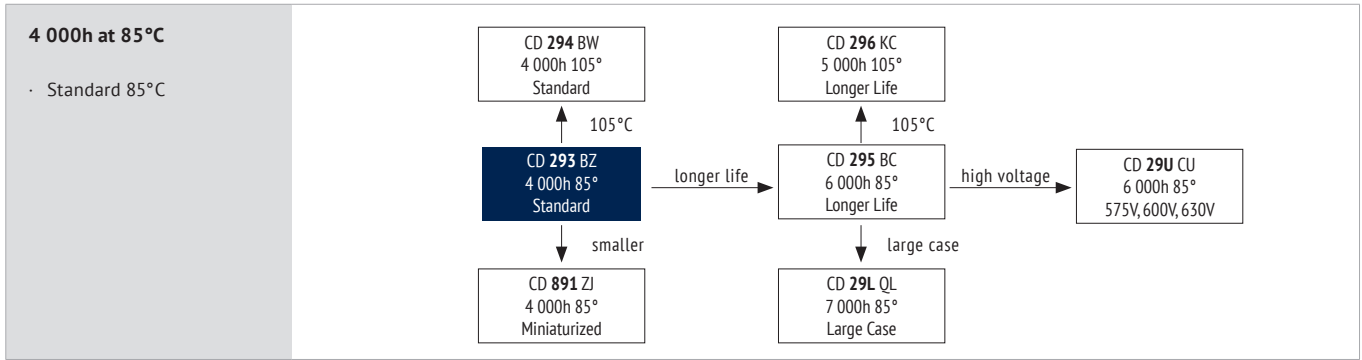


ALUMINUM ELECTROLYTIC CAPACITORS · SNAP-IN TYPE

# CD 293 BZ SERIES



**ITEM CHARACTERISTICS**

Operating Temperature Range (°C)	-40 ~ +85	-25 ~ +85
Voltage Range (V)	10 ~ 400	420 ~ 500
Capacitance Range (µF)	68 ~ 82 000	
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)	10	16-35	50-100	160-200	250-400	420-500
	Z <sub>-25°C</sub> / Z <sub>+20°C</sub>		5	4	3		4
Z <sub>-40°C</sub> / Z <sub>+20°C</sub>		18	15	10	6	8	-

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	4 000h	> 65 000h	2 000h	3 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 ± 15% of initial value	Within ± 20% of initial value	Within ± 15% of initial value	
Dissipation Factor	Not more than 300% of specified value		Not more than 150% of specified value	Not more than 200% of specified value	Not more than 150% of specified value	
Condition:						
Applied Voltage	U <sub>R</sub>	U <sub>R</sub>	U <sub>R</sub>	U <sub>R</sub>	U <sub>R</sub> = 0	After test: U <sub>R</sub> to be applied for 30 min > 24h before measurement
Applied Current	I <sub>R</sub>	1,2 x I <sub>R</sub>	I <sub>R</sub>	I <sub>R</sub> = 0	I <sub>R</sub> = 0	
Applied Temperature	85°C	40°C	85°C	85°C	85°C	
				IEC 60384		

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

Rated Voltage (V)	Frequency					
	50Hz	120Hz	300Hz	1kHz	10kHz	100kHz
≤ 50	0,88	1,00	1,07	1,15	1,15	1,15
63 - 100	0,80	1,00	1,17	1,32	1,45	1,50
≥ 160	0,80	1,00	1,16	1,30	1,41	1,43

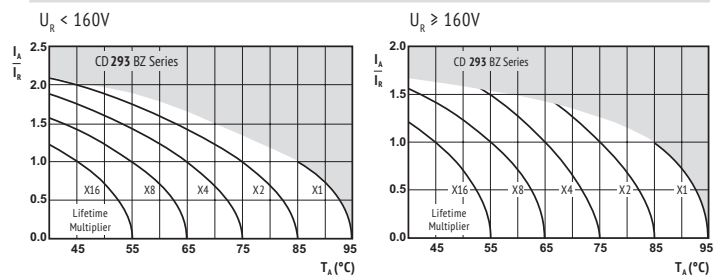
Multipliers for typical operating conditions.

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

**ENVIRONMENTAL**

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

**MULTIPLIER FOR LIFETIME (LIFETIME DIAGRAM)**



I<sub>A</sub> = actual ripple current at 120Hz,  
I<sub>R</sub> = rated ripple current at 120Hz, 85°C  
Multiplier of Useful Life as a function of ambient temperature & ripple current load

I<sub>A</sub> = actual ripple current at 120Hz,  
I<sub>R</sub> = rated ripple current at 120Hz, 85°C  
Multiplier of Useful Life as a function of ambient temperature & ripple current load

**! 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 85°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 5
<b>10</b> <b>(13)</b> <b>1A</b>	18 000	30	24	0,40	1,5	3,60	25x30	ECS1ABZ183M◇◇△△2530
	22 000	25	20	0,40	1,5	4,00	22x40	ECS1ABZ223M◇◇△△2240
		25	20	0,40	1,5	4,10	25x35	ECS1ABZ223M◇◇△△2535
	33 000	17	13	0,40	1,5	4,60	25x40	ECS1ABZ333M◇◇△△2540
		17	13	0,40	1,5	4,80	30x30	ECS1ABZ333M◇◇△△3030
	39 000	14	10,9	0,40	1,5	5,20	25x45	ECS1ABZ393M◇◇△△2545
		14	10,9	0,40	1,5	5,30	30x35	ECS1ABZ393M◇◇△△3035
	47 000	12	9,1	0,40	1,5	6,00	30x40	ECS1ABZ473M◇◇△△3040
		12	9,1	0,40	1,5	6,00	35x30	ECS1ABZ473M◇◇△△3530
	56 000	9,5	7,6	0,40	1,5	6,80	35x35	ECS1ABZ563M◇◇△△3535
	68 000	7,9	6,3	0,40	1,5	7,70	35x40	ECS1ABZ683M◇◇△△3540
	82 000	6,5	5,2	0,40	1,5	8,70	35x45	ECS1ABZ823M◇◇△△3545

<b>16</b> <b>(20)</b> <b>1C</b>	15 000	36	29	0,40	1,5	3,30	22x40	ECS1CBZ153M◇◇△△2240
		36	29	0,40	1,5	3,30	25x30	ECS1CBZ153M◇◇△△2530
	18 000	30	24	0,40	1,5	3,80	22x45	ECS1CBZ183M◇◇△△2245
		30	24	0,40	1,5	3,70	25x35	ECS1CBZ183M◇◇△△2535
	22 000	25	20	0,40	1,5	4,20	25x40	ECS1CBZ223M◇◇△△2540
		25	20	0,40	1,5	4,20	30x30	ECS1CBZ223M◇◇△△3030
	27 000	20	16	0,40	1,5	5,00	25x45	ECS1CBZ273M◇◇△△2545
		20	16	0,40	1,5	5,00	30x35	ECS1CBZ273M◇◇△△3035
	33 000	17	13	0,40	1,5	5,60	35x30	ECS1CBZ333M◇◇△△3530
	39 000	14	11	0,40	1,5	6,30	35x35	ECS1CBZ393M◇◇△△3535
	47 000	12	9,1	0,40	1,5	7,20	35x40	ECS1CBZ473M◇◇△△3540
	56 000	9,5	7,6	0,40	1,5	8,00	35x45	ECS1CBZ563M◇◇△△3545

<b>25</b> <b>(32)</b> <b>1E</b>	10 000	47	38	0,35	1,5	2,90	22x40	ECS1EBZ103M◇◇△△2240
		47	38	0,35	1,5	2,80	25x30	ECS1EBZ103M◇◇△△2530
	12 000	39	31	0,35	1,5	3,20	25x35	ECS1EBZ123M◇◇△△2535
		39	31	0,35	1,5	3,40	30x30	ECS1EBZ123M◇◇△△3030
	15 000	31	25	0,35	1,5	3,70	25x40	ECS1EBZ153M◇◇△△2540
		31	25	0,35	1,5	3,90	35x25	ECS1EBZ153M◇◇△△3525
	18 000	26	21	0,35	1,5	4,20	30x35	ECS1EBZ183M◇◇△△3035
		26	21	0,35	1,5	4,40	35x30	ECS1EBZ183M◇◇△△3530
	22 000	22	17	0,35	1,5	5,00	35x35	ECS1EBZ223M◇◇△△3535
	33 000	15	12	0,35	1,5	6,50	35x40	ECS1EBZ333M◇◇△△3540
	39 000	12	10	0,35	1,5	7,50	35x45	ECS1EBZ393M◇◇△△3545
	47 000	10	8	0,35	1,5	8,80	35x50	ECS1EBZ473M◇◇△△3550

<b>35</b> <b>(44)</b> <b>1V</b>	5 600	72	57	0,30	1,5	2,30	22x35	ECS1VBZ562M◇◇△△2235
		72	57	0,30	1,5	2,30	25x30	ECS1VBZ562M◇◇△△2530
	6 800	59	47	0,30	1,5	2,90	22x40	ECS1VBZ682M◇◇△△2240
		59	47	0,30	1,5	2,60	25x35	ECS1VBZ682M◇◇△△2535
	8 200	57	46	0,35	1,5	2,80	25x40	ECS1VBZ822M◇◇△△2540
		57	46	0,35	1,5	2,80	30x30	ECS1VBZ822M◇◇△△3030
	10 000	47	38	0,35	1,5	3,20	30x35	ECS1VBZ103M◇◇△△3035
	12 000	39	31	0,35	1,5	3,60	35x30	ECS1VBZ123M◇◇△△3530
	15 000	31	25	0,35	1,5	4,10	35x35	ECS1VBZ153M◇◇△△3535
	18 000	26	21	0,35	1,5	4,70	35x40	ECS1VBZ183M◇◇△△3540
	22 000	22	17	0,35	1,5	5,30	35x45	ECS1VBZ223M◇◇△△3545
	27 000	18	14	0,35	1,5	7,00	35x50	ECS1VBZ273M◇◇△△3550

<b>50</b> <b>(63)</b> <b>1H</b>	3 900	86	69	0,25	1,5	2,10	25x30	ECS1HBZ392M◇◇△△2530
		71	57	0,25	1,5	2,40	22x40	ECS1HBZ472M◇◇△△2240
	4 700	71	57	0,25	1,5	2,40	25x35	ECS1HBZ472M◇◇△△2535
		72	57	0,30	1,5	2,50	25x40	ECS1HBZ562M◇◇△△2540
	5 600	72	57	0,30	1,5	2,50	30x30	ECS1HBZ562M◇◇△△3030
		59	47	0,30	1,5	2,80	25x45	ECS1HBZ682M◇◇△△2545
	6 800	59	47	0,30	1,5	2,80	30x35	ECS1HBZ682M◇◇△△3035
		57	46	0,35	1,5	3,00	30x40	ECS1HBZ822M◇◇△△3040
	8 200	57	46	0,35	1,5	3,00	35x30	ECS1HBZ822M◇◇△△3530
		47	38	0,35	1,5	3,40	35x35	ECS1HBZ103M◇◇△△3535
	12 000	39	31	0,35	1,5	3,80	35x40	ECS1HBZ123M◇◇△△3540
	15 000	31	25	0,35	1,5	4,50	35x50	ECS1HBZ153M◇◇△△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 85°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 5	
<b>63</b> <b>(79)</b> <b>1J</b>	2 700	74	59	0,15	1,5	2,30	25x30	ECS1JBZ272M◇◇△△2530	
		3 300	81	65	0,20	1,5	2,30	22x40	ECS1JBZ332M◇◇△△2240
			81	65	0,20	1,5	2,30	25x35	ECS1JBZ332M◇◇△△2535
	3 900	69	55	0,20	1,5	2,60	25x40	ECS1JBZ392M◇◇△△2540	
		69	55	0,20	1,5	2,60	30x30	ECS1JBZ392M◇◇△△3030	
	4 700	56	45	0,20	1,5	3,00	25x45	ECS1JBZ472M◇◇△△2545	
		57	45	0,20	1,5	3,00	30x30	ECS1JBZ472M◇◇△△3030	
	5 600	48	38	0,20	1,5	3,30	35x30	ECS1JBZ562M◇◇△△3530	
	6 800	40	32	0,20	1,5	3,70	35x35	ECS1JBZ682M◇◇△△3535	
	8 200	41	33	0,25	1,5	3,80	35x40	ECS1JBZ822M◇◇△△3540	
	10 000	34	27	0,25	1,5	4,30	35x45	ECS1JBZ103M◇◇△△3545	
	12 000	28	23	0,25	1,5	4,80	35x50	ECS1JBZ123M◇◇△△3550	

<b>80</b> <b>(100)</b> <b>1K</b>	1 800	111	89	0,15	1,4	1,90	25x30	ECS1KBZ182M◇◇△△2530
		91	73	0,15	1,5	2,20	25x35	ECS1KBZ222M◇◇△△2535
	2 200	91	73	0,15	1,5	2,20	30x25	ECS1KBZ222M◇◇△△3025
		74	59	0,15	1,5	2,50	25x40	ECS1KBZ392M◇◇△△2540
	2 700	74	59	0,15	1,5	2,50	30x30	ECS1KBZ272M◇◇△△3030
		61	49	0,15	1,5	2,80	25x45	ECS1KBZ332M◇◇△△2545
	3 300	61	49	0,15	1,5	2,80	30x35	ECS1KBZ332M◇◇△△3035
		52	41	0,15	1,5	3,10	25x50	ECS1KBZ392M◇◇△△2550
	3 900	52	41	0,15	1,5	3,20	35x30	ECS1KBZ392M◇◇△△3530
		4 700	43	34	0,15	1,5	3,60	35x35
	5 600	48	38	0,20	1,5	4,10	35x40	ECS1KBZ562M◇◇△△3540
	6 800	40	32	0,20	1,5	4,10	35x45	ECS1KBZ682M◇◇△△3545
8 200	41	33	0,20	1,5	4,70	35x50	ECS1KBZ822M◇◇△△3550	
10 000	34	27	0,25	1,5	5,20	35x50	ECS1KBZ103M◇◇△△3550	
12 000	28	23	0,25	1,5	5,80	35x55	ECS1KBZ123M◇◇△△3555	

<b>100</b> <b>(125)</b> <b>2A</b>	1 200	166	133	0,15	1,2	1,60	25x30	ECS2ABZ122M◇◇△△2530
		133	107	0,15	1,5	1,80	22x40	ECS2ABZ152M◇◇△△2240
		133	107	0,15	1,5	1,70	25x35	ECS2ABZ152M◇◇△△2535
	1 800	111	89	0,15	1,5	2,00	25x40	ECS2ABZ182M◇◇△△2540
		111	89	0,15	1,5	2,10	30x30	ECS2ABZ182M◇◇△△3030
	2 200	91	73	0,15	1,5	2,30	30x35	ECS2ABZ222M◇◇△△3035
		91	73	0,15	1,5	2,50	35x30	ECS2ABZ222M◇◇△△3530
	2 700	74	59	0,15	1,5	2,60	25x50	ECS2ABZ272M◇◇△△2550
		74	59	0,15	1,5	2,70	30x40	ECS2ABZ272M◇◇△△3040
	3 300	61	49	0,15	1,5	3,10	35x35	ECS2ABZ332M◇◇△△3535
	3 900	52	41	0,15	1,5	3,40	35x40	ECS2ABZ392M◇◇△△3540
	4 700	43	34	0,15	1,5	4,00	35x50	ECS2ABZ472M◇◇△△3550

<b>160</b> <b>(200)</b> <b>2C</b>	470	283	226	0,10	0,8	1,60	25x30	ECS2CBZ471M◇◇△△2530
		237	190	0,10	0,9	1,90	22x35	ECS2CBZ561M◇◇△△2235
	560	237	190	0,10	0,9	1,90	25x30	ECS2CBZ561M◇◇△△2530
		196	157	0,10	1,1	2,10	22x40	ECS2CBZ681M◇◇△△2240
	680	196	157	0,10	1,1	2,20	25x35	ECS2CBZ681M◇◇△△2535
		162	130	0,10	1,3	2,40	25x40	ECS2CBZ821M◇◇△△2540
	820	162	130	0,10	1,3	2,50	30x30	ECS2CBZ821M◇◇△△3030
		133	107	0,10	1,5	2,80	30x35	ECS2CBZ102M◇◇△△3035
	1 000	160	128	0,12	1,5	2,70	35x30	ECS2CBZ102M◇◇△△3530
		1 200	133	107	0,12	1,5	3,00	35x35
	1 500	107	85	0,12	1,5	3,50	35x40	ECS2CBZ152M◇◇△△3540
	1 800	89	71	0,12	1,5	3,90	35x45	ECS2CBZ182M◇◇△△3545
2 200	73	58	0,12	1,5	4,50	35x50	ECS2CBZ222M◇◇△△3550	

<b>180</b> <b>(225)</b> <b>2K</b>	680	196	157	0,10	1,2	2,20	25x40	ECS2KBZ681M◇◇△△2540
		196	157	0,10	1,2	2,30	30x30	ECS2KBZ681M◇◇△△3030
	820	162	130	0,10	1,5	2,60	30x35	ECS2KBZ821M◇◇△△3035
		195	156	0,12	1,5	2,50	35x30</	

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 85°C 120Hz	Size øD x L	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 5
(V)	(µF)	(mΩ)	(mΩ)		(mA)	(Arms)	(mm)	
<b>200 (250) 2D</b>	390	341	273	0,10	0,8	1,60	25x30	ECS2DBZ391M◇◇△△2530
		283	226	0,10	0,9	1,70	22x35	ECS2DBZ471M◇◇△△2235
		283	226	0,10	0,9	1,90	30x25	ECS2DBZ471M◇◇△△3025
	560	237	190	0,10	1,1	2,00	25x35	ECS2DBZ561M◇◇△△2535
		237	190	0,10	1,1	2,10	30x30	ECS2DBZ561M◇◇△△3030
		196	157	0,10	1,4	2,30	25x40	ECS2DBZ681M◇◇△△2540
	680	196	157	0,10	1,4	2,40	30x35	ECS2DBZ681M◇◇△△3035
		162	130	0,10	1,5	2,70	30x40	ECS2DBZ821M◇◇△△3040
	820	195	156	0,12	1,5	2,50	35x30	ECS2DBZ821M◇◇△△3530
		160	128	0,12	1,5	2,80	35x35	ECS2DBZ102M◇◇△△3535
	1 200	135	107	0,12	1,5	3,20	35x40	ECS2DBZ122M◇◇△△3540
	1 500	107	85	0,12	1,5	3,80	35x50	ECS2DBZ152M◇◇△△3550

<b>250 (300) 2E</b>	330	603	483	0,15	0,8	1,40	22x40	ECS2EBZ331M◇◇△△2240
		603	483	0,15	0,8	1,40	25x30	ECS2EBZ331M◇◇△△2530
	390	511	409	0,15	1,0	1,60	22x45	ECS2EBZ391M◇◇△△2245
		511	409	0,15	1,0	1,60	25x35	ECS2EBZ391M◇◇△△2535
	470	424	339	0,15	1,2	1,80	25x40	ECS2EBZ471M◇◇△△2540
		424	339	0,15	1,2	1,80	30x30	ECS2EBZ471M◇◇△△3030
	560	356	285	0,15	1,4	2,00	25x45	ECS2EBZ561M◇◇△△2545
		356	285	0,15	1,4	2,00	30x35	ECS2EBZ561M◇◇△△3035
	680	293	235	0,15	1,5	2,30	30x40	ECS2EBZ681M◇◇△△3040
		293	235	0,15	1,5	2,30	35x30	ECS2EBZ681M◇◇△△3530
	820	243	195	0,15	1,5	2,60	30x45	ECS2EBZ821M◇◇△△3045
		243	195	0,15	1,5	2,60	35x35	ECS2EBZ821M◇◇△△3535
1 000	199	160	0,15	1,5	3,00	35x40	ECS2EBZ102M◇◇△△3540	
1 200	166	133	0,15	1,5	3,40	35x45	ECS2EBZ122M◇◇△△3545	

<b>315 (365) 2F</b>	180	1106	885	0,15	0,6	0,96	25x30	ECS2FBZ181M◇◇△△2530
		905	724	0,15	0,7	1,10	22x40	ECS2FBZ221M◇◇△△2240
	220	905	724	0,15	0,7	1,10	25x35	ECS2FBZ221M◇◇△△2535
		737	590	0,15	0,9	1,20	22x45	ECS2FBZ271M◇◇△△2245
	270	737	590	0,15	0,9	1,30	25x40	ECS2FBZ271M◇◇△△2540
		737	590	0,15	0,9	1,30	30x30	ECS2FBZ271M◇◇△△3030
	330	603	483	0,15	1,0	1,40	25x45	ECS2FBZ331M◇◇△△2545
		603	483	0,15	1,0	1,40	30x35	ECS2FBZ331M◇◇△△3035
	390	511	409	0,15	1,2	1,60	30x40	ECS2FBZ391M◇◇△△3040
		511	409	0,15	1,2	1,60	35x30	ECS2FBZ391M◇◇△△3530
	470	424	339	0,15	1,5	1,80	30x45	ECS2FBZ471M◇◇△△3045
		424	339	0,15	1,5	1,80	35x35	ECS2FBZ471M◇◇△△3535
560	356	285	0,15	1,5	2,00	30x50	ECS2FBZ561M◇◇△△3050	
	356	285	0,15	1,5	2,00	35x40	ECS2FBZ561M◇◇△△3540	
680	293	235	0,15	1,5	2,30	35x45	ECS2FBZ681M◇◇△△3545	

<b>350 (400) 2V</b>	150	1327	1062	0,15	0,5	0,94	25x30	ECS2VBZ151M◇◇△△2530
		1106	885	0,15	0,6	1,10	22x40	ECS2VBZ181M◇◇△△2240
	180	1106	885	0,15	0,6	1,10	30x25	ECS2VBZ181M◇◇△△3025
		905	724	0,15	0,8	1,20	25x35	ECS2VBZ221M◇◇△△2535
	220	905	724	0,15	0,8	1,20	30x30	ECS2VBZ221M◇◇△△3030
		737	590	0,15	0,9	1,40	25x45	ECS2VBZ271M◇◇△△2545
	270	737	590	0,15	0,9	1,40	30x35	ECS2VBZ271M◇◇△△3035
		603	483	0,15	1,2	1,60	25x50	ECS2VBZ331M◇◇△△2550
	330	603	483	0,15	1,2	1,60	35x30	ECS2VBZ331M◇◇△△3530
		511	409	0,15	1,4	1,70	30x40	ECS2VBZ391M◇◇△△3040
	390	511	409	0,15	1,4	1,80	35x35	ECS2VBZ391M◇◇△△3535
		424	339	0,15	1,5	2,00	30x45	ECS2VBZ471M◇◇△△3045
470	424	339	0,15	1,5	2,00	35x40	ECS2VBZ471M◇◇△△3540	
560	356	285	0,15	1,5	2,30	35x45	ECS2VBZ561M◇◇△△3545	
680	293	235	0,15	1,5	2,60	35x50	ECS2VBZ681M◇◇△△3550	
820	243	195	0,15	1,5	2,80	35x60	ECS2VBZ821M◇◇△△3560	

<b>400 (450) 2G</b>	150	1327	1062	0,15	0,6	0,89	25x30	ECS2GBZ151M◇◇△△2530
		1106	885	0,15	0,7	1,00	22x40	ECS2GBZ181M◇◇△△2240
	180	1106	885	0,15	0,7	1,00	25x30	ECS2GBZ181M◇◇△△2530
		905	724	0,15	0,9	1,10	22x45	ECS2GBZ221M◇◇△△2245
	220	905	724	0,15	0,9	1,20	25x40	ECS2GBZ221M◇◇△△2540
		737	590	0,15	1,1	1,30	25x45	ECS2GBZ271M◇◇△△2545

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 85°C 120Hz	Size øD x L	ORDER CODE ◇◇ = pin style & length △△ = pin number Details: Page 5
(V)	(µF)	(mΩ)	(mΩ)		(mA)	(Arms)	(mm)	
<b>400 (450) 2G</b>	270	737	590	0,15	1,1	1,50	30x30	ECS2GBZ271M◇◇△△3030
		603	483	0,15	1,3	1,60	25x45	ECS2GBZ331M◇◇△△2545
		603	483	0,15	1,3	1,70	30x35	ECS2GBZ331M◇◇△△3035
	390	511	409	0,15	1,5	1,80	25x45	ECS2GBZ391M◇◇△△2545
		511	409	0,15	1,5	1,90	30x40	ECS2GBZ391M◇◇△△3040
		470	424	339	0,15	1,5	2,10	35x35
	560	356	285	0,15	1,5	2,30	35x40	ECS2GBZ561M◇◇△△3540
		680	293	235	0,15	1,5	2,70	35x45
	820	243	194	0,15	1,5	3,10	35x50	ECS2GBZ821M◇◇△△3550
	1 000	133	107	0,15	1,5	3,70	35x60	ECS2GBZ102M◇◇△△3560
	1 200	166	89	0,15	1,5	4,20	40x60	ECS2GBZ122M◇◇△△4060
	1 500	133	71	0,15	1,5	5,00	40x70	ECS2GBZ152M◇◇△△4070
1 800	111	59	0,15	1,5	5,80	40x80	ECS2GBZ182M◇◇△△4080	

<b>420 (470) 2X</b>	120	1658	1327	0,15	0,5	0,82	25x30	ECS2XBZ121M◇◇△△2530
		1327	1062	0,15	0,6	0,96	25x30	ECS2XBZ151M◇◇△△2530
	150	1106	885	0,15	0,8	1,10	25x35	ECS2XBZ181M◇◇△△2535
		1106	885	0,15	0,8	1,20	30x30	ECS2XBZ181M◇◇△△3030
	180	905	724	0,15	0,9	1,20	25x40	ECS2XBZ221M◇◇△△2540
		905	724	0,15	0,9	1,30	30x30	ECS2XBZ221M◇◇△△3030
	220	737	590	0,15	1,1	1,30	25x45	ECS2XBZ271M◇◇△△2545
		737	590	0,15	1,1	1,40	30x35	ECS2XBZ271M◇◇△△3035
	270	603	483	0,15	1,4	1,70	30x40	ECS2XBZ331M◇◇△△3040
		511	409	0,15	1,5	1,80	30x45	ECS2XBZ391M◇◇△△3045
	390	511	409	0,15	1,5	1,90	35x35	ECS2XBZ391M◇◇△△3535
		424	339	0,15	1,5	2,00	30x45	ECS2XBZ471M◇◇△△3045
470	424	339	0,15	1,5	2,20	35x40	ECS2XBZ471M◇◇△△3540	
	560	356	285	0,15	1,5	2,40	35x45	ECS2XBZ561M◇◇△△3545
680	293	235	0,15	1,5	2,80	35x50	ECS2XBZ681M◇◇△△3550	
820	243	194	0,15	1,5	3,20	35x60	ECS2XBZ821M◇◇△△3560	
1 000	199	107	0,15	1,5	4,00	40x60	ECS2XBZ102M◇◇△△4060	

<b>450 (500) 2W</b>	120	1658	1327	0,15	0,5	0,83	25x30	ECS2WBZ121M◇◇△△2530
		1327	1062	0,15	0,7	0,95	22x45	ECS2WBZ151M◇◇△△2245
	150	1327	1062	0,15	0,7	0,95	25x35	ECS2WBZ151M◇◇△△2535
		1106	885	0,15	0,8	1,10	25x40	ECS2WBZ181M◇◇△△2540
	180	1106	885	0,15	0,8	1,10	30x30	ECS2WBZ181M◇◇△△3030
		905	724	0,15	1,0	1,20	22x50	ECS2WBZ221M◇◇△△2250
	220	905	724	0,15	1,0	1,20	25x40	ECS2WBZ221M◇◇△△2540
		905	724	0,15	1,0	1,20	30x30	ECS2WBZ221M◇◇△△3030
	270	737	590	0,15	1,2	1,40	30x30	ECS2WBZ271M◇◇△△3030
		330	603	480	0,15	1,5	1,60	30x40
	390	511	409	0,15	1,5	1,70	30x40	ECS2WBZ391M◇◇△△3040
		511	409	0,15	1,5	1,80	35x35	ECS2WBZ391M◇◇△△3535
470	424	339	0,15	1,5	2,10	30x45	ECS2WBZ471M◇◇△△3045	
	560	356	285	0,15	1,5	2,30	35x45	ECS2WBZ561M◇◇△△3545
680	293	235	0,15	1,5	2,70	35x50	ECS2WBZ681M◇◇△△3550	
820	243	194	0,15	1,5	3,20	35x60	ECS2WBZ821M◇◇△△3560	
1 000	133	107	0,15	1,5	4,20	35x70	ECS2WBZ102M◇◇△△3570	
1 200	166	89	0,15	1,5	4,40	40x70	ECS2WBZ122M◇◇△△4070	
1 500	133	71	0,15	1,5	5,20	40x80	ECS2WBZ152M◇◇△△4080	
1 800	111	59	0,15	1,5	6,30	40x100	ECS2WBZ182M◇◇△△40100	

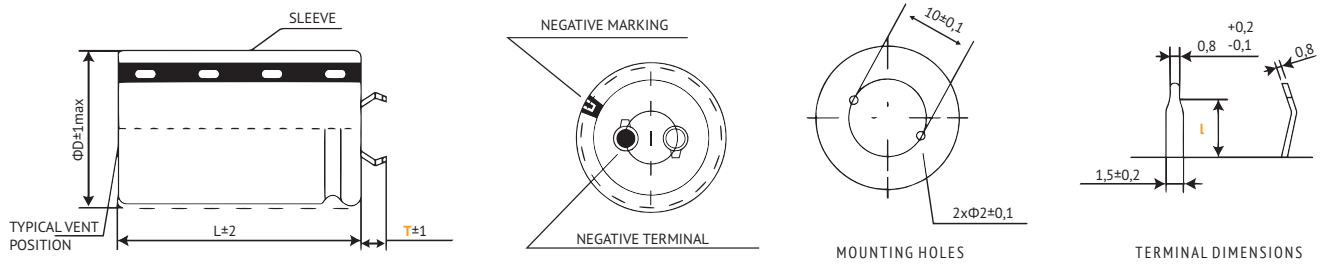
<b>500 (550) 2H</b>	100	1990	1592	0,15	0,5	0,75	25x30	ECS2HBZ101M◇◇△△2530
		120	1658	1327	0,15	0,6	0,83	25x30
	150	1327	1062	0,15	0,8	0,95	30x30	ECS2HBZ151M◇◇△△3030

**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 0R1	±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



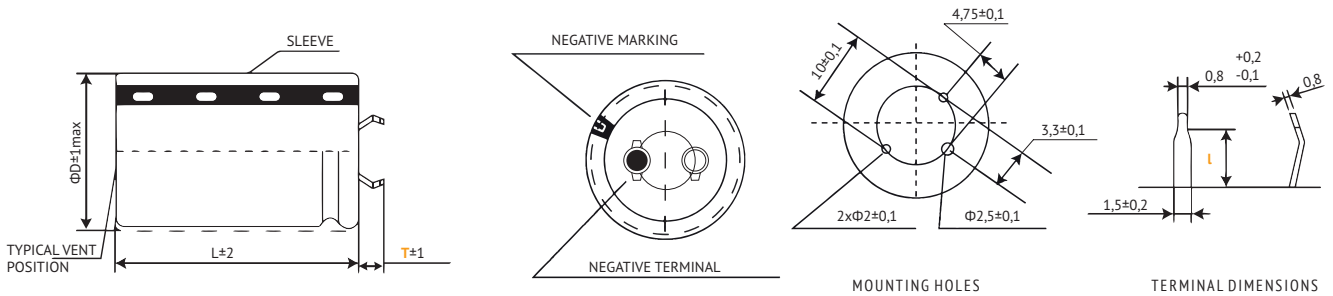
Standard Version: Self-Lock Terminal. Other terminal types and styles on request.  
For diameter  $\phi D \geq 45\text{mm}$  the safety vent is typically placed at the side of the housing.

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

## 3 PIN TYPE: T4P3



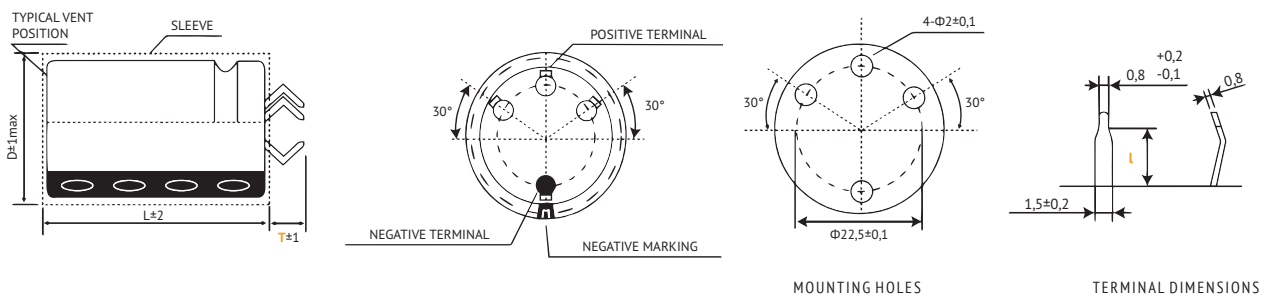
For diameter  $\phi D \geq 45\text{mm}$  the safety vent is typically placed at the side of the housing.

Terminal	T6	T4
Pin Length <b>T</b>	-	4,0 mm
Pin Detail <b>l</b>	-	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  $\phi D \geq 30\text{mm}$  only.  
For diameter  $\phi D \geq 45\text{mm}$  the safety vent is typically placed at the side of the housing.

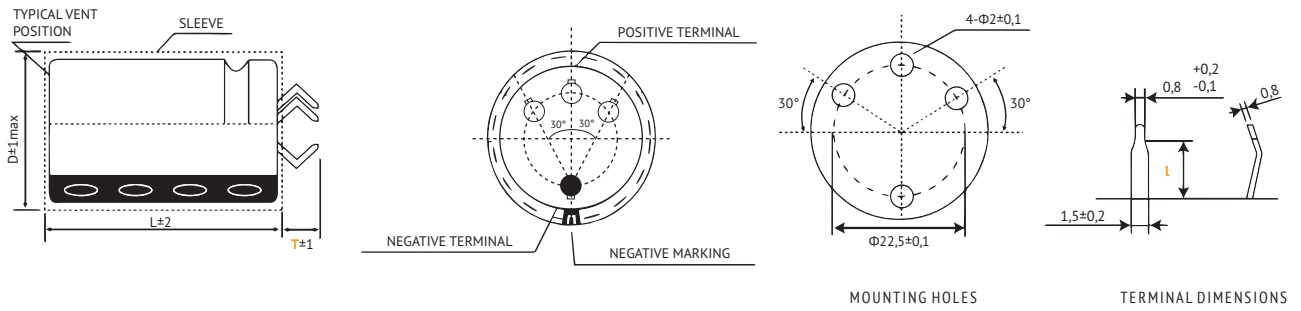
Terminal	T6 (preferred)	T4
Pin Length <b>T</b>	6,3 mm	4,0 mm
Pin Detail <b>l</b>	3,5 mm	2,5 mm

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

in mm



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



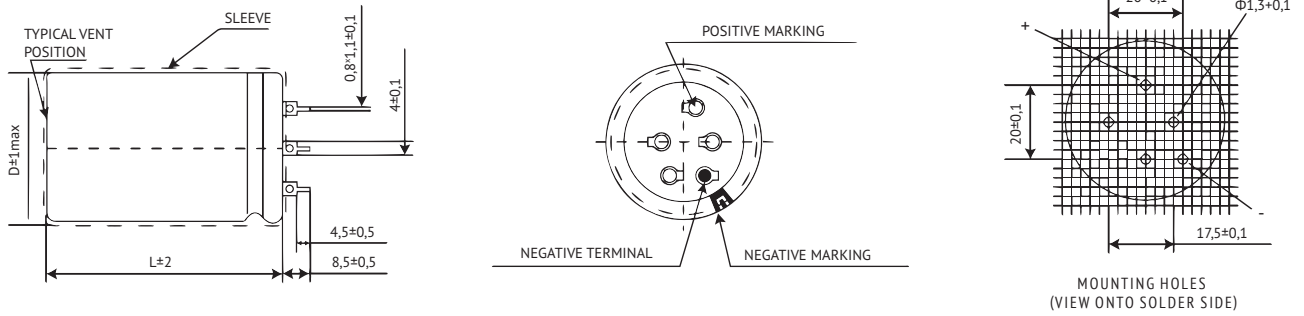
For  $\varnothing D \geq 30\text{mm}$  only. Other terminal types and styles on request.  
For diameter  $\varnothing D \geq 45\text{mm}$  the safety vent is typically placed at the side of the housing.

Terminal	T6 (preferred)	T4
Pin Length $T$	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

## 5 PIN TYPE: S4P5 SOLDERING PIN

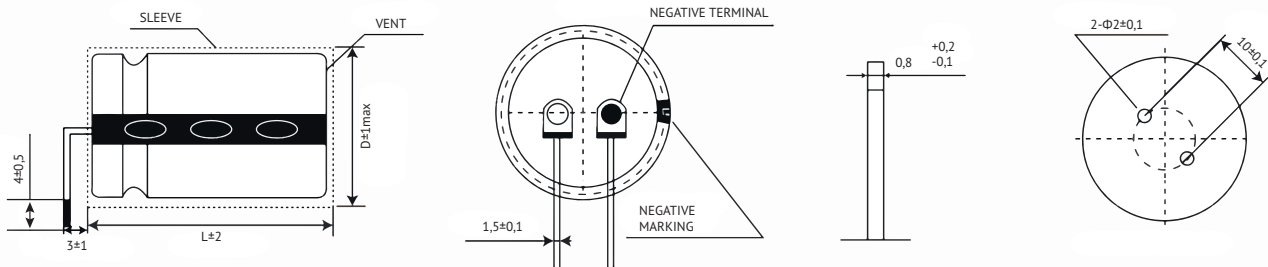


For  $\varnothing D \geq 30\text{mm}$  only.  
For diameter  $\varnothing D \geq 45\text{mm}$  the safety vent is typically placed at the side of the housing.

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

in mm

## EXAMPLE: AXIAL MOUNTING



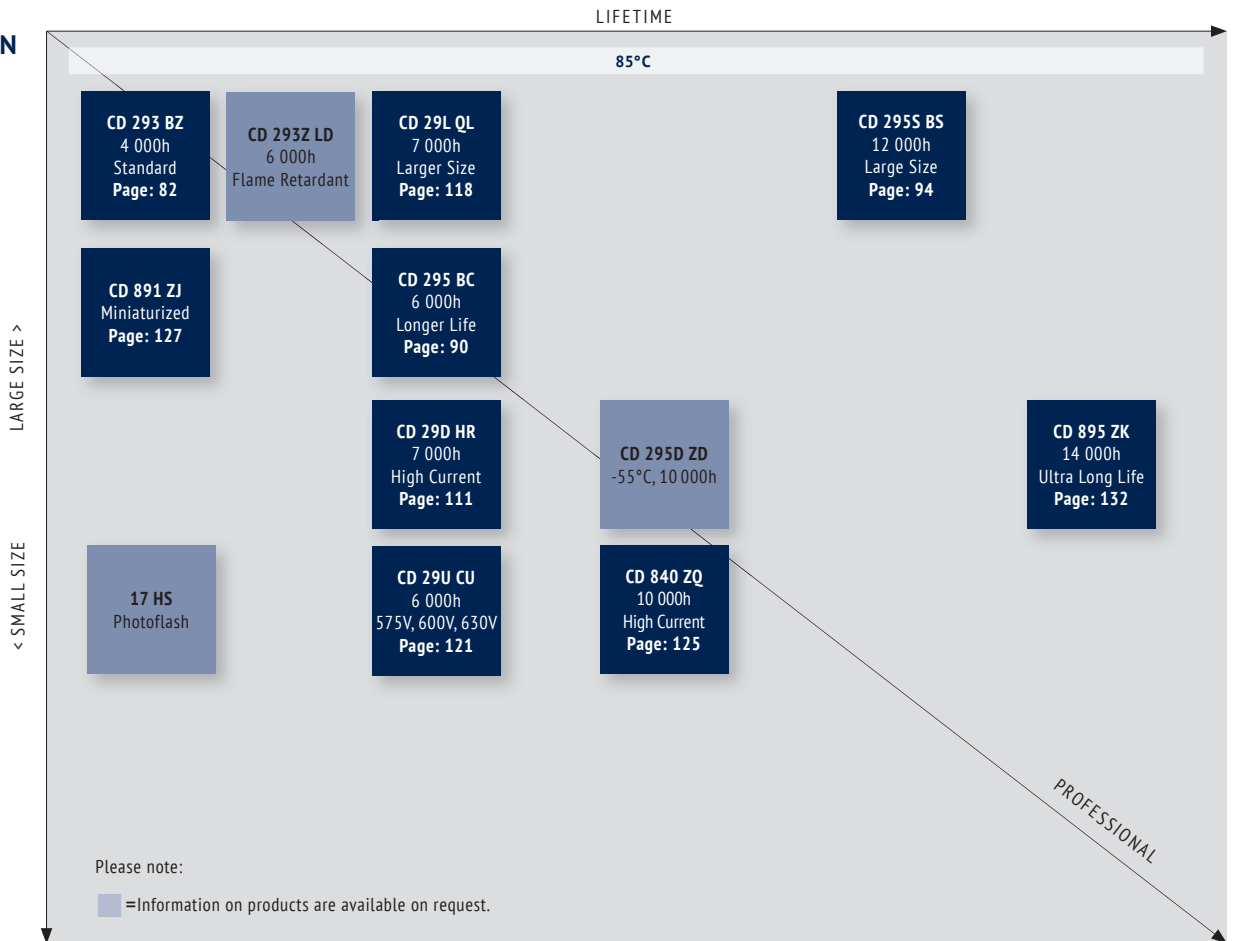
For  $\varnothing D \geq 25\text{mm}$  only.  
Available also for high vibration usage.

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

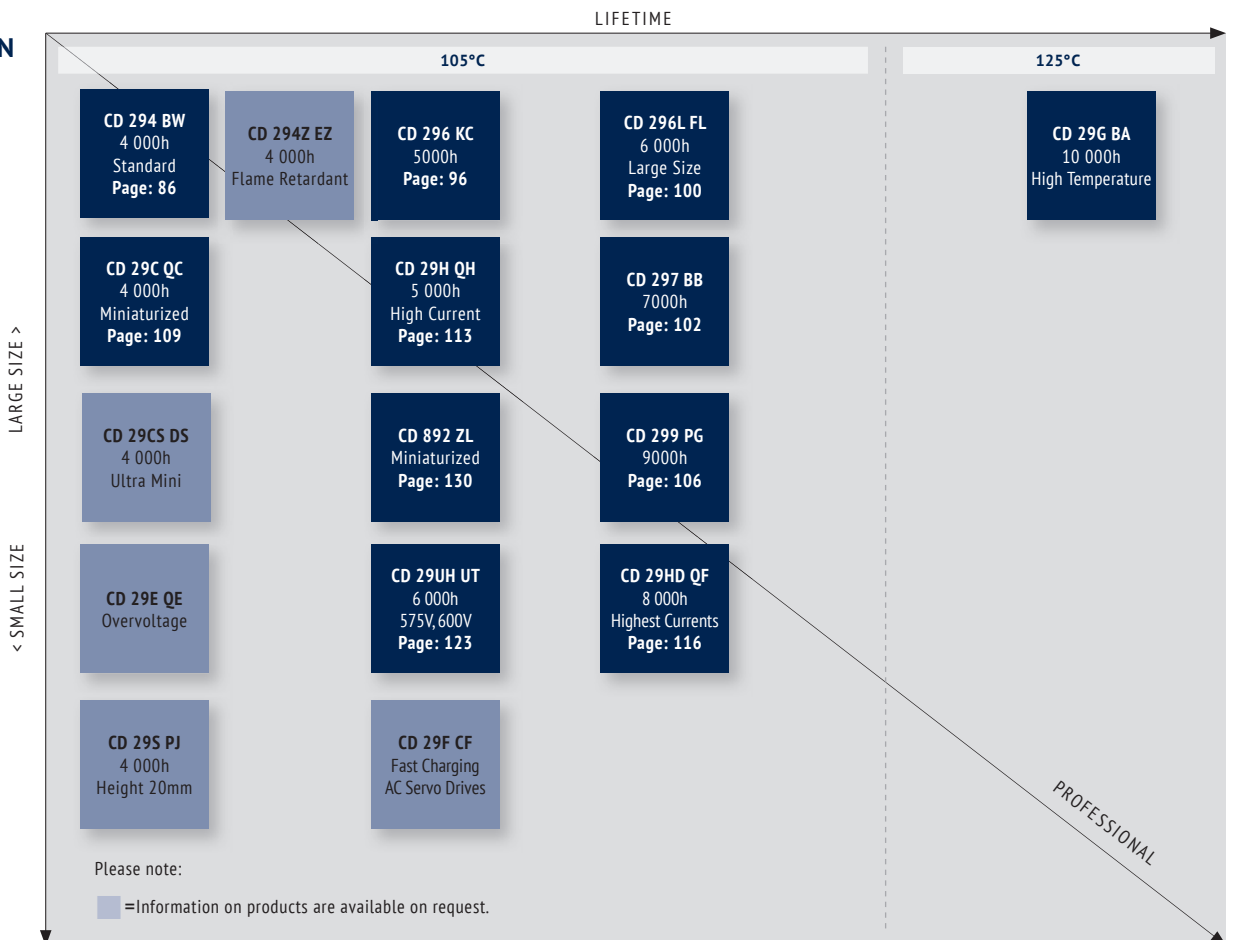
in mm

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 1kΩ 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 1kΩ resistor before use for 1 hour, then it should be discharged through a resistor of about 1 Ω/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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