100   |
| SMFJ7.5A          | SMFJ7.5CA        | 7.5A         | 7.5CA | 7.5                                 | 8.33                                 | 9.21 | 1                       | 12.9  | 15.5                                    | 50  |
| SMFJ8.0A          | SMFJ8.0CA        | 8.0A         | 8.0CA | 8                                   | 8.89                                 | 9.83 | 1                       | 13.6  | 14.7                                    | 25  |
| SMFJ8.5A          | SMFJ8.5CA        | 8.5A         | 8.5CA | 8.5                                 | 9.44                                 | 10.4 | 1                       | 14.4  | 13.9                                    | 10  |
| SMFJ9.0A          | SMFJ9.0CA        | 9.0A         | 9.0CA | 9                                   | 10                                   | 11.1 | 1                       | 15.4  | 13                                      | 5   |
| SMFJ10A           | SMFJ10CA         | 10A          | 10CA  | 10                                  | 11.1                                 | 12.3 | 1                       | 17  | 11.8                                    | 2.5   |
| SMFJ11A           | SMFJ11CA         | 11A          | 11CA  | 11                                  | 12.2                                 | 13.5 | 1                       | 18.2  | 11                                      | 2.5   |
| SMFJ12A           | SMFJ12CA         | 12A          | 12CA  | 12                                  | 13.3                                 | 14.7 | 1                       | 19.9  | 10.1                                    | 2.5   |
| SMFJ13A           | SMFJ13CA         | 13A          | 13CA  | 13                                  | 14.4                                 | 15.9 | 1                       | 21.5  | 9.3                                     | 1   |
| SMFJ14A           | SMFJ14CA         | 14A          | 14CA  | 14                                  | 15.6                                 | 17.2 | 1                       | 23.2  | 8.6                                     | 1   |
| SMFJ15A           | SMFJ15CA         | 15A          | 15CA  | 15                                  | 16.7                                 | 18.5 | 1                       | 24.4  | 8.2                                     | 1   |
| SMFJ16A           | SMFJ16CA         | 16A          | 16CA  | 16                                  | 17.8                                 | 19.7 | 1                       | 26  | 7.7                                     | 1   |
| SMFJ17A           | SMFJ17CA         | 17A          | 17CA  | 17                                  | 18.9                                 | 20.9 | 1                       | 27.6  | 7.2                                     | 1   |
| SMFJ18A           | SMFJ18CA         | 18A          | 18CA  | 18                                  | 20                                   | 22.1 | 1                       | 29.2  | 6.8                                     | 1   |
| SMFJ20A           | SMFJ20CA         | 20A          | 20CA  | 20                                  | 22.2                                 | 24.5 | 1                       | 32.4  | 6.2                                     | 1   |
| SMFJ22A           | SMFJ22CA         | 22A          | 22CA  | 22                                  | 24.4                                 | 26.9 | 1                       | 35.5  | 5.6                                     | 1   |
| SMFJ24A           | SMFJ24CA         | 24A          | 24CA  | 24                                  | 26.7                                 | 29.5 | 1                       | 38.9  | 5.1                                     | 1   |

**»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  |                         |   |   |   |
| SMFJ26A           | SMFJ26CA         | 26A          | 26CA | 26                                  | 28.9                                 | 31.9 | 1                       | 42.1  | 4.8                                     | 1   |
| SMFJ28A           | SMFJ28CA         | 28A          | 28CA | 28                                  | 31.1                                 | 34.4 | 1                       | 45.4  | 4.4                                     | 1   |
| SMFJ30A           | SMFJ30CA         | 30A          | 30CA | 30                                  | 33.3                                 | 36.8 | 1                       | 48.4  | 4.1                                     | 1   |
| SMFJ33A           | SMFJ33CA         | 33A          | 33CA | 33                                  | 36.7                                 | 40.6 | 1                       | 53.3  | 3.8                                     | 1   |
| SMFJ36A           | SMFJ36CA         | 36A          | 36CA | 36                                  | 40                                   | 44.2 | 1                       | 58.1  | 3.4                                     | 1   |
| SMFJ40A           | SMFJ40CA         | 40A          | 40CA | 40                                  | 44.4                                 | 49.1 | 1                       | 64.5  | 3.1                                     | 1   |
| SMFJ43A           | SMFJ43CA         | 43A          | 43CA | 43                                  | 47.8                                 | 52.8 | 1                       | 69.4  | 2.9                                     | 1   |
| SMFJ45A           | SMFJ45CA         | 45A          | 45CA | 45                                  | 50                                   | 55.3 | 1                       | 72.7  | 2.8                                     | 1   |
| SMFJ48A           | SMFJ48CA         | 48A          | 48CA | 48                                  | 53.3                                 | 58.9 | 1                       | 77.4  | 2.6                                     | 1   |
| SMFJ51A           | SMFJ51CA         | 51A          | 51CA | 51                                  | 56.7                                 | 62.7 | 1                       | 82.4  | 2.4                                     | 1   |
| SMFJ54A           | SMFJ54CA         | 54A          | 54CA | 54                                  | 60                                   | 66.3 | 1                       | 87.1  | 2.3                                     | 1   |
| SMFJ58A           | SMFJ58CA         | 58A          | 58CA | 58                                  | 64.4                                 | 71.2 | 1                       | 93.6  | 2.1                                     | 1   |
| SMFJ60A           | SMFJ60CA         | 60A          | 60CA | 60                                  | 66.7                                 | 73.7 | 1                       | 96.8  | 1.8                                     | 1   |
| SMFJ64A           | SMFJ64CA         | 64A          | 64CA | 64                                  | 71.1                                 | 78.6 | 1                       | 103   | 1.7                                     | 1   |
| SMFJ70A           | SMFJ70CA         | 70A          | 70CA | 70                                  | 77.8                                 | 86   | 1                       | 113   | 1.5                                     | 1   |
| SMFJ75A           | SMFJ75CA         | 75A          | 75CA | 75                                  | 83.3                                 | 92.1 | 1                       | 121   | 1.4                                     | 1   |
| SMFJ78A           | SMFJ78CA         | 78A          | 78CA | 78                                  | 86.7                                 | 95.8 | 1                       | 126   | 1.4                                     | 1   |
| SMFJ85A           | SMFJ85CA         | 85A          | 85CA | 85                                  | 94.4                                 | 104  | 1                       | 137   | 1.3                                     | 1   |
| SMFJ90A           | SMFJ90CA         | 90A          | 90CA | 90                                  | 100                                  | 111  | 1                       | 146   | 1.2                                     | 1   |
| SMFJ100A          | SMFJ100CA        | 100          | 100C | 100                                 | 111                                  | 123  | 1                       | 162   | 1.1                                     | 1   |
| SMFJ110A          | SMFJ110CA        | 110          | 110C | 110                                 | 122                                  | 135  | 1                       | 177   | 1                                       | 1   |
| SMFJ120A          | SMFJ120CA        | 120          | 120C | 120                                 | 133                                  | 147  | 1                       | 193   | 0.9                                     | 1   |
| SMFJ130A          | SMFJ130CA        | 130          | 130C | 130                                 | 144                                  | 159  | 1                       | 209   | 0.8                                     | 1   |
| SMFJ150A          | SMFJ150CA        | 150          | 150C | 150                                 | 167                                  | 185  | 1                       | 243   | 0.7                                     | 1   |
| SMFJ160A          | SMFJ160CA        | 160          | 160C | 160                                 | 178                                  | 197  | 1                       | 259   | 0.7                                     | 1   |
| SMFJ170A          | SMFJ170CA        | 170          | 170C | 170                                 | 189                                  | 209  | 1                       | 275   | 0.6                                     | 1   |

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

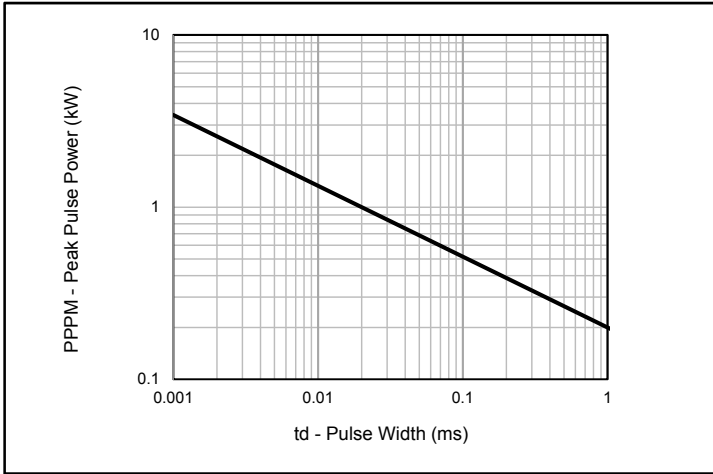


Fig.1 - Peak Pulse Power Rating

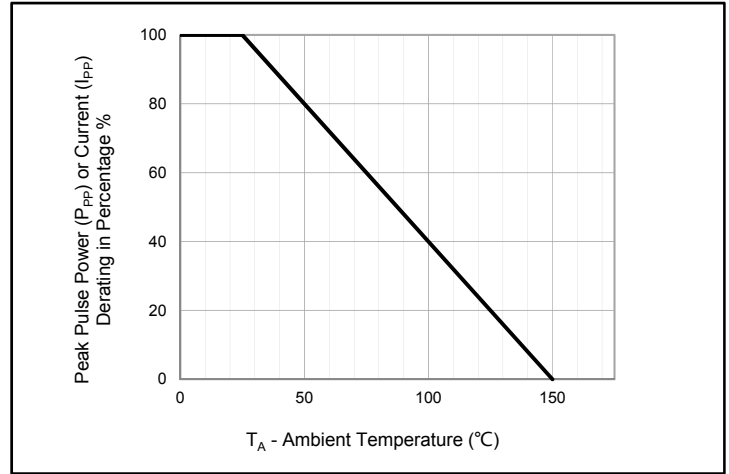


Fig.2 - Pulse Derating Curve

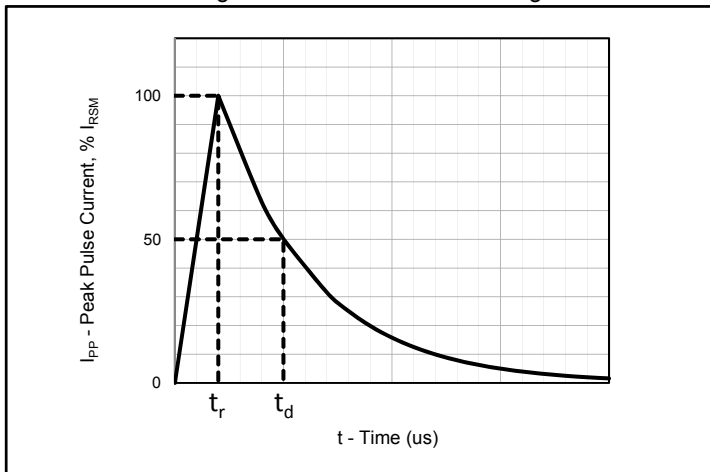


Fig.3 - Pulse Waveform

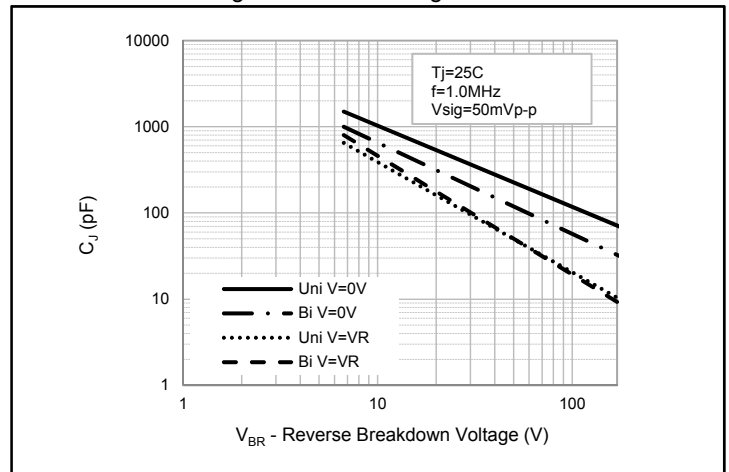


Fig.4 - Typical Junction Capacitance

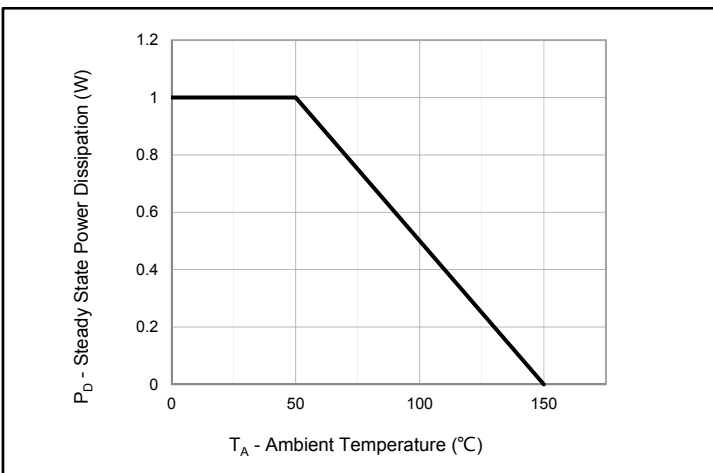


Fig.5 - Steady State Power Dissipation Derating Curve

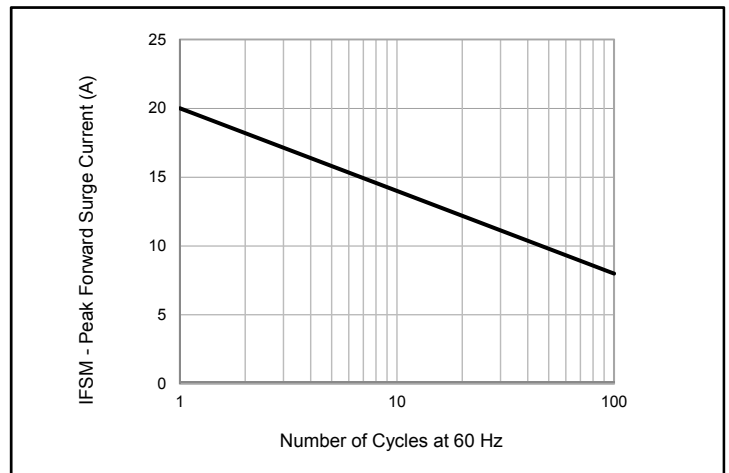
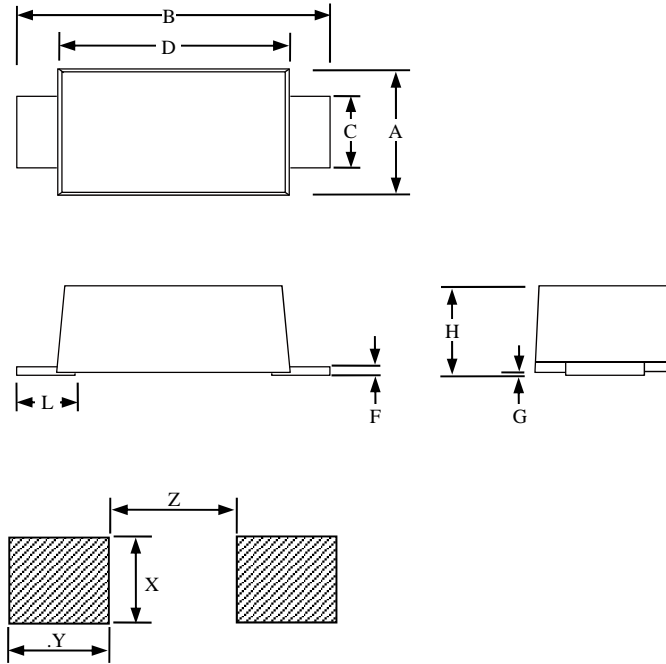


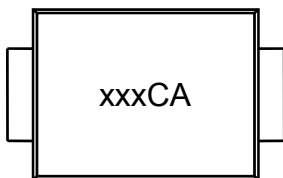
Fig.6 - Maximum Non-Repetitive Peak Forward Surge Current  
Uni-Directional Only

»Package Dimensions

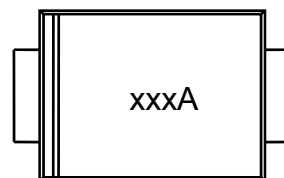


| SOD-123F  |        |       |       |             |     |      |
|-----------|--------|-------|-------|-------------|-----|------|
| Dimension | Inches |       |       | Millimeters |     |      |
|           | MIN    | NOM   | MAX   | MIN         | NOM | MAX  |
| A         | 0.059  |       | 0.079 | 1.5         |     | 2    |
| B         | 0.134  |       | 0.154 | 3.4         |     | 3.9  |
| C         | 0.028  |       | 0.047 | 0.7         |     | 1.2  |
| D         | 0.098  |       | 0.114 | 2.5         |     | 2.9  |
| F         | 0.002  |       | 0.01  | 0.05        |     | 0.26 |
| G         | -      |       | 0.004 | -           |     | 0.1  |
| H         | 0.037  |       | 0.053 | 0.95        |     | 1.35 |
| L         | 0.014  |       | 0.035 | 0.35        |     | 0.9  |
| X         |        | 0.055 |       |             | 1.4 |      |
| Y         |        | 0.051 |       |             | 1.3 |      |
| Z         |        | 0.063 |       |             | 1.6 |      |

»Marking Information



xxxCA = Type Code



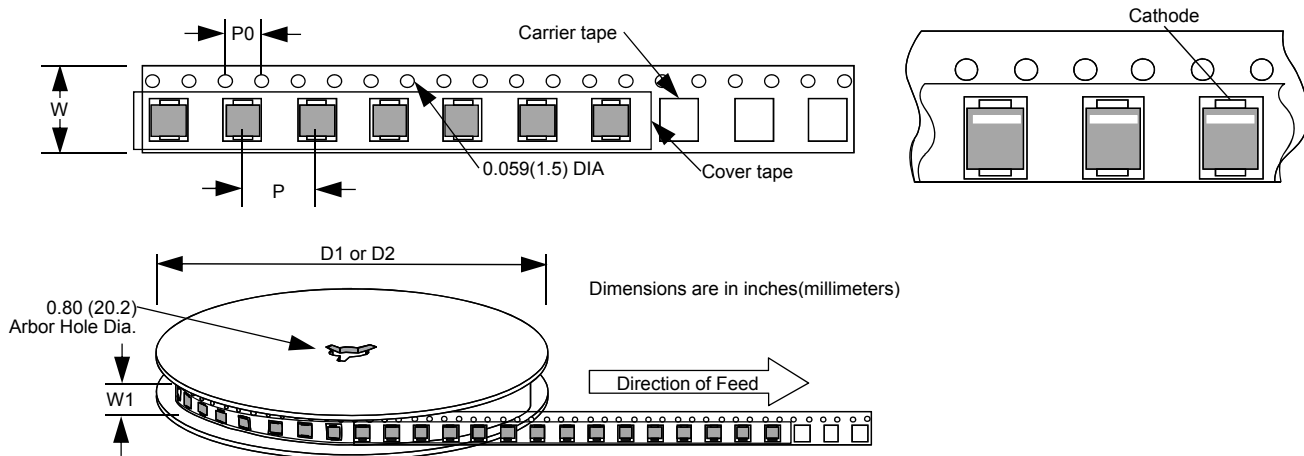
xxxA = Type Code

»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         |        | 0.157 |     |             | 4     |     |
| P0        |        | 0.157 |     |             | 4     |     |
| W         |        | 0.315 |     |             | 8     |     |
| W1        |        | 0.374 |     |             | 9.5   |     |
| D1        |        | 7     |     |             | 177.8 |     |
| D2        |        | 13    |     |             | 330.2 |     |