

# HMOV™ Varistor Series

## Radial Leaded Varistors



### Description

The HMOV™ Varistor Series is specifically designed for applications requiring high surge energy absorption and high operating temperature of 125°C.

The maximum peak surge current is rated up to 10kA (8/20µs pulse) to protect against indirect lightning strikes, switching surge transients, and abnormally fast transients.

### Features & Benefits

- High operating temperature combined with high isolation voltage capability: 125°C and 2500V, respectively
- High surge current withstanding capability up to 10kA (8/20µs pulse)
- Complies with 1000 cycle, -55°C to 125°C, Thermal Shock Cycling Test
- Wide operating voltage range
- Three disc sizes available: 10mm, 14mm, and 20mm
- Lead-free, Halogen-free, and RoHS compliant

### Additional Information



Resources



Accessories



Samples

### Agency Approvals

| Agency | Agency Approval                                | Agency File Number            |
|--------|--|-------------------------------|
|        | UL1449   | E320116                       |
|        | IEC 60950-1(Annex Q)<br>IECQ CS 042200 GB 0001 | IECQ-C BSI 15.0013<br>E1291/F |

### Applications

- LED lighting
- Security System (fire alarm or smoke detector)
- Solar Power Inverter
- Automation control
- Power Supply Unit (outdoor and industrial)

### Absolute Maximum Ratings

|  | Low Voltage Series | Units |
|--|--------------------|-------|
| <b>Continous:</b>  |                    |       |
| Steady State Applied Voltage:  |                    |       |
| AC Voltage Range ( $V_{M(AC)RMS}$ )  | 11 to 625          | V     |
| DC Voltage Range ( $V_{M(DC)}$ )   | 14 to 825          | V     |
| <b>Transient:</b>  |                    |       |
| Non-Repetitive Surge Current, 8/20µs Waveform ( $I_{TM}$ )                                     | 800 to 10,000      | A     |
| Non-Repetitive Energy Capability, 2ms Waveform ( $W_{TM}$ )                                    | 0.8 to 150         | J     |
| Operating Ambient Temperature Range ( $T_A$ )  | -55 to +125        | °C    |
| Storage Temperature Range ( $T_{STG}$ )  | -55 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)  | 2500               | V     |
| Silicone Coating Insulation Resistance   | >1,000             | MΩ    |

**Note:** See Device Ratings and Specifications chart for ratings of individual members of a series.

**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.

# HMOV™ Varistor Series

## Radial Leded Varistors

### HMOV™ Series Device Ratings and Specifications

| Silicone Coated Models  |          | Size Disc Dia. (mm) | Maximum Rating (125°C) |                    |                           |                            |                              | Specifications (25°C)   |                      |                                     |                 |                              |  |
|-------------------------|----------|---------------------|------------------------|--------------------|---------------------------|----------------------------|------------------------------|-------------------------|----------------------|-------------------------------------|-----------------|------------------------------|--|
|                         |          |                     | Max Continuous Voltage |                    | Max Peak Current (8/20µs) |                            | Energy Rating (2ms, 1 pulse) | Varistor Voltage at 1mA |                      | Maximum Clamping Voltage (8 x 20µs) |                 | Typical Capacitance f = 1MHz |  |
|                         |          |                     | V <sub>M(AC) RMS</sub> | V <sub>M(DC)</sub> | I <sub>TM</sub> 1 x Pulse | I <sub>TM</sub> 2 x Pulses | W <sub>TM</sub>              | V <sub>NOM Min</sub>    | V <sub>NOM Max</sub> | V <sub>C</sub>                      | I <sub>PK</sub> | C                            |  |
| Part Number (Base part) | Branding |                     | (V)                    | (V)                | (A)                       | (A)                        | (J)                          | (V)                     | (V)                  | (V)                                 | (A)             | (pF)                         |  |
| V10H11P                 | P10H11   | 10                  | 11                     | 14                 | 1500                      | 800                        | 4.2                          | 16.2                    | 19.8                 | 36                                  | 5               | 5450                         |  |
| V14H11P                 | P14H11   | 14                  | 11                     | 14                 | 3000                      | 1800                       | 8                            | 16.2                    | 19.8                 | 36                                  | 10              | 12000                        |  |
| V20H11P                 | P20H11   | 20                  | 11                     | 14                 | 5000                      | 3000                       | 25                           | 16.2                    | 19.8                 | 36                                  | 20              | 26000                        |  |
| V10H14P                 | P10H14   | 10                  | 14                     | 18                 | 1500                      | 800                        | 5                            | 19.8                    | 24.2                 | 43                                  | 5               | 4650                         |  |
| V14H14P                 | P14H14   | 14                  | 14                     | 18                 | 3000                      | 1800                       | 10                           | 19.8                    | 24.2                 | 43                                  | 10              | 10200                        |  |
| V20H14P                 | P20H14   | 20                  | 14                     | 18                 | 5000                      | 3000                       | 28                           | 19.8                    | 24.2                 | 43                                  | 20              | 22200                        |  |
| V10H17P                 | P10H17   | 10                  | 17                     | 22                 | 1500                      | 800                        | 6.5                          | 24.3                    | 29.7                 | 53                                  | 5               | 3900                         |  |
| V14H17P                 | P14H17   | 14                  | 17                     | 22                 | 3000                      | 1800                       | 13                           | 24.3                    | 29.7                 | 53                                  | 10              | 8700                         |  |
| V20H17P                 | P20H17   | 20                  | 17                     | 22                 | 5000                      | 3000                       | 35                           | 24.3                    | 29.7                 | 53                                  | 20              | 18750                        |  |
| V10H20P                 | P10H20   | 10                  | 20                     | 26                 | 1500                      | 800                        | 10                           | 29.7                    | 36.3                 | 65                                  | 5               | 3400                         |  |
| V14H20P                 | P14H20   | 14                  | 20                     | 26                 | 3000                      | 1800                       | 20                           | 29.7                    | 36.3                 | 65                                  | 10              | 7500                         |  |
| V20H20P                 | P20H20   | 20                  | 20                     | 26                 | 5000                      | 3000                       | 58                           | 29.7                    | 36.3                 | 65                                  | 20              | 15000                        |  |
| V10H23P                 | P10H23   | 10                  | 23                     | 28                 | 1500                      | 800                        | 12                           | 32.4                    | 39.6                 | 71                                  | 5               | 3200                         |  |
| V14H23P                 | P14H23   | 14                  | 23                     | 28                 | 3000                      | 1800                       | 23                           | 32.4                    | 39.6                 | 71                                  | 10              | 7000                         |  |
| V20H23P                 | P20H23   | 20                  | 23                     | 28                 | 5000                      | 3000                       | 70                           | 32.4                    | 39.6                 | 71                                  | 20              | 14000                        |  |
| V10H25P                 | P10H25   | 10                  | 25                     | 31                 | 1500                      | 800                        | 13                           | 35.1                    | 42.9                 | 77                                  | 5               | 2900                         |  |
| V14H25P                 | P14H25   | 14                  | 25                     | 31                 | 3000                      | 1800                       | 25                           | 35.1                    | 42.9                 | 77                                  | 10              | 6200                         |  |
| V20H25P                 | P20H25   | 20                  | 25                     | 31                 | 5000                      | 3000                       | 77                           | 35.1                    | 42.9                 | 77                                  | 20              | 13500                        |  |
| V10H30P                 | P10H30   | 10                  | 30                     | 38                 | 1500                      | 800                        | 15.5                         | 42.3                    | 51.7                 | 93                                  | 5               | 2550                         |  |
| V14H30P                 | P14H30   | 14                  | 30                     | 38                 | 3000                      | 1800                       | 32                           | 42.3                    | 51.7                 | 93                                  | 10              | 5550                         |  |
| V20H30P                 | P20H30   | 20                  | 30                     | 38                 | 5000                      | 3000                       | 90                           | 42.3                    | 51.7                 | 93                                  | 20              | 12000                        |  |
| V10H35P                 | P10H35   | 10                  | 35                     | 45                 | 1500                      | 800                        | 20                           | 50.4                    | 61.6                 | 110                                 | 5               | 2200                         |  |
| V14H35P                 | P14H35   | 14                  | 35                     | 45                 | 3000                      | 1800                       | 40                           | 50.4                    | 61.6                 | 110                                 | 10              | 5000                         |  |
| V20H35P                 | P20H35   | 20                  | 35                     | 45                 | 5000                      | 3000                       | 115                          | 50.4                    | 61.6                 | 110                                 | 20              | 10500                        |  |
| V10H40P                 | P10H40   | 10                  | 40                     | 56                 | 1500                      | 800                        | 25                           | 61.2                    | 74.8                 | 135                                 | 5               | 1850                         |  |
| V14H40P                 | P14H40   | 14                  | 40                     | 56                 | 3000                      | 1800                       | 50                           | 61.2                    | 74.8                 | 135                                 | 10              | 4000                         |  |
| V20H40P                 | P20H40   | 20                  | 40                     | 56                 | 5000                      | 3000                       | 140                          | 61.2                    | 74.8                 | 135                                 | 20              | 8500                         |  |
| V10H50P                 | P10H50   | 10                  | 50                     | 65                 | 3500                      | 3000                       | 20                           | 73.8                    | 90.2                 | 135                                 | 25              | 1400                         |  |
| V14H50P                 | P14H50   | 14                  | 50                     | 65                 | 6500                      | 5000                       | 40                           | 73.8                    | 90.2                 | 145                                 | 50              | 3000                         |  |
| V20H50P                 | P20H50   | 20                  | 50                     | 65                 | 10000                     | 7000                       | 80                           | 73.8                    | 90.2                 | 145                                 | 100             | 6000                         |  |
| V10H60P                 | P10H60   | 10                  | 60                     | 85                 | 3500                      | 3000                       | 24                           | 90                      | 110                  | 165                                 | 25              | 1200                         |  |
| V14H60P                 | P14H60   | 14                  | 60                     | 85                 | 6500                      | 5000                       | 50                           | 90                      | 110                  | 175                                 | 50              | 2500                         |  |
| V20H60P                 | P20H60   | 20                  | 60                     | 85                 | 10000                     | 7000                       | 100                          | 90                      | 110                  | 175                                 | 100             | 5200                         |  |
| V10H75P                 | P10H75   | 10                  | 75                     | 100                | 3500                      | 3000                       | 29                           | 108                     | 132                  | 200                                 | 25              | 1100                         |  |
| V14H75P                 | P14H75   | 14                  | 75                     | 100                | 6500                      | 5000                       | 60                           | 108                     | 132                  | 210                                 | 50              | 2300                         |  |
| V20H75P                 | P20H75   | 20                  | 75                     | 100                | 10000                     | 7000                       | 120                          | 108                     | 132                  | 210                                 | 100             | 4800                         |  |
| V10H95P                 | P10H95   | 10                  | 95                     | 125                | 3500                      | 3000                       | 36                           | 135                     | 165                  | 250                                 | 25              | 800                          |  |
| V14H95P                 | P14H95   | 14                  | 95                     | 125                | 6500                      | 5000                       | 75                           | 135                     | 165                  | 250                                 | 50              | 1700                         |  |
| V20H95P                 | P20H95   | 20                  | 95                     | 125                | 10000                     | 7000                       | 150                          | 135                     | 165                  | 250                                 | 100             | 3700                         |  |
| V10H115P                | P10H115  | 10                  | 115                    | 153                | 3500                      | 3000                       | 30                           | 162                     | 198                  | 300                                 | 25              | 465                          |  |
| V14H115P                | P14H115  | 14                  | 115                    | 153                | 6500                      | 5000                       | 50                           | 162                     | 198                  | 300                                 | 50              | 1190                         |  |
| V20H115P                | P20H115  | 20                  | 115                    | 153                | 10000                     | 7000                       | 120                          | 162                     | 198                  | 300                                 | 100             | 2400                         |  |
| V10H130P                | P10H130  | 10                  | 130                    | 170                | 3500                      | 3000                       | 40                           | 184.5                   | 225.5                | 340                                 | 25              | 450                          |  |
| V14H130P                | P14H130  | 14                  | 130                    | 170                | 6500                      | 5000                       | 60                           | 184.5                   | 225.5                | 340                                 | 50              | 1000                         |  |
| V20H130P                | P20H130  | 20                  | 130                    | 170                | 10000                     | 7000                       | 145                          | 184.5                   | 225.5                | 340                                 | 100             | 1900                         |  |
| V10H140P                | P10H140  | 10                  | 140                    | 180                | 3500                      | 3000                       | 45                           | 198                     | 242                  | 360                                 | 25              | 400                          |  |

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

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## Radial Ledged Varistors

### HMOV™ Series Device Ratings and Specifications

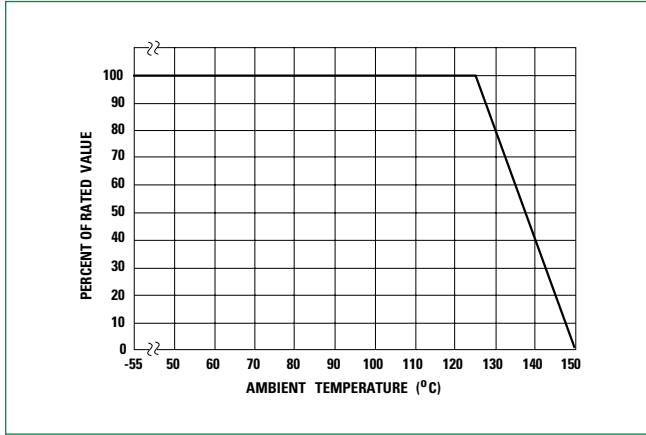
| Silicone Coated Models  |          | Size Disc Dia. (mm) | Maximum Rating (125°C) |                    |                           |                            |                              | Specifications (25°C)   |                      |                                     |                 |                              |
|-------------------------|----------|---------------------|------------------------|--------------------|---------------------------|----------------------------|------------------------------|-------------------------|----------------------|-------------------------------------|-----------------|------------------------------|
|                         |          |                     | Max Continuous Voltage |                    | Max Peak Current (8/20µs) |                            | Energy Rating (2ms, 1 pulse) | Varistor Voltage at 1mA |                      | Maximum Clamping Voltage (8 x 20µs) |                 | Typical Capacitance f = 1MHz |
|                         |          |                     | V <sub>M(Ac)</sub> RMS | V <sub>M(DC)</sub> | I <sub>TM</sub> 1 x Pulse | I <sub>TM</sub> 2 x Pulses | W <sub>TM</sub>              | V <sub>NOM</sub> Min    | V <sub>NOM</sub> Max | V <sub>C</sub>                      | I <sub>PK</sub> | C                            |
| Part Number (Base part) | Branding |                     | (V)                    | (V)                | (A)                       | (A)                        | (J)                          | (V)                     | (V)                  | (V)                                 | (A)             | (pF)                         |
| V14H140P                | P14H140  | 14                  | 140                    | 180                | 6500                      | 5000                       | 65                           | 198                     | 242                  | 360                                 | 50              | 900                          |
| V20H140P                | P20H140  | 20                  | 140                    | 180                | 10000                     | 7000                       | 155                          | 198                     | 242                  | 360                                 | 100             | 1750                         |
| V10H150P                | P10H150  | 10                  | 150                    | 200                | 3500                      | 3000                       | 50                           | 216                     | 264                  | 395                                 | 25              | 360                          |
| V14H150P                | P14H150  | 14                  | 150                    | 200                | 6500                      | 5000                       | 70                           | 216                     | 264                  | 395                                 | 50              | 800                          |
| V20H150P                | P20H150  | 20                  | 150                    | 200                | 10000                     | 7000                       | 165                          | 216                     | 264                  | 395                                 | 100             | 1600                         |
| V10H175P                | P10H175  | 10                  | 175                    | 225                | 3500                      | 3000                       | 55                           | 243                     | 297                  | 455                                 | 25              | 350                          |
| V14H175P                | P14H175  | 14                  | 175                    | 225                | 6500                      | 5000                       | 80                           | 243                     | 297                  | 455                                 | 50              | 700                          |
| V20H175P                | P20H175  | 20                  | 175                    | 225                | 10000                     | 7000                       | 180                          | 243                     | 297                  | 455                                 | 100             | 1400                         |
| V10H230P                | P10H230  | 10                  | 230                    | 300                | 3500                      | 3000                       | 60                           | 324                     | 396                  | 595                                 | 25              | 250                          |
| V14H230P                | P14H230  | 14                  | 230                    | 300                | 6500                      | 5000                       | 105                          | 324                     | 396                  | 595                                 | 50              | 550                          |
| V20H230P                | P20H230  | 20                  | 230                    | 300                | 10000                     | 7000                       | 225                          | 324                     | 396                  | 595                                 | 100             | 1100                         |
| V10H250P                | P10H250  | 10                  | 250                    | 320                | 3500                      | 3000                       | 65                           | 351                     | 429                  | 650                                 | 25              | 220                          |
| V14H250P                | P14H250  | 14                  | 250                    | 320                | 6500                      | 5000                       | 115                          | 351                     | 429                  | 650                                 | 50              | 500                          |
| V20H250P                | P20H250  | 20                  | 250                    | 320                | 10000                     | 7000                       | 240                          | 351                     | 429                  | 650                                 | 100             | 1000                         |
| V10H275P                | P10H275  | 10                  | 275                    | 350                | 3500                      | 3000                       | 70                           | 387                     | 473                  | 710                                 | 25              | 200                          |
| V14H275P                | P14H275  | 14                  | 275                    | 350                | 6500                      | 5000                       | 130                          | 387                     | 473                  | 710                                 | 50              | 450                          |
| V20H275P                | P20H275  | 20                  | 275                    | 350                | 10000                     | 7000                       | 260                          | 387                     | 473                  | 710                                 | 100             | 900                          |
| V10H300P                | P10H300  | 10                  | 300                    | 385                | 3500                      | 3000                       | 75                           | 423                     | 517                  | 775                                 | 25              | 180                          |
| V14H300P                | P14H300  | 14                  | 300                    | 385                | 6500                      | 5000                       | 140                          | 423                     | 517                  | 775                                 | 50              | 400                          |
| V20H300P                | P20H300  | 20                  | 300                    | 385                | 10000                     | 7000                       | 290                          | 423                     | 517                  | 775                                 | 100             | 800                          |
| V10H320P                | P10H320  | 10                  | 320                    | 420                | 3500                      | 3000                       | 80                           | 459                     | 561                  | 840                                 | 25              | 170                          |
| V14H320P                | P14H320  | 14                  | 320                    | 420                | 6500                      | 5000                       | 150                          | 459                     | 561                  | 840                                 | 50              | 380                          |
| V20H320P                | P20H320  | 20                  | 320                    | 420                | 10000                     | 7000                       | 320                          | 459                     | 561                  | 840                                 | 100             | 750                          |
| V10H385P                | P10H385  | 10                  | 385                    | 505                | 3500                      | 3000                       | 85                           | 558                     | 682                  | 1025                                | 25              | 160                          |
| V14H385P                | P14H385  | 14                  | 385                    | 505                | 6500                      | 5000                       | 175                          | 558                     | 682                  | 1025                                | 50              | 360                          |
| V20H385P                | P20H385  | 20                  | 385                    | 505                | 10000                     | 7000                       | 325                          | 558                     | 682                  | 1025                                | 100             | 700                          |
| V10H420P                | P10H420  | 10                  | 420                    | 560                | 3500                      | 3000                       | 90                           | 612                     | 748                  | 1120                                | 25              | 140                          |
| V14H420P                | P14H420  | 14                  | 420                    | 560                | 6500                      | 5000                       | 185                          | 612                     | 748                  | 1120                                | 50              | 300                          |
| V20H420P                | P20H420  | 20                  | 420                    | 560                | 10000                     | 7000                       | 330                          | 612                     | 748                  | 1120                                | 100             | 600                          |
| V10H440P                | P10H440  | 10                  | 440                    | 585                | 3500                      | 3000                       | 95                           | 643.5                   | 786.5                | 1180                                | 25              | 130                          |
| V14H440P                | P14H440  | 14                  | 440                    | 585                | 6500                      | 5000                       | 185                          | 643.5                   | 786.5                | 1180                                | 50              | 260                          |
| V20H440P                | P20H440  | 20                  | 440                    | 585                | 10000                     | 7000                       | 340                          | 643.5                   | 786.5                | 1180                                | 100             | 500                          |
| V10H460P                | P10H460  | 10                  | 460                    | 615                | 3500                      | 3000                       | 95                           | 675                     | 825                  | 1240                                | 25              | 120                          |
| V14H460P                | P14H460  | 14                  | 460                    | 615                | 6500                      | 5000                       | 190                          | 675                     | 825                  | 1240                                | 50              | 220                          |
| V20H460P                | P20H460  | 20                  | 460                    | 615                | 10000                     | 7000                       | 370                          | 675                     | 825                  | 1240                                | 100             | 400                          |
| V10H510P                | P10H510  | 10                  | 510                    | 670                | 3500                      | 3000                       | 98                           | 738                     | 902                  | 1355                                | 25              | 110                          |
| V14H510P                | P14H510  | 14                  | 510                    | 670                | 6500                      | 5000                       | 205                          | 738                     | 902                  | 1355                                | 50              | 200                          |
| V20H510P                | P20H510  | 20                  | 510                    | 670                | 10000                     | 7000                       | 410                          | 738                     | 902                  | 1355                                | 100             | 350                          |
| V10H550P                | P10H550  | 10                  | 550                    | 745                | 3500                      | 3000                       | 98                           | 819                     | 1001                 | 1500                                | 25              | 100                          |
| V14H550P                | P14H550  | 14                  | 550                    | 745                | 6500                      | 5000                       | 210                          | 819                     | 1001                 | 1500                                | 50              | 180                          |
| V20H550P                | P20H550  | 20                  | 550                    | 745                | 10000                     | 7000                       | 450                          | 819                     | 1001                 | 1500                                | 100             | 300                          |
| V10H625P                | P10H625  | 10                  | 625                    | 825                | 3500                      | 3000                       | 110                          | 900                     | 1100                 | 1650                                | 25              | 90                           |
| V14H625P                | P14H625  | 14                  | 625                    | 825                | 6500                      | 5000                       | 235                          | 900                     | 1100                 | 1650                                | 50              | 160                          |
| V20H625P                | P20H625  | 20                  | 625                    | 825                | 10000                     | 7000                       | 490                          | 900                     | 1100                 | 1650                                | 100             | 250                          |

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

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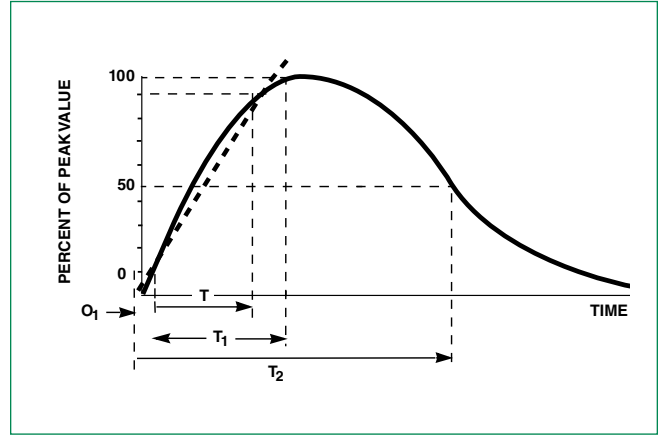
## Radial Led Varistors

### Current Energy and Power Dissipation Ratings



**Note:** The peak surge current and energy ratings must be reduced for applications exceeding 125°C ambient temperature.

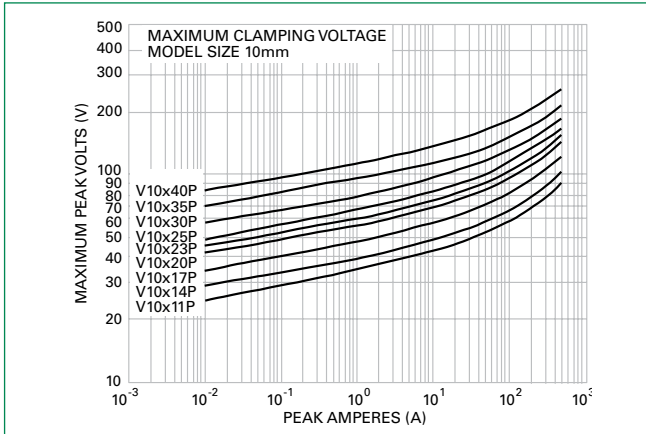
### Peak Pulse Current Test Waveform for Clamping Voltage



$O_1$  = 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

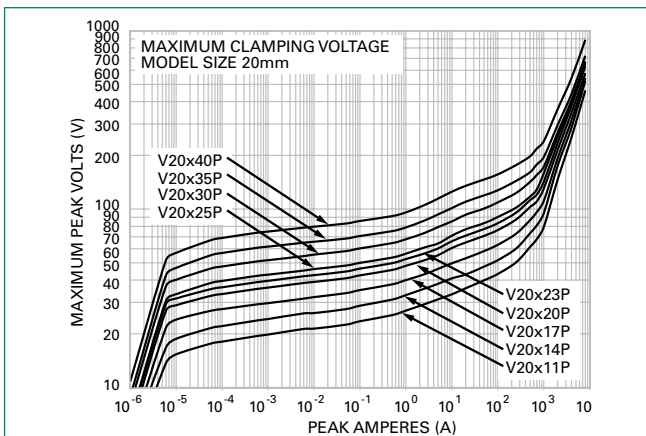
### Maximum Clamping Voltage for 10mm Parts

V10x11P - V10x40P



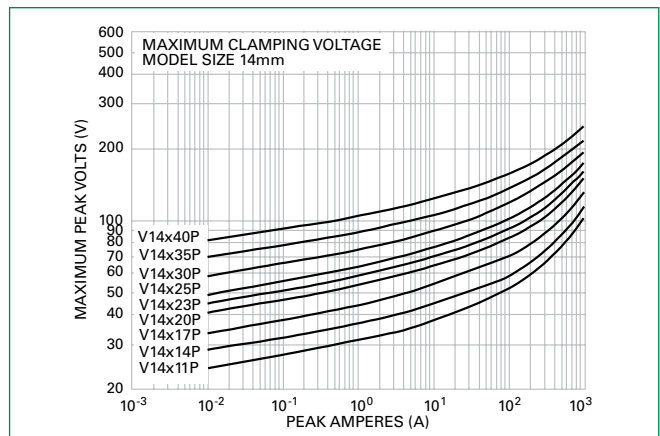
### Maximum Clamping Voltage for 20mm Parts

V20x11P - V20x40P



### Maximum Clamping Voltage for 14mm Parts

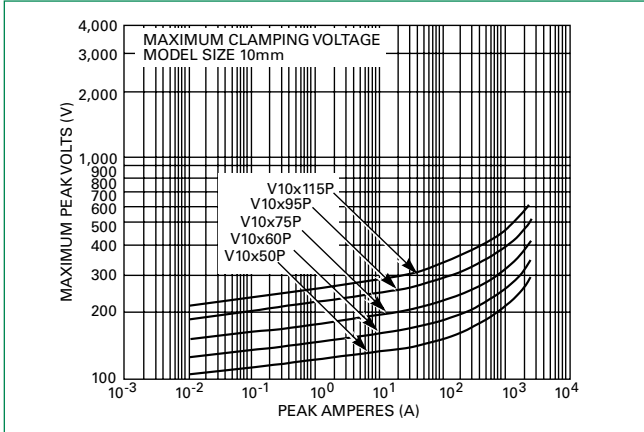
V14x11P - V14x40P



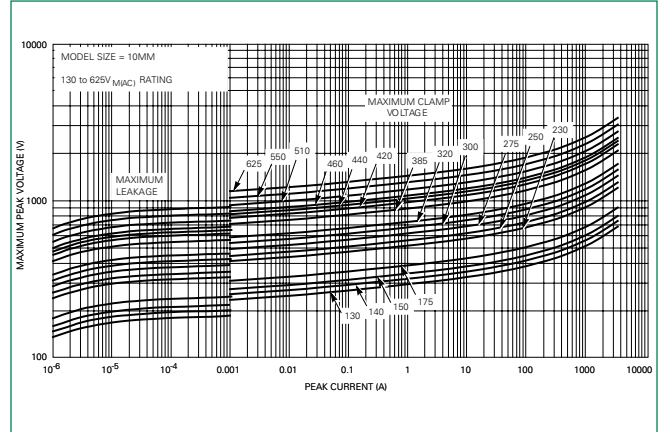
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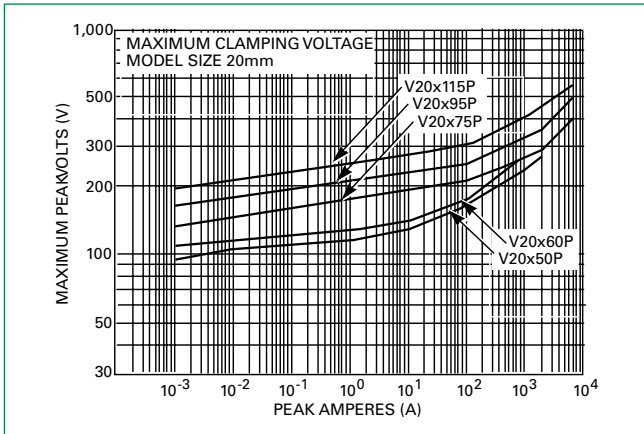
**Maximum Clamping Voltage for 10mm Parts**  
V10x50P - V10x115P



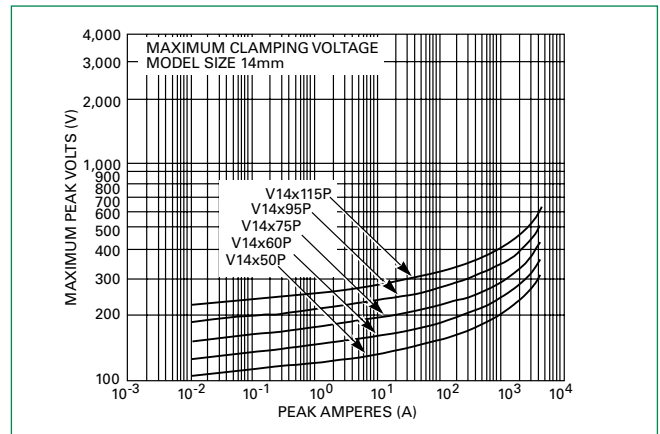
**Maximum Clamping Voltage for 10mm Parts**  
V10x130P - V10x625P



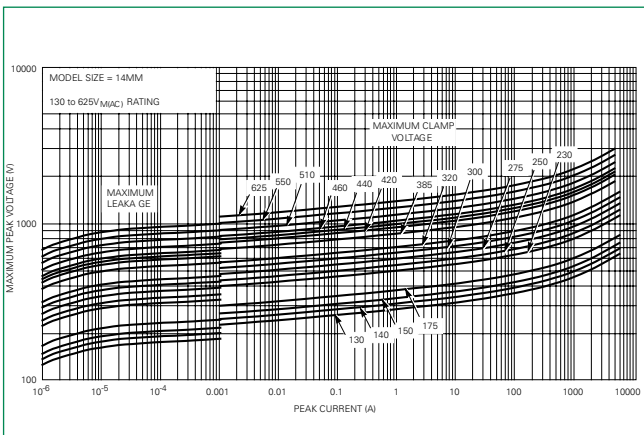
**Maximum Clamping Voltage for 20mm Parts**  
V20x50P - V20x115P



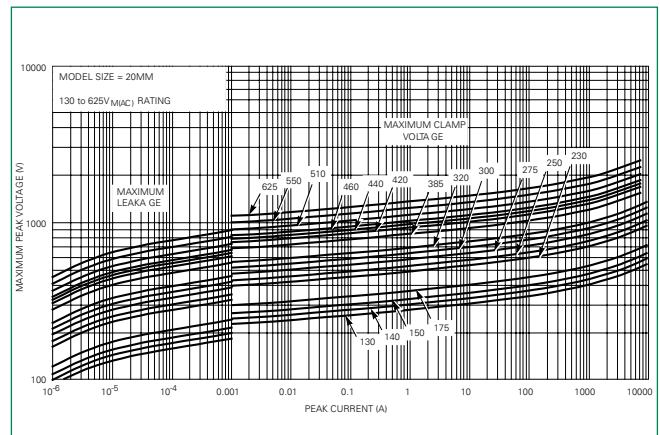
**Maximum Clamping Voltage for 14mm Parts**  
V14x50P - V14x115P



**Maximum Clamping Voltage for 14mm Parts**  
V14x130P - V14x625P



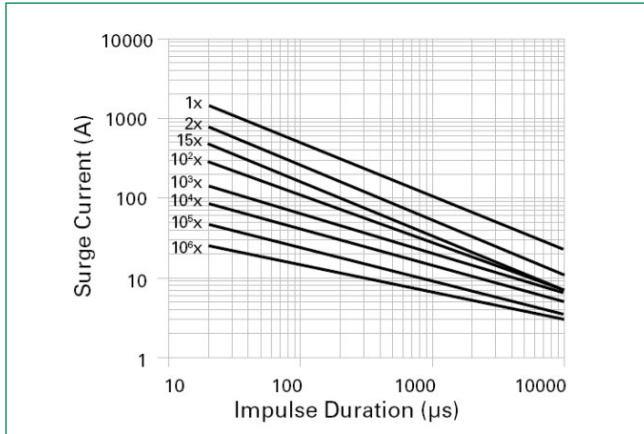
**Maximum Clamping Voltage for 20mm Parts**  
V20x130P - V20x625P



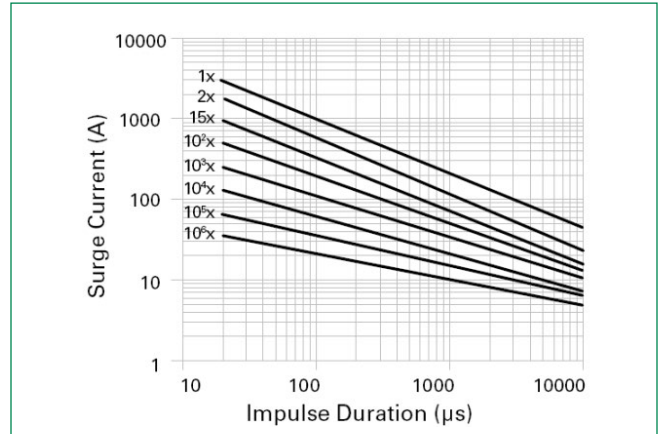
# HMOV™ Varistor Series

## Radial Leded Varistors

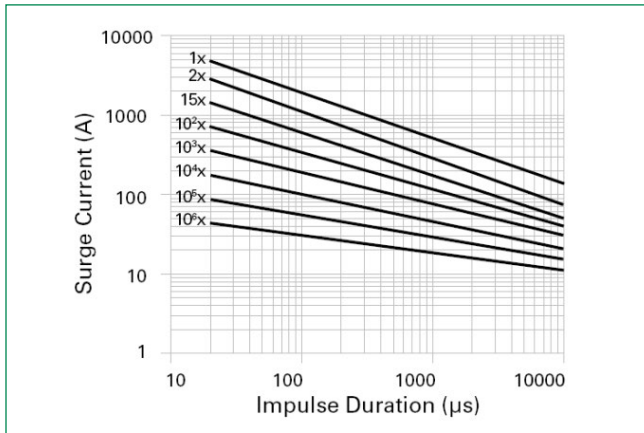
**Repetitive Surge Capability for 10mm Parts**  
V10x11P - V10x40P



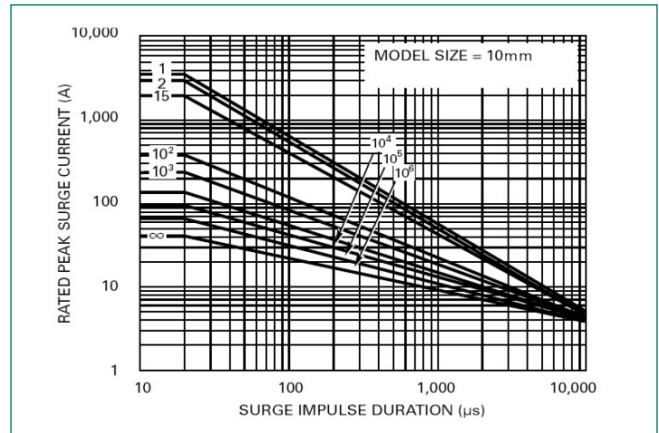
**Repetitive Surge Capability for 14mm Parts**  
V14x11P - V14x40P



**Repetitive Surge Capability for 20mm Parts**  
V20x11P - V20x40P



**Maximum Clamping Voltage 10mm Parts**  
V10x115P - V10x625P



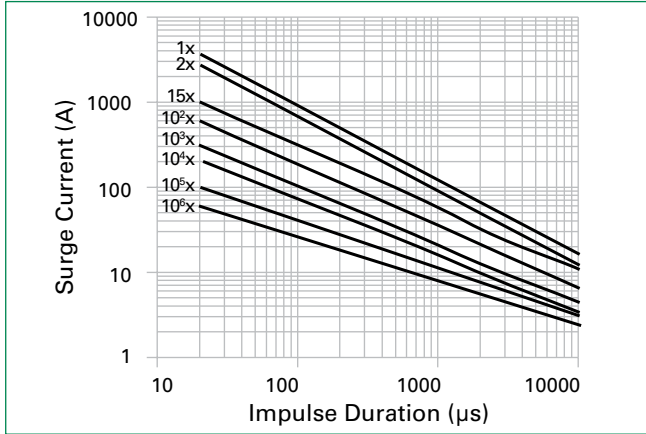
**Note:** Repetitive surge capability is qualified and tested based on 8/20µs current waveform (not combination waveform) and UL1449 40.7.3 (Edition 4) test condition.

**Note:** If pulse ratings are exceeded, a shift of  $V_{\text{NDC}}$  (at specified current) of more than +/-10% could result. This type of shift, which normally results in a decrease of  $V_{\text{NDC}}$ , 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.

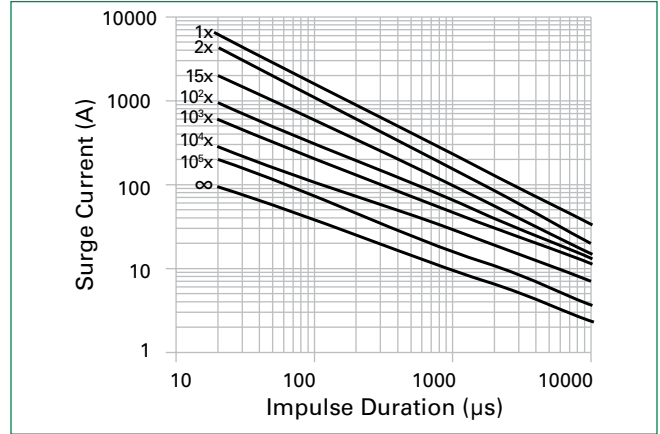
# HMOV™ Varistor Series

## Radial Leded Varistors

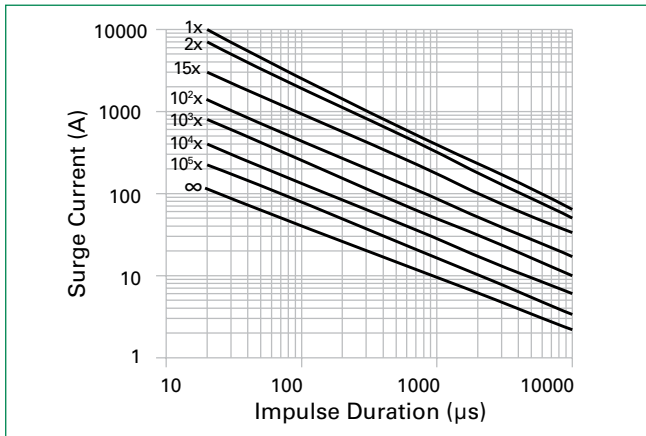
**Repetitive Surge Capability for 10mm Parts**  
V10x50P - V10x95P



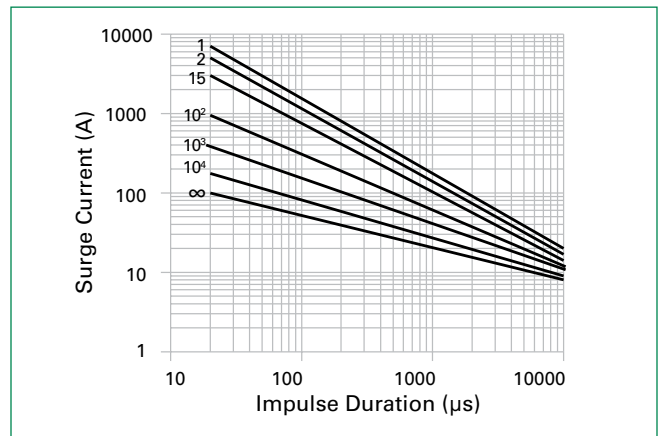
**Repetitive Surge Capability for 14mm Parts**  
V14x50P - V14x95P



**Repetitive Surge Capability for 20mm Parts**  
V20x50P - V20x95P

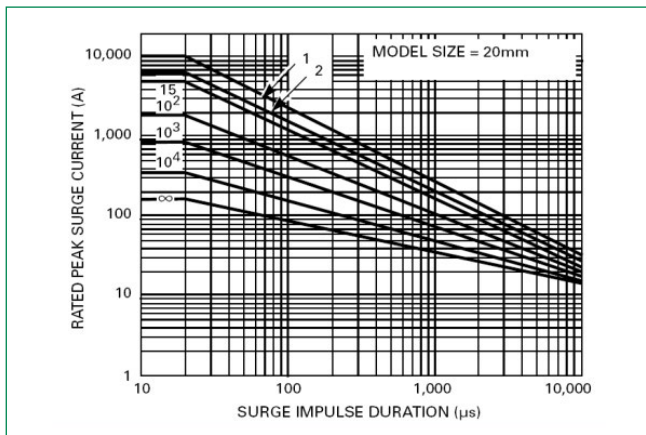


**Repetitive Surge Capability for 14mm Parts**  
V14x115P - V14x625P



**Note:** Repetitive surge capability is qualified and tested based on 8/20µs current waveform (not combination waveform) and UL1449 40.7.3 (Edition 4) test condition.

**Repetitive Surge Capability for 20mm Parts**  
V20x115P - V20x625P

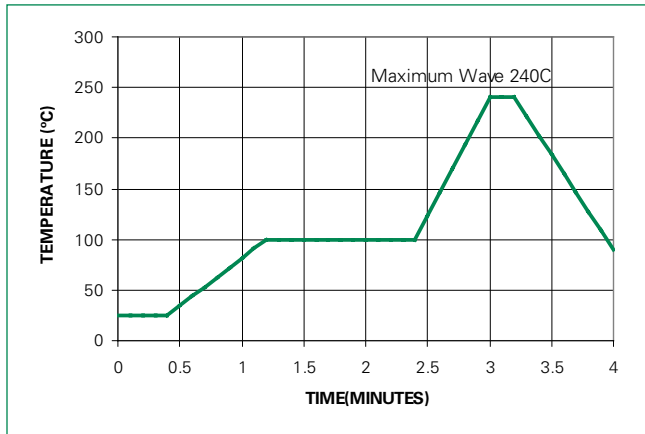


# HMOV™ Varistor Series

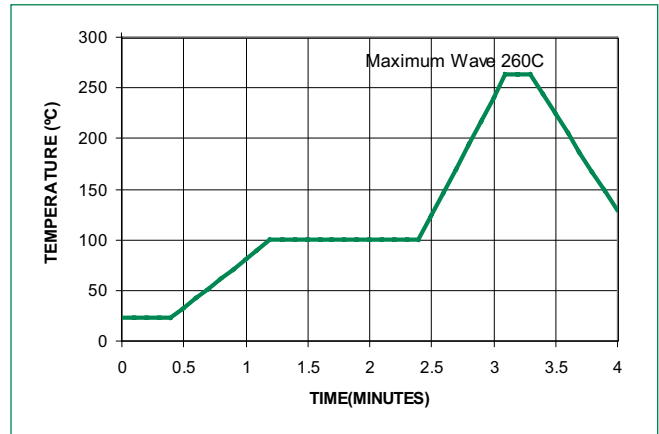
## Radial Leded Varistors

### 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, Silicone meets UL94V-0 requirements |
| <b>Device Labeling</b>           | Marked with LF, voltage and date code      |

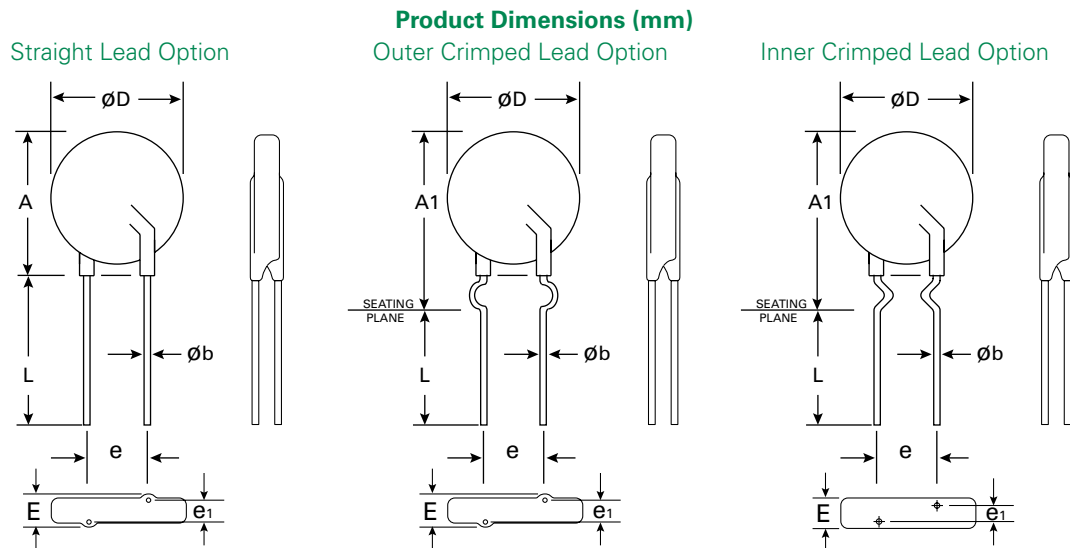
### Environmental Specifications

|                             |   |
|-----------------------------|---|
| <b>Humidity Aging</b>       | +85°C, 85% RH, 1500 hours<br>+/-10% typical voltage change    |
| <b>Thermal Shock</b>        | -55°C to +125°C, 1000 cycles<br>+/-10% typical voltage change |
| <b>Solvent Resistance</b>   | MIL-STD-202, Method 215                                       |
| <b>Moisture Sensitivity</b> | Level 1, J-STD-020  |



# HMOV™ Varistor Series

## Radial Leded Varistors



| Dimension               | V <sub>RMS</sub><br>Voltage<br>Model | 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) |
| A                       | 11 - 320                             | -               | 16<br>(0.630)   | -               | 20<br>(0.787)   | -               | 26.5<br>(1.043) |
|                         | 385 - 625                            | -               | 17<br>(0.689)   | -               | 20.5<br>(0.807) | -               | 28.0<br>(1.102) |
| A1                      | All                                  | -               | 19.5<br>(0.768) | -               | 22.5<br>(0.886) | -               | 29.0<br>(1.142) |
| ØD                      | All                                  | -               | 12.5<br>(0.492) | -               | 17<br>(0.669)   | -               | 23.0<br>(0.906) |
| e                       | 11 - 95                              | 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)  |
|                         | ≥115                                 |                 |                 |                 |                 | 9.0<br>(0.354)  | 11.0<br>(0.433) |
| e <sub>1</sub>          | 11 - 30                              | 1.0<br>(0.039)  | 3.0<br>(0.118)  | 1.0<br>(0.039)  | 3.0<br>(0.118)  | 1.0<br>(0.039)  | 3.0<br>(0.118)  |
|                         | 35 - 320                             | 1.5<br>(0.059)  | 3.5<br>(0.138)  | 1.5<br>(0.059)  | 3.5 (0.138)     | 1.5<br>(0.059)  | 3.5<br>(0.138)  |
|                         | 385 - 625                            | 2.5<br>(0.098)  | 5.5<br>(0.217)  | 2.5<br>(0.098)  | 5.5<br>(0.217)  | 2.5<br>(0.098)  | 5.5<br>(0.217)  |
| E                       | 11 - 30                              | -               | 5.0<br>(0.197)  | -               | 5.0<br>(0.197)  | -               | 5.0<br>(0.197)  |
|                         | 35 - 320                             | -               | 5.6<br>(0.220)  | -               | 5.6<br>(0.220)  | -               | 5.6<br>(0.220)  |
|                         | 385 - 510                            | -               | 7.3 (0.287)     | -               | 7.3 (0.287)     | -               | 7.3<br>(0.287)  |
|                         | 550 - 625                            | -               | 8.3<br>(0.327)  | -               | 8.3<br>(0.327)  | -               | 8.3<br>(0.327)  |
| Øb                      | All                                  | 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) |
| L (bulk packaging only) | All                                  | 25.4<br>(1.00)  | -               | 25.4<br>(1.00)  | -               | 25.4<br>(1.00)  | -               |
| L <sub>TRIM</sub>       | All                                  | 2.5<br>(0.098)  | 4.5<br>(0.177)  | 2.5<br>(0.098)  | 4.5<br>(0.177)  | 2.5<br>(0.098)  | 4.5<br>(0.177)  |

Note: Dimensions in Millimetres (Inches) are typical.

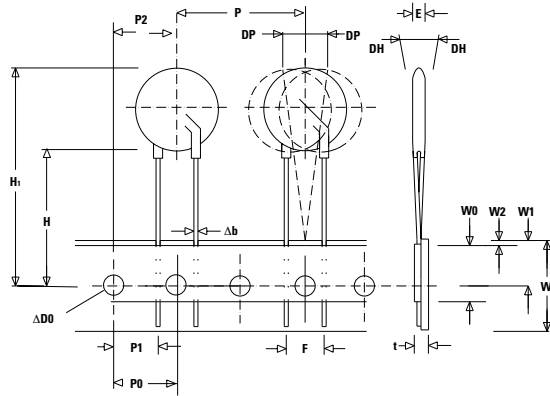
# HMOV™ Varistor Series

## Radial Leded Varistors

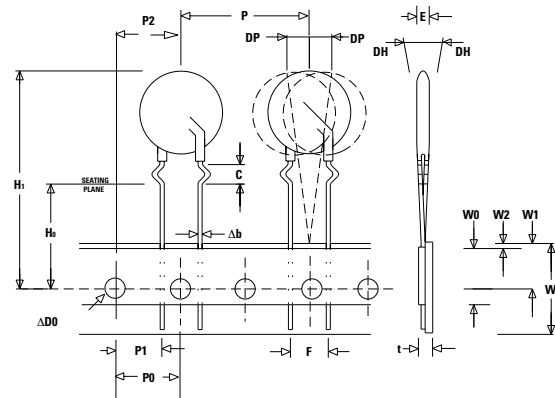
### Tape and Reel Specifications

10, 14, and 20mm Devices

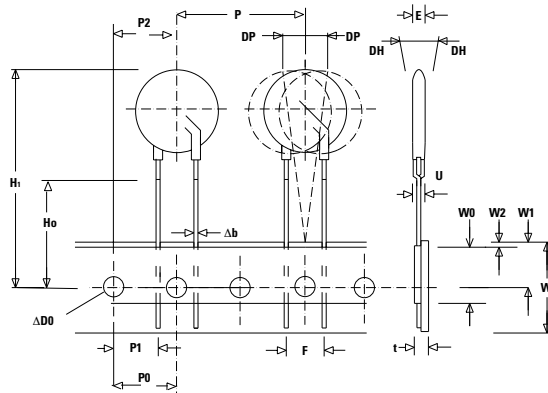
Straight Leads "L1"



Crimped Leads "L2"



Under Crimped / IN-LINE Leads "L3"



Refer next page for dimension measurement specifications.

# HMOV™ Varistor Series

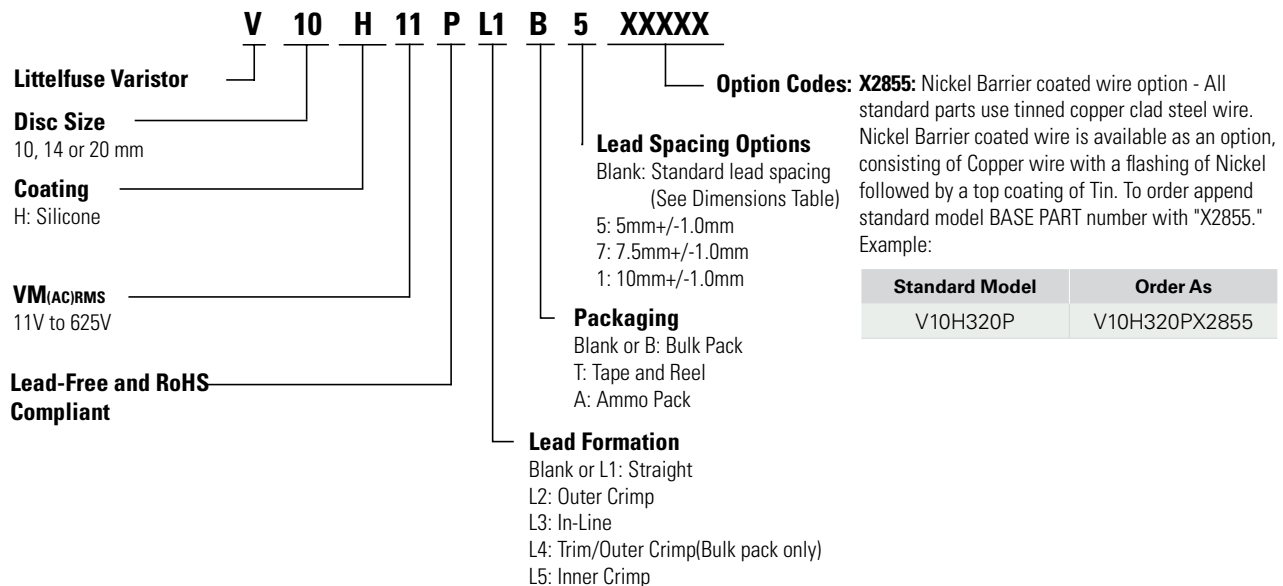
## Radial Leaded Varistors

### Tape and Reel Specifications (continued)

| Symbol               | Description                               | 10mm              | 14mm              | 20mm                     |                   |
|----------------------|---|-------------------|-------------------|--------------------------|-------------------|
|                      |   |                   |                   | (11vac To 95vac Voltage) | (≥115vac Voltage) |
| <b>P</b>             | Pitch of Component                        | 25.4 +/- 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      |
| <b>P<sub>1</sub></b> | Feed Hole Center to Pitch                 | 8.85 +/- 0.7      | 8.85 +/- 0.7      | 8.85 +/- 0.7             | 7.70 +/- 0.7      |
| <b>P<sub>2</sub></b> | Hole Center to Component Center           | 12.7 +/- 0.7      | 12.7 +/- 0.7      | 12.7 +/- 0.7             | 12.7 +/- 0.7      |
| <b>F</b>             | Lead to Lead Distance                     | 7.5 +/- 1.0       | 7.5 +/- 1.0       | 7.5 +/- 1.0              | 10 +/- 1.0        |
| <b>h</b>             | Component Alignment                       | 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  |
| <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      |
| <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 |
| <b>W<sub>2</sub></b> | Hold Down Tape Position                   | 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  |
| <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      |
| <b>H<sub>1</sub></b> | Component Height                          | 36.0 Max          | 40.0 Max          | 46.5 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       |
| <b>t</b>             | Total Tape Thickness                      | 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           |
| <b>p</b>             | Component Alignment                       | 3° Max            | 3° Max            | 3° Max                   | 3° Max            |

- 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

### Part Numbering System



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