

CKR/CKS

+85°C General Purpose Radial Lead Aluminum Electrolytic Capacitors



Applications

- Filtering
- Bypass
- Coupling

Features

- Standard case sizes
- Multiple case sizes
- RoHS compliant
- Lead free

Operating Temperature Range		-40°C to +85°C (6.3 to 400 WVDC) -25°C to +85°C (450 WVDC)													
Capacitance Tolerance		+20% at 120 Hz, 20°C													
Surge voltage	WVDC	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	SVDC	7.9	13	20	32	44	63	79	125	200	250	300	400	450	500
Dissipation Factor	WVDC	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	Tan δ	.22	.19	.16	.14	.12	.1	.1	.08	.15	.15	.15	.2	.2	.2
		Add .02 for every 1000uF above 1000uF													
Leakage current		6.3 to 100 WVDC								160 to 450 WVDC					
		1 Minutes				2 Minutes				2 Minutes					
		.03CV or 4uA, Whichever is greater				.01CV or 3uA, Whichever is greater				.03CV+40uA					
Low temperature stability Impedance ratio (120 Hz)	Rated WVDC	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
	-25°C to +20°C	4	2	2	2	2	2	2	2	3	3	3	6	6	15
	-40°C to +20°C	8	6	4	3	3	3	3	3	6	6	6	6	6	-
Load Life		2000 hours at 85°C with rated WVDC and ripple current applied													
		Capacitance change				<20% of initial measured value									
		Dissipation factor				<150% of maximum specified value									
		Leakage current				>100% of maximum specified value									
Shelf Life		1000 hours at 85°C with no voltage applied													
		Capacitance change				<20% initial measured value									
		Dissipation factor				<200% of maximum specified value									
		Insulation resistance				>100% of maximum specified value									
Ripple Current Multipliers					Frequency (Hz)				Temperature (°C)						
		WVDC		50	120	1k	10k	+85	+70	+60					
		6.3 to 25V		0.8	1.0	1.10	1.20	1.0	1.3	1.5					
		35 to 100V		0.8	1.0	1.15	1.25	1.0	1.3	1.5					
		160 to 250V		.75	1.0	1.25	1.40	1.0	1.3	1.5					
		350 to 450V		.7	1.0	1.30	1.80	1.0	1.3	1.5					

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Physical Dimensions

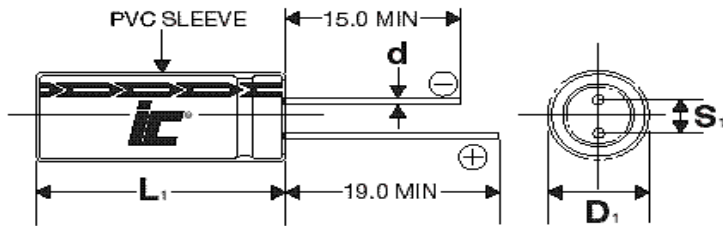
WVDC (SV) uF	6.3 (7.9)	10 (13)	16 (20)	25 (32)	35 (44)	50 (63)	63 (79)	100 (125)	160 (200)	200 (250)	250 (300)	350 (400)	400 (450)	450 (500)
0.1	-----	-----	-----	-----	----->	5x11								
0.15	-----	-----	-----	-----	----->	5x11								
0.22	-----	-----	-----	-----	----->	5x11								
0.33	-----	-----	-----	-----	----->	5x11								
0.47	-----	-----	-----	-----	----->	5x11	----->	5x11						
0.68	-----	-----	-----	-----	----->	5x11								
1	-----	-----	-----	-----	----->	5x11	----->	5x11	-----	----->	6.3x11	-----	----->	8x11.5
1.5	-----	-----	-----	-----	----->	5x11								
2.2	-----	-----	-----	-----	----->	5x11	----->	5x11	-----	----->	6.3x11 8x11.5	6.3x11	8x11.5	10x12.5 8x11.5
3.3	-----	-----	-----	-----	----->	5x11	----->	5x11	-----	----->	6.3x11 8x11.5	8x11.5	10x12.5 8x11.5	10x12.5 10x16
4.7	-----	-----	-----	-----	----->	5x11	----->	5x11	-----	----->	6.3x11 8x11.5	10x12.5 8x11.5	10x12.5 10x16	10x12.5 10x16
6.8	-----	-----	-----	-----	-----	----->	5x11							
10	-----	-----	-----	-----	----->	5x11	5x11	5x11 6.3x11	8x11.5	10x12.5 8x11.5	10x12.5 10x16	10x12.5 10x20	10x16	10x20 12.5x20
15	-----	-----	-----	-----	----->	5x11	----->	8x11.5						
22	-----	-----	-----	-----	----->	5x11	5x11 6.3x11	6.3x11 8x11.5	10x12.5 10x16	10x16 10x20	10x20	12.5x20	12.5x25	13x26 16x25
33	-----	-----	-----	-----	----->	5x11 6.3x11	6.3x11	10x12.5 8x11.5	10x16 10x20	10x20	12.5x20	12.5x25	16x25	16x25 16x31.5
47	-----	-----	-----	----->	5x11	6.3x11	6.3x11 8x11.5	10x12.5 10x16 8x11.5	10x21 12.5x25	----->	12.5x20 12.5x25 16x25	16x25	16x25 16x31.5	16x31.5 18x35.5
68	-----	-----	----->	6.3x11	----->	8x11.5	10x12.5	10x16						
100	-----	----->	5x11	5x11	6.3x11	8x11.5	10x12.5	10x16 10x20 12.5x20	12.5x25	----->	16x25 16x31.5	18x35.5	18x35.5	18x40
150	----->	6.3x11	----->	8x11.5	10x12.5	10x16	----->	12.5x20						
220	----->	5x11 6.3x11	6.3x11	6.3x11 8x11.5	10x12.5 8x11.5	10x12.5 10x16	10x16 10x20	12.5x20 12.5x25 16x25	16x31.5	16x35.5	18x35.5			
330	----->	6.3x11	6.3x11	8x11.5	10x12.5	10x16 10x20	10x20	12.5x25 16x25	18x35.5	18x40				
470	----->	6.3x11	8x11.5	10x12.5	10x16	10x20 12.5x20	12.5x20 12.5x25	16x25						
680	-----	----->	10x16	----->	12.5x20	12.5x25								
1000	8x11.5	10x12.5	10x12.5 10x16	10x16 10x20 12.5x20	12.5x20 12.5x25	12.5x25 16x25	16x25 16x31.5	18x35.5						
1500	----->	10x16	10x20	12.5x20	12.5x25 16x25	16x31.5								



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WVDC (SV) uF	6.3 (7.9)	10 (13)	16 (20)	25 (32)	35 (44)	50 (63)	63 (79)	100 (125)	160 (200)	200 (250)	250 (300)	350 (400)	400 (450)	450 (500)
2200	10x16	10x16 10x20	10x21 12.5x20	12.5x25 16x25	16x25 16x31.5	16x31.5 16x35.5 18x35.5	18x35.5							
3300	10x20 12.5x20	12.5x20 12.5x25	12.5x25 16x25	16x25	16x31.5 16x35.5 18x35.5	18x35.5								
4700	12.5x20	12.5x25	16x25	16x25 16x31.5 18x35.5	16x35.5 18x35.5									
6800	12.5x25	16x25	16x25 16x35.5 18x35.5	16x35.5 18x35.5	18x40									
10000	16x25	16x31.5	16x35.5 18x35.5	18x40										
15000	16x31.5 16x35.5	16x35.5 18x35.5	18x40											
22000	18x35.5	18x40												



Lead spacing vs. Case diameter

D	5	6.3	8	10	12.5	16	18
S	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5	0.5	0.6	0.6	0.6	0.8	0.8

$L_1 = L + 1.5 \text{ mm Max}$
 $D_1 = D + 0.5 \text{ mm Max.}$
 $S_1 = S + 0.5 \text{ mm}$

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Cap (uF)	VDC	PART #	Maximum ESR Ω 120Hz 20C	Maximum RMS ripple current (mA) 120Hz,85C	Dims DxL (mm)
0.1	50	104CKR050M	1657.864	1.5	5x11
0.15	50	154CKR050M	1105.243	2	5x11
0.22	50	224CKR050M	753.575	9	5x11
0.33	50	334CKR050M	502.383	10	5x11
0.47	50	474CKR050M	352.737	16	5x11
0.47	100	474CKR100M	282.190	18	5x11
0.68	50	684CKR050M	243.804	9	5x11
1	50	105CKR050M	165.786	24	5x11
1	100	105CKR100M	132.629	26	5x11
1	250	105CKR250M	248.680	29	6.3x11
1	450	105CKS450M	331.573	29	8x11.5
1.5	50	155CKR050M	110.524	18	5x11
2.2	50	225CKR050M	75.357	35	5x11
2.2	100	225CKS100M	60.286	39	5x11
2.2	250	225CKS250M	113.036	43	6.3x11
2.2	250	225CKR250M	113.036	31	8x11.5
2.2	350	225CKS350M	150.715	30	6.3x11
2.2	400	225CKS400M	150.715	44	8x11.5
2.2	450	225CKS450M	150.715	45	10x12.5
2.2	450	225CKS450MJM	150.715	28	8x11.5
3.3	50	335CKS050M	50.238	43	5x11
3.3	100	335CKS100M	40.191	48	5x11
3.3	250	335CKS250MGM	75.357	40	6.3x11
3.3	250	335CKS250M	75.357	60	8x11.5
3.3	350	335CKS350MJM	100.477	43	8x11.5
3.3	400	335CKS400M	100.477	55	10x12.5
3.3	400	335CKS400MJM	100.477	48	8x11.5
3.3	450	335CKS450MLM	100.477	40	10x12.5
3.3	450	335CKS450M	100.477	60	10x16
4.7	50	475CKR050M	35.274	50	5x11
4.7	100	475CKR100M	28.219	55	5x11
4.7	250	475CKS250MGM	52.911	50	6.3x11
4.7	250	475CKS250M	52.911	75	8x11.5
4.7	350	475CKS350M	70.547	65	10x12.5
4.7	350	475CKS350MJM	70.547	55	8x11.5
4.7	400	475CKS400MLN	70.547	60	10x12.5
4.7	400	475CKS400M	70.547	75	10x16
4.7	450	475CKS450MLN	70.547	46	10x12.5
4.7	450	475CKS450M	70.547	75	10x16
6.8	63	685CKR063M	24.380	51	5x11
10	50	106CKR050M	16.579	110	5x11
10	63	106CKR063M	16.579	75	5x11
10	100	106CKS100MEM	13.263	70	5x11

Cap (uF)	VDC	PART #	Maximum ESR Ω 120Hz 20C	Maximum RMS ripple current (mA) 120Hz,85C	Dims DxL (mm)
10	100	106CKS100M	13.263	95	6.3x11
10	160	106CKS160M	24.868	90	8x11.5
10	200	106CKS200M	24.868	100	10x12.5
10	200	106CKS200MJM	24.868	80	8x11.5
10	250	106CKS250MLN	24.868	100	10x12.5
10	250	106CKS250M	24.868	120	10x16
10	350	106CKS350MLQ	33.157	90	10x12.5
10	350	106CKS350M	33.157	120	10x20
10	400	106CKS400MLQ	33.157	90	10x16
10	450	106CKS450MLU	33.157	80	10x20
10	450	106CKS450M	33.157	130	12.5x20
15	50	156CKR050M	11.052	78	5x11
15	100	156CKR100M	8.842	98	8x11.5
22	50	226CKR050M	7.536	110	5x11
22	63	226CKS063M	7.536	110	5x11
22	63	226CKR063M	7.536	130	6.3x11
22	100	226CKS100M	6.029	140	6.3x11
22	100	226CKR100M	6.029	160	8x11.5
22	160	226CKS160MLN	11.304	130	10x12.5
22	160	226CKS160M	11.304	160	10x16
22	200	226CKS200MLQ	11.304	150	10x16
22	200	226CKS200M	11.304	190	10x20
22	250	226CKS250MLU	11.304	150	10x20
22	350	226CKS350M	15.071	190	12.5x20
22	400	226CKS400M	15.071	210	12.5x25
22	450	226CKS450MNV	15.071	140	13x26
22	450	226CKS450M	15.071	210	16x25
33	50	336CKS050M	5.024	140	5x11
33	50	336CKR050M	5.024	150	6.3x11
33	63	336CKR063M	5.024	150	6.3x11
33	100	336CKR100M	4.019	210	10x12.5
33	100	336CKS100M	4.019	200	8x11.5
33	160	336CKS160MLQ	7.536	180	10x16
33	160	336CKS160M	7.536	210	10x20
33	200	336CKS200MLU	7.536	200	10x20
33	250	336CKS250M	7.536	270	12.5x20
33	350	336CKS350M	10.048	250	12.5x25
33	400	336CKS400M	10.048	260	16x25
33	450	336CKS450MQV	10.048	180	16x25
33	450	336CKS450M	10.048	280	16x31.5
47	35	476CKS035M	4.233	150	5x11
47	50	476CKR050M	3.527	180	6.3x11
47	63	476CKS063M	3.527	180	6.3x11



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Cap (uF)	VDC	PART #	Maximum ESR Ω 120Hz 20C	Maximum RMS ripple current (mA) 120Hz,85C	Dims DxL (mm)
47	63	476CKR063M	3.527	210	8x11.5
47	100	476CKS100M	2.822	250	10x12.5
47	100	476CKR100M	2.822	280	10x16
47	100	476CKS100MJM	2.822	200	8x11.5
47	160	476CKS160MLU	5.291	210	10x21
47	160	476CKR160M	5.291	270	12.5x25
47	250	476CKS250M	5.291	350	12.5x25
47	250	476CKS250MNU	5.291	270	13x21
47	250	476CKR250M	5.291	350	16x25
47	350	476CKS350M	7.055	300	16x25
47	400	476CKS400MQV	7.055	280	16x25
47	400	476CKR400M	7.055	350	16x31.5
47	450	476CKS450MQW	7.055	220	16x31.5
47	450	476CKS450M	7.055	380	18x35.5
68	25	686CKR025M	3.413	170	6.3x11
68	50	686CKR050M	2.438	200	8x11.5
68	63	686CKR063M	2.438	215	10x12.5
68	100	686CKR100M	1.950	282	10x16
100	16	107CKS016M	2.653	180	5x11
100	25	107CKS025MEM	2.321	180	5x11
100	35	107CKS035M	1.989	240	6.3x11
100	50	107CKR050M	1.658	310	8x11.5
100	63	107CKR063M	1.658	330	10x12.5
100	63	107CKS063MJM	1.658	280	8x11.5
100	100	107CKS100MLQ	1.326	340	10x16
100	100	107CKS100M	1.326	450	10x20
100	100	107CKR100M	1.326	480	12.5x20
100	160	107CKS160M	2.487	440	12.5x25
100	250	107CKS250MQV	2.487	440	16x25
100	250	107CKS250M	2.487	570	16x31.5
100	350	107CKS350M	3.316	550	18x35.5
100	400	107CKS400M	3.316	570	18x35.5
100	450	107CKS450M	3.316	550	18x40
150	10	157CKR010M	2.210	188	6.3x11
150	25	157CKR025M	1.547	258	8x11.5
150	35	157CKR035M	1.326	291	10x12.5
150	50	157CKR050M	1.105	330	10x16
150	100	157CKR100M	0.884	425	12.5x20
220	10	227CKS010M	1.507	250	5x11
220	10	227CKR010M	1.507	290	6.3x11
220	16	227CKS016M	1.206	310	6.3x11
220	25	227CKS025MGM	1.055	280	6.3x11
220	25	227CKR025M	1.055	390	8x11.5

Cap (uF)	VDC	PART #	Maximum ESR Ω 120Hz 20C	Maximum RMS ripple current (mA) 120Hz,85C	Dims DxL (mm)
220	35	227CKR035M	0.904	450	10x12.5
220	35	227CKS035M	0.904	420	8x11.5
220	50	227CKS050M	0.754	490	10x12.5
220	50	227CKR050M	0.754	540	10x16
220	63	227CKS063M	0.754	540	10x16
220	63	227CKR063M	0.754	600	10x20
220	100	227CKS100MNU	0.603	550	12.5x20
220	100	227CKS100M	0.603	790	12.5x25
220	100	227CKR100M	0.603	790	16x25
220	160	227CKS160MQW	1.130	580	16x31.5
220	200	227CKS200M	1.130	700	16x35.5
220	250	227CKS250M	1.130	680	18x35.5
330	10	337CKS010M	1.005	350	6.3x11
330	16	337CKS016MGM	0.804	320	6.3x11
330	25	337CKS025M	0.703	480	8x11.5
330	35	337CKS035M	0.603	550	10x12.5
330	50	337CKS050M	0.502	670	10x16
330	50	337CKR050M	0.502	730	10x20
330	63	337CKS063M	0.502	730	10x20
330	100	337CKS100M	0.402	960	12.5x25
330	100	337CKR100M	0.402	970	16x25
330	160	337CKS160M	0.754	800	18x35.5
330	200	337CKS200M	0.754	950	18x40
470	10	477CKS010M	0.705	420	6.3x11
470	16	477CKS016M	0.564	540	8x11.5
470	25	477CKS025M	0.494	600	10x12.5
470	35	477CKS035M	0.423	720	10x16
470	50	477CKS050M	0.353	820	10x20
470	50	477CKR050M	0.353	930	12.5x20
470	63	477CKS063M	0.353	930	12.5x20
470	63	477CKR063M	0.353	1030	12.5x25
470	100	477CKS100M	0.282	1160	16x25
680	16	687CKR016M	0.390	596	10x16
680	35	687CKR035M	0.293	770	12.5x20
680	50	687CKR050M	0.244	810	12.5x25
1000	6.3	108CKS6R3M	0.398	670	8x11.5
1000	10	108CKS010M	0.332	760	10x12.5
1000	16	108CKS016MLN	0.332	700	10x12.5
1000	16	108CKS016M	0.332	920	10x16
1000	25	108CKS025MLQ	0.232	890	10x16
1000	25	108CKS025M	0.232	1080	10x20
1000	25	108CKR025M	0.232	1150	12.5x20
1000	35	108CKS035M	0.199	1240	12.5x20



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Cap (uF)	VDC	PART #	Maximum ESR Ω 120Hz 20C	Maximum RMS ripple current (mA) 120Hz,85C	Dims DxL (mm)
1000	35	108CKR035M	0.199	1370	12.5x25
1000	50	108CKS050M	0.166	1500	12.5x25
1000	50	108CKR050M	0.166	1510	16x25
1000	63	108CKS063M	0.166	1510	16x25
1000	63	108CKR063M	0.166	1670	16x31.5
1000	100	108CKS100MRY	0.133	1350	18x35.5
1500	10	158CKS010M	0.243	897	10x16
1500	16	158CKS016M	0.199	1075	10x20
1500	25	158CKS025M	0.177	1340	12.5x20
1500	35	158CKS035M	0.155	1590	12.5x25
1500	35	158CKR035M	0.155	1110	16x25
1500	50	158CKS050M	0.133	1650	16x31.5
2200	6.3	228CKS6R3M	0.211	1110	10x16
2200	10	228CKS010MLQ	0.181	990	10x16
2200	10	228CKS010M	0.181	1310	10x20
2200	16	228CKS016MLU	0.151	1010	10x20
2200	16	228CKS016M	0.151	1510	12.5x20
2200	25	228CKS025M	0.136	1760	12.5x25
2200	25	228CKR025M	0.136	1770	16x25
2200	35	228CKS035M	0.121	1890	16x25
2200	35	228CKR035M	0.121	2090	16x31.5
2200	50	228CKS050MQW	0.106	1980	16x31.5
2200	50	228CKS050M	0.106	2390	16x35.5
2200	50	228CKR050M	0.106	2550	18x35.5
2200	63	228CKS063M	0.106	2300	18x35.5
3300	6.3	338CKS6R3M	0.151	1440	10x20
3300	6.3	338CKR6R3M	0.151	1380	12.5x20
3300	10	338CKS010M	0.131	1630	12.5x20
3300	10	338CKR010M	0.131	1800	12.5x25
3300	16	338CKS016M	0.111	1930	12.5x25
3300	16	338CKR016M	0.111	1940	16x25
3300	25	338CKS025M	0.100	2040	16x25
3300	35	338CKS035MQW	0.090	2100	16x31.5

Cap (uF)	VDC	PART #	Maximum ESR Ω 120Hz 20C	Maximum RMS ripple current (mA) 120Hz,85C	Dims DxL (mm)
3300	35	338CKS035MQW	0.090	2100	16x31.5
3300	35	338CKS035M	0.090	2530	16x35.5
3300	35	338CKR035M	0.090	2700	18x35.5
3300	50	338CKS050M	0.080	2890	18x35.5
4700	6.3	478CKS6R3M	0.113	1730	12.5x20
4700	10	478CKS010M	0.099	2020	12.5x25
4700	16	478CKS016M	0.085	2160	16x25
4700	25	478CKS025MQV	0.078	2200	16x25
4700	25	478CKS025M	0.078	2500	16x31.5
4700	25	478CKR025M	0.078	2810	18x35.5
4700	35	478CKS035MQY	0.071	2500	16x35.5
4700	35	478CKS035M	0.071	2960	18x35.5
6800	6.3	688CKS6R3M	0.088	2160	12.5x25
6800	10	688CKS010M	0.078	2270	16x25
6800	16	688CKS016MQV	0.068	2250	16x25
6800	16	688CKS016M	0.068	2600	16x35.5
6800	16	688CKR016M	0.068	2980	18x35.5
6800	25	688CKS025MQY	0.063	2600	16x35.5
6800	25	688CKS025M	0.063	2880	18x35.5
6800	35	688CKS035M	0.059	2800	18x40
10000	6.3	109CKS6R3M	0.066	2330	16x25
10000	10	109CKS010MQW	0.063	2550	16x31.5
10000	16	109CKS016MQY	0.056	2710	16x35.5
10000	16	109CKS016M	0.056	3230	18x35.5
10000	25	109CKS025M	0.053	2800	18x40
15000	6.3	159CKS6R3MQW	0.057	2550	16x31.5
15000	6.3	159CKS6R3M	0.057	3050	16x35.5
15000	10	159CKS010MQY	0.053	2880	16x35.5
15000	10	159CKS010M	0.053	3360	18x35.5
15000	16	159CKS016M	0.053	3100	18x40
22000	6.3	229CKS6R3MRY	0.050	3200	18x35.5
22000	10	229CKS010M	0.048	3400	18x40

