

# Type R1812

## Resettable Fuse (PTC's)

### Surface Mount



www.optifuse.com (619) 593-5050

#### Application:

All high-density boards

#### Product Features:

- Small surface mount, Solid State
- Faster time to trip than standard SMD devices.
- Lower resistance than standard SMD devices.

**Operation Current:** 100mA ~ 3.0A

**Maximum Voltage:** 100VDC

**Temperature Range:** -40°C to 85°C

#### Agency Standards and Listings:



#### Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance Tolerance	
	I <sub>H</sub> , A	I <sub>T</sub> , A				Current	Time	R <sub>MIN</sub>	R <sub>1MAX</sub>
	I <sub>H</sub> , A	I <sub>T</sub> , A	V <sub>MAX</sub> , Vdc	I <sub>MAX</sub> , A	Pd, W	Amp	Sec	Ω	Ω
R1812-010	0.10	0.30	60	100	0.8	8.0	0.020	1.600	15.00
R1812-010-R	0.10	0.30	60	100	0.8	8.0	0.020	1.600	15.00
R1812-014	0.14	0.30	60	100	0.8	8.0	0.008	1.200	6.500
R1812-014-R	0.14	0.30	60	100	0.8	8.0	0.008	1.200	6.500
R1812-020	0.20	0.40	30	100	0.8	8.0	0.020	0.800	5.000
R1812-020-R	0.20	0.40	30	100	0.8	8.0	0.020	0.800	5.000
R1812-020-60-R	0.20	0.40	60	100	0.8	8.0	0.020	0.800	5.000
R1812-030-R	0.30	0.60	30	100	0.8	8.0	0.100	0.200	1.750
R1812-035	0.35	0.70	16	100	0.8	8.0	0.100	0.320	1.500
R1812-035-R	0.35	0.70	16	100	0.8	8.0	0.100	0.320	1.500
R1812-035-30-R	0.35	0.70	30	100	0.8	8.0	0.100	0.320	1.500
R1812-050	0.50	1.00	16	100	0.8	8.0	0.150	0.150	1.000
R1812-050-R	0.50	1.00	16	100	0.8	8.0	0.150	0.150	1.000
R1812-050-30-R	0.50	1.00	30	100	0.8	8.0	0.150	0.150	1.000
R1812-075	0.75	1.50	16	100	0.8	8.0	0.200	0.110	0.450
R1812-075-R	0.75	1.50	16	100	0.8	8.0	0.200	0.110	0.450
R1812-075-24-R	0.75	1.50	24	100	1.0	8.0	0.200	0.110	0.290
R1812-075-33-R	0.75	1.50	33	100	1.0	8.0	0.200	0.110	0.400
R1812-110	1.10	2.20	8	100	0.8	8.0	0.300	0.040	0.210
R1812-110-R	1.10	2.20	8	100	0.8	8.0	0.300	0.040	0.210
R1812-110-16	1.10	2.20	16	100	0.8	8.0	0.500	0.040	0.180
R1812-110-16-R	1.10	2.20	16	100	0.8	8.0	0.500	0.040	0.180
R1812-110-24-R	1.10	2.20	24	100	1.0	8.0	0.500	0.060	0.200
R1812-125	1.25	2.50	6	100	0.8	8.0	0.400	0.050	0.140
R1812-125-R	1.25	2.50	6	100	0.8	8.0	0.400	0.050	0.140
R1812-125-16-R	1.25	2.50	16	100	0.8	8.0	0.400	0.050	0.140
R1812-150	1.50	3.00	8	100	0.8	8.0	0.500	0.040	0.110
R1812-150-R	1.50	3.00	8	100	0.8	8.0	0.500	0.040	0.110
R1812-150-12-R	1.50	3.00	12	100	1.0	8.0	1.500	0.040	0.110
R1812-150-24-R	1.50	3.00	24	100	1.0	8.0	0.500	0.040	0.120

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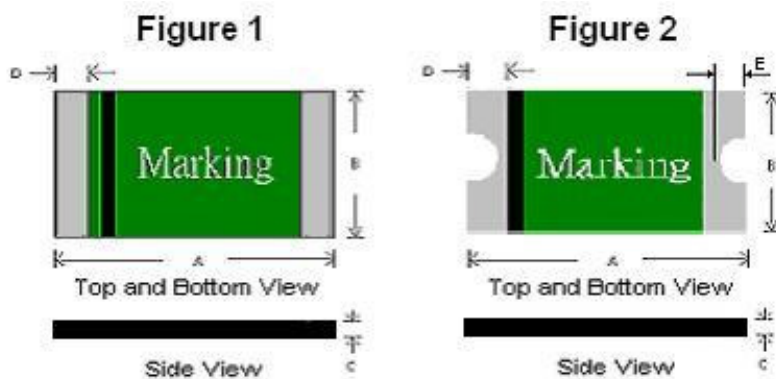
<b>R1812-160</b>	1.60	3.20	8	100	0.8	8.0	0.500	0.030	0.100
<b>R1812-160-R</b>	1.60	3.20	8	100	0.8	8.0	0.500	0.030	0.100
<b>R1812-160-12-R</b>	1.60	3.20	12	100	1.0	8.0	1.000	0.030	0.100
<b>R1812-160-16-R</b>	1.60	3.20	16	100	1.0	8.0	1.000	0.030	0.100
<b>R1812-200-R</b>	2.00	3.50	8	100	1.0	8.0	2.000	0.020	0.070
<b>R1812-200-16-R</b>	2.00	3.50	16	100	1.0	8.0	5.000	0.020	0.085
<b>R1812-260-R</b>	2.60	5.00	8	100	1.0	8.0	2.500	0.015	0.047
<b>R1812-260-13-R</b>	2.60	5.00	13.2	100	1.3	8.0	5.000	0.015	0.050
<b>R1812-260-16-R</b>	2.60	5.00	16	100	1.3	8.0	5.000	0.015	0.050
<b>R1812-300-R</b>	3.00	5.00	6	100	1.0	8.0	4.000	0.012	0.040

**I<sub>H</sub>** = Hold Current – Maximum current at which the device will not trip at 23°C still air.  
**I<sub>T</sub>** = Trip Current – Minimum current at which the device will always trip at 23°C still air.  
**V<sub>MAX</sub>** = Maximum voltage device can withstand without damage at it's rated current.  
**I<sub>MAX</sub>** = 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.  
**R<sub>MIN</sub>** = Minimum device resistance at 23°C.  
**R<sub>1MAX</sub>** = Maximum device resistance at 23°C, 1 hour after tripping.

### Physical Specifications:

Termination Pad Characteristics: Pure Tin

### R1812: Product Dimensions (millimeters)



Part Number	Figure	A		B		C		D		E	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>R1812-010</b>	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	-	-
<b>R1812-010-R</b>	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
<b>R1812-014</b>	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	-	-
<b>R1812-014-R</b>	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65

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R1812-020	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	-	-
R1812-020-R	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
R1812-020-60-R	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
R1812-030-R	2	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
R1812-035	1	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	-	-
R1812-035-R	2	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
R1812-035-30-R	2	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
R1812-050	1	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	-	-
R1812-050-R	2	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	0.25	0.65
R1812-050-30-R	2	4.37	4.73	3.07	3.41	0.45	0.75	0.30	0.95	0.25	0.65
R1812-075	1	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	-	-
R1812-075-R	2	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	0.25	0.65
R1812-075-24-R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
R1812-075-33-R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
R1812-110	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	-	-
R1812-110-R	2	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
R1812-110-16	1	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	-	-
R1812-110-16-R	2	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	0.25	0.65
R1812-110-24-R	2	4.37	4.73	3.07	3.41	0.80	1.30	0.25	0.95	0.25	0.65
R1812-125	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	-	-
R1812-125-R	2	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
R1812-125-16-R	2	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.95	0.25	0.65
R1812-150	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	-	-
R1812-150-R	2	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
R1812-150-12-R	2	4.37	4.73	3.07	3.41	0.60	1.10	0.25	0.95	0.25	0.65
R1812-150-24-R	2	4.37	4.73	3.07	3.41	0.60	1.55	0.25	0.95	0.25	0.65
R1812-160	1	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	-	-
R1812-160-R	2	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	0.25	0.65
R1812-160-12-R	2	4.37	4.73	3.07	3.41	0.60	1.35	0.25	0.95	0.25	0.65
R1812-160-16-R	2	4.37	4.73	3.07	3.41	0.60	1.35	0.25	0.95	0.25	0.65
R1812-200-R	2	4.37	4.73	3.07	3.41	0.40	0.90	0.25	0.95	0.25	0.65
R1812-200-16-R	2	4.37	4.73	3.07	3.41	0.60	1.55	0.25	0.95	0.25	0.65
R1812-260-R	2	4.37	4.73	3.07	3.41	0.55	1.20	0.25	0.95	0.25	0.65
R1812-260-13-R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
R1812-260-16-R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
R1812-300-R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65

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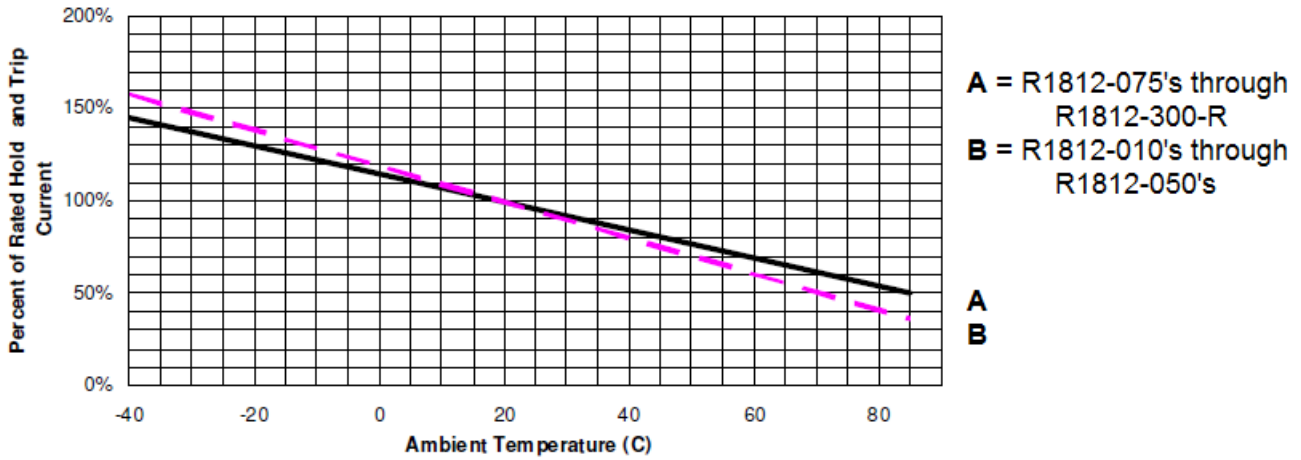
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# Type R1812 Resettable Fuse (PTC's) Surface Mount



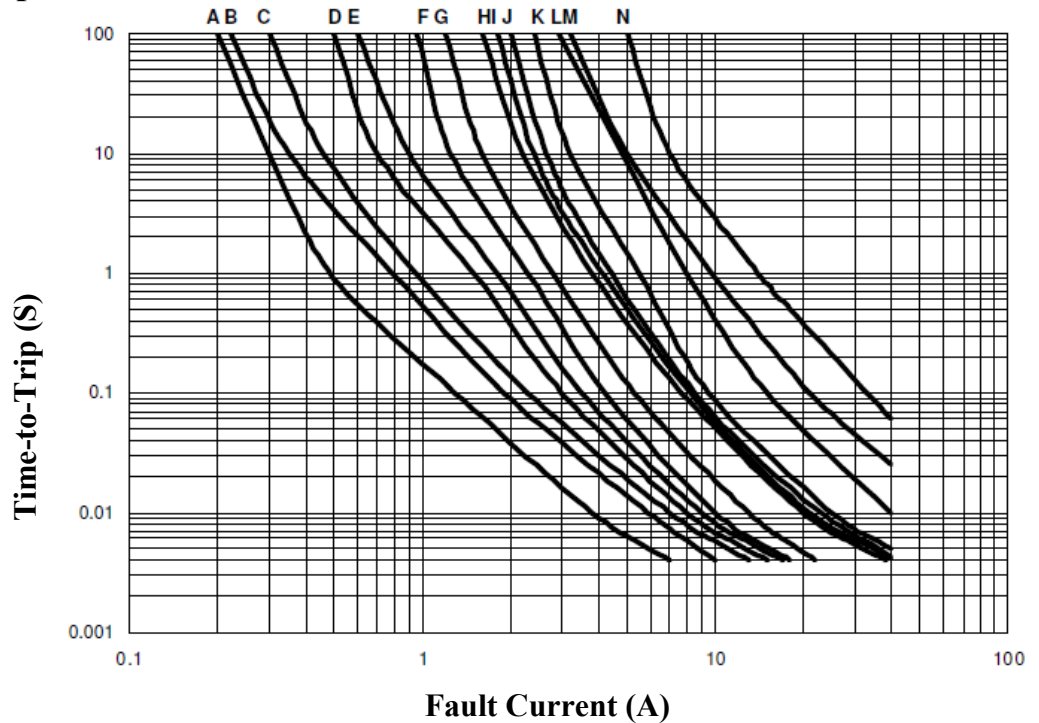
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## Thermal Derating Curve



## Typical Time-To-Trip at 23°C

- A = R1812-010's
- B = R1812-014's
- C = R1812-020's
- D = R1812-030-R
- E = R1812-035's
- F = R1812-050's
- G = R1812-075's
- H = R1812-110's
- I = R1812-125's
- J = R1812-150's
- K = R1812-160's
- L = R1812-200-R
- M = R1812-260's
- N = R1812-300-R



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Profile Features	Pb-Free Assembly
<b>Average Ramp-Up Rate (T<sub>smax</sub> to T<sub>p</sub>)</b>	3 °C/second max.
<b>Preheat:</b> Temperature Min (T <sub>smin</sub> ) Temperature Max (T <sub>smax</sub> ) Time (T <sub>smin</sub> to T <sub>smax</sub> )	150 °C 200 °C 60-180 seconds
<b>Time maintained above:</b> Temperature (T <sub>L</sub> ) Time (t <sub>L</sub> )	217 °C 60-150 seconds
<b>Peak/Classification Temperature (T<sub>p</sub>):</b>	260 °C
<b>Time within 5 °C of actual Peak:</b> Temperature (t <sub>p</sub> )	20-40 seconds
<b>Ramp-Down Rate:</b>	6 °C/second max.
<b>Time 25 °C to Peak Temperature:</b>	8 minute max.

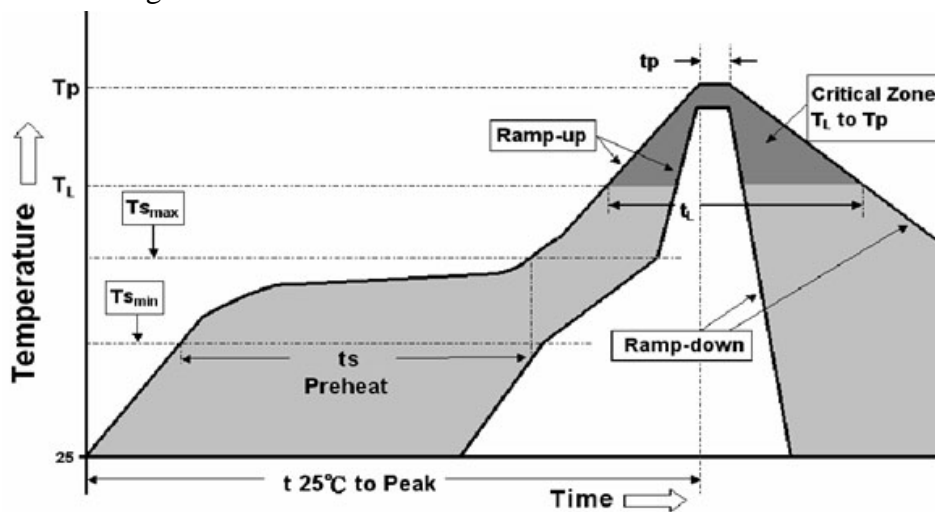
**Solder reflow**

\* Due to “Lead Free” nature, Temperature and Dwelling time for the soldering zone is higher than those for Regular. This may cause damage to other components.

1. Recommended maximum paste thickness > 0.25mm.
2. Devices can be cleaned using standard industry 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.



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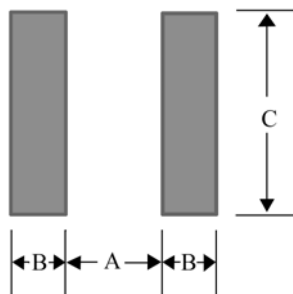
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**Standard Package**

Part Numbers	Reel/Tape
R1812-010 ~ R1812-075-R	2K
R1812-075-24-R ~ R1812-075-33-R	1.5K
R1812-110 ~ R1812-110-16-R	2K
R1812-110-24-R	1.5K
R1812-125 ~ R1812-125-R	2K
R1812-125-16-R	1.5K
R1812-150 ~ R1812-200-R	2K
R1812-200-16-R	1.5K
R1812-260-R	2K
R1812-260-13-R ~ R1812-300-R	1.5K

**Pad Layouts – Solder Reflow and Rework Recommendations**

The dimensions in the table below provide the recommended pad layout for each R1812 device.



Pad Dimensions (millimeters)
A – Nominal – 3.45 mm
B – Nominal – 1.78 mm
C – Nominal – 3.50 mm

	<p><b>Warning:</b> -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.</p>
	<p>-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.</p> <p>-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.</p>

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