

## PolySwitch Resettable Devices Line-Voltage-Rated Devices

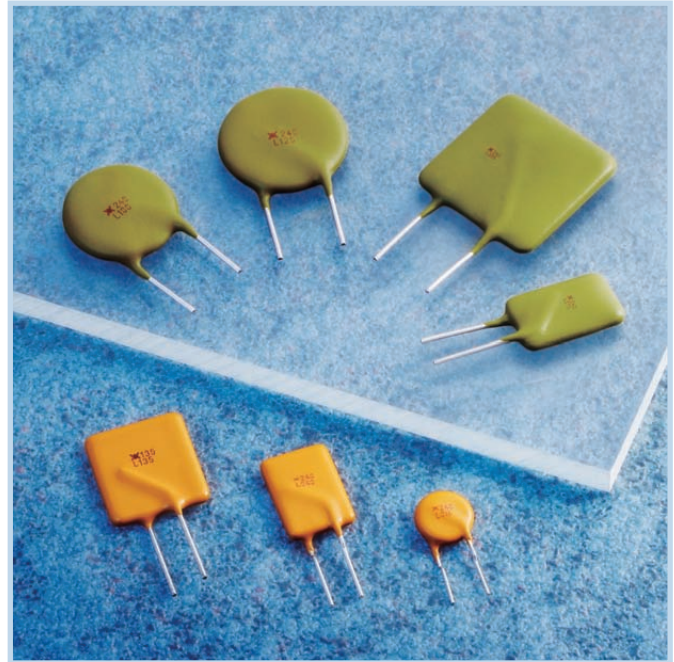
PolySwitch LVR devices help protect electric motors and transformers used in commercial and home appliances from damage caused by mechanical overloads, overheating, stall, lost neutral and other potentially harmful conditions.

The LVR line-voltage product line of polymeric positive temperature coefficient (PPTC) devices includes components that are rated for line voltages of 120V<sub>AC</sub> and 240V<sub>AC</sub>, for up to 2A of operating current at 20°C. They help protect against damage caused by both overcurrent surges and overtemperature faults, offer low resistance, and are compatibly sized with fuse solutions.

Unlike traditional fuses, PolySwitch devices do not require replacement after a fault event. After power has been removed and the overcurrent condition eliminated, the circuit is restored to normal operating condition. Compared to bimetal breakers, they offer greater flexibility, longer lifespan, and lower electromagnetic interference (EMI).

The PolySwitch LVR devices' resettable functionality and latching attributes make them a reliable, cost-effective circuit protection solution for both intermittent- and continuous-operation motor applications. Their low resistance, fast time-to-trip, and low profile help circuit designers provide a safe and dependable product, comply with regulatory agency requirements, and reduce warranty repair costs.

LVR/LVRL series are suitable for line-voltage applications up to a continuous operating voltage of 240V<sub>AC</sub>/120V<sub>AC</sub>. RoHS versions of all products are available.



### Benefits

- Many product choices give engineers more design flexibility
- Compatible with high-volume electronics assembly
- Assist in meeting regulatory requirements
- Higher voltage ratings allow use in new applications

### Features

- RoHS compliant
- Broadest range of radial-leaded resettable devices available in the industry
- Current ratings from 50mA to 2A
- Line voltage rating of 120V<sub>AC</sub> and 240V<sub>AC</sub>
- Agency recognition : UL, CSA, TÜV
- Fast time-to-trip
- Low resistance

### Applications

- |                         |                             |                                   |
|-------------------------|-----------------------------|-----------------------------------|
| • Electromagnetic loads | • Medical equipment         | • Security and fire alarm systems |
| • Game machines         | • Motors, fans and blowers  | • Test and measurement equipment  |
| • Industrial controls   | • POS equipment             | • Transformers                    |
| • Lighting ballast      | • Satellite video receivers | • USB hubs, ports and peripherals |
| • Loudspeakers          |                             |                                   |

**Table L1 Product Series - Current Rating, Voltage Rating / Typical Resistance for LVR Devices**

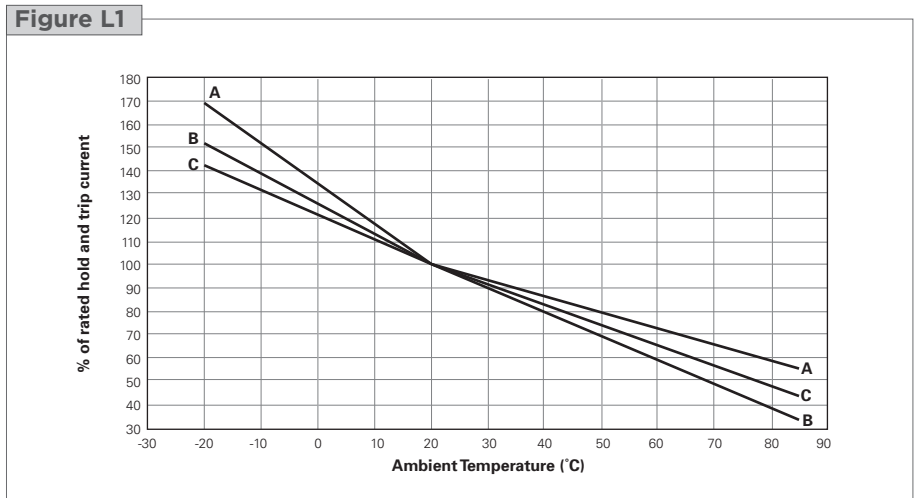
| Voltage Rating          | LVR<br>240V <sub>AC</sub> / 120V <sub>AC</sub> | LVRL<br>120V <sub>AC</sub> |
|-------------------------|--|----------------------------|
| <b>Hold Current (A)</b> |  |                            |
| 0.050                   | 25.00Ω   | —                          |
| 0.080                   | 9.800Ω   | —                          |
| 0.120                   | 4.800Ω   | —                          |
| 0.160                   | 3.400Ω   | —                          |
| 0.250                   | 1.700Ω   | —                          |
| 0.330                   | 1.000Ω   | —                          |
| 0.400                   | 0.800Ω   | —                          |
| 0.550                   | 0.590Ω   | —                          |
| 0.750                   | 0.400Ω   | 0.325Ω                     |
| 1.000                   | 0.276Ω   | 0.224Ω                     |
| 1.250                   | 0.209Ω   | 0.148Ω                     |
| 1.350                   | —  | 0.138Ω                     |
| 2.000                   | 0.110Ω   | 0.097Ω                     |

**Table L2 Thermal Derating for LVR Devices [Hold Current (A) at Ambient Temperature (°C)]**

| Part Number     | Maximum Ambient Temperature |      |      |      |      |      |      |      |      |
|-----------------|-----------------------------|------|------|------|------|------|------|------|------|
|                 | -20°C                       | 0°C  | 20°C | 25°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| <b>LVR/LVRL</b> |                             |      |      |      |      |      |      |      |      |
| LVR005N         | 0.08                        | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 |
| LVR008N         | 0.12                        | 0.10 | 0.08 | 0.08 | 0.07 | 0.06 | 0.05 | 0.04 | 0.03 |
| LVR012          | 0.18                        | 0.15 | 0.12 | 0.12 | 0.10 | 0.09 | 0.07 | 0.06 | 0.04 |
| LVR016          | 0.24                        | 0.20 | 0.16 | 0.16 | 0.13 | 0.11 | 0.10 | 0.08 | 0.05 |
| LVR025          | 0.38                        | 0.32 | 0.25 | 0.25 | 0.21 | 0.18 | 0.15 | 0.13 | 0.09 |
| LVR033          | 0.50                        | 0.42 | 0.33 | 0.33 | 0.27 | 0.23 | 0.20 | 0.17 | 0.11 |
| LVR040          | 0.61                        | 0.51 | 0.40 | 0.40 | 0.33 | 0.28 | 0.24 | 0.20 | 0.14 |
| LVR055          | 0.80                        | 0.68 | 0.55 | 0.54 | 0.46 | 0.40 | 0.35 | 0.29 | 0.22 |
| LVR075          | 1.23                        | 0.98 | 0.75 | 0.74 | 0.60 | 0.56 | 0.49 | 0.45 | 0.41 |
| LVR100          | 1.65                        | 1.30 | 1.00 | 0.94 | 0.80 | 0.75 | 0.65 | 0.60 | 0.55 |
| LVR125          | 2.06                        | 1.63 | 1.25 | 1.20 | 1.00 | 0.94 | 0.81 | 0.75 | 0.69 |
| LVR200          | 3.30                        | 2.60 | 2.00 | 1.97 | 1.60 | 1.50 | 1.30 | 1.20 | 1.10 |
| LVRL075         | 1.08                        | 0.93 | 0.75 | 0.74 | 0.64 | 0.57 | 0.51 | 0.44 | 0.35 |
| LVRL100         | 1.40                        | 1.19 | 1.00 | 0.94 | 0.82 | 0.73 | 0.65 | 0.57 | 0.45 |
| LVRL125         | 1.80                        | 1.53 | 1.25 | 1.20 | 1.04 | 0.94 | 0.83 | 0.73 | 0.60 |
| LVRL135         | 2.00                        | 1.65 | 1.35 | 1.29 | 1.12 | 1.01 | 0.90 | 0.78 | 0.65 |
| LVRL200         | 3.05                        | 2.55 | 2.00 | 1.97 | 1.72 | 1.55 | 1.39 | 1.22 | 0.98 |

**Figure L1 Thermal Derating Curve for LVR Devices**

- A = LVR075-LVR200
- B = LVRL075-LVRL200
- C = LVR005N-LVR055



**Table L3 Electrical Characteristics for LVR Devices\***

| Part Number     | I <sub>H</sub> (A) | I <sub>T</sub> (A) | V <sub>MAX</sub> <sup>†</sup> |                              | I <sub>MAX</sub> <sup>†</sup> Interrupt (A) | P <sub>D</sub> TYP (W) | Max. Time-to-trip |      | R <sub>MIN</sub> (Ω) | R <sub>MAX</sub> (Ω) | R <sub>1MAX</sub> (Ω) | Lead Size [mm (AWG)] |
|-----------------|--------------------|--------------------|-------------------------------|------------------------------|---|------------------------|-------------------|------|----------------------|----------------------|-----------------------|----------------------|
|                 |                    |                    | Operating (V <sub>AC</sub> )  | Interrupt (V <sub>AC</sub> ) |   |                        | (A)               | (s)  |                      |                      |                       |                      |
| <b>LVR/LVRL</b> |                    |                    |                               |                              |   |                        |                   |      |                      |                      |                       |                      |
| LVR005NK        | 0.05               | 0.12               | 240<br>120                    | 265<br>135                   | 1.0<br>20.0                                 | 0.9                    | 0.25              | 10.0 | 18.500               | 31.000               | 65.000                | [0.51mm(24)]         |
| LVR005NS        | 0.05               | 0.12               | 240<br>120                    | 265<br>135                   | 1.0<br>20.0                                 | 0.9                    | 0.25              | 10.0 | 18.500               | 31.000               | 65.000                | [0.51mm(24)]         |
| LVR008NK        | 0.08               | 0.19               | 240<br>120                    | 265<br>135                   | 1.2<br>20.0                                 | 0.9                    | 0.40              | 10.0 | 7.400                | 12.000               | 26.000                | [0.51mm(24)]         |
| LVR008NS        | 0.08               | 0.19               | 240<br>120                    | 265<br>135                   | 1.2<br>20.0                                 | 0.9                    | 0.40              | 10.0 | 7.400                | 12.000               | 26.000                | [0.51mm(24)]         |
| LVR012K         | 0.12               | 0.30               | 240<br>120                    | 265<br>135                   | 1.2<br>20.0                                 | 1.0                    | 0.60              | 15.0 | 3.000                | 6.500                | 12.000                | [0.51mm(24)]         |
| LVR012S         | 0.12               | 0.30               | 240<br>120                    | 265<br>135                   | 1.2<br>20.0                                 | 1.0                    | 0.60              | 15.0 | 3.000                | 6.500                | 12.000                | [0.51mm(24)]         |
| LVR016K         | 0.16               | 0.37               | 240<br>120                    | 265<br>135                   | 2.0<br>20.0                                 | 1.4                    | 0.80              | 15.0 | 2.500                | 4.100                | 7.800                 | [0.51mm(24)]         |
| LVR016S         | 0.16               | 0.37               | 240<br>120                    | 265<br>135                   | 2.0<br>20.0                                 | 1.4                    | 0.80              | 15.0 | 2.500                | 4.100                | 7.800                 | [0.51mm(24)]         |
| LVR025K         | 0.25               | 0.56               | 240<br>120                    | 265<br>135                   | 3.5<br>20.0                                 | 1.5                    | 1.25              | 18.5 | 1.300                | 2.100                | 3.800                 | [0.64mm(22)]         |
| LVR025S         | 0.25               | 0.56               | 240<br>120                    | 265<br>135                   | 3.5<br>20.0                                 | 1.5                    | 1.25              | 18.5 | 1.300                | 2.100                | 3.800                 | [0.64mm(22)]         |
| LVR033K         | 0.33               | 0.74               | 240<br>120                    | 265<br>135                   | 4.5<br>20.0                                 | 1.7                    | 1.65              | 21.0 | 0.770                | 1.240                | 2.600                 | [0.64mm(22)]         |
| LVR033S         | 0.33               | 0.74               | 240<br>120                    | 265<br>135                   | 4.5<br>20.0                                 | 1.7                    | 1.65              | 21.0 | 0.770                | 1.240                | 2.600                 | [0.64mm(22)]         |
| LVR040K         | 0.40               | 0.90               | 240<br>120                    | 265<br>135                   | 5.5<br>20.0                                 | 2.0                    | 2.00              | 24.0 | 0.600                | 0.970                | 1.900                 | [0.64mm(22)]         |
| LVR040S         | 0.40               | 0.90               | 240<br>120                    | 265<br>135                   | 5.5<br>20.0                                 | 2.0                    | 2.00              | 24.0 | 0.600                | 0.970                | 1.900                 | [0.64mm(22)]         |
| LVR055K         | 0.55               | 1.25               | 240<br>120                    | 265<br>135                   | 7.0<br>20.0                                 | 3.4                    | 2.75              | 26.0 | 0.450                | 0.730                | 1.450                 | [0.81mm(20)]         |
| LVR055S         | 0.55               | 1.25               | 240<br>120                    | 265<br>135                   | 7.0<br>20.0                                 | 3.4                    | 2.75              | 26.0 | 0.450                | 0.730                | 1.450                 | [0.81mm(20)]         |
| LVR075S         | 0.75               | 1.50               | 240                           | 265                          | 7.5   | 2.6                    | 3.75              | 18.0 | 0.316                | 0.483                | 0.839                 | [0.81mm(20)]         |
| LVR100S         | 1.00               | 2.00               | 240                           | 265                          | 10.0  | 2.9                    | 5.00              | 21.0 | 0.218                | 0.334                | 0.580                 | [0.81mm(20)]         |
| LVR125S         | 1.25               | 2.50               | 240                           | 265                          | 12.5  | 3.3                    | 6.25              | 23.0 | 0.165                | 0.253                | 0.440                 | [0.81mm(20)]         |
| LVR200S         | 2.00               | 4.00               | 240                           | 265                          | 20.0  | 4.5                    | 10.00             | 28.0 | 0.089                | 0.131                | 0.221                 | [0.81mm(20)]         |
| LVRL075S        | 0.75               | 1.52               | 120                           | 135                          | 7.5   | 1.8                    | 3.75              | 14.0 | 0.250                | 0.400                | 0.690                 | [0.81mm(20)]         |
| LVRL100S        | 1.00               | 2.00               | 120                           | 135                          | 10.0  | 2.2                    | 5.00              | 13.6 | 0.179                | 0.269                | 0.470                 | [0.81mm(20)]         |
| LVRL125S        | 1.25               | 2.50               | 120                           | 135                          | 12.5  | 2.0                    | 6.25              | 18.0 | 0.117                | 0.179                | 0.320                 | [0.81mm(20)]         |
| LVRL135S        | 1.35               | 2.70               | 120                           | 135                          | 13.5  | 2.8                    | 6.75              | 20.0 | 0.109                | 0.167                | 0.300                 | [0.81mm(20)]         |
| LVRL200S        | 2.00               | 4.20               | 120                           | 135                          | 20.0  | 3.9                    | 10.00             | 36.0 | 0.075                | 0.117                | 0.205                 | [0.81mm(20)]         |

**Notes:**

- I<sub>H</sub> : Hold current: maximum current device will pass without interruption in 20°C still air.
- I<sub>T</sub> : Trip current: minimum current that will switch the device from low resistance to high resistance in 20°C still air.
- V<sub>MAX</sub> Operating: Maximum continuous voltage device can withstand without damage at rated current.
- V<sub>MAX</sub> Interrupt : Under specified conditions this is the highest voltage that can be applied to the device at the maximum interrupt current.
- I<sub>MAX</sub> Interrupt : Maximum fault current device can withstand without damage at rated voltage.
- P<sub>D</sub> : Power dissipated from device when in the tripped state in 20°C still air.
- R<sub>MIN</sub> : Minimum resistance of device as supplied at 20°C unless otherwise specified.
- R<sub>MAX</sub> : Maximum resistance of device as supplied at 20°C unless otherwise specified.
- R<sub>1MAX</sub> : Maximum resistance of device when measured one hour post trip at 20°C unless otherwise specified.

\* Electrical characteristics determined at 20°C.

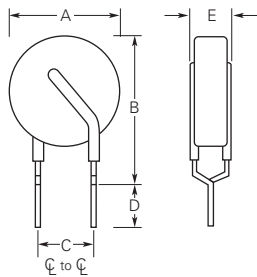
† See Application Limitations on next page.

## Warning : Application Limitations for the LVR Product Line

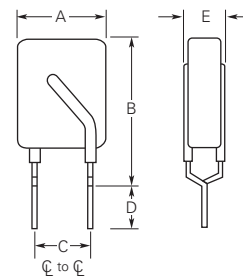
- 1) Users should independently evaluate the suitability of and test each product selected for their own application.
- 2) This product should not be used in an application where the maximum interrupt voltage or maximum interrupt current can be exceeded in a fault condition. Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- 3) A PPTC device is not a fuse - it is a nonlinear thermistor that limits current. Under a fault condition all PPTC devices go into a high resistance state but do not open circuit, so hazardous voltage may be present at PPTC locations.
- 4) The 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.
- 5) In most applications power must be removed and the fault condition cleared in order to reset a PPTC device; however under certain unusual conditions, a PPTC device may automatically reset. PPTC devices should not be used in an application where an automatic reset could create a safety hazard, such as garbage disposals and blenders. Appropriate qualification testing should be performed.
- 6) It is the responsibility of the user to determine the need for back up or failsafe protection to prevent damage that may occur in the event of abnormal function or failure of the PPTC device.
- 7) Operation in circuits with a large inductance can generate a circuit voltage ( $Ldi/dt$ ) above the rated voltage of a PPTC device. This product should not be used in an application where the maximum interrupt voltage or maximum interrupt current can be exceeded by inductive spikes.
- 8) Devices are not recommended for reflow soldering.
- 9) Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, or mechanical procedures for electronic components.
- 10) 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.
- 11) Contamination of the PPTC material with certain silicone-based oils or some aggressive solvents can adversely impact the performance of the devices.

**Figure L2-L5 Dimension Figures for LVR Devices**

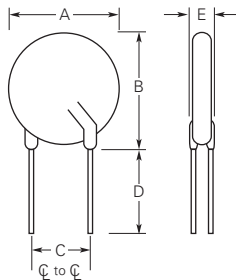
**Figure L2**



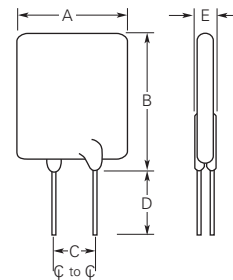
**Figure L3**



**Figure L4**



**Figure L5**



**Table L4 Dimensions for LVR Devices in Millimeters (Inches)**

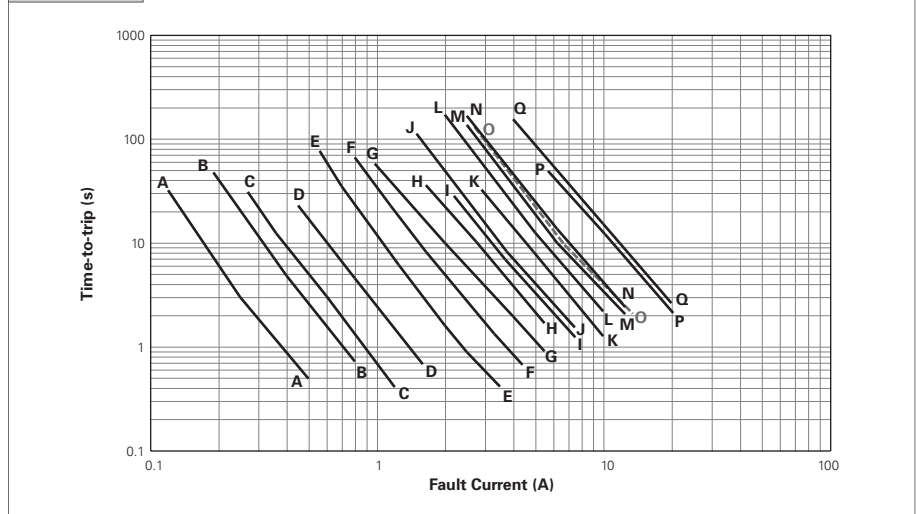
| Part Number     | A    |                | B    |                | C             |                | D             |      | E    |               | Figure |
|-----------------|------|----------------|------|----------------|---------------|----------------|---------------|------|------|---------------|--------|
|                 | Min. | Max.           | Min. | Max.           | Min.          | Max.           | Min.          | Max. | Min. | Max.          |        |
| <b>LVR/LVRL</b> |      |                |      |                |               |                |               |      |      |               |        |
| LVR005NK        | —    | 6.9<br>(0.27)  | —    | 12.1<br>(0.48) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.6<br>(0.18) | L2     |
| LVR005NS        | —    | 6.9<br>(0.27)  | —    | 9.9<br>(0.39)  | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.6<br>(0.18) | L4     |
| LVR008NK        | —    | 7.2<br>(0.28)  | —    | 12.4<br>(0.49) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.6<br>(0.18) | L2     |
| LVR008NS        | —    | 7.2<br>(0.28)  | —    | 10.2<br>(0.40) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.6<br>(0.18) | L4     |
| LVR012K         | —    | 8.3<br>(0.33)  | —    | 12.9<br>(0.51) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L2     |
| LVR012S         | —    | 8.3<br>(0.33)  | —    | 10.7<br>(0.43) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L4     |
| LVR016K         | —    | 9.9<br>(0.39)  | —    | 13.8<br>(0.54) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L2     |
| LVR016S         | —    | 9.9<br>(0.39)  | —    | 12.5<br>(0.50) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L4     |
| LVR025K         | —    | 9.6<br>(0.38)  | —    | 18.8<br>(0.74) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L3     |
| LVR025S         | —    | 9.6<br>(0.38)  | —    | 17.4<br>(0.69) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L5     |
| LVR033K         | —    | 11.4<br>(0.45) | —    | 19.0<br>(0.75) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L3     |
| LVR033S         | —    | 11.4<br>(0.45) | —    | 16.5<br>(0.65) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L5     |
| LVR040K         | —    | 11.5<br>(0.46) | —    | 20.9<br>(0.82) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L3     |
| LVR040S         | —    | 11.5<br>(0.46) | —    | 19.5<br>(0.77) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 3.8<br>(0.15) | L5     |
| LVR055K         | —    | 14.0<br>(0.55) | —    | 22.4<br>(0.88) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.1<br>(0.16) | L3     |
| LVR055S         | —    | 14.0<br>(0.55) | —    | 21.7<br>(0.85) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.1<br>(0.16) | L5     |
| LVR075S         | —    | 11.5<br>(0.45) | —    | 23.4<br>(0.92) | 4.1<br>(0.16) | 6.1<br>(0.24)  | 5.1<br>(0.20) | —    | —    | 4.8<br>(0.19) | L5     |
| LVR100S         | —    | 18.7<br>(0.74) | —    | 24.4<br>(0.96) | 8.9<br>(0.35) | 11.4<br>(0.45) | 5.1<br>(0.20) | —    | —    | 5.1<br>(0.20) | L4     |
| LVR125S         | —    | 21.2<br>(0.84) | —    | 27.4<br>(1.08) | 8.9<br>(0.35) | 11.4<br>(0.45) | 5.1<br>(0.20) | —    | —    | 5.3<br>(0.21) | L4     |
| LVR200S         | —    | 24.9<br>(0.98) | —    | 33.8<br>(1.33) | 8.9<br>(0.35) | 11.4<br>(0.45) | 5.1<br>(0.20) | —    | —    | 6.1<br>(0.24) | L5     |
| LVRL075S        | —    | 10.9<br>(0.43) | —    | 17.0<br>(0.67) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.1<br>(0.16) | L5     |
| LVRL100S        | —    | 11.5<br>(0.45) | —    | 20.1<br>(0.79) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.1<br>(0.16) | L5     |
| LVRL125S        | —    | 14.0<br>(0.55) | —    | 21.7<br>(0.85) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.1<br>(0.16) | L5     |
| LVRL135S        | —    | 16.3<br>(0.64) | —    | 21.7<br>(0.85) | 4.3<br>(0.17) | 5.8<br>(0.23)  | 7.6<br>(0.30) | —    | —    | 4.1<br>(0.16) | L5     |
| LVRL200S        | —    | 23.5<br>(0.93) | —    | 31.8<br>(1.25) | 9.4<br>(0.37) | 10.9<br>(0.43) | 7.6<br>(0.30) | —    | —    | 4.1<br>(0.16) | L5     |

**Figure L6** Typical Time-to-trip curves at 20°C for LVR Devices

**LVR/LVRL**

- A = LVR005N    K = LVRL100
- B = LVR008N    L = LVR100
- C = LVR012    M = LVRL125
- D = LVR016    N = LVR125
- E = LVR025    O = LVRL135
- F = LVR033    P = LVRL200
- G = LVR040    Q = LVR200
- H = LVR055
- I = LVRL075
- J = LVR075

**Figure L6**



**Table L5** Physical Characteristics and Environmental Specifications for LVR Devices

**LVR/LVRL**

**Physical Characteristics**

|                           |  |
|---------------------------|--|
| Lead material             | LVR005N-016 : Tin-plated copper, (24AWG), ø0.51mm (0.020in.)                                 |
|                           | LVR025-040 : Tin-plated copper, (22AWG), ø0.64mm (0.025in.)                                  |
|                           | LVR055-200 : Tin-plated copper, (20AWG), ø0.81mm (0.032in.)                                  |
|                           | LVRL : Tin-plated copper, (20AWG), ø0.81mm (0.032in.)  |
| Soldering characteristics | Solderability per ANSI/J-STD-002 Category 3  |
| Solder heat withstand     | Per IEC-STD 68-2-20, Test Tb, Method 1A, Condition B, can withstand 10 seconds at 260°C ±5°C |
| Insulating material       | LVR005N-055 : Cured, flame-retardant epoxy polymer, meets UL 94V-0                           |
|                           | LVR075-200 : Cured, flame-retardant modified silicone, meets UL 94V-0                        |
|                           | LVRL : Cured, flame-retardant epoxy polymer, meets UL 94V-0                                  |

**Note:** Devices are not designed to be placed through a reflow process.

**Environmental Specifications**

| Test               | Conditions               | Resistance Change |
|--------------------|--------------------------|-------------------|
| Passive aging      | 70°C, 1000 hours         | ±10%              |
|                    | 85°C, 1000 hours         | ±10%              |
| Humidity aging     | 85°C, 85%RH, 1000 hours  | ±20%              |
| Thermal shock      | 85°C, -40°C (10 times)   | ±15%              |
| Solvent resistance | MIL-STD-202, Method 215F | No change         |

**Agency Recognitions for LVR Devices**

|     |  |
|-----|--|
| UL  | File # E74889  |
| CSA | File # CA78165   |
| TÜV | Certificate number available on request (per IEC 60730-1). |

**Table L6 Packaging and Marking Information for LVR Devices**

| Part Number     | Bag Quantity | Tape & Reel Quantity | Ammo Pack Quantity | Standard Package Quantity | Part Marking | Agency Recognition |
|-----------------|--------------|----------------------|--------------------|---------------------------|--------------|--------------------|
| <b>LVR/LVRL</b> |              |                      |                    |                           |              |                    |
| LVR005NK        | 500          | —                    | —                  | 10,000                    | L005         | UL, CSA, TÜV       |
| LVR005NK-2      | —            | 1,500                | —                  | 7,500                     | L005         | UL, CSA, TÜV       |
| LVR005NS        | 500          | —                    | —                  | 10,000                    | L005         | UL, CSA, TÜV       |
| LVR005NS-2      | —            | 1,500                | —                  | 7,500                     | L005         | UL, CSA, TÜV       |
| LVR008NK        | 500          | —                    | —                  | 10,000                    | L008         | UL, CSA, TÜV       |
| LVR008NK-2      | —            | 1,500                | —                  | 7,500                     | L008         | UL, CSA, TÜV       |
| LVR008NS        | 500          | —                    | —                  | 10,000                    | L008         | UL, CSA, TÜV       |
| LVR008NS-2      | —            | 1,500                | —                  | 7,500                     | L008         | UL, CSA, TÜV       |
| LVR012K         | 500          | —                    | —                  | 10,000                    | L012         | UL, CSA, TÜV       |
| LVR012K-2       | —            | 2,000                | —                  | 10,000                    | L012         | UL, CSA, TÜV       |
| LVR012S         | 500          | —                    | —                  | 10,000                    | L012         | UL, CSA, TÜV       |
| LVR012S-2       | —            | 2,000                | —                  | 10,000                    | L012         | UL, CSA, TÜV       |
| LVR016K         | 500          | —                    | —                  | 10,000                    | L016         | UL, CSA, TÜV       |
| LVR016K-2       | —            | 2,000                | —                  | 10,000                    | L016         | UL, CSA, TÜV       |
| LVR016S         | 500          | —                    | —                  | 10,000                    | L016         | UL, CSA, TÜV       |
| LVR016S-2       | —            | 2,000                | —                  | 10,000                    | L016         | UL, CSA, TÜV       |
| LVR025K         | 500          | —                    | —                  | 10,000                    | L025         | UL, CSA, TÜV       |
| LVR025K-2       | —            | 2,000                | —                  | 10,000                    | L025         | UL, CSA, TÜV       |
| LVR025S         | 500          | —                    | —                  | 10,000                    | L025         | UL, CSA, TÜV       |
| LVR025S-2       | —            | 2,000                | —                  | 10,000                    | L025         | UL, CSA, TÜV       |
| LVR033K         | 500          | —                    | —                  | 10,000                    | L033         | UL, CSA, TÜV       |
| LVR033K-2       | —            | 2,000                | —                  | 10,000                    | L033         | UL, CSA, TÜV       |
| LVR033S         | 500          | —                    | —                  | 10,000                    | L033         | UL, CSA, TÜV       |
| LVR033S-2       | —            | 2,000                | —                  | 10,000                    | L033         | UL, CSA, TÜV       |
| LVR040K         | 500          | —                    | —                  | 10,000                    | L040         | UL, CSA, TÜV       |
| LVR040K-2       | —            | 2,000                | —                  | 10,000                    | L040         | UL, CSA, TÜV       |
| LVR040S         | 500          | —                    | —                  | 10,000                    | L040         | UL, CSA, TÜV       |
| LVR040S-2       | —            | 2,000                | —                  | 10,000                    | L040         | UL, CSA, TÜV       |
| LVR055K         | 500          | —                    | —                  | 10,000                    | L055         | UL, CSA, TÜV       |
| LVR055S         | 500          | —                    | —                  | 10,000                    | L055         | UL, CSA, TÜV       |
| LVR055S-2       | —            | 1,000                | —                  | 5,000                     | L055         | UL, CSA, TÜV       |
| LVR075S         | 500          | —                    | —                  | 10,000                    | L075         | UL, CSA, TÜV       |
| LVR100S         | 250          | —                    | —                  | 5,000                     | L100         | UL, CSA, TÜV       |
| LVR125S         | 250          | —                    | —                  | 5,000                     | L125         | UL, CSA, TÜV       |
| LVR200S         | 250          | —                    | —                  | 5,000                     | L200         | UL, CSA, TÜV       |
| LVRL075S        | 500          | —                    | —                  | 10,000                    | L075         | UL, CSA, TÜV       |
| LVRL100S        | 500          | —                    | —                  | 10,000                    | L100         | UL, CSA, TÜV       |
| LVRL125S        | 500          | —                    | —                  | 10,000                    | L125         | UL, CSA, TÜV       |
| LVRL135S        | 500          | —                    | —                  | 10,000                    | L135         | UL, CSA, TÜV       |
| LVRL200S        | 250          | —                    | —                  | 5,000                     | L200         | UL, CSA, TÜV       |

**Table L7 Tape and Reel Specifications for LVR Devices**

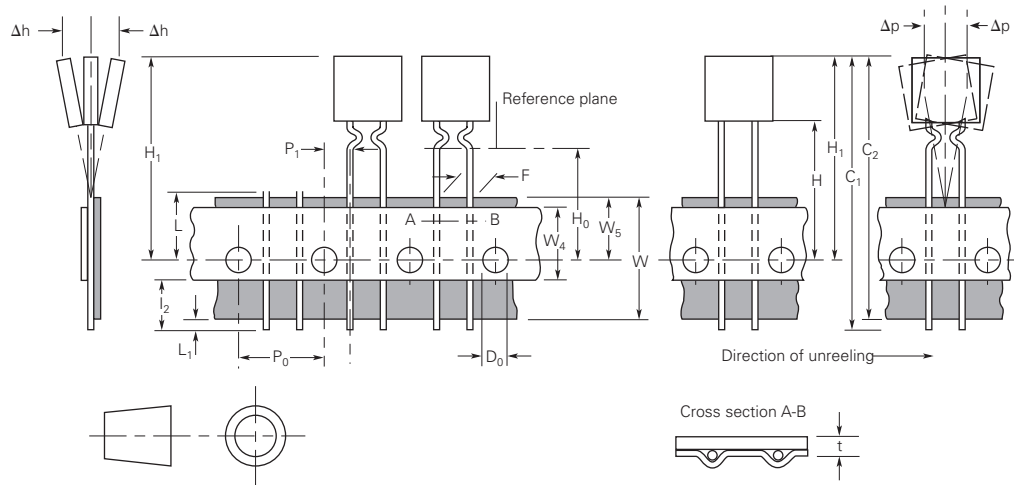
LVR devices are available in tape and reel packaging per EIA468-B/IEC60286-2 standards.  
See Figures L7 and L8 for details.

| Description   | EIA Mark       | Dimension (mm) | Tolerance  |
|---|----------------|----------------|------------|
| Carrier tape width  | W              | 18             | -0.5/+1.0  |
| Hold-down tape width                                      | W <sub>4</sub> | 11             | Minimum    |
| Top distance between tape edges                           | W <sub>6</sub> | 3              | Maximum    |
| Sprocket hole position                                    | W <sub>5</sub> | 9              | -0.5/+0.75 |
| Sprocket hole diameter                                    | D <sub>0</sub> | 4              | ± 0.2      |
| Abscissa to plane (straight lead) (LVR005N to LVR016)     | H              | 18.5           | ± 2.5      |
| Abscissa to plane (kinked lead) (LVR005N to LVR016)       | H <sub>0</sub> | 16.0           | ± 0.5      |
| Abscissa to top (LVR005N to LVR016)                       | H <sub>1</sub> | 32.2           | Maximum    |
| Abscissa to top* (LVR025 to LVR055)                       | H <sub>1</sub> | 45.0           | Maximum    |
| Overall width with lead protrusion (LVR005N to LVR016)    | C <sub>1</sub> | 43.2           | Maximum    |
| Overall width with lead protrusion (LVR025 to LVR055)     | C <sub>1</sub> | 56.0           | Maximum    |
| Overall width without lead protrusion (LVR005N to LVR016) | C <sub>2</sub> | 42.5           | Maximum    |
| Overall width without lead protrusion (LVR025 to LVR055)  | C <sub>2</sub> | 56.0           | Maximum    |
| Lead protrusion   | L <sub>1</sub> | 1.0            | Maximum    |
| Protrusion of cut-out                                     | L              | 11.0           | Maximum    |
| Protrusion beyond hold-down tape                          | I <sub>2</sub> | Not specified  | —          |
| Sprocket hole pitch                                       | P <sub>0</sub> | 12.7           | ± 0.3      |
| Device pitch (LVR005N to LVR040)                          | —              | 12.7           | ± 0.3      |
| Device pitch (LVR055)                                     | —              | 25.4           | ± 0.6      |
| Pitch tolerance   | —              | 20 consecutive | ± 1        |
| Tape thickness  | t              | 0.9            | Maximum    |
| Overall tape and lead thickness (LVR005N to LVR040)       | t <sub>1</sub> | 1.5            | Maximum    |
| Overall tape and lead thickness (LVR055)                  | t <sub>1</sub> | 2.3            | Maximum    |
| Splice sprocket hole alignment                            | —              | 0              | ± 0.3      |
| Body lateral deviation                                    | Δh             | 0              | ± 1.0      |
| Body tape plane deviation                                 | Δp             | 0              | ± 1.3      |
| Ordinate to adjacent component lead                       | P <sub>1</sub> | 3.81           | ± 0.7      |
| Lead spacing*   | F              | 5.08           | +0.75/-0.5 |
| Reel width (LVR005N to LVR040)                            | w <sub>2</sub> | 56.0           | Maximum    |
| Reel width* (LVR055)                                      | w <sub>2</sub> | 63.5           | Maximum    |
| Reel diameter   | a              | 370.0          | Maximum    |
| Space between flanges* (LVR005N to LVR040)                | w <sub>1</sub> | 48.0           | Maximum    |
| Space between flanges* (LVR055)                           | w <sub>1</sub> | 55.0           | Maximum    |
| Arbor hold diameter                                       | c              | 26.0           | ± 12.0     |
| Core diameter*  | n              | 91.0           | Maximum    |
| Box   | —              | 64/372/362     | Maximum    |
| Consecutive missing places                                | —              | None           | —          |
| Empty places per reel                                     | —              | 0.1%           | Maximum    |

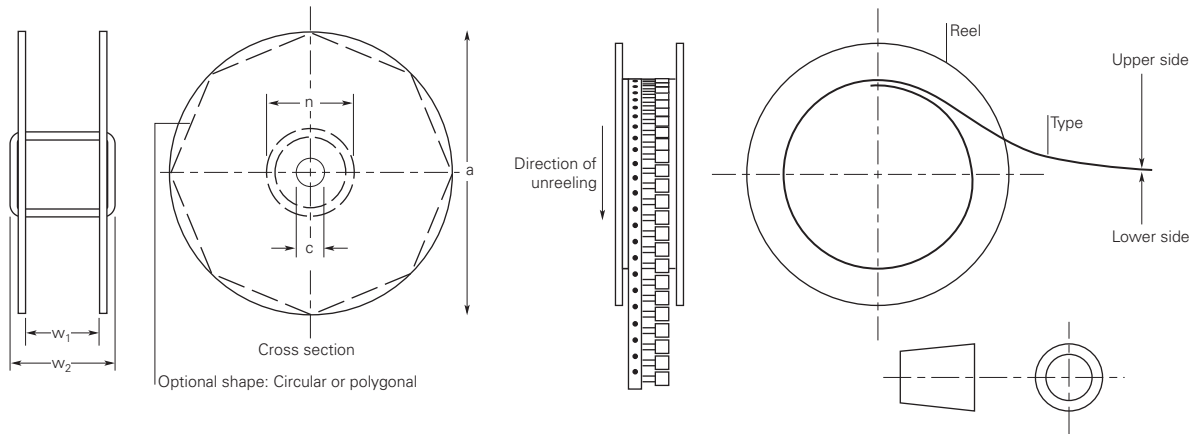
\*Differs from EIA specification.



**Figure L7 EIA Referenced Taped Component Dimensions for LVR Devices**



**Figure L8 EIA Referenced Reel Dimensions for LVR Devices**



**Part Numbering System for LVR Devices**

