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ROV14, ROV14H, ROV14E

14mm Series Metal Oxide Varistors

www.tycopowercomponents.com

Document: SCD 25483
Status: Released
Rev.: A June 30, 2003

GENERAL DESCRIPTION

The ROV14-XXX (Radial-leaded Metal Oxide Varistor) products are 14mm radial leaded varistor devices suitable for protection of overvoltage transients.

ROV devices can provide protection for a wide variety of power systems against overvoltage faults such as lightning, power contact and power induction. Suitable for a broad range of applications including, but not limited to security, power supplies, surge strips, etc., the ROV device helps to protect valuable equipment from potential power surge damage by clamping high energy, short duration impulses. The ROV devices have high current handling and energy absorption capability and fast response times to help protect against transient faults.

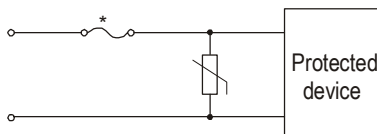
FEATURES

- Radial leaded
- Broad Varistor voltage and V_{rms} range
 - Varistor voltage : 18V - 1800V
 - V_{rms} voltage : 11V - 1000V
- Three surge capability series
 - Standard series, High surge series, Extra high surge Series
- Various lead types
 - Straight, Kinked, Other
- Various packaging options
 - Bulk, Tape & Reel, Ammo Pack
- Helps designers meet the following standards
 - UL, CSA, VDE
- Fast response time
- High current and energy absorption capability

APPLICATIONS

- Power supplies and power systems
- Line voltage
- Telecommunications systems
- Automotive systems
- Appliances

TYPICAL APPLICATION SCHEMATIC



*In some applications, a polymeric PTC device such as a Tyco Electronics PolySwitch device may be used instead of a fuse to provide a preferred solution.

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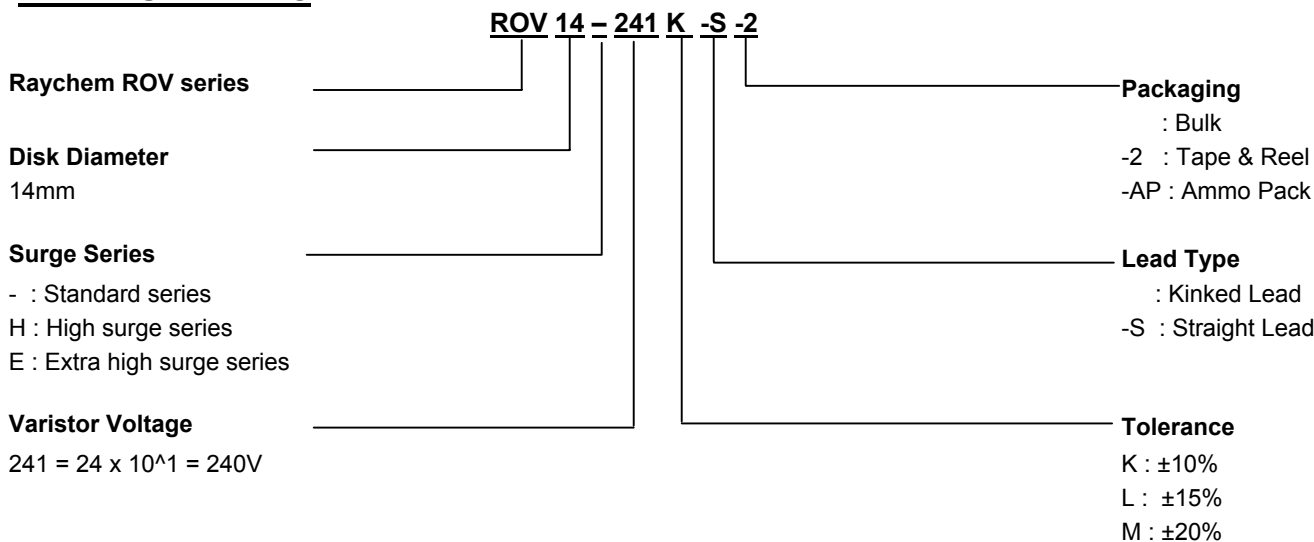
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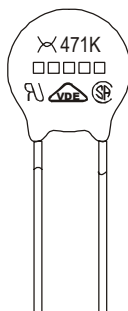
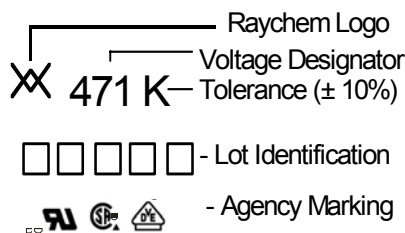
Status: Released

Rev.: A June 30, 2003

PART NUMBERING



DEVICE MARKING



GENERAL CHARACTERISTICS

| | |
|---|----------------------------|
| Storage temperature: | -40°C ... +125°C |
| Maximum operating temperature: | -40°C ... +125°C |
| Maximum working surface temperature: | +115°C |
| Temperature coefficient of voltage: | 0....+0.05% / °C max. |
| Insulation resistance of coating (@ 500 VDC): | Over 1000MΩ |
| Maximum response time: | 25ns |
| Lead Material: | 22 AWG Sn/Pb Plated Copper |

AGENCY RECOGNITION

Device Ratings and Characteristics Tables contain specific recognition information for each individual part. The table below details marking symbols for each agency recognition type.

| | | | |
|--------|-------------------------|-----|-----|
| UL1414 | UL1449 (2nd Edition) | CSA | VDE |
| ◆ | ● | ▲ | ■ |

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DEVICE RATINGS AND CHARACTERISTICS

STANDARD SERIES

| Part Number | Varistor Voltage V@1.0mA | | Maximum Allowable Voltage | | Maximum Clamping Voltage V@50A | Maximum Surge Current (8x20us) | | Rated Wattage | Energy (10x1000us) | Capacitance (Typical) | Certifications |
|-------------|-----------------------------|-----------|--|--------------------|-----------------------------------|-----------------------------------|-------------------|---------------|-----------------------|--------------------------|---|
| | (V _{DC}) | Tolerance | V _{rms} (V _{AC}) | (V _{DC}) | (V _{DC}) | 1 Time (A) | 2 Times (A) | (W) | (J) | @1kHz (pF) |  |
| | | | | | | | | | | | |
| ROV14-180M | 18 | ± 20% | 11 | 14 | 36 ¹⁾ | 1000 | 500 | 0.10 | 4.7 | 14898 | ● ■ |
| ROV14-220L | 22 | ± 15% | 14 | 18 | 43 ¹⁾ | | | | 5.4 | 11957 | ● ■ |
| ROV14-270K | 27 | ± 10% | 17 | 22 | 53 ¹⁾ | | | | 6.9 | 9731 | ● ■ |
| ROV14-330K | 33 | | 20 | 26 | 65 ¹⁾ | | | | 8.8 | 7704 | ● ■ |
| ROV14-390K | 39 | | 25 | 31 | 77 ¹⁾ | | | | 9.4 | 7622 | ● ■ |
| ROV14-470K | 47 | | 30 | 38 | 93 ¹⁾ | | | | 12.0 | 6417 | ● ■ |
| ROV14-560K | 56 | | 35 | 45 | 110 ¹⁾ | | | | 14.0 | 5184 | ● ■ |
| ROV14-680K | 68 | | 40 | 56 | 135 ¹⁾ | | | | 17.0 | 5099 | ● ■ |
| ROV14-820K | 82 | | 50 | 65 | 135 | | | | 22.0 | 2965 | ● ■ |
| ROV14-101K | 100 | | 60 | 85 | 165 | 28.0 | 2221 | ● ■ | | | |
| ROV14-121K | 120 | | 75 | 100 | 200 | 32.0 | 1742 | ● ■ | | | |
| ROV14-151K | 150 | 95 | 125 | 250 | 44.0 | 1510 | ● ■ | | | | |
| ROV14-181K | 180 | 115 | 150 | 300 | 52.0 | 922 | ● ■ | | | | |
| ROV14-201K | 200 | 130 | 170 | 340 | 57.0 | 845 | ◆ ● ▲ ■ | | | | |
| ROV14-221K | 220 | 140 | 180 | 360 | 62.0 | 713 | ◆ ● ▲ ■ | | | | |
| ROV14-241K | 240 | 150 | 200 | 395 | 67.0 | 769 | ◆ ● ▲ ■ | | | | |
| ROV14-271K | 270 | 175 | 225 | 455 | 79.0 | 655 | ◆ ● ▲ ■ | | | | |
| ROV14-301K | 300 | 195 | 250 | 505 | 84.0 | 650 | ◆ ● ▲ ■ | | | | |
| ROV14-331K | 330 | 210 | 275 | 550 | 92.0 | 613 | ◆ ● ▲ ■ | | | | |
| ROV14-361K | 360 | 230 | 300 | 595 | 104.0 | 465 | ◆ ● ▲ ■ | | | | |
| ROV14-391K | 390 | 250 | 320 | 650 | 120.0 | 458 | ◆ ● ▲ ■ | | | | |
| ROV14-431K | 430 | 275 | 350 | 710 | 132.0 | 454 | ◆ ● ▲ ■ | | | | |
| ROV14-471K | 470 | 300 | 385 | 775 | 140.0 | 413 | ◆ ● ▲ ■ | | | | |
| ROV14-511K | 510 | 320 | 418 | 842 | 148.0 | 374 | ◆ ● ▲ ■ | | | | |
| ROV14-561K | 560 | 350 | 460 | 920 | 156.0 | 398 | ◆ ● ▲ ■ | | | | |
| ROV14-621K | 620 | 385 | 505 | 1025 | 164.0 | 305 | ◆ ● ▲ ■ | | | | |
| ROV14-681K | 680 | 420 | 560 | 1120 | 172.0 | 312 | ◆ ● ▲ ■ | | | | |
| ROV14-751K | 750 | 460 | 615 | 1240 | 180.0 | 270 | ◆ ● ▲ ■ | | | | |
| ROV14-781K | 780 | 485 | 640 | 1290 | 184.0 | 252 | ◆ ● ▲ ■ | | | | |
| ROV14-821K | 820 | 510 | 670 | 1355 | 188.0 | 265 | ◆ ● ▲ ■ | | | | |
| ROV14-911K | 910 | 550 | 745 | 1500 | 204.0 | 240 | ◆ ● ▲ ■ | | | | |
| ROV14-102K | 1000 | 625 | 825 | 1650 | 224.0 | 200 | ◆ ● ▲ ■ | | | | |
| ROV14-112K | 1100 | 680 | 895 | 1815 | 248.0 | 180 | ◆ ● ▲ ■ | | | | |
| ROV14-182K | 1800 | 1000 | 1465 | 2970 | 348.0 | 118 | | | | | |

1). The clamping voltage for devices ROV14-180M to ROV14-680K is tested with 10A current.

ROV14, ROV14H, ROV14E 14mm Series Metal Oxide Varistors

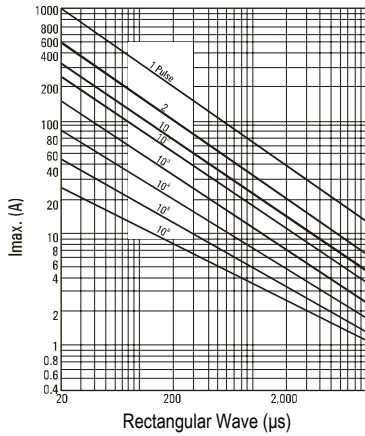
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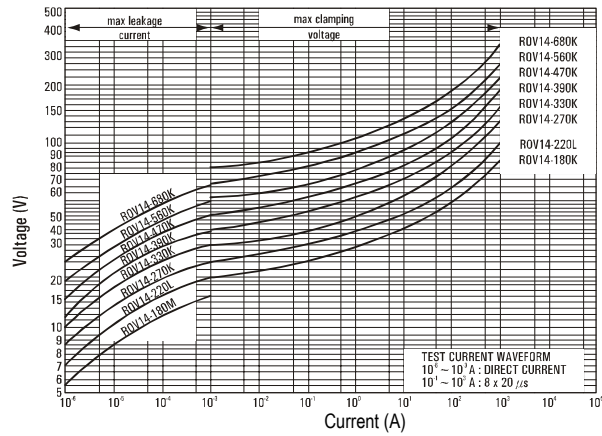
PULSE LIFETIME RATING CURVES STANDARD SERIES

V-I CHARACTERISTIC CURVES STANDARD SERIES

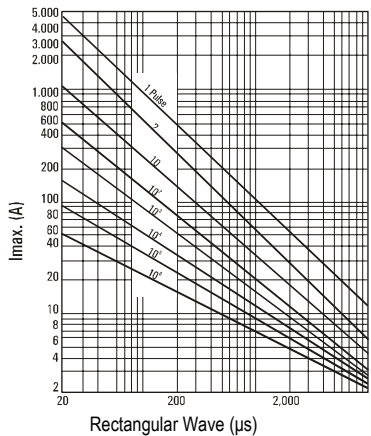
ROV14-180M – ROV14-680K



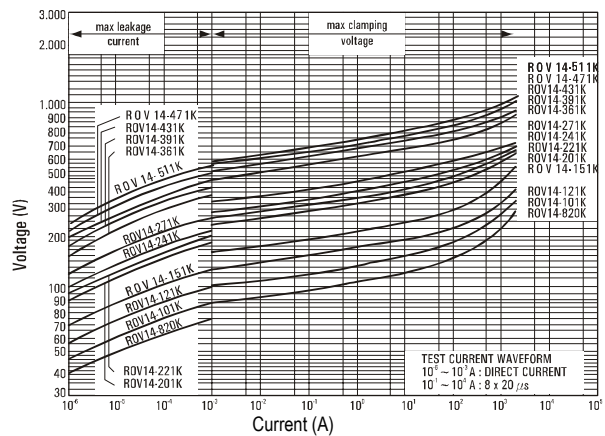
ROV14-180M – ROV14-680K



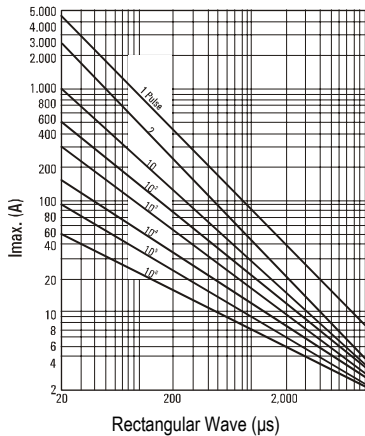
ROV14-820K – ROV14-511K



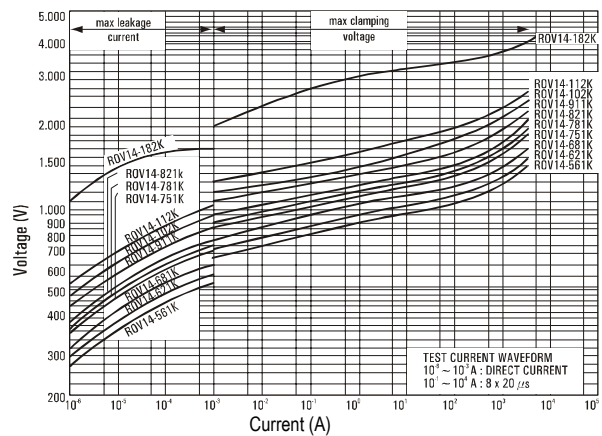
ROV14-820K – ROV14-511K



ROV14-561K – ROV14-182K



ROV14-561K – ROV14-182K



ROV14, ROV14H, ROV14E

14mm Series Metal Oxide Varistors

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DEVICE RATINGS AND CHARACTERISTICS

HIGH SURGE SERIES

| Part Number | Varistor Voltage V@1.0mA | | Maximum Allowable Voltage | | Maximum Clamping Voltage V@50A | Maximum Surge Current (8x20us) | | Rated Wattage | Energy (10x1000us) | Capacitance (Typical) | Certifications |
|-------------|-----------------------------|-----------|--|--------------------|-----------------------------------|-----------------------------------|-------------------|---------------|-----------------------|--------------------------|---|
| | (V _{DC}) | Tolerance | V _{rms} (V _{AC}) | (V _{DC}) | (V _{DC}) | 1 Time (A) | 2 Times (A) | (W) | (J) | @1kHz (pF) |  |
| ROV14H180M | 18 | ± 20% | 11 | 14 | 36 ¹⁾ | 2000 | 1000 | 0.10 | 5.2 | 14890 | ● ■ |
| ROV14H220L | 22 | ± 15% | 14 | 18 | 43 ¹⁾ | | | | 6.3 | 11960 | ● ■ |
| ROV14H270K | 27 | ± 10% | 17 | 22 | 53 ¹⁾ | | | | 7.8 | 9730 | ● ■ |
| ROV14H330K | 33 | | 20 | 26 | 65 ¹⁾ | | | | 9.5 | 7700 | ● ■ |
| ROV14H390K | 39 | | 25 | 31 | 77 ¹⁾ | | | | 11.0 | 7620 | ● ■ |
| ROV14H470K | 47 | | 30 | 38 | 93 ¹⁾ | | | | 14.0 | 6420 | ● ■ |
| ROV14H560K | 56 | | 35 | 45 | 110 ¹⁾ | | | | 16.0 | 5180 | ● ■ |
| ROV14H680K | 68 | | 40 | 56 | 135 ¹⁾ | | | | 20.0 | 5100 | ● ■ |
| ROV14H820K | 82 | | 50 | 65 | 135 | | | | 28.0 | 2970 | ● ■ |
| ROV14H101K | 100 | | 60 | 85 | 165 | | | | 36.0 | 2220 | ● ■ |
| ROV14H121K | 120 | | 75 | 100 | 200 | 44.0 | 1740 | ● ■ | | | |
| ROV14H151K | 150 | | 95 | 125 | 250 | 53.0 | 1510 | ● ■ | | | |
| ROV14H181K | 180 | 115 | 150 | 300 | 65.0 | 920 | ● ■ | | | | |
| ROV14H201K | 200 | 130 | 170 | 340 | 70.0 | 840 | ◆ ● ▲ ■ | | | | |
| ROV14H221K | 220 | 140 | 180 | 360 | 78.0 | 710 | ◆ ● ▲ ■ | | | | |
| ROV14H241K | 240 | 150 | 200 | 395 | 84.0 | 770 | ◆ ● ▲ ■ | | | | |
| ROV14H271K | 270 | 175 | 225 | 455 | 99.0 | 650 | ◆ ● ▲ ■ | | | | |
| ROV14H301K | 300 | 195 | 250 | 505 | 105.0 | 650 | ◆ ● ▲ ■ | | | | |
| ROV14H331K | 330 | 210 | 275 | 550 | 115.0 | 610 | ◆ ● ▲ ■ | | | | |
| ROV14H361K | 360 | 230 | 300 | 595 | 130.0 | 470 | ◆ ● ▲ ■ | | | | |
| ROV14H391K | 390 | 250 | 320 | 650 | 140.0 | 460 | ◆ ● ▲ ■ | | | | |
| ROV14H431K | 430 | 275 | 350 | 710 | 155.0 | 450 | ◆ ● ▲ ■ | | | | |
| ROV14H471K | 470 | 300 | 385 | 775 | 175.0 | 420 | ◆ ● ▲ ■ | | | | |
| ROV14H511K | 510 | 320 | 418 | 842 | 190.0 | 370 | ◆ ● ▲ ■ | | | | |
| ROV14H561K | 560 | 350 | 460 | 920 | 205.0 | 400 | ◆ ● ▲ ■ | | | | |
| ROV14H621K | 620 | 385 | 505 | 1025 | 215.0 | 300 | ◆ ● ▲ ■ | | | | |
| ROV14H681K | 680 | 420 | 560 | 1120 | 225.0 | 310 | ◆ ● ▲ ■ | | | | |
| ROV14H751K | 750 | 460 | 615 | 1240 | 230.0 | 270 | ◆ ● ▲ ■ | | | | |
| ROV14H781K | 780 | 485 | 640 | 1290 | 233.0 | 250 | ◆ ● ▲ ■ | | | | |
| ROV14H821K | 820 | 510 | 670 | 1355 | 235.0 | 260 | ◆ ● ▲ ■ | | | | |
| ROV14H911K | 910 | 550 | 745 | 1500 | 255.0 | 240 | ◆ ● ▲ ■ | | | | |
| ROV14H102K | 1000 | 625 | 825 | 1650 | 283.0 | 200 | ◆ ● ▲ ■ | | | | |
| ROV14H112K | 1100 | 680 | 895 | 1815 | 310.0 | 180 | ◆ ● ▲ ■ | | | | |

1). The clamping voltage for devices ROV14H180M to ROV14H680K is tested with 10A current.

ROV14, ROV14H, ROV14E
14mm Series Metal Oxide Varistors

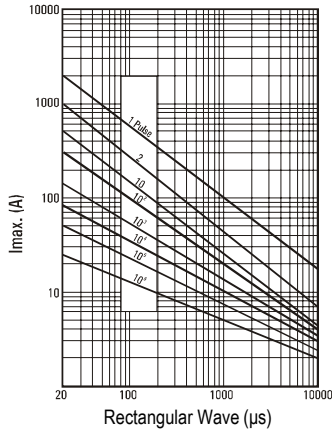
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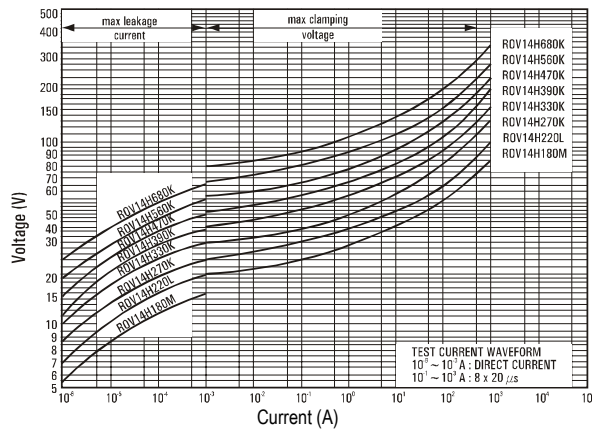
PULSE LIFETIME RATING CURVES
HIGH SURGE SERIES

V-I CHARACTERISTIC CURVES
HIGH SURGE SERIES

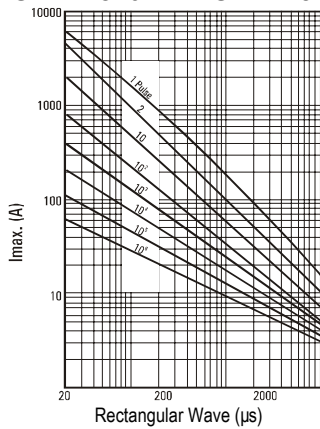
ROV14H180M – ROV14H680K



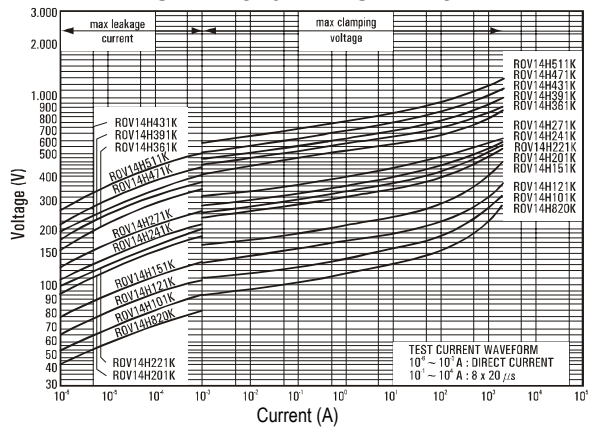
ROV14H180M – ROV14H680K



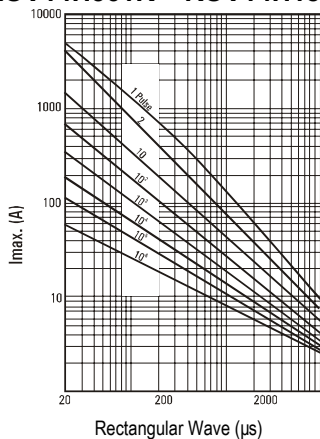
ROV14H820K – ROV14H511K



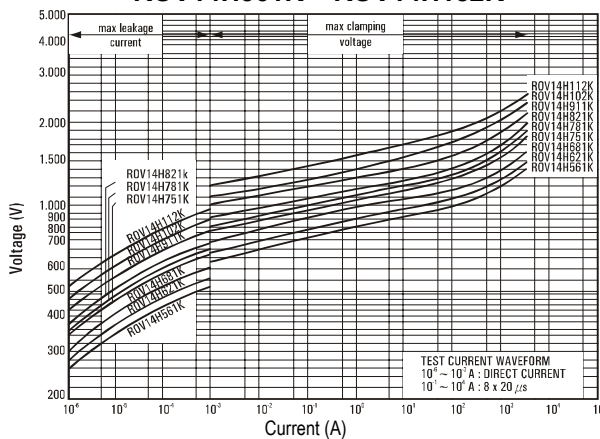
ROV14H820K – ROV14H511K



ROV14H561K – ROV14H182K



ROV14H561K – ROV14H182K



ROV14, ROV14H, ROV14E


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DEVICE RATINGS AND CHARACTERISTICS

EXTRA HIGH SURGE SERIES

| Part Number | Varistor Voltage V@1.0mA | | Maximum Allowable Voltage | | Maximum Clamping Voltage V@50A | Maximum Surge Current (8x20us) | | Rated Wattage | Energy (10x1000us) | Capacitance (Typical) | Certifications |
|-------------|-----------------------------|-----------|--|--------------------|-----------------------------------|-----------------------------------|-------------------|---------------|-----------------------|--------------------------|---|
| | (V _{DC}) | Tolerance | V _{rms} (V _{AC}) | (V _{DC}) | (V _{DC}) | 1 Time (A) | 2 Times (A) | (W) | (J) | @1kHz (pF) |  |
| ROV14E201K | 200 | ± 10% | 130 | 170 | 340 | 6500 | 6000 | 0.60 | 84.0 | 840 | ● ▲ |
| ROV14E221K | 220 | | 140 | 180 | 360 | | | | 93.0 | 710 | ● ▲ |
| ROV14E241K | 240 | | 150 | 200 | 395 | | | | 101.0 | 770 | ● ▲ |
| ROV14E271K | 270 | | 175 | 225 | 455 | | | | 113.0 | ----- | |
| ROV14E301K | 300 | | 195 | 250 | 505 | | | | 126.0 | ----- | |
| ROV14E331K | 330 | | 210 | 275 | 550 | | | | 138.0 | ----- | |
| ROV14E361K | 360 | | 230 | 300 | 595 | | | | 151.0 | ----- | |

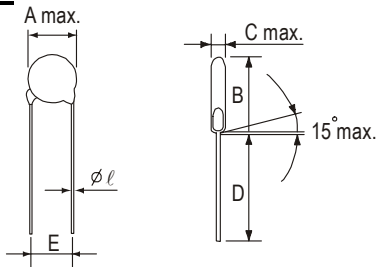
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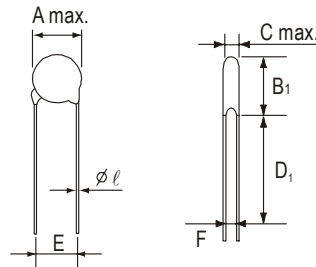
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DIMENSIONS



KINKED LEAD TYPE
Dimension Table

| | |
|-----------------|------|
| A max. | 16.5 |
| $\ell \pm 0.05$ | 0.8 |
| $E \pm 1.0$ | 7.5 |
| B max. | 22.0 |
| D_1 min. | 25.0 |
| D min. | 24.0 |



STRAIGHT LEAD TYPE (-S)
Table of C max., F, and B_1 max.

| Type No. | C max. | $F \pm 0.8$ | B_1 max. |
|----------|--------|-------------|------------|
| 180M | 5.0 | 0.9 | 19.5 |
| 220L | 5.0 | 1.0 | 19.5 |
| 270K | 5.2 | 1.1 | 19.5 |
| 330K | 5.2 | 1.2 | 19.5 |
| 390K | 5.2 | 1.4 | 19.5 |
| 470K | 5.6 | 1.4 | 19.5 |
| 560K | 5.6 | 1.6 | 19.5 |
| 680K | 6.1 | 1.9 | 19.5 |
| 820K | 4.4 | 1.0 | 19.5 |
| 101K | 4.5 | 1.0 | 19.5 |
| 121K | 4.6 | 1.1 | 19.5 |
| 151K | 5.1 | 1.4 | 19.5 |
| 181K | 4.7 | 1.2 | 19.5 |
| 201K | 4.8 | 1.2 | 19.5 |
| 221K | 4.9 | 1.3 | 19.5 |
| 241K | 5.0 | 1.5 | 19.5 |
| 271K | 5.2 | 1.5 | 19.5 |
| 301K | 5.4 | 1.7 | 19.5 |
| 331K | 5.5 | 1.7 | 19.5 |
| 361K | 5.7 | 2.1 | 19.5 |
| 391K | 5.9 | 2.2 | 20.0 |
| 431K | 6.7 | 2.5 | 20.0 |
| 471K | 7.0 | 2.7 | 20.0 |
| 511K | 7.2 | 3.1 | 20.5 |
| 561K | 7.5 | 3.4 | 20.5 |
| 621K | 7.8 | 3.8 | 20.5 |
| 681K | 8.2 | 4.1 | 20.5 |
| 751K | 8.6 | 4.3 | 20.5 |
| 781K | 8.8 | 4.6 | 20.5 |
| 821K | 9.0 | 4.6 | 20.5 |
| 911K | 9.6 | 5.4 | 20.5 |
| 102K | 10.1 | 5.6 | 20.5 |
| 112K | 10.7 | 6.1 | 20.5 |
| 182K | 12.8 | 10.2 | 22.5 |

ROV14, ROV14H, ROV14E

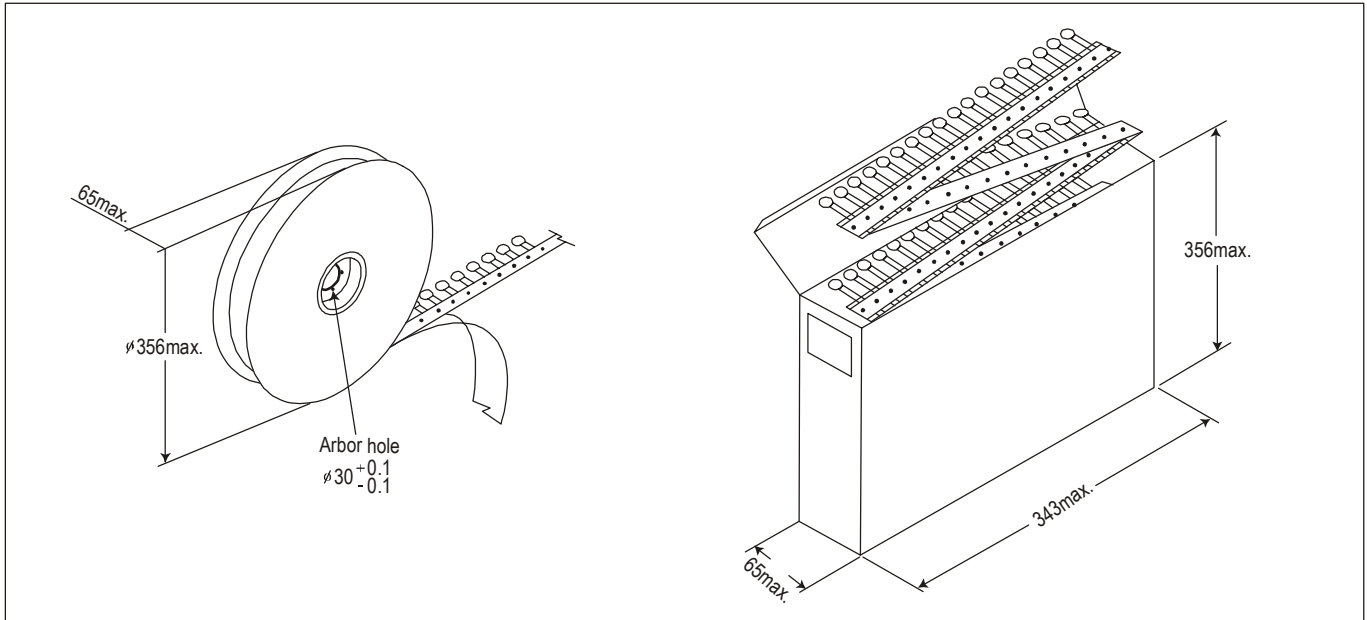
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PACKAGING

in mm



| Packaging | Bulk (box) | Reel | Ammo |
|------------------|-----------------|-------------------|-----------------|
| Box size (mm) | 290 x 155 x 110 | 350 x 350 x 74 | 350 x 260 x 65 |
| Carton size (mm) | 310 x 328 x 250 | 370 x 370 x 468 | 365 x 535 x 275 |
| One carton with | 4 Boxes | 6 Boxes (6 reels) | 8 Boxes |

| Part Number | Bulk (box) | Reel | Ammo |
|---|------------|------|------|
| ROV14-180M to ROV14-470K, ROV14H180M to ROV14H470K | 1500 | 750 | 500 |
| ROV14-560K to ROV14-680K, ROV14H560K to ROV14H680K | 1500 | 750 | 500 |
| ROV14-820K to ROV14-331K, ROV14H820K to ROV14H331K | 1500 | 750 | 500 |
| ROV14-361K to ROV14-391K, ROV14H361K to ROV14H391K | 1500 | 750 | 500 |
| ROV14-431K to ROV14-471K, ROV14H431K to ROV14H471K | 1500 | 750 | 500 |
| ROV14-511K to ROV14-751K, ROV14H511K to ROV14H751K | 750 | 500 | 500 |
| ROV14-751K to ROV14-182K, ROV14H751K to ROV14H112K | 750 | 500 | 500 |



ROV14, ROV14H, ROV14E

14mm Series Metal Oxide Varistors

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