



### Description

The 1210L Series device provides surface mount overcurrent protection for applications where space is at a premium and resettable protection is desired.



### Features

- RoHS compliant, lead-free and halogen-free<sup>1</sup>
- 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
- PC motherboards - plug and play protection
- Mobile phones - battery and port protection
- PDAs / digital cameras
- Game console port protection

### Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E183209
	R50119118

### Electrical Characteristics

Part Number	Marking	I <sub>hold</sub> (A)	I <sub>trip</sub> (A)	V <sub>max</sub> (Vdc)	I <sub>max</sub> (A)	P <sub>d</sub> max. (W)	Maximum Time To Trip		Resistance		Agency Approvals	
							Current (A)	Time (Sec.)	R <sub>min</sub> (Ω)	R <sub>1max</sub> (Ω)		
1210L005	A	0.05	0.15	30	10	0.60	0.25	1.50	3.600	50.00	X	X
1210L010	B	0.10	0.30	30	10	0.60	0.50	1.50	1.600	15.00	X	X
1210L020	C	0.20	0.40	30	10	0.60	8.00	0.02	0.800	5.000	X	X
1210L035	E	0.35	0.70	6	100	0.60	8.00	0.20	0.320	1.300	X	X
1210L050	F	0.50	1.00	13.2	100	0.60	8.00	0.05	0.250	0.900	X	X
1210L075	G	0.75	1.50	6	100	0.60	8.00	0.10	0.130	0.400	X	X
1210L110TH <sup>2</sup>	H	1.10	2.20	8	100	0.60	8.00	0.10	0.060	0.210	X	X
1210L150TH <sup>2</sup>	K	1.50	3.00	6	100	0.80	8.00	0.30	0.040	0.110	X	X
1210L175	V	1.75	3.50	6	100	0.80	8.00	0.60	0.020	0.080	X	X
1210L200	L	2.00	4.00	6	100	0.80	8.00	1.00	0.015	0.070	X	X

I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20°C still air.

V<sub>max</sub> = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>)

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>)

P<sub>d</sub> = Power dissipated from device when in the tripped state at 20°C still air.

R<sub>min</sub> = Minimum resistance of device in initial (un-soldered) state.

R<sub>typ</sub> = Typical resistance of device in initial (un-soldered) state.

R<sub>1max</sub> = 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.

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#### Notes:

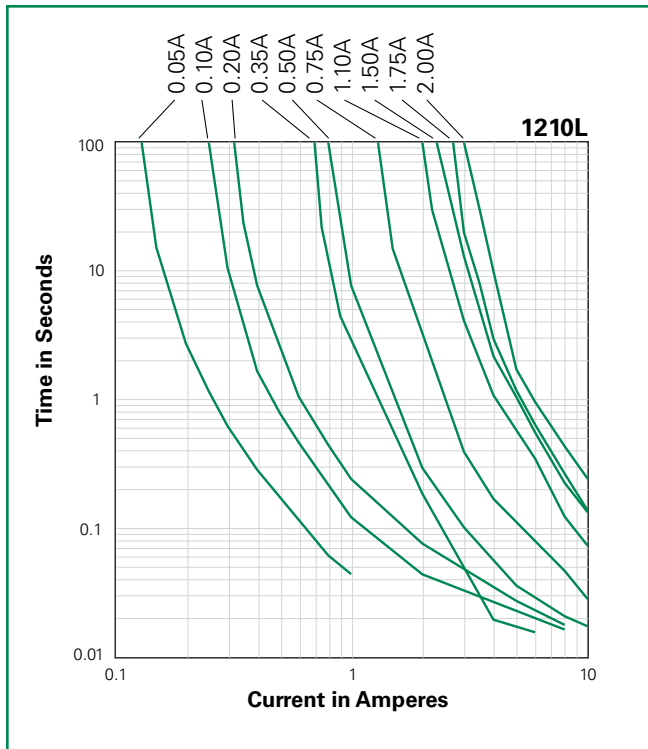
**1** Effective September 15, 2009 onward, all 1210L PTC products will be manufactured Halogen Free (HF). Existing Non-Halogen Free 1210L PTC products will continue to be sold until supplies are depleted. Effective January 1, 2010, all 1210L PTC product will be manufactured and sold as Halogen Free by default, and the "HF" part number suffix code will be discontinued – Refer to Part Ordering Number System and Packaging Options sections for additional information.

**2** Part numbers ending in "TH" refer to new lower profile devices. For these items the "TH" suffix must be included in the ordering instructions. Please refer also to the Dimensions and Part Ordering Number System sections of this document for additional information. Orders for the original thicker product (No TH in part number) may be accepted in some instances through October 31, 2009. Please contact Littelfuse for additional information or arrangements.

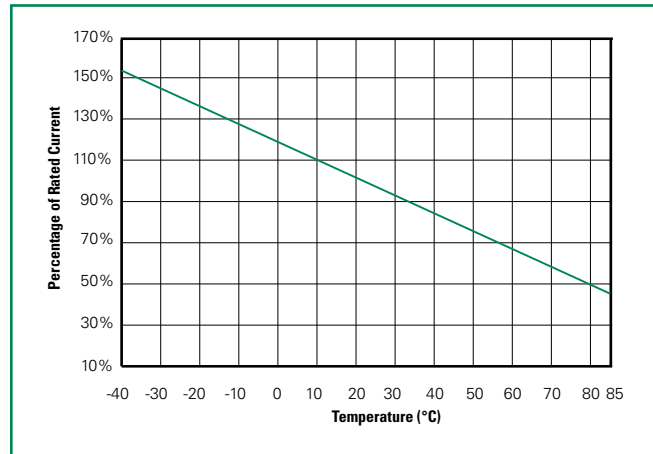
**Temperature Derating**

Part Number	Ambient Operation Temperature								
	-40°C	-20°C	0°C	23°C	40°C	50°C	60°C	70°C	85°C
1210L005	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.02
1210L010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
1210L020	0.29	0.26	0.22	0.20	0.16	0.14	0.13	0.11	0.08
1210L035	0.47	0.45	0.40	0.35	0.33	0.28	0.24	0.21	0.18
1210L050	0.76	0.67	0.58	0.50	0.43	0.40	0.36	0.32	0.28
1210L075	1.00	0.97	0.86	0.75	0.64	0.59	0.54	0.48	0.40
1210L110TH	1.69	1.48	1.29	1.10	0.88	0.76	0.65	0.57	0.43
1210L150TH	2.13	1.92	1.71	1.50	1.26	1.14	1.01	0.89	0.71
1210L175	2.42	2.22	1.98	1.75	1.52	1.35	1.23	1.05	0.84
1210L200	2.60	2.44	2.35	2.00	1.78	1.67	1.50	1.45	1.10

**Average Time Current Curves**



**Temperature Derating Curve**



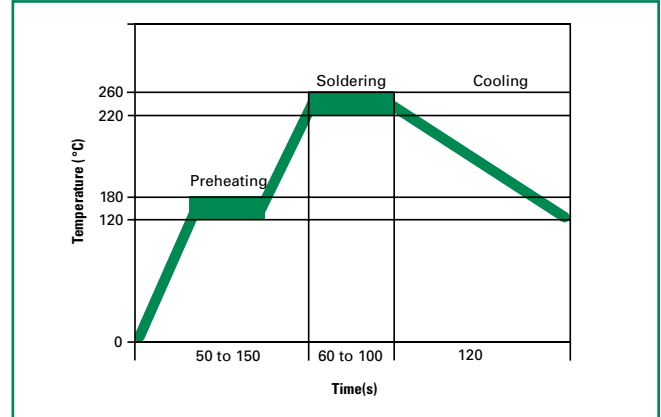
The average time current curves and Temperature Derating curve performance is affected by a number of variables, and these curves provided as guidance only. Customer must verify the performance in their application.

### Soldering Parameters

Condition	Reflow
Peak Temp/ Duration Time	260°C / 10 Sec
Time above liquids (TAL) 220°C	60 Sec ~ 100 Sec
Preheat 120°C~ 180°C	50 Sec ~ 150 Sec
Storage Condition	0°C~35°C, ≤70%RH

- Recommended reflow methods: IR, vapor phase oven, hot air oven, N<sub>2</sub> environment for lead-free
- Recommended maximum paste thickness is 0.25mm (0.010 inch)
- Devices can be cleaned using standard industry methods and solvents.

**Note:** If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.



### Physical Specifications

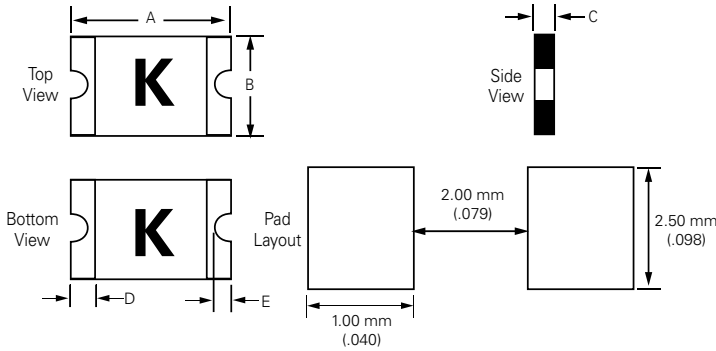
<b>Terminal Material</b>	Solder-Plated Copper (Solder Material: Matte Tin (Sn))
<b>Lead Solderability</b>	Meets EIA Specification RS186-9E, ANSI/J-STD-002 Category 3.

### Environmental Specifications

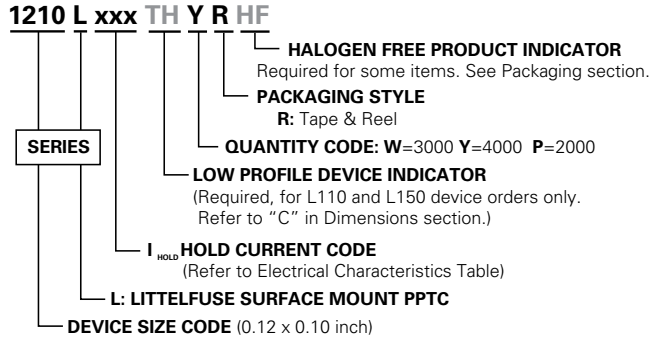
<b>Operating/Storage Temperature</b>	-40°C to +85°C
<b>Maximum Device Surface Temperature in Tripped State</b>	125°C
<b>Passive Aging</b>	+85°C, 1000 hours -/+5% typical resistance change
<b>Humidity Aging</b>	+85°C, 85, R.H., 1000 hours -/+5% typical resistance change
<b>Thermal Shock</b>	MIL-STD-202, Method 107G +85°C/-40°C, 20 times -30% typical resistance change
<b>Solvent Resistance</b>	MIL-STD-202, Method 215 No change
<b>Vibration</b>	MIL-STD-883C, Method 2007.1, Condition A No change
<b>Moisture Level Sensitivity</b>	Level 1, J-STD-020C

**Dimensions**

MARKING CODE VARIES  
WITH AMPERAGE RATING  
(See Electrical Characteristics Table)  
SHOWN IS 1.5AMP RATING



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
1210L005	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.03	0.05	0.75	1.25	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L010	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.03	0.05	0.75	1.25	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L020	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.02	0.04	0.60	1.00	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L035	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.02	0.03	0.50	0.85	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L050	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.02	0.03	0.50	0.85	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L075	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.02	0.03	0.50	0.85	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L110TH	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.04	0.05	0.30	0.71	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L150TH	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.03	0.07	0.75	1.07	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L175	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.02	0.04	0.60	1.00	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5
1210L200	0.12	0.14	3.0	3.43	0.09	0.11	2.35	2.80	0.03	0.06	0.80	1.60	0.01	0.03	0.25	0.75	0.008	0.02	0.2	0.5

**Part Ordering Number System**

**Packaging Options**

Part Number	Ordering Number	Halogen Free*	I <sub>hold</sub> (A)	I <sub>hold</sub> Code	Packaging Option	Quantity	Quantity & Packaging Codes
1210L005	1210L005WRHF	Yes	0.05	005	Tape and Reel	3000	WR
	1210L005WR	No					
1210L010	1210L010WRHF	Yes	0.10	010	Tape and Reel	3000	WR
	1210L010WR	No					
1210L020	1210L020WRHF	Yes	0.20	020	Tape and Reel	3000	WR
	1210L020WR	No					
1210L035	1210L035YRHF	Yes	0.35	035	Tape and Reel	4000	YR
	1210L035YR	No					
1210L050	1210L050YRHF	Yes	0.50	050	Tape and Reel	4000	YR
	1210L050YR	No					
1210L075	1210L075YRHF	Yes	0.75	075	Tape and Reel	4000	YR
	1210L075YR	No					
1210L110TH	1210L110THYR	Yes	1.10	110	Tape and Reel	4000	YR
1210L150TH	1210L150THWR	Yes	1.50	150	Tape and Reel	3000	WR
1210L175	1210L175WR	Yes	1.75	175	Tape and Reel	3000	WR
1210L200	1210L200PR	Yes	2.00	200	Tape and Reel	2000	PR

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**Tape and Reel Specifications**

TAPE SPECIFICATIONS: EIA-481-1 (mm)			
	Packaging Code "YR": 1210L035 1210L050 1210L075 1210L110TH	Packaging Code "WR": 1210L005 1210L010 1210L020 1210L150TH 1210L175	Packaging Code "PR": 1210L200
<b>W</b>	8.0+/-0.30	8.0+/-0.30	8.0+/-0.30
<b>F</b>	3.5+/-0.05	3.5+/-0.05	3.5+/-0.05
<b>E<sub>1</sub></b>	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10
<b>D<sub>0</sub></b>	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05
<b>D<sub>1</sub></b>	1.0 (min)	1.0 (min)	1.0 (min)
<b>P<sub>0</sub></b>	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
<b>P<sub>1</sub></b>	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
<b>P<sub>2</sub></b>	2.0+/-0.05	2.0+/-0.05	2.0+/-0.05
<b>A<sub>0</sub></b>	2.82+/-0.10	2.82+/-0.10	2.67+/-0.10
<b>B<sub>0</sub></b>	3.46+/-0.10	3.46+/-0.10	3.36+/-0.10
<b>T</b>	0.25+/-0.10	0.25+/-0.10	0.25+/-0.10
<b>K<sub>0</sub></b>	1.00+/-0.10	1.30+/-0.10	1.65+/-0.10
Leader min.	390	390	390
Trailer min.	160	160	160

REEL DIMENSIONS: EIA-481-1 (mm)	
<b>H</b>	12.0+/-0.05
<b>W</b>	9.0+/-0.5
<b>D</b>	Ø 60+0.5
<b>F</b>	Ø 13.0+/-0.2
<b>C</b>	Ø 178+/-1.0
<b>H<sub>1</sub></b>	11+/-0.5
<b>W<sub>1</sub></b>	2.2+/-0.5
<b>W<sub>2</sub></b>	3.0+0.5
<b>W<sub>3</sub></b>	4.0+0.5
<b>W<sub>4</sub></b>	5.5+0.5

