Surface Mount Polymer PTC
Automotive Grade, High Operating Temperature
PAT Series, 1210 Size

Features:

- AEC-Q200 Rev-D stress test qualification
- Operating temperature range up to 125˚C
- Low thermal derating factor
- Higher hold currents at elevated temperature
- RoHS compliant
- Halogen free

Applications:

- Overcurrent surge protection of electronic equipment required to operate at high operating temperature ranges
- Resettable fault protection of general electronic equipment
- Protection of automotive circuitry including engine control modules

Ordering Code:

PAT 1210–016

(1) (2) (3)

(1) Series code

(2) Size code

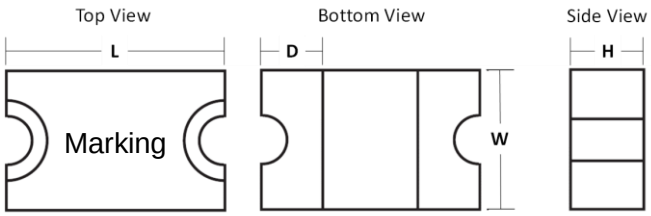
(3) Current rating code

016: 0.16A

Agency Approval:

Pending

Product Dimensions:



Part Number	L mm (inches)		W mm (inches)		H mm (inches)		D mm (inches)
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
PAT1210-010 **PAT1210-016** **PAT1210-020** **PAT2120-035** **PAT1210-050**	3.00 (0.118)	3.43 (0.135)	2.35 (0.093)	2.80 (0.110)	0.40 (0.016)	0.85 (0.033)	0.30 (0.012)
PAT1210-075	3.00 (0.118)	3.43 (0.135)	2.35 (0.093)	2.80 (0.110)	0.60 (0.024)	1.20 (0.047)	0.30 (0.012)
PAT1210-110	3.00 (0.118)	3.43 (0.135)	2.35 (0.093)	2.80 (0.110)	0.80 (0.031)	1.60 (0.063)	0.30 (0.012)

Typical Ratings and Characteristics (@ 23˚C):

✧ Operating temperature: -40 to +125°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]
	Hold (I_H)	Trip (I_T)			Current (A)	Time (sec)			
PAT1210-010	0.10	0.50	30	20	2.50	1.50	1.0	1.00	7.50
PAT1210-016	0.16	0.80	30	20	8.00	0.10	1.0	0.70	6.00
PAT1210-020	0.20	1.00	30	20	8.00	0.10	1.0	0.60	5.00
PAT1210-035	0.35	1.75	30	20	8.00	0.10	1.0	0.40	2.20
PAT1210-050	0.50	2.50	30	20	8.00	0.10	1.0	0.30	1.60
PAT1210-075	0.75	3.75	16	20	8.00	5.00	1.0	0.10	1.00
PAT1210-110	1.10	5.50	9	20	8.00	5.00	1.0	0.06	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:

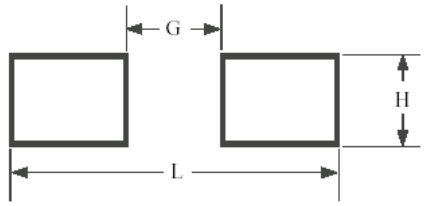
Part Number	Part Marking	Tape & Reel Quantity (piece)
PAT1210-010	B w	3,000
PAT1210-016	D w	
PAT1210-020	E w	
PAT1210-035	F w	
PAT1210-050	K w	
PAT1210-075	L w	
PAT1210-110	N w	2,000

B w → B = 0.10A; w = Week code (w=Y → week 49~50)

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

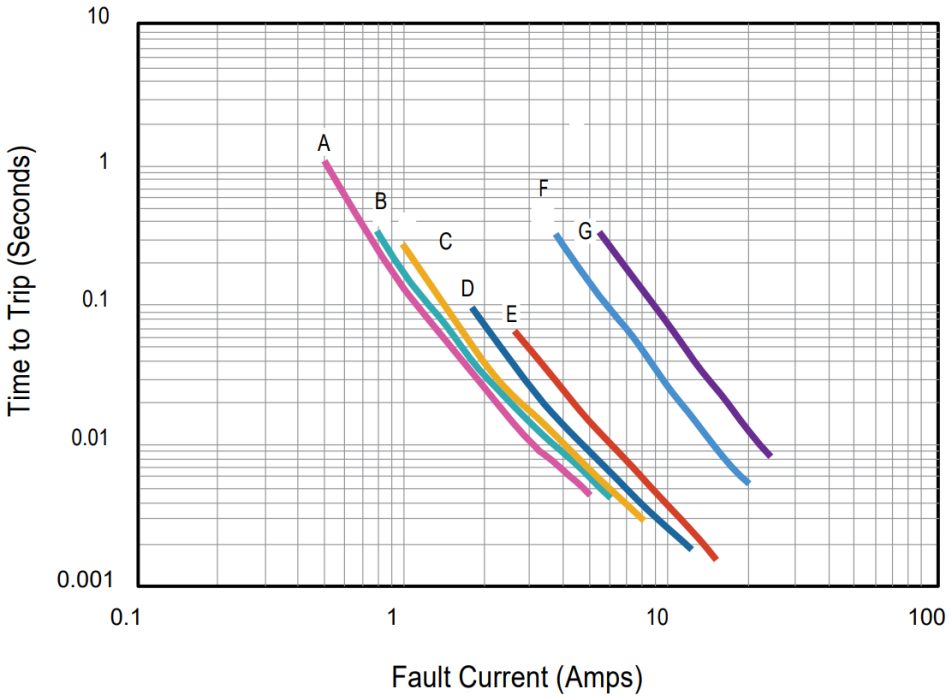
Part Number	Ambient temperature									
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C	125°C
PAT1210-010	0.15	0.13	0.12	0.10	0.09	0.08	0.07	0.07	0.06	0.03
PAT1210-016	0.23	0.21	0.19	0.16	0.14	0.13	0.12	0.11	0.09	0.04
PAT1210-020	0.29	0.26	0.23	0.20	0.18	0.16	0.15	0.13	0.11	0.05
PAT1210-035	0.51	0.46	0.41	0.35	0.31	0.28	0.26	0.23	0.20	0.09
PAT1210-050	0.73	0.66	0.58	0.50	0.44	0.41	0.37	0.34	0.28	0.14
PAT1210-075	1.09	0.98	0.87	0.75	0.66	0.61	0.56	0.50	0.42	0.20
PAT1210-110	1.60	1.44	1,28	1.10	0.97	0.89	0.81	0.74	0.62	0.30

Recommended Foot Print Dimensions:



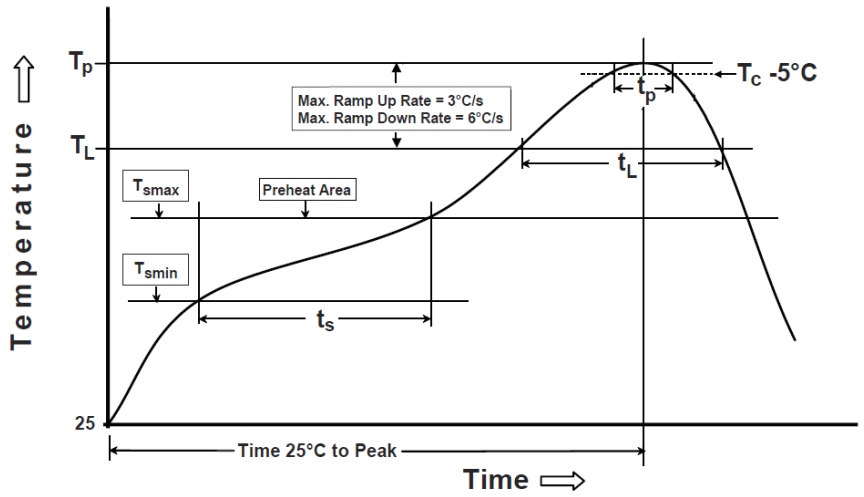
G (mm)	H (mm)	L (mm)
1.8±0.1	2.8±0.1	3.8±0.1

Typical Time to Trip (@ 23˚C):



A- PAT1210-010
B- PAT1210-016
C- PAT1210-020
D- PAT1210-035
E- PAT1210-050
F- PAT1210-075
G- PAT1210-110

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:

- PAT1210 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.