

# Surface Mount Polymer PTC PBS Series, 1812 Size

## **Features:**

- Resettable over-current protection
- Small size of 1812
- Fast time-to-trip
- RoHS compliant
- Halogen free

## **Applications:**

- Battery packs
- Portable electronic devices
- Industrial controls
- Multimedia
- Game machines
- Telecom & broadband instruments

## **Ordering Code:**

### **PBS 1812-110-24 F**

(1) (2) (3) (4) (5)

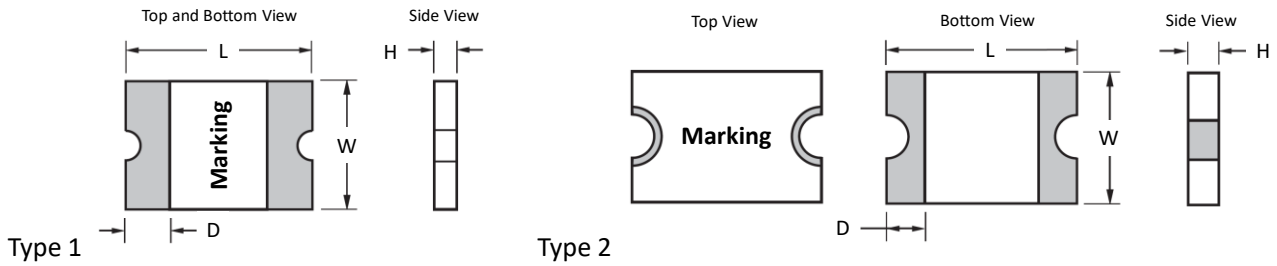
- (1) Series code
- (2) Size code
- (3) Current rating code  
110: 1.1A
- (4) Voltage rating code  
24: 24V
- (5) Identification code

## **Agency Approval:**

UL file number: E355716

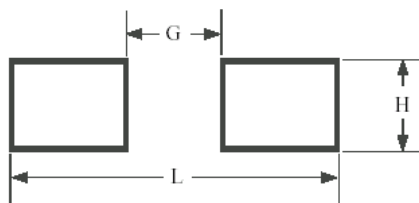
TÜV certification number: R50371797, R50371842, R50371875 and R50385152. Tested for EN60738-1: 2006+A1; EN60738-1:2008; EN60730-1: 2011 clause 15, 17 and Annex J

### Product Dimensions:



Part Number	Type	L mm (inches)		W mm (inches)		H mm (inches)		D mm (inches)
		Min.	Max.	Min.	Max.	Min.	Max.	Min.
PBS1812-010 PBS1812-014 PBS1812-020 PBS1812-020-60 PBS1812-030	1	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.10 (0.043)	0.30 (0.012)
PBS1812-050	1	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)
PBS1812-050-30F	2	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.40 (0.022)	0.85 (0.033)	0.30 (0.012)
PBS1812-075 PBS1812-075-24	1	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.016)	0.85 (0.033)	0.30 (0.012)
PBS1812-110 PBS1812-110-16	1	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.45 (0.018)	0.85 (0.033)	0.30 (0.012)
PBS1812-110-24F	2	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)
PBS1812-125 PBS1812-150 PBS1812-150-12	1	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)
PBS1812-150-24F	2	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)
PBS1812-160 PBS1812-200	1	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.55 (0.022)	0.85 (0.033)	0.30 (0.012)
PBS1812-250-16F PBS1812-260-16F	2	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)
PBS1812-260	1	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.48 (0.019)	0.85 (0.033)	0.30 (0.012)
PBS1812-300F	2	4.37 (0.172)	4.73 (0.186)	3.07 (0.121)	3.41 (0.134)	0.70 (0.028)	1.60 (0.063)	0.30 (0.012)

### Recommended Foot Print Dimensions:



Type	G (mm)	H (mm)	L (mm)
1	2.7±0.1	3.2±0.1	5.7±0.1
2	2.9±0.1	2.95±0.1	6.1±0.1

## Typical Ratings and Characteristics (@ 23°C):

✧ Operating temperature: -40 to +85°C

Part Number	Current (A)		V <sub>Max</sub> (Vdc)	I <sub>Max</sub> (A)	Max. Time to Trip (sec)		Typical Power (Pd, W)	Resistance Min. (Ω)	One Hours Post Reflow Resistance R <sub>1</sub> Max. (Ω) <sup>1</sup>
	Hold (I <sub>H</sub> )	Trip (I <sub>T</sub> )			Current (A)	Time (sec)			
PBS1812-010	0.10	0.30	60	40	0.5	1.50	0.8	0.700	15.00
PBS1812-014	0.14	0.34	60	40	1.5	0.15	0.8	0.400	6.50
PBS1812-020	0.20	0.40	30	80	6.0	0.06	0.8	0.400	6.00
PBS1812-020-60	0.20	0.40	60	40	1.5	0.15	0.8	0.400	6.00
PBS1812-030	0.30	0.60	30	10	8.0	0.10	0.8	0.300	3.00
PBS1812-050	0.50	1.00	15	100	8.0	0.15	0.8	0.150	1.00
PBS1812-050-30F	0.50	1.00	30	40	8.0	0.15	0.8	0.150	1.00
PBS1812-075	0.75	1.50	13.2	100	8.0	0.20	0.8	0.110	0.450
PBS1812-075-24	0.75	1.50	24	40	8.0	0.20	0.8	0.110	0.450
PBS1812-110	1.10	2.20	6	100	8.0	0.30	0.8	0.040	0.210
PBS1812-110-16	1.10	2.20	16	100	8.0	0.30	0.8	0.040	0.210
PBS1812-110-24F	1.10	2.20	24	20	8.0	0.50	0.8	0.060	0.180
PBS1812-125	1.25	2.50	6	100	8.0	0.40	0.8	0.035	0.140
PBS1812-150	1.50	3.00	6	100	8.0	0.50	0.8	0.030	0.120
PBS1812-150-12	1.50	3.00	12	100	8.0	0.50	0.8	0.030	0.120
PBS1812-150-24F	1.50	3.00	24	20	8.0	1.50	1.0	0.030	0.120
PBS1812-160	1.60	2.80	8	100	8.0	2.0	0.8	0.035	0.099
PBS1812-200	2.00	4.00	8	40	8.0	3.0	0.8	0.020	0.080
PBS1812-250-16F	2.50	5.00	16	100	8.0	5.0	1.2	0.015	0.100
PBS1812-260-16F	2.60	5.00	16	100	8.0	5.0	1.2	0.015	0.050
PBS1812-260	2.60	5.20	6	100	8.0	5.0	0.8	0.015	0.080
PBS1812-300F	3.00	5.00	6	100	8.0	5.0	1.2	0.010	0.040

<sup>1</sup> The max resistance of one-hour post reflow is a reference value. The value may change a little according to reflow conditions and soldering state.

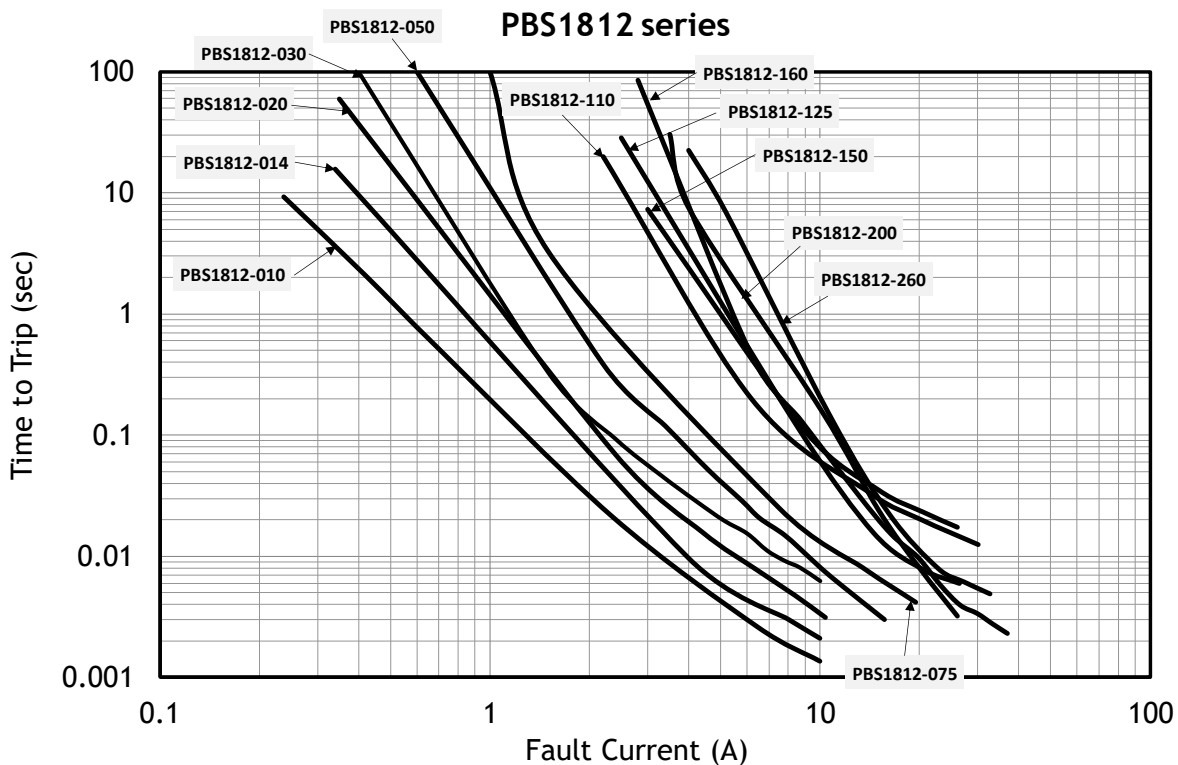
## Packaging and Marking Information:

Part Number	Tape & Reel Quantity (piece)
PBS1812-010	1,500
PBS1812-014	
PBS1812-020	
PBS1812-020-60	
PBS1812-030	
PBS1812-050	2,000
PBS1812-050-30F	
PBS1812-075	
PBS1812-075-24	
PBS1812-110	
PBS1812-110-16	1,500
PBS1812-110-24F	
PBS1812-125	2,000
PBS1812-150	
PBS1812-150-12	1,500
PBS1812-150-24F	
PBS1812-160	2,000
PBS1812-200	
PBS1812-250-16F	1,500
PBS1812-260-16F	
PBS1812-260	2,000
PBS1812-300F	1,500

### Thermal De-rating Hold Current (A) at Ambient Temperature (23°C):

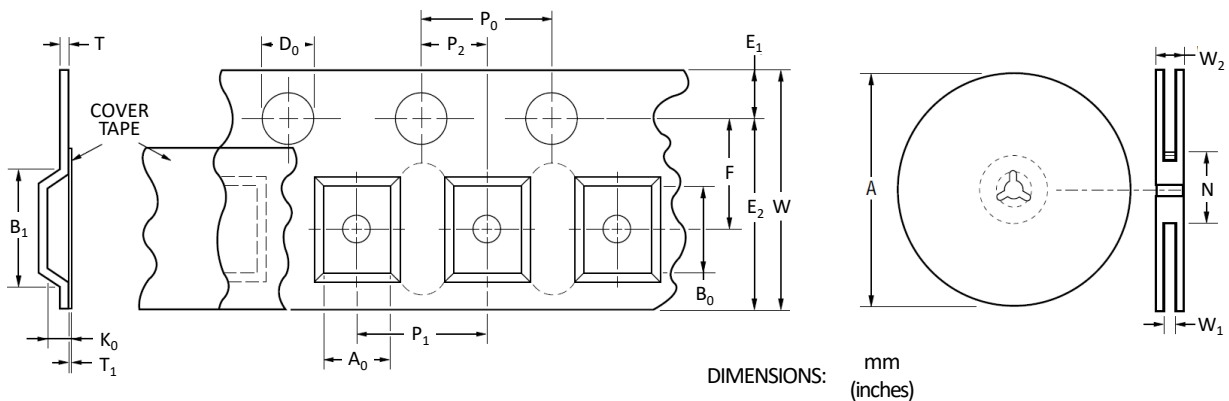
Part Number	Ambient temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
PBS1812-010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
PBS1812-014	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
PBS1812-020	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
PBS1812-020-60	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
PBS1812-030	0.44	0.39	0.35	0.30	0.26	0.23	0.21	0.18	0.15
PBS1812-050	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.29
PBS1812-050-30F	0.77	0.68	0.59	0.50	0.44	0.40	0.37	0.33	0.25
PBS1812-075	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
PBS1812-075-24	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
PBS1812-110	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
PBS1812-110-16	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
PBS1812-110-24F	2.00	1.70	1.40	1.10	0.95	0.88	0.80	0.73	0.61
PBS1812-125	1.80	1.63	1.43	1.25	1.08	0.99	0.91	0.81	0.68
PBS1812-150	2.17	1.95	1.72	1.50	1.30	1.18	1.09	0.97	0.82
PBS1812-150-12	2.17	1.95	1.72	1.50	1.30	1.18	1.09	0.97	0.82
PBS1812-150-24F	2.10	1.90	1.70	1.50	1.25	1.13	1.00	0.88	0.69
PBS1812-160	2.30	2.20	1.90	1.60	1.45	1.30	1.15	1.03	0.91
PBS1812-200	3.08	2.71	2.35	2.00	1.80	1.60	1.50	1.40	1.25
PBS1812-250-16F	3.90	3.42	2.96	2.50	2.24	1.98	1.85	1.29	0.94
PBS1812-260-16F	3.50	3.20	3.00	2.60	2.30	2.15	2.00	1.85	1.63
PBS1812-260	4.00	3.52	3.06	2.60	2.34	2.08	1.95	1.39	1.04
PBS1812-300F	4.68	4.10	3.67	3.00	2.69	2.50	2.22	1.55	1.13

### Typical Time to Trip (@ 23°C):

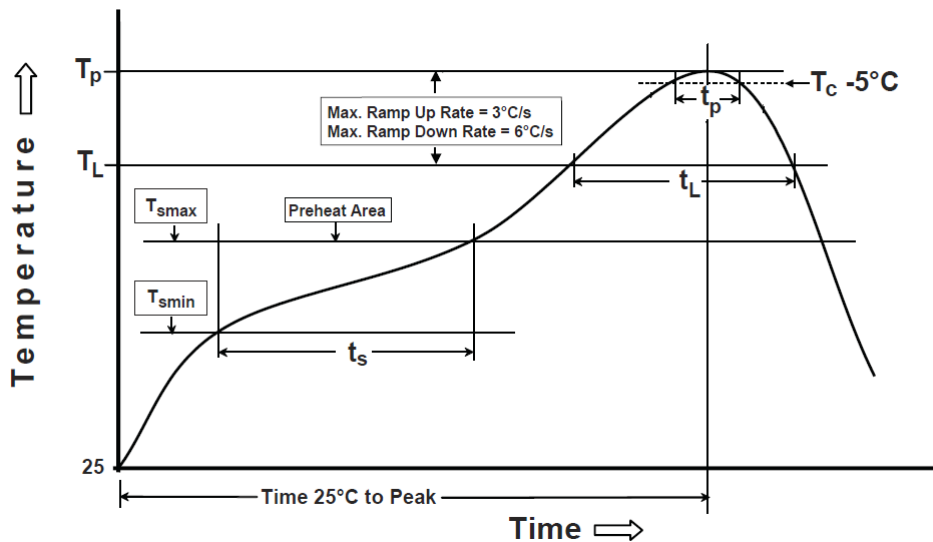


**Tape and Reel Specifications:**

Dimensions (Tape)	PBS1812-01 ~ PBS1812-030	PBS1812-050 ~ PBS1812-260	PBS1812-110-24F PBS1812-150-24F PBS1812-250-16F PBS1812-260-16F PBS1812-300F	Dimensions (Reel)	PBS1812 Series
<b>W</b>	12.0±0.3 (0.472±0.012)	12.0±0.3 (0.472±0.012)	12.0±0.3 (0.472±0.012)	<b>A max.</b>	185 (7.28)
<b>P<sub>0</sub></b>	4.0±0.1 (0.157±0.004)	4.0±0.1 (0.157±0.004)	4.0±0.1 (0.157±0.004)	<b>N min.</b>	50 (1.97)
<b>P<sub>1</sub></b>	8.0±0.1 (0.315±0.004)	8.0±0.1 (0.315±0.004)	8.0±0.1 (0.315±0.004)	<b>W<sub>1</sub></b>	12.4+2.0/-0.0 (0.488+0.079/-0.0)
<b>P<sub>2</sub></b>	2.0±0.05 (0.079±0.002)	2.0±0.05 (0.079±0.002)	2.0±0.05 (0.079±0.002)	<b>W<sub>2</sub> max.</b>	18.4 (0.724)
<b>A<sub>0</sub></b>	3.58±0.1 (0.141±0.004)	3.66±0.15 (0.144±0.006)	3.70±0.1 (0.146±0.004)		
<b>B<sub>0</sub></b>	4.93±0.1 (0.194±0.004)	4.98±0.1 (0.196±0.004)	5.10±0.1 (0.200±0.004)		
<b>B<sub>1</sub> max.</b>	5.9 (0.232)	5.9 (0.232)	5.9 (0.232)		
<b>D<sub>0</sub></b>	1.5+0.1/-0.0 (0.059+0.004/-0.0)	1.5+0.1/-0.0 (0.059+0.004/-0.0)	1.5+0.1/-0.0 (0.059+0.004/-0.0)		
<b>F</b>	5.5±0.05 (0.217±0.002)	5.5±0.05 (0.217±0.002)	5.5±0.05 (0.217±0.002)		
<b>E<sub>1</sub></b>	1.75±0.1 (0.069±0.004)	1.75±0.1 (0.069±0.004)	1.75±0.1 (0.069±0.004)		
<b>E<sub>2</sub> max.</b>	10.25 (0.404)	10.25 (0.404)	10.25 (0.404)		
<b>T max.</b>	0.6 (0.024)	0.6 (0.024)	0.6 (0.024)		
<b>T<sub>1</sub> max.</b>	0.1 (0.004)	0.1 (0.004)	0.1 (0.004)		
<b>K<sub>0</sub></b>	1.30±0.1 (0.051±0.004)	1.30±0.1 (0.051±0.004)	1.30±0.1 (0.051±0.004)		



### Recommended Reflow Soldering Profile:



Profile Feature	Pb-Free Assembly
<b>Preheat/Soak</b>	
Temperature Min ( $T_{smin}$ )	150°C
Temperature Max ( $T_{smax}$ )	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60~120 seconds
Ramp-up rate ( $T_L$ to $T_p$ )	3°C/second max.
Liquidous temperature ( $T_L$ )	217°C
Time ( $t_L$ ) maintained above $T_L$	60~150 seconds
Peak package body temperature ( $T_p$ )	260°C
Time ( $t_p$ )* within 5°C of the specified classification temperature ( $T_c$ )	30 seconds *
Ramp-down rate ( $T_p$ to $T_L$ )	6°C/second max.
Time 25°C to peak temperature	8 minutes max.
* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum	

#### Note:

- PBS1812 series cannot be wave soldered. Please contact AEM for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.
- Excess solder may cause a short circuit, especially during hand soldering.

**Caution:** Operation beyond the rated voltage or current may result in rupture electrical arcing or flame.

**WARNING:**

- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- The devices are intended for protection against occasional over-current or over-temperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal and mechanical procedures for electronic components.
- Operation in circuit with a large inductance can generate a circuit voltage ( $L di/dt$ ) above the rated voltage of the PPTC device.

Do not use this product in any Automotive Power train or Safety equipment such as ECU, ABS systems, or Battery Pack, Battery Management System, Battery Charger for Electric Vehicles and Plug-in Hybrid Vehicles. Only AEM products clearly described as "for Automotive Use" on its catalog can be used for automobile applications such as Power train and Safety equipment.