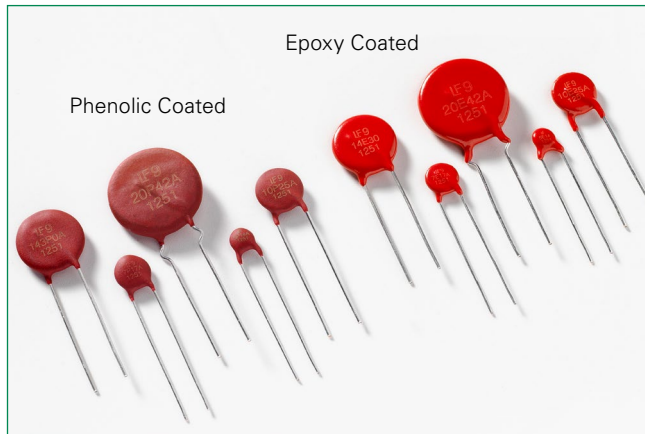


# LV UltraMOV® Series

## Radial Leaded Varistors



### Web Resources



Download ECAD models, order samples, and find technical resources at [www.littelfuse.com](http://www.littelfuse.com)

### Agency Approvals

| Agency | Agency Approval                                                      | Agency File Number      |
|--------|----------------------------------------------------------------------|-------------------------|
|        | UL 1449                                                              | E320116 <sup>1</sup>    |
|        | UL 1449                                                              | E320116 <sup>2</sup>    |
|        | IEC/EN61051<br>IEC 61051-2<br>IEC 61051-2-2<br>IEC 60950-1 (Annex Q) | J 50324242 <sup>3</sup> |

#### Notes:

1. 10mm, 14mm and 20mm phenolic coated parts are UL Recognized for the US and Canada.
2. All epoxy coated parts (in all sizes) are UL Recognized for the US.
3. 10mm, 14mm and 20mm phenolic coated parts only.

### Description

The Littelfuse LV UltraMOV® Varistor Series provides an ideal circuit protection solution for DC voltage applications.

The maximum peak surge current rating can reach up to 10kA (8/20µs pulse) to protect against the damage from high peak surge current induced by indirect lightning strike interference, system switching transients, and abnormal fast transients from the power source.

Available in five model sizes: 5mm, 7mm, 10mm, 14mm, and 20mm, these device feature a wide voltage range from 14V to 125V.

### Features & Benefits

- Breakthrough in low voltage varistor design provides high peak (up to 10KA) surge current rating
- Reduced footprint and volume required for surge protection
- Wide operating voltage range VM(AC)RMS 11V to 95V and V M(DC) 14V to 125V
- Lead-free, Halogen-Free and RoHS compliant
- High operating temperature range up to 125°C (phenolic coating option)
- 5 model sizes available: 5, 7, 10, 14, and 20mm
- 10mm, 14mm and 20mm devices are UL Recognized and TUV certified with 800V isolation voltage rating.

### Applications

- LED lights
- Cordless phones
- Audio and video devices
- Mobile phone chargers
- Security systems
- Fire alarm systems
- Automation control systems
- Industrial control contact relays
- Surge protection device
- Telecom power systems
- Wireless base stations

### Absolute Maximum Ratings

For ratings of individual members of a series, see Device Ratings and Specifications chart

|                                                                                                | Low Voltage Series | Units |
|------------------------------------------------------------------------------------------------|--------------------|-------|
| <b>Continous:</b>                                                                              |                    |       |
| <b>Steady State Applied Voltage:</b>                                                           |                    |       |
| AC Voltage Range ( $V_{M(AC)RMS}$ )                                                            | 11 to 95           | V     |
| DC Voltage Range ( $V_{M(DC)}$ )                                                               | 14 to 125          | V     |
| <b>Transient:</b>                                                                              |                    |       |
| Non-Repetitive Surge Current, 8/20µs Waveform ( $I_{TM}$ )                                     | 500 to 10,000      | A     |
| Non-Repetitive Energy Capability, 2ms Waveform ( $W_{TM}$ )                                    | 0.8 to 150         | J     |
| Operating Ambient Temperature Range ( $T_A$ ) for Epoxy coated                                 | -40 to +85         | °C    |
| Operating Ambient Temperature Range ( $T_A$ ) for Phenolic coated                              | -40 to +125        | °C    |
| Storage Temperature Range ( $T_{STG}$ ) for Epoxy coated                                       | -40 to +125        | °C    |
| Storage Temperature Range ( $T_{STG}$ ) for Phenolic coated                                    | -40 to +150        | °C    |
| Temperature Coefficient ( $\alpha V$ ) of Clamping Voltage ( $V_C$ ) at Specified Test Current | < 0.01 %           | °C    |
| Hi-Pot Encapsulation (Isolation Voltage Capability) for Epoxy coated                           | 2500               | V     |
| Hi-Pot Encapsulation (Isolation Voltage Capability) for Phenolic coated                        | 800                | V     |
| Epoxy Coating Insulation Resistance                                                            | >1,000             | MΩ    |

**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

# LV UltraMOV® Series

## Radial Leaded Varistors

LV UltraMOV® Series Device Ratings and Specifications

| Epoxy Coated Models     |          | Phenolic Coated Models <sup>2</sup> |          | Size Disc Dia. (mm) | Max Continuous Voltage |                    | Varistor Voltage at 1mA |                      |                      | Maximum Clamping Voltage |                 | Max Peak Current (8 x 20µs 1 pulse) | Energy Rating (2ms, 1pulse) | Typical Capacitance f = 1MHz |
|-------------------------|----------|-------------------------------------|----------|---------------------|------------------------|--------------------|-------------------------|----------------------|----------------------|--------------------------|-----------------|-------------------------------------|-----------------------------|------------------------------|
| Part Number (Base part) | Branding | Part Number (Base part)             | Branding |                     | V <sub>M(AC)RMS</sub>  | V <sub>M(DC)</sub> | V <sub>NOM Min</sub>    | V <sub>NOM Nom</sub> | V <sub>NOM Max</sub> | V <sub>C</sub>           | I <sub>PK</sub> | I <sub>TM</sub>                     | W <sub>TM</sub>             | C                            |
|                         |          |                                     |          |                     | (V)                    | (V)                | (V)                     | (V)                  | (V)                  | (V)                      | (A)             | (A)                                 | (J)                         | (pF)                         |
| V05E11P                 | P5E11    | V05P11P                             | P5P11    | 5                   | 11                     | 14                 | 16.2                    | 18.0                 | 19.8                 | 36                       | 1               | 500                                 | 0.8                         | 1300                         |
| V07E11P                 | P7E11    | V07P11P                             | P7P11    | 7                   | 11                     | 14                 | 16.2                    | 18.0                 | 19.8                 | 36                       | 2.5             | 1000                                | 2.0                         | 2900                         |
| V10E11P                 | P10E11   | V10P11P                             | P10P11   | 10                  | 11                     | 14                 | 16.2                    | 18.0                 | 19.8                 | 36                       | 5               | 2000                                | 4.2                         | 5450                         |
| V14E11P                 | P14E11   | V14P11P                             | P14P11   | 14                  | 11                     | 14                 | 16.2                    | 18.0                 | 19.8                 | 36                       | 10              | 4000                                | 8                           | 12000                        |
| V20E11P                 | P20E11   | V20P11P                             | P20P11   | 20                  | 11                     | 14                 | 16.2                    | 18.0                 | 19.8                 | 36                       | 20              | 8000                                | 25                          | 26000                        |
| V05E14P                 | P5E14    | V05P14P                             | P5P14    | 5                   | 14                     | 18                 | 19.8                    | 22.0                 | 24.2                 | 43                       | 1               | 500                                 | 1                           | 1100                         |
| V07E14P                 | P7E14    | V07P14P                             | P7P14    | 7                   | 14                     | 18                 | 19.8                    | 22.0                 | 24.2                 | 43                       | 2.5             | 1000                                | 2.2                         | 2450                         |
| V10E14P                 | P10E14   | V10P14P                             | P10P14   | 10                  | 14                     | 18                 | 19.8                    | 22.0                 | 24.2                 | 43                       | 5               | 2000                                | 5                           | 4650                         |
| V14E14P                 | P14E14   | V14P14P                             | P14P14   | 14                  | 14                     | 18                 | 19.8                    | 22.0                 | 24.2                 | 43                       | 10              | 4000                                | 10                          | 10200                        |
| V20E14P                 | P20E14   | V20P14P                             | P20P14   | 20                  | 14                     | 18                 | 19.8                    | 22.0                 | 24.2                 | 43                       | 20              | 8000                                | 28                          | 22200                        |
| V05E17P                 | P5E17    | V05P17P                             | P5P17    | 5                   | 17                     | 22                 | 24.3                    | 27.0                 | 29.7                 | 53                       | 1               | 500                                 | 1.4                         | 950                          |
| V07E17P                 | P7E17    | V07P17P                             | P7P17    | 7                   | 17                     | 22                 | 24.3                    | 27.0                 | 29.7                 | 53                       | 2.5             | 1000                                | 2.8                         | 2100                         |
| V10E17P                 | P10E17   | V10P17P                             | P10P17   | 10                  | 17                     | 22                 | 24.3                    | 27.0                 | 29.7                 | 53                       | 5               | 2000                                | 6.5                         | 3900                         |
| V14E17P                 | P14E17   | V14P17P                             | P14P17   | 14                  | 17                     | 22                 | 24.3                    | 27.0                 | 29.7                 | 53                       | 10              | 4000                                | 13                          | 8700                         |
| V20E17P                 | P20E17   | V20P17P                             | P20P17   | 20                  | 17                     | 22                 | 24.3                    | 27.0                 | 29.7                 | 53                       | 20              | 8000                                | 35                          | 18750                        |
| V05E20P                 | P5E20    | V05P20P                             | P5P20    | 5                   | 20                     | 26                 | 29.7                    | 33.0                 | 36.3                 | 65                       | 1               | 500                                 | 2                           | 850                          |
| V07E20P                 | P7E20    | V07P20P                             | P7P20    | 7                   | 20                     | 26                 | 29.7                    | 33.0                 | 36.3                 | 65                       | 2.5             | 1000                                | 4.2                         | 1750                         |
| V10E20P                 | P10E20   | V10P20P                             | P10P20   | 10                  | 20                     | 26                 | 29.7                    | 33.0                 | 36.3                 | 65                       | 5               | 2000                                | 10                          | 3400                         |
| V14E20P                 | P14E20   | V14P20P                             | P14P20   | 14                  | 20                     | 26                 | 29.7                    | 33.0                 | 36.3                 | 65                       | 10              | 4000                                | 20                          | 7500                         |
| V20E20P                 | P20E20   | V20P20P                             | P20P20   | 20                  | 20                     | 26                 | 29.7                    | 33.0                 | 36.3                 | 65                       | 20              | 8000                                | 58                          | 15000                        |
| V05E23P                 | P5E23    | V05P23P                             | P5P23    | 5                   | 23                     | 28                 | 32.4                    | 36.0                 | 39.6                 | 71                       | 1               | 500                                 | 2.2                         | 800                          |
| V07E23P                 | P7E23    | V07P23P                             | P7P23    | 7                   | 23                     | 28                 | 32.4                    | 36.0                 | 39.6                 | 71                       | 2.5             | 1000                                | 5.0                         | 1650                         |
| V10E23P                 | P10E23   | V10P23P                             | P10P23   | 10                  | 23                     | 28                 | 32.4                    | 36.0                 | 39.6                 | 71                       | 5               | 2000                                | 12                          | 3200                         |
| V14E23P                 | P14E23   | V14P23P                             | P14P23   | 14                  | 23                     | 28                 | 32.4                    | 36.0                 | 39.6                 | 71                       | 10              | 4000                                | 23                          | 7000                         |
| V20E23P                 | P20E23   | V20P23P                             | P20P23   | 20                  | 23                     | 28                 | 32.4                    | 36.0                 | 39.6                 | 71                       | 20              | 8000                                | 70                          | 14000                        |
| V05E25P                 | P5E25    | V05P25P                             | P5P25    | 5                   | 25                     | 31                 | 35.1                    | 39.0                 | 42.9                 | 77                       | 1               | 500                                 | 2.5                         | 750                          |
| V07E25P                 | P7E25    | V07P25P                             | P7P25    | 7                   | 25                     | 31                 | 35.1                    | 39.0                 | 42.9                 | 77                       | 2.5             | 1000                                | 5.5                         | 1500                         |
| V10E25P                 | P10E25   | V10P25P                             | P10P25   | 10                  | 25                     | 31                 | 35.1                    | 39.0                 | 42.9                 | 77                       | 5               | 2000                                | 13                          | 2900                         |
| V14E25P                 | P14E25   | V14P25P                             | P14P25   | 14                  | 25                     | 31                 | 35.1                    | 39.0                 | 42.9                 | 77                       | 10              | 4000                                | 25                          | 6200                         |
| V20E25P                 | P20E25   | V20P25P                             | P20P25   | 20                  | 25                     | 31                 | 35.1                    | 39.0                 | 42.9                 | 77                       | 20              | 8000                                | 77                          | 13500                        |
| V05E30P                 | P5E30    | V05P30P                             | P5P30    | 5                   | 30                     | 38                 | 42.3                    | 47.0                 | 51.7                 | 93                       | 1               | 500                                 | 3.1                         | 650                          |
| V07E30P                 | P7E30    | V07P30P                             | P7P30    | 7                   | 30                     | 38                 | 42.3                    | 47.0                 | 51.7                 | 93                       | 2.5             | 1000                                | 7                           | 1350                         |
| V10E30P                 | P10E30   | V10P30P                             | P10P30   | 10                  | 30                     | 38                 | 42.3                    | 47.0                 | 51.7                 | 93                       | 5               | 2000                                | 15.5                        | 2550                         |
| V14E30P                 | P14E30   | V14P30P                             | P14P30   | 14                  | 30                     | 38                 | 42.3                    | 47.0                 | 51.7                 | 93                       | 10              | 4000                                | 32                          | 5550                         |
| V20E30P                 | P20E30   | V20P30P                             | P20P30   | 20                  | 30                     | 38                 | 42.3                    | 47.0                 | 51.7                 | 93                       | 20              | 8000                                | 90                          | 12000                        |
| V05E35P                 | P5E35    | V05P35P                             | P5P35    | 5                   | 35                     | 45                 | 50.4                    | 56.0                 | 61.6                 | 93                       | 1               | 500                                 | 4                           | 550                          |
| V07E35P                 | P7E35    | V07P35P                             | P7P35    | 7                   | 35                     | 45                 | 50.4                    | 56.0                 | 61.6                 | 110                      | 2.5             | 1000                                | 9                           | 1200                         |
| V10E35P                 | P10E35   | V10P35P                             | P10P35   | 10                  | 35                     | 45                 | 50.4                    | 56.0                 | 61.6                 | 110                      | 5               | 2000                                | 20                          | 2200                         |
| V14E35P                 | P14E35   | V14P35P                             | P14P35   | 14                  | 35                     | 45                 | 50.4                    | 56.0                 | 61.6                 | 110                      | 10              | 4000                                | 40                          | 5000                         |
| V20E35P                 | P20E35   | V20P35P                             | P20P35   | 20                  | 35                     | 45                 | 50.4                    | 56.0                 | 61.6                 | 110                      | 20              | 8000                                | 115                         | 10500                        |
| V05E40P                 | P5E40    | V05P40P                             | P5P40    | 5                   | 40                     | 56                 | 61.2                    | 68.0                 | 74.8                 | 135                      | 1               | 500                                 | 5                           | 500                          |
| V07E40P                 | P7E40    | V07P40P                             | P7P40    | 7                   | 40                     | 56                 | 61.2                    | 68.0                 | 74.8                 | 135                      | 2.5             | 1000                                | 11                          | 1000                         |
| V10E40P                 | P10E40   | V10P40P                             | P10P40   | 10                  | 40                     | 56                 | 61.2                    | 68.0                 | 74.8                 | 135                      | 5               | 2000                                | 25                          | 1850                         |
| V14E40P                 | P14E40   | V14P40P                             | P14P40   | 14                  | 40                     | 56                 | 61.2                    | 68.0                 | 74.8                 | 135                      | 10              | 4000                                | 50                          | 4000                         |
| V20E40P                 | P20E40   | V20P40P                             | P20P40   | 20                  | 40                     | 56                 | 61.2                    | 68.0                 | 74.8                 | 135                      | 20              | 8000                                | 140                         | 8500                         |

**Notes:**

1. Average power dissipation of transients not to exceed 0.2W, 0.25W, 0.4W, 0.6W or 1W for model sizes 5mm, 7mm, 10mm, 14mm, and 20mm, respectively.

2. 10mm, 14mm and 20mm devices are UL recognized with 800V isolation voltage rating.

# LV UltraMOV® Series

## Radial Leaded Varistors

| Epoxy Coated Models     |          | Phenolic Coated Models <sup>2</sup> |          | Size Disc Dia. (mm) | Max Continuous Voltage |                    | Varistor Voltage at 1mA |                      |                      | Maximum Clamping Voltage |                 | Max Peak Current (8 x 20µs 1 pulse) | Energy Rating (2ms, 1pulse) | Typical Capacitance f = 1MHz |
|-------------------------|----------|-------------------------------------|----------|---------------------|------------------------|--------------------|-------------------------|----------------------|----------------------|--------------------------|-----------------|-------------------------------------|-----------------------------|------------------------------|
| Part Number (Base part) | Branding | Part Number (Base part)             | Branding |                     | V <sub>M(AC)RMS</sub>  | V <sub>M(DC)</sub> | V <sub>NOM Min</sub>    | V <sub>NOM Nom</sub> | V <sub>NOM Max</sub> | V <sub>C</sub>           | I <sub>PK</sub> | I <sub>TM</sub>                     | W <sub>TM</sub>             | C                            |
|                         |          |                                     |          |                     | (V)                    | (V)                | (V)                     | (V)                  | (V)                  | (V)                      | (A)             | (A)                                 | (J)                         | (pF)                         |
| V05E50P                 | P5E50    | V05P50P                             | P5P50    | 5                   | 50                     | 65                 | 73.8                    | 82                   | 90.2                 | 135                      | 5               | 800                                 | 5                           | 350                          |
| V07E50P                 | P7E50    | V07P50P                             | P7P50    | 7                   | 50                     | 65                 | 73.8                    | 82                   | 90.2                 | 135                      | 10              | 1750                                | 10                          | 800                          |
| V10E50P                 | P10E50   | V10P50P                             | P10P50   | 10                  | 50                     | 65                 | 73.8                    | 82                   | 90.2                 | 135                      | 25              | 3500                                | 20                          | 1400                         |
| V14E50P                 | P14E50   | V14P50P                             | P14P50   | 14                  | 50                     | 65                 | 73.8                    | 82                   | 90.2                 | 145                      | 50              | 6500                                | 40                          | 3000                         |
| V20E50P                 | P20E50   | V20P50P                             | P20P50   | 20                  | 50                     | 65                 | 73.8                    | 82                   | 90.2                 | 145                      | 100             | 10000                               | 80                          | 6000                         |
| V05E60P                 | P5E60    | V05P60P                             | P5P60    | 5                   | 60                     | 85                 | 90                      | 100                  | 110                  | 165                      | 5               | 800                                 | 6                           | 310                          |
| V07E60P                 | P7E60    | V07P60P                             | P7P60    | 7                   | 60                     | 85                 | 90                      | 100                  | 110                  | 165                      | 10              | 1750                                | 12                          | 700                          |
| V10E60P                 | P10E60   | V10P60P                             | P10P60   | 10                  | 60                     | 85                 | 90                      | 100                  | 110                  | 165                      | 25              | 3500                                | 24                          | 1200                         |
| V14E60P                 | P14E60   | V14P60P                             | P14P60   | 14                  | 60                     | 85                 | 90                      | 100                  | 110                  | 175                      | 50              | 6500                                | 50                          | 2500                         |
| V20E60P                 | P20E60   | V20P60P                             | P20P60   | 20                  | 60                     | 85                 | 90                      | 100                  | 110                  | 175                      | 100             | 10000                               | 100                         | 5200                         |
| V05E75P                 | P5E75    | V05P75P                             | P5P75    | 5                   | 75                     | 100                | 108                     | 120                  | 132                  | 205                      | 5               | 800                                 | 7                           | 260                          |
| V07E75P                 | P7E75    | V07P75P                             | P7P75    | 7                   | 75                     | 100                | 108                     | 120                  | 132                  | 205                      | 10              | 1750                                | 14                          | 600                          |
| V10E75P                 | P10E75   | V10P75P                             | P10P75   | 10                  | 75                     | 100                | 108                     | 120                  | 132                  | 200                      | 25              | 3500                                | 29                          | 1100                         |
| V14E75P                 | P14E75   | V14P75P                             | P14P75   | 14                  | 75                     | 100                | 108                     | 120                  | 132                  | 210                      | 50              | 6500                                | 60                          | 2300                         |
| V20E75P                 | P20E75   | V20P75P                             | P20P75   | 20                  | 75                     | 100                | 108                     | 120                  | 132                  | 210                      | 100             | 10000                               | 120                         | 4800                         |
| V05E95P                 | P5E95    | V05P95P                             | P5P95    | 5                   | 95                     | 125                | 135                     | 150                  | 165                  | 250                      | 5               | 800                                 | 9                           | 200                          |
| V07E95P                 | P7E95    | V07P95P                             | P7P95    | 7                   | 95                     | 125                | 135                     | 150                  | 165                  | 250                      | 10              | 1750                                | 18                          | 520                          |
| V10E95P                 | P10E95   | V10P95P                             | P10P95   | 10                  | 95                     | 125                | 135                     | 150                  | 165                  | 250                      | 25              | 3500                                | 36                          | 800                          |
| V14E95P                 | P14E95   | V14P95P                             | P14P95   | 14                  | 95                     | 125                | 135                     | 150                  | 165                  | 250                      | 50              | 6500                                | 75                          | 1700                         |
| V20E95P                 | P20E95   | V20P95P                             | P20P95   | 20                  | 95                     | 125                | 135                     | 150                  | 165                  | 250                      | 100             | 10000                               | 150                         | 3700                         |

**Notes:**

1. Average power dissipation of transients not to exceed 0.2W, 0.25W, 0.4W, 0.6W or 1W for model sizes 5mm, 7mm, 10mm, 14mm, and 20mm respectively.
2. 10mm, 14mm and 20mm devices are UL recognized and TUV certified with 800V isolation voltage rating.

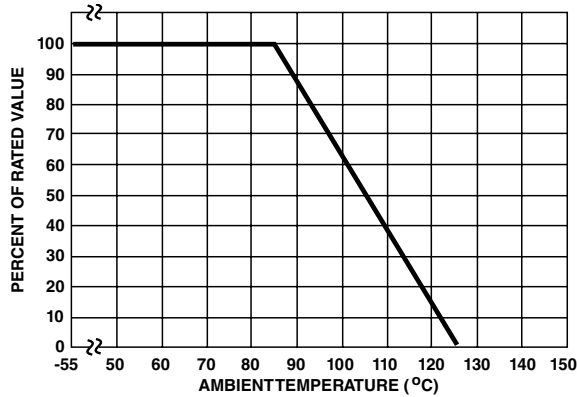
# LV UltraMOV® Series

## Radial Leaded Varistors

### Current Energy and Power Dissipation Ratings

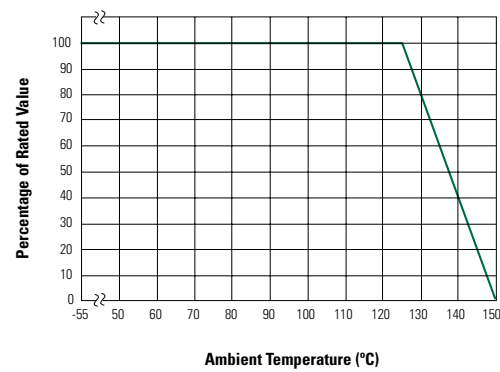
**Figure 1A - Power Derating for Epoxy Coated**

For applications exceeding 85°C ambient temperature, the peak surge current and energy ratings must be reduced as shown below.

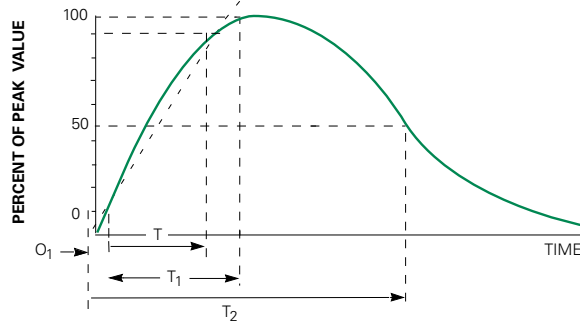


**Figure 1B - Power Derating for Phenolic Coated**

For applications exceeding 125°C ambient temperature, the peak surge current and energy ratings must be reduced as shown below.



### Peak Pulse Current Test Waveform for Clamping Voltage



**Figure 2**

$O_1$  = Virtual Origin of Wave

$T$  = Time from 10% to 90% of Peak

$T_1$  = Rise Time =  $1.25 \times T$

$T_2$  = Decay Time

**Example** - For an 8/20 $\mu$ s Current Waveform:

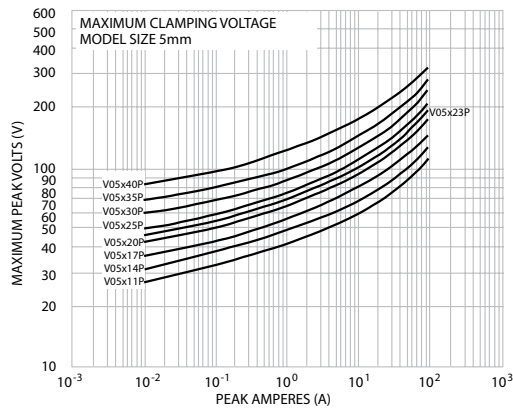
8 $\mu$ s =  $T_1$  = Rise Time

20 $\mu$ s =  $T_2$  = Decay Time

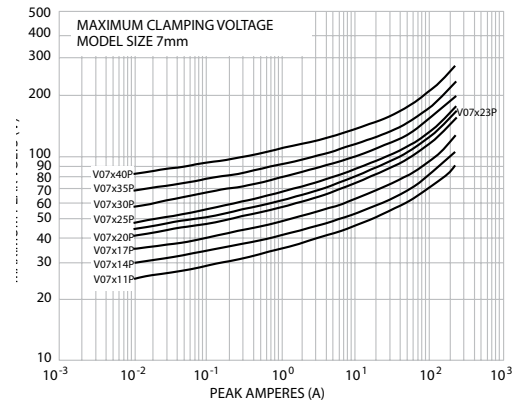
# LV UltraMOV® Series

## Radial Leaded Varistors

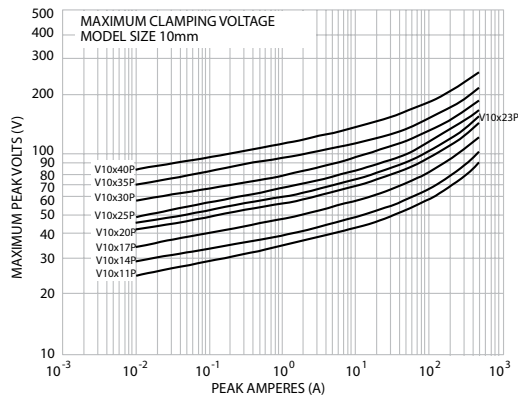
**Maximum Clamping Voltage for 5mm Parts**  
V05x11P - V05x40P



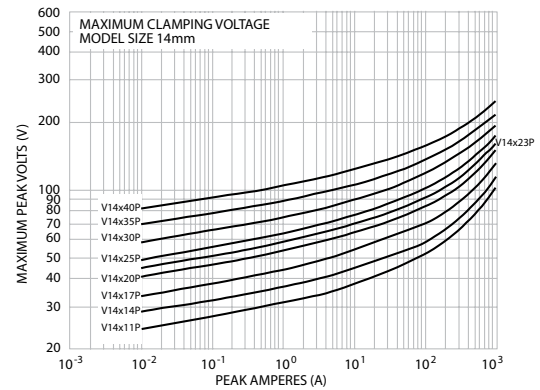
**Maximum Clamping Voltage for 7mm Parts**  
V07x11P - V07x40P



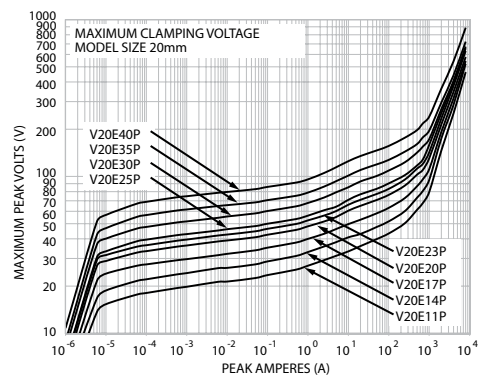
**Maximum Clamping Voltage for 10mm Parts**  
V10x11P - V10x40P



**Maximum Clamping Voltage for 14mm Parts**  
V14x11P - V14x40P



**Maximum Clamping Voltage for 20mm Parts**  
V20x11P - V20x40P



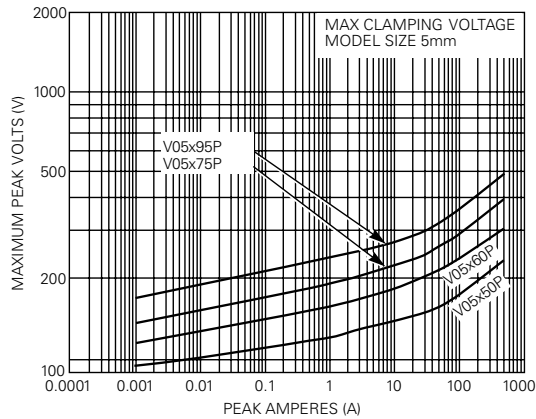
CLAMPING VOLTAGE FOR V20x11P - V20x40P

# LV UltraMOV® Series

## Radial Leaded Varistors

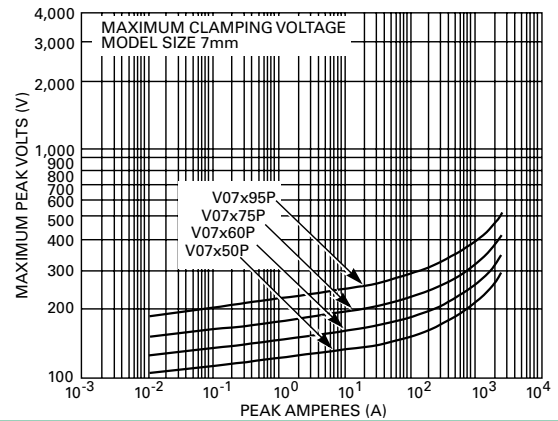
### Maximum Clamping Voltage for 5mm Parts

V05x50P - V05x95P



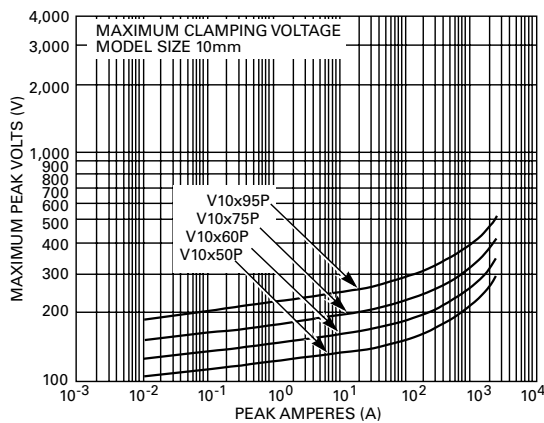
### Maximum Clamping Voltage for 7mm Parts

V07x50P - V07x95P



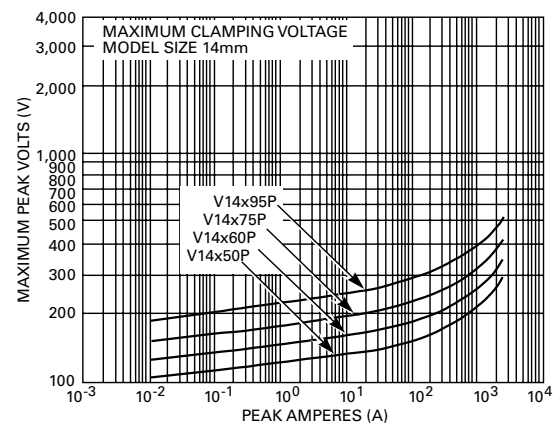
### Maximum Clamping Voltage for 10mm Parts

V10x50P - V10x95P



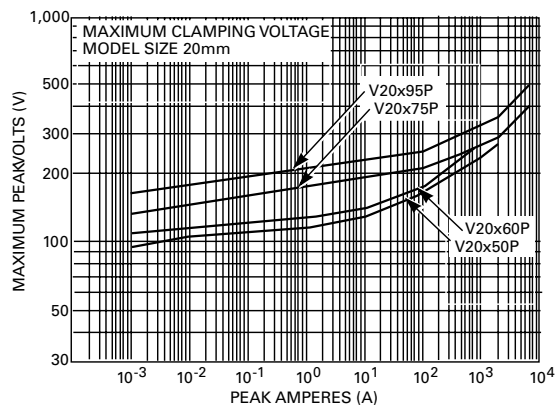
### Maximum Clamping Voltage for 14mm Parts

V14x50P - V14x95P



### Maximum Clamping Voltage for 20mm Parts

V20x50P - V20x95P

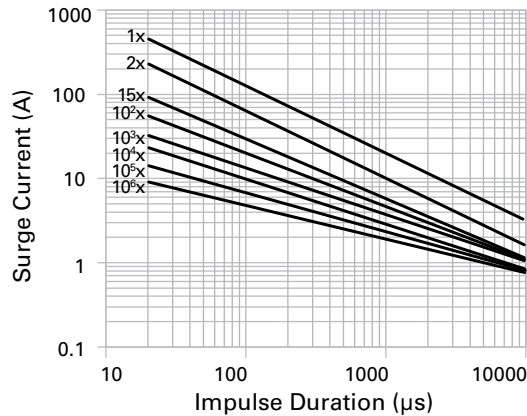


# LV UltraMOV® Series

## Radial Leaded Varistors

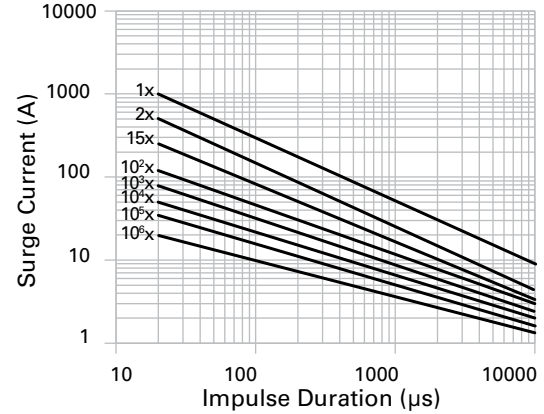
### Repetitive Surge Capability for 5mm Parts

V05x11P - V05x40P



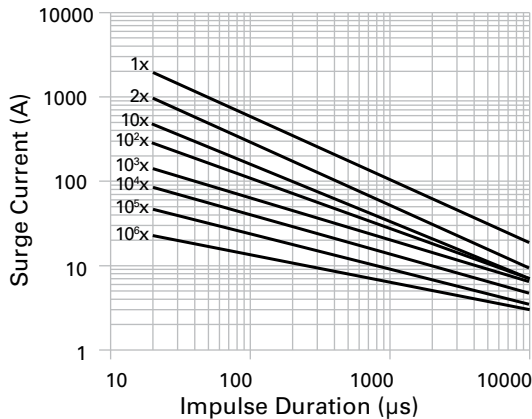
### Repetitive Surge Capability for 7mm Parts

V07x11P - V07x40P



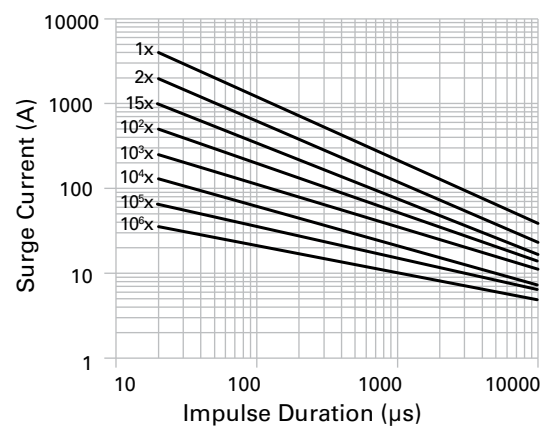
### Repetitive Surge Capability for 10mm Parts

V10x11P - V10x40P



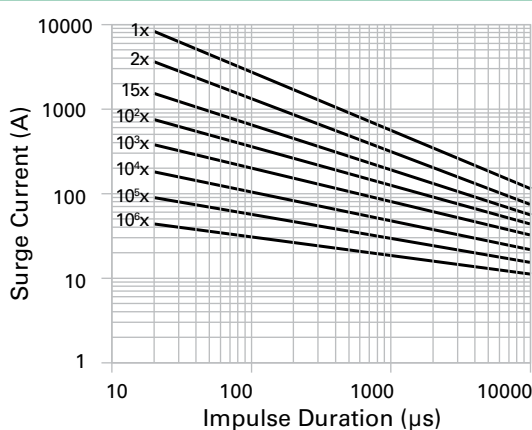
### Repetitive Surge Capability for 14mm Parts

V14x11P - V14x40P



### Repetitive Surge Capability for 20mm Parts

V20x11P - V20x40P



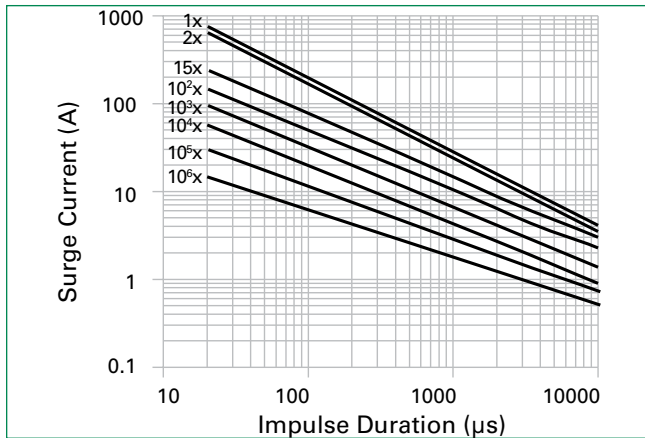
**Note:** If pulse ratings are exceeded, a shift of  $V_{NDCI}$  (at specified current) of more than  $\pm 10\%$  could result. This type of shift, which normally results in a decrease of  $V_{NDCI}$ , may result in the device not meeting the original published specifications, but does not prevent the device from continuing to function, and to provide ample protection.

# LV UltraMOV® Series

## Radial Leaded Varistors

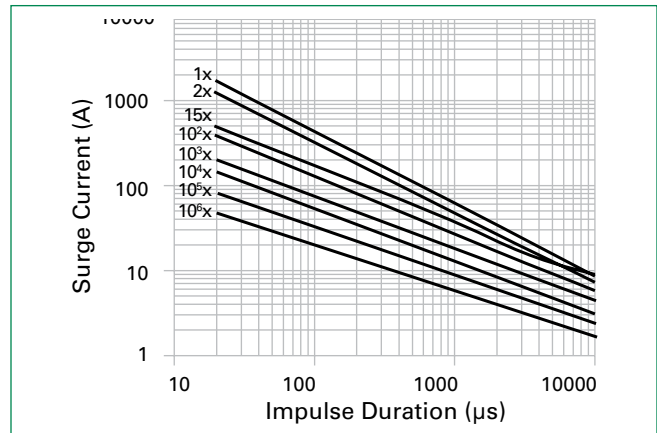
### Repetitive Surge Capability for 5mm Parts

V05x50P - V05x95P



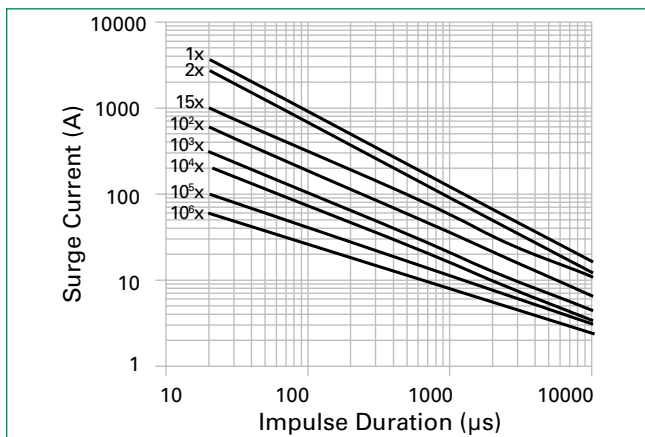
### Repetitive Surge Capability for 7mm Parts

V07x50P - V07x95P



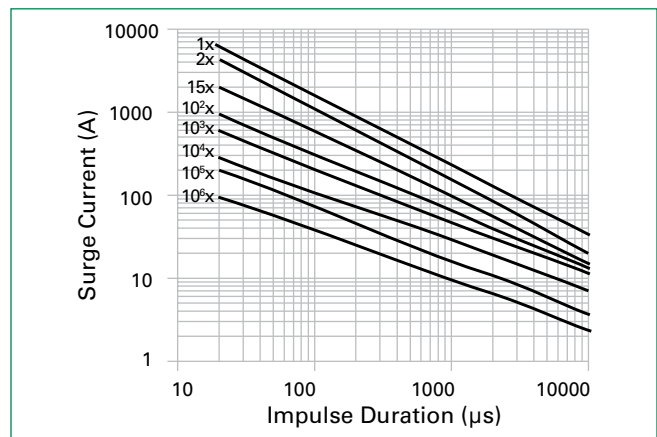
### Repetitive Surge Capability for 10mm Parts

V10x50P - V10x95P



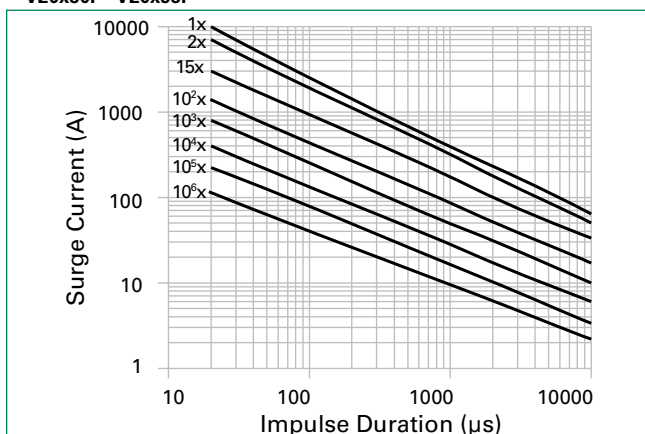
### Repetitive Surge Capability for 14mm Parts

V14x50P - V14x95P



### Repetitive Surge Capability for 20mm Parts

V20x50P - V20x95P



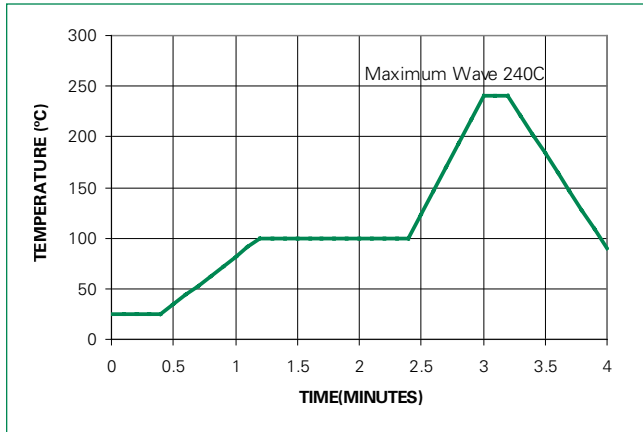


# LV UltraMOV® Series

## Radial Leaded Varistors

### Wave Solder Profile

Non Lead-free Profile



Lead-free Profile



### Physical Specifications

|                                  |                                                                 |
|----------------------------------|-----------------------------------------------------------------|
| <b>Lead Material</b>             | Copper Clad Steel Wire                                          |
| <b>Soldering Characteristics</b> | Solderability per MIL-STD-202, Method 208                       |
| <b>Insulating Material</b>       | Cured, flame retardant epoxy polymer meets UL94V-0 requirements |
| <b>Device Labeling</b>           | Marked with LF, voltage and date code                           |

### Environmental Specifications

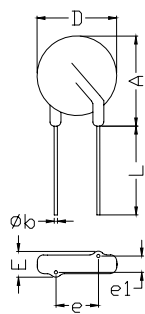
|                             |                                                            |
|-----------------------------|------------------------------------------------------------|
| <b>Humidity Aging</b>       | +85°C, 85% RH, 1000 hours<br>+/-10% typical voltage change |
| <b>Thermal Shock</b>        | +85°C to -40°C 10 times<br>+/-10% typical voltage change   |
| <b>Solvent Resistance</b>   | MIL-STD-202, Method 215                                    |
| <b>Moisture Sensitivity</b> | Level 1, J-STD-020                                         |

# LV UltraMOV® Series

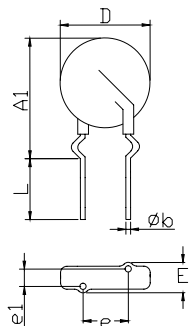
## Radial Leaded Varistors

### Product Dimensions (mm)

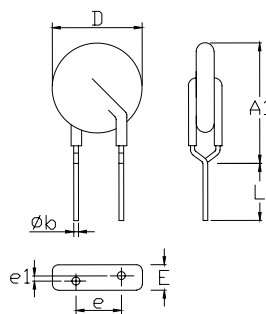
Straight Lead



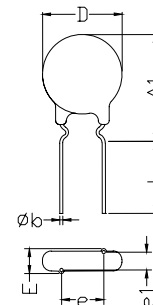
Outer Crimp Lead



In-Line (Under Crimp) Lead



Inner Crimp Lead



| Dimension                         | V <sub>RMS</sub><br>Voltage<br>Model | 5mm Size         |                  | 7mm Size         |                  | 10mm Size       |                 | 14mm Size       |                 | 20mm Size       |                 |
|-----------------------------------|--------------------------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                   |                                      | Min.<br>mm (in)  | Max.<br>mm (in)  | Min.<br>mm (in)  | Max.<br>mm (in)  | Min.<br>mm (in) | Max.<br>mm (in) | Min.<br>mm (in) | Max.<br>mm (in) | Min.<br>mm (in) | Max.<br>mm (in) |
| <b>A</b>                          | All                                  | -                | 10<br>(0.394)    | -                | 12<br>(0.472)    | -               | 16<br>(0.630)   | -               | 20<br>(0.787)   | -               | 26.5<br>(1.043) |
| <b>A1</b>                         | All                                  | -                | 13<br>(0.512)    | -                | 15<br>(0.591)    | -               | 19.5<br>(0.768) | -               | 22.5<br>(0.886) | -               | 29<br>(1.142)   |
| <b>ØD</b>                         | All                                  | -                | 7<br>(0.276)     | -                | 9<br>(0.354)     | -               | 12.5<br>(0.492) | -               | 17<br>(0.669)   | -               | 23<br>(0.906)   |
| <b>e</b>                          | All                                  | 4<br>(0.157)     | 6<br>(0.236)     | 4<br>(0.157)     | 6<br>(0.236)     | 6.5<br>(0.256)  | 8.5<br>(0.335)  | 6.5<br>(0.256)  | 8.5<br>(0.335)  | 6.5<br>(0.256)  | 8.5<br>(0.335)  |
| <b>e<sub>1</sub></b>              | 11 - 30                              | 1<br>(0.039)     | 3<br>(0.118)     | 1<br>(0.039)     | 3<br>(0.118)     | 1<br>(0.039)    | 3<br>(0.118)    | 1<br>(0.039)    | 3<br>(0.118)    | 1<br>(0.039)    | 3<br>(0.118)    |
|                                   | 35 - 95                              | 1.5<br>(0.059)   | 3.5<br>(0.138)   | 1.5<br>(0.059)   | 3.5<br>(0.138)   | 1.5<br>(0.059)  | 3.5<br>(0.138)  | 1.5<br>(0.059)  | 3.5<br>(0.138)  | 1.5<br>(0.059)  | 3.5<br>(0.138)  |
| <b>E</b>                          | 11 - 30                              | -                | 5.0<br>(0.197)   | -                | 5.0<br>(0.197)   | -               | 5.0<br>(0.197)  | -               | 5.0<br>(0.197)  | -               | 5.0<br>(0.197)  |
|                                   | 35 - 95                              | -                | 5.6<br>(0.220)   | -                | 5.6<br>(0.220)   | -               | 5.6<br>(0.220)  | -               | 5.6<br>(0.220)  | -               | 5.6<br>(0.220)  |
| <b>Øb</b>                         | All                                  | 0.585<br>(0.023) | 0.685<br>(0.027) | 0.585<br>(0.023) | 0.685<br>(0.027) | 0.76<br>(0.030) | 0.86<br>(0.034) | 0.76<br>(0.030) | 0.86<br>(0.034) | 0.76<br>(0.030) | 0.86<br>(0.034) |
| <b>L</b>                          | All                                  | 25.4<br>(1.00)   | -                | 25.4<br>(1.00)   | -                | 25.4<br>(1.00)  | -               | 25.4<br>(1.00)  | -               | 25.4<br>(1.00)  | -               |
| <b>L(bulk<br/>packaging only)</b> | All                                  | 2.41<br>(0.095)  | 4.69<br>(0.185)  | 2.41<br>(0.095)  | 4.69<br>(0.185)  | 2.41<br>(0.095) | 4.69<br>(0.185) | 2.41<br>(0.095) | 4.69<br>(0.185) | 2.41<br>(0.095) | 4.69<br>(0.185) |

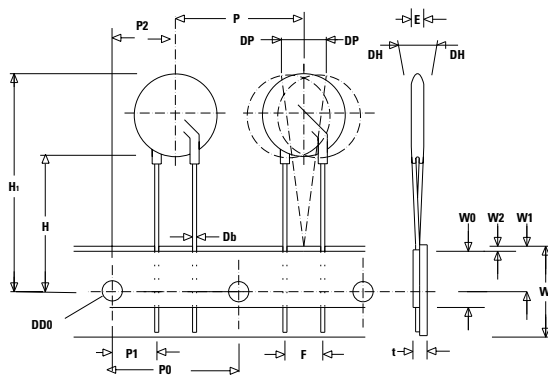
# LV UltraMOV® Series

## Radial Ledged Varistors

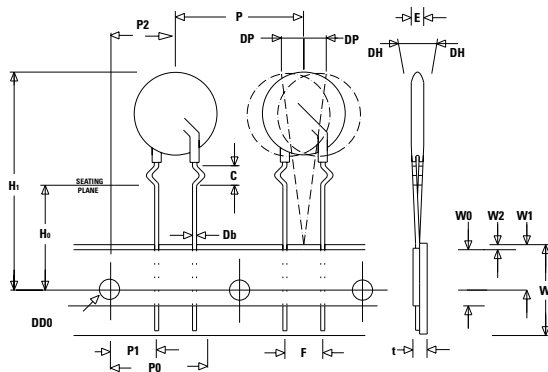
### Tape and Reel Specifications

#### 5 and 7mm Devices

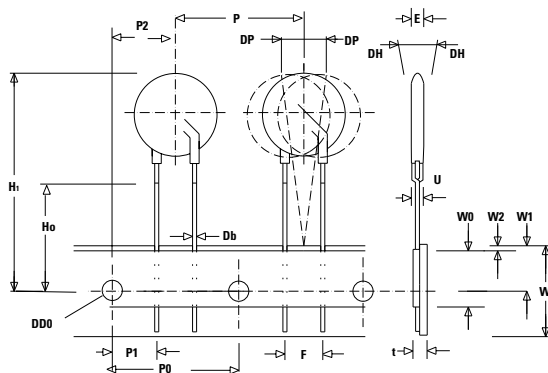
##### STRAIGHT LEADS "L1"



##### CRIMPED LEADS "L2"

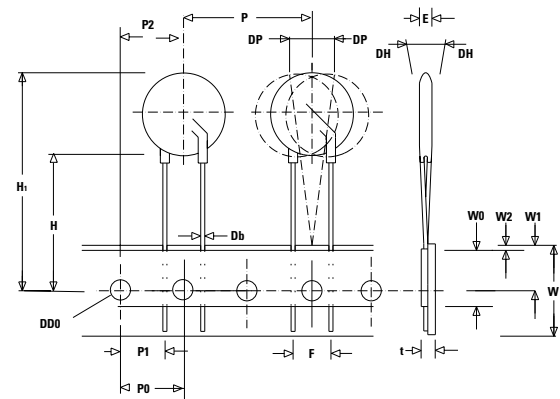


##### UNDER CRIMPED / IN-LINE LEADS "L3"

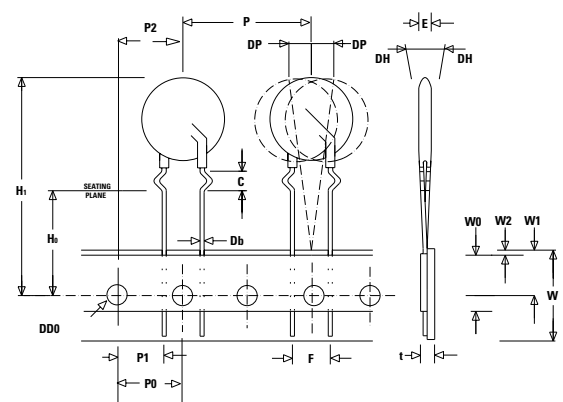


#### 10, 14, and 20mm Devices

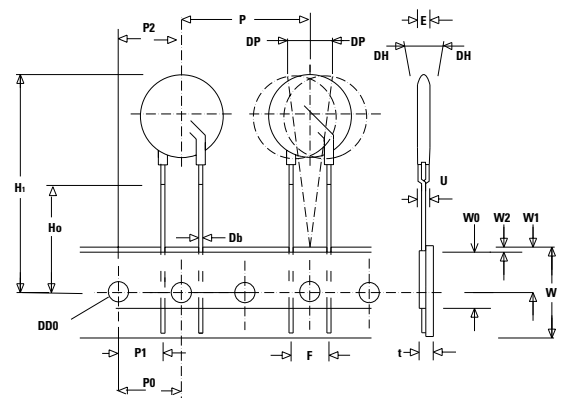
##### STRAIGHT LEADS "L1"



##### CRIMPED LEADS "L2"



##### UNDER CRIMPED / IN-LINE LEADS "L3"



Refer to next page for dimension measurement specifics.

# LV UltraMOV® Series

## Radial Leaded Varistors

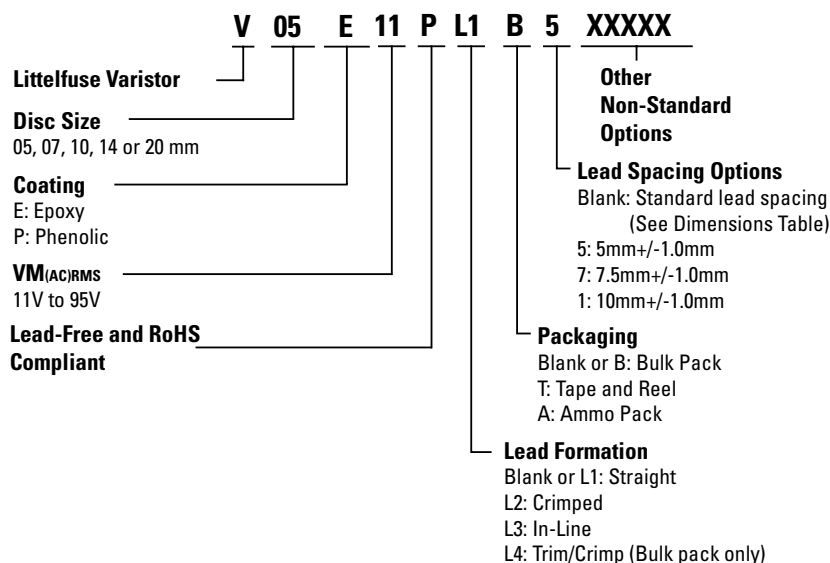
### Tape and Reel Specifications (continued)

**Notes:**

- Radial devices on tape are supplied with crimped leads, straight leads, or under-crimped leads
- Leads are offset by product dimension e1
- Conforms to ANSI and EIA specifications
- Can be supplied to IEC Publication 286-2

| Symbol               | Description                               | Model Size        |                   |                   |                   |                   |
|----------------------|-------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                      |                                           | 5mm               | 7mm               | 10mm              | 14mm              | 20mm              |
| <b>P</b>             | Pitch of Component                        | 12.7 +/- 1.0      | 12.7 +/- 1.0      | 25.4 +/- 1.0      | 25.4 +/- 1.0      | 25.4 +/- 1.0      |
| <b>P<sub>0</sub></b> | Feed Hole Pitch                           | 12.7 +/- 0.2      | 12.7 +/- 0.2      | 12.7 +/- 0.2      | 12.7 +/- 0.2      | 12.7 +/- 0.2      |
| <b>P<sub>1</sub></b> | Feed Hole Center to Pitch                 | 3.85 +/- 0.7      | 3.85 +/- 0.7      | 8.85 +/- 0.7      | 8.85 +/- 0.7      | 8.85 +/- 0.7      |
| <b>P<sub>2</sub></b> | Hole Center to Component Center           | 6.35 +/- 1.0      | 6.35 +/- 1.0      | 12.7 +/- 0.7      | 12.7 +/- 0.7      | 12.7 +/- 0.7      |
| <b>F</b>             | Lead to Lead Distance                     | 5.0 +/- 1.0       | 5.0 +/- 1.0       | 7.5 +/- 1.0       | 7.5 +/- 1.0       | 7.5 +/- 1.0       |
| <b>h</b>             | Component Alignment                       | 2.0 Max           | 2.0 Max           | 2.0 Max           | 2.0 Max           | 2.0 Max           |
| <b>W</b>             | Tape Width                                | 18.0 +1.0 / -0.5  | 18.0 +1.0 / -0.5  | 18.0 +1.0 / -0.5  | 18.0 +1.0 / -0.5  | 18.0 +1.0 / -0.5  |
| <b>W<sub>0</sub></b> | Hold Down Tape Width                      | 12.0 +/- 0.3      | 12.0 +/- 0.3      | 12.0 +/- 0.3      | 12.0 +/- 0.3      | 12.0 +/- 0.3      |
| <b>W<sub>1</sub></b> | Hole Position                             | 9.0 +0.75 / -0.50 | 9.0 +0.75 / -0.50 | 9.0 +0.75 / -0.50 | 9.0 +0.75 / -0.50 | 9.0 +0.75 / -0.50 |
| <b>W<sub>2</sub></b> | Hold Down Tape Position                   | 0.5 Max           | 0.5 Max           | 0.5 Max           | 0.5 Max           | 0.5 Max           |
| <b>H</b>             | Height from Tape Center to Component Base | 18.0 +2.0 / -0.0  | 18.0 +2.0 / -0.0  | 18.0 +2.0 / -0.0  | 18.0 +2.0 / -0.0  | 18.0 +2.0 / -0.0  |
| <b>H<sub>0</sub></b> | Seating Plane Height                      | 16.0 +/- 0.5      | 16.0 +/- 0.5      | 16.0 +/- 0.5      | 16.0 +/- 0.5      | 16.0 +/- 0.5      |
| <b>H<sub>1</sub></b> | Component Height                          | 29.0 Max          | 32.0 Max          | 36.0 Max          | 40.0 Max          | 46.5 Max          |
| <b>D<sub>0</sub></b> | Feed Hole Diameter                        | 4.0 +/- 0.2       | 4.0 +/- 0.2       | 4.0 +/- 0.2       | 4.0 +/- 0.2       | 4.0 +/- 0.2       |
| <b>t</b>             | Total Tape Thickness                      | 0.7 +/- 0.2       | 0.7 +/- 0.2       | 0.7 +/- 0.2       | 0.7 +/- 0.2       | 0.7 +/- 0.2       |
| <b>U</b>             | Undercrimp Width                          | 8.0 Max           | 8.0 Max           | 8.0 Max           | 8.0 Max           | 8.0 Max           |
| <b>p</b>             | Component Alignment                       | 3° Max            | 3° Max            | 3° Max            | 3° Max            | 3° Max            |

### Part Numbering System


**Option Codes:**

X2855: Nickel Barrier COATED WIRE OPTION --  
All standard parts use tinned copper clad steel wire. Nickel Barrier Coated wire is available as an option, consisting of Copper wire with a flashing of Nickel followed by a top coating of Tin. To order append standard model BASE PART number with "X2855".

**Example:**

Standard Model: V05P11P      Order As: V05P11PX2855

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