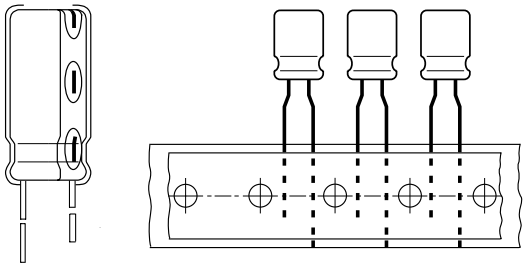
VISHAY

EKS

Vishay Roederstein

Aluminum Capacitors Radial Style



Component outlines

Obsolete - please refer to: www.vishay.com/doc?25013

FEATURES

- Polarized Aluminum electrolytic capacitor
- High C x U product
- Small dimensions
- Long lifetime
- Extended temperature range: 105 °C
- Compliant to RoHS directive 2002/95/EC

Pb-free

RoHS COMPLIANT

APPLICATIONS

- Industrial electronics, automotive electronics, telecommunication systems, audio/video systems
- Smoothing, filtering, timing elements
- Small space requirement
- Portable and mobile units

QUICK REFERENCE DATA

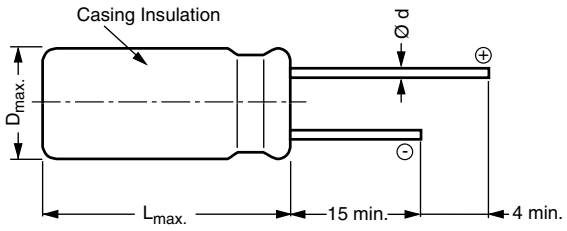
DESCRIPTION	UNIT	VALUE		
Nominal case size (Ø D x L)	mm	5 x 11 to 8 x 11.5	10 x 12.5 to 18 x 40	
Rated capacitance range C_R	µF	0.47 to 10 000		
Capacitance tolerance	%	± 20		
Rated voltage range	V	6.3 to 450		
Category temperature range	°C	6.3 V to 100 V - 55 to 105	160 V to 350 V - 40 to 105	400 V, 450 V - 25 to 105
Endurance test at upper category temp.	h	1000	2000	
Useful life at 105 °C and I_R applied	h	1500	2500	
Useful life at 85 °C and I_R applied	h	6000	10 000	
Useful life at 40°C and I_R applied	h	140 000	230 000	
Failure rate	10^{-9}/h	≤ 45		
Based on sectional specifications		IEC 384-4, CECC 30300, GP grade		
Based on detailed specifications		similar to CECC 30301-037, similar to DIN 45910 part 124 without quality assessment		
Climatic category IEC 68 DIN 40040		- 40 to 85 55/105/56 FMF	- 40 to 85 40/105/56 GMF	- 40 to 85 25/105/56 HMF

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

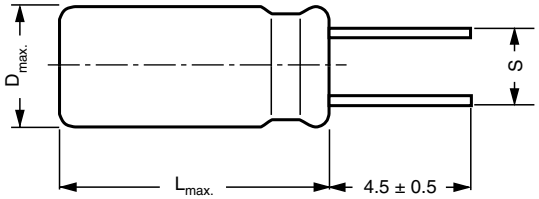
C_R (µF)	RATED VOLTAGE (V)											
	10	16	25	35	50	63	100	160	250	350	400	450
0.47	-	-	-	-	5 x 11	-	5 x 11	-	6.3 x 11	-	-	-
1.0	-	-	-	-	5 x 11	-	5 x 11	-	6.3 x 11	8 x 11.5	8 x 11.5	8 x 11.5
2.2	-	-	-	-	5 x 11	-	5 x 11	6.3 x 11	8 x 11.5	10 x 12.5	10 x 12.5	10 x 12.5
3.3	-	-	-	-	5 x 11	-	5 x 11	8 x 11.5	10 x 12.5	10 x 16	10 x 16	10 x 16
4.7	-	-	-	-	5 x 11	-	5 x 11	8 x 11.5	10 x 12.5	10 x 16	10 x 16	10 x 20
10	-	-	-	-	5 x 11	5 x 11	6.3 x 11	10 x 16	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 20	16 x 25	15 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 31.5	16 x 35.5	18 x 40
100	5 x 11	6.3 x 11	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	13 x 20	16 x 25	16 x 35.5	18 x 40	-	-
220	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	13 x 16	16 x 25	16 x 40	-	-	-	-
330	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	13 x 16	13 x 20	16 x 25	18 x 40	-	-	-	-
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	16 x 40	-	-	-	-	-	-	-	-	-	-
10 000	18 x 35.5	-	-	-	-	-	-	-	-	-	-	-

Note
± 10% capacitance tolerance on request

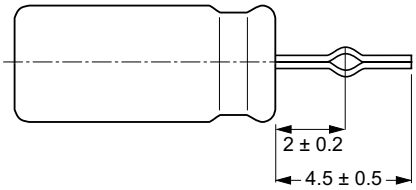
DIMENSIONS in millimeters AND AVAILABLE FORMS



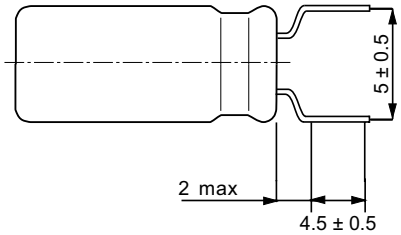
5 ≤ Ø D ≤ 18 Long leads EKS 00...



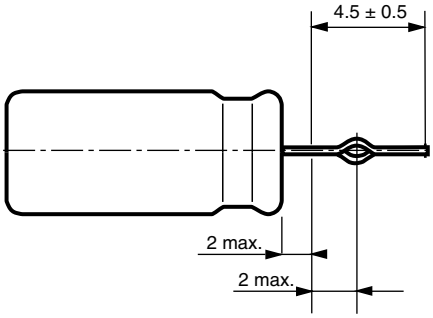
10 ≤ Ø D ≤ 18 Leads shortened and formed EKS 06...
(S = 5 / 7.5 mm)



5 ≤ Ø D ≤ 18 Shortened leads EKS 05...
(S = 2 / 2.5 / 3.5 / 5 / 7.5 mm)



5 ≤ Ø D ≤ 8 Leads bent open, shortened EKS 09...
(S = 5 mm)



5 ≤ Ø D ≤ Leads bent open, shortened and formed EKS 09...
(S = 5 mm)

RADIAL STYLE: DIMENSIONS in millimeters			
NOMINAL CASE SIZE Ø D x L	**MAXIMUM SIZE $D_{max.}$ x $L_{max.}$**	**LEAD Ø d ± 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 16	13.5 x 18.0	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
18 x 35.5	16.5 x 37.5	0.8	7.5
16 x 40	16.5 x 42.0	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

ELECTRICAL DATA	
SYMBOL	DESCRIPTION
C_R	rated capacitance at 120 Hz
U_R	rated voltage
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 upper category temperature

Note

Unless otherwise specified, all electrical values apply at T_{amb} = 20 °C, P = 80 kPa to 120 kPa, RH = 45 % to 75 %.

ORDERING EXAMPLE

EKS 100 µF / 25 V, ± 20 %, size: 6.3 mm x 11 mm

Leads: Long - Ordering code: EKS 00BA42210E00

Leads: Short (4.5 mm ± 0.5 mm) - Ordering code: EKS 05...

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

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

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 100 kHz/105 °C (mA)	WEIGHT (g)	CATALOG NUMBER
10	100	5 x 11	0.19	2.52	105	0.5	EKS00AA310C00
	220	6.3 x 11	0.19	1.15	180	0.8	EKS00BA322C00
	330	8 x 11.5	0.19	0.76	259	1.1	EKS00PB333C00
	470	8 x 11.5	0.19	0.54	310	1.1	EKS00PB347C00
	1000	10 x 16	0.19	0.25	575	2.0	EKS00DD410C00
	2200	13 x 20	0.21	0.13	891	3.8	EKS00GE422C00
	3300	13 x 25	0.24	0.10	1137	4.5	EKS00GG433C00
	4700	16 x 25	0.26	0.07	1444	7.0	EKS00JG447C00
	6800	16 x 31.5	0.31	0.06	1765	9.0	EKS00JS468C00
	10 000	18 x 35.5	0.37	0.05	2193	13.0	EKS00KL510C00
16	100	6.3 x 11	0.16	2.12	131	0.8	EKS00BA310D00
	220	8 x 11.5	0.16	0.97	229	1.1	EKS00PB322D00
	330	8 x 11.5	0.16	0.65	280	1.1	EKS00PB333D00
	470	10 x 12.5	0.16	0.45	388	1.5	EKS00DC347D00
	1000	10 x 20	0.16	0.21	677	2.5	EKS00DE410D00
	2200	13 x 25	0.18	0.11	1050	4.5	EKS00GG422D00
	3300	16 x 25	0.20	0.08	1353	7.0	EKS00JG433D00
	4700	16 x 31.5	0.23	0.06	1685	9.0	EKS00JS447D00
	6800	16 x 40	0.28	0.05	2055	15.0	EKS00KL468D00
25	47	5 x 11	0.14	3.95	81	0.5	EKS00AA247E00
	100	6.3 x 11	0.14	1.86	137	0.8	EKS00BA310E00
	220	8 x 11.5	0.14	0.85	239	1.1	EKS00PB322E00
	330	10 x 12.5	0.14	0.56	340	1.5	EKS00DC333E00
	470	10 x 16	0.14	0.40	444	2.0	EKS00DD347E00
	1000	13 x 20	0.14	0.19	830	3.8	EKS00GE410E00
	2200	16 x 25	0.16	0.10	1198	7.0	EKS00JG422E00
	3300	16 x 31.5	0.21	0.085	1519	9.0	EKS00JS433E00
	4700	18 x 35.5	0.23	0.07	1914	13.0	EKS00KL447E00
35	33	5 x 11	0.12	4.83	75	0.5	EKS00AA233F00
	47	6.3 x 11	0.12	3.39	104	0.8	EKS00BA247F00
	100	8 x 11.5	0.12	1.58	178	1.1	EKS00PB310F00
	220	10 x 12.5	0.12	0.73	307	1.5	EKS00DC322F00
	330	10 x 16	0.12	0.48	412	2.0	EKS00DD333F00
	470	10 x 20	0.12	0.34	536	2.5	EKS00DE347F00
	1000	13 x 25	0.12	0.16	1001	4.5	EKS00GG410F00
	2200	16 x 31.5	0.14	0.09	1351	9.0	EKS00JS422F00
	3300	18 x 35.5	0.17	0.08	1757	13.0	EKS00KL433F00

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 100 kHz/105 °C (mA)	WEIGHT (g)	CATALOG NUMBER
50	0.47	5 x 11	0.10	283	10	0.5	EKS00AA047H00
	1	5 x 11	0.10	133	15	0.5	EKS00AA110H00
	2.2	5 x 11	0.10	61	22	0.5	EKS00AA122H00
	3.3	5 x 11	0.10	41	27	0.5	EKS00AA133H00
	4.7	5 x 11	0.10	29	32	0.5	EKS00AA147H00
	10	5 x 11	0.10	13.30	47	0.5	EKS00AA210H00
	22	5 x 11	0.10	6.03	70	0.5	EKS00AA222H00
	33	6.3 x 11	0.10	4.02	98	0.8	EKS00BA233H00
	47	6.3 x 11	0.10	2.83	117	0.8	EKS00BA247H00
	100	8 x 11.5	0.10	1.33	202	1.1	EKS00PB310H00
	220	10 x 16	0.10	0.61	381	2.0	EKS00DD322H00
	330	13 x 16	0.10	0.41	551	2.5	EKS00GD333H00
	470	13 x 20	0.10	0.29	704	3.8	EKS00GE347H00
	1000	16 x 25	0.10	0.14	1259	7.0	EKS00JG410H00
	2200	18 x 35.5	0.12	0.08	1626	13.0	EKS00KL422H00
63	10	5 x 11	0.09	11.95	47	0.5	EKS00AA210J00
	22	6.3 x 11	0.09	5.43	80	0.8	EKS00BA222J00
	33	6.3 x 11	0.09	3.62	98	0.8	EKS00BA233J00
	47	8 x 11.5	0.09	2.54	138	1.1	EKS00PB247J00
	100	10 x 12.5	0.09	1.20	235	2.5	EKS00DC310J00
	220	13 x 16	0.09	0.55	450	2.5	EKS00GD322J00
	330	13 x 20	0.09	0.37	598	3.8	EKS00GE333J00
	470	13 x 25	0.09	0.26	779	4.5	EKS00GG347J00
	1000	16 x 31.5	0.09	0.12	1377	9.0	EKS00JS410J00
100	0.47	5 x 11	0.08	226	11	0.5	EKS00AA047L00
	1	5 x 11	0.08	107	16	0.5	EKS00AA110L00
	2.2	5 x 11	0.08	49	24	0.5	EKS00AA122L00
	3.3	5 x 11	0.08	32.2	29	0.5	EKS00AA133L00
	4.7	5 x 11	0.08	22.6	35	0.5	EKS00AA147L00
	10	6.3 x 11	0.08	10.7	58	0.8	EKS00BA210L00
	22	8 x 11.5	0.08	4.83	102	1.1	EKS00PB222L00
	33	10 x 12.5	0.08	3.22	146	1.5	EKS00DC233L00
	47	10 x 16	0.08	2.26	190	2.0	EKS00DD247L00
	100	13 x 20	0.08	1.07	356	3.8	EKS00GE310L00
	220	16 x 25	0.08	0.49	638	7.0	EKS00JG322L00
	330	16 x 25	0.08	0.33	781	7.0	EKS00JG333L00
	470	16 x 31.5	0.08	0.23	1020	9.0	EKS00JS347L00
160	2.2	6.3 x 11	0.15	91	20	0.8	EKS00BA122M00
	3.3	8 x 11.5	0.15	61	28	1.1	EKS00PB133M00
	4.7	8 x 11.5	0.15	43	34	1.1	EKS00PB147M00
	10	10 x 16	0.15	20	63	2.0	EKS00DD210M00
	22	10 x 20	0.15	9.10	102	2.5	EKS00DE222M00
	33	13 x 20	0.15	6.10	146	3.8	EKS00GE233M00
	47	13 x 20	0.15	4.24	174	3.8	EKS00GE247M00
	100	16 x 25	0.15	2	307	7.0	EKS00JG310M00
	220	16 x 40	0.15	0.91	550	15.0	EKS00JK322M00
	220	18 x 40	0.15	0.61	722	16.0	EKS00KK333M00
250	0.47	6.3 x 11.5	0.15	424	9	0.8	EKS00BA047N00
	2	6.3 x 11	0.15	200	13	0.8	EKS00BA110N00
	2.2	8 x 11.5	0.15	91	23	1.1	EKS00PB122N00
	3.3	10 x 12.5	0.15	61	33	1.5	EKS00DC133N00
	4.7	10 x 12.5	0.15	43	39	1.5	EKS00DC147N00
	10	10 x 16	0.15	20	63	2.0	EKS00DD210N00
	22	13 x 20	0.15	9.10	119	3.8	EKS00GE222N00
	33	13 x 20	0.15	6.10	146	3.8	EKS00GE233N00
	47	13 x 25	0.15	4.24	190	4.5	EKS00GG247N00
	100	16 x 35.5	0.15	2	353	11.0	EKS00JL310N00

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 100 kHz/105 °C (mA)	WEIGHT (g)	CATALOG NUMBER
350	1	8 x 11.5	0.20	266	16	1.1	EKS00PB110O00
	2.2	10 x 12.5	0.20	121	28	1.5	EKS00DC122O00
	3.3	10 x 16	0.20	81	38	2.0	EKS00DD133O00
	4.7	10 x 16	0.20	57	45	2.0	EKS00DD147O00
	10	10 x 20	0.20	26.54	72	2.5	EKS00DE210O00
	22	13 x 25	0.20	12.10	137	4.5	EKS00GG222O00
	33	16 x 25	0.20	8.05	186	7.0	EKS00JG233O00
	47	16 x 31.5	0.20	5.65	243	9.0	EKS00JS247O00
	100	18 x 40	0.20	2.66	419	16.0	EKS00KK310O00
400	1	8 x 11.5	0.20	266	16	1.1	EKS00PB110X00
	2.2	10 x 12.5	0.20	121	28	1.5	EKS00DC122X00
	3.3	10 x 16	0.20	81	38	2.0	EKS00DD133X00
	4.7	10 x 16	0.20	57	45	2.5	EKS00DD147X00
	10	13 x 20	0.20	26.54	85	3.8	EKS00GE210X00
	22	13 x 25	0.20	12.10	137	4.5	EKS00GG222X00
	33	16 x 25.5	0.20	8.05	186	7.0	EKS00JG233X00
	47	16 x 35.5	0.20	5.65	255	11.0	EKS00JL247X00
450	1.0	8 x 11.5	0.20	266	15	1.1	EKS00PB110P00
	2.2	10 x 12.5	0.20	121	26	1.5	EKS00DC122P00
	1	10 x 16	0.20	81	34	2.5	EKS00DD133P00
	4.7	10 x 20	0.20	57	45	2.5	EKS00DE147P00
	10	13 x 25	0.20	26.54	77	4.5	EKS00GG210P00
	22	16 x 31.5	0.20	12.10	138	9.0	EKS00JS222P00
	33	16 x 40	0.20	8.05	184	15.0	EKS00JK233P00
	47	18 x 40	0.20	5.65	260	16.0	EKS00KK247P00

LOW TEMPERATURE BEHAVIOUR

IMPEDANCE RATIO Z(T2)/Z(T1) AT 120 Hz

T2/T1	RATED VOLTAGE (V)						
	10	16	25 - 100	160	250	350	400/450
- 25 °C/+ 20 °C	3	2	2	3	3	3	8
- 25 °C/+ 20 °C	6	4	3	4	4	4	-

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} [µA] ≤ 0.01 x C_R [µF] x U_R [V] or 3 µA for $U_R \leq 100$ V (whichever is greater)

I_{L5} [µA] ≤ 0.02 x C_R [µF] x U_R [V] + 15 µA for $U_R > 100$ V

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