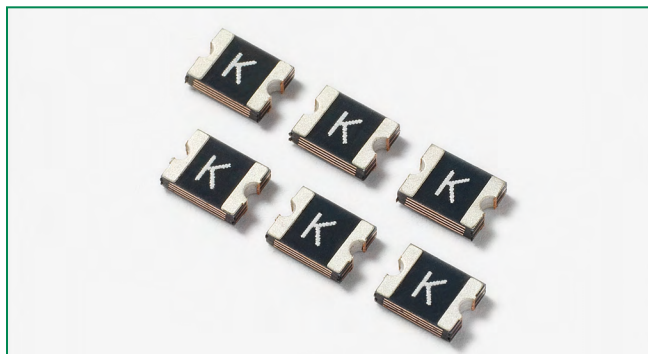


### 1210L Series



#### Agency Approvals

| AGENCY  | AGENCY FILE NUMBER |
|---|--------------------|
|  | E183209            |
|  | R50119118          |

#### Description

The 1210L Series PTC 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
- 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

#### 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> typ. (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   |
| 1210L075/24 | G2      | 0.75                  | 1.50                  | 24                     | 100                  | 0.60                    | 8.00                 | 0.10        | 0.130                | 0.400                 | X   | X   |
| 1210L110/12 | H1      | 1.10                  | 2.20                  | 12                     | 100                  | 0.6                     | 8.00                 | 0.10        | 0.060                | 0.210                 | X   | X   |
| 1210L110/16 | HF      | 1.10                  | 2.20                  | 16                     | 100                  | 0.6                     | 8.00                 | 0.10        | 0.060                | 0.210                 | X   | X   |
| 1210L110TH  | H       | 1.10                  | 2.20                  | 8                      | 100                  | 0.60                    | 8.00                 | 0.10        | 0.060                | 0.210                 | X   | X   |
| 1210L150TH  | 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.

**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)              |       |      |      |      |      |      |      |      |
| 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 |
| 1210L075/24 | 1.00                          | 0.97  | 0.86 | 0.75 | 0.64 | 0.59 | 0.54 | 0.48 | 0.40 |
| 1210L110/12 | 1.65                          | 1.47  | 1.27 | 1.10 | 0.92 | 0.83 | 0.73 | 0.63 | 0.52 |
| 1210L110/16 | 1.65                          | 1.47  | 1.27 | 1.10 | 0.92 | 0.83 | 0.73 | 0.63 | 0.52 |
| 1210L110TH  | 1.60                          | 1.42  | 1.26 | 1.10 | 0.94 | 0.86 | 0.80 | 0.70 | 0.58 |
| 1210L150TH  | 2.30                          | 2.02  | 1.76 | 1.50 | 1.24 | 1.11 | 1.00 | 0.85 | 0.65 |
| 1210L175    | 2.45                          | 2.22  | 2.01 | 1.75 | 1.45 | 1.26 | 1.10 | 0.98 | 0.80 |
| 1210L200    | 2.60                          | 2.44  | 2.35 | 2.00 | 1.78 | 1.67 | 1.50 | 1.45 | 1.10 |

Note:  
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**



Note:  
Typical Temperature derating curve, refer to table for derating data

### 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 <sup>+0/-5</sup> °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, N<sub>2</sub> 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

### 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<br>-/+5% typical resistance change                               |
| <b>Humidity Aging</b>                                      | +85°C, 85, R.H., 1000 hours<br>-/+5% typical resistance change                     |
| <b>Thermal Shock</b>                                       | MIL-STD-202, Method 107<br>+85°C/-40°C, 20 times<br>-30% typical resistance change |
| <b>Solvent Resistance</b>                                  | MIL-STD-202, Method 215<br>No change   |
| <b>Vibration</b>   | MIL-STD-883, Method 2007, Condition A<br>No change                                 |
| <b>Moisture Level Sensitivity</b>                          | Level 1, J-STD-020   |

**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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 1210L075/24 | 0.12   | 0.14 | 3.0 | 3.43 | 0.09   | 0.11 | 2.35 | 2.80 | 0.05   | 0.07 | 1.20 | 1.80 | 0.01   | 0.03 | 0.25 | 0.75 | 0.004  | 0.02 | 0.10 | 0.50 |
| 1210L110/12 | 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 1210L110/16 | 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |
| 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 | 0.004  | 0.02 | 0.10 | 0.50 |

**Part Ordering Number System**



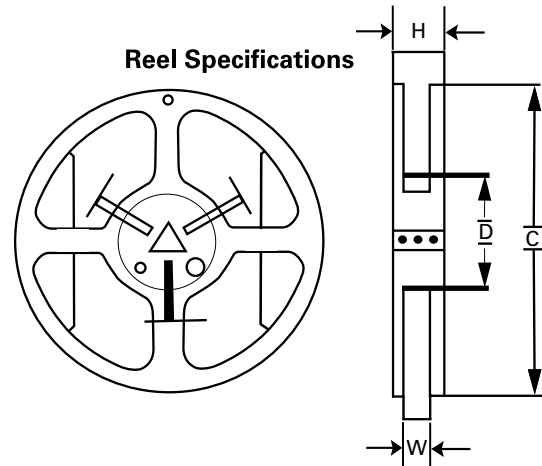
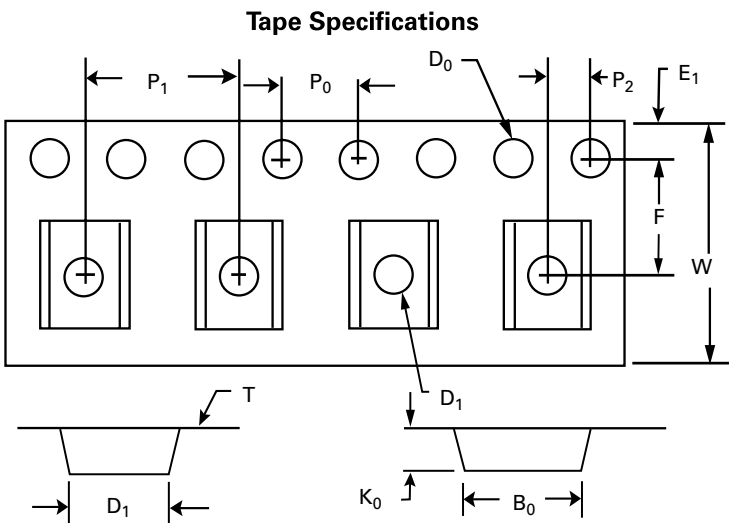
**Packaging Options**

| Part Number | Ordering Number | Halogen Free | I <sub>hold</sub> (A) | I <sub>hold</sub> Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|-------------|-----------------|--------------|-----------------------|------------------------|------------------|----------|----------------------------|
| 1210L005    | 1210L005WR      | Yes          | 0.05                  | 005                    | Tape and Reel    | 3000     | WR                         |
| 1210L010    | 1210L010WR      | Yes          | 0.10                  | 010                    | Tape and Reel    | 3000     | WR                         |
| 1210L020    | 1210L020WR      | Yes          | 0.20                  | 020                    | Tape and Reel    | 3000     | WR                         |
| 1210L035    | 1210L035YR      | Yes          | 0.35                  | 035                    | Tape and Reel    | 4000     | YR                         |
| 1210L050    | 1210L050YR      | Yes          | 0.50                  | 050                    | Tape and Reel    | 4000     | YR                         |
| 1210L075    | 1210L075YR      | Yes          | 0.75                  | 075                    | Tape and Reel    | 4000     | YR                         |
| 1210L075/24 | 1210L075/24PR   | Yes          | 0.75                  | 075                    | Tape and Reel    | 2000     | PR                         |
| 1210L110/12 | 1210L110/12WR   | Yes          | 1.10                  | 110                    | Tape and Reel    | 3,000    | WR                         |
| 1210L110/16 | 1210L110/16WR   | Yes          | 1.10                  | 110                    | Tape and Reel    | 3,000    | WR                         |
| 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                         |

**Tape and Reel Specifications**

| TAPE SPECIFICATIONS: EIA-481-1 (mm) |  |  |                                  |                                     |
|-------------------------------------|--|--|----------------------------------|-------------------------------------|
|                                     | Packaging Code "YR":<br>1210L035<br>1210L050<br>1210L075<br>1210L110TH | Packaging Code "WR":<br>1210L005<br>1210L010<br>1210L020<br>1210L110/12<br>1210L110/16<br>1210L150TH<br>1210L175 | Packaging Code "PR":<br>1210L200 | Packaging Code "PR":<br>1210L075/24 |
| <b>W</b>                            | 8.00+/-0.30  | 8.00+/-0.30  | 8.00+/-0.30                      | 8.00+/-0.30                         |
| <b>F</b>                            | 3.50+/-0.05  | 3.50+/-0.05  | 3.50+/-0.05                      | 3.50+/-0.05                         |
| <b>E<sub>1</sub></b>                | 1.75+/-0.10  | 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                      | 1.55+/-0.05                         |
| <b>D<sub>1</sub></b>                | 1.00 (min)   | 1.00 (min)   | 1.00 (min)                       | 1.00+0.25/-0                        |
| <b>P<sub>0</sub></b>                | 4.00+/-0.10  | 4.00+/-0.10  | 4.00+/-0.10                      | 4.00+/-0.10                         |
| <b>P<sub>1</sub></b>                | 4.00+/-0.10  | 4.00+/-0.10  | 4.00+/-0.10                      | 4.00+/-0.10                         |
| <b>P<sub>2</sub></b>                | 2.00+/-0.05  | 2.00+/-0.05  | 2.00+/-0.05                      | 2.00+/-0.05                         |
| <b>A<sub>0</sub></b>                | 2.82+/-0.10  | 2.82+/-0.10  | 2.80+/-0.10                      | 2.80+/-0.10                         |
| <b>B<sub>0</sub></b>                | 3.46+/-0.10  | 3.50+/-0.10  | 3.50+/-0.10                      | 3.55+/-0.10                         |
| <b>T</b>                            | 0.25+/-0.10  | 0.20+/-0.10  | 0.25+/-0.10                      | 0.25+/-0.10                         |
| <b>K<sub>0</sub></b>                | 1.00+/-0.10  | 1.30+/-0.10  | 1.60+/-0.10                      | 1.75+/-0.10                         |
| <i>Leader min.</i>                  | 390  | 390  | 390                              | 390                                 |
| <i>Trailer min.</i>                 | 160  | 160  | 160                              | 160                                 |

| REEL DIMENSIONS:<br>EIA-481-1 (mm) |             |
|------------------------------------|-------------|
| <b>C</b>                           | Ø178+/-1.0  |
| <b>D</b>                           | Ø60.2+/-0.5 |
| <b>H</b>                           | 11.0+/-0.05 |
| <b>W</b>                           | 9.0+/-1.5   |



**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.

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