

SMD Type 400 W

■ Features

1. Glass passivated chip
2. RoHS compliant
3. Low leakage
4. Very fast response time
5. Excellent clamping capability
6. 400W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle): 0.01%
7. High reliability application and automotive grade AEC Q101 qualified
8. ESD protection of data lines in accordance with IEC 61000-4-2,30kV(Air),30kV(Contact)



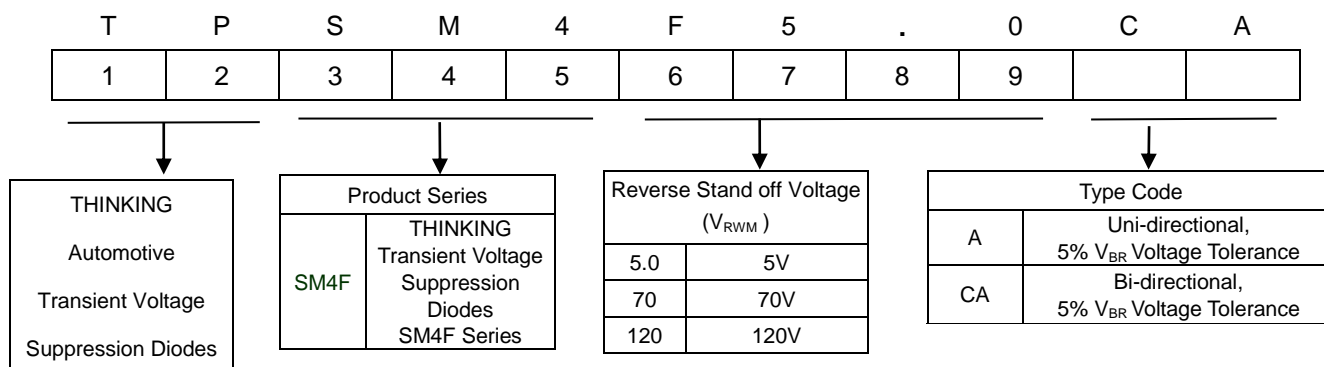
■ Recommended Applications

1. I/O interface
2. VCC BUS
3. Low frequency signal transmission line

■ Mechanical Data

1. Case: SOD-123FL, molded plastic
2. Epoxy : UL 94V-0 rate flame retardant
3. Polarity: Color band denotes cathode end

■ Part Number Code

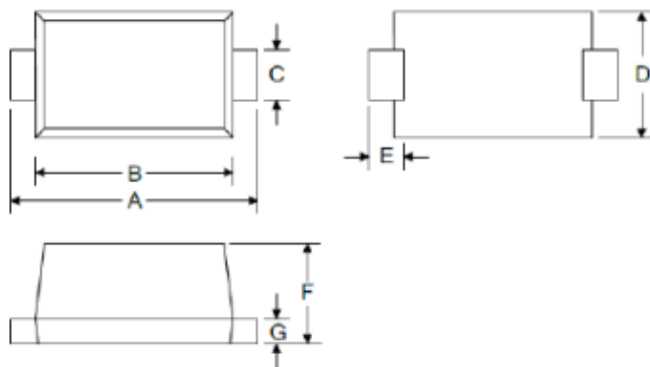


Transient Voltage Suppression Diodes: TP5M4F Series

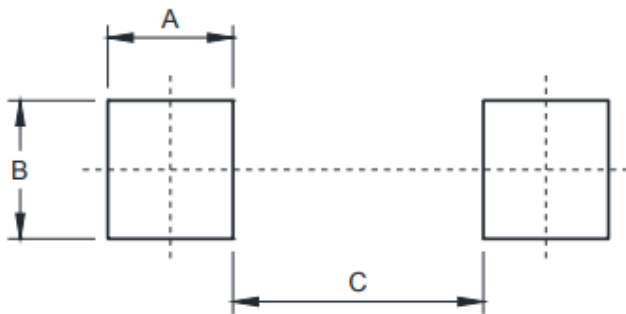
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Structures and Dimensions



| Symbol | Dimensions in millimeters | |
|--------|---------------------------|------|
| | Min | Max |
| A | 3.50 | 3.90 |
| B | 2.60 | 3.00 |
| C | 0.90 | 1.10 |
| D | 1.60 | 2.00 |
| E | 0.80 Typ. | |
| F | 0.90 | 1.40 |
| G | 0.12 | 0.22 |



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A | 1.0 | 0.039 |
| B | 1.1 | 0.043 |
| C | 2.0 | 0.079 |

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

| Parameter | Symbol | Value | Unit |
|--|-----------------|----------|----------------------|
| Peak power dissipation with a 10/1000 μs waveform (Note 1,2) | P_{PPM} | 400 | W |
| Peak forward surge current, 8.3ms single half sine wave on rated load (Note 3) | I_{FSM} | 40 | A |
| Power dissipation on infinite heatsink at $T_L=75^{\circ}\text{C}$ | P_D | 1.0 | W |
| Typical thermal resistance junction to ambient | $R_{\theta JA}$ | 220 | $^{\circ}\text{C/W}$ |
| Typical thermal resistance junction to lead | $R_{\theta JL}$ | 100 | $^{\circ}\text{C/W}$ |
| Operating junction and storage temperature range | T_J, T_{STG} | -55~+150 | $^{\circ}\text{C}$ |

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

(2) Mounted on 5.0 x 5.0mm copper pad to each terminal

(3) Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum

Transient Voltage Suppression Diodes: TPSM4F Series



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■ Electrical Characteristics (T_A=25°C unless otherwise noted)

| Part No. (Uni) | Part No. (Bi) | Reverse Stand off Voltage VRWM (V) | Breakage Voltage VBR @ IT | | Test Current IT (mA) | Maximum Clamping Voltage VC @ Ipp (V) | Maximum Peak Pulse Current Ipp(A) | Maximum Reverse Leakage IR @VRWM (μA) | Marking Code | |
|-------------------|------------------|--|---------------------------------|----------|----------------------------|---|---|--|-----------------|-----|
| | | | Min(V) | Max(V) | | | | | Uni | Bi |
| TPSM4F5.0A | TPSM4F5.0CA | 5 | 6.4 | 7 | 10 | 9.2 | 43.5 | 800 | 4AE | 4WE |
| TPSM4F6.0A | TPSM4F6.0CA | 6 | 6.7 | 7.4 | 10 | 10.3 | 38.8 | 800 | 4AG | 4WG |
| TPSM4F6.5A | TPSM4F6.5CA | 6.5 | 7.2 | 8 | 10 | 11.2 | 35.7 | 500 | 4AK | 4WK |
| TPSM4F7.0A | TPSM4F7.0CA | 7 | 7.8 | 8.6 | 10 | 12 | 33.3 | 200 | 4AM | 4WM |
| TPSM4F7.5A | TPSM4F7.5CA | 7.5 | 8.3 | 9.2 | 1 | 12.9 | 31 | 100 | 4AP | 4WP |
| TPSM4F8.0A | TPSM4F8.0CA | 8 | 8.9 | 9.8 | 1 | 13.6 | 29.4 | 50 | 4AR | 4WR |
| TPSM4F8.5A | TPSM4F8.5CA | 8.5 | 9.4 | 10.4 | 1 | 14.4 | 27.8 | 10 | 4AT | 4WT |
| TPSM4F9.0A | TPSM4F9.0CA | 9 | 10 | 11 | 1 | 15.4 | 26 | 5 | 4AV | 4WV |
| TPSM4F10A | TPSM4F10CA | 10 | 11.1 | 12.3 | 1 | 17 | 23.5 | 1 | 4AX | 4WX |
| TPSM4F11A | TPSM4F11CA | 11 | 12.2 | 13.5 | 1 | 18.2 | 22 | 1 | 4AZ | 4WZ |
| TPSM4F12A | TPSM4F12CA | 12 | 13.3 | 14.7 | 1 | 19.9 | 20.1 | 1 | 4BE | 4XE |
| TPSM4F13A | TPSM4F13CA | 13 | 14.4 | 15.9 | 1 | 21.5 | 18.6 | 1 | 4BG | 4XG |
| TPSM4F14A | TPSM4F14CA | 14 | 15.6 | 17.2 | 1 | 23.2 | 17.2 | 1 | 4BK | 4XK |
| TPSM4F15A | TPSM4F15CA | 15 | 16.7 | 18.5 | 1 | 24.4 | 16.4 | 1 | 4BM | 4XM |
| TPSM4F16A | TPSM4F16CA | 16 | 17.8 | 19.7 | 1 | 26 | 15.4 | 1 | 4BP | 4XP |
| TPSM4F17A | TPSM4F17CA | 17 | 18.9 | 20.9 | 1 | 27.6 | 14.5 | 1 | 4BR | 4XR |
| TPSM4F18A | TPSM4F18CA | 18 | 20 | 22.1 | 1 | 29.2 | 13.7 | 1 | 4BT | 4XT |
| TPSM4F20A | TPSM4F20CA | 20 | 22.2 | 24.5 | 1 | 32.4 | 12.3 | 1 | 4BV | 4XV |
| TPSM4F22A | TPSM4F22CA | 22 | 24.4 | 26.9 | 1 | 35.5 | 11.3 | 1 | 4BX | 4XX |
| TPSM4F24A | TPSM4F24CA | 24 | 26.7 | 29.5 | 1 | 38.9 | 10.3 | 1 | 4BZ | 4XZ |
| TPSM4F26A | TPSM4F26CA | 26 | 28.9 | 31.9 | 1 | 42.1 | 9.5 | 1 | 4CE | 4YE |
| TPSM4F28A | TPSM4F28CA | 28 | 31.1 | 34.4 | 1 | 45.4 | 8.8 | 1 | 4CG | 4YG |
| TPSM4F30A | TPSM4F30CA | 30 | 33.3 | 36.8 | 1 | 48.4 | 8.3 | 1 | 4CK | 4YK |
| TPSM4F33A | TPSM4F33CA | 33 | 36.7 | 40.6 | 1 | 53.3 | 7.5 | 1 | 4CM | 4YM |
| TPSM4F36A | TPSM4F36CA | 36 | 40 | 44.2 | 1 | 58.1 | 6.9 | 1 | 4CP | 4YP |
| TPSM4F40A | TPSM4F40CA | 40 | 44.4 | 49.1 | 1 | 64.5 | 6.2 | 1 | 4CR | 4YR |
| TPSM4F43A | TPSM4F43CA | 43 | 47.8 | 52.8 | 1 | 69.4 | 5.8 | 1 | 4CT | 4YT |
| TPSM4F45A | TPSM4F45CA | 45 | 50 | 55.3 | 1 | 72.7 | 5.5 | 1 | 4CV | 4YV |

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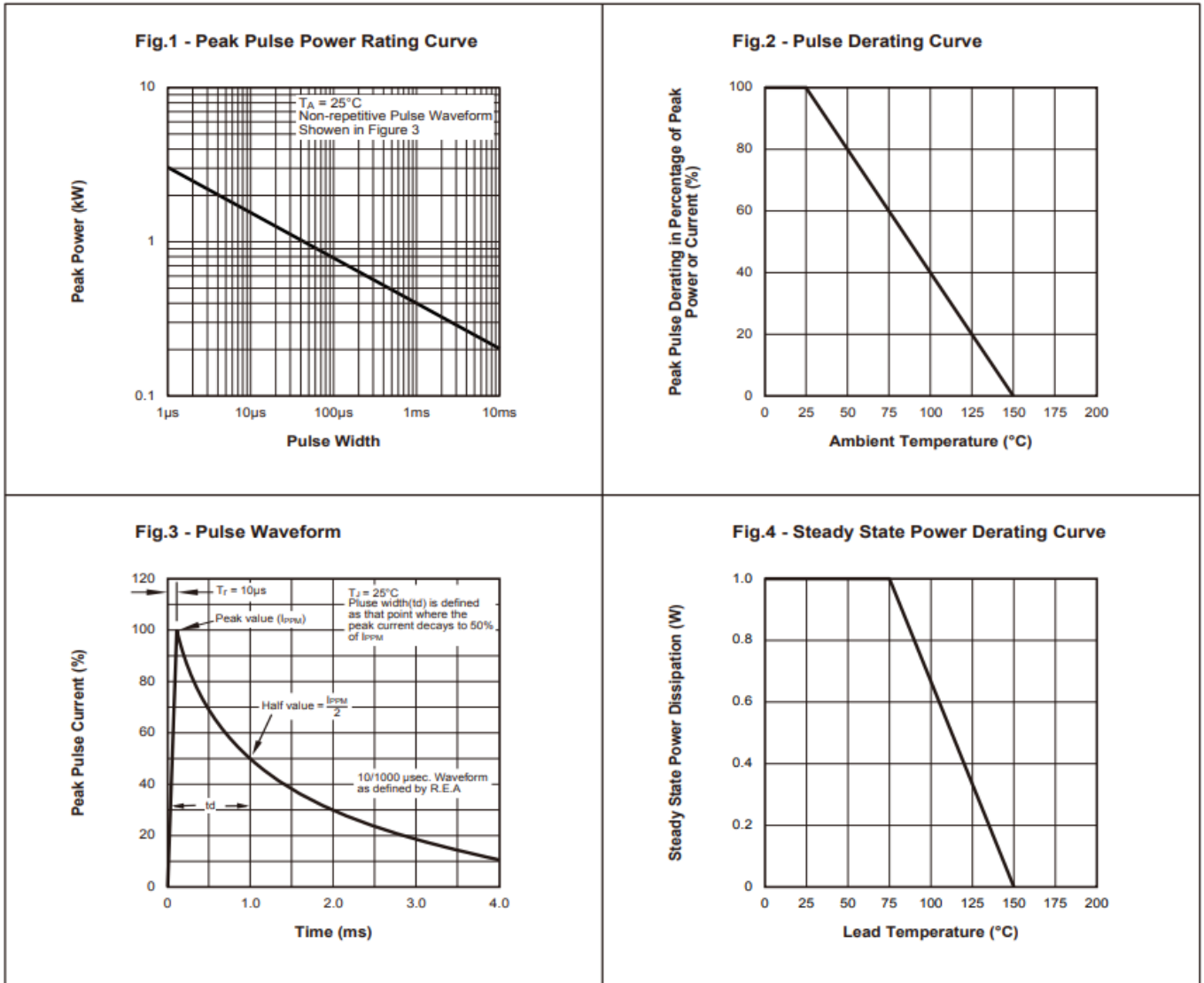


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| Part No. (Uni) | Part No. (Bi) | Reverse Stand off Voltage | Breakage Voltage VBR @ IT | | Test Current IT(mA) | Maximum Clamping Voltage VC @ Ipp | Maximum Peak Pulse Current Ipp(A) | Maximum Reverse Leakage IR @VRWM | Marking Code | |
|-------------------|------------------|---------------------------------|---------------------------------|----------|-----------------------------|--|---|--|-----------------|-----|
| | | | VRWM (V) | Min(V) | | | | | Max(V) | Uni |
| TPSM4F48A | TPSM4F48CA | 48 | 53.3 | 58.9 | 1 | 77.4 | 5.2 | 1 | 4CX | 4YX |
| TPSM4F51A | TPSM4F51CA | 51 | 56.7 | 62.7 | 1 | 82.4 | 4.9 | 1 | 4CZ | 4YZ |
| TPSM4F54A | TPSM4F54CA | 54 | 60 | 66.3 | 1 | 87.1 | 4.6 | 1 | 4RE | 4ZE |
| TPSM4F58A | TPSM4F58CA | 58 | 64.4 | 71.2 | 1 | 93.6 | 4.3 | 1 | 4RG | 4ZG |
| TPSM4F60A | TPSM4F60CA | 60 | 66.7 | 73.7 | 1 | 96.8 | 4.1 | 1 | 4RK | 4ZK |
| TPSM4F64A | TPSM4F64CA | 64 | 71.1 | 78.6 | 1 | 103 | 3.9 | 1 | 4RM | 4ZM |
| TPSM4F70A | TPSM4F70CA | 70 | 77.8 | 86 | 1 | 113 | 3.5 | 1 | 4RP | 4ZP |
| TPSM4F75A | TPSM4F75CA | 75 | 83.3 | 92.1 | 1 | 121 | 3.3 | 1 | 4RR | 4ZR |
| TPSM4F78A | TPSM4F78CA | 78 | 86.7 | 95.8 | 1 | 126 | 3.2 | 1 | 4RT | 4ZT |
| TPSM4F85A | TPSM4F85CA | 85 | 94.4 | 104 | 1 | 137 | 2.2 | 1 | 4RV | 4ZV |
| TPSM4F90A | TPSM4F90CA | 90 | 100 | 111 | 1 | 146 | 2.1 | 1 | 4RX | 4ZX |
| TPSM4F100A | TPSM4F100CA | 100 | 111 | 123 | 1 | 162 | 1.9 | 1 | 4RZ | 4ZZ |
| TPSM4F110A | TPSM4F110CA | 110 | 122 | 135 | 1 | 177 | 1.7 | 1 | 4SE | 4VE |
| TPSM4F120A | TPSM4F120CA | 120 | 133 | 147 | 1 | 193 | 1.6 | 1 | 4SG | 4VG |
| TPSM4F130A | TPSM4F130CA | 130 | 144 | 159 | 1 | 209 | 1.4 | 1 | 4SK | 4VK |
| TPSM4F150A | TPSM4F150CA | 150 | 167 | 185 | 1 | 243 | 1.2 | 1 | 4SM | 4VM |
| TPSM4F160A | TPSM4F160CA | 160 | 178 | 197 | 1 | 259 | 1.2 | 1 | 4SP | 4VP |
| TPSM4F170A | TPSM4F170CA | 170 | 189 | 209 | 1 | 275 | 1.09 | 1 | 4SR | 4VR |
| TPSM4F180A | TPSM4F180CA | 180 | 201 | 222 | 1 | 292 | 1.4 | 1 | 4ST | 4VT |
| TPSM4F200A | TPSM4F200CA | 200 | 224 | 247 | 1 | 324 | 1.2 | 1 | 4SV | 4VV |

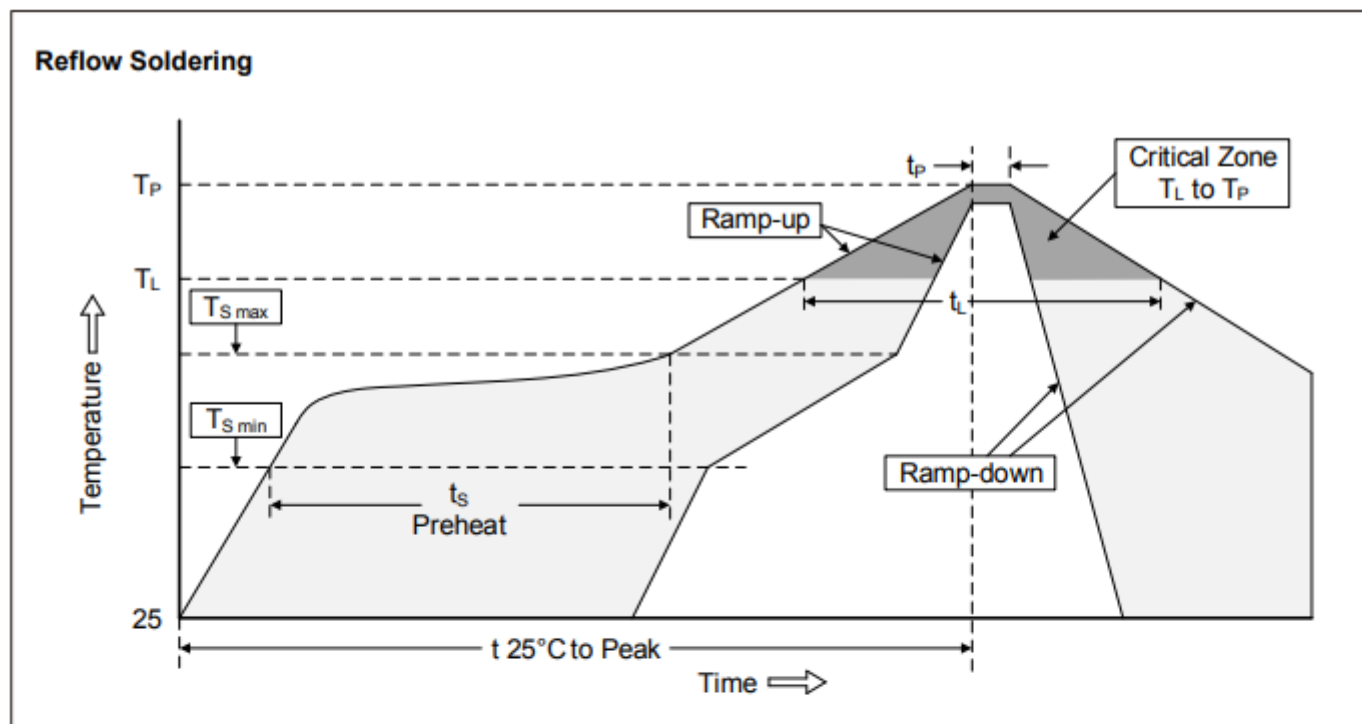
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■ Rate and Characteristic Curve ($T_A=25^\circ\text{C}$ unless otherwise noted)



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IR-reflow soldering profile

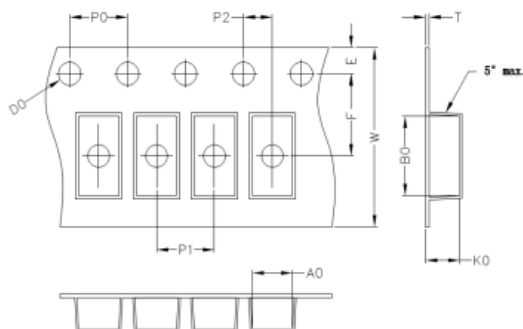


Recommended Conditions

| Profile Feature | Pb-Free Assembly |
|--|------------------|
| Average ramp-up rate (T _L to T _P) | 3°C/second max. |
| Preheat | |
| -Temperature Min (T _{S min}) | 150°C |
| -Temperature Max (T _{S max}) | 200°C |
| -Time (min to max) (t _s) | 60-180 seconds |
| T _{S max} to T _L | |
| -Ramp-up Rate | 3°C/second max. |
| Time maintained above: | |
| -Temperature (T _L) | 217°C |
| -Time (t _L) | 60-150 seconds |
| Peak Temperature (T _P) | 260°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 | 8 minutes max. |

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■ Packaging



| | | | | | | |
|-----------|----------|----------|----------|----------|----------|---------|
| Symbol | A0 | B0 | K0 | D0 | E | F |
| Unit (mm) | 2.15±0.1 | 3.95±0.1 | 13.5±0.1 | 1.5±0.1 | 1.75±0.1 | 3.5±0.1 |
| Symbol | P0 | P1 | P2 | T | W | |
| Unit (mm) | 4.0±0.1 | 4.0±0.1 | 2.0±0.1 | 0.25±0.1 | 8.0±0.3 | |

■ Quantity

MPQ: 3,000pcs

| PackageType | Packaging specification | Quantity (pcs/reel) |
|-------------|-------------------------|---------------------|
| SOD-123FL | EIA STD RS-481 | 3,000 |

■ Warehouse Storage Conditions of product

- Storage Condition:
 1. Storage Temperature: 15~30°C
 2. Relative Humidity: ≤75%RH
 3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year.