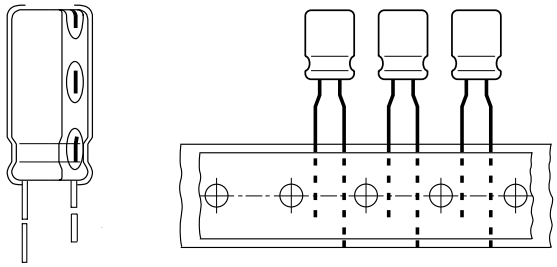
Aluminum Capacitors
Low Leakage Current Radial Style



Component outlines

FEATURES

- Polarized aluminum electrolytic capacitor
- High CU product with miniature dimensions
- Low leakage current
- Low energy requirement
- Temperature range 105 °C
- RoHS compliant

Pb-free

RoHS COMPLIANT

APPLICATIONS

- Industrial electronics, automotive electronics, audio/video systems
- Coupling, decoupling, timing elements, storage
- Portable and mobile units

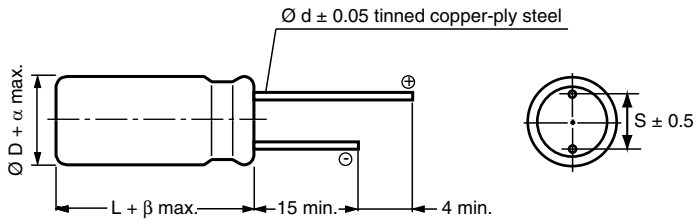
QUICK REFERENCE DATA

DESCRIPTION	UNIT	VALUE
Nominal case size (Ø D x L)	mm	5 x 11 to 10 x 12.5
Rated capacitance range C_R	µF	0.10 to 330
Capacitance tolerance	%	± 20
Rated voltage range	V	10 to 50
Category temperature range	°C	- 55 to + 105
Load life	h	1000
Based on sectional specification		IEC 60384-4/EN 130300
Climatic category IEC 60068		55/105/56

SELECTION CHART FOR C_R, U_R AND RELEVANT NOMINAL CASE SIZE (Ø D x L in mm)

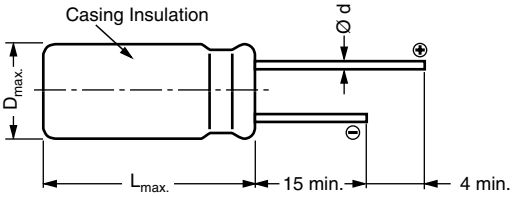
C_R (µF)	RATED VOLTAGE (V)				
	10	16	25	35	50
0.10	→	→	→	→	5 x 11
0.15	→	→	→	→	5 x 11
0.22	→	→	→	→	5 x 11
0.33	→	→	→	→	5 x 11
0.47	→	→	→	→	5 x 11
0.68	→	→	→	→	5 x 11
1.0	→	→	→	→	5 x 11
1.5	→	→	→	→	5 x 11
2.2	→	→	→	→	5 x 11
3.3	→	→	→	→	5 x 11
4.7	→	→	→	→	5 x 11
6.8	→	→	→	→	5 x 11
10	→	→	→	→	5 x 11
15	→	→	→	5 x 11	6.3 x 11
22	→	→	5 x 11	→	6.3 x 11
33	→	5 x 11	→	6.3 x 11	8 x 11.5
47	5 x 11	→	6.3 x 11	→	8 x 11.5
68	→	6.3 x 11	→	8 x 11.5	10 x 12.5
100	6.3 x 11	→	8 x 11.5	10 x 12.5	-
150	→	8 x 11.5	10 x 12.5	-	-
220	8 x 11.5	10 x 12.5	-	-	-
330	10 x 12.5	-	-	-	-

RADIAL STYLE: DIMENSIONS in millimeters

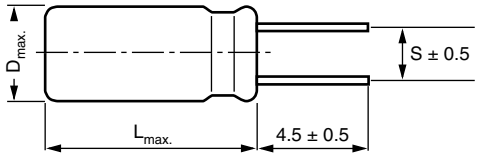


Ø D	5	6.3	8	10	12.5	16	18	22	25
S	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
Ø d	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
β	1.5			2.0					
α	0.5							1.0	

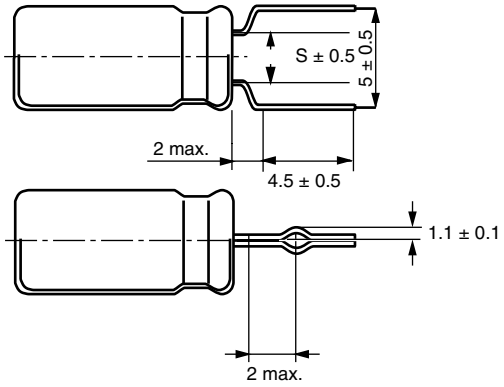
DIMENSIONS in millimeters AND AVAILABLE FORMS



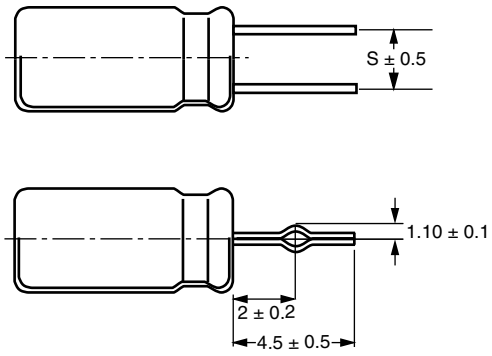
Ø D ≤ 18 long leads MALREKI00...



Ø D ≤ 18 shortened leads MALREKI05...
(S = 2/2.5/3.5/5/7.5 mm)



Ø D ≤ 8 leads shortened and formed MALREKI09...
(S = 2.0/2.5/3.5 mm)



10 ≤ Ø D ≤ 18 leads shortened and formed MALREKI06...
(S = 5/7.5 mm)

GENERAL NOTE

- For Standard Packaging Quantity (SPQ) 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

ELECTRICAL DATA

SYMBOL	DESCRIPTION
U_R	rated voltage
C_R	rated capacitance at 120 Hz
tan δ	max. dissipation factor at 120 Hz
R_{ESR}	max. equivalent series resistance at 120 Hz
I_{L2}	max. leakage current for acceptance test after 2 minutes at U_R
I_R	rated alternating current (rms) at 120 Hz and upper category temperature

Note
Unless otherwise specified, all electrical values apply at T_a = 20 °C, P = 80 to 120 kPa, RH = 45 to 75 %

ORDERING EXAMPLE

EKI 220 µF/16 V, ± 20 %, size: 10 x 12.5 mm
Leads: Long
Ordering code: MALREKI00DC322D00K

Leads: Short
Ordering code: MALREKI05...

For 5 ≤ Ø D ≤ 8 mm
Leads: Bent open, shortened and formed
Ordering code: MALREKI09...

For 10 ≤ Ø D ≤ 18 mm
Leads: Shortened and formed
Ordering code: MALREKI06 ...

ELECTRICAL DATA AND ORDERING INFORMATION

U_R (V)	C_R 120 Hz (µF)	DIMENSIONS Ø D x L (mm)	tan δ 120 Hz	R_{ESR} 120 Hz (Ω)	I_{L2} (µA)	I_R 120 Hz/105 °C (mA)	WEIGHT (g)	ORDERING NUMBER (Long Leads)
10	47	5 x 11	0.15	4.23	0.94	70	0.4	MALREKI00AA247C00K
	100	6.3 x 11	0.15	1.99	2.00	117	0.7	MALREKI00BA310C00K
	220	8 x 11.5	0.15	0.90	4.40	205	1.0	MALREKI00PB322C00K
	330	10 x 12.5	0.15	0.60	6.60	291	1.8	MALREKI00DC333C00K
16	33	5 x 11	0.12	4.82	1.06	65	0.4	MALREKI00AA233D00K
	68	6.3 x 11	0.12	2.34	2.18	108	0.7	MALREKI00BA268D00K
	150	8 x 11.5	0.12	1.06	4.80	189	1.0	MALREKI00PB315D00K
	220	10 x 12.5	0.12	0.72	7.04	266	1.8	MALREKI00DC322D00K
25	22	5 x 11	0.08	4.82	1.10	65	0.4	MALREKI00AA222E00K
	47	6.3 x 11	0.08	2.26	2.35	110	0.7	MALREKI00BA247E00K
	100	8 x 11.5	0.08	1.06	5.00	189	1.0	MALREKI00PB310E00K
	150	10 x 12.5	0.08	0.71	7.50	269	1.8	MALREKI00DC315E00K
35	15	5 x 11	0.08	7.07	1.05	54	0.4	MALREKI00AA215F00K
	33	6.3 x 11	0.08	3.22	2.31	92	0.7	MALREKI00BA233F00K
	68	8 x 11.5	0.08	1.56	4.76	156	1.0	MALREKI00PB268F00K
	100	10 x 12.5	0.08	1.06	7.00	219	1.8	MALREKI00DC310F00K
50	0.10	5 x 11	0.08	1061	0.40	4.4	0.4	MALREKI00AA010H00K
	0.15	5 x 11	0.08	707	0.40	5.4	0.4	MALREKI00AA015H00K
	0.22	5 x 11	0.08	482	0.40	6.5	0.4	MALREKI00AA022H00K
	0.33	5 x 11	0.08	322	0.40	8.0	0.4	MALREKI00AA033H00K
	0.47	5 x 11	0.08	226	0.40	9.6	0.4	MALREKI00AA047H00K
	0.68	5 x 11	0.08	156	0.40	11	0.4	MALREKI00AA068H00K
	1.0	5 x 11	0.08	106	0.40	14	0.4	MALREKI00AA110H00K
	1.5	5 x 11	0.08	70.7	0.40	17	0.4	MALREKI00AA115H00K
	2.2	5 x 11	0.08	48.2	0.40	21	0.4	MALREKI00AA122H00K
	3.3	5 x 11	0.08	32.2	0.40	25	0.4	MALREKI00AA133H00K
	4.7	5 x 11	0.08	22.6	0.47	30	0.4	MALREKI00AA147H00K
	6.8	5 x 11	0.08	15.6	0.68	36	0.4	MALREKI00AA168H00K
	10	5 x 11	0.08	10.6	1.00	44	0.4	MALREKI00AA210H00K
	15	6.3 x 11	0.08	7.07	1.50	62	0.7	MALREKI00BA215H00K
	22	6.3 x 11	0.08	4.82	2.20	75	0.7	MALREKI00BA222H00K
	33	8 x 11.5	0.08	3.22	3.30	109	1.0	MALREKI00PB233H00K
	47	8 x 11.5	0.08	2.26	4.70	129	1.0	MALREKI00PB247H00K
	68	10 x 12.5	0.08	1.56	6.80	181	1.8	MALREKI00DC268H00K

LOW TEMPERATURE BEHAVIOUR (at 120 Hz)					
IMPEDANCE RATIO Z(T2)/Z(T1)	**RATED VOLTAGE (V)**				
T2/T1	**10**	**16**	**25**	**35**	**50**
- 25 °C/+ 20 °C	2	2	1.5	1.5	1.5
- 40 °C/+ 20 °C	4	3	2	2	2

ADDITIONAL ELECTRICAL DATA		
PARAMETER	**CONDITIONS**	**VALUE**
Current		
Leakage current (Test conditions: U_R, 20 °C)	After 2 minutes at U_R	$I_{L2} \leq 0.002 \times C_R \times U_R$ or 0.4 µA for $U_R \leq 100$ V (whichever is greater)
Resistance		
Equivalent series resistance (ESR)	Calculated from tan $\delta_{max.}$	ESR = tan $\delta / 2 \pi f C_R$

MULTIPLIER OF RIPPLE CURRENT (I_R) AS A FUNCTION OF FREQUENCY			
FREQUENCY (Hz)	**I_R MULTIPLIER FOR $U_R \leq 100$ V**		
	$C_R \leq 47$ µF	**C_R = 68 to 680 µF**	**$C_R \geq 1000$ µF**
50	0.75	0.80	0.85
120	1.00	1.00	1.00
300	1.35	1.25	1.10
1000	1.55	1.35	1.15
≥ 10 000	2.00	1.50	1.15

TEST PROCEDURES AND REQUIREMENTS		
TEST	**PROCEDURE (QUICK REFERENCE)**	**REQUIREMENTS**
Load life	T_{amb} = 105 °C U_R and I_R applied After 1000 hours	Δ C/C: ± 15 % of initial value $I_L \leq$ spec. limit tan $\delta \leq 1.5$ x spec. limit
Shelf life	No voltage applied After 1000 hours After test: U_R to be applied for 30 minutes 24 to 48 hours before measurement	Δ C/C: ± 15 % of initial value $I_L \leq$ spec.limit tan $\delta \leq 1.5$ x spec. limit

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