Tyco Electronics

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

Metal Oxide Varistors

Overvoltage Protection Device

Raychem Circuit Protection Products

GENERAL DESCRIPTION

The ROV10-XXX (**R**adial-leaded Metal **O**xide **V**aristor) products are 10mm 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.

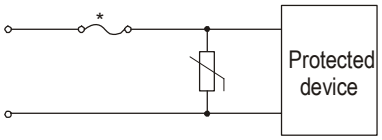
FEATURES

- Radial leaded
- Broad Varistor voltage and V_{rms} range
  - Varistor voltage : 18V - 1800V
  - V_{rms} voltage : 11V - 1000V
- Two surge capability series
  - Standard series, 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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PART NUMBERING

ROV 10 – 241 K -S -2

Manufacturer series

Disk Diameter
10mm

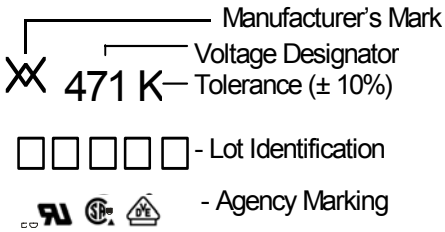
Surge series
- : Standard Series
H : High Surge Series

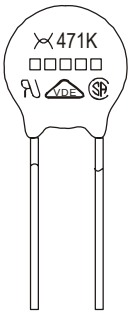
Varistor Voltage
241 = 24 x 10^1 = 240V

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

Lead Type
: Kinked Lead
-S : Straight Lead

Tolerance
K : ±10%
L : ±15%
M : ±20%





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

GENERAL CHARACTERISTICS

Storage temperature:	-40°C … +125°C
Maximum operating temperature:	-40°C … + 85°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 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@25A	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)	
ROV10-180M	18	± 20%	11	14	36[1)]	500	250	0.05	2.4	6500	● ■
ROV10-220L	22	± 15%	14	18	43[1)]				2.7	5521	● ■
ROV10-270K	27	± 10%	17	22	53[1)]				3.5	4742	● ■
ROV10-330K	33		20	26	65[1)]				4.4	4247	● ■
ROV10-390K	39		25	31	77[1)]				4.7	3658	● ■
ROV10-470K	47		30	38	93[1)]				6.0	3137	● ■
ROV10-560K	56		35	45	110[1)]				7.0	2900	● ■
ROV10-680K	68		40	56	135[1)]				8.5	2230	● ■
ROV10-820K	82		50	65	135	2500	1250	0.40	11.0	1261	● ■
ROV10-101K	100		60	85	165				14.0	1021	● ■
ROV10-121K	120		75	100	200				16.0	946	● ■
ROV10-151K	150		95	125	250				22.0	733	● ■
ROV10-181K	180		115	150	300				26.0	483	● ■
ROV10-201K	200		130	170	340				28.5	400	♦ ● ▲ ■
ROV10-221K	220		140	180	360				31.0	393	♦ ● ▲ ■
ROV10-241K	240		150	200	395				33.5	325	♦ ● ▲ ■
ROV10-271K	270		175	225	455				39.5	334	♦ ● ▲ ■
ROV10-301K	300		195	250	505				42.0	278	♦ ● ▲ ■
ROV10-331K	330		210	275	550				46.0	275	♦ ● ▲ ■
ROV10-361K	360		230	300	595				52.0	231	♦ ● ▲ ■
ROV10-391K	390		250	320	650				60.0	247	♦ ● ▲ ■
ROV10-431K	430		275	350	710				66.0	216	♦ ● ▲ ■
ROV10-471K	470		300	385	775				70.0	210	♦ ● ▲ ■
ROV10-511K	510		320	418	842				74.0	187	♦ ● ▲ ■
ROV10-561K	560		350	460	920				78.0	186	♦ ● ▲ ■
ROV10-621K	620		385	505	1025				82.0	160	♦ ● ▲ ■
ROV10-681K	680		420	560	1120				86.0	156	♦ ● ▲ ■
ROV10-751K	750		460	615	1240				90.0	133	♦ ● ▲ ■
ROV10-781K	780		485	640	1290				92.0	117	♦ ● ▲ ■
ROV10-821K	820		510	670	1355				94.0	130	♦ ● ▲ ■
ROV10-911K	910		550	745	1500				102.0	111	♦ ● ▲ ■
ROV10-102K	1000		625	825	1650				112.0	96	♦ ● ▲ ■
ROV10-112K	1100		680	895	1815				124.0	88	♦ ● ▲ ■
ROV10-182K	1800		1000	1465	2970				174.0	65	■*

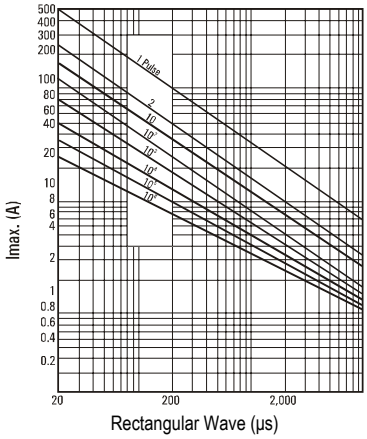
* Pending VDE Recognition

1) The clamping voltage for devices ROV10-180M to ROV10-680K is tested with 5A current.

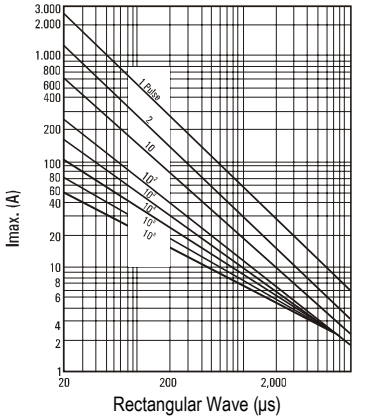
PULSE LIFETIME RATING CURVES

STANDARD SERIES

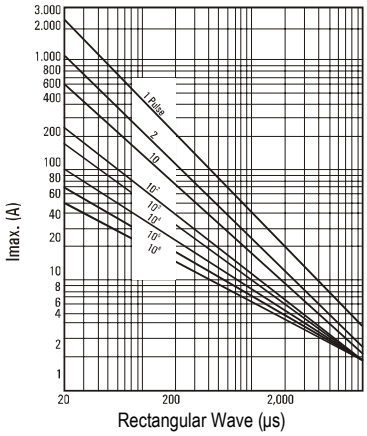
ROV10-180M – ROV10-680K



ROV10-820K – ROV10-511K



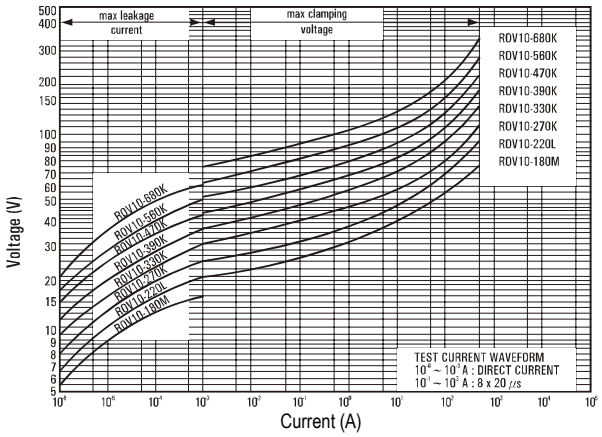
ROV10-561K – ROV10-182K



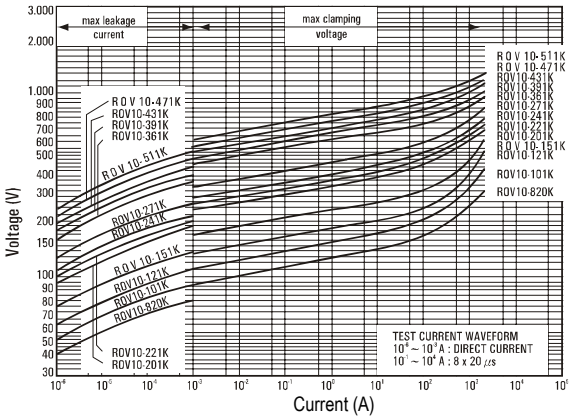
V-I CHARACTERISTIC CURVES

STANDARD SERIES

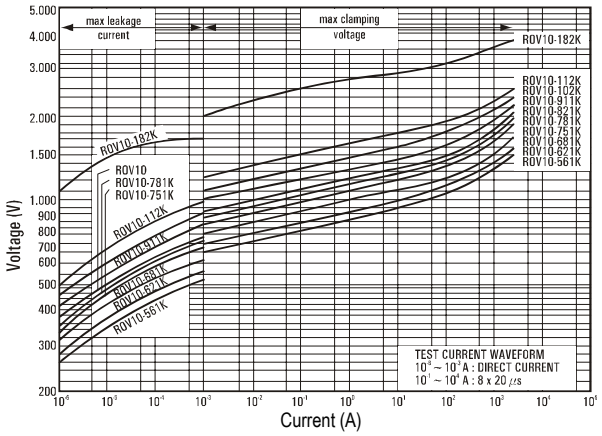
ROV10-180M – ROV10-680K



ROV10-820K – ROV10-511K



ROV10-561K – ROV10-182K



DEVICE RATINGS AND CHARACTERISTICS

HIGH SURGE SERIES

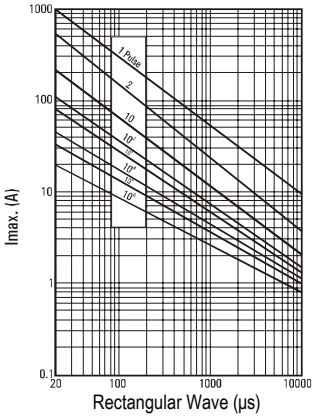
Part Number	Varistor Voltage V@1.0mA		Maximum Allowable Voltage		Maximum Clamping Voltage V@25A	Maximum Surge Current (8x20us)		Rated Wattage	Energy (10x1000us)	Capacitance (Typical)	Certifications
	(V_{DC})	Tolerance	V_{rms} (V_{AC})	(V_{DC})	(V_{DC})	1 Time (A)	2 Times (A)	(W)	(J)	@1kHz (pF)	
ROV10H180M	18	± 20%	11	14	36[1)]	1000	500	0.05	2.6	6500	● ■
ROV10H220L	22	± 15%	14	18	43[1)]				3.2	5520	● ■
ROV10H270K	27		17	22	53[1)]				3.9	4740	● ■
ROV10H330K	33		20	26	65[1)]				4.8	4250	● ■
ROV10H390K	39		25	31	77[1)]				5.6	3660	● ■
ROV10H470K	47		30	38	93[1)]				6.8	3140	● ■
ROV10H560K	56		35	45	110[1)]				8.1	2900	● ■
ROV10H680K	68		40	56	135[1)]				9.8	2230	● ■
ROV10H820K	82		50	65	135	3500	2500	0.40	14.0	1260	● ■
ROV10H101K	100		60	85	165				18.0	1020	● ■
ROV10H121K	120		75	100	200				22.0	950	● ■
ROV10H151K	150		95	125	250				25.0	730	● ■
ROV10H181K	180		115	150	300				32.0	480	● ■
ROV10H201K	200		130	170	340				35.0	400	♦ ● ▲ ■
ROV10H221K	220		140	180	360				39.0	390	♦ ● ▲ ■
ROV10H241K	240		150	200	395				42.0	330	♦ ● ▲ ■
ROV10H271K	270		175	225	455				49.0	330	♦ ● ▲ ■
ROV10H301K	300	± 10%	195	250	505				52.0	280	♦ ● ▲ ■
ROV10H331K	330		210	275	550				58.0	280	♦ ● ▲ ■
ROV10H361K	360		230	300	595				65.0	230	♦ ● ▲ ■
ROV10H391K	390		250	320	650				70.0	250	♦ ● ▲ ■
ROV10H431K	430		275	350	710				80.0	220	♦ ● ▲ ■
ROV10H471K	470		300	385	775				85.0	210	♦ ● ▲ ■
ROV10H511K	510		320	418	842				92.0	190	♦ ● ▲ ■
ROV10H561K	560		350	460	920				102.0	190	♦ ● ▲ ■
ROV10H621K	620		385	505	1025				107.0	160	♦ ● ▲ ■
ROV10H681K	680		420	560	1120				112.0	160	♦ ● ▲ ■
ROV10H751K	750		460	615	1240				115.0	130	♦ ● ▲ ■
ROV10H781K	780		485	640	1290				116.0	120	♦ ● ▲ ■
ROV10H821K	820		510	670	1355				118.0	130	♦ ● ▲ ■
ROV10H911K	910		550	745	1500				127.0	110	♦ ● ▲ ■
ROV10H102K	1000		625	825	1650				140.0	95	♦ ● ▲ ■
ROV10H112K	1100		680	895	1815				155.0	90	♦ ● ▲ ■

1) The clamping voltage for devices ROV10H180M to ROV10H680K is tested with 5A current.

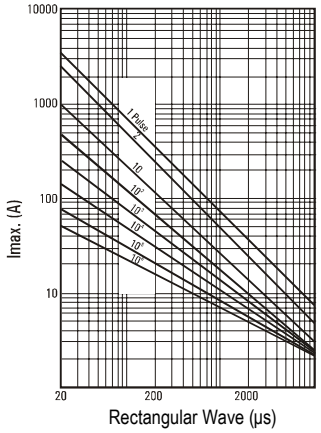
PULSE LIFETIME RATING CURVES

HIGH SURGE SERIES

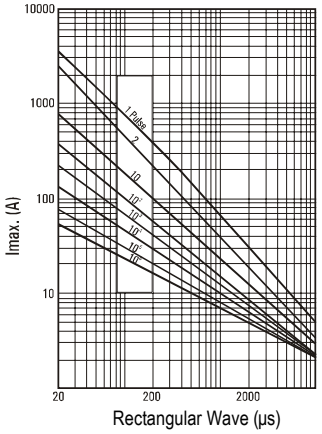
ROV10H180M – ROV10H680K



ROV10H820K – ROV10H511K



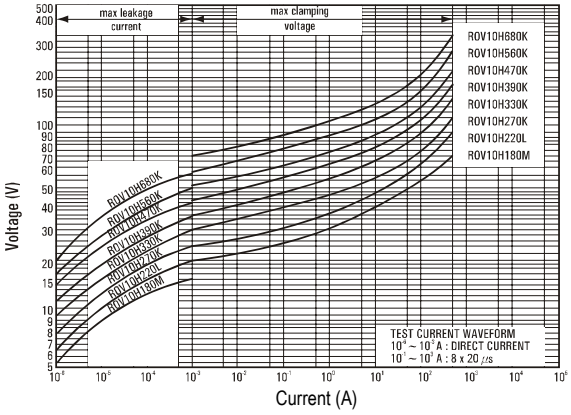
ROV10H561K – ROV10H182K



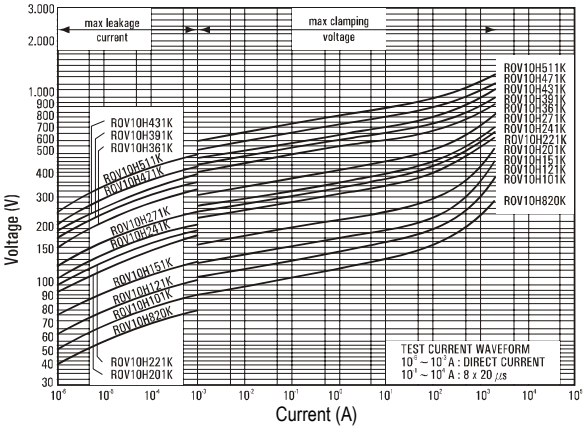
V-I CHARACTERISTIC CURVES

HIGH SURGE SERIES

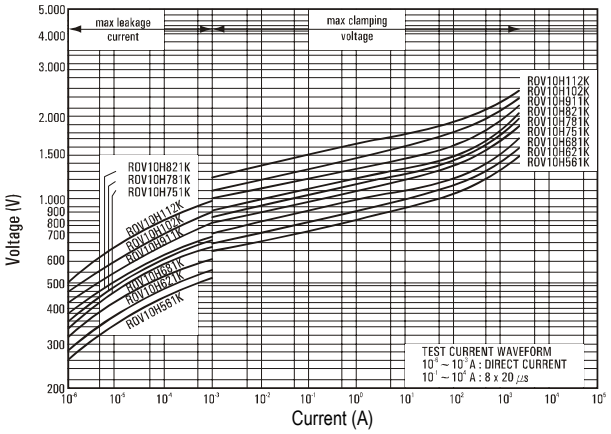
ROV10H180M – ROV10H680K



ROV10H820K – ROV10H511K



ROV10H561K – ROV10H182K



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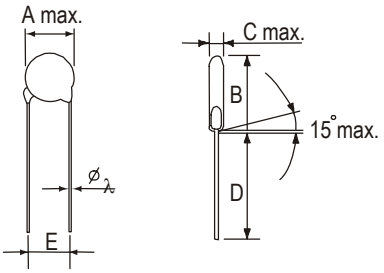
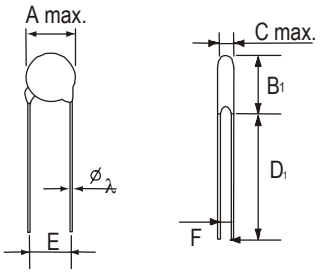
DIMENSIONS



KINKED LEAD TYPE

Dimension Table

A max.	12.5
λ ± 0.05	0.8
E ± 1.0	7.5
B max.	18.0
D_1 min.	25.0
D min.	24.0



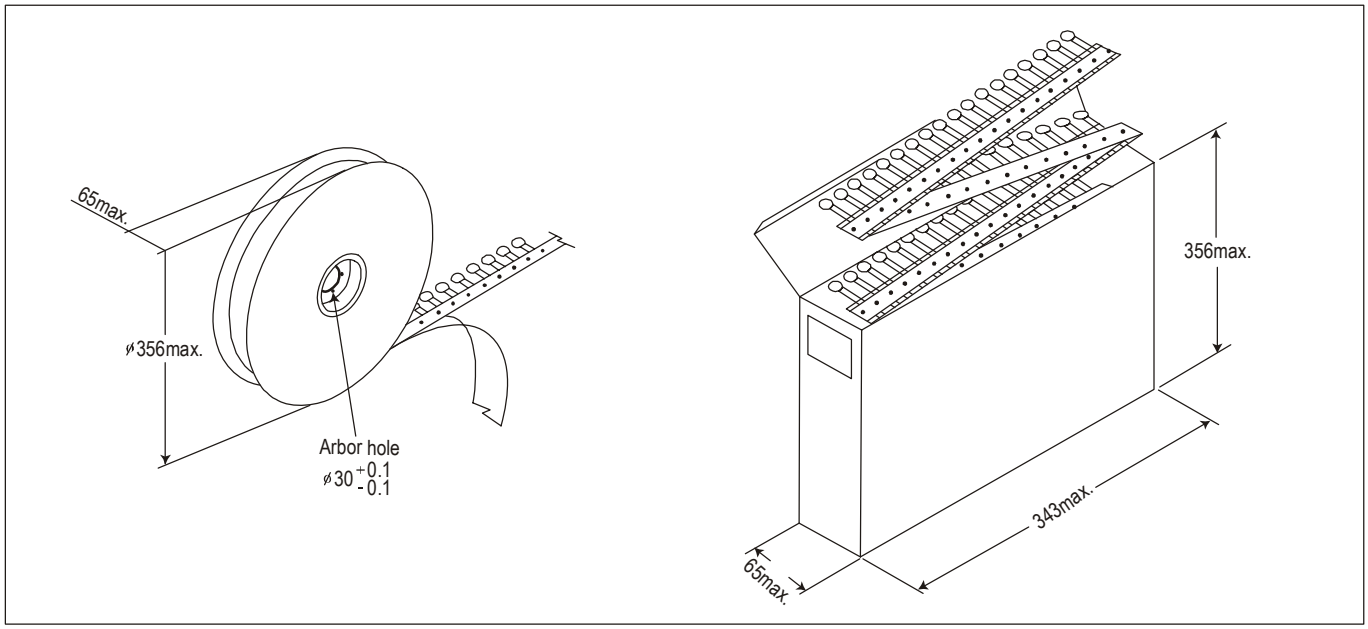
STRAIGHT LEAD TYPE (-S)

Table of C max., F, and B_1 max.

Type No.	C max.	F±0.8	B_1 max.
180M	4.9	0.8	15.5
220L	4.9	0.9	15.5
270K	5.1	0.9	15.5
330K	5.1	1.0	15.5
390K	5.1	1.2	15.5
470K	5.5	1.2	15.5
560K	5.5	1.4	15.5
680K	6.0	1.7	15.5
820K	4.3	0.8	15.5
101K	4.4	0.8	15.5
121K	4.5	0.9	15.5
151K	4.9	1.2	15.5
181K	4.5	1.0	15.5
201K	4.6	1.0	15.5
221K	4.7	1.1	15.5
241K	4.8	1.3	15.5
271K	5.0	1.4	15.5
301K	5.2	1.6	15.5
331K	5.3	1.6	15.5
361K	5.5	1.9	15.5
391K	5.7	2.2	16.0
431K	6.5	2.5	16.0
471K	6.8	2.6	16.0
511K	7.0	3.1	16.5
561K	7.3	3.4	16.5
621K	7.6	4.0	16.5
681K	8.0	4.4	16.5
751K	8.4	4.4	16.5
781K	8.6	4.6	16.5
821K	8.8	4.6	16.5
911K	9.4	5.4	16.5
102K	9.9	5.4	16.5
112K	10.5	5.7	16.5
182K	12.6	9.8	18.5

PACKAGING

in mm

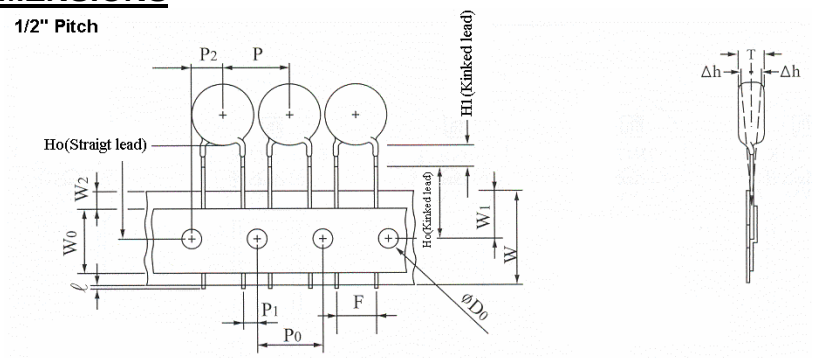


Packaging	Bulk (box)	Reel	Ammo
Box size (mm)	290 x 155 x 110	350 x 350 x 108	343 x 260 x 52
Carton size (mm)	310 x 328 x 250	371 x 371 x 590	363 x 540 x 250
One carton with	4 Boxes	5 Boxes (10 reels)	8 Boxes

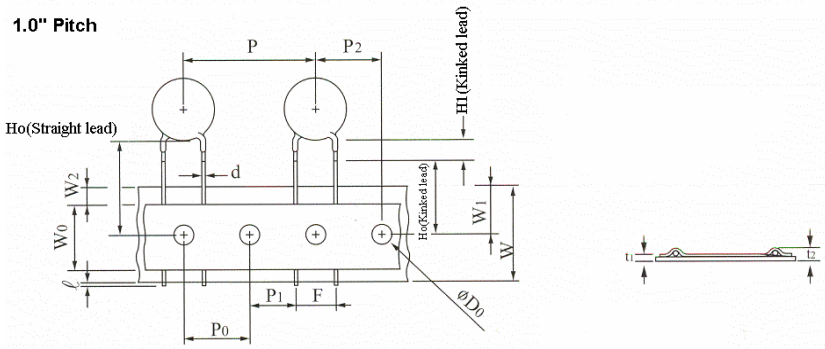
Part Number	Bulk (box)	Reel	Ammo	
			F=7.5	F=5.0
ROV10-180M to ROV10-470K, ROV10H180M to ROV10H470K	2500	1000	500	1000
ROV10-560K to ROV10-680K, ROV10H 560K to ROV10H 680K	2500	1000	500	1000
ROV10-820K to ROV10-331K, ROV10H820K to ROV10H331K	2500	1000	500	1000
ROV10-361K to ROV10-391K, ROV10H361K to ROV10H391K	2500	1000	500	1000
ROV10-431K to ROV10-471K, ROV10H431K to ROV10H471K	2500	750	500	750
ROV10-511K to ROV10- 751K, ROV10H511K to ROV10H751K	1500	500	500	500
ROV10-751K to ROV10-182K, ROV10H751K to ROV10H112K	1500	500	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 lead)	Height of kink	5.0mm max.
H_o (Kinked lead)	Height to seating plane	16.0 ± 0.5mm
H_o (Straight lead)	Height of component from hole center	16.0-21.0mm
Δh	Front to back deviation	0.0 ± 2.0mm
W	Carrier tape width	$18.0^{+1.0}_{-0.5}$ mm
W_0	Hold down tape width	10.0mm, 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 , $5.0^{+0.8}_{-0.2}$ mm
P	Pitch of component	12.7 ± 1.0mm, 25.4 ± 1.0mm
P_0	Sprocket hole pitch	12.7 ± 0.3mm
P_1	Lead length from hole center to lead	3.85 ± 0.7mm, 8.95 ± 0.7mm
P_2	Length from hole center to disk center	6.35 ± 1.3mm, 12.7 ± 1.3mm
D_0	Sprocket hole diameter	4.0 ± 0.2mm
d	Lead wire diameter	0.6 ± 0.05mm, 0.8 ± 0.05mm
T	Disk thickness	See C. max table
t_1	Total thickness tape	0.7 ± 0.05mm
t_2	Total thickness	1.6mm max. , 1.8mm max