

## Aluminum Capacitors Radial Style



### FEATURES

- Polarized aluminum electrolytic capacitor
- High ripple current
- High reliability
- High load life up to 10 000 h
- Temperature range up to 105 °C
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

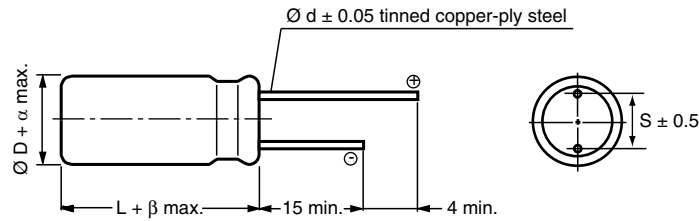

**RoHS  
COMPLIANT**

### APPLICATIONS

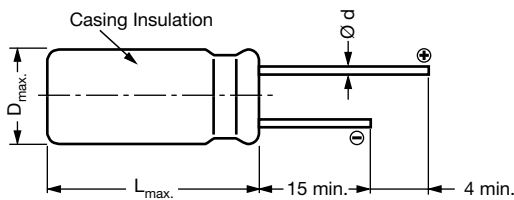
- For electronic lighting ballast
- Power supply

QUICK REFERENCE DATA		
DESCRIPTION	UNIT	VALUE
Nominal case size (Ø D x L)	mm	10 x 12.5 to 18 x 31.5
Rated capacitance range C <sub>R</sub>	µF	1.0 to 150
Capacitance tolerance	%	± 20
Rated voltage range	V	200 to 450
Category temperature range	°C	- 25 to 105
Load life	h	10 000
Based on sectional specification		IEC 60384-4/EN130300
Climatic category IEC 60068		25/105/56

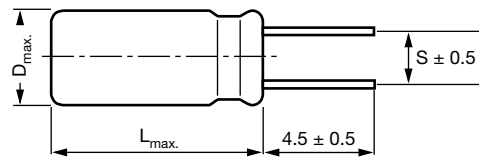
SELECTION CHART FOR C <sub>R</sub> , U <sub>R</sub> , AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm)					
C <sub>R</sub> (µF)	RATED VOLTAGE (V)				
	200	250	350	400	450
1.0	→	→	→	10 x 12.5	-
2.2	→	→	→	10 x 12.5	10 x 16
3.3	→	→	10 x 12.5	→	10 x 16
4.7	→	→	→	10 x 16	10 x 20
6.8	→	10 x 12.5	→	10 x 16	10 x 20
10	10 x 16	→	→	10 x 20	12.5 x 20
22	10 x 20	→	12.5 x 20	12.5 x 25	16 x 25
33	→	12.5 x 20	16 x 20	16 x 25	18 x 25
47	12.5 x 20	12.5 x 25	16 x 25	18 x 25	18 x 31.5
68	12.5 x 25	16 x 25	18 x 25	-	-
100	16 x 25	18 x 25	-	-	-
150	18 x 25	-	-	-	-

**RADIAL STYLE: DIMENSIONS** in millimeters


<b>Ø D</b>	<b>5</b>	<b>6.3</b>	<b>8</b>	<b>10</b>	<b>12.5</b>	<b>16</b>	<b>18</b>	<b>22</b>	<b>25</b>
<b>S</b>	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
<b>Ø d</b>	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
<b>β</b>	1.5			2.0					
<b>α</b>	0.5						1.0		

**DIMENSIONS** in millimeters **AND AVAILABLE FORMS**


Ø D ≤ 18 long leads MALREKV00...


 Ø D ≤ 18 shortened leads MALREKV05...  
 (S = 2 mm/2.5 mm/3.5 mm/5 mm/7.5 mm)

**GENERAL NOTE**

- For Minimum Package Quantity (MPQ) and Minimum Order Quantity (MOQ) please refer to our price list or contact customer service.
- For other packaging forms please refer to Vishay Roederstein General Information.

<b>ELECTRICAL DATA</b>	
<b>SYMBOL</b>	<b>DESCRIPTION</b>
$U_R$	Rated voltage
$C_R$	Rated capacitance at 120 Hz
$\tan \delta$	Max. dissipation factor at 120 Hz
$R_{ESR}$	Max. equivalent series resistance at 120 Hz
$I_R$	Rated alternating current (RMS) at 120 Hz and upper category temperature

**Note**

- Unless otherwise specified, all electrical values apply at  $T_{amb} = 20\text{ °C}$ ,  $P = 80\text{ kPa}$  to  $120\text{ kPa}$ ,  $RH = 45\%$  to  $75\%$ .

**ORDERING EXAMPLE**

EKV 22 µF/450 V, ± 20 %, size: 16 mm x 25 mm

Leads: Long

Ordering code: MALREKV00JG222P00K

Leads: Short

Ordering code: MALREKV05JG222P00K



ELECTRICAL DATA AND ORDERING INFORMATION							
U <sub>R</sub> (V)	C <sub>R</sub> 120 Hz (μF)	DIMENSIONS Ø D x L (mm)	tan Δ 120 Hz	R <sub>ESR</sub> 120 Hz (Ω)	I <sub>R</sub> 100 kHz/105 °C (mA)	WEIGHT (g)	CATALOG NUMBER (Long Leads)
200	10	10 x 16	0.15	19.9	250	2.3	MALREKV00DD210S00K
	22	10 x 20	0.15	9.04	500	2.8	MALREKV00DE222S00K
	47	12.5 x 20	0.15	4.23	660	3.8	MALREKV00FE247S00K
	68	12.5 x 25	0.15	2.93	760	5.1	MALREKV00FG268S00K
	100	16 x 25	0.15	1.99	1120	7.1	MALREKV00JG310S00K
	150	18 x 25	0.15	1.33	1360	9.5	MALREKV00KG315S00K
250	6.8	10 x 12.5	0.15	29.3	120	1.9	MALREKV00DC168N00K
	33	12.5 x 20	0.15	6.03	600	3.8	MALREKV00FE233N00K
	47	12.5 x 25	0.15	4.23	720	5.1	MALREKV00FG247N00K
	68	16 x 25	0.15	2.93	920	7.1	MALREKV00JG268N00K
	100	18 x 25	0.15	1.99	1200	9.5	MALREKV00KG310N00K
350	3.3	10 x 12.5	0.20	80.4	100	1.9	MALREKV00DC133O00K
	22	12.5 x 20	0.20	12.1	350	3.8	MALREKV00FE222O00K
	33	16 x 20	0.20	8.04	500	6.3	MALREKV00JE233O00K
	47	16 x 25	0.20	5.64	660	7.1	MALREKV00JG247O00K
	68	18 x 25	0.20	3.90	840	9.5	MALREKV00KG268O00K
400	1.0	10 x 12.5	0.24	318	90	1.9	MALREKV00DC110X00K
	2.2	10 x 12.5	0.24	145	100	1.9	MALREKV00DC122X00K
	4.7	10 x 16	0.24	67.7	180	2.3	MALREKV00DD147X00K
	6.8	10 x 16	0.24	46.8	200	2.3	MALREKV00DD168X00K
	10	10 x 20	0.20	26.5	280	2.8	MALREKV00DE210X00K
	22	12.5 x 25	0.20	12.1	430	5.1	MALREKV00FG222X00K
	33	16 x 25	0.20	8.04	640	7.1	MALREKV00JG233X00K
	47	18 x 25	0.20	5.64	840	9.5	MALREKV00KG247X00K
450	2.2	10 x 16	0.24	145	120	2.3	MALREKV00DD122P00K
	3.3	10 x 16	0.24	96.5	140	2.3	MALREKV00DD133P00K
	4.7	10 x 20	0.24	67.7	180	2.8	MALREKV00DE147P00K
	6.8	10 x 20	0.24	46.8	200	2.8	MALREKV00DE168P00K
	10	12.5 x 20	0.20	26.5	320	3.8	MALREKV00FE210P00K
	22	16 x 25	0.20	12.1	560	7.1	MALREKV00JG222P00K
	33	18 x 25	0.20	8.04	700	9.5	MALREKV00KG233P00K
	47	18 x 31.5	0.20	5.64	880	12.0	MALREKV00KS247P00K

LOW TEMPERATURE BEHAVIOUR (at 120 Hz)					
IMPEDANCE RATIO Z (T2)/Z (T1)	RATED VOLTAGE (V)				
	200	250	350	400	450
T2/T1					
- 25 °C/+ 20 °C	3	3	4	6	6

ADDITIONAL ELECTRICAL DATA		
PARAMETER	CONDITIONS	VALUE
<b>Current</b>		
Leakage current (test conditions: U <sub>R</sub> , 20 °C)	After 5 min at U <sub>R</sub>	I <sub>L5</sub> ≤ 0.02 x C <sub>R</sub> x U <sub>R</sub> + 25 μA
<b>Resistance</b>		
Equivalent series resistance (ESR)	Calculated from tan δ <sub>max</sub> .	ESR = tan δ/2 π f C <sub>R</sub>



MULTIPLIER OF RIPPLE CURRENT ( $I_R$ ) AS A FUNCTION OF FREQUENCY		
FREQUENCY (Hz)	$I_R$ MULTIPLIER	
	1.0 $\mu$ F ~ 4.7 $\mu$ F	6.8 $\mu$ F ~ 150 $\mu$ F
60	0.25	0.35
120	0.30	0.50
300	0.45	0.60
1000	0.60	0.80
10 000	0.80	0.90
$\geq 100\ 000$	1.00	1.00

TEST PROCEDURES AND REQUIREMENTS		
TEST	PROCEDURE (quick reference)	REQUIREMENTS
Load life	$T_{amb} = 105\ ^\circ\text{C}$ $U_R$ and $I_R$ applied After 5000 h $\leq 6.8\ \mu\text{F}$ After 10 000 h $\geq 10\ \mu\text{F}$	$\Delta C/C: \pm 20\ \%$ of initial value $I_L \leq \text{spec. limit}$ $\tan \delta \leq 2 \times \text{spec. limit}$
Shelf life	No voltage applied After 1000 h After test: $U_R$ to be applied for 30 min 24 h to 48 h before measurement	$\Delta C/C: \pm 20\ \%$ of initial value $I_L \leq \text{spec. limit}$ $\tan \delta \leq 2 \times \text{spec. limit}$



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