# SMD1812 Series

## Surface Mount PTC

LEAD FREE
RoSH COMPLIANT



| | |
|---|---|
| Application: | All high-density boards |
| Product Features: | Small surface mount, Solid state<br>Faster time to trip than standard SMD devices<br>Lower resistance than standard SMD devices |
| Operation Current: | 100mA~3.0A |
| Maximum Voltage: | 6V~60VDC |
| Temperature Range: | -40°C to 85°C |
| Agency Recognition: | UL, C-UL, TÜV |

## Electrical Characteristics (23°C)

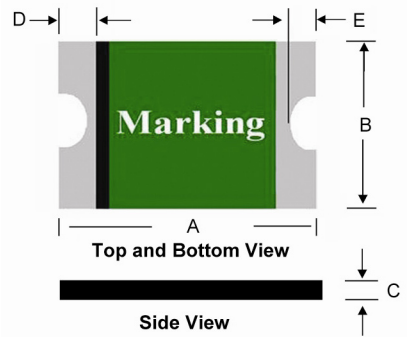
| Part Number | Hold Current | Trip Current | Rated Voltage | Maximum Current | Typical Power | Max Time to Trip | | Resistance Tolerance | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Current | Time | RMIN | R1MAX |
| | IH, A | IT, A | VMAX,VDC | IMAX, A | Pd, W | Amp | Sec | ohms | ohms |
| SMD1812-010-60R | 0.10 | 0.30 | 60 | 100 | 0.8 | 8.0 | 0.020 | 1.600 | 15.00 |
| SMD1812-014-60R | 0.14 | 0.30 | 60 | 100 | 0.8 | 8.0 | 0.008 | 1.200 | 6.500 |
| SMD1812-020-30R | 0.20 | 0.40 | 30 | 100 | 0.8 | 8.0 | 0.020 | 0.800 | 5.000 |
| SMD1812-020-60R | 0.20 | 0.40 | 60 | 100 | 0.8 | 8.0 | 0.020 | 0.800 | 5.000 |
| SMD1812-030-30R | 0.30 | 0.60 | 30 | 100 | 0.8 | 8.0 | 0.100 | 0.200 | 1.750 |
| SMD1812-035-16R | 0.35 | 0.70 | 16 | 100 | 0.8 | 8.0 | 0.100 | 0.320 | 1.500 |
| SMD1812-035-30R | 0.35 | 0.70 | 30 | 100 | 0.8 | 8.0 | 0.100 | 0.320 | 1.500 |
| SMD1812-050-16R | 0.50 | 1.00 | 16 | 100 | 0.8 | 8.0 | 0.150 | 0.150 | 1.000 |
| SMD1812-050-30R | 0.50 | 1.00 | 30 | 100 | 0.8 | 8.0 | 0.150 | 0.150 | 1.000 |
| SMD1812-075-16R | 0.75 | 1.50 | 16 | 100 | 0.8 | 8.0 | 0.200 | 0.110 | 0.450 |
| SMD1812-075-24R | 0.75 | 1.50 | 24 | 100 | 1.0 | 8.0 | 0.200 | 0.110 | 0.290 |
| SMD1812-075-33R | 0.75 | 1.50 | 33 | 100 | 1.0 | 8.0 | 0.200 | 0.110 | 0.400 |
| SMD1812-110-8R | 1.10 | 2.20 | 8 | 100 | 0.8 | 8.0 | 0.300 | 0.040 | 0.210 |
| SMD1812-110-16R | 1.10 | 2.20 | 16 | 100 | 0.8 | 8.0 | 0.500 | 0.060 | 0.180 |
| SMD1812-110-24R | 1.10 | 2.20 | 24 | 100 | 1.0 | 8.0 | 0.500 | 0.060 | 0.200 |
| SMD1812-125-6R | 1.25 | 2.50 | 6 | 100 | 0.8 | 8.0 | 0.400 | 0.050 | 0.140 |
| SMD1812-125-16R | 1.25 | 2.50 | 16 | 100 | 0.8 | 8.0 | 0.400 | 0.050 | 0.140 |
| SMD1812-150-8R | 1.50 | 3.00 | 8 | 100 | 0.8 | 8.0 | 0.500 | 0.040 | 0.110 |
| SMD1812-150-12R | 1.50 | 3.00 | 12 | 100 | 1.0 | 8.0 | 0.500 | 0.040 | 0.110 |
| SMD1812-150-24R | 1.50 | 3.00 | 24 | 100 | 1.0 | 8.0 | 1.500 | 0.040 | 0.120 |
| SMD1812-160-8R | 1.60 | 3.20 | 8 | 100 | 0.8 | 8.0 | 0.500 | 0.030 | 0.100 |
| SMD1812-160-12R | 1.60 | 3.20 | 12 | 100 | 1.0 | 8.0 | 1.000 | 0.030 | 0.100 |
| SMD1812-160-16R | 1.60 | 3.20 | 16 | 100 | 1.0 | 8.0 | 1.000 | 0.030 | 0.100 |
| SMD1812-200-8R | 2.00 | 3.50 | 8 | 100 | 1.0 | 8.0 | 2.000 | 0.020 | 0.070 |
| SMD1812-200-16R | 2.00 | 3.50 | 16 | 100 | 1.0 | 8.0 | 5.000 | 0.020 | 0.085 |
| SMD1812-260-8R | 2.60 | 5.00 | 8 | 100 | 1.0 | 8.0 | 2.500 | 0.015 | 0.047 |
| SMD1812-260-13R | 2.60 | 5.00 | 13.2 | 100 | 1.3 | 8.0 | 5.000 | 0.015 | 0.050 |
| SMD1812-260-16R | 2.60 | 5.00 | 16 | 100 | 1.3 | 8.0 | 5.000 | 0.015 | 0.050 |
| SMD1812-300-6R | 3.00 | 5.00 | 6 | 100 | 1.0 | 8.0 | 4.000 | 0.012 | 0.040 |

IH=Hold current-maximum current at which the device will not trip at 23°C still air.
IT=Trip current-minimum current at which the device will always trip at 23°C still air.
V MAX=Maximum voltage device can withstand without damage at its rated current.
I MAX= Maximum fault current device can withstand without damage at rated voltage (V max).
Pd=Typical power dissipated from device when in the tripped state in 23°C still air environment.
RMIN=Minimum device resistance at 23°C.
R1MAX=Maximum device resistance at 23°C, 1 hour after tripping .
Termination pad characteristics
Termination pad materials: Tin-plated copper

# SMD1812 Series

**Surface Mount PTC**

## SMD1812 Product Dimensions (Millimeters)




| Part Number | A | | B | | C | | D | | E | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max |
| SMD1812-010-60R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 0.90 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-014-60R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 0.90 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-020-30R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 0.90 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-020-60R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 0.90 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-030-30R | 4.37 | 4.73 | 3.07 | 3.41 | 0.40 | 0.70 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-035-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.40 | 0.70 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-035-30R | 4.37 | 4.73 | 3.07 | 3.41 | 0.40 | 0.70 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-050-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.35 | 0.65 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-050-30R | 4.37 | 4.73 | 3.07 | 3.41 | 0.45 | 0.75 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-075-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.35 | 0.65 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-075-24R | 4.37 | 4.73 | 3.07 | 3.41 | 0.80 | 1.55 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-075-33R | 4.37 | 4.73 | 3.07 | 3.41 | 0.80 | 1.55 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-110-8R | 4.37 | 4.73 | 3.07 | 3.41 | 0.25 | 0.55 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-110-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.25 | 0.90 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-110-24R | 4.37 | 4.73 | 3.07 | 3.41 | 0.80 | 1.30 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-125-6R | 4.37 | 4.73 | 3.07 | 3.41 | 0.25 | 0.55 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-125-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.50 | 1.00 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-150-8R | 4.37 | 4.73 | 3.07 | 3.41 | 0.25 | 0.55 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-150-12R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 1.10 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-150-24R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 1.55 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-160-8R | 4.37 | 4.73 | 3.07 | 3.41 | 0.25 | 0.90 | 0.30 | 0.95 | 0.25 | 0.65 |
| SMD1812-160-12R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 1.35 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-160-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 1.35 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-200-8R | 4.37 | 4.73 | 3.07 | 3.41 | 0.55 | 1.20 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-200-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.60 | 1.55 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-260-8R | 4.37 | 4.73 | 3.07 | 3.41 | 0.55 | 1.20 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-260-13R | 4.37 | 4.73 | 3.07 | 3.41 | 0.80 | 1.55 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-260-16R | 4.37 | 4.73 | 3.07 | 3.41 | 0.80 | 1.55 | 0.25 | 0.95 | 0.25 | 0.65 |
| SMD1812-300-6R | 4.37 | 4.73 | 3.07 | 3.41 | 0.80 | 1.55 | 0.25 | 0.95 | 0.25 | 0.65 |

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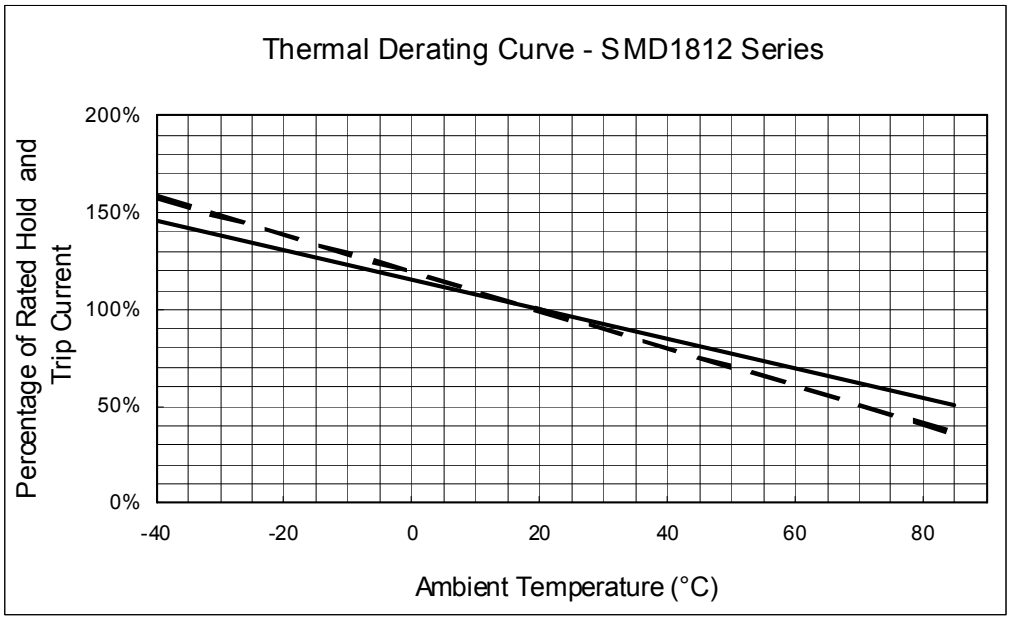
## Thermal Derating Curve

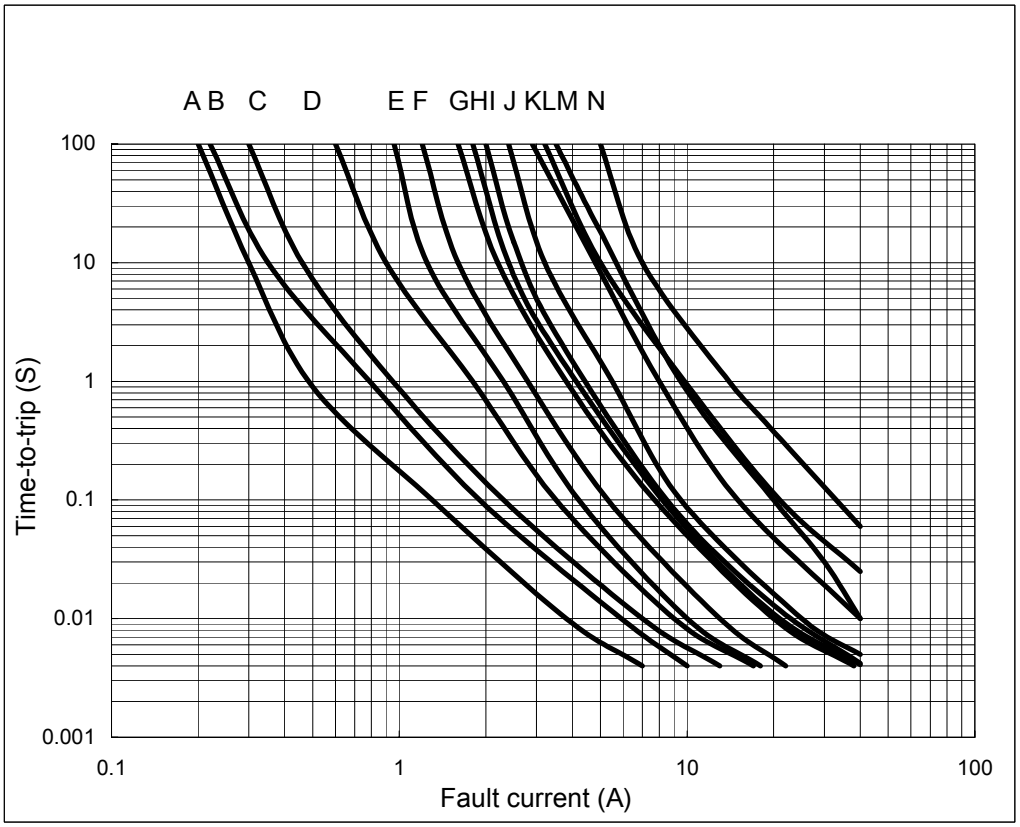



SMD1812-075-16R, 075-24R, 075-33R, 110-8R, 110-16R, 110-24R, 125-6R, 125-16R, 150-8R, 150-12R, 150-24R, 160-8R, 160-12R, 160-16R, 200-8R, 200-16R, 260-8R, 260-13R, 260-16R, 300-6R

SMD1812-010-60R, 014-60R, 020-30R, 020-60R, 030-30R, 035-30R, 050-16R, 050-30R

## Typical Time-To-Trip at 23°C

A = SMD1812-010-60R
B = SMD1812-014-60R
C = SMD1812-020-30R / 020-60R
D = SMD1812-030-30R
E = SMD1812-035-16R / 035-30R
F = SMD1812-050-16R / 050-30R
G = SMD1812-075-16R / 075-24R / 075-33R
H = SMD1812-110-8R / 110-16R / 110-24R
I = SMD1812-125-6R / 125-16R
J = SMD1812-150-8R / 150-12R / 150-24R
K = SMD1812-160-8R / 160-12R / 160-16R
L = SMD1812-200-8R / 200-16R
M = SMD1812-260-8R / 260-13R / 260-16R
N = SMD1812-300-6R



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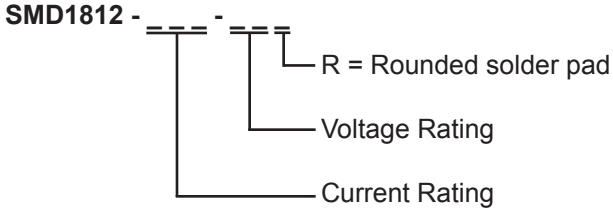
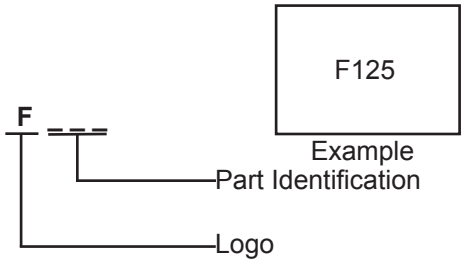
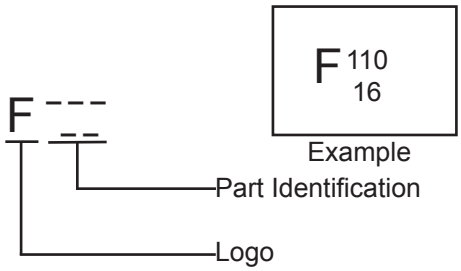
## Part Numbering System




## Part Marking System




**Special Marking for SMD1812-010-60R, 014-60R, 020-30R, 030-30R, 035-16R, 050-16R, 075-16R, 110-8R, 125-6R, 150-8R, 160-8R, 200-8R, 260-8R, 300-6R**




## Standard Package

| P/N | Reel / Tape |
|---|---|
| SMD1812-010-60R | 2K |
| SMD1812-014-60R | 2K |
| SMD1812-020-30R | 2K |
| SMD1812-020-60R | 2K |
| SMD1812-030-30R | 2K |
| SMD1812-035-16R | 2K |
| SMD1812-035-30R | 2K |
| SMD1812-050-16R | 2K |
| SMD1812-050-30R | 2K |
| SMD1812-075-16R | 2K |
| SMD1812-075-24R | 1.5K |
| SMD1812-075-33R | 1.5K |
| SMD1812-110-8R | 2K |
| SMD1812-110-16R | 2K |
| SMD1812-110-24R | 1.5K |

| P/N | Reel / Tape |
|---|---|
| SMD1812-125-6R | 2k |
| SMD1812-125-16R | 1.5K |
| SMD1812-150-8R | 2K |
| SMD1812-150-12R | 2K |
| SMD1812-150-24R | 2K |
| SMD1812-160-8R | 2K |
| SMD1812-160-12R | 2K |
| SMD1812-160-16R | 2K |
| SMD1812-200-8R | 2K |
| SMD1812-200-16R | 2K |
| SMD1812-260-8R | 2K |
| SMD1812-260-13R | 1.5K |
| SMD1812-260-16R | 1.5K |
| SMD1812-300-6R | 1.5K |

1- Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.

2 -PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

3- Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.

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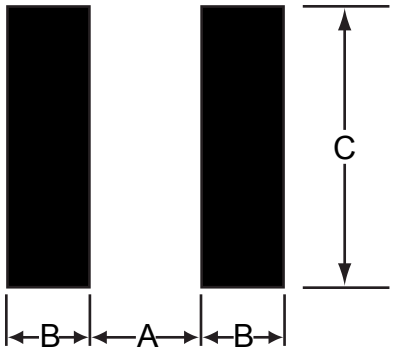
## Pad Layouts, Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout.




| Pad dimensions (millimeters) | | | |
|---|---|---|---|
| Device | A | B | C |
| | Nominal | Nominal | Nominal |
| SMD1812 Series | 3.45 | 1.78 | 3.50 |

| Profile Feature | Pb-Free Assembly |
|---|---|
| **Average Ramp-Up Rate (Tsmax to Tp)** | 3°C / second max. |
| **Preheat:**<br>Temperature Min (Tsmin)<br>Temperature Max (Tsmax)<br>Time (tsmin to tsmax) | <br>150°C<br>200°C<br>60-180 seconds |
| **Time maintained above:**<br>Temperature ($T_L$)<br>Time ($t_L$) | <br>217°C<br>60-150 seconds |
| **Peak / Classification Temperature (Tp):** | 260°C |
| **Time within 5°C of actual peak:**<br>Temperature (tp) | <br>20-40 seconds |
| **Ramp-Down Rate:** | 6°C / second max. |
| **Time 25°C to Peak Temperature:** | 8 minutes max. |

**SOLDER REFLOW**

Due to "Lead Free" nature, Temperature and Dwelling Time for the soldering zone is higher then those for Regular. This may cause damage to other components

1. Recommended maximum paste thickness > 0.25mm.
2. Devices can be cleaned using standard methods and aqueous solvents.
3. Rework use standard industry practices.
4. Storage Environment: <30°C / 60%RH

**CAUTION:**

1. If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
2. Devices are not designed to be wave soldered to the bottom side of the board.