

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

Web Resources



Download ECAD models, order samples, and find technical resources at www.littelfuse.com

Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | 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) | | |
| 1206L005/30 | f3 | 0.05 | 0.15 | 30 | 40 | 0.6 | 0.25 | 1.50 | 3.60 | 20.00 | X | X |
| 1206L005/60 | f6 | 0.05 | 0.15 | 60 | 10 | 0.6 | 0.25 | 1.50 | 3.60 | 20.00 | X | X |
| 1206L010/30 | n3 | 0.10 | 0.25 | 30 | 40 | 0.6 | 0.50 | 1.50 | 1.50 | 10.00 | 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.

- 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.
- Part Number tested and complied with AEC-Q200.

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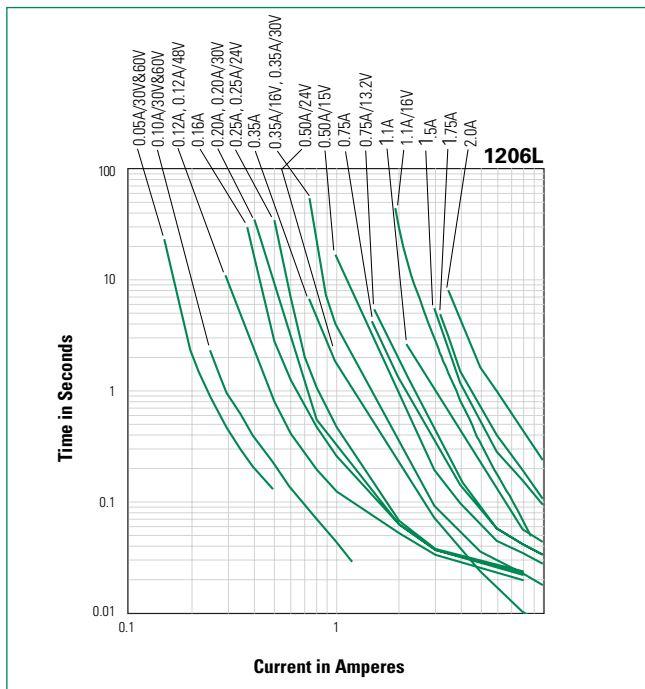
Surface Mount

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) | | | | | | | | |
| 1206L005/30 | 0.076 | 0.068 | 0.060 | 0.050 | 0.043 | 0.039 | 0.034 | 0.030 | 0.023 |
| 1206L005/60 | 0.076 | 0.068 | 0.060 | 0.050 | 0.043 | 0.039 | 0.034 | 0.030 | 0.023 |
| 1206L010/30 | 0.156 | 0.139 | 0.120 | 0.100 | 0.083 | 0.074 | 0.065 | 0.056 | 0.042 |
| 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 |

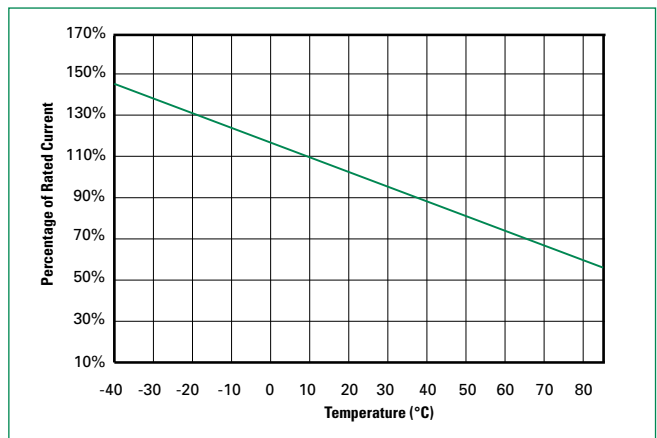
Notes: The temperature derating data is only for reference, please contact Littelfuse technical support for detail temperature derating information.

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

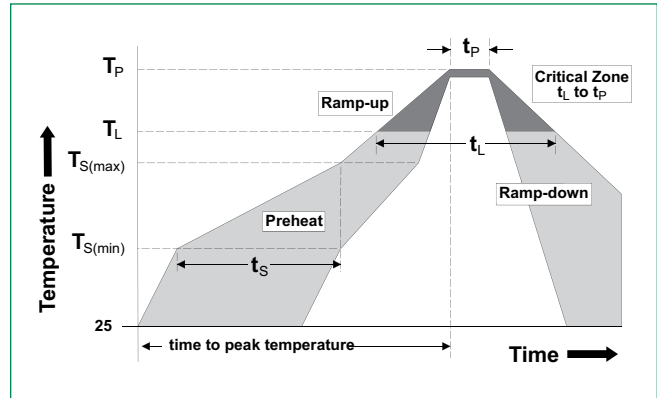


1206L Series

Surface Mount

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. | |



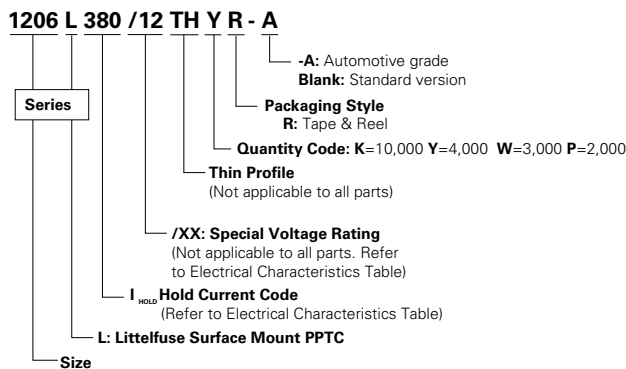
Environmental Specifications

| | |
|------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Operating 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. |

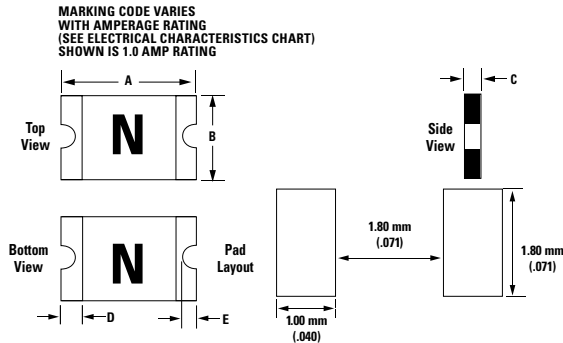
Part Ordering Number System



1206L Series

Surface Mount

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 |
| 1206L005/30 | | | | | | | | | 0.03 | 0.04 | 0.65 | 1.10 | | | | | | | | |
| 1206L005/60 | | | | | | | | | 0.03 | 0.05 | 0.65 | 1.25 | | | | | | | | |
| 1206L010/30 | | | | | | | | | 0.03 | 0.04 | 0.65 | 1.10 | | | | | | | | |
| 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 | 0.12 | 0.13 | 3.00 | 3.40 | 0.06 | 0.07 | 1.50 | 1.80 | 0.02 | 0.03 | 0.45 | 0.75 | 0.01 | 0.03 | 0.25 | 0.75 | 0.002 | 0.018 | 0.05 | 0.45 |
| 1206L035/30 | | | | | | | | | 0.02 | 0.04 | 0.50 | 1.00 | | | | | | | | |
| 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 | | | | | | | | |

Packaging Options

| Part Number | Ordering Number | Halogen Free | I _{hold} (A) | I _{hold} Code | Packaging Option | Quantity | Quantity/Pack Code |
|---------------|------------------|--------------|-----------------------|------------------------|------------------|----------|--------------------|
| 1206L005/30 | 1206L005/30WVR | Yes | 0.05 | 005 | Tape and Reel | 3,000 | WR |
| 1206L005/60 | 1206L005/60WVR | | 0.05 | 005 | | 3,000 | WR |
| 1206L010/30 | 1206L010/30WVR | | 0.10 | 010 | | 3,000 | WR |
| 1206L010/60 | 1206L010/60WVR | | 0.10 | 010 | | 3,000 | WR |
| 1206L012/48 | 1206L012/48WVR | | 0.12 | 012 | | 3,000 | WR |
| 1206L012 | 1206L012WR | | 0.125 | 012 | | 3,000 | WR |
| 1206L016 | 1206L016WVR | | 0.16 | 016 | | 3,000 | WR |
| 1206L020/30 | 1206L020/30YR | | 0.20 | 020 | | 4,000 | YR |
| 1206L020 | 1206L020YR | | 0.20 | 020 | | 4,000 | YR |
| 1206L025/24 | 1206L025/24YR | | 0.25 | 025 | | 4,000 | YR |
| 1206L025 | 1206L025YR | | 0.25 | 025 | | 4,000 | YR |
| 1206L035 | 1206L035YR | | 0.35 | 035 | | 4,000 | YR |
| 1206L035/16 | 1206L035/16YR | | 0.35 | 035 | | 4,000 | YR |
| 1206L035/30 | 1206L035/30WVR | | 0.35 | 035 | | 3,000 | WR |
| 1206L050 | 1206L050YR | | 0.50 | 050 | | 4,000 | YR |
| 1206L050/15 | 1206L050/15YR | | 0.50 | 050 | | 4,000 | YR |
| 1206L050/24 | 1206L050/24WVR | | 0.50 | 050 | | 3,000 | WR |
| 1206L075/13.2 | 1206L075/13.2WVR | | 0.75 | 075 | | 3,000 | WR |
| 1206L075/16 | 1206L075/16WVR | | 0.75 | 075 | | 3,000 | WR |
| 1206L075TH | 1206L075THYR | | 0.75 | 075 | | 4,000 | YR |
| 1206L110TH | 1206L110THYR | 1.10 | 110 | 4,000 | YR | | |
| 1206L110/16 | 1206L110/16WVR | 1.10 | 110 | 3,000 | WR | | |
| 1206L150TH | 1206L150THWR | 1.50 | 150 | 3,000 | WR | | |
| 1206L175 | 1206L175PR | 1.75 | 175 | 2,000 | PR | | |
| 1206L200 | 1206L200PR | 2.00 | 200 | 2,000 | PR | | |

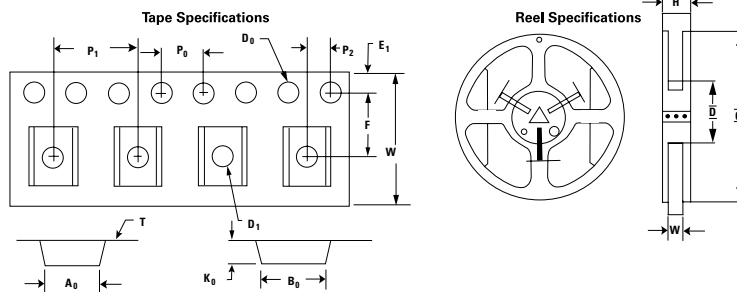
1206L Series

Surface Mount

Tape and Reel Specifications

| Tape Specifications: 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 | 1206L005/30 1206L005/60 1206L010/30 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 |
| 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+/-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 |

| Reel Dimensions: EIA-481-1 (mm) | |
|------------------------------------|-------------|
| C | Ø178+/-1.0 |
| D | Ø60.2+/-0.5 |
| H | 11.0+/-0.5 |
| W | 9.0+/-1.5 |



Warning

- Users should independently evaluate the suitability of and test each product selected for their own application.
- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- These devices are intended for protection against damage caused by occasional overcurrent or overtemperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Contamination of the PPTC material with certain silicone-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.
- PPTC devices are not recommended for installation in applications where the device is constrained such that its PTC properties are inhibited, for example in rigid potting materials or in rigid housings, which lack adequate clearance to accommodate device expansion.
- Operation in circuits with a large inductance can generate a circuit voltage (Ldi/dt) above the rated voltage of the device.

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