

Surface Mount Polymer PTC

Low Ohmic, PBL Series, 0402 Size



Features:

- Resettable over-current protection
- Small size of 0402
- Ultra-low resistance
- Fast time-to-trip
- RoHS compliant and Halogen free
- Portable electronic devices
- Industrial controls
- Multimedia
- Game machines
- Telecom & broadband instruments
- Thermal protection for wearables, Li-ion & polymer battery packs
- USB port protection

Applications:

Ordering Code:

PBL 0402-010-06

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

- (1) Series code
- (2) Size code
- (3) Current rating code
010: 0.1A
- (4) Voltage rating code
06: 6V

Agency Approval:

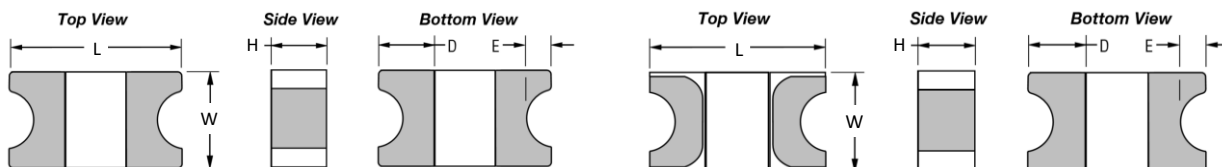
UL file number: E355716

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

Product Dimensions:

Type 1

Type 2



Part Number	Type	L mm (inches)		W mm (inches)		H mm (inches)		D mm (inches)	E mm (inches)
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
PBL0402-010-06	1								
PBL0402-020-06	2	0.85	1.15	0.35	0.65	0.20	0.60	0.10	0.030
PBL0402-035-06		(0.033)	(0.045)	(0.014)	(0.026)	(0.008)	(0.024)	(0.004)	(0.0012)
PBL0402-050-06									

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
PBL0402-010-06	0.10	0.30	6	50	0.5	1.0	0.5	0.15	3.00	√	√
PBL0402-020-06	0.20	0.50	6	50	1.0	1.0	0.5	0.10	1.60	√	√
PBL0402-035-06	0.35	0.70	6	50	8.0	0.1	0.5	0.05	0.85	√	√
PBL0402-050-06	0.50	1.00	6	50	8.0	0.1	0.5	0.04	0.50	√	√

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.

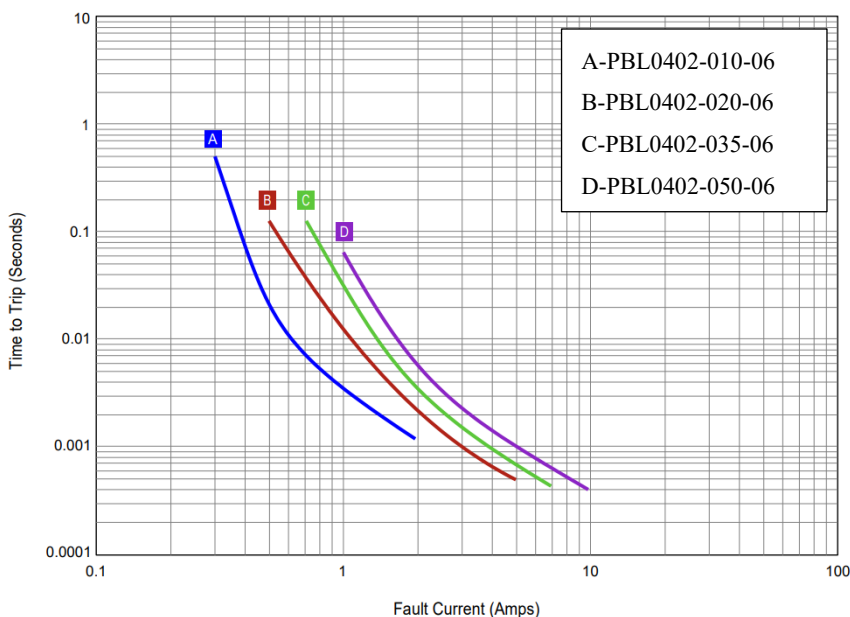
Packaging and Marking Information:

Part Number	Part Marking	Tape & Reel Quantity (piece)
PBL0402-010-06	No marking	10,000
PBL0402-020-06		
PBL0402-035-06		
PBL0402-050-06		

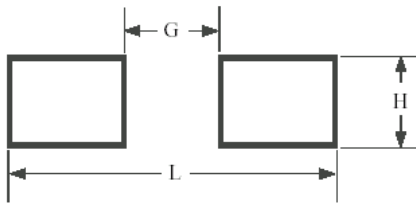
Thermal De-rating Hold Current (A) at Ambient Temperature:

Part Number	Ambient temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
PBL0402-010-06	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.04
PBL0402-020-06	0.32	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08
PBL0402-035-06	0.56	0.49	0.42	0.35	0.28	0.24	0.21	0.17	0.14
PBL0402-050-06	0.80	0.70	0.60	0.50	0.40	0.35	0.30	0.25	0.20

Typical Time to Trip (@ 23°C):



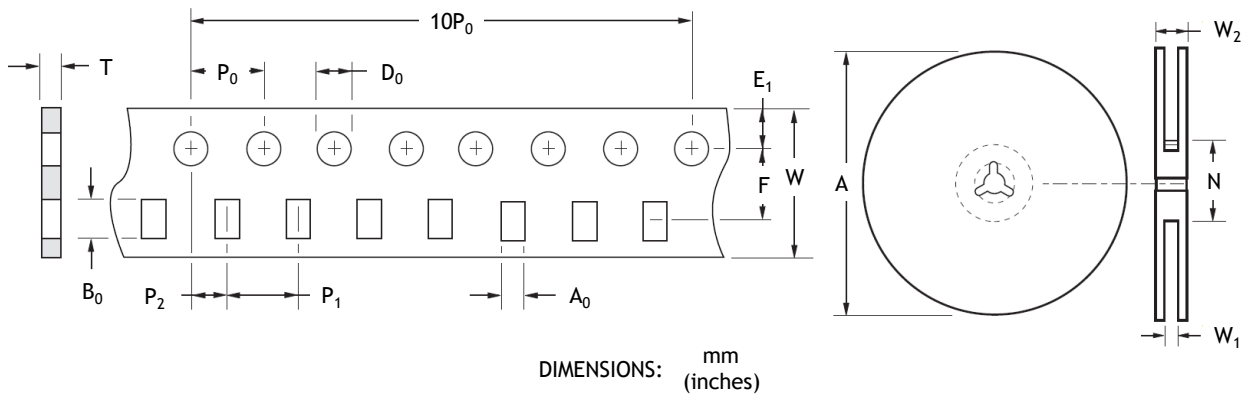
Recommended Foot Print Dimensions:



G (mm)	H (mm)	L (mm)
0.35±0.1	0.7±0.1	1.35±0.1

Tape and Reel Specifications:

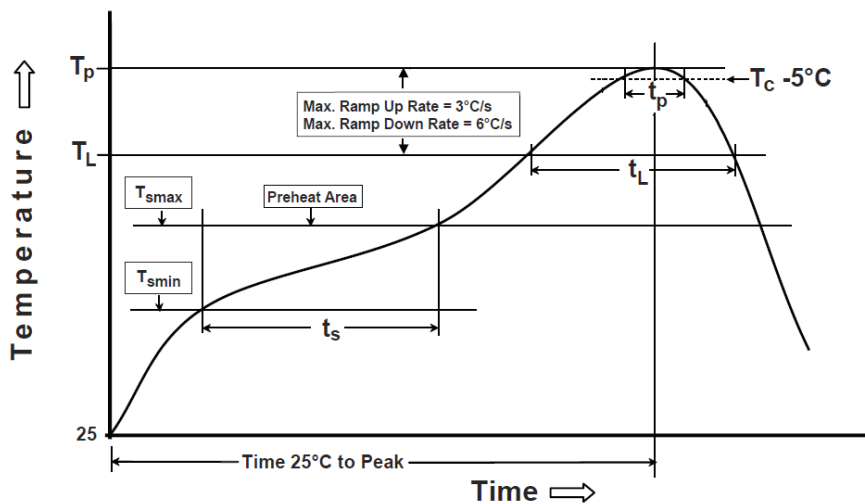
Dimensions (Tape)	PBL0402-010-06 PBL0402-020-06 PBL0402-035-06 PBL0402-050-06	Dimensions (Reel)	PBL0402 Series
W	8.0±0.1 (0.315±0.004)	A max.	185 (7.28)
P ₀	4.0±0.1 (0.157±0.004)	N min.	50 (1.97)
P ₁	2.0±0.05 (0.79±0.002)	W ₁	8.4+1.5/-0.0 (0.331+0.059/-0.0)
P ₂	2.0±0.05 (0.079±0.002)	W ₂ max.	14.4 (0.567)
A ₀	0.70±0.05 (0.028±0.002)		
B ₀	1.18±0.05 (0.046±0.002)		
D ₀	1.55±0.05 (0.061±0.002)		
F	3.5±0.05 (0.138±0.002)		
E ₁	1.75±0.1 (0.069±0.004)		
T	0.60±0.05 (0.024±0.002)		
10P ₀	40.0±0.1 (1.575±0.004)		



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 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})	60~180seconds
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:

- PBL0402 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.