

Description

The new LR Series device provides reliable, noncycling protection against overcharging and short circuits events for rechargeable battery cells where resettable protection is desired.



Features

- RoHS compliant and lead-free
- Weldable Nickel terminals
- Slim, low profile design
- Compact design saves board space
- Low resistance
- Fast trip time



Applications

- Rechargeable battery cell protection
- Portable Computers
- Camcorders

Agency Approvals

| AGENCY | AGENCY FILE NUMBER |
|---|--------------------|
|  | E183209 |
|  | R50119583 |

Electrical Characteristics

| Part Number | 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 _{typ} (Ω) | R _{1max} (Ω) |  |  |
| 15LR190 | 1.9 | 3.9 | 15 | 100 | 1.2 | 9.50 | 5.00 | 0.039 | 0.072 | 0.102 | X | X |
| 15LR190S | 1.9 | 3.9 | 15 | 100 | 1.2 | 9.50 | 5.00 | 0.039 | 0.072 | 0.102 | X | X |
| 15LR260 | 2.6 | 5.8 | 15 | 100 | 2.5 | 13.00 | 5.00 | 0.020 | 0.042 | 0.063 | X | X |
| 15LR260S | 2.6 | 5.8 | 15 | 100 | 2.5 | 13.00 | 5.00 | 0.020 | 0.042 | 0.063 | X | X |
| 15LR380 | 3.8 | 8.3 | 15 | 100 | 2.5 | 19.00 | 5.00 | 0.013 | 0.026 | 0.037 | X | X |
| 20LR450 | 4.5 | 8.9 | 20 | 100 | 2.5 | 22.50 | 5.00 | 0.011 | 0.020 | 0.028 | X | X |
| 20LR550 | 5.5 | 10.5 | 20 | 100 | 2.8 | 27.50 | 5.00 | 0.009 | 0.016 | 0.022 | X | X |
| 20LR600 | 6.0 | 11.7 | 20 | 100 | 2.8 | 30.00 | 5.00 | 0.007 | 0.014 | 0.019 | X | X |
| 20LR730 | 7.3 | 14.1 | 20 | 100 | 3.3 | 30.00 | 5.00 | 0.006 | 0.012 | 0.015 | 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.

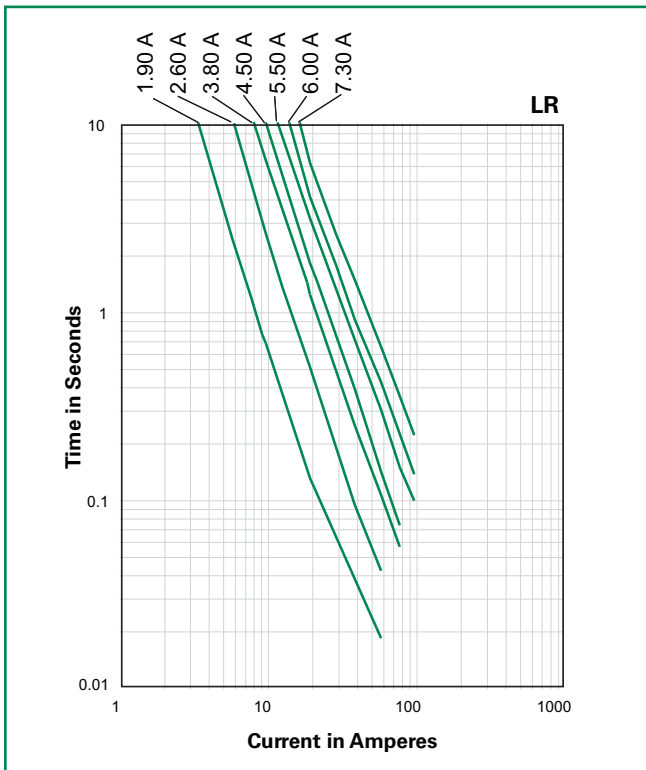
R_{1max} = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

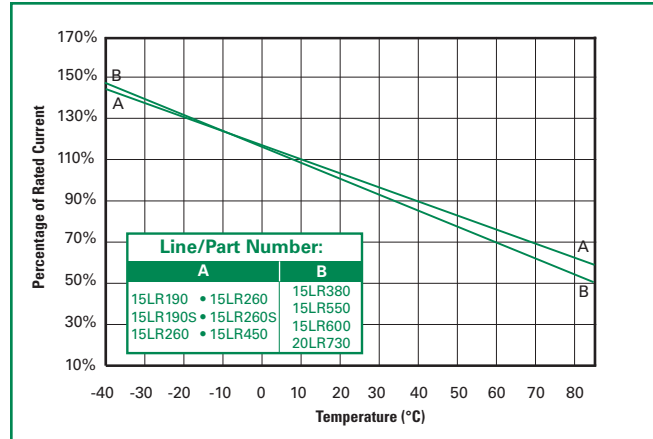
Temperature Derating

| Part Number | Ambient Operation Temperature | | | | | | | | |
|-------------|-------------------------------|-------|------|------|------|------|------|------|------|
| | -40°C | -20°C | 0°C | 23°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| 15LR190 | 2.80 | 2.50 | 2.30 | 1.90 | 1.60 | 1.50 | 1.40 | 1.20 | 1.00 |
| 15LR190S | 2.80 | 2.50 | 2.30 | 1.90 | 1.60 | 1.50 | 1.40 | 1.20 | 1.00 |
| 15LR260 | 3.80 | 3.40 | 3.10 | 2.60 | 2.20 | 2.00 | 1.90 | 1.70 | 1.40 |
| 15LR260S | 3.80 | 3.40 | 3.10 | 2.60 | 2.20 | 2.00 | 1.90 | 1.70 | 1.40 |
| 15LR380 | 5.50 | 4.90 | 4.40 | 3.80 | 3.30 | 3.00 | 2.80 | 2.50 | 2.10 |
| 20LR450 | 6.50 | 5.80 | 5.30 | 4.50 | 3.90 | 3.60 | 3.30 | 2.90 | 2.50 |
| 20LR550 | 8.00 | 7.10 | 6.20 | 5.50 | 4.70 | 4.30 | 4.00 | 3.60 | 3.00 |
| 20LR600 | 8.70 | 7.80 | 7.10 | 6.00 | 5.20 | 4.70 | 4.40 | 3.90 | 3.30 |
| 20LR730 | 10.60 | 9.50 | 8.60 | 7.30 | 6.30 | 5.70 | 5.40 | 4.70 | 4.00 |

Average Time Current Curves



Temperature Derating Curve



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.

Physical Specifications

| | |
|----------------------------|---|
| Terminal Material | 0.13mm nominal thickness, quarter-hard Nickel |
| Insulating Material | Polyester tape |

Environmental Specifications

| | |
|--|--|
| Operating/Storage Temperature | -40°C to +85°C |
| Maximum Device Surface Temperature in Tripped State | 125°C |
| Passive Aging | +70°C, 1000 hours -/+10% typical resistance change |
| Humidity Aging | +85°C, 85% R.H., 7 days -/+5% typical resistance change |
| Vibration | MIL-STD-883C, Method 2007.1, Condition A, No change |

Dimensions

Figure 1

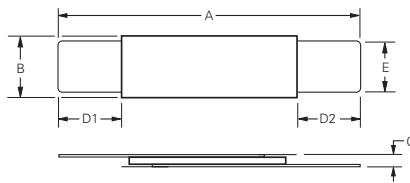
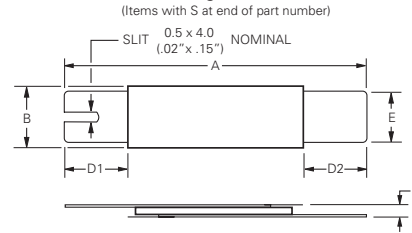
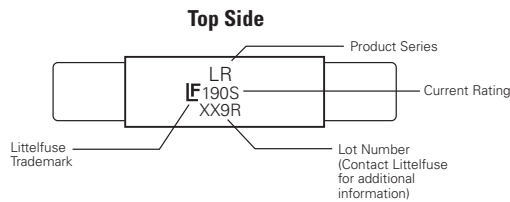


Figure 2

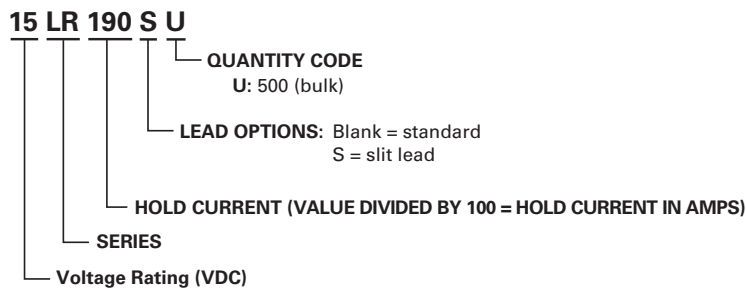


| Part Number | Figure | A | | B | | C | | D1 | | D2 | | E | | | | | | | | | |
|-------------|--------|--------|------|--------|-------|--------|------|--------|-------|--------|------|--------|------|------|------|------|------|------|------|------|------|
| | | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | Inches | mm | | | | | | | | |
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | | | | | | | | |
| 15LR190 | 1 | 0.78 | 0.87 | 19.90 | 22.10 | 0.19 | 0.22 | 4.90 | 5.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.22 | 5.50 | 0.22 | 5.50 | 0.01 | 0.22 | 3.90 | 4.10 |
| 15LR190S | 2 | 0.78 | 0.87 | 19.90 | 22.10 | 0.19 | 0.22 | 4.90 | 5.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.22 | 5.50 | 0.22 | 5.50 | 0.01 | 0.22 | 3.90 | 4.10 |
| 15LR260 | 1 | 0.82 | 0.91 | 20.90 | 23.10 | 0.19 | 0.22 | 4.90 | 5.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.16 | 4.10 | 0.16 | 4.10 | 0.01 | 0.16 | 3.90 | 4.10 |
| 15LR260S | 2 | 0.82 | 0.91 | 20.90 | 23.10 | 0.19 | 0.22 | 4.90 | 5.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.16 | 4.10 | 0.16 | 4.10 | 0.01 | 0.16 | 3.90 | 4.10 |
| 15LR380 | 1 | 0.94 | 1.02 | 24.00 | 26.00 | 0.27 | 0.30 | 6.90 | 7.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.16 | 4.10 | 0.16 | 4.10 | 0.01 | 0.16 | 4.90 | 5.10 |
| 20LR450 | 1 | 0.94 | 1.02 | 24.00 | 26.00 | 0.39 | 0.41 | 9.90 | 10.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.21 | 5.30 | 0.21 | 5.30 | 0.01 | 0.21 | 5.90 | 6.10 |
| 20LR550 | 1 | 1.38 | 1.46 | 35.00 | 37.00 | 0.27 | 0.30 | 6.90 | 7.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.21 | 5.30 | 0.21 | 5.30 | 0.01 | 0.21 | 4.90 | 5.10 |
| 20LR600 | 1 | 0.94 | 1.02 | 24.00 | 26.00 | 0.55 | 0.57 | 13.90 | 14.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.16 | 4.10 | 0.16 | 4.10 | 0.01 | 0.16 | 5.90 | 6.10 |
| 20LR730 | 1 | 1.07 | 1.15 | 27.10 | 29.10 | 0.55 | 0.57 | 13.90 | 14.50 | 0.02 | 0.04 | 0.60 | 1.00 | 0.16 | 4.10 | 0.16 | 4.10 | 0.01 | 0.16 | 5.90 | 6.10 |

Part Marking System



Part Ordering Number System



Packaging

| Part Number | Ordering Number | I_{hold} (A) | I_{hold} Code | Packaging Option | Quantity | Quantity & Packaging Codes |
|-------------|-----------------|----------------|-----------------|------------------|----------|----------------------------|
| 15LR190 | 15LR190U | 1.9 | 190 | Bulk | 500 | U |
| 15LR190S | 15LR190SU | 1.9 | 190 | Bulk | 500 | U |
| 15LR260 | 15LR260U | 2.6 | 260 | Bulk | 500 | U |
| 15LR260S | 15LR260SU | 2.6 | 260 | Bulk | 500 | U |
| 15LR380 | 15LR380U | 3.8 | 380 | Bulk | 500 | U |
| 20LR450 | 20LR450U | 4.5 | 450 | Bulk | 500 | U |
| 20LR550 | 20LR550U | 5.5 | 550 | Bulk | 500 | U |
| 20LR600 | 20LR600U | 6.0 | 600 | Bulk | 500 | U |
| 20LR730 | 20LR730U | 7.3 | 730 | Bulk | 500 | U |