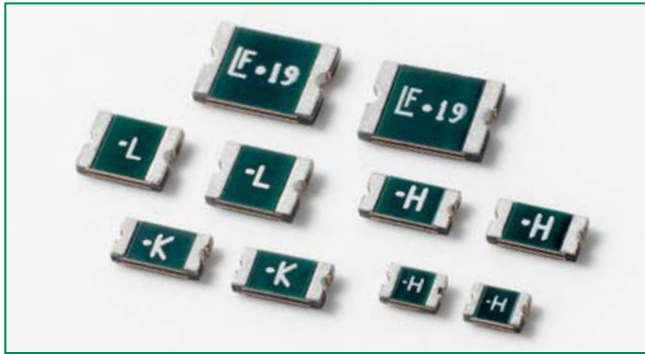


RoHS (Pb) HF Lo Rho Surface Mount Series

Description

The Littelfuse Lo Rho Surface Mount PPTC (polymer positive temperature coefficient) series offers ultra low normal operating resistance while maintains the same performance of existing Littelfuse PPTC products.

Available in 5 hold current ratings, all devices are TUV and UL certified and possess a maximum fault current rating of 40A.



Features

- Lo Rho (low resistance at normal operating hold current)
- RoHS compliant, Lead Free and Halogen Free
- Fast response to fault currents
- Compact design saves board space
- Thin-profile <0.75mm
- Compatible with high temperature solders



Applications

- USB peripherals
- Disk drives
- CD-ROMs
- Plug and play protection for motherboards and peripherals
- PDAs / digital cameras
- Game console port protection

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 max. (W) | Maximum Time To Trip | | Resistance | | Agency Approvals | |
|---------------|---------|-----------------------|-----------------------|------------------------|----------------------|-------------------------|----------------------|-------------|----------------------|-----------------------|---|---|
| | | | | | | | Current (A) | Time (Sec.) | R _{min} (Ω) | R _{1max} (Ω) |  |  |
| 0805L110SLYR | -H | 1.10 | 1.80 | 6 | 50 | 0.6 | 8.00 | 0.30 | 0.030 | 0.130 | X | X |
| 1206L110SLYR | -H | 1.10 | 2.20 | 6 | 50 | 0.8 | 8.00 | 0.30 | 0.015 | 0.100 | X | X |
| 1206L150SLYR | -K | 1.50 | 3.00 | 6 | 50 | 0.8 | 8.00 | 0.30 | 0.010 | 0.065 | X | X |
| 1210L200SLYR | -L | 2.00 | 4.00 | 6 | 50 | 0.8 | 8.00 | 3.00 | 0.005 | 0.024 | X | X |
| 1210L350SLSYR | -T | 3.50 | 7.00 | 6 | 50 | 0.8 | 17.50 | 2.00 | 0.003 | 0.018 | X | X |
| 1812L190SLPR | LF 19 | 1.90 | 4.90 | 6 | 50 | 1.0 | 9.50 | 4.50 | 0.003 | 0.025 | 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.

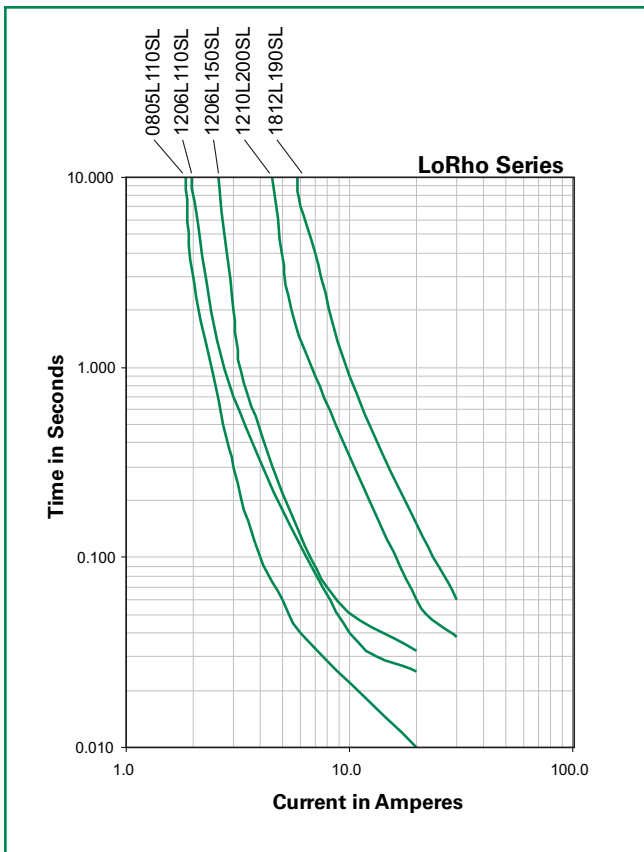
R_{1max} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

Temperature Derating

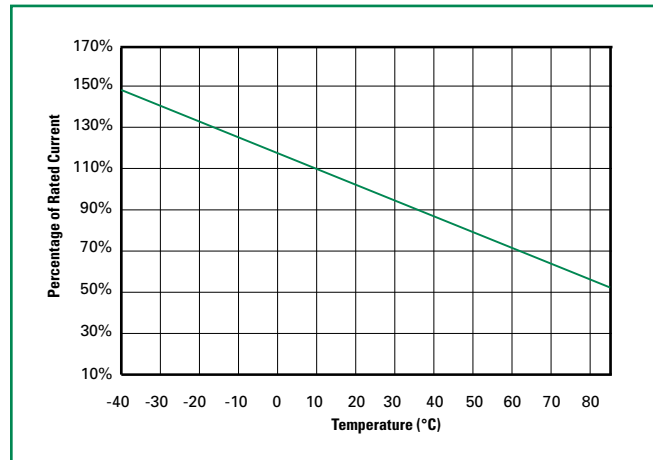
| Part Number | Ambient Operation Temperature | | | | | | | |
|----------------|-------------------------------|-------|------|------|------|------|------|------|
| | -40°C | -20°C | 0°C | 20°C | 40°C | 60°C | 70°C | 85°C |
| 0805L110SLYR | 1.93 | 1.65 | 1.38 | 1.10 | 0.83 | 0.55 | 0.41 | 0.21 |
| 1206L110SLYR | 2.00 | 1.70 | 1.40 | 1.10 | 0.83 | 0.56 | 0.44 | 0.24 |
| 1206L150SLYR | 2.67 | 2.32 | 1.95 | 1.50 | 1.15 | 0.78 | 0.64 | 0.36 |
| 1210L200SLYR | 3.26 | 2.87 | 2.50 | 2.00 | 1.70 | 1.29 | 1.09 | 0.78 |
| 1210L350SL-SYR | 5.00 | 4.60 | 4.05 | 3.50 | 2.80 | 2.00 | 1.60 | 1.00 |
| 1812L190SLPR | 3.00 | 2.58 | 2.22 | 1.90 | 1.49 | 1.14 | 0.93 | 0.61 |

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



Environmental Specifications

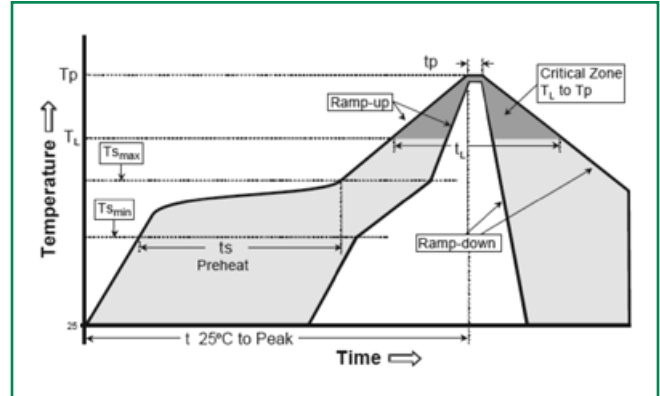
| | |
|--|--|
| Operating/Storage Temperature | -40°C to +85°C |
| Maximum Device Surface Temperature in Tripped State | 125°C |
| Passive Aging | +85°C, 1000 hours -/+10% typical resistance change |
| Humidity Aging | +85°C, 85% R.H., 100 hours -/+15% typical resistance change |
| Thermal Shock | MIL-STD-202, Method 107G +85°C/-40°C 20 times -30% typical resistance change |
| Solvent Resistance | MIL-STD-202, Method 215 No change |
| Vibration | MIL-STD-883C, Method 2007.1, Condition A No change |
| Moisture Sensitivity Level | Level 1, J-STD-020C |

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. |

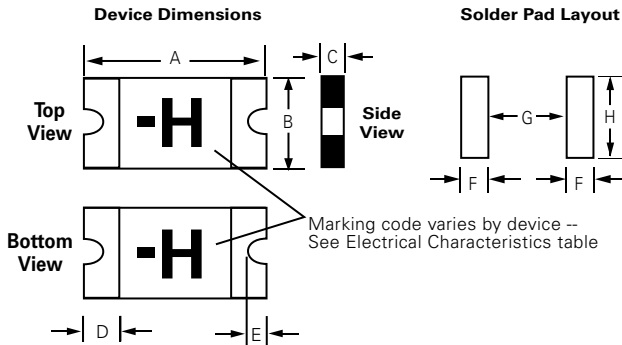
Soldering Parameters

| | | |
|--|----------------------------------|-------------------------|
| 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 (0.010 inch)
- Devices can be cleaned using standard industry methods and solvents
- Devices can be reworked using the standard industry practices

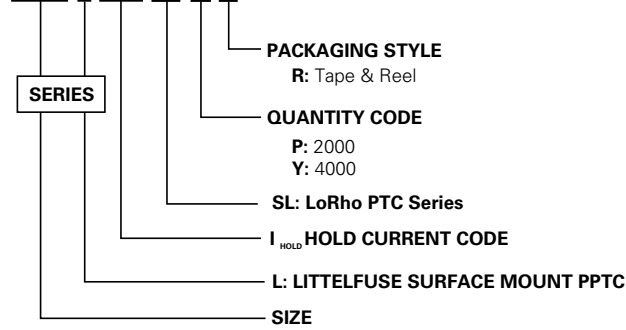
Dimensions



| Part Number | Device Dimension | | | | | | | | | | Solder Pad Layout | | |
|----------------|------------------|------|------|------|------|------|------|------|------|------|-------------------|------|------|
| | A | | B | | C | | D | | E | | F | G | H |
| | mm | mm | mm | mm | mm | mm | mm | mm | mm | | | | |
| 0805L110SLYR | 2.00 | 2.20 | 1.20 | 1.50 | 0.40 | 0.75 | 0.20 | 0.55 | 0.10 | 0.45 | 1.00 | 1.20 | 1.50 |
| 1206L110SLYR | 3.00 | 3.40 | 1.50 | 1.80 | 0.40 | 0.75 | 0.25 | 0.75 | 0.10 | 0.45 | 1.00 | 1.80 | 1.80 |
| 1206L150SLYR | 3.00 | 3.40 | 1.50 | 1.80 | 0.40 | 0.70 | 0.25 | 0.75 | 0.10 | 0.45 | 1.00 | 1.80 | 1.80 |
| 1210L200SLYR | 3.00 | 3.43 | 2.35 | 2.80 | 0.40 | 0.70 | 0.25 | 0.75 | 0.20 | 0.50 | 1.00 | 2.00 | 2.50 |
| 1210L350SL-SYR | 3.00 | 3.43 | 2.35 | 2.80 | 0.60 | 1.00 | 0.25 | 0.75 | 0.20 | 0.50 | 1.00 | 2.00 | 2.50 |
| 1812L190SLPR | 4.37 | 4.73 | 3.07 | 3.41 | 0.40 | 0.70 | 0.30 | 1.20 | 0.25 | 0.65 | 1.78 | 3.45 | 3.15 |

Part Ordering Number System

0805 L 110 SL Y R



Packaging

| Part Number | I _{hold} (A) | I _{hold} Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|---------------|-----------------------|------------------------|------------------|----------|----------------------------|
| 0805L110SLYR | 1.10 | 110 | Tape & Reel | 4000 | YR |
| 1206L110SLYR | 1.10 | 110 | | 4000 | YR |
| 1206L150SLYR | 1.50 | 150 | | 4000 | YR |
| 1210L200SLYR | 2.00 | 200 | | 4000 | YR |
| 1210L350SLSYR | 3.50 | 350 | | 4000 | YR |
| 1812L190SLPR | 1.90 | 190 | | 2000 | PR |

Tape and Reel Specifications

TAPE SPECIFICATIONS: EIA-481-1 (mm)

| | 0805L110SL | 1206L110SL 1206L150SL | 1210L200SL 1210L350SL-S | 1812P190SL |
|----------------------|-------------|--------------------------|----------------------------|-----------------|
| W | 8.0+/-0.10 | 8.15+0.15-0.30 | 8.0+/-0.30 | 12.00+0.30-0.10 |
| F | 3.5+/-0.05 | 3.50+/-0.05 | 3.5+/-0.05 | 5.50+/-0.05 |
| E₁ | 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 |
| D₁ | 1.0 (min) | 1.00 (MIN) | 1.0 (min) | 1.50+0.25 |
| P₀ | 4.0+/-0.10 | 4.00+/-0.10 | 4.0+/-0.10 | 4.00+/-0.10 |
| P₁ | 4.0+/-0.10 | 4.00+/-0.10 | 4.0+/-0.10 | 8.00+/-0.10 |
| P₂ | 2.0+/-0.05 | 2.00+/-0.05 | 2.0+/-0.05 | 2.00+/-0.05 |
| A₀ | 1.45+/-0.10 | 1.95+/-0.10 | 2.82+/-0.10 | 3.58+/-0.10 |
| B₀ | 2.30+/-0.10 | 3.65+/-0.10 | 3.46+/-0.10 | 4.93+/-0.10 |
| T | 0.25+/-0.10 | 0.25+/-0.10 | 0.25+/-0.10 | 0.25+/-0.10 |
| K₀ | 0.74+/-0.10 | 0.87+/-0.10 | 1.00+/-0.10 | 1.02+/-0.10 |
| Leader min. | 390 | 390 | 390 | 390 |
| Trailer min. | 160 | 160 | 160 | 160 |

REEL DIMENSIONS: EIA-481-1 (mm)

| | 0805L110SL 1210L200SL | 1206L110SL 1206L150SL 1812P190SL |
|----------------------|--------------------------|--|
| H | 12.0+/-0.05 | 16.0+/-0.2 |
| W | 9.0+/-0.5 | 13.2+/-1.5 |
| D | Ø60+0.5 | Ø 60.2+/-0.5 |
| F | Ø13.0+/-0.2 | Ø 13.0+/-0.5 |
| C | Ø178+/-1.0 | Ø 178+/-1.0 |
| H₁ | 11+/-0.5 | 11+/-0.5 |
| W₁ | 2.2+/-0.5 | 2.5+0.5 |
| W₂ | 3.0+0.5 | 3.0+0.5 |
| W₃ | 4.0+0.5 | 4.0+0.5 |
| W₄ | 5.5+0.5 | 5.0+0.5 |

Tape and Reel Diagram

