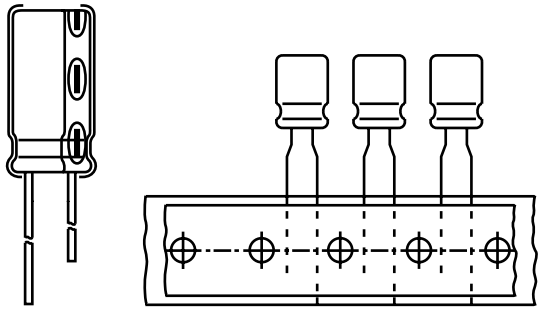
Aluminum Capacitors
Radial Style



Component outlines

FEATURES

- Polarized aluminum electrolytic capacitor
- High CU product with miniature dimensions
- Temperature range 85 °C

Pb-free
RoHS COMPLIANT

APPLICATIONS

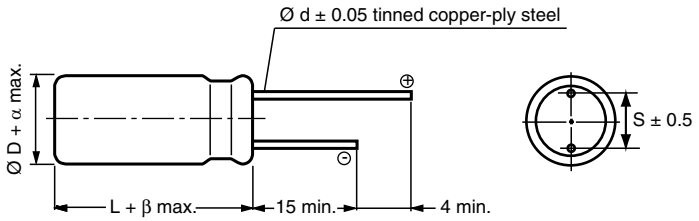
- General uses, audio/video systems, automotive electronics
- Filtering, smoothing, coupling, decoupling
- Small space requirement, high component density
- Portable and mobile units

QUICK REFERENCE DATA		
DESCRIPTION	**UNIT**	**VALUE**
Nominal case size (Ø D x L)	mm	4 x 5 to 8 x 5
Rated capacitance range C_R	µF	0.10 to 220
Capacitance tolerance	%	± 20
Rated voltage range	V	6.3 to 63
Category temperature range	°C	- 40 to 85
Load life	h	2000
Based on sectional specification		IEC 60384-4/EN 130 300
Climatic category IEC 60068		40/85/56

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

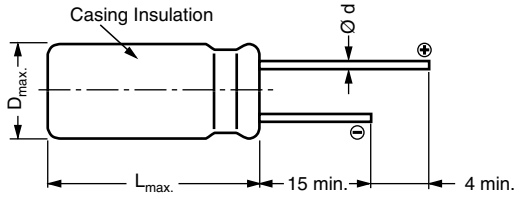
C_R (µF)	RATED VOLTAGE (V)						
	6.3	**10**	**16**	**25**	**35**	**50**	**63**
0.10	→	→	→	→	→	→	4 x 5
0.15	→	→	→	→	→	→	4 x 5
0.22	→	→	→	→	→	→	4 x 5
0.33	→	→	→	→	→	→	4 x 5
0.47	→	→	→	→	→	→	4 x 5
0.68	→	→	→	→	→	→	4 x 5
1.0	→	→	→	→	→	→	4 x 5
1.5	→	→	→	→	→	→	4 x 5
2.2	→	→	→	→	→	→	4 x 5
3.3	→	→	→	→	→	4 x 5	5 x 5
4.7	→	→	→	→	4 x 5	→	5 x 5
6.8	→	→	→	4 x 5	→	5 x 5	6.3 x 5
10	→	→	4 x 5	→	5 x 5	→	6.3 x 5
15	→	4 x 5	→	5 x 5	→	6.3 x 5	8 x 5
22	4 x 5	→	5 x 5	→	6.3 x 5	→	8 x 5
33	→	5 x 5	→	6.3 x 5	→	8 x 5	-
47	5 x 5	→	6.3 x 5	→	8 x 5	-	-
68	→	→	6.3 x 5	8 x 5	-	-	-
100	6.3 x 5	→	→	8 x 5	-	-	-
150	→	→	8 x 5	-	-	-	-
220	→	8 x 5	-	-	-	-	-

RADIAL STYLE: DIMENSIONS in millimeters

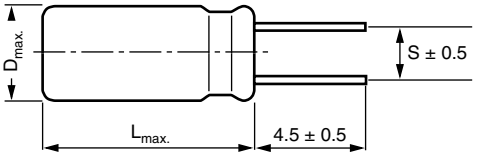


Ø D	4	5	6.3	8
S	1.5	2.0	2.5	2.5
Ø d	0.45	0.45	0.45	0.45
β	1.0			1.5
α	0.5			

DIMENSIONS in millimeters AND AVAILABLE FORMS



Ø D ≤ 8 long leads MALREKF00...



Ø D ≤ 8 shortened leads MALREKF05...
(S = 1.5/2.0/2.5 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_R	rated alternating current (rms) at 120 Hz and

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

ORDERING EXAMPLE

EKF 47 µF/35 V, ± 20 %, size: 8 x 5 mm
Leads: Long
Ordering code: MALREKF00PP247F00K

Leads: Short
Ordering code: MALREKF05...

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/20 °C (Ω)	I_R 120 Hz/85 °C (mA)	WEIGHT (g)	CATALOG NUMBER (Long Leads)
6.3	22	4 x 5	0.24	14.5	37	0.18	MALREKF00MP222B00K
	47	5 x 5	0.24	6.77	63	0.25	MALREKF00AP247B00K
	100	6.3 x 5	0.24	3.18	108	0.34	MALREKF00BP310B00K
10	15	4 x 5	0.20	17.7	34	0.18	MALREKF00MP215C00K
	33	5 x 5	0.20	8.04	58	0.25	MALREKF00AP233C00K
	220	8 x 5	0.20	1.21	208	0.50	MALREKF00PP322C00K
16	10	4 x 5	0.16	21.2	31	0.18	MALREKF00MP210D00K
	22	5 x 5	0.16	9.65	53	0.25	MALREKF00AP222D00K
	47	6.3 x 5	0.16	4.52	91	0.34	MALREKF00BP247D00K
	68	6.3 x 5	0.16	3.12	109	0.34	MALREKF00BP268D00K
	150	8 x 5	0.16	1.41	192	0.50	MALREKF00PP315D00K
25	6.8	4 x 5	0.13	25.4	28	0.18	MALREKF00MP168E00K
	15	5 x 5	0.13	11.5	49	0.25	MALREKF00AP215E00K
	33	6.3 x 5	0.13	5.22	84	0.34	MALREKF00BP233E00K
	68	8 x 5	0.13	2.54	143	0.50	MALREKF00PP268E00K
	100	8 x 5	0.13	1.72	174	0.50	MALREKF00PP310E00K
35	4.7	4 x 5	0.12	33.9	24	0.18	MALREKF00MP147F00K
	10	5 x 5	0.12	15.9	41	0.25	MALREKF00AP210F00K
	22	6.3 x 5	0.12	7.23	72	0.34	MALREKF00BP222F00K
	47	8 x 5	0.12	3.39	124	0.50	MALREKF00PP247F00K
50	3.3	4 x 5	0.09	36.2	24	0.18	MALREKF00MP133H00K
	6.8	5 x 5	0.09	17.6	39	0.25	MALREKF00AP168H00K
	15	6.3 x 5	0.09	7.96	68	0.34	MALREKF00BP215H00K
	33	8 x 5	0.09	3.62	120	0.50	MALREKF00PP233H00K
63	0.10	4 x 5	0.09	1194	4.1	0.18	MALREKF00MP010J00K
	0.15	4 x 5	0.09	796	5.0	0.18	MALREKF00MP015J00K
	0.22	4 x 5	0.09	543	6.1	0.18	MALREKF00MP022J00K
	0.33	4 x 5	0.09	362	7.5	0.18	MALREKF00MP033J00K
	0.47	4 x 5	0.09	254	8.9	0.18	MALREKF00MP047J00K
	0.68	4 x 5	0.09	176	11	0.18	MALREKF00MP068J00K
	1.0	4 x 5	0.09	119	13	0.18	MALREKF00MP110J00K
	1.5	4 x 5	0.09	79.6	16	0.18	MALREKF00MP115J00K
	2.2	4 x 5	0.09	54.3	19	0.18	MALREKF00MP122J00K
	3.3	5 x 5	0.09	36.2	27	0.25	MALREKF00AP133J00K
	4.7	5 x 5	0.09	25.4	33	0.25	MALREKF00AP147J00K
	6.8	6.3 x 5	0.09	17.6	46	0.34	MALREKF00BP168J00K
	10	6.3 x 5	0.09	11.9	56	0.34	MALREKF00BP210J00K
	15	8 x 5	0.09	7.96	81	0.50	MALREKF00PP215J00K
	22	8 x 5	0.09	5.43	98	0.50	MALREKF00PP222J00K

LOW TEMPERATURE BEHAVIOUR

IMPEDANCE RATIO Z (T2) / Z (T1)	RATED VOLTAGE (V)			
T2/T1	**6.3**	**10**	**16**	**25 ~ 63**
- 25/+ 20 °C	4	3	2	2
- 40/+ 20 °C	8	6	4	4

ADDITIONAL ELECTRICAL DATA

PARAMETER	CONDITIONS	VALUE
Current		
Leakage current (Test conditions: U_R, 20 °C)	after 1 minute at U_R	$I_{L1} \leq 0.01 \times C_R \times U_R$ or 4 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 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} = 85 °C U_R and I_R applied After 2000 hours	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 hours 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

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