

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.

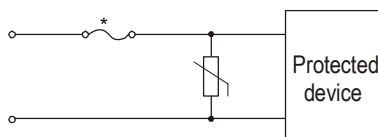
FEATURES

- 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.

MATERIALS INFORMATION

RoHS Compliant

Directive 2002/95/EC
Compliant

ELV Compliant

Directive 2000/53/EC
Compliant

*After May 1, 2005 all ROV devices will be produced as RoHS compliant devices.

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 Menlo Park, CA 94025-1164
 Phone: 800-227-4856
 www.circuitprotection.com

Raychem Circuit Protection Products

DOCUMENT: SCD 25483
 PCN:
 REV LETTER: D
 REV DATE: JULY 19, 2007
 PAGE NO.: 2 of 11

PART NUMBERING

ROV 14 - 241 K -S -2

Manufacturer series

Disk Diameter
 14mm

Surge Series

- : Standard series
 H : High surge series
 E : Extra high surge series

Varistor Voltage

241 = $24 \times 10^1 = 240V$

Packaging

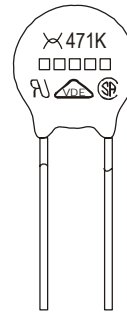
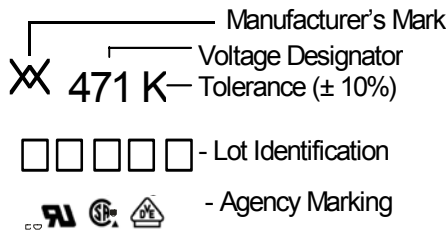
: Bulk
 -2 : Tape & Reel
 -AP : Ammo Pack

Lead Type

: Kinked Lead
 -S : Straight Lead

Tolerance

K : $\pm 10\%$
 L : $\pm 15\%$
 M : $\pm 20\%$



Lot Identification

RoHS compliant devices: 4 characters
 Non RoHS compliant devices: 5 characters with M at the end.

GENERAL CHARACTERISTICS

Storage temperature: $-40^{\circ}C \dots +125^{\circ}C$
 Maximum operating temperature: $-40^{\circ}C \dots +85^{\circ}C$
 Maximum working surface temperature: $+115^{\circ}C$
 Temperature coefficient of voltage: $0 \dots +0.05\% / ^{\circ}C \text{ max.}$
 Insulation resistance of coating (@ 500 VDC): Over $1000M\Omega$
 Maximum response time: 25ns
 Lead Material: 22 AWG Sn 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 |
| ◆ | ● | ▲ | ■ |

DEVICE RATINGS AND CHARACTERISTICS

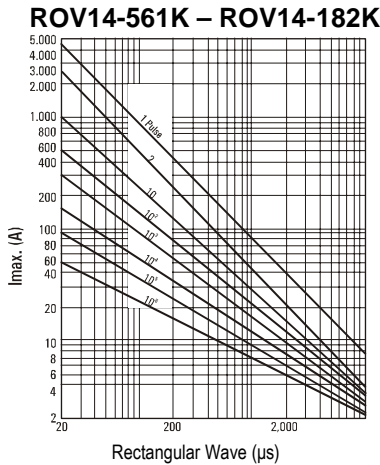
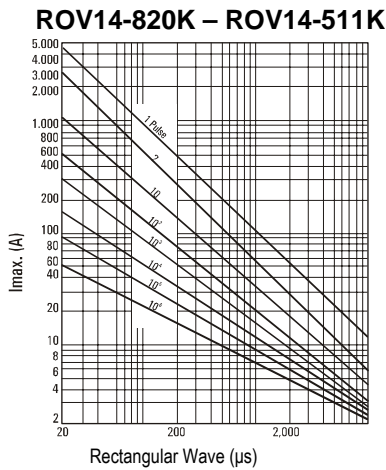
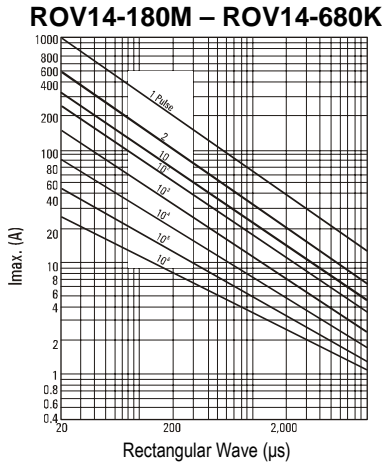
STANDARD SERIES

| 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 | ◆ ● ▲ ■* | | | | |

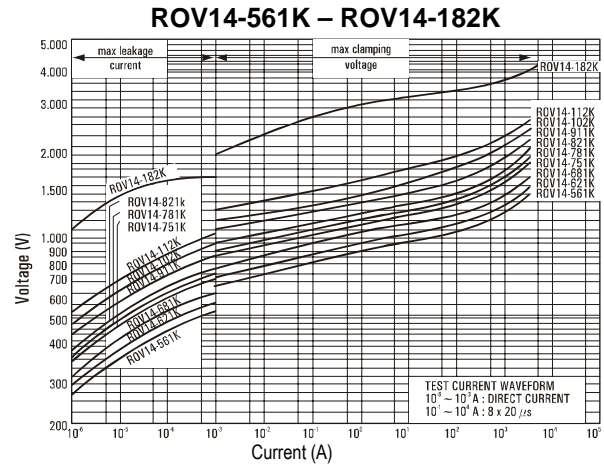
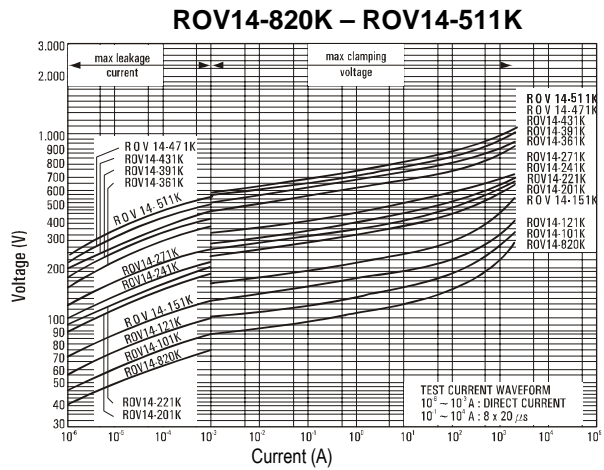
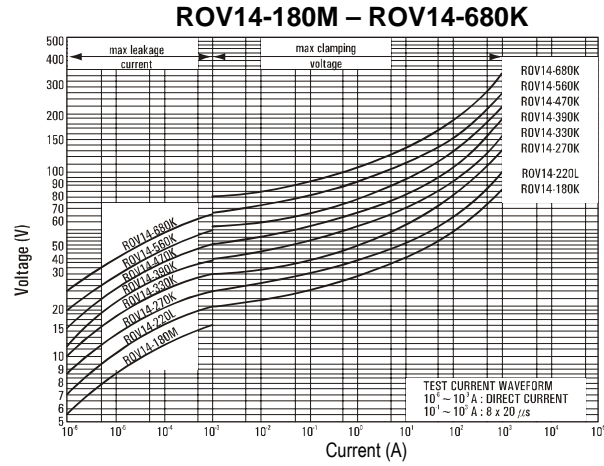
* Pending VDE Recognition

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

PULSE LIFETIME RATING CURVES
STANDARD SERIES



V-I CHARACTERISTIC CURVES
STANDARD SERIES



DEVICE RATINGS AND CHARACTERISTICS

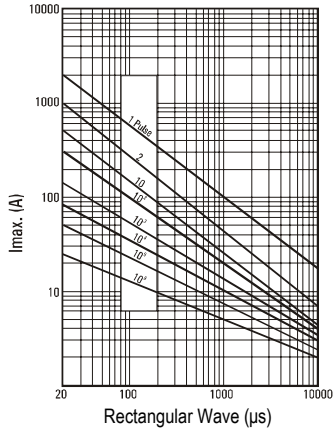
HIGH SURGE SERIES

| 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 | ◆ ● ▲ ■ | | | | |

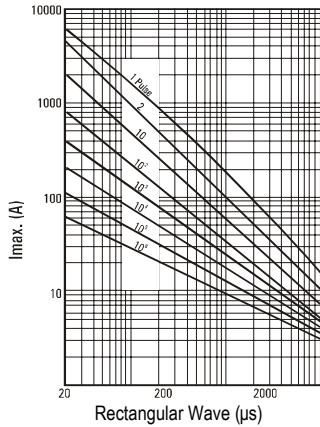
1). The clamping voltage for devices ROV14H180M to ROV14H680K is tested with 10A current.

PULSE LIFETIME RATING CURVES
HIGH SURGE SERIES

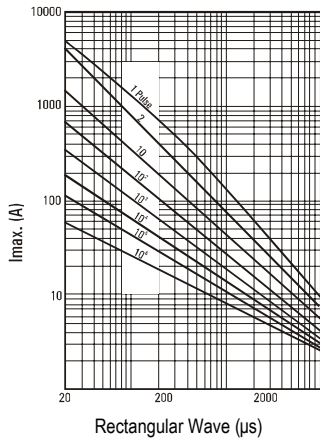
ROV14H180M – ROV14H680K



ROV14H820K – ROV14H511K

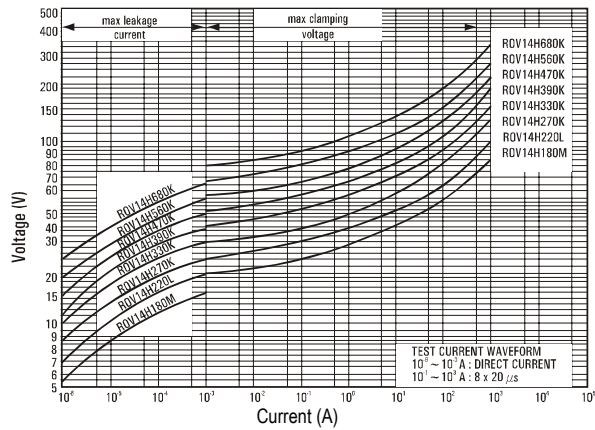


ROV14H561K – ROV14H182K

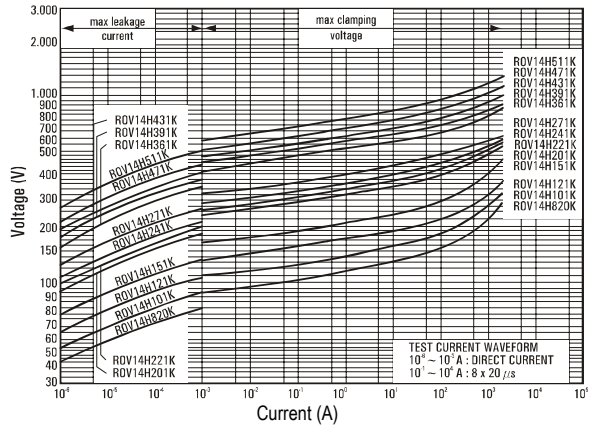


V-I CHARACTERISTIC CURVES
HIGH SURGE SERIES

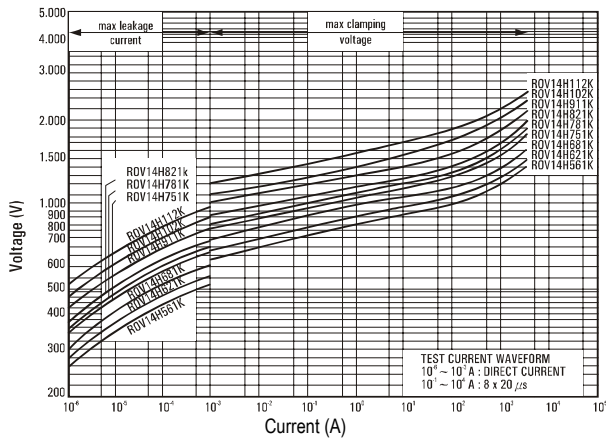
ROV14H180M – ROV14H680K



ROV14H820K – ROV14H511K



ROV14H561K – ROV14H182K

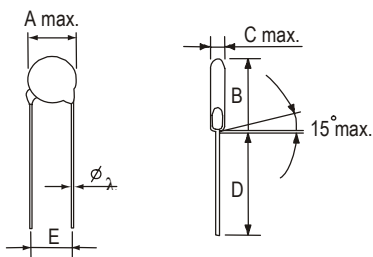


DEVICE RATINGS AND CHARACTERISTICS

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 | ----- | |

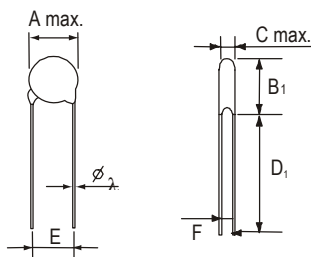
DIMENSIONS



KINKED LEAD TYPE

Dimension Table

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



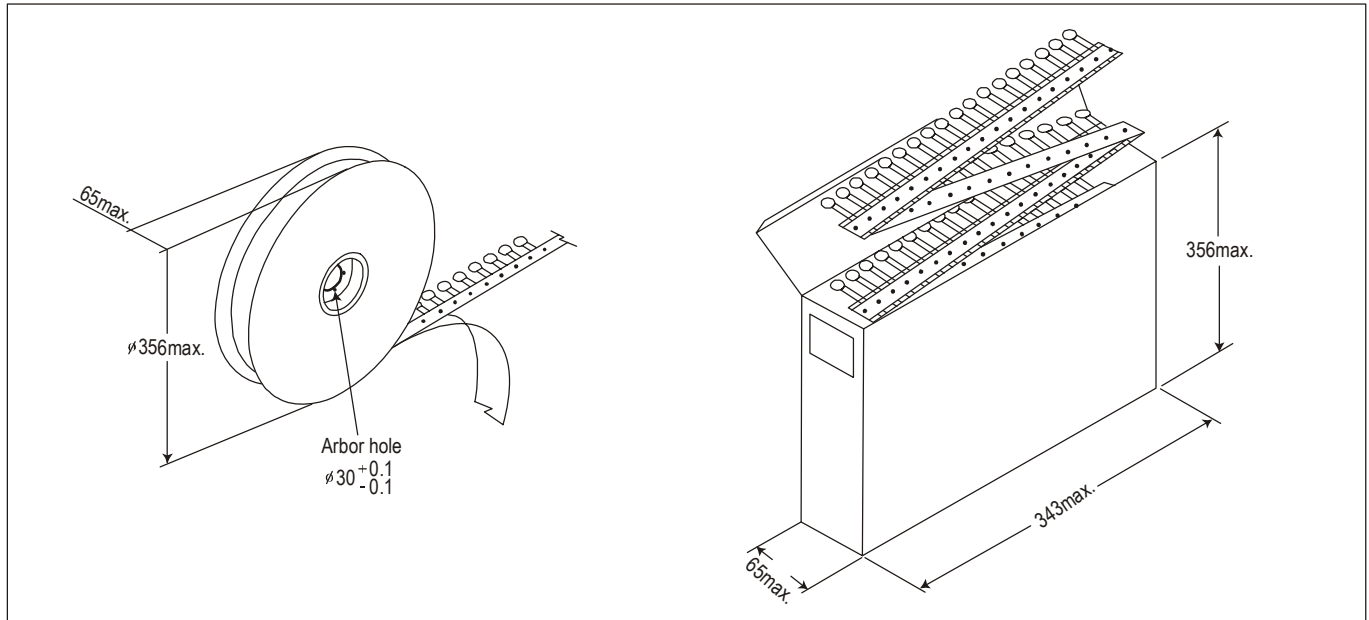
STRAIGHT LEAD TYPE (-S)

Table of C max., F, and B₁ max.

| Type No. | C max. | F±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 |

PACKAGING

in mm

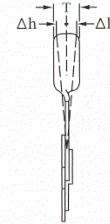
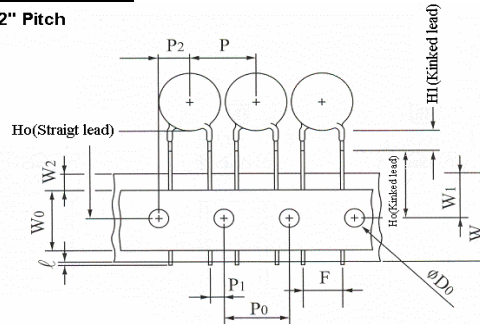


| Packaging | Bulk (box) | Reel | Ammo |
|------------------|-----------------|-------------------|-----------------|
| Box size (mm) | 290 x 155 x 110 | 350 x 350 x 74 | 343 x 260 x 52 |
| Carton size (mm) | 310 x 328 x 250 | 370 x 370 x 468 | 363 x 540 x 250 |
| One carton with | 4 Boxes | 6 Boxes (6 reels) | 8 Boxes |

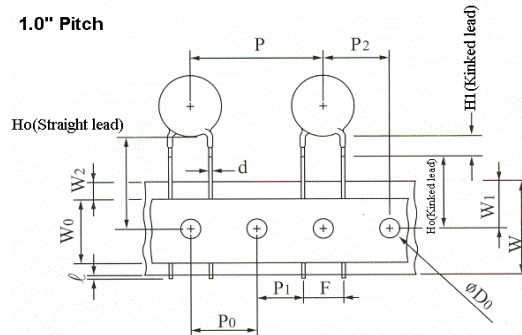
| Part Number | Bulk (box) | Reel | Ammo |
|---|------------|------|------|
| ROV14-180M to ROV14-470K, ROV14H180M to ROV14H470K | 1500 | 750 | 500 |
| ROV14-560K to ROV14-680K, ROV14H560K to ROV14H680K | 1500 | 750 | 500 |
| ROV14-820K to ROV14-331K, ROV14H820K to ROV14H331K | 1500 | 750 | 500 |
| ROV14-361K 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 |

TAPE AND REEL DIMENSIONS

1/2" Pitch



1.0" Pitch



| Symbols | Item | Value |
|-----------------------|--|--------------------------------------|
| λ | Cut out length | 1.1mm max. |
| H_1 (Kinked type) | Height of kink | 5.0mm max. |
| H_0 (Kinked type) | Height to seating plane | 16.0 ± 0.5 mm |
| H_0 (Straight type) | Height of component from hole center | 16.0-21.0mm |
| Δh | Front to back deviation | 0.0 ± 2.0 mm |
| W | Carrier tape width | $18.0^{+1.0}_{-0.5}$ mm |
| W_0 | Hold down tape width | 12.0mm |
| W_1 | Sprocket hole position | $9.0^{+0.75}_{-0.5}$ mm |
| W_2 | Adhesive tape position | 3.0mm max. |
| F | Component lead spacing | $7.5^{+0.8}_{-0.2}$ mm |
| P | Pitch of component | 25.4 ± 1.0 mm |
| P_0 | Sprocket hole pitch | 12.7 ± 0.3 mm |
| P_1 | Lead length from hole center to lead | 7.7 ± 0.7 mm, 8.95 ± 0.7 mm |
| P_2 | Length from hole center to disk center | 12.7 ± 1.3 mm |
| D_0 | Sprocket hole diameter | 4.0 ± 0.2 mm |
| d | Lead wire diameter | 0.8 ± 0.05 mm, 1.0 ± 0.05 mm |
| T | Disk thickness | See C. max table |
| t_1 | Total thickness tape | 0.7 ± 0.05 mm |
| t_2 | Total thickness | 1.8mm max. |

Metal Oxide Varistors

Overvoltage Protection Device

Raychem Circuit Protection Products

PRODUCT: ROV014, ROV014H
14mm Series

DOCUMENT: SCD 25483
PCN:
REV LETTER: D
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