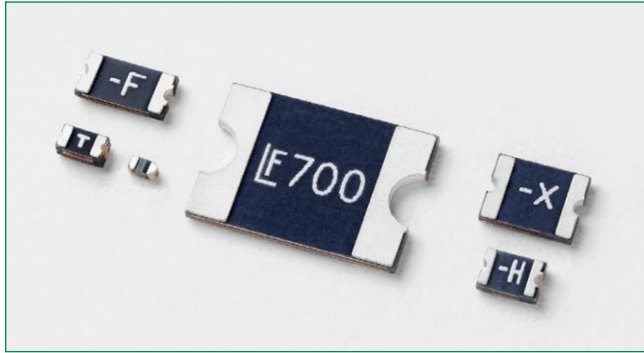


Low Rho Surface Mount Series



Description

Littelfuse Low Rho Surface Mount PPTC (Polymer Positive Temperature Coefficient) devices provide overcurrent protection for applications where ultra low internal resistance, ultra low voltage drop and automatic resettable protection are desired. This new series allows a higher hold current device in a smaller factor and lower profile as compared to a standard PPTC. It offers ultra low internal resistance while maintaining the high level electrical characteristics and performances of standard PPTC products. All devices are UL recognized and TUV approved and have maximum fault current of 50A. They are available in 0402 to 2920 sizes while the hold current ranges from 100mA to 9A.

Agency Approvals

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

Applications

- USB peripherals including new USB 3.0 / 2.0 ports
- Li-ion / Li-Polymer battery packs
- Smart phones
- Tablet and Notebook PCs
- E-readers
- LCD / LED HDTV
- Computer peripherals
- Digital cameras and video cameras
- Hard disk drives
- Game consoles

Additional Information



Datasheet



Resources



Samples

Features

- Ultra low internal resistance
- Very thin profile
- Miniature size saves board space
- Allows a higher hold current device in a smaller factor and lower profile as compared to a standard PPTC
- Fast response to fault currents
- Compatible with high temperature solders
- Broadest range of Hold Current ratings (100mA to 9A)
- RoHS compliant, Lead Free and Halogen Free
- UL recognized and TUV approved

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.

Electrical Characteristics

| Part Number | Marking | I _{hold} (A) | I _{trip} (A) | V _{max} (Vdc) | I _{max} (A) | P _g typ. (W) | Maximum Time-To-Trip | | Resistance | | Agency Approvals | |
|---------------|---------|-----------------------|-----------------------|------------------------|----------------------|-------------------------|----------------------|-------------|----------------------|-----------------------|------------------|-----|
| | | | | | | | Current (A) | Time (Sec.) | R _{min} (Ω) | R _{1max} (Ω) | UL US | CSA |
| 0402L010SL | - | 0.10 | 0.30 | 6 | 40 | 0.5 | 0.50 | 1.00 | 0.150 | 2.000 | X | X |
| 0402L020SL | - | 0.20 | 0.50 | 6 | 40 | 0.5 | 1.00 | 1.00 | 0.100 | 1.250 | X | X |
| 0402L035SL | - | 0.35 | 0.70 | 6 | 40 | 0.5 | 8.00 | 0.10 | 0.050 | 0.700 | X | X |
| 0402L050SL | - | 0.50 | 1.00 | 6 | 40 | 0.5 | 8.00 | 0.10 | 0.040 | 0.400 | X | X |
| 0402L075SL | - | 0.75 | 1.50 | 6 | 40 | 0.5 | 8.00 | 0.10 | 0.030 | 0.300 | X | X |
| 0402L100SL | - | 1.00 | 2.00 | 6 | 40 | 0.5 | 8.00 | 0.20 | 0.030 | 0.250 | X | X |
| 0603L050SL | K | 0.50 | 1.00 | 6 | 50 | 0.6 | 8.00 | 0.10 | 0.070 | 0.350 | X | X |
| 0603L075SL | N | 0.75 | 1.50 | 6 | 50 | 0.6 | 8.00 | 0.20 | 0.020 | 0.165 | X | X |
| 0603L100SL | S | 1.00 | 1.80 | 6 | 50 | 0.6 | 8.00 | 0.30 | 0.040 | 0.120 | X | X |
| 0603L150SL | T | 1.50 | 3.00 | 6 | 50 | 0.6 | 8.00 | 0.50 | 0.007 | 0.080 | X | X |
| 0603L175SL | V | 1.75 | 3.50 | 6 | 50 | 0.6 | 8.00 | 0.60 | 0.005 | 0.060 | X | X |
| 0603L200SL-V | X | 2.00 | 4.00 | 6 | 50 | 0.6 | 8.00 | 1.00 | 0.005 | 0.040 | X | X |
| 0603L300SL | Y | 3.00 | 6.00 | 6 | 50 | 0.6 | 8.00 | 5.00 | 0.003 | 0.030 | X | X |
| 0805L075SL | -G | 0.75 | 1.50 | 6 | 50 | 0.6 | 8.00 | 0.20 | 0.040 | 0.150 | X | X |
| 0805L110SL | -H | 1.10 | 1.80 | 6 | 50 | 0.6 | 8.00 | 0.30 | 0.030 | 0.120 | X | X |
| 0805L150SL | -K | 1.50 | 3.00 | 6 | 50 | 0.6 | 8.00 | 0.50 | 0.015 | 0.065 | X | X |
| 0805L175SL | -V | 1.75 | 3.50 | 6 | 50 | 0.6 | 8.00 | 0.60 | 0.005 | 0.055 | X | X |
| 0805L200SLTH | -L | 2.00 | 4.00 | 6 | 50 | 0.6 | 8.00 | 1.00 | 0.005 | 0.045 | X | X |
| 0805L260SLTH | -S | 2.60 | 5.20 | 6 | 50 | 0.6 | 8.00 | 4.00 | 0.003 | 0.035 | X | X |
| 0805L300SL | -N | 3.00 | 6.00 | 6 | 50 | 0.6 | 8.00 | 5.00 | 0.003 | 0.030 | X | X |
| 0805L300SLTH | -N | 3.00 | 6.00 | 6 | 50 | 0.6 | 8.00 | 5.00 | 0.003 | 0.030 | X | X |
| 0805L350SL | -T | 3.50 | 7.00 | 6 | 50 | 0.6 | 8.00 | 5.00 | 0.003 | 0.025 | X | X |
| 0805L400SL | -Y | 4.00 | 9.00 | 6 | 50 | 0.6 | 20.00 | 2.00 | 0.003 | 0.018 | X | X |
| 1206L075SL | -G | 0.75 | 1.50 | 6 | 50 | 0.8 | 8.00 | 0.30 | 0.017 | 0.180 | X | X |
| 1206L110SL | -H | 1.10 | 2.20 | 6 | 50 | 0.8 | 8.00 | 0.30 | 0.015 | 0.100 | X | X |
| 1206L150SL | -K | 1.50 | 3.00 | 6 | 50 | 0.8 | 8.00 | 0.30 | 0.010 | 0.055 | X | X |
| 1206L110/12SL | -H1 | 1.10 | 2.20 | 12 | 50 | 0.8 | 8.00 | 0.30 | 0.015 | 0.130 | X | X |
| 1206L150/12SL | -K1 | 1.50 | 3.00 | 12 | 50 | 0.8 | 8.00 | 0.50 | 0.010 | 0.080 | X | X |
| 1206L175SL | -F | 1.75 | 3.50 | 6 | 50 | 0.8 | 8.00 | 0.40 | 0.005 | 0.030 | X | X |
| 1206L200SL | -L | 2.00 | 4.00 | 6 | 50 | 0.8 | 8.00 | 0.50 | 0.005 | 0.025 | X | X |
| 1206L260SLTH | -S | 2.60 | 5.00 | 6 | 50 | 0.8 | 8.00 | 4.00 | 0.003 | 0.026 | X | X |
| 1206L260/12SL | -S1 | 2.60 | 5.00 | 12 | 50 | 0.8 | 8.00 | 4.00 | 0.003 | 0.055 | X | X |
| 1206L300SLTH | -N | 3.00 | 6.00 | 6 | 50 | 0.8 | 8.00 | 4.00 | 0.003 | 0.020 | X | X |
| 1206L300/12SL | -N1 | 3.00 | 6.00 | 12 | 50 | 0.8 | 8.00 | 4.00 | 0.003 | 0.030 | X | X |
| 1206L350SLTH | -T | 3.50 | 7.00 | 6 | 50 | 0.8 | 8.00 | 5.00 | 0.003 | 0.018 | X | X |
| 1206L350/12SL | CT | 3.50 | 7.00 | 12 | 50 | 0.8 | 8.00 | 5.00 | 0.003 | 0.020 | X | X |
| 1206L380SLTH* | -V | 2.82* | 8.00 | 6 | 50 | 0.8 | 8.00 | 5.00 | 0.002 | 0.014 | X | X |
| 1206L400SL | -Y | 4.00 | 8.00 | 6 | 50 | 0.8 | 20.00 | 2.00 | 0.001 | 0.016 | X | X |
| 1206L400/12SL | CY | 4.00 | 8.00 | 12 | 50 | 0.8 | 20.00 | 2.00 | 0.003 | 0.016 | X | X |
| 1206L450SL | -Z | 4.50 | 9.00 | 6 | 50 | 0.8 | 22.50 | 2.00 | 0.001 | 0.014 | X | X |
| 1206L450/12SL | CZ | 4.50 | 9.00 | 12 | 50 | 1.0 | 22.50 | 2.00 | 0.003 | 0.014 | X | X |
| 1206L500SL-V | -M | 5.00 | 10.00 | 6 | 50 | 1.0 | 25.00 | 2.00 | 0.001 | 0.012 | X | X |
| 1206L500/12SL | CM | 5.00 | 10.00 | 12 | 50 | 1.0 | 25.00 | 2.00 | 0.001 | 0.012 | X | X |
| 1206L600SL | -W | 6.00 | 12.00 | 6 | 50 | 1.0 | 30.00 | 2.00 | 0.001 | 0.010 | X | X |
| 1210L175SL | -J | 1.75 | 3.50 | 6 | 50 | 0.8 | 8.00 | 2.50 | 0.006 | 0.040 | X | X |
| 1210L200SL | -L | 2.00 | 4.00 | 6 | 50 | 0.8 | 8.00 | 3.00 | 0.005 | 0.024 | X | X |
| 1210L260SL | -S | 2.60 | 5.00 | 6 | 50 | 0.8 | 8.00 | 4.00 | 0.003 | 0.020 | X | X |
| 1210L300SL | -N | 3.00 | 6.00 | 6 | 50 | 0.8 | 15.00 | 2.00 | 0.003 | 0.020 | X | X |
| 1210L350SL | -T | 3.50 | 7.00 | 6 | 50 | 0.8 | 17.50 | 2.00 | 0.003 | 0.018 | X | X |
| 1210L380SL | -X | 3.80 | 8.00 | 6 | 50 | 1.0 | 8.00 | 5.00 | 0.002 | 0.016 | X | X |
| 1210L400SL | -V | 4.00 | 8.00 | 6 | 50 | 1.0 | 8.00 | 5.00 | 0.001 | 0.014 | X | X |
| 1210L450SL | -Y | 4.50 | 9.00 | 6 | 50 | 1.0 | 22.50 | 2.00 | 0.001 | 0.014 | X | X |
| 1210L500/12SL | CM | 5.00 | 10.00 | 12 | 50 | 1.2 | 25.00 | 2.00 | 0.001 | 0.012 | X | X |
| 1210L550SL | -R | 5.50 | 11.00 | 6 | 50 | 1.2 | 27.50 | 2.00 | 0.001 | 0.011 | X | X |
| 1210L600SL | -W | 6.00 | 12.00 | 6 | 50 | 1.2 | 30.00 | 2.00 | 0.001 | 0.010 | X | X |
| 1210L900SL | -Z | 9.00 | 18.00 | 6 | 50 | 1.4 | 45.00 | 2.00 | 0.001 | 0.0055 | X | X |
| 1812L190SL | LF-19 | 1.90 | 4.90 | 6 | 50 | 1.0 | 9.50 | 4.50 | 0.003 | 0.025 | X | X |
| 1812L260SL | LF-26 | 2.60 | 6.00 | 6 | 50 | 1.0 | 13.00 | 2.00 | 0.003 | 0.024 | X | X |
| 1812L270SL | LF-27 | 2.70 | 6.20 | 6 | 50 | 1.0 | 13.50 | 2.00 | 0.003 | 0.022 | X | X |
| 1812L300SL | LF-30 | 3.00 | 7.00 | 6 | 50 | 1.0 | 8.00 | 5.00 | 0.003 | 0.021 | X | X |
| 1812L300/24SL | LF 30J | 3.00 | 6.00 | 24 | 50 | 2.0 | 15.00 | 2.00 | 0.001 | 0.030 | X | X |
| 1812L350SL** | LF-35 | 3.50 | 8.10 | 6 | 50 | 1.0 | 8.00 | 5.00 | 0.003 | 0.020** | X | X |
| 1812L370SL | LF-37 | 3.70 | 9.10 | 6 | 50 | 1.0 | 18.50 | 2.00 | 0.003 | 0.018 | X | X |
| 2920L500/24SL | LF 50J | 5.00 | 10.00 | 24 | 50 | 2.2 | 25.00 | 2.00 | 0.001 | 0.018 | X | X |
| 2920L600/24SL | LF 60J | 6.00 | 12.00 | 24 | 50 | 2.5 | 30.00 | 2.00 | 0.001 | 0.012 | X | X |
| 2920L700SL*** | LF700 | 7.00 | 14.00 | 6 | 50 | 2.2 | 35.00 | 2.0 | 0.001 | 0.007 | X | X |
| 2920L700/24SL | LF 70J | 7.00 | 14.00 | 24 | 50 | 2.5 | 35.00 | 2.00 | 0.001 | 0.010 | X | X |

Notes:

0805L150SL and 1206L150SL are ideal for overcurrent protection in VBUS of USB 3.0 / USB 2.0 ports.
 * 1206L380SLTH has I_{hold} 2.82A for at least 15min @ 55°C. It is ideal for overcurrent protection in Li-ion / Li-Polymer battery packs of smartphones.

** 1812L350SL Typical Time-To-Trip is 50A at 0.013-0.020 seconds. R_{1min}=0.015ohm (resistance range 0.015-0.025ohm).

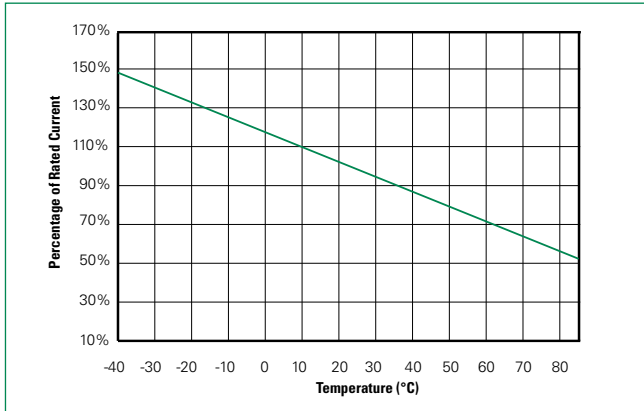
*** 2920L700SL is ideal for overcurrent protection in Li-ion / Li-Polymer battery packs of tablet PC.

Temperature Derating

| Part Number | Ambient Operation Temperature | | | | | | | |
|---------------|-------------------------------|-------|-------|------|------|------|------|------|
| | -40°C | -20°C | 0°C | 20°C | 40°C | 60°C | 70°C | 85°C |
| | Hold Current (A) | | | | | | | |
| 0402L010SL | 0.14 | 0.13 | 0.11 | 0.10 | 0.09 | 0.07 | 0.06 | 0.05 |
| 0402L020SL | 0.29 | 0.26 | 0.23 | 0.20 | 0.18 | 0.15 | 0.13 | 0.09 |
| 0402L035SL | 0.50 | 0.45 | 0.40 | 0.35 | 0.31 | 0.26 | 0.22 | 0.16 |
| 0402L050SL | 0.71 | 0.64 | 0.57 | 0.50 | 0.44 | 0.37 | 0.31 | 0.23 |
| 0402L075SL | 1.05 | 0.95 | 0.85 | 0.75 | 0.65 | 0.55 | 0.45 | 0.30 |
| 0402L100SL | 1.40 | 1.25 | 1.10 | 1.00 | 0.85 | 0.70 | 0.60 | 0.40 |
| 0603L050SL | 0.81 | 0.71 | 0.62 | 0.50 | 0.41 | 0.30 | 0.24 | 0.16 |
| 0603L075SL | 1.23 | 1.08 | 0.94 | 0.75 | 0.61 | 0.45 | 0.36 | 0.23 |
| 0603L100SL | 1.35 | 1.25 | 1.10 | 1.00 | 0.82 | 0.65 | 0.52 | 0.35 |
| 0603L150SL | 2.40 | 2.10 | 1.80 | 1.50 | 1.25 | 0.95 | 0.80 | 0.50 |
| 0603L175SL | 2.50 | 2.25 | 2.00 | 1.75 | 1.55 | 1.30 | 1.10 | 0.80 |
| 0603L200SL-V | 2.85 | 2.60 | 2.30 | 2.00 | 1.70 | 1.45 | 1.25 | 1.05 |
| 0603L300SL | 4.70 | 4.15 | 3.60 | 3.00 | 2.50 | 2.00 | 1.65 | 1.20 |
| 0805L075SL | 1.15 | 1.00 | 0.85 | 0.75 | 0.55 | 0.40 | 0.30 | 0.20 |
| 0805L110SL | 1.70 | 1.50 | 1.30 | 1.10 | 0.85 | 0.60 | 0.50 | 0.30 |
| 0805L150SL | 2.25 | 2.00 | 1.75 | 1.50 | 1.15 | 0.85 | 0.65 | 0.45 |
| 0805L175SL | 2.60 | 2.30 | 2.00 | 1.75 | 1.30 | 0.95 | 0.75 | 0.50 |
| 0805L200SLTH | 3.10 | 2.75 | 2.40 | 2.00 | 1.65 | 1.15 | 0.95 | 0.65 |
| 0805L260SLTH | 3.80 | 3.30 | 2.90 | 2.60 | 2.20 | 1.75 | 1.50 | 1.05 |
| 0805L300SL | 4.70 | 4.15 | 3.60 | 3.00 | 2.50 | 2.00 | 1.65 | 1.20 |
| 0805L300SLTH | 3.90 | 3.60 | 3.30 | 3.00 | 2.60 | 2.10 | 1.90 | 1.60 |
| 0805L350SL | 5.05 | 4.55 | 4.00 | 3.50 | 3.00 | 2.55 | 2.25 | 1.90 |
| 0805L400SL | 5.80 | 5.20 | 4.60 | 4.00 | 3.40 | 3.00 | 2.60 | 2.20 |
| 1206L075SL | 1.30 | 1.13 | 0.92 | 0.75 | 0.58 | 0.38 | 0.31 | 0.14 |
| 1206L110SL | 1.90 | 1.65 | 1.35 | 1.10 | 0.85 | 0.55 | 0.45 | 0.20 |
| 1206L150SL | 2.65 | 2.30 | 1.90 | 1.50 | 1.15 | 0.70 | 0.50 | 0.25 |
| 1206L110/12SL | 1.65 | 1.45 | 1.30 | 1.10 | 0.85 | 0.65 | 0.55 | 0.30 |
| 1206L150/12SL | 2.25 | 2.00 | 1.80 | 1.50 | 1.20 | 0.90 | 0.75 | 0.55 |
| 1206L175SL | 2.60 | 2.45 | 2.00 | 1.75 | 1.35 | 1.05 | 0.90 | 0.60 |
| 1206L200SL | 2.95 | 2.80 | 2.30 | 2.00 | 1.55 | 1.20 | 1.00 | 0.70 |
| 1206L260SLTH | 4.05 | 3.60 | 3.12 | 2.60 | 2.15 | 1.70 | 1.40 | 1.00 |
| 1206L260/12SL | 3.70 | 3.40 | 3.00 | 2.60 | 2.20 | 1.75 | 1.55 | 1.05 |
| 1206L300SLTH | 4.70 | 4.15 | 3.60 | 3.00 | 2.50 | 2.00 | 1.65 | 1.20 |
| 1206L300/12SL | 4.25 | 3.90 | 3.45 | 3.00 | 2.50 | 2.00 | 1.75 | 1.20 |
| 1206L350SLTH | 5.50 | 4.85 | 4.15 | 3.50 | 2.85 | 2.25 | 1.90 | 1.40 |
| 1206L350/12SL | 5.25 | 4.65 | 4.20 | 3.50 | 2.80 | 2.10 | 1.75 | 1.25 |
| 1206L380SLTH | 5.59 | 5.05 | 4.48 | 3.80 | 3.23 | 2.70 | 2.17 | 1.98 |
| 1206L400SL | 5.75 | 5.25 | 4.65 | 4.00 | 3.40 | 2.75 | 2.40 | 1.65 |
| 1206L400/12SL | 6.00 | 5.30 | 4.80 | 4.00 | 3.20 | 2.40 | 2.00 | 1.40 |
| 1206L450SL | 6.50 | 5.95 | 5.25 | 4.50 | 3.85 | 3.10 | 2.70 | 1.90 |
| 1206L450/12SL | 6.75 | 5.95 | 5.40 | 4.50 | 3.60 | 2.70 | 2.25 | 1.60 |
| 1206L500SL-V | 7.20 | 6.50 | 5.85 | 5.00 | 4.45 | 3.75 | 3.40 | 2.85 |
| 1206L500/12SL | 7.20 | 6.60 | 5.80 | 5.00 | 4.25 | 3.40 | 3.00 | 2.10 |
| 1206L600SL | 8.65 | 7.80 | 7.00 | 6.00 | 5.30 | 4.50 | 4.05 | 3.40 |
| 1210L175SL | 2.65 | 2.30 | 2.05 | 1.75 | 1.40 | 1.05 | 0.90 | 0.60 |
| 1210L200SL | 3.30 | 2.80 | 2.40 | 2.00 | 1.90 | 1.60 | 1.40 | 1.00 |
| 1210L260SL | 4.20 | 3.75 | 3.30 | 2.60 | 2.20 | 1.70 | 1.45 | 1.05 |
| 1210L300SL | 4.70 | 4.15 | 3.60 | 3.00 | 2.50 | 1.90 | 1.70 | 1.20 |
| 1210L350SL | 5.00 | 4.60 | 4.05 | 3.50 | 2.80 | 2.00 | 1.75 | 1.20 |
| 1210L380SL | 5.70 | 5.10 | 4.40 | 3.80 | 3.20 | 2.25 | 1.80 | 1.30 |
| 1210L400SL | 5.70 | 5.25 | 4.60 | 4.00 | 3.20 | 2.25 | 1.90 | 1.30 |
| 1210L450SL | 7.15 | 6.25 | 5.30 | 4.50 | 3.45 | 2.50 | 2.00 | 0.85 |
| 1210L500/12SL | 7.20 | 6.50 | 5.75 | 5.00 | 4.40 | 3.75 | 3.35 | 2.75 |
| 1210L550SL | 8.00 | 7.15 | 6.35 | 5.50 | 4.90 | 4.10 | 3.70 | 3.05 |
| 1210L600SL | 8.65 | 7.80 | 7.00 | 6.00 | 5.30 | 4.50 | 4.05 | 3.40 |
| 1210L900SL | 13.05 | 11.70 | 10.40 | 9.00 | 8.00 | 6.75 | 6.05 | 5.00 |
| 1812L190SL | 2.91 | 2.57 | 2.20 | 1.90 | 1.78 | 1.50 | 1.40 | 1.05 |
| 1812L260SL | 4.00 | 3.65 | 2.90 | 2.60 | 1.90 | 1.60 | 1.20 | 0.85 |
| 1812L270SL | 3.86 | 3.55 | 3.12 | 2.70 | 2.16 | 1.54 | 1.35 | 0.93 |
| 1812L300SL | 4.35 | 3.90 | 3.45 | 3.00 | 2.65 | 2.25 | 2.00 | 1.65 |
| 1812L300/24SL | 4.95 | 4.35 | 3.75 | 3.00 | 2.45 | 1.85 | 1.55 | 1.05 |
| 1812L350SL | 5.40 | 4.95 | 3.90 | 3.50 | 2.60 | 2.15 | 1.65 | 1.20 |
| 1812L370SL | 5.75 | 5.15 | 4.35 | 3.70 | 2.85 | 2.30 | 1.90 | 1.50 |
| 2920L500/24SL | 8.20 | 7.25 | 6.25 | 5.00 | 4.25 | 3.25 | 2.80 | 2.05 |
| 2920L600/24SL | 10.15 | 8.90 | 7.65 | 6.00 | 5.15 | 3.90 | 3.25 | 2.35 |
| 2920L700SL | 10.00 | 9.20 | 8.10 | 7.00 | 5.60 | 4.00 | 3.50 | 2.40 |
| 2920L700/24SL | 11.52 | 10.08 | 8.65 | 7.00 | 5.78 | 4.35 | 3.63 | 2.55 |

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

Temperature Derating Curve



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. |

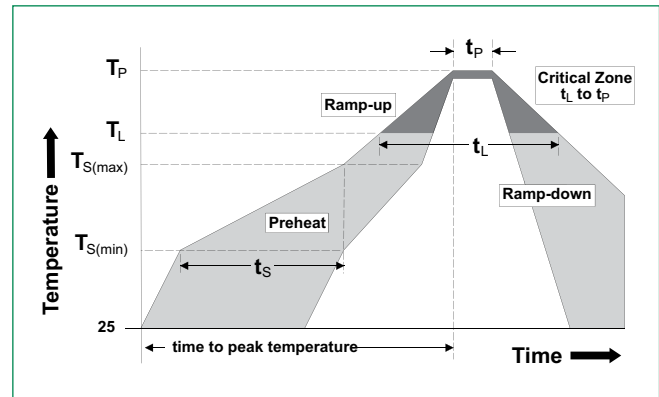
Environmental Specifications

| | |
|--|---|
| Operating Temperature | -40°C to +85°C |
| Maximum Device Surface Temperature in Tripped State | 125°C |
| Passive Aging | +85°C, 1000 hours -/+10% typical resistance change |
| Humidity Aging | +85°C, 85% R.H., 100 hours -/+15% 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 Sensitivity Level | Level 1, J-STD-020 |

Note: MSL level 2a for 2920 size product

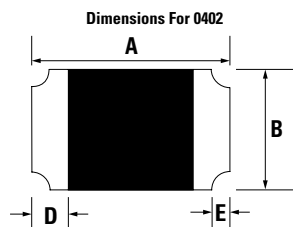
Soldering Parameters

| | | |
|---|--|------------------|
| 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_t) | 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. | |

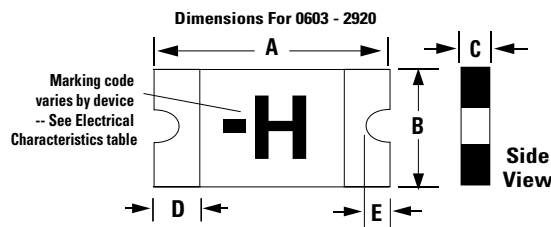


- All temperature refer to topside of the package, measured on the package body surface
- If reflow temperature exceeds the recommended profile, devices may not meet the performance requirements
- Recommended reflow methods: IR, vapor phase oven, hot air oven, N₂ environment for lead
- Recommended maximum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

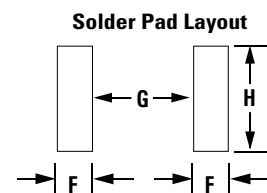
Dimensions



Device Top and Bottom Marking and Dimensions are Similar



Device Top and Bottom Marking and Dimensions are Similar

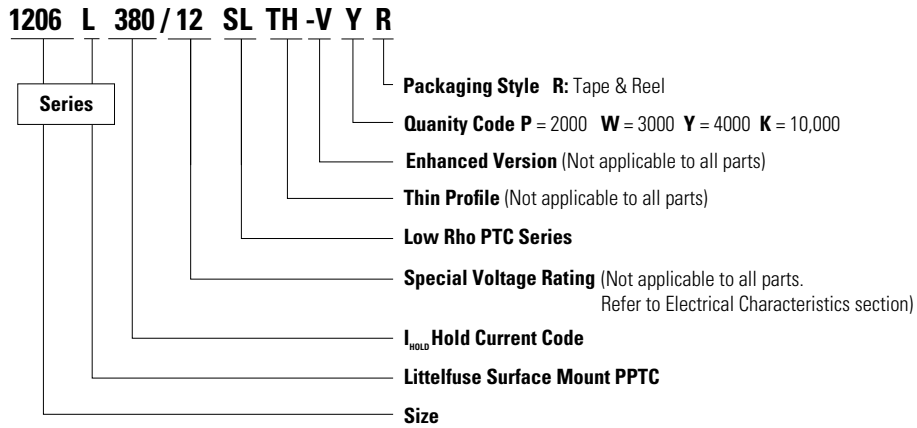


Packaging

| Part Number | Ordering Number | I _{hold} (A) | I _{hold} Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|---------------|------------------|-----------------------|------------------------|------------------|----------|----------------------------|
| 0402L010SL | 0402L010SLKR | 0.10 | 010 | Tape & Reel | 10,000 | KR |
| 0402L020SL | 0402L020SLKR | 0.20 | 020 | | 10,000 | KR |
| 0402L035SL | 0402L035SLKR | 0.35 | 035 | | 10,000 | KR |
| 0402L050SL | 0402L050SLKR | 0.50 | 050 | | 10,000 | KR |
| 0402L075SL | 0402L075SLKR | 0.75 | 075 | | 10,000 | KR |
| 0402L100SL | 0402L100SLKR | 1.00 | 100 | | 10,000 | KR |
| 0603L050SL | 0603L050SLYR | 0.50 | 050 | | 4,000 | YR |
| 0603L075SL | 0603L075SLYR | 0.75 | 075 | | 4,000 | YR |
| 0603L100SL | 0603L100SLYR | 1.00 | 100 | | 4,000 | YR |
| 0603L150SL | 0603L150SLYR | 1.50 | 150 | | 4,000 | YR |
| 0603L175SL | 0603L175SLYR | 1.75 | 175 | | 4,000 | YR |
| 0603L200SLV | 0603L200SLVYR | 2.00 | 200 | | 4,000 | YR |
| 0603L300SL | 0603L300SLYR | 3.00 | 300 | | 4,000 | YR |
| 0805L075SL | 0805L075SLYR | 0.75 | 075 | | 4,000 | YR |
| 0805L110SL | 0805L110SLYR | 1.10 | 110 | | 4,000 | YR |
| 0805L150SL | 0805L150SLYR | 1.50 | 150 | | 4,000 | YR |
| 0805L175SL | 0805L175SLYR | 1.75 | 175 | | 4,000 | YR |
| 0805L200SLTH | 0805L200SLTHYR | 2.00 | 200 | | 4,000 | YR |
| 0805L260SLTH | 0805L260SLTHYR | 2.60 | 260 | | 4,000 | YR |
| 0805L300SL | 0805L300SLWVR | 3.00 | 300 | | 3,000 | WR |
| 0805L300SLTH | 0805L300SLTHYR | 3.00 | 300 | | 4,000 | YR |
| 0805L350SL | 0805L350SLYR | 3.50 | 350 | | 4,000 | YR |
| 0805L400SL | 0805L400SLWVR | 4.00 | 400 | | 3,000 | WR |
| 1206L075SL | 1206L075SLYR | 0.75 | 075 | | 4,000 | YR |
| 1206L110SL | 1206L110SLYR | 1.10 | 110 | | 4,000 | YR |
| 1206L150SL | 1206L150SLYR | 1.50 | 150 | | 4,000 | YR |
| 1206L110/12SL | 1206L110/12SLYR | 1.10 | 110 | | 4,000 | YR |
| 1206L150/12SL | 1206L150/12SLYR | 1.50 | 150 | | 4,000 | YR |
| 1206L175SL | 1206L175SLYR | 1.75 | 175 | | 4,000 | YR |
| 1206L200SL | 1206L200SLYR | 2.00 | 200 | | 4,000 | YR |
| 1206L260SLTH | 1206L260SLTHYR | 2.60 | 260 | | 4,000 | YR |
| 1206L260/12SL | 1206L260/12SLYR | 2.60 | 260 | | 4,000 | YR |
| 1206L300SLTH | 1206L300SLTHYR | 3.00 | 300 | | 4,000 | YR |
| 1206L300/12SL | 1206L300/12SLYR | 3.00 | 300 | | 4,000 | YR |
| 1206L350SLTH | 1206L350SLTHYR | 3.50 | 350 | | 4,000 | YR |
| 1206L350/12SL | 1206L350/12SLWVR | 3.50 | 350 | | 3,000 | WR |
| 1206L380SLTH* | 1206L380SLTHYR | 2.82* | 380 | | 4,000 | YR |
| 1206L400SL | 1206L400SLWVR | 4.00 | 400 | | 3,000 | WR |
| 1206L400/12SL | 1206L400/12SLWVR | 4.00 | 400 | | 3,000 | WR |
| 1206L450SL | 1206L450SLWVR | 4.50 | 450 | | 3,000 | WR |
| 1206L450/12SL | 1206L450/12SLWVR | 4.50 | 450 | | 3,000 | WR |
| 1206L500SLV | 1206L500SLVWVR | 5.00 | 500 | | 3,000 | WR |
| 1206L500/12SL | 1206L500/12SLPR | 5.00 | 500 | | 2,000 | PR |
| 1206L600SL | 1206L600SLWVR | 6.00 | 600 | | 3,000 | WR |
| 1210L175SL | 1210L175SLYR | 1.75 | 175 | | 4,000 | YR |
| 1210L200SL | 1210L200SLYR | 2.00 | 200 | | 4,000 | YR |
| 1210L260SL | 1210L260SLYR | 2.60 | 260 | | 4,000 | YR |
| 1210L300SL | 1210L300SLWVR | 3.00 | 300 | | 3,000 | WR |
| 1210L350SL | 1210L350SLWVR | 3.50 | 350 | | 3,000 | WR |
| 1210L380SL | 1210L380SLYR | 3.80 | 380 | | 4,000 | YR |
| 1210L400SL | 1210L400SLWVR | 4.00 | 400 | | 3,000 | WR |
| 1210L450SL | 1210L450SLWVR | 4.50 | 450 | | 3,000 | WR |
| 1210L500/12SL | 1210L500/12SLWVR | 5.00 | 500 | | 3,000 | WR |
| 1210L550SL | 1210L550SLWVR | 5.50 | 550 | | 3,000 | WR |
| 1210L600SL | 1210L600SLWVR | 6.00 | 600 | | 3,000 | WR |
| 1210L900SL | 1210L900SLPR | 9.00 | 900 | | 2,000 | PR |
| 1812L190SL | 1812L190SLPR | 1.90 | 190 | | 2,000 | PR |
| 1812L260SL | 1812L260SLPR | 2.60 | 260 | | 2,000 | PR |
| 1812L270SL | 1812L270SLPR | 2.70 | 270 | | 2,000 | PR |
| 1812L300SL | 1812L300SLPR | 3.00 | 300 | | 2,000 | PR |
| 1812L300/24SL | 1812L300/24SLER | 3.00 | 300 | 2,500 | ER | |
| 1812L350SL | 1812L350SLPR | 3.50 | 350 | 2,000 | PR | |
| 1812L370SL | 1812L370SLPR | 3.70 | 370 | 2,000 | PR | |
| 2920L500/24SL | 2920L500/24SLDR | 5.00 | 500 | 1,500 | DR | |
| 2920L600/24SL | 2920L600/24SLER | 6.00 | 600 | 2,500 | ER | |
| 2920L700SL | 2920L700SLPR | 7.00 | 700 | 2,000 | PR | |
| 2920L700/24SL | 2920L700/24SLER | 7.00 | 700 | 2,500 | ER | |

Notes: *1206L380SLTH has I_{hold} 2.82A for at least 15min @ 55°C.

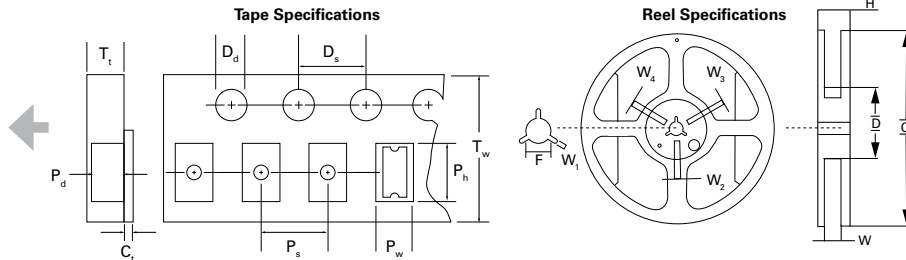
Part Ordering Number System



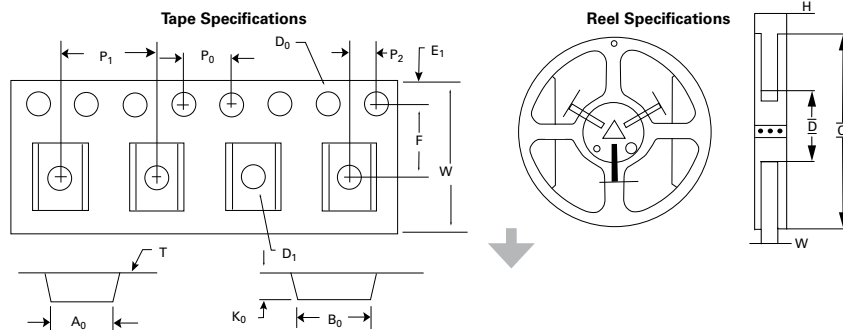
Tape and Reel Specifications

| Symbol | 0402L010SL 0402L020SL 0402L035SL 0402L050SL 0402L075SL 0402L100SL |
|--|--|
| Tape Dimensions: EIA-481-1 (mm) | |
| C_t | 0.05 ± 0.01 |
| D_d | 1.5 ± 0.1 |
| D_s | 4.0 ± 0.1 |
| P_d | 0.41 ± 0.1 |
| P_h | 1.12 ± 0.1 |
| P_s | 2.0 ± 0.1 |
| P_w | 0.65 ± 0.03 |
| T_t | 0.61 ± 0.1 |
| T_w | 8.0 ± 0.1 |
| Leader min. | 390 |
| Trailer min. | 160 |
| Reel Dimensions: EIA-481-1 (mm) | |
| H | 12.0 ± 0.5 |
| W | 9.0 ± 0.5 |
| D | Ø60 ± 0.5 |
| F | Ø13.0 ± 0.2 |
| C | Ø178 ± 1 |
| W_1 | 2.2 ± 0.5 |
| W_2 | 3.0 ± 0.5 |
| W_3 | 4.0 ± 0.5 |
| W_4 | 5.5 ± 0.5 |

Dimensions for 0402 size product (see table at left)



Dimensions for 0603, 0805, 1206, 1210, 1812 and 2920 size product (see table below)



...Continued on next page.

| Symbol | 0603L050SL 0603L075SL 0603L100SL | 0603L150SL 0603L175SL 0603L200SL-V 0603L300SL | 0805L075SL 0805L110SL 0805L150SL 0805L175SL 0805L200SLTH 0805L260SLTH 0805L300SLTH | 0805L350SL | 0805L300SL 0805L400SL | 1206L075SL 1206L110SL 1206L150SL 1206L110/12SL 1206L150/12SL 1206L175SL 1206L200SL | 1206L260SLTH 1206L260/12SL 1206L300SLTH 1206L300/12SL 1206L350SLTH 1206L380SLTH | 1206L350/12SL 1206L400SL 1206L400/12SL 1206L450SL 1206L450/12SL 1206L500SL-V 1206L600SL | 1206L500/12SL | 1210L175SL 1210L200SL 1210L260SL 1210L300SL 1210L380SL |
|--|--|--|--|-------------|--------------------------|--|--|---|---------------|--|
| Tape Dimensions: EIA-481-1 (mm) | | | | | | | | | | |
| W | 8.00 ± 0.30 | 8.00 ± 0.30 | 8.00 ± 0.10 | 8.00 ± 0.30 | 8.00 ± 0.30 | 8.20 +0.10/-0.30 | 8.15 +0.15/-0.30 | 8.20 +0.10/-0.30 | 8.00 ± 0.30 | |
| F | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 | 3.50 ± 0.05 |
| E₁ | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 |
| D₀ | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 |
| D₁ | 0.50 ± 0.10 | 0.50 ± 0.10 | 1.00 (Min.) | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 ± 0.10 | 1.00 (Min.) |
| P₀ | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.08 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| P₁ | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| P₂ | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 |
| A₀ | 1.10 ± 0.10 | 1.10 ± 0.10 | 1.60 ± 0.10 | 1.65 ± 0.10 | 1.65 ± 0.10 | 1.95 ± 0.10 | 1.92 ± 0.10 | 1.95 ± 0.10 | 1.95 ± 0.10 | 2.82 ± 0.10 |
| B₀ | 1.92 ± 0.10 | 1.92 ± 0.10 | 2.30 ± 0.10 | 2.35 ± 0.10 | 2.35 ± 0.10 | 3.65 ± 0.10 | 3.65 ± 0.10 | 3.65 ± 0.10 | 3.65 ± 0.10 | 3.46 ± 0.10 |
| T | 0.20 ± 0.10 | 0.20 ± 0.10 | 0.25 ± 0.10 | 0.20 ± 0.10 | 0.25 ± 0.10 | 0.20 ± 0.10 | 0.25 ± 0.10 | 0.25 ± 0.10 | 0.25 ± 0.10 | 0.25 ± 0.10 |
| K₀ | 0.72 ± 0.10 | 0.96 ± 0.10 | 0.90 ± 0.10 | 1.05 ± 0.10 | 1.50 ± 0.10 | 0.87 ± 0.10 | 1.30 ± 0.10 | 1.70 ± 0.10 | 1.70 ± 0.10 | 1.00 ± 0.10 |
| Leader min. | 390 | | | | | | | | | |
| Trailer min. | 160 | | | | | | | | | |
| Reel Dimensions: EIA-481-1 (mm) | | | | | | | | | | |
| H | 11.0 ± 0.5 | | | | | | | | | |
| W | 9.0 ± 1.5 | | | | | | | | | |
| C | Ø178 ± 1.0 | | | | | | | | | |
| D | Ø60.2 ± 0.5 | | | | | | | | | |

| Symbol | 1210L350SL 1210L400SL 1210L450SL 1210L500/12SL 1210L550SL 1210L600SL | 1210L900SL | 1812L190SL 1812L260SL 1812L270SL 1812L300SL 1812L350SL 1812L370SL | 1812L300/24SL | 2920L500/24SL | 2920L700SL | 2920L600/24SL 2920L700/24SL |
|--|---|-------------|--|---------------|---------------|--------------|--------------------------------|
| Tape Dimensions: EIA-481-1 (mm) | | | | | | | |
| W | 8.00 ± 0.30 | 8.00 ± 0.30 | 12.00 ± 0.30 | 12.00 ± 0.30 | 16.00 ± 0.30 | 16.00 ± 0.30 | 16.00 ± 0.30 |
| F | 3.50 ± 0.05 | 3.50 ± 0.05 | 5.50 ± 0.05 | 5.50 ± 0.05 | 7.50 ± 0.10 | 7.50 ± 0.10 | 7.50 ± 0.10 |
| E₁ | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 |
| D₀ | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.50 +0.10/-0 | 1.55 ± 0.05 | 1.55 ± 0.05 | 1.50 +0.10/-0 |
| D₁ | 1.00 (Min.) | 1.00 (Min.) | 1.55 (Min.) | 1.50 +0.10/-0 | 1.50 ± 0.10 | 1.50 ± 0.10 | 1.50 (Min.) |
| P₀ | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 |
| P₁ | 4.00 ± 0.10 | 4.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 | 8.00 ± 0.10 |
| P₂ | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.05 | 2.00 ± 0.10 | 2.00 ± 0.10 | 2.00 ± 0.10 |
| A₀ | 2.82 ± 0.10 | 2.80 ± 0.10 | 3.58 ± 0.10 | 3.55 ± 0.10 | 5.74 ± 0.10 | 5.74 ± 0.10 | 5.60 ± 0.10 |
| B₀ | 3.50 ± 0.10 | 3.50 ± 0.10 | 4.93 ± 0.10 | 4.88 ± 0.10 | 8.02 ± 0.10 | 8.02 ± 0.10 | 7.95 ± 0.10 |
| T | 0.20 ± 0.10 | 0.25 ± 0.10 | 0.25 ± 0.05 | 0.30 ± 0.05 | 0.30 ± 0.10 | 0.30 ± 0.10 | 0.30 ± 0.05 |
| K₀ | 1.30 ± 0.10 | 1.60 ± 0.10 | 0.87 ± 0.06 | 2.45 ± 0.10 | 1.30 ± 0.10 | 0.91 ± 0.10 | 2.55 ± 0.10 |
| Leader min. | 390 | | | | | | |
| Trailer min. | 160 | | | | | | |
| Reel Dimensions: EIA-481-1 (mm) | | | | | | | |
| H | 11.0 ± 0.5 | | 16.0 ± 0.5 | 17.4 ± 1.0 | 19.5 ± 1.0 | | 21.4 ± 1.0 |
| W | 9.0 ± 1.5 | | 13.2 ± 1.5 | 13.4 ± 1.0 | 17 ± 0.2 | | 17.4 ± 1.0 |
| C | Ø178 ± 1.0 | | Ø178 ± 1.0 | Ø330 ± 1.0 | Ø180 ± 3.0 | | Ø330 ± 1.0 |
| D | Ø60.2 ± 0.5 | | Ø60.2 ± 0.5 | Ø99 ± 0.5 | Ø60 ± 0.5 | | Ø99 ± 0.5 |

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