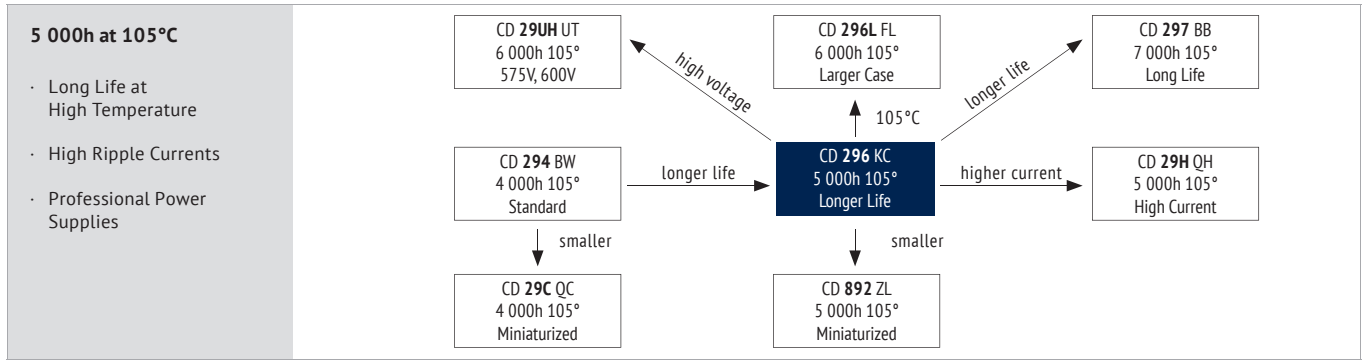


ALUMINUM ELECTROLYTIC CAPACITORS · SNAP-IN TYPE

# CD 296 KC SERIES



**ITEM CHARACTERISTICS**

Operating Temperature Range (°C)	-40 ~ +105	-25 ~ +105
Voltage Range (V)	16 ~ 100	160 ~ 550
Capacitance Range (µF)	47 ~ 47 000	
Capacitance Tolerance (20°C, 120Hz)	± 20%	

**!** The usage at lower temperatures than indicated may be possible. Please contact the Jianghai Europe sales office for approval.

Leakage Current: After 5 minutes at 20°C application of rated voltage, leakage current is not more than specified in table.

Stability at Low Temperature (Impedance Ratio at 120Hz)	Rated Voltage (V)	16 ~ 100	160 ~ 200	250 ~ 550
	$Z_{-25°C} / Z_{+20°C}$	4		
	$Z_{-40°C} / Z_{+20°C}$	15	-	

Fast Charge-Discharge: **!** Please contact Jianghai for an appropriate choice of the capacitor or possible technical adaptations, esp. for applications like: Welding, Photoflash, Servo motors, X-Ray

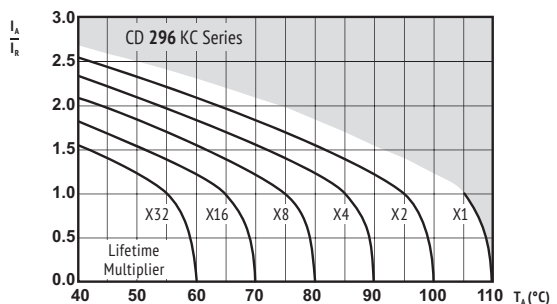
ITEM	USEFUL LIFE		LOAD LIFE	ENDURANCE TEST	SHELF LIFE	
Lifetime	5 000h	> 200 000h	3 000h	4 000h	1 000h	
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value	
Capacitance Change	Within ± 30% of initial value		Within ± 20% of initial value	Within ± 20% of initial value	Within ± 20% of initial value	
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value	
Condition:						
Applied Voltage	$U_R$	$U_R$	$U_R$	$U_R$	$U_R = 0$	After test: $U_R$ to be applied for 30 min > 24h before measurement
Applied Current	$I_R$	$1,4 \times I_R$	$I_R$	$I_R = 0$	$I_R = 0$	
Applied Temperature	105°C	40°C	105°C	105°C IEC 60384	105°C	

**MULTIPLIER FOR RIPPLE CURRENT (FREQUENCY COEFFICIENT)**

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz	≥ 50 kHz
Rated Voltage (V)						
≤ 100	0,95	1,00	1,07	1,13	1,19	1,20
160 ~ 250	0,87	1,00	1,17	1,32	1,45	1,50
≥ 315	0,80	1,00	1,16	1,30	1,41	1,43

Multipliers for typical operating conditions.

**MULTIPLIER FOR LIFETIME (LIFETIME DIAGRAM)**



$I_A$  = actual ripple current at 120Hz,  
 $I_R$  = rated ripple current at 120Hz, 105°C  
Multiplier of Useful Life as a function of ambient temperature & ripple current load

**!** Max. Current Snap-In Terminal: 15A. For more current use Lug-Terminals.

**ENVIRONMENTAL**

The products are RoHS, WEEE and RECh compliant. The detailed version please see separate "Environmental Certificates" document or [www.jianghai-europe.com](http://www.jianghai-europe.com)

**! SAFETY FACTOR**

This diagram includes a safety margin. In many cases the allowed current capability/lifetime may be increased. For details and approvals please contact the Jianghai Europe sales office.

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance (μF)	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current (mA)	I <sub>RAC</sub> Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6
<b>16</b> (20) 1C	6 800	98	68	0,50	1,1	1,60	22 x 25	ECS1CKC682M◇◇△△2225
	8 200	81	57	0,50	1,3	1,80	25 x 25	ECS1CKC822M◇◇△△2525
	10 000	67	46	0,50	1,5	1,99	22 x 30	ECS1CKC103M◇◇△△2230
		67	46	0,50	1,5	1,99	25 x 25	ECS1CKC103M◇◇△△2525
12 000	56	39	0,50	1,5	2,28	22 x 35	ECS1CKC123M◇◇△△2235	
	56	39	0,50	1,5	2,30	25 x 30	ECS1CKC123M◇◇△△2530	
	56	39	0,50	1,5	2,38	30 x 25	ECS1CKC123M◇◇△△3025	
15 000	45	31	0,50	1,5	2,64	22 x 40	ECS1CKC153M◇◇△△2240	
	45	31	0,50	1,5	2,68	25 x 35	ECS1CKC153M◇◇△△2535	
18 000	37	26	0,50	1,5	2,98	22 x 45	ECS1CKC183M◇◇△△2245	
	37	26	0,50	1,5	3,04	25 x 40	ECS1CKC183M◇◇△△2540	
	37	26	0,50	1,5	3,00	30 x 30	ECS1CKC183M◇◇△△3030	
22 000	37	26	0,50	1,5	3,10	35 x 25	ECS1CKC183M◇◇△△3525	
	31	21	0,50	1,5	3,40	25 x 45	ECS1CKC223M◇◇△△2545	
	31	21	0,50	1,5	3,39	30 x 35	ECS1CKC223M◇◇△△3035	
27 000	25	17	0,50	1,5	3,81	25 x 50	ECS1CKC273M◇◇△△2550	
	25	17	0,50	1,5	3,83	30 x 40	ECS1CKC273M◇◇△△3040	
	25	17	0,50	1,5	3,74	35 x 30	ECS1CKC273M◇◇△△3530	
33 000	21	14	0,50	1,5	4,30	30 x 45	ECS1CKC333M◇◇△△3045	
	21	14	0,50	1,5	4,24	35 x 35	ECS1CKC333M◇◇△△3535	
39 000	18	12	0,50	1,5	4,74	30 x 50	ECS1CKC393M◇◇△△3050	
	18	12	0,50	1,5	4,72	35 x 40	ECS1CKC393M◇◇△△3540	
47 000	15	10	0,50	1,5	5,27	35 x 45	ECS1CKC473M◇◇△△3545	

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance (μF)	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current (mA)	I <sub>RAC</sub> Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6
<b>25</b> (32) 1E	4 700	113	79	0,40	1,2	1,55	22 x 25	ECS1EKC472M◇◇△△2225
	5 600	95	66	0,40	1,4	1,70	25 x 25	ECS1EKC562M◇◇△△2525
	6 800	79	55	0,40	1,5	1,91	22 x 30	ECS1EKC682M◇◇△△2230
		79	55	0,40	1,5	1,91	25 x 25	ECS1EKC682M◇◇△△2525
8 200	65	45	0,40	1,5	2,14	22 x 35	ECS1EKC822M◇◇△△2235	
	65	45	0,40	1,5	2,16	25 x 30	ECS1EKC822M◇◇△△2530	
	65	45	0,40	1,5	2,25	30 x 25	ECS1EKC822M◇◇△△3025	
10 000	54	37	0,40	1,5	2,40	22 x 40	ECS1EKC103M◇◇△△2240	
	54	37	0,40	1,5	2,44	25 x 35	ECS1EKC103M◇◇△△2535	
	45	31	0,40	1,5	2,69	22 x 45	ECS1EKC123M◇◇△△2245	
12 000	45	31	0,40	1,5	2,74	25 x 40	ECS1EKC123M◇◇△△2540	
	45	31	0,40	1,5	2,70	30 x 30	ECS1EKC123M◇◇△△3030	
	45	31	0,40	1,5	2,80	35 x 25	ECS1EKC123M◇◇△△3525	
15 000	36	25	0,40	1,5	3,15	25 x 45	ECS1EKC153M◇◇△△2545	
	36	25	0,40	1,5	3,13	30 x 35	ECS1EKC153M◇◇△△3035	
	36	25	0,40	1,5	3,22	35 x 30	ECS1EKC153M◇◇△△3530	
18 000	30	21	0,40	1,5	3,54	25 x 50	ECS1EKC183M◇◇△△2550	
	30	21	0,40	1,5	3,54	30 x 40	ECS1EKC183M◇◇△△3040	
22 000	25	17	0,40	1,5	4,24	30 x 45	ECS1EKC223M◇◇△△3045	
	25	17	0,40	1,5	3,96	35 x 35	ECS1EKC223M◇◇△△3535	
27 000	20	14	0,40	1,5	4,75	35 x 45	ECS1EKC273M◇◇△△3545	
33 000	17	11	0,40	1,5	5,39	35 x 50	ECS1EKC333M◇◇△△3550	

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance (μF)	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current (mA)	I <sub>RAC</sub> Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6
<b>35</b> (44) 1V	3 300	141	99	0,35	1,2	1,43	22 x 25	ECS1VKC332M◇◇△△2225
	3 900	120	83	0,35	1,4	1,65	22 x 30	ECS1VKC392M◇◇△△2230
	4 700	99	69	0,35	1,5	1,78	25 x 25	ECS1VKC472M◇◇△△2525
		83	58	0,35	1,5	2,02	22 x 35	ECS1VKC562M◇◇△△2235
5 600	83	58	0,35	1,5	2,04	25 x 30	ECS1VKC562M◇◇△△2530	
	83	58	0,35	1,5	2,12	30 x 25	ECS1VKC562M◇◇△△3025	
	69	48	0,35	1,5	2,28	22 x 40	ECS1VKC682M◇◇△△2240	
6 800	69	48	0,35	1,5	2,31	25 x 35	ECS1VKC682M◇◇△△2535	
	57	40	0,35	1,5	2,67	22 x 50	ECS1VKC822M◇◇△△2250	
	57	40	0,35	1,5	2,60	25 x 40	ECS1VKC822M◇◇△△2540	
8 200	57	40	0,35	1,5	2,56	30 x 30	ECS1VKC822M◇◇△△3030	
	57	40	0,35	1,5	2,78	35 x 25	ECS1VKC822M◇◇△△3525	
	47	33	0,35	1,5	2,92	25 x 45	ECS1VKC103M◇◇△△2545	
10 000	47	33	0,35	1,5	2,92	30 x 35	ECS1VKC103M◇◇△△3035	
	39	27	0,35	1,5	3,26	25 x 50	ECS1VKC123M◇◇△△2550	
	39	27	0,35	1,5	3,28	30 x 40	ECS1VKC123M◇◇△△3040	
12 000	39	27	0,35	1,5	3,20	35 x 30	ECS1VKC123M◇◇△△3530	
	31	22	0,35	1,5	3,74	30 x 45	ECS1VKC153M◇◇△△3045	
	31	22	0,35	1,5	3,69	35 x 35	ECS1VKC153M◇◇△△3535	
18 000	26	18	0,35	1,5	4,16	35 x 40	ECS1VKC183M◇◇△△3540	
22 000	22	15	0,35	1,5	4,92	35 x 50	ECS1VKC223M◇◇△△3550	

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance (μF)	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current (mA)	I <sub>RAC</sub> Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6
<b>50</b> (63) 1H	1 800	222	155	0,30	0,9	1,31	22 x 25	ECS1HKC182M◇◇△△2225
	2 200	181	127	0,30	1,1	1,45	22 x 30	ECS1HKC222M◇◇△△2230
	2 700	148	103	0,30	1,4	1,70	22 x 30	ECS1HKC272M◇◇△△2230
		148	103	0,30	1,4	1,70	25 x 25	ECS1HKC272M◇◇△△2525
3 300	121	84	0,30	1,5	1,98	22 x 35	ECS1HKC332M◇◇△△2235	
	121	84	0,30	1,5	2,00	25 x 30	ECS1HKC332M◇◇△△2530	
	103	72	0,30	1,5	2,25	22 x 40	ECS1HKC392M◇◇△△2240	
3 900	103	72	0,30	1,5	2,28	25 x 35	ECS1HKC392M◇◇△△2535	
	103	72	0,30	1,5	2,22	30 x 25	ECS1HKC392M◇◇△△3025	
4 700	85	59	0,30	1,5	2,56	22 x 45	ECS1HKC472M◇◇△△2245	
	85	59	0,30	1,5	2,58	30 x 30	ECS1HKC472M◇◇△△3030	
	85	59	0,30	1,5	2,67	35 x 25	ECS1HKC472M◇◇△△3525	
5 600	72	50	0,30	1,5	2,89	22 x 50	ECS1HKC562M◇◇△△2250	
	72	50	0,30	1,5	2,81	25 x 40	ECS1HKC562M◇◇△△2540	
	72	50	0,30	1,5	2,95	30 x 35	ECS1HKC562M◇◇△△3035	
6 800	59	41	0,30	1,5	3,37	25 x 50	ECS1HKC682M◇◇△△2550	
	59	41	0,30	1,5	3,39	30 x 40	ECS1HKC682M◇◇△△3040	
	59	41	0,30	1,5	3,31	35 x 30	ECS1HKC682M◇◇△△3530	
8 200	49	34	0,30	1,5	3,71	30 x 45	ECS1HKC822M◇◇△△3045	
	49	34	0,30	1,5	3,66	35 x 35	ECS1HKC822M◇◇△△3535	
10 000	40	28	0,30	1,5	4,09	30 x 50	ECS1HKC103M◇◇△△3050	
	40	28	0,30	1,5	4,07	35 x 40	ECS1HKC103M◇◇△△3540	
12 000	34	23	0,30	1,5	4,50	35 x 45	ECS1HKC123M◇◇△△3545	

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance (μF)	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current (mA)	I <sub>RAC</sub> Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6
<b>63</b> (79) 1J	1 200	222	155	0,20	0,8	1,39	22 x 25	ECS1JKC122M◇◇△△2225
	1 500	177	124	0,20	0,9	1,52	22 x 30	ECS1JKC152M◇◇△△2230
	1 800	148	103	0,20	1,1	1,52	22 x 30	ECS1JKC182M◇◇△△2230
		148	103	0,20	1,1	1,52	25 x 25	ECS1JKC182M◇◇△△2525
2 200	121	84	0,20	1,4	1,73	22 x 35	ECS1JKC222M◇◇△△2235	
	121	84	0,20	1,4	1,75	25 x 30	ECS1JKC222M◇◇△△2530	
	99	69	0,20	1,5	1,97	22 x 40	ECS1JKC272M◇◇△△2240	
2 700	99	69	0,20	1,5	1,99	25 x 35	ECS1JKC272M◇◇△△2535	
	99	69	0,20	1,5	1,93	30 x 25	ECS1JKC272M◇◇△△3025	
3 300	81	56	0,20	1,5	2,32	22 x 50	ECS1JKC332M◇◇△△2250	
	81	56	0,20	1,5	2,27	25 x 40	ECS1JKC332M◇◇△△2540	
	81	56	0,20	1,5	2,24	30 x 30	ECS1JKC332M◇◇△△3030	
	81	56	0,20	1,5	2,41	35 x 25	ECS1JKC332M◇◇△△3525	
3 900	69	48	0,20	1,5	2,54	25 x 45	ECS1JKC392M◇◇△△2545	
	69	48	0,20	1,5	2,55	30 x 35	ECS1JKC392M◇◇△△3035	
4 700	57	40	0,20	1,5	2,88	25 x 50	ECS1JKC472M◇◇△△2550	
	57	40	0,20	1,5	2,90	30 x 40	ECS1JKC472M◇◇△△3040	
	57	40	0,20	1,5	2,83	35 x 30	ECS1JKC472M◇◇△△3530	
5 600	48	33	0,20	1,5	3,28	30 x 45	ECS1JKC562M◇◇△△3045	
	48	33	0,20	1,5	3,24	35 x 35	ECS1JKC562M◇◇△△3535	
	40	27	0,20	1,5	3,73	30 x 50	ECS1JKC682M◇◇△△3050	
6 800	40	27	0,20	1,5	3,71	35 x 40	ECS1JKC682M◇◇△△3540	
	33	23	0,20	1,5	4,16	35 x 45	ECS1JKC822M◇◇△△3545	
10 000	27	19	0,20	1,5	4,69	35 x 50	ECS1JKC103M◇◇△△3550	

U <sub>RDC</sub> (Surge
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U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance (μF)	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current (mA)	I <sub>RAC</sub> Rated Ripple Current 105°C 105Hz (Arms)	Size øD x L (mm)	ORDER CODE Details: Page 6 ♦♦ = pin style & length ΔΔ = pin number	
<b>80</b> <b>(100)</b> <b>1K</b>	4 700	57	40	0,20	1,5	3,56	30 x 50	ECS1KKC472M♦♦ΔΔ3050	
		57	40	0,20	1,5	3,50	35 x 40	ECS1KKC472M♦♦ΔΔ3540	
		5 600	48	33	0,20	1,5	3,87	35 x 45	ECS1KKC562M♦♦ΔΔ3545
		6 800	40	27	0,20	1,5	4,19	35 x 50	ECS1KKC682M♦♦ΔΔ3550

<b>100</b> <b>(125)</b> <b>2A</b>	560	474	332	0,20	0,6	1,07	22 x 25	ECS2AKC561M♦♦ΔΔ2225
		680	391	274	0,20	0,7	1,20	22 x 30
	820	324	227	0,20	0,8	1,35	22 x 30	ECS2AKC821M♦♦ΔΔ2230
		324	227	0,20	0,8	1,35	25 x 25	ECS2AKC821M♦♦ΔΔ2525
	1 000	266	186	0,20	1,0	1,54	22 x 35	ECS2AKC102M♦♦ΔΔ2235
		266	186	0,20	1,0	1,56	25 x 30	ECS2AKC102M♦♦ΔΔ2530
	1 200	222	155	0,20	1,2	1,74	22 x 40	ECS2AKC122M♦♦ΔΔ2240
		222	155	0,20	1,2	1,76	25 x 35	ECS2AKC122M♦♦ΔΔ2535
		222	155	0,20	1,2	1,71	30 x 25	ECS2AKC122M♦♦ΔΔ3025
	1 500	177	124	0,20	1,5	1,99	22 x 45	ECS2AKC152M♦♦ΔΔ2245
		177	124	0,20	1,5	2,03	25 x 40	ECS2AKC152M♦♦ΔΔ2540
		177	124	0,20	1,5	2,00	30 x 30	ECS2AKC152M♦♦ΔΔ3030
	1 800	177	124	0,20	1,5	2,07	35 x 25	ECS2AKC152M♦♦ΔΔ3525
		148	103	0,20	1,5	2,28	25 x 45	ECS2AKC182M♦♦ΔΔ2545
148		103	0,20	1,5	2,27	30 x 35	ECS2AKC182M♦♦ΔΔ3035	
2 200	121	84	0,20	1,5	2,57	25 x 50	ECS2AKC222M♦♦ΔΔ2550	
	121	84	0,20	1,5	2,59	30 x 40	ECS2AKC222M♦♦ΔΔ3040	
	121	84	0,20	1,5	2,52	35 x 30	ECS2AKC222M♦♦ΔΔ3530	
2 700	99	69	0,20	1,5	2,94	30 x 45	ECS2AKC272M♦♦ΔΔ3045	
	99	69	0,20	1,5	2,90	35 x 35	ECS2AKC272M♦♦ΔΔ3535	
3 300	81	56	0,20	1,5	3,32	30 x 50	ECS2AKC332M♦♦ΔΔ3050	
	81	56	0,20	1,5	3,31	35 x 40	ECS2AKC332M♦♦ΔΔ3540	
3 900	69	48	0,20	1,5	3,69	35 x 45	ECS2AKC392M♦♦ΔΔ3545	
4 700	57	40	0,20	1,5	4,14	35 x 50	ECS2AKC472M♦♦ΔΔ3550	

<b>160</b> <b>(200)</b> <b>2C</b>	330	603	422	0,15	0,5	1,16	22 x 25	ECS2CKC331M♦♦ΔΔ2225
		390	511	357	0,15	0,6	1,43	22 x 30
	470	424	296	0,15	0,8	1,52	22 x 35	ECS2CKC471M♦♦ΔΔ2235
		424	296	0,15	0,8	1,55	25 x 25	ECS2CKC471M♦♦ΔΔ2525
	560	356	249	0,15	0,9	1,62	22 x 40	ECS2CKC561M♦♦ΔΔ2240
		356	249	0,15	0,9	1,73	25 x 30	ECS2CKC561M♦♦ΔΔ2530
	680	293	205	0,15	1,1	1,70	22 x 45	ECS2CKC681M♦♦ΔΔ2245
		293	205	0,15	1,1	1,81	25 x 35	ECS2CKC681M♦♦ΔΔ2535
	820	293	205	0,15	1,1	1,82	30 x 25	ECS2CKC681M♦♦ΔΔ3025
		243	170	0,15	1,3	1,91	22 x 50	ECS2CKC821M♦♦ΔΔ2250
		243	170	0,15	1,3	1,98	25 x 40	ECS2CKC821M♦♦ΔΔ2540
		243	170	0,15	1,3	1,98	30 x 30	ECS2CKC821M♦♦ΔΔ3030
	1 000	243	170	0,15	1,3	1,93	35 x 25	ECS2CKC821M♦♦ΔΔ3525
		199	139	0,15	1,5	2,04	25 x 45	ECS2CKC102M♦♦ΔΔ2545
		199	139	0,15	1,5	2,14	30 x 35	ECS2CKC102M♦♦ΔΔ3035
	1 200	166	116	0,15	1,5	2,12	25 x 50	ECS2CKC122M♦♦ΔΔ2550
166		116	0,15	1,5	2,22	30 x 40	ECS2CKC122M♦♦ΔΔ3040	
1 500	166	116	0,15	1,5	2,40	35 x 30	ECS2CKC122M♦♦ΔΔ3530	
	133	93	0,15	1,5	2,46	30 x 45	ECS2CKC152M♦♦ΔΔ3045	
1 800	133	93	0,15	1,5	2,53	35 x 35	ECS2CKC152M♦♦ΔΔ3535	
	111	77	0,15	1,5	2,98	35 x 45	ECS2CKC182M♦♦ΔΔ3545	
2 200	91	66	0,15	1,5	3,10	35 x 50	ECS2CKC222M♦♦ΔΔ3550	
2 700	74	51	0,15	1,5	3,92	35 x 60	ECS2CKC272M♦♦ΔΔ3560	
3 300	61	42	0,15	1,5	4,63	35 x 70	ECS2CKC332M♦♦ΔΔ3570	

<b>200</b> <b>(250)</b> <b>2D</b>	220	905	633	0,15	0,4	1,08	22 x 25	ECS2DKC221M♦♦ΔΔ2225
		603	422	0,15	0,7	1,30	22 x 30	ECS2DKC331M♦♦ΔΔ2230
	330	603	422	0,15	0,7	1,35	25 x 25	ECS2DKC331M♦♦ΔΔ2525
		390	511	357	0,15	0,8	1,41	22 x 35
	470	424	296	0,15	0,9	1,50	22 x 40	ECS2DKC471M♦♦ΔΔ2240
		424	296	0,15	0,9	1,47	25 x 30	ECS2DKC471M♦♦ΔΔ2530
	560	424	296	0,15	0,9	1,56	30 x 25	ECS2DKC471M♦♦ΔΔ3025
		356	249	0,15	1,1	1,58	22 x 45	ECS2DKC561M♦♦ΔΔ2245
	680	356	249	0,15	1,1	1,60	25 x 35	ECS2DKC561M♦♦ΔΔ2535
		293	205	0,15	1,4	1,78	22 x 50	ECS2DKC681M♦♦ΔΔ2250
		293	205	0,15	1,4	1,80	25 x 40	ECS2DKC681M♦♦ΔΔ2540
293		205	0,15	1,4	1,82	30 x 30	ECS2DKC681M♦♦ΔΔ3030	
293		205	0,15	1,4	1,86	35 x 25	ECS2DKC681M♦♦ΔΔ3525	

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance (μF)	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current (mA)	I <sub>RAC</sub> Rated Ripple Current 105°C 105Hz (Arms)	Size øD x L (mm)	ORDER CODE Details: Page 6 ♦♦ = pin style & length ΔΔ = pin number
<b>200</b> <b>(250)</b> <b>2D</b>	820	243	170	0,15	1,5	1,97	25 x 50	ECS2DKC821M♦♦ΔΔ2550
		243	170	0,15	1,5	1,99	30 x 35	ECS2DKC821M♦♦ΔΔ3035
		243	170	0,15	1,5	2,07	35 x 30	ECS2DKC821M♦♦ΔΔ3530
	1 000	199	139	0,15	1,5	2,17	30 x 45	ECS2DKC102M♦♦ΔΔ3045
		199	139	0,15	1,5	2,22	35 x 35	ECS2DKC102M♦♦ΔΔ3535
	1 200	166	116	0,15	1,5	2,32	30 x 50	ECS2DKC122M♦♦ΔΔ3050
		166	116	0,15	1,5	2,42	35 x 40	ECS2DKC122M♦♦ΔΔ3540
	1 500	133	93	0,15	1,5	2,59	35 x 45	ECS2DKC152M♦♦ΔΔ3545
	1 800	111	77	0,15	1,5	2,70	35 x 50	ECS2DKC182M♦♦ΔΔ3550
	2 200	91	63	0,15	1,5	3,23	35 x 60	ECS2DKC222M♦♦ΔΔ3560

<b>250</b> <b>(300)</b> <b>2E</b>	180	1106	774	0,15	0,5	0,94	22 x 25	ECS2EKC181M♦♦ΔΔ2225
		905	633	0,15	0,6	1,10	22 x 30	ECS2EKC221M♦♦ΔΔ2230
	220	905	633	0,15	0,6	1,15	25 x 25	ECS2EKC221M♦♦ΔΔ2525
		270	737	516	0,15	0,7	1,13	22 x 35
	330	603	422	0,15	0,8	1,20	22 x 40	ECS2EKC331M♦♦ΔΔ2240
		603	422	0,15	0,8	1,30	25 x 30	ECS2EKC331M♦♦ΔΔ2530
		603	422	0,15	0,8	1,30	30 x 25	ECS2EKC331M♦♦ΔΔ3025
	390	511	357	0,15	1,0	1,41	22 x 45	ECS2EKC391M♦♦ΔΔ2245
		511	357	0,15	1,0	1,42	25 x 35	ECS2EKC391M♦♦ΔΔ2535
		424	296	0,15	1,2	1,48	22 x 50	ECS2EKC471M♦♦ΔΔ2250
470	424	296	0,15	1,2	1,47	25 x 40	ECS2EKC471M♦♦ΔΔ2540	
	424	296	0,15	1,2	1,51	30 x 30	ECS2EKC471M♦♦ΔΔ3030	
	424	296	0,15	1,2	1,50	35 x 25	ECS2EKC471M♦♦ΔΔ3525	
	356	249	0,15	1,4	1,59	25 x 45	ECS2EKC561M♦♦ΔΔ2545	
560	356	249	0,15	1,4	1,57	30 x 35	ECS2EKC561M♦♦ΔΔ3035	
	356	249	0,15	1,4	1,56	35 x 30	ECS2EKC561M♦♦ΔΔ3530	
680	293	205	0,15	1,5	1,66	25 x 50	ECS2EKC681M♦♦ΔΔ2550	
	293	205	0,15	1,5	1,68	30 x 40	ECS2EKC681M♦♦ΔΔ3040	
820	243	170	0,15	1,5	1,83	30 x 45	ECS2EKC821M♦♦ΔΔ3045	
	243	170	0,15	1,5	1,82	35 x 35	ECS2EKC821M♦♦ΔΔ3535	
1 000	199	139	0,15	1,5	1,87	30 x 50	ECS2EKC102M♦♦ΔΔ3050	
	199	139	0,15	1,5	1,99	35 x 40	ECS2EKC102M♦♦ΔΔ3540	
1 200	166	116	0,15	1,5	2,10	35 x 45	ECS2EKC122M♦♦ΔΔ3545	
1 500	133	93	0,15	1,5	2,70	35 x 50	ECS2EKC152M♦♦ΔΔ3550	
1 800	111	77	0,15	1,5	2,92	35 x 60	ECS2EKC182M♦♦ΔΔ3560	

<b>315</b> <b>(365)</b> <b>2F</b>	100	1190	1095	0,15	0,3	0,61	22 x 25	ECS2FKC101M♦♦ΔΔ2225
		120	1659	912	0,15	0,4	0,68	22 x 30
	150	1327	730	0,15	0,5	0,76	22 x 35	ECS2FKC151M♦♦ΔΔ2235
		1327	730	0,15	0,5	0,78	25 x 25	ECS2FKC151M♦♦ΔΔ2525
	180	1106	608	0,15	0,6	0,78	22 x 40	ECS2FKC181M♦♦ΔΔ2240
		1106	608	0,15	0,6	0,85	25 x 30	ECS2FKC181M♦♦ΔΔ2530
	220	905	498	0,15	0,7	0,91	22 x 45	ECS2FKC221M♦♦ΔΔ2245
		905	498	0,15	0,7	0,94	25 x 35	ECS2FKC221M♦♦ΔΔ2535
	270	905	498	0,15	0,7	0,95	30 x 30	ECS2FKC221M♦♦ΔΔ3030
		737	406	0,15	0,9	0,98	22 x 50	ECS2FKC271M♦♦ΔΔ2250
	330	737	406	0,15	0,9	1,00	25 x 40	ECS2FKC271M♦♦ΔΔ2540
		737	406	0,15	0,9	0,98	30 x 35	ECS2FKC271M♦♦ΔΔ3035
	390	603	332	0,15	1,0	1,13	25 x 45	ECS2FKC331M♦♦ΔΔ2545
		603	332	0,15	1,0	1,13	30 x 40	ECS2FKC331M♦♦ΔΔ3040
	470	510	281	0,15	1,2	1,20	30 x 45	ECS2FKC391M♦♦ΔΔ3045
		510	281	0,15	1,2	1,20	35 x 30	ECS2FKC391M♦♦ΔΔ3530
	560	424	233	0,15	1,5	1,28	35 x 35	ECS2FKC471M♦♦ΔΔ3535
		355	196	0,15	1,5	1,46	35 x 40	ECS2FKC561M♦♦ΔΔ3540
680	293	161	0,15	1,5	1,85	35 x 45	ECS2FKC681M♦♦ΔΔ3545	
820	242	133	0,15	1,5	2,10	35 x 50	ECS2FKC821M♦♦ΔΔ3550	
1 000	199	109	0,15	1,5	2,42	35 x 55	ECS2FKC102M♦♦ΔΔ3555	

<b>350</b> <b>(400)</b> <b>2V</b>	68	2926	1610	0,15	0,2	0,56	22 x 25	ECS2VKC680M♦♦ΔΔ2225
		82	2427	1262	0,15	0,3	0,62	22 x 25
	100	1990	1095	0,15	0,4	0,70	22 x 30	ECS2VKC101M♦♦ΔΔ2230
		1990	1095	0,15	0,4	0,70	25 x 25	ECS2VKC101M♦♦ΔΔ2525

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current	I <sub>RAC</sub> Rated Ripple Current 105°C 105°C	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6	
(V)	(µF)	(mΩ)	(mΩ)		(mA)	(Arms)	(mm)		
<b>350 (400) 2V</b>	180	1106	608	0,15	0,6	0,89	25 x 35	ECS2VKC181M◇◇△△2535	
		1106	608	0,15	0,6	0,90	30 x 30	ECS2VKC181M◇◇△△3030	
	220	905	498	0,15	0,8	0,93	22 x 50	ECS2VKC221M◇◇△△2250	
		905	498	0,15	0,8	0,98	25 x 40	ECS2VKC221M◇◇△△2540	
			905	498	0,15	0,8	0,98	35 x 25	ECS2VKC221M◇◇△△3525
			737	406	0,15	0,9	1,01	25 x 50	ECS2VKC271M◇◇△△2550
	270	737	406	0,15	0,9	1,05	30 x 35	ECS2VKC271M◇◇△△3035	
		737	406	0,15	0,9	1,01	35 x 30	ECS2VKC271M◇◇△△3530	
	330	603	332	0,15	1,2	1,16	30 x 45	ECS2VKC331M◇◇△△3045	
		603	332	0,15	1,2	1,16	35 x 35	ECS2VKC331M◇◇△△3535	
	390	511	281	0,15	1,4	1,26	30 x 50	ECS2VKC391M◇◇△△3050	
		511	281	0,15	1,4	1,26	35 x 40	ECS2VKC391M◇◇△△3540	
	470	424	233	0,15	1,5	1,35	35 x 45	ECS2VKC471M◇◇△△3545	
	560	356	196	0,15	1,5	1,51	35 x 50	ECS2VKC561M◇◇△△3550	
	680	293	161	0,15	1,5	1,92	35 x 55	ECS2VKC681M◇◇△△3555	
	820	243	133	0,15	1,5	2,25	35 x 60	ECS2VKC821M◇◇△△3560	
	1 000	199	139	0,15	1,5	2,50	35 x 60	ECS2VKC102M◇◇△△3560	

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current	I <sub>RAC</sub> Rated Ripple Current 105°C 105°C	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6	
(V)	(µF)	(mΩ)	(mΩ)		(mA)	(Arms)	(mm)		
<b>400 (450) 2G</b>	68	2926	1522	0,15	0,3	0,47	22 x 25	ECS2GKC680M◇◇△△2225	
		2427	1262	0,15	0,3	0,56	22 x 30	ECS2GKC820M◇◇△△2230	
	82	2427	1262	0,15	0,3	0,56	25 x 25	ECS2GKC820M◇◇△△2525	
	100	1990	1035	0,15	0,4	0,62	22 x 30	ECS2GKC101M◇◇△△2230	
		1658	863	0,15	0,5	0,66	22 x 35	ECS2GKC121M◇◇△△2235	
	120	1658	863	0,15	0,5	0,68	25 x 30	ECS2GKC121M◇◇△△2530	
		1658	863	0,15	0,5	0,70	30 x 25	ECS2GKC121M◇◇△△3025	
	150	1327	690	0,15	0,6	0,73	22 x 40	ECS2GKC151M◇◇△△2240	
		1327	690	0,15	0,6	0,73	25 x 35	ECS2GKC151M◇◇△△2535	
	180	1106	575	0,15	0,7	0,78	22 x 45	ECS2GKC181M◇◇△△2245	
		1106	575	0,15	0,7	0,82	25 x 40	ECS2GKC181M◇◇△△2540	
			1106	575	0,15	0,7	0,83	30 x 30	ECS2GKC181M◇◇△△3030
			905	471	0,15	0,9	0,87	25 x 45	ECS2GKC221M◇◇△△2545
	220	905	471	0,15	0,9	0,88	30 x 35	ECS2GKC221M◇◇△△3035	
		737	383	0,15	1,1	0,94	25 x 50	ECS2GKC271M◇◇△△2550	
	270	737	383	0,15	1,1	0,95	30 x 40	ECS2GKC271M◇◇△△3040	
		737	383	0,15	1,1	0,91	35 x 30	ECS2GKC271M◇◇△△3530	
	330	603	314	0,15	1,3	1,11	30 x 45	ECS2GKC331M◇◇△△3045	
		603	314	0,15	1,3	1,13	35 x 35	ECS2GKC331M◇◇△△3535	
	390	511	265	0,15	1,5	1,15	30 x 50	ECS2GKC391M◇◇△△3050	
511		265	0,15	1,5	1,26	35 x 40	ECS2GKC391M◇◇△△3540		
470	424	220	0,15	1,5	1,31	35 x 45	ECS2GKC471M◇◇△△3545		
560	356	185	0,15	1,5	1,50	35 x 50	ECS2GKC561M◇◇△△3550		
680	293	153	0,15	1,5	1,90	35 x 55	ECS2GKC681M◇◇△△3555		
820	243	126	0,15	1,5	2,20	35 x 60	ECS2GKC821M◇◇△△3560		
	243	126	0,15	1,5	2,20	40 x 50	ECS2GKC821M◇◇△△4050		
1 000	199	139	0,15	1,5	2,60	35 x 75	ECS2GKC102M◇◇△△3575		
	199	139	0,15	1,5	2,60	40 x 60	ECS2GKC102M◇◇△△4060		

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current	I <sub>RAC</sub> Rated Ripple Current 105°C 105°C	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6
(V)	(µF)	(mΩ)	(mΩ)		(mA)	(Arms)	(mm)	
<b>420 (470) 2X</b>	68	3901	1951	0,20	0,3	0,50	22 x 25	ECS2XKC680M◇◇△△2225
		3235	1618	0,20	0,3	0,60	22 x 30	ECS2XKC820M◇◇△△2230
	100	2653	1327	0,20	0,4	0,65	22 x 35	ECS2XKC101M◇◇△△2235
	120	2211	1106	0,20	0,5	0,70	22 x 40	ECS2XKC121M◇◇△△2240
		2211	1106	0,20	0,5	0,72	25 x 30	ECS2XKC121M◇◇△△2530
	150	1769	885	0,20	0,6	0,75	22 x 45	ECS2XKC151M◇◇△△2245
		1769	885	0,20	0,6	0,80	25 x 35	ECS2XKC151M◇◇△△2535
	180	1474	737	0,20	0,8	0,85	25 x 40	ECS2XKC181M◇◇△△2540
		1474	737	0,20	0,8	0,85	30 x 30	ECS2XKC181M◇◇△△3030
	220	1206	603	0,20	0,9	0,90	25 x 45	ECS2XKC221M◇◇△△2545
		1206	603	0,20	0,9	0,96	30 x 35	ECS2XKC221M◇◇△△3035
	270	983	492	0,20	1,1	1,05	25 x 50	ECS2XKC271M◇◇△△2550
		983	492	0,20	1,1	1,06	30 x 40	ECS2XKC271M◇◇△△3040
	330	804	402	0,20	1,4	1,14	30 x 45	ECS2XKC331M◇◇△△3045
		804	402	0,20	1,4	1,20	35 x 35	ECS2XKC331M◇◇△△3535
	390	681	340	0,20	1,5	1,25	30 x 50	ECS2XKC391M◇◇△△3050
		681	340	0,20	1,5	1,26	35 x 40	ECS2XKC391M◇◇△△3540
	470	565	282	0,20	1,5	1,31	35 x 45	ECS2XKC471M◇◇△△3545
	560	474	237	0,20	1,5	1,50	35 x 50	ECS2XKC561M◇◇△△3550
	680	391	196	0,20	1,5	1,90	35 x 55	ECS2XKC681M◇◇△△3555
820	324	162	0,20	1,5	2,20	35 x 60	ECS2XKC821M◇◇△△3560	

U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current	I <sub>RAC</sub> Rated Ripple Current 105°C 105°C	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6	
(V)	(µF)	(mΩ)	(mΩ)		(mA)	(Arms)	(mm)		
<b>450 (500) 2W</b>	56	4737	2370	0,20	0,3	0,47	22 x 25	ECS2WKC560M◇◇△△2225	
		3901	1951	0,20	0,3	0,56	22 x 30	ECS2WKC680M◇◇△△2230	
	68	3901	1951	0,20	0,3	0,56	25 x 25	ECS2WKC680M◇◇△△2525	
		3235	1618	0,20	0,4	0,64	22 x 35	ECS2WKC820M◇◇△△2235	
	100	2653	1327	0,20	0,5	0,70	22 x 40	ECS2WKC101M◇◇△△2240	
		2653	1327	0,20	0,5	0,70	25 x 30	ECS2WKC101M◇◇△△2530	
	120	2211	1106	0,20	0,5	0,73	22 x 45	ECS2WKC121M◇◇△△2245	
		2211	1106	0,20	0,5	0,73	25 x 35	ECS2WKC121M◇◇△△2535	
	150	1769	885	0,20	0,7	0,80	22 x 50	ECS2WKC151M◇◇△△2250	
		1769	885	0,20	0,7	0,82	25 x 40	ECS2WKC151M◇◇△△2540	
			1769	885	0,20	0,7	0,83	30 x 30	ECS2WKC151M◇◇△△3030
			1474	737	0,20	0,8	0,87	25 x 45	ECS2WKC181M◇◇△△2545
	180	1474	737	0,20	0,8	0,86	30 x 35	ECS2WKC181M◇◇△△3035	
		1206	603	0,20	1,0	0,94	25 x 50	ECS2WKC221M◇◇△△2550	
	220	1206	603	0,20	1,0	0,95	30 x 40	ECS2WKC221M◇◇△△3040	
		1206	603	0,20	1,0	0,91	35 x 30	ECS2WKC221M◇◇△△3530	
	270	983	492	0,20	1,2	1,11	30 x 45	ECS2WKC271M◇◇△△3045	
		983	492	0,20	1,2	1,13	35 x 35	ECS2WKC271M◇◇△△3535	
	330	804	402	0,20	1,5	1,15	30 x 50	ECS2WKC331M◇◇△△3050	
		804	402	0,20	1,5	1,16	35 x 40	ECS2WKC331M◇◇△△3540	
390	681	340	0,20	1,5	1,31	35 x 45	ECS2WKC391M◇◇△△3545		
470	565	282	0,20	1,5	1,50	35 x 50	ECS2WKC471M◇◇△△3550		
560	474	237	0,20	1,5	1,70	35 x 55	ECS2WKC561M◇◇△△3555		
680	391	196	0,20	1,5	2,00	35 x 60	ECS2WKC681M◇◇△△3560		
	391	196	0,20	1,5	2,00	40 x 50	ECS2WKC681M◇◇△△4050		
820	324	162	0,20	1,5	2,20	35 x 65	ECS2WKC821M◇◇△△3565		
	324	162	0,20	1,5	2,30	40 x 60	ECS2WKC821M◇◇△△4060		
1 000	265	139	0,20	1,5	2,60	35 x 75	ECS2WKC102M◇◇△△3575		

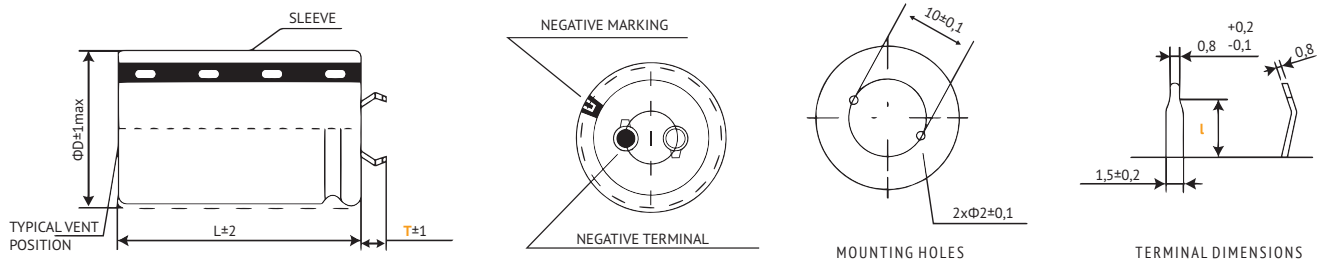
U <sub>RDC</sub> (Surge Voltage) Code	C <sub>R</sub> Rated Capacitance	ESR <sub>max</sub> Equivalent Series Resistance 20°C 120Hz	ESR <sub>typ</sub> Equivalent Series Resistance 20°C 120Hz	tanδ Dissipation Factor 20°C 120Hz	I <sub>leak</sub> Leakage Current	I <sub>RAC</sub> Rated Ripple Current 105°C 105°C	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 6	
(V)	(µF)	(mΩ)	(mΩ)		(mA)	(Arms)	(mm)		
<b>500 (550) 2H</b>	47	5644	2823	0,20	0,2	0,41	22 x 30	ECS2HKC470M◇◇△△2230	
		4737	2370	0,20	0,3	0,47	22 x 30	ECS2HKC560M◇◇△△2230	
	68	3901	1951	0,20	0,3	0,54	22 x 35	ECS2HKC680M◇◇△△2235	
		3235	1618	0,20	0,4	0,62	22 x 40	ECS2HKC820M◇◇△△2240	
	82	3235	1618	0,20	0,4	0,62	25 x 30	ECS2HKC820M◇◇△△2530	
		2653	1327	0,20	0,5	0,67	22 x 45	ECS2HKC101M◇◇△△2245	
	100	2653	1327	0,20	0,5	0,67	25 x 35	ECS2HKC101M◇◇△△2535	
		2211	1106	0,20	0,6	0,77	22 x 50	ECS2HKC121M◇◇△△2250	
	120	2211	1106	0,20	0,6	0,77	25 x 40	ECS2HKC121M◇◇△△2540	
		2211	1106	0,20	0,6	0,77	30 x 30	ECS2HKC121M◇◇△△3030	
	150	1769	885	0,20	0,8	0,82	25 x 45	ECS2HKC151M◇◇△△2545	
		1769	885	0,20	0,8	0,85	30 x 40	ECS2HKC151M◇◇△△3040	
			1769	885	0,20	0,8	0,85	35 x 35	ECS2HKC151M◇◇△△3535
			1474	737	0,20	0,9	0,98	25 x 50	ECS2HKC181M◇◇△△2550

**ORDER CODE SNAP-IN TYPE**

EC	S	2G	QC	221	M	T6	P2	2535	-	JExxxxx
Techno-logy	Terminal Type	Rated Voltage Code	Series Code	Capacitance Code	Capacitance Tolerance	Terminal Style	Terminal / Pitch	Dimension (mm)	Material Code	for Specials only
EC Electrolytic Capacitor	Snap-In S	6,3V 0J	CD 293 BZ	0,1 OR1	±20% M	4,0mm Pin Length T/L4	2 Pin P2	22x40 2240	Standard -	
		10V 1A	CD 294 BW	0,47 R47	±10% K	6,3mm Pin Length T/L6	3 Pin P3	30x45 3045	PVC V	
		16V 1C	CD 295 BC	1,0 010	+30/-10% Q	Soldering Pin S4	4 Pin P4	35x80 3580	PET E	
		20V 1D	CD 295S BS	2,2 2R2	+20/-0% R	on request: alternative pin types  ■ = preferred	5 Pin P5	45x100 45100		
		25V 1E	CD 296 KC	100 101	±15% L		6 Pin P6	50x105 50105		
		35V 1V	CD 296L FL	1 000 102	+20/-10% V					
		40V 1G	CD 297 BB	10 000 103						
		50V 1H	CD 299 PG							
		63V 1J	CD 29C QC							
		80V 1K	CD 29D HR							
		100V 2A	CD 29H QH							
		125V 2B	CD 29HD QF							
		160V 2C	CD 29L QL							
		180V 2K	CD 29U CU							
		200V 2D	CD 29UH UT							
		250V 2E	CD 840 ZQ							
		315V 2F	CD 891 ZJ							
		350V 2V	CD 892 ZL							
		385V 2J	CD 895 ZK							
		400V 2G								
		415V 2P								
		420V 2X								
		450V 2W								
		500V 2H								
550V 2Y										
575V 2Z										
600V 2S										
630V J2										



## 2 PIN TYPE: T6P2 / T4P2 STANDARD



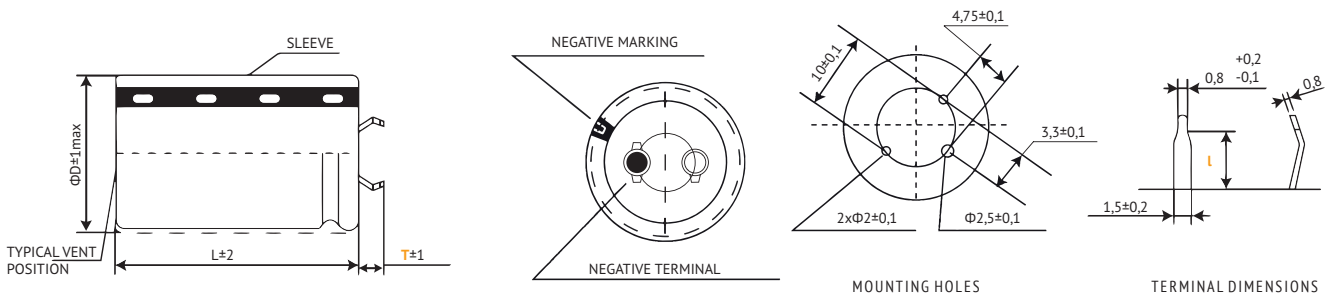
Standard Version: Self-Lock Terminal. Other terminal types and styles on request.  
For diameter  $\phi D \geq 45$  mm the safety vent is typically placed at the side of the housing.

Terminal	T6 (preferred)	T4
Pin Length $T$	6,3 mm	4,0 mm
Pin Detail $l$	3,5 mm	2,5 mm

**!** Max. Current Snap-In Terminal: 15A  
For more current please ask for Lug-Terminals.

in mm

## 3 PIN TYPE: T4P3



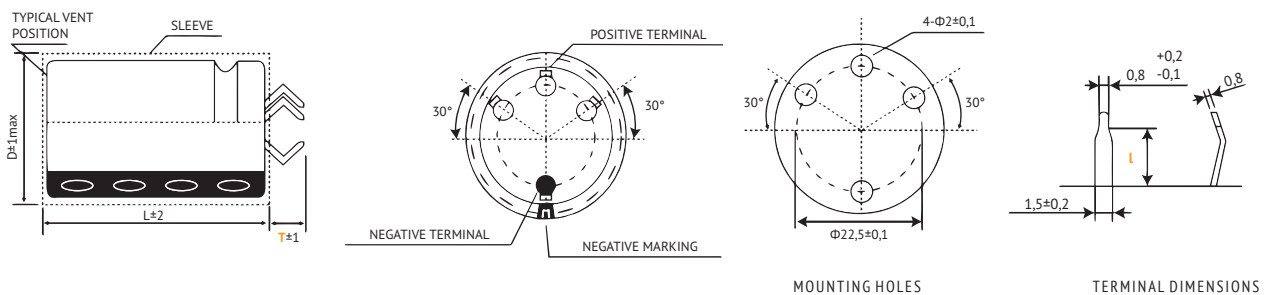
For diameter  $\phi D \geq 45$  mm the safety vent is typically placed at the side of the housing.

Terminal	T6	T4
Pin Length $T$	-	4,0 mm
Pin Detail $l$	-	2,5 mm

**!** Max. Current Snap-In Terminal: 15A  
For more current please ask for Lug-Terminals.

in mm

## 4 PIN TYPE: T6P4/T4P4 STANDARD



Standard Version: Non-Lock-Terminal. Other terminal types and styles on request.  
For  $\phi D \geq 30$  mm only.  
For diameter  $\phi D \geq 45$  mm the safety vent is typically placed at the side of the housing.

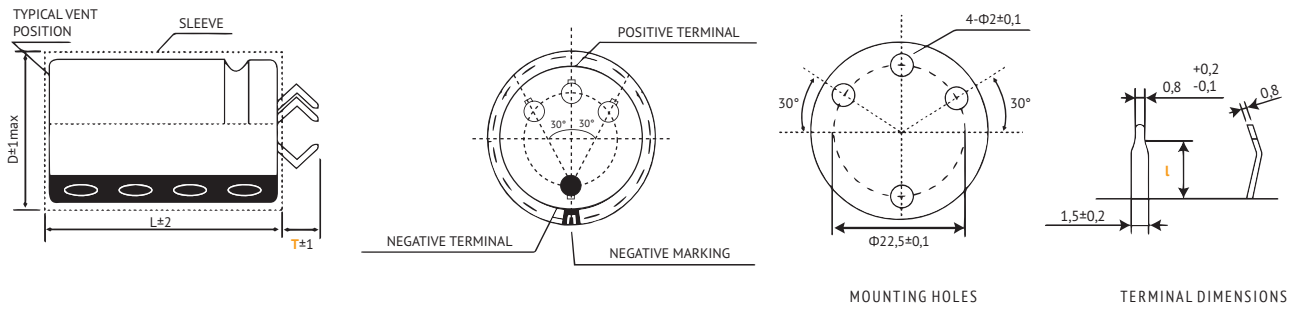
Terminal	T6 (preferred)	T4
Pin Length $T$	6,3 mm	4,0 mm
Pin Detail $l$	3,5 mm	2,5 mm

**!** Max. Current Snap-In Terminal: 15A  
For more current please ask for Lug-Terminals.

in mm



## 4 PIN TYPE: L6P4/L4P4 SELF-LOCK TERMINAL



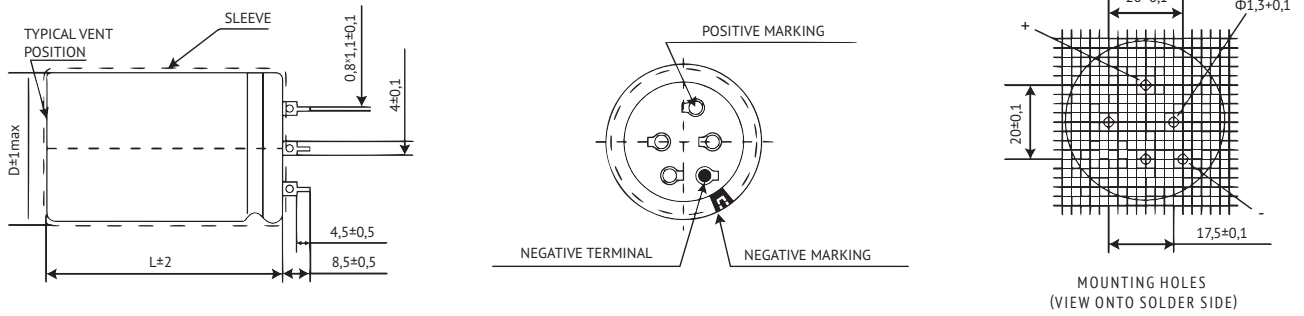
For  $\varnothing D \geq 30\text{mm}$  only. Other terminal types and styles on request.  
For diameter  $\varnothing D \geq 45\text{mm}$  the safety vent is typically placed at the side of the housing.

Terminal	T6 (preferred)	T4
Pin Length <b>T</b>	6,3 mm	4,0 mm
Pin Detail <b>l</b>	3,5 mm	2,5 mm

**!** Max. Current Snap-In Terminal: 15A  
For more current please ask for Lug-Terminals.

in mm

## 5 PIN TYPE: S4P5 SOLDERING PIN

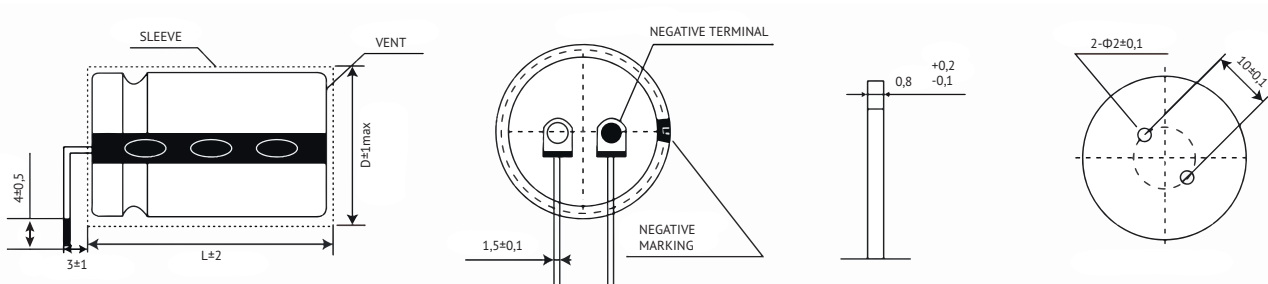


For  $\varnothing D \geq 30\text{mm}$  only.  
For diameter  $\varnothing D \geq 45\text{mm}$  the safety vent is typically placed at the side of the housing.

**!** Max. Current Snap-In Terminal: 15A  
For more current please ask for Lug-Terminals.

in mm

## EXAMPLE: AXIAL MOUNTING



For  $\varnothing D \geq 25\text{mm}$  only.  
Available also for high vibration usage.

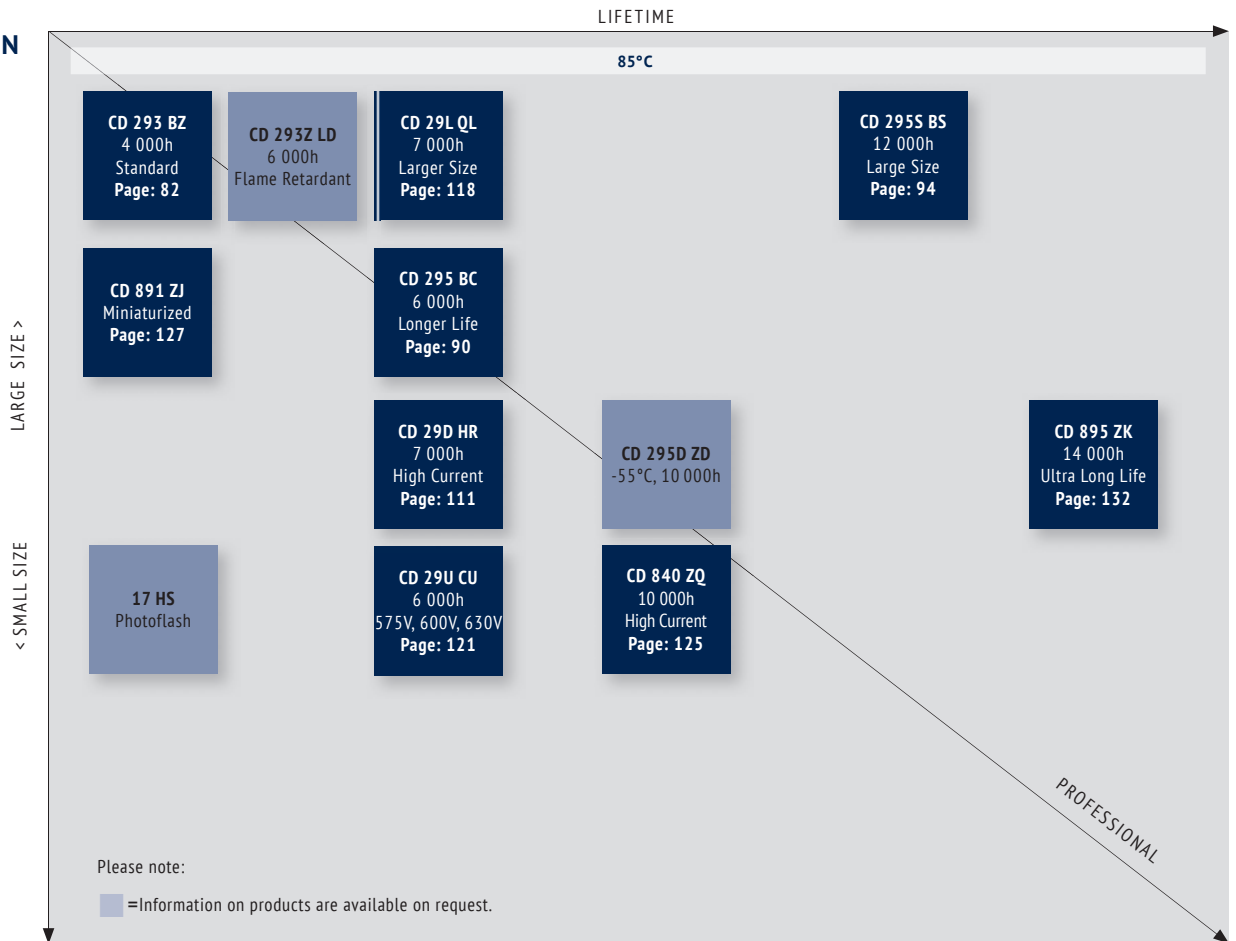
**!** Max. Current Snap-In Terminal: 15A  
For more current please ask for Lug-Terminals.

in mm

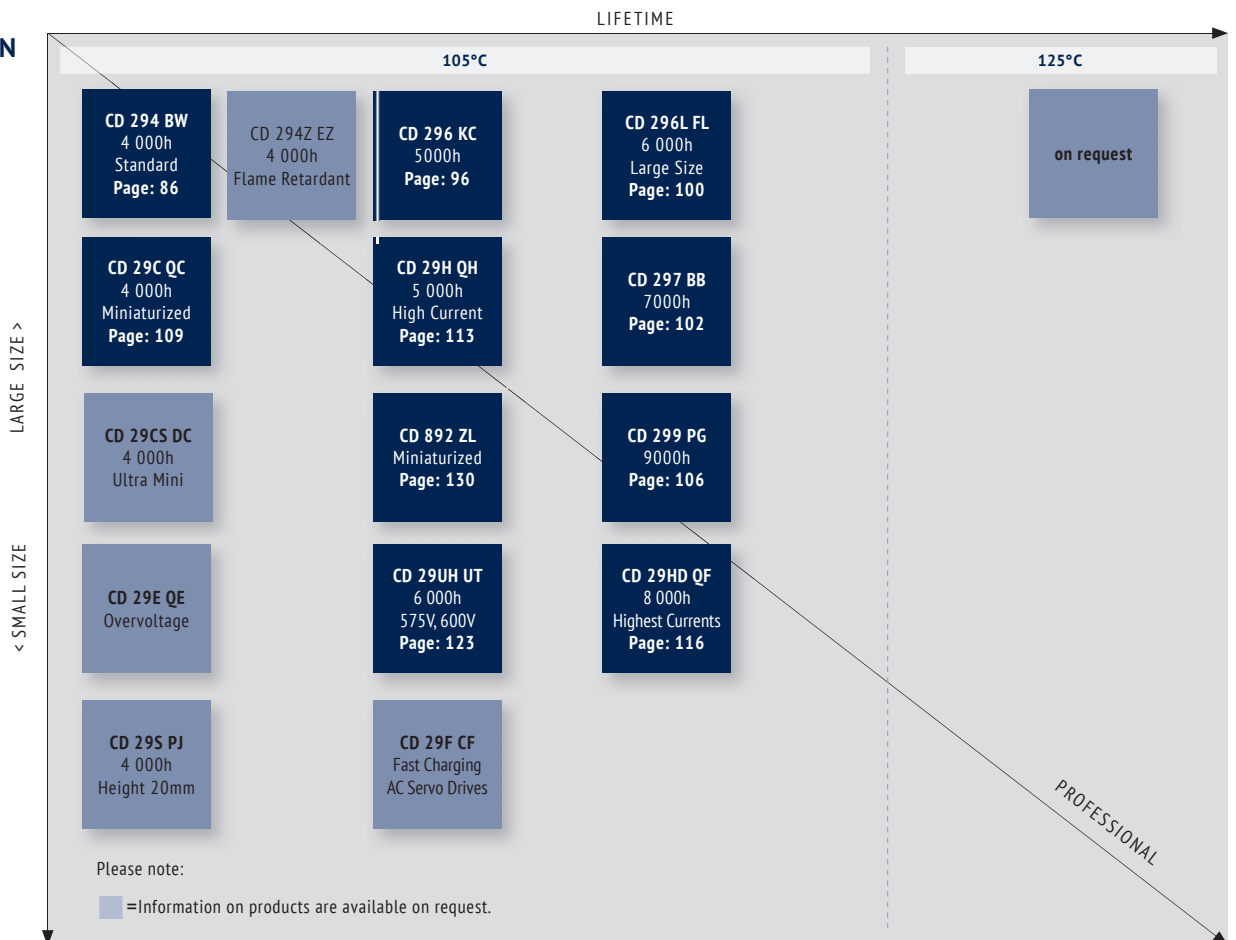
Other Terminal Styles on request.



**SNAP-IN  
85°C**



**SNAP-IN  
105°C/  
125°C**



## LIFETIME ESTIMATION OF ALUMINUM ELECTROLYTIC CAPACITORS FROM JIANGHAI

To estimate the Lifetime of a non-solid Aluminum Electrolytic Capacitor from Jianghai, the following formulas can be utilized. The Lifetime depends mainly on the ambient temperature, the ripple current and, within certain limits, the operating voltage applied. Other parameters may also affect the Lifetime. Moreover,  $L_0$  can be interpreted in many different ways, which has a fundamental influence on the numerical result. Jianghai offers a high transparency by publishing the different typical definitions of Lifetimes in each datasheet. Lifetime estimations are approximations by nature. Please let JIANGHAI EUROPE confirm any result before using it. The formulas given here do not constitute part of a contract nor of a specification. The formulas do not cover additional aging effects of certain electrolytic systems or other chemical effects. Also the dimensions of the components may have an effect. Forced cooling or other additional cooling-methods have a strong impact on the Lifetime and are not covered by the formulas as defined. For the estimation and interpretation of Lifetime, a close collaboration with JIANGHAI EUROPE is strongly advised.

### STRUCTURAL FORMULA

$$L = L_0 \cdot K_T \cdot K_R \cdot K_V$$

WHERE:

- L Total Lifetime
- $L_0$  Lifetime under Nominal Load at Upper Category Temperature (see catalogue)
- $K_T$  Temperature Factor
- $K_R$  Ripple Current Factor
- $K_V$  Voltage Factor

### $K_T$ TEMPERATURE FACTOR

Aluminum Electrolytic Capacitors follow roughly the 10 K rule of Arrhenius. It is possible to estimate the Lifetime by rule of thumb: When the operational temperature is reduced by 10 K, the Lifetime will double. The formula for  $K_T$  in detail is:

$$K_T = 2^{\frac{T_0 - T_A}{10K}}$$

WHERE:

- $T_0$  Rated Temperature
- $T_A$  Ambient Temperature

### $K_R$ RIPPLE CURRENT FACTOR

To estimate the influence of ripple current on lifetime, Jianghai uses a safety factor  $K_i$ . Under certain conditions this value can be set to  $K_i=2$ , which is prolonging the lifetime. Please contact Jianghai Europe for details and approval.

$$K_R = K_i^A \frac{\Delta T_0}{10K}$$

WITH:

$$A = 1 - \left( \frac{I_A}{I_R} \right)^2$$

WHERE:

- $I_A$  Actual Rated Ripple Current
- $I_R$  Ripple Current at Upper Category Temperature (databook value)
- $\Delta T_0$  Core Temperature Rise of the capacitor (typically 3,5 ~ 5 K for  $T_0 = 105^\circ\text{C}$  and 3,5 ~ 10K for  $T_0 = 85^\circ\text{C}$ , see databook value)
- $K_i$  Basis, typically defined as
 

$T_0 = 105^\circ\text{C}$	$I_A > I_R$ :	$K_i=4$
	$I_A \leq I_R$ :	$K_i=2$
$T_0 = 85^\circ\text{C}$		$K_i=2$



*Remark: Safety Factor  $K_i$  may be set as  $K_i=2$  under certain defined conditions. Please contact Jianghai Europe for approval.*

### $K_V$ VOLTAGE FACTOR

For Radial Electrolytic Capacitors, this part of the formula has no impact ( $K_V = 1$ ). But for some bigger capacitors like Snap-In and Screw-Terminal types with rated voltages above 160V, the operating voltage will affect their Lifetime. It is expressed as follows:

FOR:

$$0,6 \leq \frac{U_A}{U_R} \leq 1$$

$$K_V = \left( \frac{U_A}{U_R} \right)^{-2,5}$$

WHERE:

- $U_A$  Actual Operating Voltage
- $U_R$  Rated Voltage

FOR:

$$0 < \frac{U_A}{U_R} < 0,6$$

$$K_V = 3,59$$

FOR:

$$\frac{U_A}{U_R} > 1 \text{ not allowed}$$

$$K_V = 1$$

FOR: Radial Capacitors or  $U_R \leq 160V$

$$K_V = 1$$

### FREQUENCY CORRECTION FACTORS:

If the actual Ripple Currents are not given at the same frequency like  $I_{\sigma}$ , correction factors need to be applied.

$$I_A = \sqrt{\left(\frac{I_{f1}}{F_{f1}}\right)^2 + \left(\frac{I_{f2}}{F_{f2}}\right)^2 + \dots + \left(\frac{I_{fn}}{F_{fn}}\right)^2}$$

### JIANGHAI ELECTROLYTIC CAPACITOR LIFETIME

#### ESTIMATION FORMULA (incl. Safety Factors):

$$L = L_0 \cdot 2^{\frac{T_0 - T_A}{10K}} \cdot K_i \left[ 1 - \left(\frac{I_A}{I_R}\right)^2 \right]^{\frac{\Delta T_0}{10K}} \cdot \underbrace{\left(\frac{U_A}{U_R}\right)^{-n}}_{K_V}$$

WITH TYPICAL VALUES:

$$T_0 = 105^\circ\text{C} \quad I_A > I_R : K_i = 4$$

$$I_A \leq I_R : K_i = 2$$

$$T_0 = 85^\circ\text{C} \quad K_i = 2$$

$\Delta T_0 =$  depending on the series: 3,5~10K,  
see databook value

$$0,6 \leq \frac{U_A}{U_R} \leq 1 \rightarrow n = 2,5$$

$$0 < \frac{U_A}{U_R} < 0,6 \rightarrow K_V = \left(\frac{U_A}{U_R}\right)^{-n} = 3,59$$

For  $U_R \leq 160V$ , Radial and

$$\frac{U_A}{U_R} > 1 \rightarrow K_V = 1$$

## HANDLING PRECAUTIONS FOR ALUMINUM ELECTROLYTIC CAPACITORS FROM JIANGHAI

### WARNING

JIANGHAI is not liable for any extent of possible injuries or damages to persons or things, of any kind, caused by the improper application of and/or operating conditions harmful to electrolytic capacitors. Misapplications which may cause failures include, but are not limited to: ripple current or peak current or voltage above specification, operating voltage above surge voltage specified, temperature exposure outside the specified operating temperature range. Examples of harmful operating conditions comprise, but are not limited to: unusual storage or transport temperatures, excessive and/or rapid changes of ambient temperature or humidity, heavy mechanical shock or vibration, corrosive and abrasive particles in the ambient (cooling) air, conducting dust in the ambient (cooling) air, oil or water vapor or corrosive substances, explosive gas or dust, operation under extremely high or low ambient pressure conditions (below or above sea level), superimposed radio frequency voltages, radioactivity. In case of doubt about the impact of operating conditions on capacitor performance, please contact JIANGHAI.

### PERSONAL SAFETY

Electrical or mechanical misapplication of electrolytic capacitors may be hazardous. Personal injury or property damage may result from explosion of a capacitor or from the expulsion of electrolyte due to mechanical disruption or the release of a safety vent of a capacitor. In case of injury or skin or eye exposure to electrolyte, immediately seek professional medical advice. Before using electrolytic capacitors in any application, please read these Handling Precautions, familiarizing thoroughly with the information contained herein. Please check before using any of our electrolytic capacitors if these components fulfill the requirements of your application and that warnings and instructions for use are followed.

### WARRANTY

The information contained in this catalogue does not form part of any quotation or contract, is believed to be accurate, reliable and up to date. Quality data are based on the statistical evaluations of a large quantity of parts and do not constitute a guarantee in a legal sense. However, agreement on these specifications does mean that the customer may claim for replacement of individual defective capacitors within the terms of delivery. We will not assume any liability beyond the replacement of defective components. This applies in particular to any consequential damage caused by component failure. Furthermore it must be taken into consideration that the figures stated for lifetime, failure rates and outlier percentages refer to the average production status and are therefore to be understood as mean values (statistic expectations) for a large number of delivery lots of identical capacitors. These figures are based on application experience and data obtained from preceding tests under normal conditions, or – for purpose of accelerated aging – more severe conditions. JIANGHAI reserves the right to change these specifications without prior notice. Any application information given is advisory and does not form part of any specification. The products are not primarily designed for use in life support applications, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. JIANGHAI customers using or selling these products for use in such applications without prior written consent of JIANGHAI do so at their own risk and agree fully to indemnify JIANGHAI for any damage resulting from such improper use or sale. This version of the catalogue supersedes all previous versions. Latest versions of datasheets can be found on our homepage: [www.jianghai-europe.com](http://www.jianghai-europe.com). For more details on precautions and guidelines for aluminum electrolytic capacitors, please refer to CENELEC Technical Report CLC/TR 50454:2008 E, "Guide for the application of aluminum electrolytic capacitors".

### POLARITY

Electrolytic capacitors are polar and shall never be used with incorrect polarity, as there is a possible danger of shorting or destruction.

### RATED VOLTAGE $U_R$

The rated voltage is marked on the capacitor and defined in the datasheets as  $U_R$ . This voltage should never be exceeded and is the maximum peak voltage including any ripple voltages allowed to avoid a shortening of the lifetime or damage of the capacitor. When a ripple current is applied to the capacitor, the sum of the peak ripple voltage and bias DC voltage shall never exceed the rated voltage. It might be necessary to lower the maximum allowed bias DC voltage, when certain ripple currents are applied to the capacitor.

### SURGE VOLTAGE

Maximum voltage, which may be applied to the capacitor for short periods of time: max. 1000 cycles of 30 sec. per 6 min., max. 5 pulses per hour. Capacitance drift +/- 15% max.

### REVERSE VOLTAGE

Reverse voltages or voltages < 0V are not allowed.

## RECOVERY VOLTAGE

Electric potential between the positive and negative terminal may exist as a result of dielectric absorption. Please take action that this load does not damage other devices or scare workers during the production process (sparks possible). If needed please discharge the capacitor through a 1kΩ resistor.

## TEMPERATURE RANGE

Use electrolytic capacitors only within the specified operating temperature range.

## OVER-CURRENT

Currents exceeding the rated ripple currents should be avoided.

## RIPPLE CURRENT/VOLTAGE

The combined value of DC voltage and peak AC voltage (due to ripple current) shall not exceed the rated voltage and shall never be < 0V. Use of aluminum electrolytic capacitors under ripple current with wide amplitudes is equivalent to rapid charge-discharge operation.

## RAPID CHARGING/DISCHARGING

Rapid charging/discharging generates severe heat and gas may be emitted which may lead to explosion. Consult JIANGHAI about specially designed capacitors suitable for such kind of applications. Example: Servo Drive Application

## BALANCING RESISTORS

Balancing resistors should be utilized if capacitors are used in serial connection. Please choose low-tolerance resistors to limit voltage drift.

## CHARGE-DISCHARGE PROOF

JIANGHAI capacitors are charge-discharge proof, which means that 10<sup>6</sup> switching cycles will cause capacitance reduction of less than 10%.

## LIFETIME

There are many different lifetime definitions known without any true standard definition. Take special care when capacitors are compared that the capacitors fulfill the needed requirements. JIANGHAI publishes all conditions to be as transparent as possible. In the case of lifetime tests with additional ripple currents, the bias DC voltage must be reduced, so that the sum of bias DC voltage and the peak of the ripple voltage does not exceed the Rated Voltage  $U_R$ .

**Load life:** Period of time, during which the technical parameters of all capacitors stay within the given limits. JIANGHAI defines this without allowing for outliers.

**Useful life:** Defined like load life, but with a larger range of parameter change.

**Endurance test:** IEC 60384-4 defines the acceptable drift criteria of electrical parameters after the endurance tests (continuous voltage test).

**Shelf Life:** Definition of time with acceptable drift of capacitor parameters after storage at upper category temperature without load.

## VIBRATION AND MECHANICAL STRESS

Capacitors are sensitive to vibration and mechanical forces applied on the leads. Do not use capacitors, which have been dropped onto a rigid surface.

## INSULATION

If any defect of the sleeve is visible, the component should not be used – the same holds for any kind of visible damage. A capacitor should be electrically isolated from the following parts: aluminum case, cathode lead wire, anode lead wire and circuit pattern, and auxiliary terminal of snap-in type. The sleeve is not recognized as an isolator and therefore the standard capacitor should not be used in a place where insulation function is needed. Please contact JIANGHAI if a higher grade of insulation is required.

## ENVIRONMENTAL CONDITIONS

Avoid direct contact with water, salt solution, oil, dewing conditions. Halogens generally, especially fumigation treatment with bromides and flame retardant agents containing halogens must be avoided. Avoid exposing to direct sunshine, ozone, ultraviolet rays and x-ray radiation. Air Pressure: Max. 150kPa, min. 8kPa. For usage >2000m altitude above sea level current deratings might be necessary. No heavy air pressure changes are allowed. Do not use or store in an environment containing any hazardous gas (e.g., hydrogen sulphide, sulphurous acid, nitrous acid, chlorine, ammonia, bromine, methyl bromide, other halogens) or acidic or alkaline solutions.

## STORAGE

Temperature 5 to 35°C, relative humidity below 75%. Electrolytic capacitors may accumulate charge naturally during storage. In this case discharge through a 1kOhm resistor before use (Recovery voltage). Leakage current may be increased after long storage time. In this case the capacitor should be subjected to the rated voltage treatment through a 1kOhm resistor before use for 1 hour, then it should be discharged through a resistor of about 1 Ohm/Volt. Storage times above 1 year should be avoided or rated voltage treatment may be necessary. In accordance to IEC 60384-4 electrolytic capacitors are subject to a reforming process before acceptance testing. Rated voltage is applied via a series resistance (100Ω:  $U_R \leq 100VDC$ , 1kΩ:  $U_R > 100VDC$ ).

## SOLDERING

Soldering conditions (temperature, times) should be within specified conditions, especially for SMD components. Avoid high soldering temperatures as this may reduce lifetime or damage the capacitor. Do never dip the capacitor body into molten solder. Flux should not be adhered to the capacitor's body but only to its terminals. For details and different methods please contact us.

## GLUEING, CLEANING AND COATING

Do not use fixing agents or cleaning substances containing halogens. Do not use coating and moulding components that completely seal the capacitor from the environment. Also, never use solvents containing: halogenated hydrocarbons, alkali, petroleum, trichloroethylene/-ethane, xylene, acetones, trichlorotrifluoroethane, tetrachloroethylene, methylenechloride, chloroform, acetates, ketones, esters, chlorides and bromides.

## MOUNTING

Other devices, which are mounted near the capacitor, should not touch the capacitor. Additional heat coming from other components near the capacitor may reduce the lifetime of the capacitor. Do never bend or twist the capacitor after soldering to avoid stress on the leads. Radial capacitors are not protected against mechanical forces on the leads. Forces on the pins might damage the capacitor. No printed circuit board tracks are allowed between the lead pads of the capacitor. Screw Terminal capacitors should only be mounted in an upright position.

## TRANSPORT

Avoid fumigation and spraying insecticides (especially with bromides) in the import or export procedures which can cause corrosion. This applies also to the finished devices.

## MAINTENANCE

Periodical inspection should be carried out for the capacitor: visual inspection to check pressure relief open or leakage of electrolyte, electrical characteristics as leakage current, capacitance, and dissipation factor.

## ELECTROLYTE AND SEPARATOR PAPER

Electrolyte and separator paper used in aluminum capacitors may be flammable. Also, electrolyte is electrically conductive. Therefore, in case electrolyte gets in contact with PC board it may cause corrosion of circuit pattern or cause short circuit between patterns, and may lead to smoke generation or ignition in worst case.

## CAUTION DURING USE OF CAPACITORS

Do not touch the terminals of capacitors. Keep the capacitor free from conductive solution, such as acids, alkali and so on. Ensure that the operating environment of the equipment into which the capacitor has been built is within the specified conditions mentioned in the catalogue or specification sheets.

## SAFETY VENT

The safety vent needs some free space to open properly. Allow for free headroom of at least 2mm for diameter  $\leq 16mm$ , more than 3mm for diameter 18-35mm, more than 5mm for case diameter 40mm and larger.

## EMERGENCY ACTIONS

When the pressure relief vent is open and some gas blows out from the capacitor, please turn the main switch of the equipment off or pull out the plug from the power outlet immediately. During safety vent operation, extremely hot gas (>100°C) may blow out of the capacitors. Do not stand close to the capacitors. In case of eye contact, rinse the open eye(s) with clean water immediately. In case of ingestion, gargle with water immediately, do not swallow. Do not touch electrolyte but wash skin with soap and water in case of skin contact.

## DEFINITION OF ELECTRICAL PARAMETERS

Separate documents as application notes, equivalent circuit diagrams and so on are available on request.

## PACKAGING

Please refer to the data book for details. Further information is available on request.

## DISPOSAL

Scrapped capacitors are classified as scrapped metal. For disposal they are handled as controllable industrial waste because of the nature of the contents (electrolyte). Most of the material is aluminum and cannot be completely burned.

*Jianghai Europe Electronic Components GmbH*

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