

### LR Series



#### 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

#### Additional Information



Datasheet



Resources



Samples

#### Agency Approvals

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

#### Electrical Characteristics

| Part Number | I <sub>hold</sub> (A) | I <sub>trip</sub> (A) | V <sub>max</sub> (Vdc) | I <sub>max</sub> (A) | P <sub>d</sub> max. (W) | Maximum Time To Trip |             | Resistance           |                      |                       | Agency Approvals  |   |
|-------------|-----------------------|-----------------------|------------------------|----------------------|-------------------------|----------------------|-------------|----------------------|----------------------|-----------------------|---|---|
|             |                       |                       |                        |                      |                         | Current (A)          | Time (Sec.) | R <sub>min</sub> (Ω) | R <sub>typ</sub> (Ω) | R <sub>1max</sub> (Ω) |  |  |
| 15LR260     | 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   |
| 20LR730     | 7.3                   | 14.1                  | 20                     | 100                  | 3.3                     | 30.00                | 5.00        | 0.006                | 0.012                | 0.015                 | X   | X   |

I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20°C still air.

I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20°C still air.

V<sub>max</sub> = Maximum voltage device can withstand without damage at rated current (I<sub>max</sub>)

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>)

P<sub>d</sub> = Power dissipated from device when in the tripped state at 20°C still air.

R<sub>min</sub> = Minimum resistance of device in initial (un-soldered) state.

R<sub>typ</sub> = Typical resistance of device in initial (un-soldered) state.

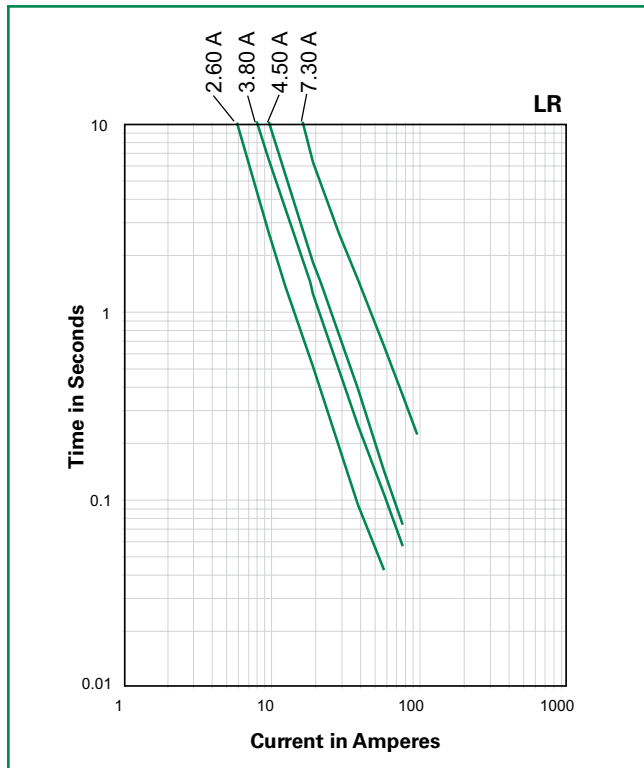
R<sub>1max</sub> = Maximum resistance of device at 20°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

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

#### Temperature Derating

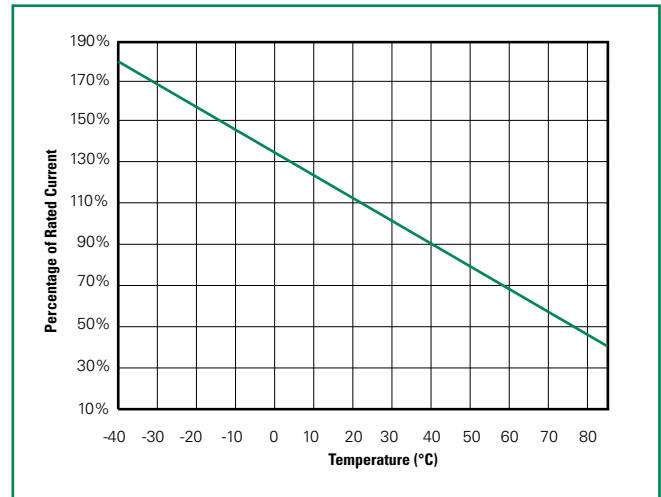
| Part Number | Ambient Operation Temperature |       |      |      |      |      |      |      |      |  |
|-------------|-------------------------------|-------|------|------|------|------|------|------|------|--|
|             | -40°C                         | -20°C | 0°C  | 20°C | 40°C | 50°C | 60°C | 70°C | 85°C |  |
|             | Hold Current (A)              |       |      |      |      |      |      |      |      |  |
| 15LR260     | 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 |  |
| 20LR730     | 10.60                         | 9.50  | 8.60 | 7.30 | 6.30 | 5.70 | 5.40 | 4.70 | 4.00 |  |

**Average Time Current Curves**



The average time current curves and Temperature Rerating 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 Rerating Curve**



Note:  
Typical Temperature rerating curve, refer to table for derating data

**Physical Specifications**

|                            |   |
|----------------------------|---|
| <b>Terminal Material</b>   | 0.13mm nominal thickness, quarter-hard Nickel |
| <b>Insulating Material</b> | Polyester tape                                |

**Environmental Specifications**

|  |  |
|--|--|
| <b>Operating/Storage Temperature</b>                       | -40°C to +85°C   |
| <b>Maximum Device Surface Temperature in Tripped State</b> | 125°C  |
| <b>Passive Aging</b>                                       | +70°C, 1000 hours<br>-/+10% typical resistance change      |
| <b>Humidity Aging</b>                                      | +85°C, 85% R.H., 7 days<br>-/+5% typical resistance change |
| <b>Vibration</b>   | MIL-STD-883, Method 2007, Condition A, No change           |

**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.

### Dimensions



| Part Number | 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. | Min.   | Min. | Min.   | Min. | Min.   | Max. | Min. | Max. |
| 15LR260     | 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     | 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     | 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 |
| 20LR730     | 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 |
|-------------|-----------------|----------------|-----------------|------------------|----------|----------------------------|
| 15LR260     | 15LR260U        | 2.6            | 260             | Bulk             | 500      | U                          |
| 15LR380     | 15LR380U        | 3.8            | 380             | Bulk             | 500      | U                          |
| 20LR450     | 20LR450U        | 4.5            | 450             | Bulk             | 500      | U                          |
| 20LR730     | 20LR730U        | 7.3            | 730             | Bulk             | 500      | U                          |

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