

1206L Series

Surface Mount



Description

The 1206L Series PTC provides surface mount overcurrent protection for applications where space is at a premium and resettable protection is desired.

Features and Benefits

- RoHS compliant, lead-free and halogen-free
- Fast response to fault currents
- Compact design saves board space
- Low resistance
- Low-profile
- Compatible with high temperature solders

Applications

- USB peripherals
- Disk drives
- CD-ROMs
- Plug and play protection for motherboards and peripherals
- Mobile phones - battery and port protection
- Disk drives
- PDAs / digital cameras
- Game console port protection

Additional Information



Resources



Accessories



Samples

Agency Approvals

Agency	Agency File Number
c UL US	E183209
△	R50119118

Electrical Characteristics

Part Number	Marking	I _{hold} (A)	I _{trip} (A)	V _{max} (Vdc)	I _{max} (A)	P _d typ. (W)	Maximum Time To Trip		Resistance		Agency Approvals	
							Current (A)	Time (Sec.)	R _{min} (Ω)	R _{1max} (Ω)	c UL US	△
1206L005/60	f6	0.05	0.15	60	10	0.6	0.25	1.50	3.60	20.00	X	X
1206L010/60	n6	0.10	0.25	60	10	0.6	0.50	1.50	1.50	10.00	X	X
1206L012/48	U	0.125	0.29	48	10	0.6	1.00	0.20	1.50	6.00	X	X
1206L012	A	0.125	0.29	30	100	0.6	1.00	0.20	1.500	6.000	X	X
1206L016	B	0.16	0.37	30	100	0.6	1.00	0.30	1.200	4.500	X	X
1206L020/30	C3	0.20	0.42	30	100	0.6	8.00	0.10	0.65	2.60	X	X
1206L020 ^{1,2}	C	0.20	0.42	24	100	0.6	8.00	0.10	0.650	2.600	X	X
1206L025/24	D2	0.25	0.55	24	100	0.6	8.00	0.08	0.55	2.30	X	X
1206L025 ¹	D	0.25	0.50	16	100	0.6	8.00	0.08	0.550	2.300	X	X
1206L035 ¹	E	0.35	0.75	6	100	0.6	8.00	0.10	0.300	1.200	X	X
1206L035/16	J	0.35	0.75	16	100	0.6	8.00	0.10	0.300	1.200	X	X
1206L035/30	J3	0.35	0.75	30	100	0.6	8.00	0.10	0.30	1.20	X	X
1206L050 ¹	F	0.50	1.00	6	100	0.6	8.00	0.10	0.150	0.700	X	X
1206L050/15	M	0.50	1.00	15	100	0.6	8.00	0.10	0.150	0.750	X	X
1206L050/24	F2	0.50	1.00	24	100	0.6	8.00	0.10	0.15	0.75	X	X
1206L075/13.2	G1	0.75	1.50	13.2	100	0.6	8.00	0.20	0.090	0.350	X	X
1206L075/16	GF	0.75	1.50	16	100	0.6	8.00	0.20	0.090	0.2900	X	X
1206L075TH ¹	G	0.75	1.50	8	100	0.6	8.00	0.20	0.090	0.290	X	X
1206L110TH ¹	H	1.10	2.20	8	100	0.8	8.00	0.10	0.040	0.210	X	X
1206L110/16	HF	1.10	2.20	16	100	0.8	8.00	0.10	0.060	0.210	X	X
1206L150TH ¹	K	1.50	3.00	8	100	0.8	8.00	0.30	0.040	0.120	X	X
1206L175	V	1.75	3.50	6	100	0.8	8.00	0.50	0.020	0.090	X	X
1206L200	L	2.00	3.50	6	100	0.8	8.00	1.50	0.018	0.080	X	X

I_{hold} = Hold current: maximum current device will pass without tripping in 20°C still air.
 I_{trip} = Trip current: minimum current at which the device will trip in 20°C still air.
 V_{max} = Maximum voltage device can withstand without damage at rated current (I_{max})
 I_{max} = Maximum fault current device can withstand without damage at rated voltage (V_{max})
 P_d = Power dissipated from device when in the tripped state at 20°C still air.

R_{min} = Minimum resistance of device in initial (un-soldered) state.
 R_{typ} = Typical resistance of device in initial (un-soldered) state.
 R_{1max} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.
 1. Some older references to these devices may include “-C” in the Part Number. The “-C” should be omitted when placing new orders for the device.
 2. Part Number tested and complied with AEC-Q200.

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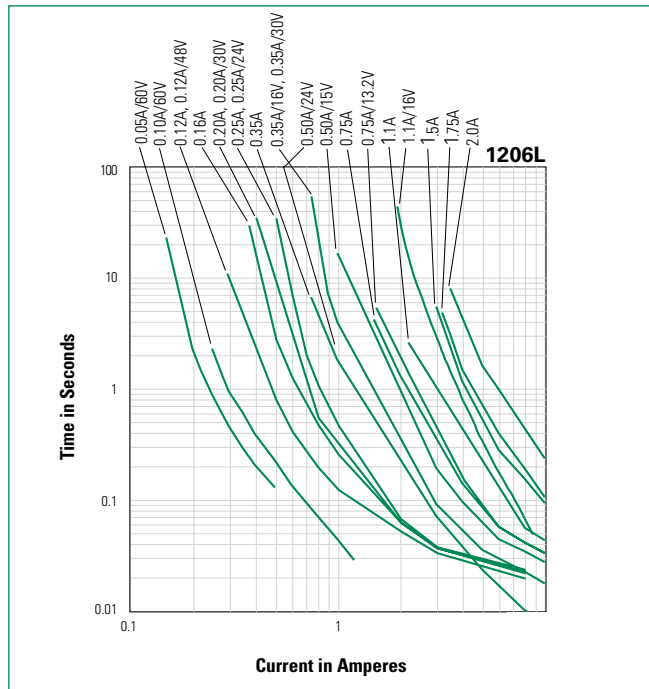
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Temperature Derating

Part Number	Ambient Operation Temperature								
	-40°C	-20°C	0°C	20°C	40°C	50°C	60°C	70°C	85°C
	Hold Current (A)								
1206L005/60	0.076	0.068	0.060	0.050	0.043	0.039	0.034	0.030	0.023
1206L010/60	0.15	0.14	0.12	0.10	0.083	0.074	0.065	0.056	0.042
1206L012/48	0.18	0.16	0.14	0.125	0.10	0.09	0.08	0.07	0.05
1206L012	0.18	0.16	0.14	0.125	0.10	0.09	0.08	0.07	0.05
1206L016	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08
1206L020/30	0.28	0.25	0.23	0.20	0.17	0.15	0.14	0.12	0.09
1206L020	0.28	0.25	0.23	0.20	0.17	0.15	0.14	0.12	0.09
1206L025/24	0.37	0.33	0.29	0.25	0.22	0.20	0.17	0.15	0.12
1206L025	0.37	0.33	0.29	0.25	0.22	0.20	0.17	0.15	0.12
1206L035	0.50	0.45	0.40	0.35	0.30	0.27	0.24	0.21	0.15
1206L035/16	0.50	0.45	0.40	0.35	0.30	0.27	0.24	0.21	0.15
1206L035/30	0.50	0.45	0.40	0.35	0.30	0.27	0.24	0.21	0.15
1206L050	0.71	0.64	0.57	0.50	0.42	0.39	0.35	0.31	0.25
1206L050/15	0.71	0.64	0.57	0.50	0.42	0.39	0.35	0.31	0.25
1206L050/24	0.71	0.64	0.57	0.50	0.42	0.39	0.35	0.31	0.25
1206L075/13.2	1.14	1.04	0.88	0.75	0.65	0.59	0.54	0.49	0.41
1206L075/16	1.14	1.01	0.88	0.75	0.65	0.59	0.54	0.49	0.41
1206L075TH	1.14	1.01	0.88	0.75	0.65	0.59	0.54	0.49	0.41
1206L110TH	1.64	1.46	1.30	1.10	0.92	0.83	0.80	0.65	0.52
1206L110/16	1.64	1.46	1.30	1.10	0.92	0.83	0.80	0.65	0.52
1206L150TH	2.20	1.99	1.77	1.50	1.34	1.23	1.10	1.01	0.84
1206L175	2.50	2.25	2.00	1.75	1.55	1.45	1.35	1.25	1.10
1206L200	2.60	2.44	2.35	2.00	1.78	1.67	1.50	1.45	1.10

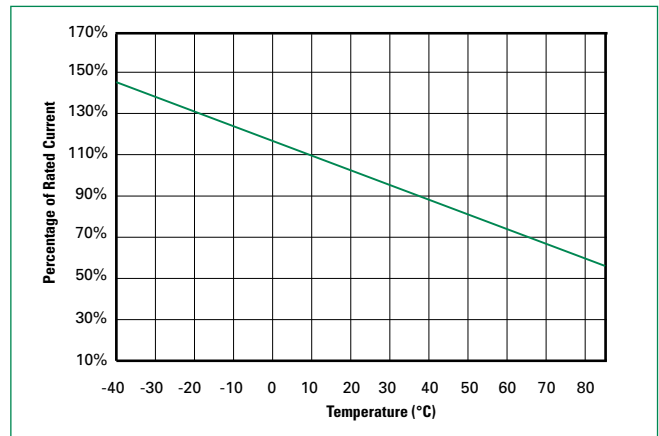
Notes: The temperature derating data is only for reference, please contact Littelfuse technical support for detail temperature derating information.

Average Time Current Curves



The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

Temperature Derating Curve

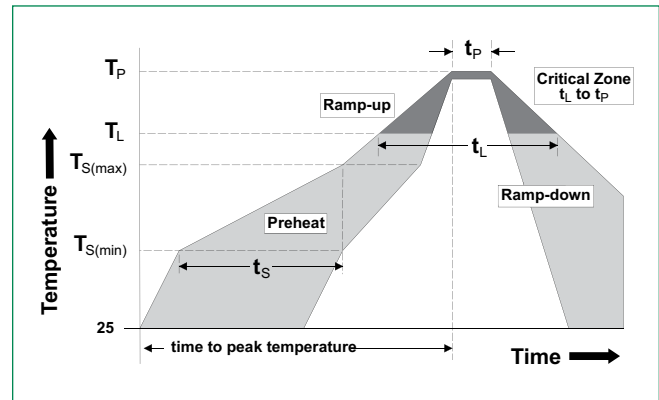


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Soldering Parameters

Profile Feature	Pb-Free Assembly	
Average Ramp-Up Rate ($T_{S(max)}$ to T_p)	3°C/second max	
Pre Heat:	Temperature Min ($T_{S(min)}$)	150°C
	Temperature Max ($T_{S(max)}$)	200°C
	Time (Min to Max) (t_s)	60 – 180 secs
Time Maintained Above:	Temperature (T_L)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak / Classification Temperature (T_p)	260 ^{+0/-5} °C	
Time within 5°C of actual peak Temperature (t_p)	20 – 40 seconds	
Ramp-down Rate	6°C/second max	
Time 25°C to peak Temperature (T_p)	8 minutes Max.	



- All temperature refer to topside of the package, measured on the package body surface
- If reflow temperature exceeds the recommended profile, devices may not meet the performance requirements
- Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead
- Recommended maximum paste thickness is 0.25mm (0.010inch)
- Devices can be cleaned using standard industry methods and solvents
- Devices can be reworked using the standard industry practices

Environmental Specifications

Operating/Storage Temperature	-40°C to +85°C
Maximum Device Surface Temperature in Tripped State	125°C
Passive Aging	+85°C, 1000 hours -/+5% typical resistance change
Humidity Aging	+85°C, 85%, R.H., 1000 hours -/+5% typical resistance change
Thermal Shock	MIL-STD-202, Method 107 +85°C/-40°C 20 times -30% typical resistance change
Solvent Resistance	MIL-STD-202, Method 215 No change
Vibration	MIL-STD-883, Method 2007, Condition A No change
Moisture Sensivity Level	Level 1, J-STD-020

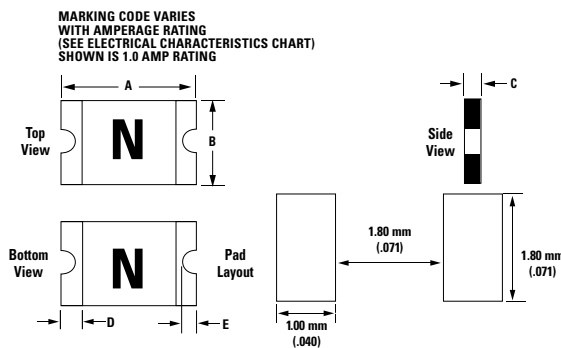
Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material: Matte Tin (Sn))
Lead Solderability	Meets EIA Specification RS186-9E, ANSI/J-STD-002 Category 3.

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Dimensions



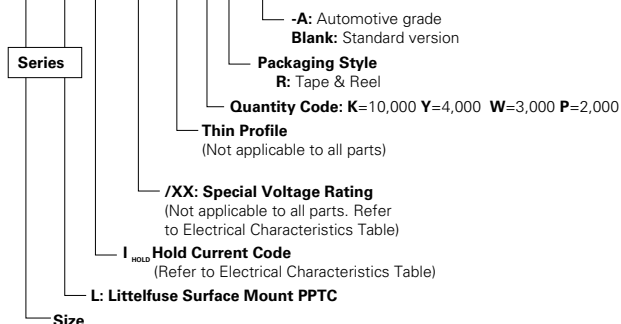
Part Number	A				B				C				D				E				
	Inches		mm		Inches		mm		Inches		mm		Inches		mm		Inches		mm		
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
1206L005/60									0.03	0.05	0.65	1.25									
1206L010/60									0.03	0.05	0.65	1.25									
1206L012/48									0.03	0.05	0.65	1.25									
1206L012									0.03	0.06	0.65	1.45									
1206L016									0.03	0.06	0.65	1.45									
1206L020/30									0.02	0.04	0.50	1.00									
1206L020									0.02	0.04	0.50	1.00									
1206L025/24									0.02	0.04	0.50	1.00									
1206L025									0.02	0.04	0.5	1.00									
1206L035									0.02	0.03	0.45	0.75									
1206L035/16									0.02	0.03	0.45	0.75									
1206L035/30	0.12	0.13	3.00	3.40	0.06	0.07	1.50	1.80	0.02	0.04	0.50	1.00	0.01	0.03	0.25	0.75	0.002	0.018	0.05	0.45	
1206L050									0.02	0.03	0.45	0.75									
1206L050/15									0.02	0.03	0.45	0.75									
1206L050/24									0.03	0.05	0.75	1.25									
1206L075/13.2									0.03	0.05	0.75	1.25									
1206L075/16									0.03	0.05	0.75	1.25									
1206L075TH									0.02	0.03	0.40	0.75									
1206L110TH									0.01	0.02	0.30	0.60									
1206L110/16									0.03	0.05	0.75	1.25									
1206L150TH									0.02	0.04	0.50	1.00									
1206L175									0.03	0.08	0.80	1.80									
1206L200									0.03	0.07	0.80	1.60									

Warning

- Users shall independently assess the suitability of these devices for each of their applications
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the performance of these PPTC devices
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses
- Circuits with inductance may generate a voltage (L di/dt) above the rated voltage of the PPTC device.

Part Ordering Number System

1206 L 380 /12 TH Y R - A



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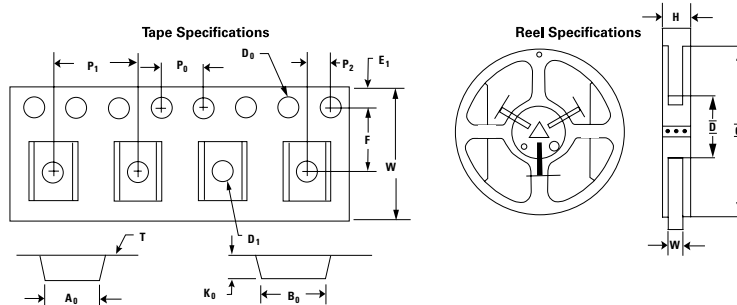
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Packaging Options

Part Number	Ordering Number	Halogen Free	I _{hold} (A)	I _{hold} Code	Packaging Option	Quantity	Quantity/Pack Code
1206L005/60	1206L005/60WVR	Yes	0.05	050	Tape and Reel	3000	WR
1206L010/60	1206L010/60WVR		0.10	100		3000	WR
1206L012/48	1206L012/48WVR		0.12	012		3,000	WR
1206L012	1206L012WVR		0.125	012		3000	WR
1206L016	1206L016WVR		0.16	016		3000	WR
1206L020/30	1206L020/30YR		0.20	020		4,000	YR
1206L020	1206L020YR		0.20	020		4000	YR
1206L025/24	1206L025/24YR		0.25	025		4,000	YR
1206L025	1206L025YR		0.25	025		4000	YR
1206L035	1206L035YR		0.35	035		4000	YR
1206L035/16	1206L035/16YR		0.35	035		4000	YR
1206L035/30	1206L035/30WVR		0.35	350		3000	WR
1206L050	1206L050YR		0.50	050		4000	YR
1206L050/15	1206L050/15YR		0.50	050		4000	YR
1206L050/24	1206L050/24WVR		0.50	500		3000	WR
1206L075/13.2	1206L075/13.2WVR		0.75	075		3000	WR
1206L075/16	1206L075/16WVR		0.75	075		3,000	WR
1206L075TH	1206L075THYR		0.75	075		4000	YR
1206L110TH	1206L110THYR		1.10	110		4000	YR
1206L110/16	1206L110/16WVR		1.10	110		3000	WR
1206L150TH	1206L150THWVR		1.50	150		3000	WR
1206L175	1206L175PR		1.75	175		2000	PR
1206L200	1206L200PR		2.00	200		2000	PR

Tape and Reel Specifications

Tape Specifications: EIA-481-1 (mm)						Reel Dimensions: EIA-481-1 (mm)	
Value	Packaging Code "YR"		Packaging Code "WR"		Packaging Code "PR"		
		1206L020 1206L020/30 1206L025 1206L025/24 1206L035 1206L035/16	1206L050 1206L050/15 1206L075TH 1206L110TH	1206L005/60 1206L010/60 1206L012 1206L012/48 1206L016 1206L035/30	1206L050/24 1206L075/13.2 1206L075/16 1206L110/16 1206L150TH	1206L175 1206L200	
W	8.20+0.10/-0.30		8.15+0.15/-0.30		8.20+0.10/-0.30	C	Ø178+/-1.0
F	3.50+/-0.05		3.50+/-0.05		3.50+/-0.05	D	Ø60.2+/-0.5
E ₁	1.75+/-0.10		1.75+/-0.10		1.75+/-0.10	H	11.0+/-0.5
D ₀	1.55+/-0.05		1.55+/-0.05		1.55+/-0.05	W	9.0+/-1.5
D ₁	1.00+/-0.10		1.00+/-0.10		1.00+/-0.10		
P ₀	4.00+/-0.10		4.00+/-0.10		4.00+/-0.10		
P ₁	4.00+/-0.10		4.00+/-0.10		4.00+/-0.10		
P ₂	2.00+/-0.05		2.00+/-0.05		2.00+/-0.05		
A ₀	1.95+/-0.10		1.92+/-0.10		1.95+/-0.10		
B ₀	3.65+/-0.10		3.65+/-0.10		3.65+/-0.10		
T	0.20+/-0.10		0.25+/-0.10		0.25+/-0.10		
K ₀	0.87+/-0.10		1.30+/-0.10		1.70+/-0.10		
Leader min.	390		390		390		
Trailer min.	160		160		160		



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