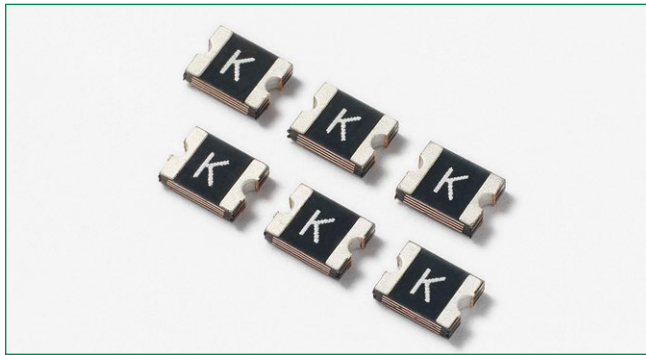




**THE DATASHEET OF
1210L005WR**



1210L Series



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

Agency Approvals

| Agency | Agency File Number |
|---|--------------------|
|  | E183209 |
|  | R50119118 |

Additional Information



Datasheet





Resources



Samples

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) |  |  |
| 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 |
| 1210L035/30 | E3 | 0.35 | 0.70 | 30 | 40 | 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 |
| 1210L050/30 | F3 | 0.50 | 1.00 | 30 | 40 | 0.60 | 8.00 | 0.15 | 0.220 | 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 |
| 1210L150/16 | KF | 1.50 | 3.00 | 16 | 100 | 0.80 | 8.00 | 0.30 | 0.040 | 0.110 | 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_{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.

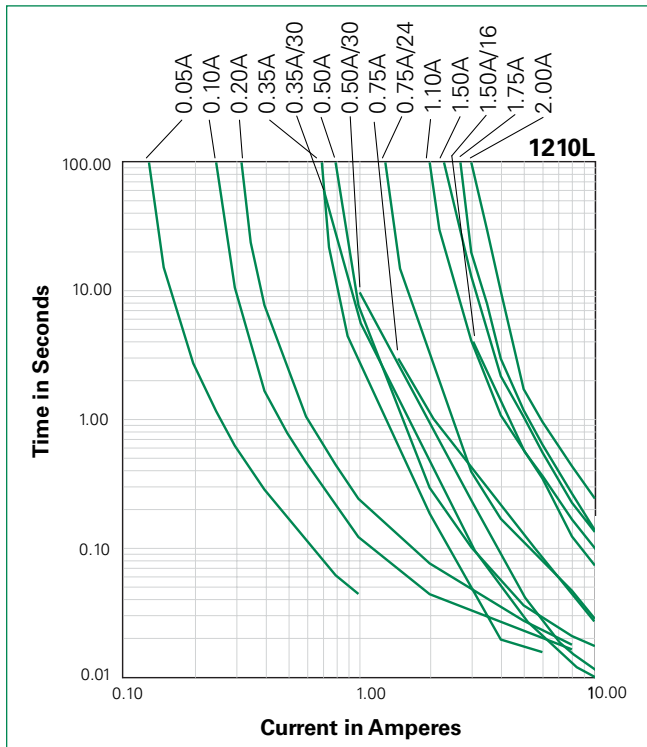
Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.

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 |
| 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 | 0.05 |
| 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 |
| 1210L035/30 | 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 |
| 1210L050/30 | 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 | 1.60 | 1.42 | 1.26 | 1.10 | 0.94 | 0.86 | 0.80 | 0.70 | 0.58 |
| 1210L110/16 | 1.60 | 1.42 | 1.26 | 1.10 | 0.94 | 0.86 | 0.80 | 0.70 | 0.58 |
| 1210L110TH | 1.60 | 1.42 | 1.26 | 1.10 | 0.94 | 0.86 | 0.80 | 0.70 | 0.58 |
| 1210L150/16 | 2.30 | 2.02 | 1.76 | 1.50 | 1.24 | 1.11 | 1.00 | 0.86 | 0.65 |
| 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 |

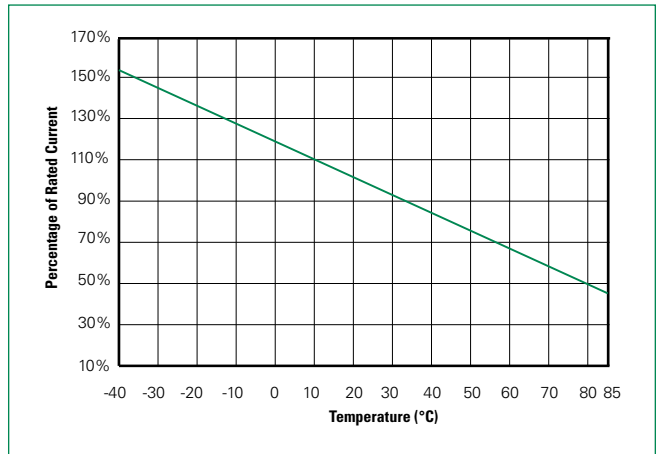
Note:
The temperature derating data is only for reference, please contact Littelfuse technical support for detail temperature derating information.

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.

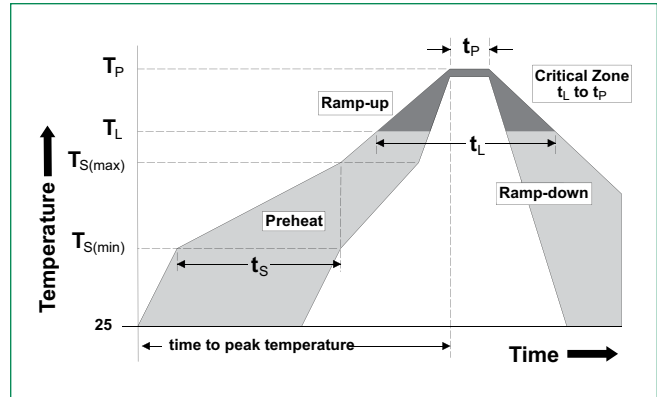
Temperature Derating Curve



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 ^{+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

Physical Specifications

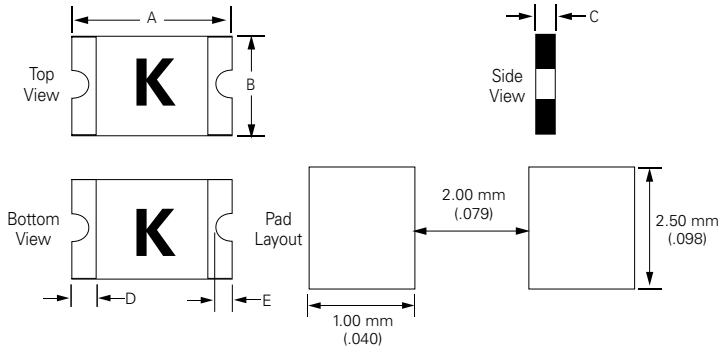
| | |
|---------------------------|--|
| Terminal Material | Solder-Plated Copper (Solder Material: Matte Tin (Sn)) |
| Lead Solderability | Meets EIA Specification RS186-9E, ANSI/J-STD-002 Category 3. |

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 Level Sensitivity | Level 1, J-STD-020 |

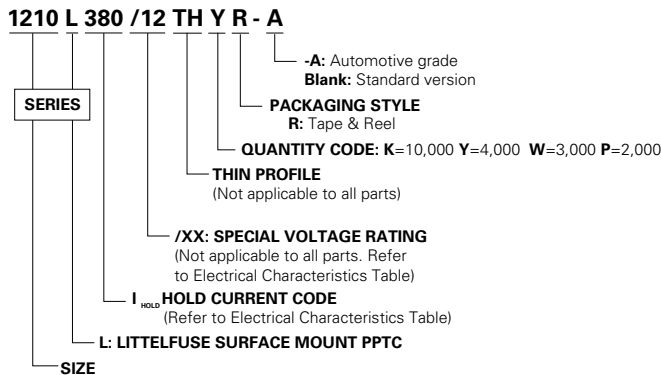
Dimensions

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 |
| 1210L035/30 | 0.12 | 0.14 | 3.00 | 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 |
| 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 |
| 1210L050/30 | 0.12 | 0.14 | 3.00 | 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 |
| 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 |
| 1210L150/16 | 0.12 | 0.14 | 3.00 | 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 |
| 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 _{hold} (A) | I _{hold} 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 |
| 1210L035/30 | 1210L035/30WR | Yes | 0.35 | 035 | Tape and Reel | 3,000 | WR |
| 1210L050 | 1210L050YR | Yes | 0.50 | 050 | Tape and Reel | 4000 | YR |
| 1210L050/30 | 1210L050/30WR | Yes | 0.50 | 050 | Tape and Reel | 3,000 | WR |
| 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 |
| 1210L150/16 | 1210L150/16WR | Yes | 1.50 | 150 | Tape and Reel | 3,000 | WR |
| 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 |

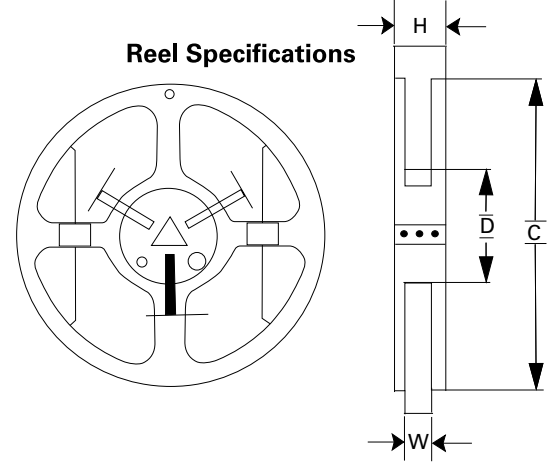
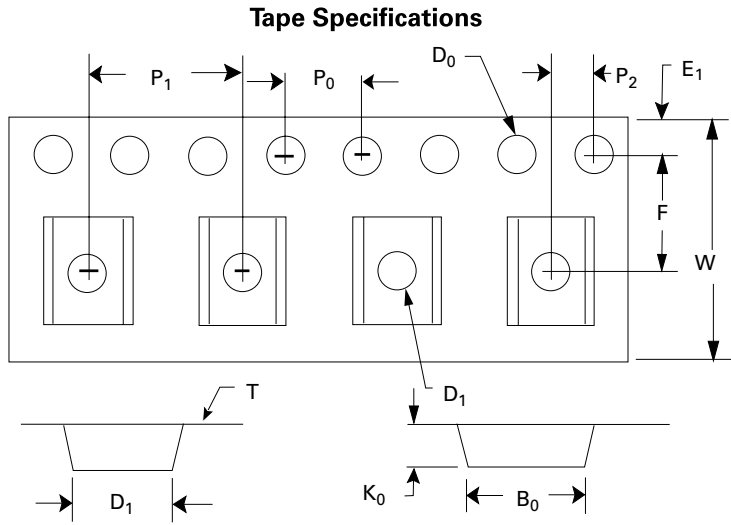
Tape and Reel Specifications

TAPE SPECIFICATIONS: EIA-481-1 (mm)

| | 1210L035 1210L050 1210L075 1210L110TH | 1210L005 1210L010 1210L020 1210L035/30 1210L050/30 1210L110/12 1210L110/16 1210L150/16 1210L150TH 1210L175 | 1210L200 1210L075/24 |
|----------------|--|---|-------------------------|
| W | 8.00+/-0.30 | 8.00+/-0.30 | 8.00+/-0.30 |
| F | 3.50+/-0.05 | 3.50+/-0.05 | 3.50+/-0.05 |
| E ₁ | 1.75+/-0.10 | 1.75+/-0.10 | 1.75+/-0.10 |
| D ₀ | 1.55+/-0.05 | 1.55+/-0.05 | 1.55+/-0.05 |
| D ₁ | 1.00 (min) | 1.00 (min) | 1.00 (min) |
| 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 | 2.82+/-0.10 | 2.82+/-0.10 | 2.80+/-0.10 |
| B ₀ | 3.46+/-0.10 | 3.50+/-0.10 | 3.50+/-0.10 |
| T | 0.25+/-0.10 | 0.20+/-0.10 | 0.25+/-0.10 |
| K ₀ | 1.00+/-0.10 | 1.30+/-0.10 | 1.60+/-0.10 |
| Leader min. | 390 | 390 | 390 |
| Trailer min. | 160 | 160 | 160 |

REEL DIMENSIONS: EIA-481-1 (mm)

| | |
|----------|-------------|
| C | Ø178+/-1.0 |
| D | Ø60.2+/-0.5 |
| H | 11.0+/-0.05 |
| W | 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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