

Surface Mount Polymer PTC

Low Ohmic, PBL Series, 1210 Size



Features:

- Resettable over-current protection
- Ultra-low resistance
- Small size of 1210
- Fast time-to-trip
- RoHS compliant
- Halogen free

Applications:

- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection
- PC motherboards - Plug & Play protection
- Mobile phones - Battery & port protection
- PDAs / digital cameras
- Bluetooth earphone power protection
- Game console port protection
- Thermal protection for Li-ion and polymer battery packs

Ordering Code:

PBL 1210-200-06

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

(1) Series code

(2) Size code

(3) Current rating code

200: 2.0A

(4) Voltage rating code

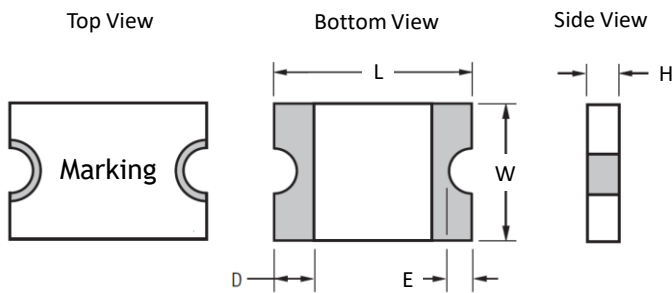
06: 6V

Agency Approval:

UL file number: E355716

TÜV certification number: R50464768. Tested for EN60738-1: 2006+A1; EN60738-1:2008; EN60730-1: 2011 clause 15, 17 and Annex J

Product Dimensions:



Part Number	L mm (inches)		W mm (inches)		H mm (inches)		D mm (inches)	E mm (inches)	
	Min.	Max.	Min.	Max.	Min.	Max.		Min.	Max.
PBL1210-175-06 PBL1210-175-12 PBL1210-200-06 PBL1210-200-12 PBL1210-260-06 PBL1210-260-12	3.00 (0.118)	3.43 (0.135)	2.35 (0.093)	2.80 (0.110)	0.40 (0.016)	0.70 (0.028)	0.25 (0.010)	0.05 (0.002)	0.45 (0.018)
PBL1210-300-06 PBL1210-300-12 PBL1210-350-06 PBL1210-350-12 PBL1210-380-06 PBL1210-380-12 PBL1210-400-06 PBL1210-400-12 PBL1210-450-06 PBL1210-450-12 PBL1210-500-06 PBL1210-500-12 PBL1210-550-06 PBL1210-550-12	3.00 (0.118)	3.43 (0.135)	2.35 (0.093)	2.80 (0.110)	0.60 (0.024)	1.20 (0.047)			
PBL1210-600-06 PBL1210-650-06 PBL1210-700-06	3.00 (0.118)	3.43 (0.135)	2.35 (0.093)	2.80 (0.110)	0.60 (0.024)	0.95 (0.037)			

Typical Ratings and Characteristics (@ 23°C):

✧ Operating temperature: -40 to +85°C

Part Number	Current (A)		V _{Max} (Vdc)	I _{Max} (A)	Max. Time to Trip (sec)		Typical Power (Pd, W)	Resistance Min. (Ω)	One Hours Post Reflow Resistance R ₁ Max. (Ω) ¹	Agency Approval	
	Hold (I _H)	Trip (I _T)			Current (A)	Time (sec)				UL	TÜV
PBL1210-175-06	1.75	3.50	6	50	8.00	0.8	1.0	0.0060	0.0500	√	√
PBL1210-175-12	1.75	3.50	12	50	8.00	0.8	1.0	0.006	0.05	√	√
PBL1210-200-06	2.00	4.00	6	50	8.00	5.00	1.0	0.005	0.0400	√	√
PBL1210-200-12	2.00	4.00	12	50	8.00	5.00	1.0	0.0050	0.0400	√	√
PBL1210-260-06	2.60	5.20	6	50	8.00	5.00	1.0	0.0040	0.0300	√	√
PBL1210-260-12	2.60	5.20	12	50	8.00	5.00	1.0	0.0040	0.0300	√	√
PBL1210-300-06	3.00	6.00	6	50	15.00	5.00	1.0	0.0030	0.0240	√	√
PBL1210-300-12	3.00	6.00	12	50	15.00	5.00	1.0	0.0030	0.0240	√	√
PBL1210-350-06	3.50	7.00	6	50	17.00	5.00	1.0	0.0020	0.0220	√	√
PBL1210-350-12	3.50	7.00	12	50	17.00	5.00	1.0	0.0020	0.0220	√	√
PBL1210-380-06	3.80	7.60	6	50	19.00	5.00	1.0	0.0020	0.0200	√	√
PBL1210-380-12	3.80	7.60	12	50	19.00	5.00	1.0	0.0020	0.0200	√	√
PBL1210-400-06	4.00	8.00	6	50	20.00	5.00	1.0	0.0020	0.018	√	√
PBL1210-400-12	4.00	8.00	12	50	20.00	5.00	1.0	0.0020	0.018	√	√
PBL1210-450-06	4.50	9.00	6	50	22.50	2.00	1.0	0.0020	0.0140	√	√
PBL1210-450-12	4.50	9.00	12	50	22.50	2.00	1.0	0.0020	0.0140	√	√
PBL1210-500-06	5.00	10.0	6	50	25.00	2.00	1.2	0.0010	0.0120	√	√
PBL1210-500-12	5.00	10.0	12	50	25.00	2.00	1.2	0.0010	0.0120	√	√
PBL1210-550-06	5.50	11.0	6	50	27.50	2.00	1.2	0.0010	0.0100	√	√
PBL1210-550-12	5.50	11.0	12	50	27.50	2.00	1.2	0.0010	0.0100	√	√
PBL1210-600-06	6.00	12.0	6	50	30.00	2.00	1.2	0.0010	0.0100	√	√
PBL1210-650-06	6.50	13.0	6	50	32.50	2.00	1.2	0.0010	0.0090	√	√
PBL1210-700-06	7.00	14.0	6	50	35.00	2.00	1.2	0.0010	0.0080	√	√

¹ 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.

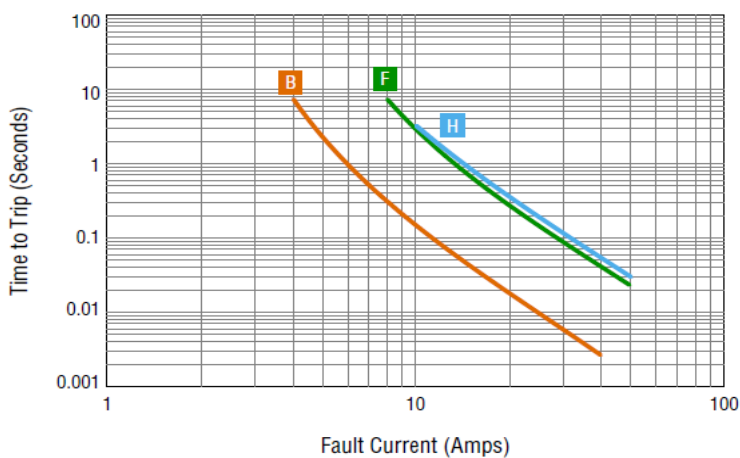
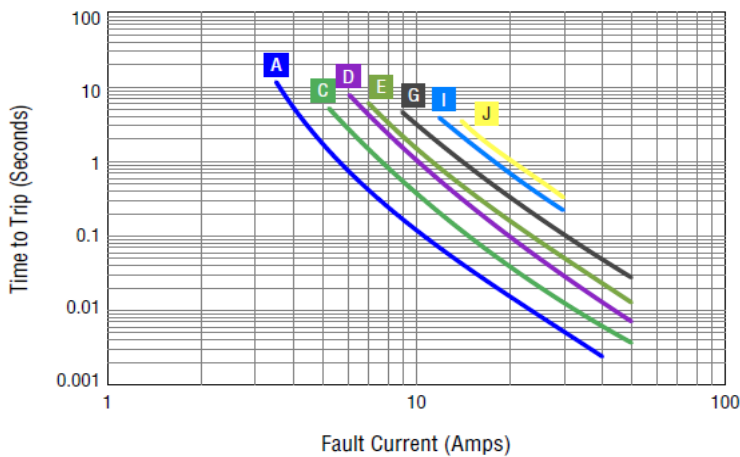
Packaging and Marking Information:

Part Number	Part Marking	Tape & Reel Quantity (piece)
PBL1210-175-06	H6	5,000
PBL1210-175-12	H12	
PBL1210-200-06	J6	
PBL1210-200-12	J12	
PBL1210-260-06	N6	
PBL1210-260-12	N12	3,500
PBL1210-300-06	P6	
PBL1210-300-12	P12	
PBL1210-350-06	S6	
PBL1210-350-12	S12	
PBL1210-380-06	V6	
PBL1210-380-12	V12	
PBL1210-400-06	U6	
PBL1210-400-12	U12	
PBL1210-450-06	X6	
PBL1210-450-12	X12	
PBL1210-500-06	Y6	
PBL1210-500-12	Y12	
PBL1210-550-06	56	
PBL1210-550-12	512	
PBL1210-600-06	Z6	
PBL1210-650-06	66	
PBL1210-700-06	A6	

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
PBL1210-175-06	2.57	2.33	2.07	1.75	1.49	1.34	1.24	1.00	0.88
PBL1210-175-12	2.57	2.33	2.07	1.75	1.49	1.34	1.24	1.00	0.88
PBL1210-200-06	2.94	2.65	2.35	2.00	1.70	1.53	1.42	1.14	1.0
PBL1210-200-12	2.94	2.65	2.35	2.00	1.70	1.53	1.42	1.14	1.0
PBL1210-260-06	3.82	3.46	3.07	2.60	2.21	1.95	1.85	1.48	1.30
PBL1210-260-12	3.82	3.46	3.07	2.60	2.21	1.95	1.85	1.48	1.30
PBL1210-300-06	4.41	3.99	3.54	3.00	2.55	2.30	2.13	1.71	1.50
PBL1210-300-12	4.41	3.99	3.54	3.00	2.55	2.30	2.13	1.71	1.50
PBL1210-350-06	5.10	4.65	4.13	3.50	2.98	2.65	2.50	2.00	1.75
PBL1210-350-12	5.10	4.65	4.13	3.50	2.98	2.65	2.50	2.00	1.75
PBL1210-380-06	5.59	5.05	4.48	3.80	3.23	2.95	2.70	2.17	1.90
PBL1210-380-12	5.59	5.05	4.48	3.80	3.23	2.95	2.70	2.17	1.90
PBL1210-400-06	5.80	5.25	4.70	4.00	3.40	3.10	2.80	2.28	2.00
PBL1210-400-12	5.80	5.25	4.70	4.00	3.40	3.10	2.80	2.28	2.00
PBL1210-450-06	6.30	5.65	4.95	4.50	3.83	3.40	2.95	2.50	2.05
PBL1210-450-12	6.30	5.65	4.95	4.50	3.83	3.40	2.95	2.50	2.05
PBL1210-500-06	7.00	6.25	5.50	5.00	4.25	3.75	3.25	2.75	2.25
PBL1210-500-12	7.00	6.25	5.50	5.00	4.25	3.75	3.25	2.75	2.25
PBL1210-550-06	7.70	6.90	6.05	5.50	4.68	4.15	3.60	3.05	2.40
PBL1210-550-12	7.70	6.90	6.05	5.50	4.68	4.15	3.60	3.05	2.40
PBL1210-600-06	8.40	7.50	6.60	6.00	5.10	4.50	3.90	3.30	2.65
PBL1210-650-06	9.10	8.15	7.15	6.50	5.50	4.90	4.25	3.60	2.85
PBL1210-700-06	9.80	8.75	7.70	7.00	5.95	5.25	4.55	3.85	3.05

Typical Time to Trip (@ 23°C):

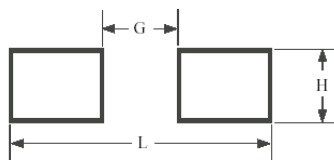


- A-PBL1210-175-06&PBL1210-175-12
- B-PBL1210-200-06&PBL1210-200-12
- C-PBL1210-260-06&PBL1210-260-12
- D-PBL1210-300-06&PBL1210-300-12
- E-PBL1210-350-06&PBL1210-350-12
- F-PBL1210-380-06&PBL1210-380-12
PBL1210-400-06&PBL1210-400-12
- G-PBL1210-450-06&PBL1210-450-12
- H-PBL1210-500-06&PBL1210-500-12
PBL1210-550-06&PBL1210-550-12
- I--PBL1210-600-06&PBL1210-650-06
- J--PBL1210-700-06

Environmental Characteristic

Item	Condition	Criteria
Operating Temperature	-40 °C to +85 °C	
Storage Condition	Before Opening	+40 °C max. / 70 % RH max
	After Opening	+40 °C max. / 10 % RH max
Floor Condition After Opening	Consumption within 4 weeks at floor condition +30 °C max. / 60 % RH max.	
Passive Aging	+85 °C, 1000 hours	±10 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 100 hours	±15 % typical resistance change
Thermal Shock	-40 °C to +85 °C, 20 times	±30 % typical resistance change
Vibration	MIL-STD-883C, Method 2007.1 Condition A	No change (R min < R < R1max)
ESD Classification	Class 6 (per AEC-Q200-2, HBM)	
Solvent Resistance	MIL-STD-202, Method 215	No change (marking still legible)

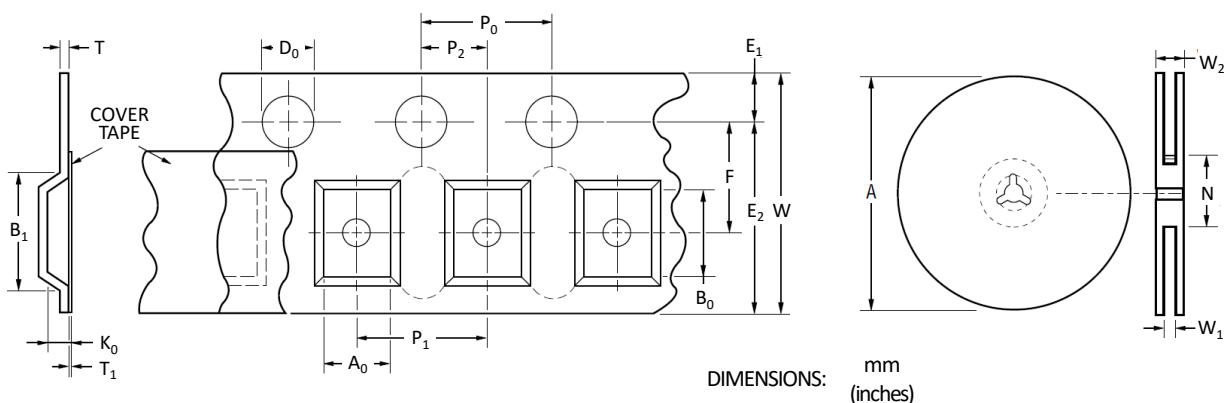
Recommended Foot Print Dimensions:



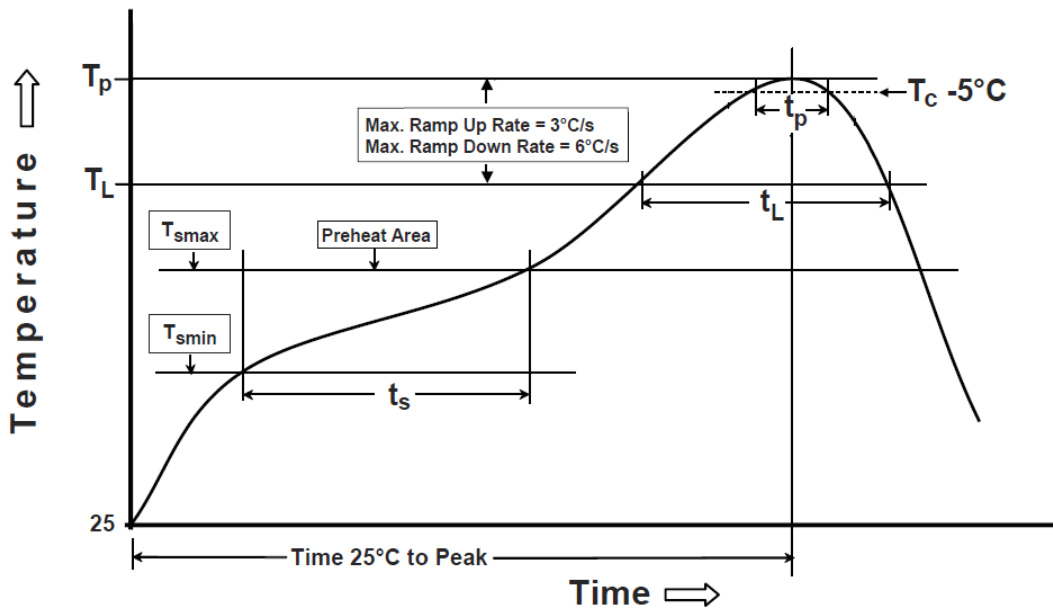
G (mm)	H (mm)	L (mm)
2.0±0.1	2.5±0.1	4.0±0.1

Tape and Reel Specifications:

Dimensions (Tape)	PBL1210-175-06 PBL1210-175-12 PBL1210-200-06 PBL1210-200-12 PBL1210-260-06 PBL1210-260-12 PBL1210-300-06 PBL1210-300-12 PBL1210-350-06 PBL1210-350-12 PBL1210-380-06 PBL1210-380-12 PBL1210-400-06 PBL1210-400-12 PBL1210-450-06 PBL1210-450-12 PBL1210-500-06 PBL1210-500-12 PBL1210-550-06 PBL1210-550-12 PBL1210-600-06 PBL1210-650-06 PBL1210-700-06	Dimensions (Reel)	PBL1210 Series
W	12.0±0.3 (0.472±0.012)	A max.	185 (7.28)
P ₀	4.0±0.1 (0.157±0.004)	N min.	50 (1.97)
P ₁	4.0±0.1 (0.157±0.004)	W ₁	12.4+1.0/-0.0 (0.488+0.039/-0.0)
P ₂	2.0±0.05 (0.079±0.002)	W ₂ max.	15.4 (0.606)
A ₀	2.9±0.1 (0.114±0.004)		
B ₀	3.5±0.1 (0.138±0.004)		
B ₁ max.	4.5 (0.177)		
D ₀	1.5+0.1/-0.0 (0.059+0.004/-0.0)		
F	5.5±0.05 (0.216±0.002)		
E ₁	1.75±0.1 (0.069±0.004)		
E ₂ typ.	10.25 (0.404)		
T max.	0.6 (0.024)		
T ₁ max.	0.1 (0.004)		
K ₀	0.65±0.1 (0.026±0.004)		



Recommended Reflow Soldering Profile:



Profile Feature	Pb-Free Assembly
Preheat/Soak	
Temperature Min (T_{smin})	150°C
Temperature Max(T_{smax})	200°C
Time(t_s) from (T_{smin} to T_{smax})	60~180 seconds
Ramp-uprate (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)	20~40 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:

- PBL1210 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.