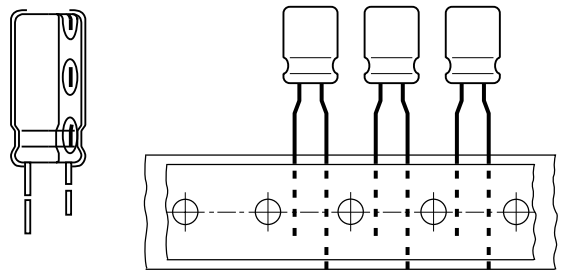
Aluminum Capacitors
Radial Style



Component outlines

FEATURES

- Polarized Aluminum electrolytic capacitor
- Small dimensions, high CU product
- Extremely low impedance and R_{ESR} values
- Very high AC rating
- Extremely long lifetime
- High temperature range

Pb-free
RoHS COMPLIANT

APPLICATIONS

- Industrial electronics, telecommunication systems, audio/video systems
- Highly professional switching power supply units
- Smoothing, filtering
- Portable and mobile units

QUICK REFERENCE DATA		
DESCRIPTION	**UNIT**	**VALUE**
Nominal case size (Ø D x L)	mm	5 x 11.5 to 16 x 40
Rated capacitance range C_R	µF	10 to 8200
Capacitance tolerance	%	± 20
Rated voltage range	V	10 to 63
Category temperature range	°C	- 55 to + 105
Endurance test at upper category temperature	h	up to 8000
Based on sectional specification		IEC 60384/EN 130300
Climatic category IEC 60068		55/105/56

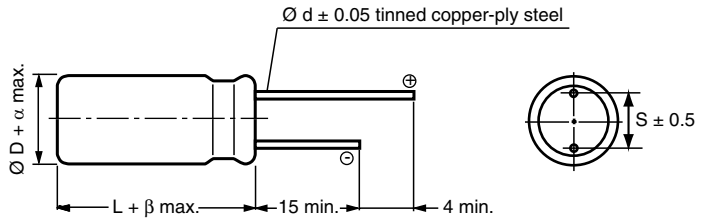
SELECTION CHART FOR C_R, U_R AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm)

C_R (µF)	RATED VOLTAGE (V)					
	10	**16**	**25**	**35**	**50**	**63**
10	→	→	→	→	→	5 x 11.5
18	→	→	→	→	5 x 11.5	6.3 x 11.5
27	→	→	→	5 x 11.5	-	-
33	→	→	→	→	→	6.3 x 15
39	→	→	5 x 11.5	→	6.3 x 11.5	-
47	→	→	→	→	→	8 x 12
56	→	5 x 11.5	→	6.3 x 11.5	6.3 x 15	10 x 12.5
68	→	→	→	→	8 x 12	8 x 15
82	5 x 11.5	→	6.3 x 11.5	6.3 x 15	8 x 15	8 x 20
100	→	→	→	8 x 12	10 x 16	10 x 20
120	→	6.3 x 11.5	6.3 x 15	8 x 12	10 x 16	10 x 20
150	→	→	8 x 12	→	→	10 x 25
180	6.3 x 11.5	6.3 x 15	10 x 12.5	8 x 15	10 x 20	10 x 30
220	6.3 x 15	→	8 x 15	10 x 16	10 x 25	12.5 x 20
270	→	8 x 12	→	→	→	12.5 x 25
330	8 x 12	8 x 15	8 x 20	10 x 20	12.5 x 20	16 x 20
390	10 x 12.5	→	→	10 x 25	→	12.5 x 30
470	8 x 15	10 x 16	10 x 20	12.5 x 20	12.5 x 25	12.5 x 35

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

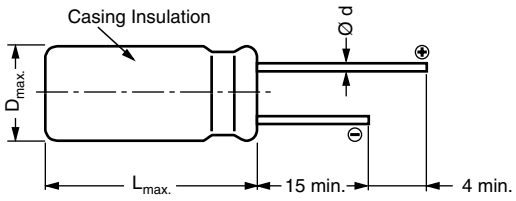
C_R (µF)	RATED VOLTAGE (V)					
	10	**16**	**25**	**35**	**50**	**63**
560	→	→	10 x 25	12.5 x 20	12.5 x 30	12.5 x 40
680	8 x 20	10 x 20	→	12.5 x 25	12.5 x 35	16 x 30
820	→	10 x 25	10 x 30	→	12.5 x 40	16 x 35
1000	10 x 20	→	12.5 x 25	16 x 20	16 x 30	16 x 40
1200	10 x 25	10 x 30	→	12.5 x 35	16 x 35	-
1500	10 x 30	12.5 x 25	12.5 x 30	12.5 x 40	16 x 40	-
1800	12.5 x 20	→	12.5 x 35	16 x 30	-	-
2200	12.5 x 25	16 x 20	12.5 x 40	16 x 35	-	-
2700	12.5 x 30	12.5 x 35	16 x 30	16 x 40	-	-
3300	12.5 x 35	12.5 x 40	16 x 35	-	-	-
3900	12.5 x 40	16 x 30	16 x 40	-	-	-
4700	→	16 x 35	-	-	-	-
5600	16 x 30	16 x 40	-	-	-	-
6800	16 x 35	-	-	-	-	-
8200	16 x 40	-	-	-	-	-

RADIAL STYLE: DIMENSIONS in millimeters

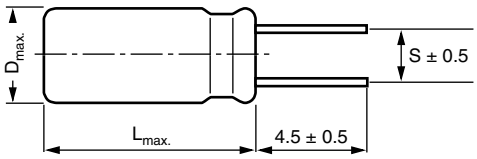


Ø D	**5**	**6.3**	**8**	**10**	**12.5**	**16**	**18**	**22**	**25**
S	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
Ø d	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
β	1.5			2.0					
α	0.5							1.0	

DIMENSIONS in millimeters AND AVAILABLE FORMS



Ø D ≤ 16 long leads MALREKC00...



Ø D ≤ 16 shortened leads MALREKC05...
(S = 2/2.5/3.5/5/7.5 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
Z	max. impedance at 100 kHz
I_R	rated alternating current (rms) at 100 kHz and upper category temperature

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

ORDERING EXAMPLE

EKC 3300 µF/25 V, ± 20 %, size: 16 x 35 mm
Leads: Long
Ordering code: MALREKC00JU433E00F

Leads: Short
Ordering code: MALREKC05...

ELECTRICAL DATA AND ORDERING INFORMATION

U_R (V)	C_R 120 Hz (µF)	NOMINAL CASE SIZE Ø D x L (mm)	tan δ 120 Hz	Z 100 kHz/20 °C (Ω)	I_R 100 kHz/105 °C (mA)	WEIGHT (g)	CATALOG NUMBER (LONG LEADS)
10	82	5 x 11.5	0.19	0.75	163	0.50	MALREKC00AB282C00F
	180	6.3 x 11.5	0.19	0.35	273	0.80	MALREKC00BB318C00F
	220	6.3 x 15	0.19	0.25	390	1.20	MALREKC00BF322C00F
	330	8 x 12	0.19	0.17	445	1.00	MALREKC00PT333C00F
	390	10 x 12.5	0.19	0.12	625	1.90	MALREKC00DC339C00F
	470	8 x 15	0.19	0.13	555	1.50	MALREKC00PF347C00F
	680	8 x 20	0.19	0.095	740	2.00	MALREKC00PE368C00F
	1000	10 x 20	0.19	0.062	1040	3.00	MALREKC00DE410C00F
	1200	10 x 25	0.21	0.052	1260	4.00	MALREKC00DG412C00F
	1500	10 x 30	0.21	0.044	1440	4.80	MALREKC00DJ415C00F
	1800	12.5 x 20	0.21	0.046	1340	4.00	MALREKC00FE418C00F
	2200	12.5 x 25	0.23	0.034	1690	4.70	MALREKC00FG422C00F
	2700	12.5 x 30	0.23	0.030	1950	5.40	MALREKC00FJ427C00F
	3300	12.5 x 35	0.25	0.024	2220	5.90	MALREKC00FU433C00F
	3900	12.5 x 40	0.25	0.022	2390	6.40	MALREKC00FK439C00F
	5600	16 x 30	0.29	0.025	2350	8.80	MALREKC00JJ456C00F
	6800	16 x 35	0.31	0.022	2550	10.0	MALREKC00JU468C00F
	8200	16 x 40	0.35	0.018	2900	11.0	MALREKC00JK482C00F
16	56	5 x 11.5	0.16	0.75	163	0.50	MALREKC00AB256D00F
	120	6.3 x 11.5	0.16	0.35	273	0.80	MALREKC00BB312D00F
	180	6.3 x 15	0.16	0.25	390	0.80	MALREKC00BF318D00F
	270	8 x 12	0.16	0.17	445	1.00	MALREKC00PT327D00F
	330	8 x 15	0.16	0.13	555	1.50	MALREKC00PF333D00F
	470	10 x 16	0.16	0.084	825	2.40	MALREKC00DD347D00F
	680	10 x 20	0.16	0.062	1040	3.00	MALREKC00DE368D00F
	820	10 x 25	0.16	0.052	1260	4.00	MALREKC00DG382D00F
	1200	10 x 30	0.18	0.044	1440	4.80	MALREKC00DJ412D00F
	1500	12.5 x 25	0.18	0.034	1690	4.70	MALREKC00FG415D00F
	2200	16 x 20	0.20	0.038	1630	5.80	MALREKC00JE422D00F
	2700	12.5 x 35	0.20	0.024	2220	5.90	MALREKC00FU427D00F
	3300	12.5 x 40	0.22	0.022	2390	6.40	MALREKC00FK433D00F
	3900	16 x 30	0.22	0.025	2350	8.80	MALREKC00JJ439D00F
	4700	16 x 35	0.24	0.022	2550	10.0	MALREKC00JU447D00F
	5600	16 x 40	0.26	0.018	2900	11.0	MALREKC00JK456D00F

ELECTRICAL DATA AND ORDERING INFORMATION

U_R (V)	C_R 120 Hz (µF)	NOMINAL CASE SIZE Ø D x L (mm)	tan δ 120 Hz	Z 100 kHz/20 °C (Ω)	I_R 100 kHz/105 °C (mA)	WEIGHT (g)	CATALOG NUMBER (LONG LEADS)
25	39	5 x 11.5	0.14	0.75	163	0.50	MALREKC00AB239E00F
	82	6.3 x 11.5	0.14	0.35	273	0.80	MALREKC00BB282E00F
	120	6.3 x 15	0.14	0.25	390	1.20	MALREKC00BF312E00F
	150	8 x 12	0.14	0.17	445	1.00	MALREKC00PT315E00F
	180	10 x 12.5	0.14	0.12	625	1.90	MALREKC00DC318E00F
	220	8 x 15	0.14	0.13	555	1.50	MALREKC00PF322E00F
	330	8 x 20	0.14	0.095	740	2.00	MALREKC00PE333E00F
	470	10 x 20	0.14	0.062	1040	3.00	MALREKC00DE347E00F
	560	10 x 25	0.14	0.052	1260	4.00	MALREKC00DG356E00F
	820	10 x 30	0.14	0.044	1440	4.80	MALREKC00DJ382E00F
	1000	12.5 x 25	0.14	0.034	1690	4.70	MALREKC00FG410E00F
	1500	12.5 x 30	0.16	0.030	1950	5.40	MALREKC00FJ415E00F
	1800	12.5 x 35	0.16	0.024	2220	5.90	MALREKC00FU418E00F
	2200	12.5 x 40	0.18	0.022	2390	6.40	MALREKC00FK422E00F
	2700	16 x 30	0.18	0.025	2350	8.80	MALREKC00JJ427E00F
	3300	16 x 35	0.20	0.022	2550	10.0	MALREKC00JU433E00F
	3900	16 x 40	0.20	0.018	2900	11.0	MALREKC00JK439E00F
35	27	5 x 11.5	0.12	0.75	163	0.50	MALREKC00AB227F00F
	56	6.3 x 11.5	0.12	0.35	273	0.80	MALREKC00BB256F00F
	82	6.3 x 15	0.12	0.25	390	1.20	MALREKC00BF282F00F
	100	8 x 12	0.12	0.17	445	1.00	MALREKC00PT310F00F
	120	8 x 12	0.12	0.17	445	1.00	MALREKC00PT312F00F
	180	8 x 15	0.12	0.13	555	1.50	MALREKC00PF318F00F
	220	10 x 16	0.12	0.084	825	2.40	MALREKC00DD322F00F
	330	10 x 20	0.12	0.062	1040	3.00	MALREKC00DE333F00F
	390	10 x 25	0.12	0.052	1260	4.00	MALREKC00DG339F00F
	470	12.5 x 20	0.12	0.046	1340	4.00	MALREKC00FE347F00F
	560	12.5 x 20	0.12	0.046	1340	4.00	MALREKC00FE356F00F
	680	12.5 x 25	0.12	0.034	1690	4.70	MALREKC00FG368F00F
	1000	16 x 20	0.12	0.038	1630	5.80	MALREKC00JE410F00F
	1200	12.5 x 35	0.14	0.024	2220	5.90	MALREKC00FU412F00F
	1500	12.5 x 40	0.14	0.022	2390	6.40	MALREKC00FK415F00F
	1800	16 x 30	0.14	0.025	2350	8.80	MALREKC00JJ418F00F
	2200	16 x 35	0.16	0.022	2550	10.0	MALREKC00JU422F00F
	2700	16 x 40	0.16	0.018	2900	11.0	MALREKC00JK427F00F
50	18	5 x 11.5	0.10	1.20	129	0.50	MALREKC00AB218H00F
	39	6.3 x 11.5	0.10	0.54	219	0.80	MALREKC00BB239H00F
	56	6.3 x 15	0.10	0.34	310	1.20	MALREKC00BF256H00F
	68	8 x 12	0.10	0.30	340	1.00	MALREKC00PT268H00F
	82	8 x 15	0.10	0.20	470	1.50	MALREKC00PF282H00F
	100	10 x 16	0.10	0.13	755	2.40	MALREKC00DD310H00F

ELECTRICAL DATA AND ORDERING INFORMATION

U_R (V)	C_R 120 Hz (µF)	NOMINAL CASE SIZE Ø D x L (mm)	tan δ 120 Hz	Z 100 kHz/20 °C (Ω)	I_R 100 kHz/105 °C (mA)	WEIGHT (g)	CATALOG NUMBER (LONG LEADS)
50	120	10 x 16	0.10	0.13	755	2.40	MALREKC00DD312H00F
	180	10 x 20	0.10	0.088	945	3.00	MALREKC00DE318H00F
	220	10 x 25	0.10	0.073	1150	4.00	MALREKC00DG322H00F
	330	12.5 x 20	0.10	0.054	1260	4.00	MALREKC00FE333H00F
	470	12.5 x 25	0.10	0.044	1490	4.70	MALREKC00FG347H00F
	560	12.5 x 30	0.10	0.039	1720	5.40	MALREKC00FJ356H00F
	680	12.5 x 35	0.10	0.033	1890	5.90	MALREKC00FU368H00F
	820	12.5 x 40	0.10	0.029	2030	6.40	MALREKC00FK382H00F
	1000	16 x 30	0.10	0.030	2150	8.80	MALREKC00JJ410H00F
	1200	16 x 35	0.12	0.027	2320	10.0	MALREKC00JU412H00F
	1500	16 x 40	0.12	0.024	2540	11.0	MALREKC00JK415H00F
63	10	5 x 11.5	0.10	1.90	103	0.50	MALREKC00AB210J00F
	18	6.3 x 11.5	0.10	1.00	161	0.80	MALREKC00BB218J00F
	33	6.3 x 15	0.10	0.61	233	1.20	MALREKC00BF233J00F
	47	8 x 12	0.10	0.47	274	1.00	MALREKC00PT247J00F
	56	10 x 12.5	0.10	0.27	418	1.90	MALREKC00DC256J00F
	68	8 x 15	0.10	0.34	360	1.50	MALREKC00PF268J00F
	82	8 x 20	0.10	0.21	525	2.00	MALREKC00PE282J00F
	100	10 x 20	0.10	0.16	650	3.00	MALREKC00DE310J00F
	120	10 x 20	0.10	0.16	650	3.00	MALREKC00DE312J00F
	150	10 x 25	0.10	0.13	783	4.00	MALREKC00DG315J00F
	180	10 x 30	0.10	0.10	960	4.80	MALREKC00DJ318J00F
	220	12.5 x 20	0.10	0.11	870	4.00	MALREKC00FE322J00F
	270	12.5 x 25	0.10	0.074	1150	4.70	MALREKC00FG327J00F
	330	16 x 20	0.10	0.085	1100	5.80	MALREKC00JE333J00F
	390	12.5 x 30	0.10	0.068	1280	5.40	MALREKC00FJ339J00F
	470	12.5 x 35	0.10	0.063	1390	5.90	MALREKC00FU347J00F
	560	12.5 x 40	0.10	0.051	1530	6.40	MALREKC00FK356J00F
	680	16 x 30	0.10	0.046	1720	8.80	MALREKC00JJ368J00F
	820	16 x 35	0.10	0.040	1910	10.0	MALREKC00JU382J00F
	1000	16 x 40	0.10	0.036	2070	11.0	MALREKC00JK410J00F

LOW TEMPERATURE BEHAVIOR (at 120Hz)

IMPEDANCE RATIO Z (T2)/Z (T1)	RATED VOLTAGE (V)	
T2/T1	10 ~ 50	63
- 55 °C/+ 20 °C	3	6

ADDITIONAL ELECTRICAL DATA				
PARAMETER	**CONDITIONS**	**VALUE**		
Current				
Leakage current (Test conditions: U_R, 20 °C)	After 2 minutes at U_R	$I_{L2} \leq 0.01 \times C_R \times U_R$	or 3 µA	(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**				
	10 ~ 180 µF	**220 ~ 560 µF**	**680 ~ 1800 µF**	**2200 ~ 3900 µF**	**4700 ~ 8200 µF**
120	0.40	0.50	0.60	0.75	0.85
1000	0.75	0.85	0.87	0.90	0.95
10 000	0.90	0.94	0.95	0.95	0.98
100 000	1.00	1.00	1.00	1.00	1.00

TEST PROCEDURES AND REQUIREMENTS		
TEST	**PROCEDURE (QUICK REFERENCE)**	**REQUIREMENTS**
Load life	T_{amb} = 105 °C U_R and I_R applied After 2000 hours Ø 5, Ø 6.3 After 3000 hours Ø 8 After 5000 hours Ø 10 After 7000 hours Ø 12.5 After 8000 hours Ø 16, Ø 18	Δ C/C: ± 20 % of initial value $I_L \leq$ spec. limit tan $\delta \leq 2$ x spec. limit
Shelf life	No voltage applied After 1000 h After test: U_R to be applied for 30 minutes 24 to 48 hours before measurement	Δ C/C: ± 20 % of initial value $I_L \leq$ spec.limit tan $\delta \leq 2$ x spec. limit

Disclaimer

All product specifications and data are subject to change without notice.

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