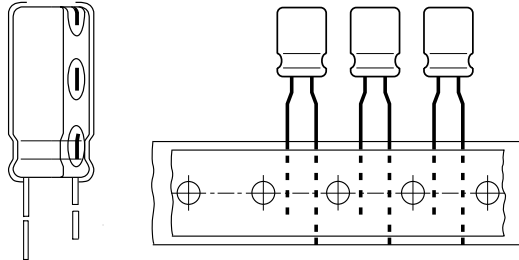




Aluminum Capacitors Radial Style



Component outlines.

Obsolete - please refer to: www.vishay.com/doc?25014

FEATURES

- Polarized Aluminum electrolytic capacitor
- High C x U product
- Small dimensions
- Compliant to RoHS directive 2002/95/EC



RoHS
COMPLIANT

APPLICATIONS

- General uses, industrial electronics, automotive electronics, audio/video systems
- Smoothing, filtering, coupling, decoupling, timing elements
- Portable and mobile units

QUICK REFERENCE DATA

DESCRIPTION	UNIT	VALUE	
Nominal case size (Ø D x L)	mm	5 x 11 to 18 x 40	
Rated capacitance range C _R	µF	0.47 to 10 000	
Capacitance tolerance	%	± 20	
Rated voltage range	V	10 to 350	400, 450
Category temperature range	°C	- 40 to + 85	- 25 to + 85
Endurance test at upper category temp.	h	2000	
Useful life at 85 °C and I _R applied	h	3000	
Useful life at 40 °C and I _R applied	h	70 000	
Failure rate	10 ⁻⁹ /h	≤ 90	
Based on sectional specification		IEC 60384-4/EN 130300	
Climatic category IEC 60068		40/085/56	25/085/56

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	100	160	250	350	400	450
0.47	-	-	-	-	5 x 11	-	5 x 11	-	-	-	-	-
1.0	-	-	-	-	5 x 11	-	5 x 11	6.3 x 11	-	-	-	8 x 11.5
2.2	-	-	-	-	5 x 11	-	5 x 11	6.3 x 11	8 x 11.5	10 x 12.5	10 x 12.5	10 x 12.5
3.3	-	-	-	-	5 x 11	-	5 x 11	8 x 11.5	10 x 12.5	10 x 12.5	10 x 12.5	10 x 16
4.7	-	-	-	-	5 x 11	5 x 11	5 x 11	8 x 11.5	10 x 12.5	10 x 12.5	10 x 16	10 x 20
10	-	-	-	-	5 x 11	5 x 11	6.3 x 11	10 x 12.5	10 x 16	10 x 20	12.5 x 20	12.5 x 20
22	-	-	-	-	5 x 11	6.3 x 11	8 x 11.5	10 x 20	12.5 x 20	12.5 x 25	12.5 x 25	16 x 25
33	-	-	-	5 x 11	6.3 x 11	6.3 x 11	10 x 12.5	12.5 x 20	12.5 x 25	12.5 x 25	16 x 25	16 x 13.5
47	-	-	5 x 11	6.3 x 11	6.3 x 11	8 x 11.5	10 x 16	12.5 x 20	12.5 x 25	16 x 25	16 x 35.5	16 x 35.5
100	5 x 11	6.3 x 11	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	10 x 20	16 x 25	16 x 31.5	18 x 40	-	-
220	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	10 x 20	12.5 x 25	18 x 35.5	-	-	-	-
330	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	10 x 20	12.5 x 20	16 x 25	-	-	-	-	-
470	8 x 11.5	10 x 12.5	10 x 16	10 x 20	12.5 x 20	12.5 x 25	16 x 31.5	-	-	-	-	-
1000	10 x 16	10 x 20	12.5 x 20	12.5 x 25	16 x 25	16 x 31.5	-	-	-	-	-	-
2200	12.5 x 20	12.5 x 25	16 x 25	16 x 31.5	18 x 35.5	-	-	-	-	-	-	-
3300	12.5 x 25	16 x 25	16 x 31.5	18 x 35.5	-	-	-	-	-	-	-	-
4700	16 x 25	16 x 31.5	18 x 35.5	-	-	-	-	-	-	-	-	-
6800	16 x 31.5	-	-	-	-	-	-	-	-	-	-	-
10 000	18 x 35.5	-	-	-	-	-	-	-	-	-	-	-

Note

Special values/dimensions on request
± 10% capacitance tolerance on request

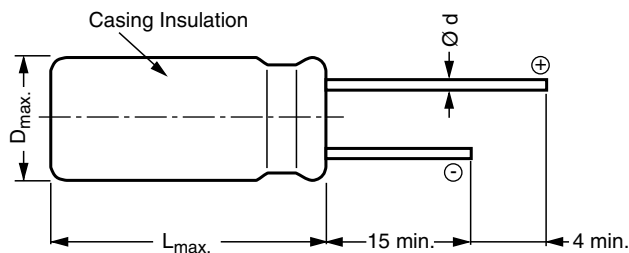
EKO

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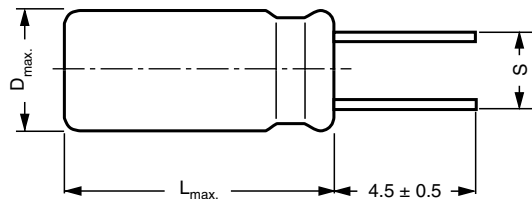
Aluminum Capacitors
Radial Style



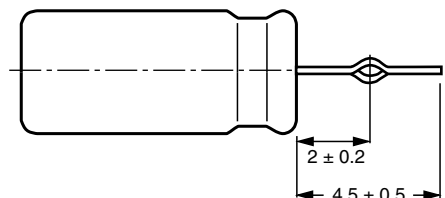
DIMENSIONS in millimeters **AND AVAILABLE FORMS**



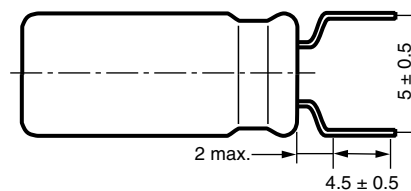
$5 \leq \varnothing D \leq 18$ Long leads EKO 00...



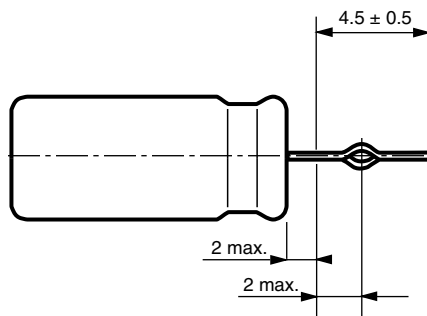
$5 \leq \varnothing D \leq 18$ Shortened leads EKO 05...
(S = 2/2.5/3.5/5/7.5 mm)



$10 \leq \varnothing D \leq 18$ Leads shortened and formed EKO 06...



$5 \leq \varnothing D \leq 8$ Leads bent open, shortened EKO 09...
(S = 5 mm)



Leads are solder-coated steel
Safety vent for $\varnothing D \geq 8$ mm

$5 \leq \varnothing D \leq$ Leads bent open, shortened and formed EKO 06...
(S = 5 mm)

RADIAL STYLE: DIMENSIONS in millimeters

NOMINAL CASE SIZE $\varnothing D \times L$	MAXIMUM SIZE $D_{max.} \times L_{max.}$	LEAD $\varnothing D \pm 0.05$	LEAD SPACING $S \pm 0.05$
5 x 11	5.5 x 12.0	0.5	2.0
6.3 x 11	6.8 x 12.0	0.5	2.5
8 x 11.5	8.5 x 12.5	0.6	3.5
10 x 12.5	10.5 x 14.5	0.6	5.0
10 x 16	10.5 x 18.0	0.6	5.0
10 x 20	10.5 x 22.0	0.6	5.0
12.5 x 20	13.0 x 22.0	0.6	5.0
12.5 x 25	13.0 x 27.0	0.6	5.0
16 x 25	16.5 x 27.0	0.8	7.5
16 x 31.5	16.5 x 33.5	0.8	7.5
16 x 35.5	16.5 x 37.5	0.8	7.5
18 x 35.5	18.5 x 37.5	0.8	7.5
18 x 40	18.5 x 42.0	0.8	7.5



Aluminum Capacitors
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ELECTRICAL DATA	
SYMBOL	DESCRIPTION
C_R	rated capacitance at 120 Hz
U_R	rated voltage
$\tan \delta$	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 at $T_a = 20^\circ\text{C}$, $P = 80\text{ kPa}$ to 120 kPa , $RH = 45\%$ to 75% .

ORDERING EXAMPLE

EKO 2200 $\mu\text{F}/25\text{ V}$, $\pm 20\%$, size: 16 mm x 25 mm

Leads: Long - Ordering code: EKO 00JG422E00

Leads: Short - Ordering code: EKO 05...

Leads: Bent open, shortened - Ordering code: EKO 09....

Leads: Bent open, shortened and formed - Ordering code: EKO 06...

The 14th place ($\square$), not indicated in the following table, is an inter-company code and is not relevant to your order.

ELECTRICAL DATA AND ORDERING INFORMATION							
U_R (V)	C_R 120 Hz (μF)	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	$\tan \delta$ 120 Hz	R_{ESR} 120 Hz (Ω)	I_R 120 Hz/85 $^\circ\text{C}$ (mA)	WEIGHT (g)	CATALOG NUMBER
10	100	5 x 11	0.20	3.18	157	0.5	EKO00AA310C00 $\square$
	220	6.3 x 11	0.20	1.45	267	0.8	EKO00BA322C00 $\square$
	330	8 x 11.5	0.20	0.97	386	1.1	EKO00PB333C00 $\square$
	470	8 x 11.5	0.20	0.68	460	1.1	EKO00PB347C00 $\square$
	1000	10 x 16	0.20	0.32	854	2.0	EKO00DD410C00 $\square$
	2200	12.5 x 20	0.22	0.16	1492	3.8	EKO00GE422C00 $\square$
	3300	12.5 x 25	0.24	0.12	1831	4.5	EKO00GG433C00 $\square$
	4700	16 x 25	0.26	0.09	2317	7.0	EKO00JG447C00 $\square$
	6800	16 x 31.5	0.30	0.07	2814	9.0	EKO00JS468C00 $\square$
	10000	18 x 35.5	0.36	0.06	3475	13.0	EKO00KL510C00 $\square$
16	100	6.3 x 11	0.16	2.55	201	0.8	EKO00BA310D00 $\square$
	220	8 x 11.5	0.16	1.16	352	1.1	EKO00PB322D00 $\square$
	330	8 x 11.5	0.16	0.77	431	1.1	EKO00PB333D00 $\square$
	470	10 x 12.5	0.16	0.54	598	1.5	EKO00DC347D00 $\square$
	1000	10 x 20	0.16	0.25	1042	2.5	EKO00DE410D00 $\square$
	2200	12.5 x 25	0.18	0.13	1713	4.5	EKO00GG422D00 $\square$
	3300	16 x 25	0.20	0.10	2194	7.0	EKO00JG433D00 $\square$
	4700	16 x 31.5	0.22	0.07	2718	9.0	EKO00JS447D00 $\square$
25	47	5 x 11	0.14	4.74	131	0.5	EKO00AA247E00 $\square$
	100	6.3 x 11	0.14	2.23	220	0.8	EKO00BA310E00 $\square$
	220	8 x 11.5	0.14	1.01	386	1.1	EKO00PB322E00 $\square$
	330	10 x 12.5	0.14	0.68	549	1.5	EKO00DC333E00 $\square$
	470	10 x 16	0.14	0.47	717	2.0	EKO00DD347E00 $\square$
	1000	12.5 x 20	0.14	0.22	1340	3.8	EKO00GE410E00 $\square$
	2200	16 x 25	0.16	0.12	2032	7.0	EKO00JG422E00 $\square$
	3300	16 x 31.5	0.18	0.09	2546	9.0	EKO00JS433E00 $\square$
35	4700	18 x 35.5	0.20	0.07	3225	13.0	EKO00KL447E00 $\square$
	33	5 x 11	0.12	5.79	123	0.5	EKO00AA233F00 $\square$
	47	6.3 x 11	0.12	4.07	169	0.8	EKO00BA247F00 $\square$
	100	8 x 11.5	0.12	1.91	291	1.1	EKO00PB310F00 $\square$
	220	10 x 12.5	0.12	0.87	501	1.5	EKO00DC322F00 $\square$
	330	10 x 16	0.12	0.58	672	2.0	EKO00DC333F00 $\square$
	470	10 x 20	0.12	0.41	875	2.5	EKO00DE347F00 $\square$
	1000	12.5 x 25	0.12	0.19	1633	4.5	EKO00GG410F00 $\square$
35	2200	16 x 31.5	0.14	0.10	2401	9.0	EKO00JS422F00 $\square$
	3300	18 x 35.5	0.16	0.08	3065	13.0	EKO00KL433F00 $\square$

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Aluminum Capacitors
Radial Style



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	R _{ESR} 120 Hz (Ω)	I _R 120 Hz/85 °C (mA)	WEIGHT (g)	CATALOG NUMBER
50	0.47	5 x 11	0.10	339.00	16	0.5	EKO00AA047H00□
	1	5 x 11	0.10	159.00	23	0.5	EKO00AA110H00□
	2.2	5 x 11	0.10	72.00	34	0.5	EKO00AA122H00□
	3.3	5 x 11	0.10	48.00	42	0.5	EKO00AA133H00□
	4.7	5 x 11	0.10	34.00	50	0.5	EKO00AA147H00□
	10	5 x 11	0.10	15.90	72	0.5	EKO00AA210H00□
	22	5 x 11	0.10	7.24	108	0.5	EKO00AA222H00□
	33	6.3 x 11	0.10	4.83	151	0.8	EKO00BA233H00□
	47	6.3 x 11	0.10	3.39	181	0.8	EKO00BA247H00□
	100	8 x 11.5	0.10	1.59	311	1.1	EKO00PB310H00□
	220	10 x 16	0.10	0.73	586	2.0	EKO00DD322H00□
	330	10 x 20	0.10	0.48	784	2.5	EKO00DE333H00□
	470	12.5 x 20	0.10	0.34	1098	3.8	EKO00GE347H00□
	1000	16 x 25	0.10	0.16	1937	7.0	EKO00JG410H00□
	2200	18 x 35.5	0.12	0.09	2823	13.0	EKO00KL422H00□
63	4.7	5 x 11	0.09	30.50	54	0.5	EKO00AA147J00□
	10	5 x 11	0.09	14.30	78	0.5	EKO00AA210J00□
	22	6.3 x 11	0.09	6.51	133	0.8	EKO00BA222J00□
	33	6.3 x 11	0.09	4.34	163	0.8	EKO00BA233J00□
	47	8 x 11.5	0.09	3.05	230	1.1	EKO00PB247J00□
	100	10 x 12.5	0.09	1.43	390	1.5	EKO00DC310J00□
	220	10 x 20	0.09	0.65	691	2.5	EKO00DE322J00□
	330	12.5 x 20	0.09	0.43	994	3.8	EKO00GE333J00□
	470	12.5 x 25	0.09	0.30	1893	4.5	EKO00GG347J00□
	1000	16 x 31.5	0.09	0.14	2289	9.0	EKO00JS410J00□
100	0.47	5 x 11	0.08	271.00	17	0.5	EKO00AA047L00□
	1	5 x 11	0.08	127.00	25	0.5	EKO00AA110L00□
	2.2	5 x 11	0.08	58.00	37	0.5	EKO00AA122L00□
	3.3	5 x 11	0.08	38.60	45	0.5	EKO00AA133L00□
	4.7	5 x 11	0.08	27.10	54	0.5	EKO00AA147L00□
	10	6.3 x 11	0.08	12.70	90	0.8	EKO00BA210L00□
	22	8 x 11.5	0.08	5.79	157	1.1	EKO00PB222L00□
	33	10 x 12.5	0.08	3.86	224	1.5	EKO00DC233L00□
	47	10 x 16	0.08	2.71	293	2.0	EKO00DD247L00□
	100	10 x 20	0.08	1.27	466	3.8	EKO00DE310L00□
	220	12.5 x 25	0.08	0.58	885	7.0	EKO00GG322L00□
	330	16 x 25	0.08	0.39	1202	7.0	EKO00JG333L00□
	470	16 x 31.5	0.08	0.27	1569	9.0	EKO00JS347L00□
160	1	6.3 x 11	0.15	239.00	25	0.8	EKO00BA110M00□
	2.2	6.3 x 11	0.15	109.00	37	0.8	EKO00BA122M00□
	3.3	8 x 11.5	0.15	72.00	53	1.1	EKO00PB133M00□
	4.7	8 x 11.5	0.15	50.80	63	1.1	EKO00PB147M00□
	10	10 x 12.5	0.15	23.90	107	1.5	EKO00DC210M00□
	22	10 x 20	0.15	10.90	189	2.5	EKO00DE222M00□
	33	12.5 x 20	0.15	7.24	272	3.8	EKO00GE233M00□
	47	12.5 x 20	0.15	5.08	325	3.8	EKO00GE247M00□
	100	16 x 25	0.15	2.39	573	7.0	EKO00JG310M00□
	220	18 x 35.5	0.15	1.09	1047	13.0	EKO00KL322M00□
250	2.2	8 x 11.5	0.15	109.00	46	1.1	EKO00PB122N00□
	3.3	10 x 12.5	0.15	72.00	61	1.5	EKO00DC133N00□
	4.7	10 x 12.5	0.15	50.80	73	1.5	EKO00DC147N00□
	10	10 x 16	0.15	23.90	117	2.0	EKO00DD210N00□
	22	12.5 x 20	0.15	10.90	222	3.8	EKO00GE222N00□
	33	12.5 x 25	0.15	7.24	297	4.5	EKO00GG233N00□
	47	12.5 x 25	0.15	5.08	393	4.5	EKO00GG247N00□
	100	16 x 31.5	0.15	2.39	627	9.0	EKO00JS310N00□



Aluminum Capacitors
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ELECTRICAL DATA AND ORDERING INFORMATION

U_R (V)	C_R 120 Hz (μ F)	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	$\tan \delta$ 120 Hz	R_{ESR} 120 Hz (Ω)	I_R 120 Hz/85 °C (mA)	WEIGHT (g)	CATALOG NUMBER
350	2.2	10 x 12.5	0.20	145.00	50	1.5	EKO00DC122O00□
	3.3	10 x 12.5	0.20	97.00	61	1.5	EKO00DC133O00□
	4.7	10 x 12.5	0.20	68.00	73	1.5	EKO00DC147O00□
	10	10 x 20	0.20	31.80	128	2.5	EKO00DE210O00□
	22	12.5 x 25	0.20	14.50	242	4.5	EKO00GG222O00□
	33	12.5 x 25	0.20	9.65	297	4.5	EKO00GG233O00□
	47	16 x 25	0.20	6.78	393	7.0	EKO00JG247O00□
	100	18 x 40	0.20	3.18	741	16.0	EKO00KK310O00□
400	2.2	10 x 12.5	0.20	145.00	50	1.5	EKA00DC122X00□
	3.3	10 x 12.5	0.20	97.00	61	1.5	EKO00DC133X00□
	4.7	10 x 16	0.20	68.00	80	2.0	EKO00DD147X00□
	10	12.5 x 20	0.20	31.80	150	3.8	EKO00GE210X00□
	22	12.5 x 25	0.20	14.50	282	4.5	EKO00GG222X00□
	33	16 x 25	0.20	9.65	329	7.0	EKO00JG233X00□
	47	16 x 35.5	0.20	6.78	451	11.0	EKO00JL247X00□
450	1.0	8 x 11.5	0.20	266.00	26	1.1	EKO00PB110P00□
	2.2	10 x 12.5	0.20	145.00	45	1.5	EKO00DC122P00□
	3.3	10 x 16	0.20	97.00	60	2.0	EKO00DD133P00□
	4.7	10 x 20	0.20	68.00	78	2.5	EKO00DE147P00□
	10	12.5 x 20	0.20	31.80	134	3.8	EKO00GE210P00□
	22	16 x 25	0.20	14.50	240	7.0	EKO00JG222P00□
	33	16 x 31.5	0.20	9.65	322	9.0	EKO00JS233P00□
	47	16 x 35.5	0.20	6.78	403	11.0	EKO00JL247P00□

LOW TEMPERATURE BEHAVIOUR

IMPEDANCE RATIO $Z(T_2) / Z(T_1)$ AT 120 Hz

T_2/T_1	RATED VOLTAGE (V)								
	10	16	25	35 - 100	160	250	350	400	450
- 25 °C / - 20 °C	3	2	2	2	4	8	8	16	16
- 25 °C / + 20 °C	8	6	4	3	8	12	12	-	-

LEAKAGE CURRENT

Formula for calculation of the maximum leakage current for acceptance tests I_L :

[Test conditions: U_R , 20 °C, 2 minutes ($U_R \leq 100$ V)/5 minutes ($U_R > 100$ V)]

$I_{L2} [\mu A] \leq 0.01 \cdot C_R [\mu F] \cdot U_R [V]$ or 3 μA for
 $U_R \leq 100$ V (whichever is greater)

$I_{L5} [\mu A] \leq 0.02 \cdot C_R [\mu F] \cdot U_R [V]$ +15 μA for
 $U_R > 100$ V

PACKAGING UNITS / MIN. ORDER QUANTITY

SIZE CODES		BULK		AMMO	VOLTAGE CODES
		LONG LEADS	CUT LEADS		
AA	5 x 11	500/2000	500/2000	2000/2000	C = 10 V
BA	6.3 x 11	500/1500	500/1500	1500/1500	D = 16 V
PB	8 x 11.5	300/1200	300/1200	1000/1000	E = 25 V
DC	10 x 12.5	200/1000	800/800	500/1000	F = 35 V
DD	10 x 16	200/1000	700/1400	500/1000	H = 50 V
DE	10 x 20	200/1000	500/1000	500/1000	J = 63 V
GE	12.5 x 20	100/1000	300/1200	400/1200	L = 100 V
GG	12.5 x 25	100/1000	250/1000	400/1200	M = 160 V
JG	16 x 25	50/500	150/600	250/500	N = 250 V
JS	16 x 31.5	50/500	150/600	250/500	O = 350 V
JL	16 x 35.5	50/500	100/500	250/500	X = 400 V
KL	18 x 35.5	50/400	100/400	200/400	P = 450 V
KK	18 x 40	50/400	80/400	-	-



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

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