



**THE DATASHEET OF  
228CKS010M**



# CKR/CKS



## Radial Lead Aluminum Electrolytic Capacitors

### FEATURES

Small Size - High Voltage - General Purpose

### APPLICATIONS

Bypass - Coupling - Filtering - De-coupling

<b>Operating Temperature Range</b>		<b>-40°C to +85°C (6.3 to 100 WVDC) -25°C to +85°C (160 to 500 WVDC)</b>															
<b>Capacitance Tolerance</b>		<b>±20% at 120 Hz, 20°C</b>															
<b>Surge Voltage</b>	<b>WVDC</b>	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	500	
	<b>SVDC</b>	7.9	13	20	32	44	63	79	125	200	250	300	400	450	500	550	
<b>Dissipation Factor</b>	<b>WVDC</b>	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	500	
	<b>Tan δ</b>	.24	0.2	.16	.14	.12	.1	.1	.08	.2	.2	.2	.2	.2	.2	.24	
		Add .02 for every 1000uF above 1000uF															
<b>Leakage Current</b>		<b>6.3 to 100 WVDC</b>							<b>160 to 500 WVDC</b>								
		<b>2 Minutes</b>							<b>2 Minutes</b>								
		.01CV or 3uA, Whichever is greater															
		.03CV+10uA															
<b>Low Temperature Stability Impedance Ratio (120 Hz)</b>	<b>WVDC</b>	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	500	
	<b>-25°C to +20°C</b>	5	4	3	2	2	2	2	2	3	3	4	6	7	7	8	
	<b>-40°C to +20°C</b>	10	8	6	5	3	3	3	3	-	-	-	-	-	-	-	
<b>Load Life</b>		<b>2000 hours at 85°C with rated WVDC and ripple current applied</b>															
		<b>Capacitance Change</b>	≤20% of initial measured value														
		<b>Dissipation Factor</b>	≤200% of maximum specified value														
		<b>Leakage Current</b>	≤100% of maximum specified value														
<b>Shelf Life</b>		<b>1000 hours at 85°C with no voltage applied</b>															
		<b>Capacitance Change</b>	≤20% initial measured value														
		<b>Dissipation Factor</b>	≤200% of maximum specified value														
		<b>Leakage Current</b>	≤100% of maximum specified value														
<b>Ripple Current Multipliers</b>		<b>WVDC</b>	<b>Capacitance (uF)</b>					<b>Frequency (Hz)</b>					<b>Temperature (°C)</b>				
		<b>6.3 to 100V</b>	47	0.75	1.0	1.35	1.57	2	2.3	1.0	1.4	1.6	1.7	1.8			
			68 to 470	0.8	1.0	1.23	1.34	1.5	1.65	1.0	1.4	1.6	1.7	1.8			
			≥560	0.85	1.0	1.1	1.13	1.15	1.4	1.0	1.4	1.6	1.7	1.8			
		<b>160 to 450V</b>	.47 to 4.7	0.65	1.0	1.35	1.75	2.3	2.5	1.0	1.4	1.6	1.7	1.8			
			6.8 to 82	0.75	1.0	1.25	1.5	1.75	1.8	1.0	1.4	1.6	1.7	1.8			
			100 to 1000	0.8	1.0	1.15	1.3	1.4	1.5	1.0	1.4	1.6	1.7	1.8			

### Special Order Options



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<sub>1</sub>=L+1.5mm Max.  
D<sub>1</sub>=D+0.5mm Max.  
S<sub>1</sub>=S+0.5 mm

Americas / EU  
Phone: 1-508-996-8561  
Email: cdena@cde.com



Asia  
Phone: 852-2793-0931  
Email: cdeasia@cde.com

# CKR\_CKS

+85°C, Standard, 2000 Hour

WVDC	Capacitance (µF)	IC PART NUMBER	Maximum ESR (Ω) 120 Hz, +20°C	Maximum RMS Ripple Current (mA) 120 Hz, +85°C	Dims DxL (mm)
6.3	1000	108CK6R3M	0.365	610	8x11.5
6.3	2200	228CK6R3M	0.211	900	10x16
6.3	3300	338CK6R3M	0.1507	1350	10x20
6.3	4700	478CK6R3M	0.1129	1830	12.5x20
6.3	6800	688CK6R3M	0.083	1930	12.5x25
6.3	10000	109CK6R3M	0.0696	2760	16x25
6.3	15000	159CK6R3M	0.0531	2860	16x35
6.3	22000	229CK6R3MRY	0.0497	3200	18x35
6.3	22000	229CK6R3M	0.0497	3400	18x40
10	220	227CK010M	1.507	230	5x11
10	330	337CK010M	1.005	325	6.3x11
10	470	477CK010M	0.67	385	6.3x11
10	1000	108CK010M	0.315	795	10x12.5
10	1500	158CK010M	0.2432	875	10x16
10	2200	228CK010M	0.1809	1230	10x20
10	3300	338CK010M	0.1306	1685	12.5x20
10	4700	478CK010M	0.0988	2105	12.5x25
10	6800	688CK010M	0.0756	2610	16x25
10	10000	109CK010MQW	0.063	2960	16x30
10	15000	159CK010MKCG	0.0531	3100	16x40
10	22000	229CK010M	0.0467	3400	18x40
16	100	107CK016M	2.653	175	5x11
16	220	227CK016M	1.206	290	6.3x11
16	470	477CK016M	0.564	500	8x11.5
16	1000	108CK016MLN	0.3316	700	10x12.5
16	1000	108CK016M	0.3316	930	10x16
16	1500	158CK016M	0.199	1025	10x20
16	2200	228CK016MLU	0.151	1010	10x20
16	2200	228CK016M	0.151	1555	12.5x20
16	3300	338CK016M	0.1105	1990	12.5x25
16	4700	478CK016M	0.085	2490	16x25
16	6800	688CK016MQV	0.068	2250	16x25
16	6800	688CK016MKAG	0.068	3010	16x30
16	10000	109CK016MQY	0.056	3490	16x35
16	10000	109CK016M	0.056	3230	18x35
16	15000	159CK016M	0.052	3100	18x40
25	47	476CKR025M	4.938	130	5x11
25	100	107CK025MEM	2.321	180	5x11
25	220	227CK025MGM	1.055	280	6.3x11
25	220	227CKR025M	1.055	370	8x11.5
25	330	337CK025M	0.703	455	8x11.5
25	470	477CK025M	0.494	630	10x12.5
25	1000	108CK025M	0.232	1095	10x20
25	1000	108CKR025M	0.232	1150	12.5x20
25	1500	158CK025M	0.177	1210	12.5x20
25	2200	228CK025M	0.136	1800	12.5x25
25	2200	228CKR025M	0.1356	1770	16x25
25	3300	338CK025M	0.703	2305	16x25
25	4700	478CK025M	0.078	2855	16x30
25	6800	688CK025MQY	0.063	2600	16x35
25	6800	688CK025M	0.063	3530	18x35
25	10000	109CK025M	0.053	2800	18x40
35	33	336CKR035M	6.0238	110	5x11
35	47	476CK035M	4.233	140	5x11
35	100	107CK035M	1.989	235	6.3x11
35	220	227CK035M	1.055	405	8x11.5
35	220	227CKR035M	0.904	450	10x12.5
35	330	337CK035M	0.603	580	10x12.5

WVDC	Capacitance (µF)	IC PART NUMBER	Maximum ESR (Ω) 120 Hz, +20°C	Maximum RMS Ripple Current (mA) 120 Hz, +85°C	Dims DxL (mm)
35	470	477CK035M	0.423	755	10x16
35	1000	108CK035M	0.199	1410	12.5x20
35	1000	108CKR035M	0.199	1370	12.5x25
35	1500	158CKR035M	0.155	1110	16x25
35	2200	228CK035M	0.121	2135	16x25
35	2200	228CKR035M	0.1206	2090	16x30
35	3300	338CK035MQW	0.0904	2340	16x30
35	4700	478CK035MQY	0.071	2500	16x35
35	4700	478CK035M	0.071	3400	18x35
35	6800	688CK035M	0.0585	3500	18x40
50	1	105CKR050M	165.79	13	5x11
50	1.5	155CKR050M	110.52	18	5x11
50	2.2	225CKR050M	75.358	28	5x11
50	3.3	335CK050M	50.238	35	5x11
50	4.7	475CKR050M	35.274	50	5x11
50	10	106CKR050M	16.579	75	5x11
50	15	156CKR050M	11.052	78	5x11
50	22	226CKR050M	7.536	110	5x11
50	33	336CK050M	5.0238	130	5x11
50	47	476CKR050M	2.822	180	6.3x11
50	100	107CKR050M	1.658	310	8x11.5
50	150	157CK050M	1.1052	263	8x11.5
50	220	227CK050M	0.754	510	10x12.5
50	220	227CKR050M	0.754	540	10x16
50	330	337CK050M	0.5024	710	10x16
50	330	337CKR050M	0.5024	730	10x20
50	470	477CK050M	0.3527	815	10x20
50	470	477CKR050M	0.353	930	12.5x20
50	680	687CK050MTJG	0.244	1000	12.5x20
50	680	687CKR050M	0.244	810	12.5x25
50	1000	108CK050M	0.166	1715	12.5x25
50	1000	108CKR050M	0.166	1510	16x25
50	1500	158CK050M	0.133	1650	16x30
50	2200	228CK050MQW	0.106	2320	16x30
50	2200	228CK050M	0.106	2390	16x35
50	3300	338CK050M	0.0804	3220	18x35
50	4700	478CK050MLCG	0.0635	3340	18x40
63	10	106CKR063M	16.579	75	5x11
63	22	226CK063M	7.536	115	5x11
63	22	226CKR063M	7.536	130	6.3x11
63	33	336CKR063M	5.0238	160	6.3x11
63	47	476CK063M	2.822	190	6.3x11
63	47	476CKR063M	2.822	210	8x11.5
63	100	107CK063MJM	1.658	325	8x11.5
63	100	107CKR063M	1.658	330	10x12.5
63	220	227CK063M	0.754	615	10x16
63	330	337CK063M	0.5024	825	10x20
63	470	477CK063M	0.3527	1155	12.5x20
63	680	687CK063MTJD	0.244	1515	12.5x25
63	1000	108CK063M	0.166	2040	16x25
63	1000	108CKR063M	0.166	1670	16x30
63	2200	228CK063M	0.106	2300	18x35
63	3300	338CK063MLCG	0.0804	2500	18x40
100	1	105CKR100M	165.79	25	5x11
100	2.2	225CK0100M	75.357	40	5x11
100	3.3	335CK0100M	50.238	45	5x11
100	4.7	475CKR100M	28.219	55	5x11
100	10	106CK0100MEM	16.579	80	5x11

# CKR\_CKS

+85°C, Standard, 2000 Hour

WVDC	Capacitance (µF)	IC PART NUMBER	Maximum ESR (Ω) 120 Hz, +20°C	Maximum RMS Ripple Current (mA) 120 Hz, +85°C	Dims DxDL (mm)
100	22	226CKS100M	7.536	135	6.3x11
100	22	226CKR100M	7.536	155	8x11.5
100	47	476CKS100M	2.822	260	10x12.5
100	47	476CKR100M	2.822	280	10x16
100	100	107CKS100MLQ	1.658	340	10x16
100	100	107CKS100M	1.658	455	10x20
100	220	227CKS100MNU	0.754	745	12.5x20
100	330	337CKS100M	0.5024	990	12.5x25
100	470	477CKS100M	0.3527	1395	16x25
100	1000	108CKS100MRY	0.166	1995	18x35
160	10	106CKS160M	33.157	90	8x11.5
160	22	226CKS160M	15.071	172	10x16
160	33	336CKS160M	10.048	230	10x20
160	47	476CKS160MLU	7.055	285	10x21
160	47	476CKR160M	7.055	270	12.5x25
160	100	107CKS160M	3.316	490	12.5x25
160	220	227CKS160MQW	1.13	900	16x30
160	330	337CKS160MLAG	1.005	1150	18x30
160	470	477CKS160MLAD	0.7055	1460	18x35
160	680	687CKS160MLCD	0.488	1600	18x45
200	10	106CKS200M	33.157	100	10x12.5
200	22	226CKS200MLQ	15.071	175	10x16
200	33	336CKS200MLU	10.048	240	10x20
200	47	476CKS200MTJG	7.055	310	12.5x20
200	220	227CKS200M	1.13	960	16x35
200	470	477CKS200MLCD	0.7055	1610	18x45
250	1	105CKR250M	331.573	18	6.3x11
250	2.2	225CKS250M	150.715	32	6.3x11
250	3.3	335CKS250MGM	100.477	40	6.3x11
250	4.7	475CKS250MGM	70.547	58	6.3x11
250	10	106CKS250MLN	33.157	105	10x20
250	22	226CKS250MLU	15.071	195	10x20
250	33	336CKS250M	10.048	260	12.5x20
250	47	476CKS250MNU	7.055	310	12.5x20
250	47	476CKS250M	7.055	350	12.5x25
250	100	107CKS250MQV	3.316	560	16x25
250	220	227CKS250M	1.13	1020	18x35
350	2.2	225CKS350M	180.858	38	6.3x11
350	3.3	335CKS350MJM	120.572	55	8x11.5
350	22	226CKS350M	18.0858	210	12.5x20
350	33	336CKS350M	12.0572	300	12.5x25

WVDC	Capacitance (µF)	IC PART NUMBER	Maximum ESR (Ω) 120 Hz, +20°C	Maximum RMS Ripple Current (mA) 120 Hz, +85°C	Dims DxDL (mm)
350	47	476CKS350M	8.4657	390	16x25
350	100	107CKS350M	3.9789	550	18x35
400	2.2	225CKS400MEBB	180.858	38	6.3x11
400	3.3	335CKS400MJM	120.572	55	8x11.5
400	4.7	475CKS400MFH	84.6569	70	8x11.5
400	4.7	475CKS400M	84.6569	75	10x16
400	10	106CKS400MLQ	39.7887	120	10x16
400	22	226CKS400MTJG	18.0858	210	12.5x20
400	22	226CKS400M	18.0858	210	12.5x25
400	33	336CKS400MTJD	12.0572	300	12.5x25
400	33	336CKS400M	12.0572	260	16x25
400	47	476CKS400MQV	8.4657	390	16x25
400	100	107CKS400MKAD	3.9789	640	16x35
450	1	105CKS450MEBB	397.887	20	6.3x11
450	1	105CKS450M	397.887	29	8x11.5
450	2.2	225CKS450MJM	180.858	38	8x11.5
450	3.3	335CKS450MLM	120.572	40	10x12.5
450	4.7	475CKS450MLN	84.6569	70	10x12.5
450	4.7	475CKS450M	84.6569	75	10x16
450	10	106CKS450MGBW	39.7887	105	10x16
450	10	106CKS450MLU	39.7887	80	10x20
450	22	226CKS450MNV	18.0858	210	12.5x25
450	22	226CKS450M	18.0858	210	16x25
450	33	336CKS450MQV	12.0572	300	16x25
450	33	336CKS450M	12.0572	280	16x30
450	47	476CKS450MQW	8.4657	380	16x30
450	100	107CKS450MLAD	3.9789	640	18x35
450	100	107CKS450M	3.9789	550	18x40
450	150	157CKS450MLCG	2.65258	860	18x40
450	150	157CKS450MLCD	2.65258	850	18x45
500	1	105CKS500MEBB	397.887	20	6.3x11
500	2.2	225CKS500MFH	180.858	34	8x11.5
500	4.7	475CKS500MGBW	84.6569	68	10x16
500	6.8	685CKS500MGJG	58.5128	80	10x20
500	10	106CKS500MTJG	39.7887	105	12.5x20
500	22	226CKS500MKJH	18.0858	195	16x20
500	33	336CKS500MKJD	12.0572	260	16x25
500	47	476CKS500MKAG	8.4657	320	16x30
500	68	686CKS500MKAD	5.8513	430	18x35
500	82	826CKS500MKCG	4.8523	500	18x40
500	100	107CKS500MKCD	3.9789	590	18x45

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