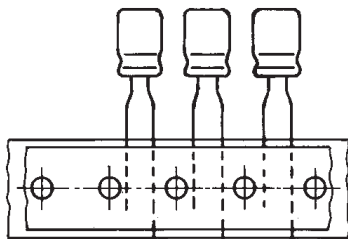
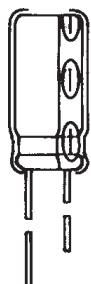


## Aluminum Electrolytic Capacitors, Radial Style



### FEATURES

- Polarized Al electrolytic capacitor
- High C·U product
- Small dimensions

### APPLICATIONS

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

MAIN SPECIFICATIONS			
Nominal Case Size D x L	[mm]	5 x 11 to 18 x 40	
Rated Capacitance Range	[ $\mu$ F]	0.47 to 10000	
Capacitance Tolerance	[%]	$\pm 20$	
Rated Voltage Range	[V]	10 to 350	400, 450
Category Temperature Range	[ $^{\circ}$ C]	-40 to 85	-25 to 85
Endurance Test at Upper Category Temperature	[h]	2000	
Lifetime at 85 $^{\circ}$ C and $I_R$	[h]	3000	
Lifetime at 40 $^{\circ}$ C and $I_R$	[h]	70.000	
Sectional Specifications		IEC 384 - 4 CECC 30300 GP grade	
Detail Specifications		CECC 30301-037, similar to DIN 45 910 part 124 without quality assesement	
Climatic Category			
IEC 68		40 / 085 / 56	25 / 085 / 56
DIN 40040		GPF	HPF
Failure Rate	[10 $^{-9}$ /h]	$\leq 90$	

DIMENSIONS												
Nominal Size D x L [in millimeters]				RATED VOLTAGE [V]								
CAP. [ μF]	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	13 x 20	13 x 20
22					5 x 11	6.3 x 11	8 x 11.5	10 x 20	13 x 20	13 x 25	13 x 25	16 x 25
33				5 x 11	6.3 x 11	6.3 x 11	10 x 12.5	13 x 20	13 x 25	13 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	13 x 20	13 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	13 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	13 x 20	16 x 25					
470	8 x 11.5	10 x 12.5	10 x 16	10 x 20	13 x 20	13 x 25	16 x 31.5					
1000	10 x 16	10 x 20	13 x 20	13 x 25	16 x 25	16 x 31.5						
2200	13 x 20	13 x 25	16 x 25	16 x 31.5	18 x 35.5							
3300	13 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	18 x 35.5										
10000	18 x 35.5											

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

## LEAKAGE CURRENT

Formula for the calculation of the maximum leakage current for acceptance tests  $I_L$ :  
[Test conditions:  $U_R$ , 20°C, 2 minutes ( $U_R \leq 100V$ ) / 5 minutes ( $U_R > 100V$ )]

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

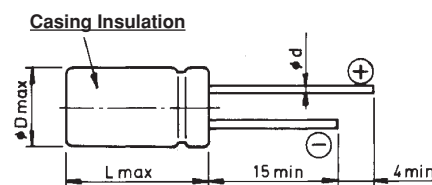
$$I_{L5} [\mu A] \leq 0.02 \cdot C_R [\mu F] \cdot U_R [V] \quad +15\mu A \quad \text{for } U_R > 100V$$

LOW TEMPERATURE BEHAVIOUR									
Impedance Ratio Z(T2) z(T1) at 120Hz									
T2 / T1	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
-40°C / +20°C	8	6	4	3	8	12	12	-	-

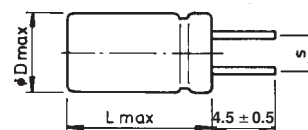
**DIMENSIONS AND LEAD CONFIGURATION** $5 \leq \text{ØD} \leq 18$ 

Long leads

EKO 00...

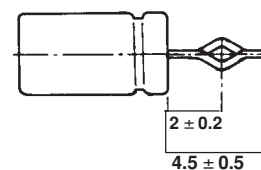
 $5 \leq \text{ØD} \leq 18$ Shortened leads  
(S = 2 / 2.5 / 3.5 / 5 / 7.5mm)

EKO 05...

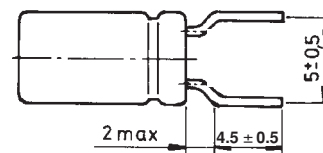
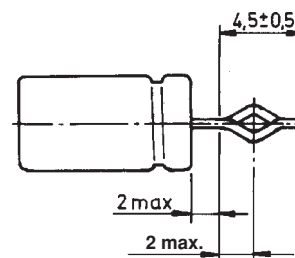
 $10 \leq \text{ØD} \leq 18$ 

Leads shortened and formed

EKO 06...

 $5 \leq \text{ØD} \leq 8$ Leads bent open, shortened  
(S = 5mm)

EKO 09...

 $5 \leq \text{ØD} \leq 8$  Leads bent open, shortened and formed EKO 06...  
(S = 5mm)Leads are solder-coated steel  
safety vent for ØD ≥ 8mm

<b>DIMENSIONS</b> [in millimeters]			
NOMINAL SIZE D x L	MAXIMUM SIZE D <sub>max.</sub> x L <sub>max.</sub>	LEAD ød ± 0.05	LEAD SPACING S ± 0.5
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
13 X 20	13.5 X 22.0	0.6	5.0
13 X 25	13.5 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	0.8	7.5

## Vishay Roederstein

**TECHNICAL AND ORDERING INFORMATION**

If not indicated otherwise the following test conditions apply to all electrical parameters:

$$T_a = 20^\circ\text{C}, p = 80\text{-}120 \text{ kPa}, RH = 45\text{-}75\%$$

$C_R$  Rated Capacitance at 120Hz

$U_R$  Rated Voltage

$\tan d$  Max. Dissipation Factor at 120Hz

$R_{ESR}$  Max. Equivalent Series Resistance at 120Hz

$I_R$  Rated Alternating Current at 120Hz and  
Upper Category Temperature

**Ordering example:**

EKO 22 $\mu$ F / 25V,  $\pm 20\%$ , size: 16mm x 25mm

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...

**ELECTRICAL CHARACTERISTICS, WEIGHT AND ORDERING CODE**

CAPACITANCE 120Hz $C_R$ [ $\mu$ F]	RATED VOLTAGE $U_R$ [V]	DIMENSIONS D x L [mm]	DISSIPATION FACTOR 120Hz	EQUIVALENT SERIES RESISTANCE 120Hz [ $\Omega$ ]	RATED CURRENT $I_R$ 120Hz, 85°C [mA]	WEIGHT [g]	ORDERING CODE
100	10	5.0 x 11.0	0.20	3.18	157	0.5	EKO00AA310C00
220	10	6.3 x 11.0	0.20	1.45	267	0.8	EKO00BA322C00
330	10	8.0 x 11.5	0.20	0.97	386	1.1	EKO00PB333C00
470	10	8.0 x 11.5	0.20	0.68	460	1.1	EKO00PB347C00
1000	10	10.0 x 16.0	0.20	0.32	854	2.0	EKO00DD410C00
2200	10	13.0 x 20.0	0.22	0.16	1492	3.8	EKO00GE422C00
3300	10	13.0 x 25.0	0.24	0.12	1831	4.5	EKO00GG433C00
4700	10	16.0 x 25.0	0.26	0.09	2317	7.0	EKO00JG447C00
6800	10	16.0 x 31.5	0.30	0.07	2814	9.0	EKO00JS468C00
10000	10	18.0 x 35.5	0.36	0.06	3475	13.0	EKO00KL510C00
100	16	6.3 x 11.0	0.16	2.55	201	0.8	EKO00BA310D00
220	16	8.0 x 11.5	0.16	1.16	352	1.1	EKO00PB322D00
330	16	8.0 x 11.5	0.16	0.77	431	1.1	EKO00PB333D00
470	16	10.0 x 12.5	0.16	0.54	598	1.5	EKO00DC347D00
1000	16	10.0 x 20.0	0.16	0.25	1042	2.5	EKO00DE410D00
2200	16	13.0 x 25.0	0.18	0.13	1713	4.5	EKO00GG422D00
3300	16	16.0 x 25.0	0.20	0.10	2194	7.0	EKO00JG433D00
4700	16	16.0 x 31.5	0.22	0.07	2718	9.0	EKO00JS447D00
6800	16	18.0 x 35.5	0.26	0.06	3360	13.0	EKO00KL468D00
47	25	5.0 x 11.0	0.14	4.74	131	0.5	EKO00AA247E00
100	25	6.3 x 11.0	0.14	2.23	220	0.8	EKO00BA310E00
220	25	8.0 x 11.5	0.14	1.01	386	1.1	EKO00PB322E00
330	25	10.0 x 12.5	0.14	0.68	549	1.5	EKO00DC333E00
470	25	10.0 x 16.0	0.14	0.47	717	2.0	EKO00DD347E00
1000	25	13.0 x 20.0	0.14	0.22	1340	3.8	EKO00GE410E00
2200	25	16.0 x 25.0	0.16	0.12	2032	7.0	EKO00JG422E00
3300	25	16.0 x 31.5	0.18	0.09	2546	9.0	EKO00JS433E00
4700	25	18.0 x 35.5	0.20	0.07	3225	13.0	EKO00KL447E00

ELECTRICAL CHARACTERISTICS, WEIGHT AND ORDERING CODE							
CAPACITANCE 120Hz CR [ $\mu$ F]	RATED VOLTAGE UR [V]	DIMENSIONS D x L [mm]	DISSIPATION FACTOR 120Hz	EQUIVALENT SERIES RESISTANCE 120Hz [ $\Omega$ ]	RATED CURRENT IR 120Hz, 85°C [mA]	WEIGHT [g]	ORDERING CODE
33	35	5.0 x 11.0	0.12	5.79	123	0.5	EKO00AA233F00
47	35	6.3 x 11.0	0.12	4.07	169	0.8	EKO00BA247F00
100	35	8.0 x 11.5	0.12	1.91	291	1.1	EKO00PB310F00
220	35	10.0 x 12.5	0.12	0.87	501	1.5	EKO00DC322F00
330	35	10.0 x 16.0	0.12	0.58	672	2.0	EKO00DC333F00
470	35	10.0 x 20.0	0.12	0.41	875	2.5	EKO00DE347F00
1000	35	13.0 x 25.0	0.12	0.19	1633	4.5	EKF00GG410F00
2200	35	16.0 x 31.5	0.14	0.10	2401	9.0	EKO00JS422F00
3300	35	18.0 x 35.5	0.16	0.08	3065	13.0	EKO00KL433F00
0.47	50	5.0 x 11.0	0.10	339.00	16	0.5	EKO00AA047H00
1	50	5.0 x 11.0	0.10	159.00	23	0.5	EKO00AA110H00
2.2	50	5.0 x 11.0	0.10	72.00	34	0.5	EKO00AA122H00
3.3	50	5.0 x 11.0	0.10	48.00	42	0.5	EKO00AA133H00
4.7	50	5.0 x 11.0	0.10	34.00	50	0.5	EKO00AA147H00
10	50	5.0 x 11.0	0.10	15.90	72	0.5	EKO00AA210H00
22	50	5.0 x 11.0	0.10	7.24	108	0.5	EKO00AA222H00
33	50	6.3 x 11.0	0.10	4.83	151	0.8	EKO00BA233H00
47	50	6.3 x 11.0	0.10	3.39	181	0.8	EKO00BA247H00
100	50	8.0 x 11.5	0.10	1.59	311	1.1	EKO00PB310H00
220	50	10.0 x 16.0	0.10	0.73	586	2.0	EKO00DD322H00
330	50	10.0 x 20.0	0.10	0.48	784	2.5	EKO00DE333H00
470	50	13.0 x 20.0	0.10	0.34	1098	3.8	EKO00GE347H00
1000	50	16.0 x 25.0	0.10	0.16	1937	7.0	EKO00JG410H00
2200	50	18.0 x 35.5	0.12	0.09	2823	13.0	EKO00KL422H00
4.7	63	5.0 x 11.0	0.09	30.50	54	0.5	EKO00AA147J00
10	63	5.0 x 11.0	0.09	14.30	78	0.5	EKO00AA210J00
22	63	6.3 x 11.0	0.09	6.51	133	0.8	EKO00BA222J00
33	63	6.3 x 11.0	0.09	4.34	163	163	EKO00BA233J00
47	63	8.0 x 11.5	0.09	3.05	230	1.1	EKO00PB247J00
100	63	10.0 x 12.5	0.09	1.43	390	1.5	EKO00DC310J00
220	63	10.0 x 20.0	0.09	0.65	691	2.5	EKO00DE322J00
330	63	13.0 x 20.0	0.09	0.43	994	3.8	EKO00GE333J00
470	63	13.0 x 25.0	0.09	0.30	1893	4.5	EKO00GG347J00
1000	63	16.0 x 31.5	0.09	0.14	2289	9.0	EKO00JS410J00
0.47	100	5.0 x 11.0	0.08	271.00	17	0.5	EKO00AA047L00
1	100	5.0 x 11.0	0.08	127.00	25	0.5	EKO00AA110L00
2.2	100	5.0 x 11.0	0.08	58.00	37	0.5	EKO00AA122L00
3.3	100	5.0 x 11.0	0.08	38.60	45	0.5	EKO00AA133L00
4.7	100	5.0 x 11.0	0.08	27.10	54	0.5	EKO00AA147L00
10	100	6.3 x 11.0	0.08	12.70	90	0.8	EKO00BA210L00
22	100	8.0 x 11.5	0.08	5.79	157	1.1	EKO00PB222L00
33	100	10.0 x 12.5	0.08	3.86	224	1.5	EKO00DC233L00
47	100	10.0 x 16.0	0.08	2.71	293	2.0	EKO00DD247L00
100	100	13.0 x 20.0	0.08	1.27	466	3.8	EKO00GE310L00
220	100	13.0 x 25.0	0.08	0.58	885	7.0	EKO00GG322L00
330	100	16.0 x 25.0	0.08	0.39	1202	7.0	EKO00JG333L00
470	100	16.0 x 31.5	0.08	0.27	1569	9.0	EKO00JS347L00

**ELECTRICAL CHARACTERISTICS, WEIGHT AND ORDERING CODE**

CAPACITANCE 120Hz CR [μF]	RATED VOLTAGE UR [V]	DIMENSIONS D x L [mm]	DISSIPATION FACTOR 120Hz	EQUIVALENT SERIES RESISTANCE 120Hz [Ω]	RATED CURRENT IR 120Hz, 85°C [mA]	WEIGHT [g]	ORDERING CODE
1	160	6.3 x 11.0	0.15	239.00	25	0.8	EKO00BA110M00
2.2	160	6.3 x 11.0	0.15	109.00	37	0.8	EKO00BA122M00
3.3	160	8.0 x 11.5	0.15	72.00	53	1.1	EKO00PB133M00
4.7	160	8.0 x 11.5	0.15	50.80	63	1.1	EKO00PB147M00
10	160	10.0 x 12.5	0.15	23.90	107	1.5	EKO00DC210M00
22	160	10.0 x 20.0	0.15	10.90	189	2.5	EKO00DE222M00
33	160	13.0 x 20.0	0.15	7.24	272	3.8	EKF00GE233M00
47	160	13.0 x 20.0	0.15	5.08	325	3.8	EKO00GE247M00
100	160	16.0 x 25.0	0.15	2.39	573	7.0	EKO00JG310M00
220	160	18.0 X 35.5	0.15	1.09	1047	13.0	EKO00KL322M00
2.2	250	8.0 x 11.5	0.15	109.00	46	1.1	EKO00PB122N00
3.3	250	10.0 x 12.5	0.15	72.00	61	1.5	EKO00DC133N00
4.7	250	10.0 x 12.5	0.15	50.80	73	1.5	EKO00DC147N00
10	250	10.0 x 16.0	0.15	23.90	117	2.0	EKO00DD210N00
22	250	13.0 x 20.0	0.15	10.90	222	3.8	EKO00GE222N00
33	250	13.0 x 25.0	0.15	7.24	297	4.5	EKO00GG233N00
47	250	13.0 x 25.0	0.15	5.08	393	4.5	EKO00GG247N00
100	250	16.0 x 31.5	0.15	2.39	627	9.0	EKO00JS310N00
2.2	350	10.0 x 12.5	0.20	145.00	50	1.5	EKO00DC122O00
3.3	350	10.0 x 12.5	0.20	97.00	61	1.5	EKO00DC133O00
4.7	350	10.0 x 12.5	0.20	68.00	73	1.5	EKO00DC147O00
10	350	10.0 x 20.0	0.20	31.80	128	2.5	EKO00DE210O00
22	350	13.0 x 25.0	0.20	14.50	242	4.5	EKO00GG222O00
33	350	13.0 x 25.0	0.20	9.65	297	4.5	EKO00GG233O00
47	350	16.0 x 25.0	0.20	6.78	393	7.0	EKO00JG247O00
100	350	18.0 x 40.0	0.20	3.18	741	16.0	EKO00KK310O00
2.2	400	10.0 x 12.5	0.20	145.00	50	1.5	EKO00DC122X00
3.3	400	10.0 x 12.5	0.20	97.00	61	1.5	EKO00DC133X00
4.7	400	10.0 x 16.0	0.20	68.00	80	2.0	EKO00DD147X00
10	400	13.0 x 20.0	0.20	31.80	150	3.8	EKO00GE210X00
22	400	13.0 x 25.0	0.20	14.50	282	4.5	EKO00GG222X00
33	400	16.0 x 25.0	0.20	9.65	329	7.0	EKO00JG233X00
47	400	16.0 x 35.5	0.20	6.78	451	11.0	EKO00JL247X00
1.0	450	8.0 x 11.5	0.20	266.00	26	1.1	EKO00PB110P00
2.2	450	10.0 x 12.5	0.20	145.00	45	1.5	EKO00DC122P00
3.3	450	10.0 x 16.0	0.20	97.00	60	2.0	EKO00DD133P00
4.7	450	10.0 x 20.0	0.20	68.00	78	2.5	EKO00DE147P00
10	450	13.0 x 20.0	0.20	31.80	134	3.8	EKO00GE210P00
22	450	16.0 x 25.0	0.20	14.50	240	7.0	EKO00JG222P00
33	450	16.0 x 31.5	0.20	9.65	322	9.0	EKO00JS233P00
47	450	16.0 x 35.5	0.20	6.78	403	11.0	EKO00JL247P00

PACKAGING UNITS					
SIZE CODES		BULK		AMMO	VOLTAGE CODES
		LONG LEADS	CUT LEADS		
AA	5*11	7000	7000	2000	C = 10V
BA	6.3*11	6000	6000	1500	D = 16V
PB	8*11.5	3600	3600	1000	E = 25V
DC	10*12.5	2400	800	500	F = 35V
DD	10*16	2000	700	500	H = 50V
DE	10*20	1600	500	500	J = 63V
GE	13*20	1000	300	400	L = 100V
GG	13*25	900	250	400	M = 160V
JG	16*25	500	150	250	N = 250V
JS	16*31.5	500	150	250	O = 350V
JL	16*35.5	400	100	250	X = 400V
KL	18*35.5	300	100	125	P = 450V
KK	18*40	300	80		