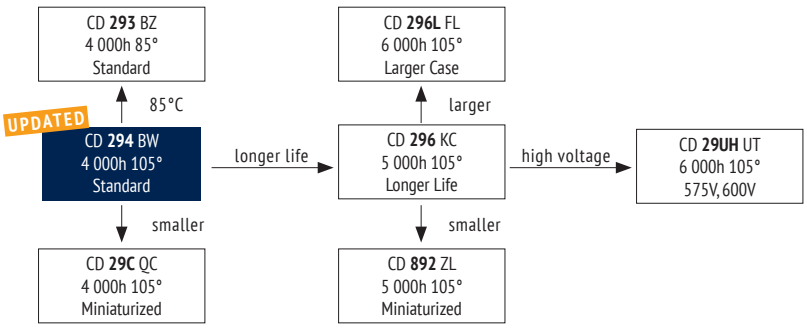
ALUMINUM ELECTROLYTIC CAPACITORS · SNAP-IN TYPE

CD **294** BW SERIES

4 000h at 105°C

- Standard 105°C
- Genereal Industry



ITEM — CHARACTERISTICS

Operating Temperature Range (°C)	-40 ~ +105	-25 ~ +105
Voltage Range (V)	16 ~ 100	160 ~ 550
Capacitance Range (µF)	100 ~ 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 adaptions, esp. for applications like: Welding, Photoflash, Servo motors, X-Ray**			

ITEM	USEFUL LIFE		LOAD LIFE	ENDURANCE TEST	SHELF LIFE	
Lifetime	4 000h	> 180 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 ± 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 Applied Current Applied Temperature	U_R I_R 105°C	U_R 1,4 x I_R 40°C	U_R I_R 105°C	U_R I_R = 0 105°C IEC 60384	U_R = 0 I_R = 0 105°C	After test: U_R to be applied for 30 min > 24h before measurement

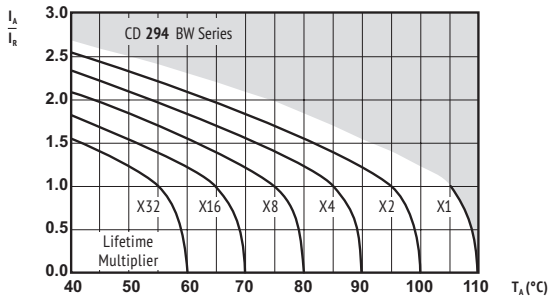
MULTIPLIER FOR RIPPLE CURRENT (FREQUENCY COEFFICIENT)

Frequency / Rated Voltage (V)	50Hz	120Hz	300Hz	1kHz	10kHz	⩾ 50 kHz
⩽ 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.

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

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

ENVIRONMENTAL

The products are RoHS, WEEE and REACh compliant. The detailed version please see seperate "Environmental Certificates" document or 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_{RDC} (Surge Voltage) Code (V)	C_R Rated Capacitance (µF)	ESR_{max} Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR_{typ} Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I_{leak} Leakage Current (mA)	I_{RAC} Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◊◊ = pin style & length ΔΔ = pin number Details: Page 6
16 (20) 1C	12 000	56	39	0,50	1,5	2,30	25x30	ECS1CBW123M◊◊ΔΔ2530
	15 000	45	31	0,50	1,5	2,68	25x35	ECS1CBW153M◊◊ΔΔ2535
	18 000	37	26	0,50	1,5	3,04	25x40	ECS1CBW183M◊◊ΔΔ2540
		37	26	0,50	1,5	3,00	30x30	ECS1CBW183M◊◊ΔΔ3030
	22 000	31	21	0,50	1,5	3,40	25x45	ECS1CBW223M◊◊ΔΔ2545
		31	21	0,50	1,5	3,39	30x35	ECS1CBW223M◊◊ΔΔ3035
	27 000	25	17	0,50	1,5	3,83	30x40	ECS1CBW273M◊◊ΔΔ3040
		25	17	0,50	1,5	3,74	35x30	ECS1CBW273M◊◊ΔΔ3530
	33 000	21	14	0,50	1,5	4,30	30x45	ECS1CBW333M◊◊ΔΔ3045
		21	14	0,50	1,5	4,24	35x35	ECS1CBW333M◊◊ΔΔ3535
	39 000	18	12	0,50	1,5	4,74	30x50	ECS1CBW393M◊◊ΔΔ3050
		18	12	0,50	1,5	4,72	35x40	ECS1CBW393M◊◊ΔΔ3540
	47 000	15	10	0,50	1,5	5,27	35x45	ECS1CBW473M◊◊ΔΔ3545
25 (32) 1E	8 200	65	45	0,40	1,5	2,16	25x30	ECS1EBW822M◊◊ΔΔ2530
	10 000	54	37	0,40	1,5	2,44	25x35	ECS1EBW103M◊◊ΔΔ2535
	12 000	45	31	0,40	1,5	2,74	25x40	ECS1EBW123M◊◊ΔΔ2540
		45	31	0,40	1,5	2,70	30x30	ECS1EBW123M◊◊ΔΔ3030
	15 000	36	25	0,40	1,5	3,15	25x45	ECS1EBW153M◊◊ΔΔ2545
		36	25	0,40	1,5	3,13	30x35	ECS1EBW153M◊◊ΔΔ3035
	18 000	30	21	0,40	1,5	3,54	25x50	ECS1EBW183M◊◊ΔΔ2550
		30	21	0,40	1,5	3,54	30x40	ECS1EBW183M◊◊ΔΔ3040
	22 000	25	17	0,40	1,5	4,24	30x45	ECS1EBW223M◊◊ΔΔ3045
		25	17	0,40	1,5	3,96	35x35	ECS1EBW223M◊◊ΔΔ3535
	27 000	20	14	0,40	1,5	4,75	35x45	ECS1EBW273M◊◊ΔΔ3545
	33 000	17	11	0,40	1,5	5,39	35x50	ECS1EBW333M◊◊ΔΔ3550
35 (44) 1V	5 600	83	58	0,35	1,5	2,04	25x30	ECS1VBW562M◊◊ΔΔ2530
	6 800	69	48	0,35	1,5	2,31	25x35	ECS1VBW682M◊◊ΔΔ2535
	8 200	57	40	0,35	1,5	2,60	25x40	ECS1VBW822M◊◊ΔΔ2540
		57	40	0,35	1,5	2,56	30x30	ECS1VBW822M◊◊ΔΔ3030
	10 000	47	33	0,35	1,5	2,92	25x45	ECS1VBW103M◊◊ΔΔ2545
		47	33	0,35	1,5	2,92	30x35	ECS1VBW103M◊◊ΔΔ3035
	12 000	39	27	0,35	1,5	3,28	30x40	ECS1VBW123M◊◊ΔΔ3040
		39	27	0,35	1,5	3,20	35x30	ECS1VBW123M◊◊ΔΔ3530
	15 000	31	22	0,35	1,5	3,74	30x45	ECS1VBW153M◊◊ΔΔ3045
		31	22	0,35	1,5	3,69	35x35	ECS1VBW153M◊◊ΔΔ3535
	18 000	26	18	0,35	1,5	4,16	35x40	ECS1VBW183M◊◊ΔΔ3540
	22 000	22	15	0,35	1,5	4,92	35x50	ECS1VBW223M◊◊ΔΔ3550
50 (63) 1H	3 300	121	84	0,30	1,5	2,00	25x25	ECS1HBW332M◊◊ΔΔ2525
	3 900	103	72	0,30	1,5	2,28	25x30	ECS1HBW392M◊◊ΔΔ2530
	4 700	85	59	0,30	1,5	2,58	25x30	ECS1HBW472M◊◊ΔΔ2530
	5 600	72	50	0,30	1,5	2,81	25x35	ECS1HBW562M◊◊ΔΔ2535
	6 800	59	41	0,30	1,5	3,37	25x40	ECS1HBW682M◊◊ΔΔ2540
		59	41	0,30	1,5	3,39	30x35	ECS1HBW682M◊◊ΔΔ3035
	8 200	49	34	0,30	1,5	3,71	30x40	ECS1HBW822M◊◊ΔΔ3040
		49	34	0,30	1,5	3,66	35x35	ECS1HBW822M◊◊ΔΔ3535
	10 000	40	28	0,30	1,5	4,09	30x45	ECS1HBW103M◊◊ΔΔ3045
		40	28	0,30	1,5	4,07	35x40	ECS1HBW103M◊◊ΔΔ3540
	12 000	34	23	0,30	1,5	4,50	35x45	ECS1HBW123M◊◊ΔΔ3545
63 (79) 1J	2 200	121	84	0,20	1,4	1,75	25x30	ECS1JBW222M◊◊ΔΔ2530
	2 700	99	69	0,20	1,5	1,99	25x35	ECS1JBW272M◊◊ΔΔ2535
	3 300	81	56	0,20	1,5	2,27	25x40	ECS1JBW332M◊◊ΔΔ2540
		81	56	0,20	1,5	2,24	30x30	ECS1JBW332M◊◊ΔΔ3030
	3 900	69	48	0,20	1,5	2,54	25x45	ECS1JBW392M◊◊ΔΔ2545
		69	48	0,20	1,5	2,55	30x35	ECS1JBW392M◊◊ΔΔ3035
	4 700	57	40	0,20	1,5	2,88	25x50	ECS1JBW472M◊◊ΔΔ2550
		57	40	0,20	1,5	2,90	30x40	ECS1JBW472M◊◊ΔΔ3040
	5 600	48	33	0,20	1,5	3,28	30x45	ECS1JBW562M◊◊ΔΔ3045
		48	33	0,20	1,5	3,24	35x35	ECS1JBW562M◊◊ΔΔ3535
	6 800	40	27	0,20	1,5	3,73	30x50	ECS1JBW682M◊◊ΔΔ3050
		40	27	0,20	1,5	3,71	35x40	ECS1JBW682M◊◊ΔΔ3540
	8 200	33	23	0,20	1,5	4,16	35x45	ECS1JBW822M◊◊ΔΔ3545
	10 000	27	19	0,20	1,5	4,69	35x50	ECS1JBW103M◊◊ΔΔ3550

U_{RDC} (Surge Voltage) Code (V)	C_R Rated Capacitance (µF)	ESR_{max} Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR_{typ} Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I_{leak} Leakage Current (mA)	I_{RAC} Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◊◊ = pin style & length ΔΔ = pin number Details: Page 6
80 (100) 1K	1 500	177	124	0,20	1,2	1,62	25x30	ECS1KBW152M◊◊ΔΔ2530
	1 800	148	103	0,20	1,4	1,81	25x30	ECS1KBW182M◊◊ΔΔ2530
	2 200	121	84	0,20	1,5	2,09	22x45	ECS1KBW222M◊◊ΔΔ2245
		121	84	0,20	1,5	2,01	25x35	ECS1KBW222M◊◊ΔΔ2535
	2 700	99	69	0,20	1,5	2,43	30x35	ECS1KBW272M◊◊ΔΔ3035
	3 300	81	56	0,20	1,5	2,78	30x40	ECS1KBW332M◊◊ΔΔ3040
	3 900	69	48	0,20	1,5	3,12	30x45	ECS1KBW392M◊◊ΔΔ3045
	4 700	57	40	0,20	1,5	3,50	35x40	ECS1KBW472M◊◊ΔΔ3540
	5 600	48	33	0,20	1,5	3,87	35x45	ECS1KBW562M◊◊ΔΔ3545
	6 800	40	27	0,20	1,5	4,19	35x50	ECS1KBW682M◊◊ΔΔ3550
100 (125) 2A	1 000	266	186	0,20	1,0	1,56	25x30	ECS2ABW102M◊◊ΔΔ2530
	1 200	222	155	0,20	1,2	1,76	25x35	ECS2ABW122M◊◊ΔΔ2535
	1 500	177	124	0,20	1,5	2,03	25x40	ECS2ABW152M◊◊ΔΔ2540
		177	124	0,20	1,5	2,00	30x30	ECS2ABW152M◊◊ΔΔ3030
	1 800	148	103	0,20	1,5	2,28	25x45	ECS2ABW182M◊◊ΔΔ2545
		148	103	0,20	1,5	2,27	30x35	ECS2ABW182M◊◊ΔΔ3035
	2 200	121	84	0,20	1,5	2,57	25x50	ECS2ABW222M◊◊ΔΔ2550
		121	84	0,20	1,5	2,59	30x40	ECS2ABW222M◊◊ΔΔ3040
	2 700	99	69	0,20	1,5	2,94	30x45	ECS2ABW272M◊◊ΔΔ3045
	3 300	81	56	0,20	1,5	3,32	30x50	ECS2ABW332M◊◊ΔΔ3050
		81	56	0,20	1,5	3,31	35x40	ECS2ABW332M◊◊ΔΔ3540
	3 900	69	48	0,20	1,5	3,69	35x45	ECS2ABW392M◊◊ΔΔ3545
	4 700	57	40	0,20	1,5	4,14	35x50	ECS2ABW472M◊◊ΔΔ3550
160 (200) 2C	560	356	249	0,15	0,9	1,62	22x40	ECS2CBW561M◊◊ΔΔ2240
		356	249	0,15	0,9	1,73	25x30	ECS2CBW561M◊◊ΔΔ2530
	680	293	205	0,15	1,1	1,70	22x45	ECS2CBW681M◊◊ΔΔ2245
		293	205	0,15	1,1	1,81	25x35	ECS2CBW681M◊◊ΔΔ2535
	820	243	170	0,15	1,3	1,98	25x40	ECS2CBW821M◊◊ΔΔ2540
		243	170	0,15	1,3	1,98	30x30	ECS2CBW821M◊◊ΔΔ3030
	1 000	199	139	0,15	1,5	2,04	25x45	ECS2CBW102M◊◊ΔΔ2545
		199	139	0,15	1,5	2,14	30x35	ECS2CBW102M◊◊ΔΔ3035
	1 200	166	116	0,15	1,5	2,12	25x50	ECS2CBW122M◊◊ΔΔ2550
		166	116	0,15	1,5	2,22	30x40	ECS2CBW122M◊◊ΔΔ3040
	1 500	133	93	0,15	1,5	2,46	30x45	ECS2CBW152M◊◊ΔΔ3045
		133	93	0,15	1,5	2,53	35x35	ECS2CBW152M◊◊ΔΔ3535
	1 800	111	77	0,15	1,5	2,98	35x45	ECS2CBW182M◊◊ΔΔ3545
	2 200	91	63	0,15	1,5	3,10	35x50	ECS2CBW222M◊◊ΔΔ3550
	2 700	74	51	0,15	1,5	3,77	35x55	ECS2CBW272M◊◊ΔΔ3555
	3 300	61	42	0,15	1,5	4,33	35x60	ECS2CBW332M◊◊ΔΔ3560
180 (225) 2K	470	424	296	0,15	0,8	1,50	22x35	ECS2KBW471M◊◊ΔΔ2235
		424	296	0,15	0,8	1,62	25x30	ECS2KBW471M◊◊ΔΔ2530
	560	356	249	0,15	1,0	1,62	22x40	ECS2KBW561M◊◊ΔΔ2240
		356	249	0,15	1,0	1,69	25x35	ECS2KBW561M◊◊ΔΔ2535
	680	293	205	0,15	1,2	1,72	25x40	ECS2KBW681M◊◊ΔΔ2540
		293	205	0,15	1,2	1,74	30x30	ECS2KBW681M◊◊ΔΔ3030
	820	243	170	0,15	1,5	1,78	25x45	ECS2KBW821M◊◊ΔΔ2545
		243	170	0,15	1,5	1,85	30x35	ECS2KBW821M◊◊ΔΔ3035
	1 000	199	139	0,15	1,5	1,91	25x50	ECS2KBW102M◊◊ΔΔ2550
		199	139	0,15	1,5	2,01	30x40	ECS2KBW102M◊◊ΔΔ3040
	1 200	166	116	0,15	1,5	2,19	30x45	ECS2KBW122M◊◊ΔΔ3045
	1 500	133	93	0,15	1,5	2,36	30x50	ECS2KBW152M◊◊ΔΔ3050
	1 800	111	77	0,15	1,5	2,67	35x45	ECS2KBW182M◊◊ΔΔ3545
	2 200	91	63	0,15	1,5	3,27	35x50	ECS2KBW222M◊◊ΔΔ3550
	2 700	74	52	0,15	1,5	3,92	35x60	ECS2KBW272M◊◊ΔΔ3560
200 (250) 2D	470	424	296	0,15	0,9	1,47	25x30	ECS2DBW471M◊◊ΔΔ2530
		424	296	0,15	0,9	1,56	30x25	ECS2DBW471M◊◊ΔΔ3025
	560	356	249	0,15	1,1	1,58	25x35	ECS2DBW561M◊◊ΔΔ2535
		356	249	0,15	1,1	1,65	30x30	ECS2DBW561M◊◊ΔΔ3030
	680	293	205	0,15	1,4	1,80	25x40	ECS2DBW681M◊◊ΔΔ2540
		293	205	0,15	1,4	1,82	30x30	ECS2DBW681M◊◊ΔΔ3030
	820	243	170	0,15	1,5	1,99	30x35	ECS2DBW821M◊◊ΔΔ3035
	1 000	199	139	0,15	1,5	2,17	22x50	ECS2DBW102M◊◊ΔΔ2250
		199	139	0,15	1,5	2,21	30x40	ECS2DBW102M◊◊ΔΔ3040

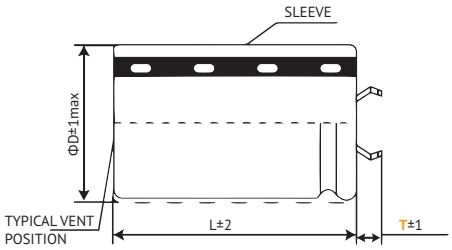
U_{RDC} (Surge Voltage) Code (V)	C_R Rated Capacitance (µF)	ESR_{max} Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR_{typ} Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I_{leak} Leakage Current (mA)	I_{RAC} Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◊◊ = pin style & length ΔΔ = pin number Details: Page 6
200 (250) 2D	1 200	166	116	0,15	1,5	2,22	25x45	ECS2DBW122M◊◊ΔΔ2545
		166	116	0,15	1,5	2,28	30x40	ECS2DBW122M◊◊ΔΔ3040
	1 500	133	93	0,15	1,5	2,59	30x50	ECS2DBW152M◊◊ΔΔ3050
		133	93	0,15	1,5	2,64	35x40	ECS2DBW152M◊◊ΔΔ3540
	1 800	111	77	0,15	1,5	2,70	35x45	ECS2DBW182M◊◊ΔΔ3545
	2 200	91	63	0,15	1,5	3,23	35x50	ECS2DBW222M◊◊ΔΔ3550
250 (300) 2E	330	603	422	0,15	0,8	1,20	22x40	ECS2EBW331M◊◊ΔΔ2240
		603	422	0,15	0,8	1,30	25x30	ECS2EBW331M◊◊ΔΔ2530
	390	511	357	0,15	1,0	1,41	25x35	ECS2EBW391M◊◊ΔΔ2535
	470	424	296	0,15	1,2	1,52	25x40	ECS2EBW471M◊◊ΔΔ2540
		424	296	0,15	1,2	1,56	30x30	ECS2EBW471M◊◊ΔΔ3030
	560	356	249	0,15	1,4	1,59	25x45	ECS2EBW561M◊◊ΔΔ2545
		356	249	0,15	1,4	1,61	30x30	ECS2EBW561M◊◊ΔΔ3030
	680	293	205	0,15	1,5	1,66	25x50	ECS2EBW681M◊◊ΔΔ2550
		293	205	0,15	1,5	1,76	30x35	ECS2EBW681M◊◊ΔΔ3035
	820	243	170	0,15	1,5	1,83	30x40	ECS2EBW821M◊◊ΔΔ3040
		243	170	0,15	1,5	1,82	35x35	ECS2EBW821M◊◊ΔΔ3535
	1 000	199	139	0,15	1,5	1,87	30x50	ECS2EBW102M◊◊ΔΔ3050
		199	139	0,15	1,5	1,99	35x40	ECS2EBW102M◊◊ΔΔ3540
	1 200	166	116	0,15	1,5	2,10	35x45	ECS2EBW122M◊◊ΔΔ3545
	1 500	133	93	0,15	1,5	2,70	35x50	ECS2EBW152M◊◊ΔΔ3550
	1 800	111	77	0,15	1,5	2,90	35x55	ECS2EBW182M◊◊ΔΔ3555
		111	77	0,15	1,5	2,92	35x60	ECS2EBW182M◊◊ΔΔ3560
315 (365) 2F	180	1106	608	0,15	0,6	0,78	22x40	ECS2FBW181M◊◊ΔΔ2240
		1106	608	0,15	0,6	0,85	25x25	ECS2FBW181M◊◊ΔΔ2525
	220	905	498	0,15	0,7	0,91	22x45	ECS2FBW221M◊◊ΔΔ2245
		905	498	0,15	0,7	0,94	25x30	ECS2FBW221M◊◊ΔΔ2530
	270	737	406	0,15	0,9	1,00	25x35	ECS2FBW271M◊◊ΔΔ2535
		737	406	0,15	0,9	0,98	30x25	ECS2FBW271M◊◊ΔΔ3025
	330	603	332	0,15	1,0	1,13	30x30	ECS2FBW331M◊◊ΔΔ3030
	390	511	281	0,15	1,2	1,20	30x35	ECS2FBW391M◊◊ΔΔ3035
	470	424	233	0,15	1,5	1,28	30x35	ECS2FBW471M◊◊ΔΔ3035
	560	355	196	0,15	1,5	1,46	30x40	ECS2FBW561M◊◊ΔΔ3040
	680	293	161	0,15	1,5	1,85	30x45	ECS2FBW681M◊◊ΔΔ3045
		293	161	0,15	1,5	1,88	35x35	ECS2FBW681M◊◊ΔΔ3535
	820	242	133	0,15	1,5	2,10	30x50	ECS2FBW821M◊◊ΔΔ3050
		242	133	0,15	1,5	2,15	35x40	ECS2FBW821M◊◊ΔΔ3540
	1 000	199	109	0,20	1,5	2,42	30x55	ECS2FBW102M◊◊ΔΔ3055
		199	109	0,15	1,5	2,47	35x45	ECS2FBW102M◊◊ΔΔ3545
	1 200	166	91	0,15	1,5	2,60	35x50	ECS2FBW122M◊◊ΔΔ3550
350 (400) 2V	150	1327	730	0,15	0,5	0,82	25x30	ECS2VBW151M◊◊ΔΔ2530
	180	1106	608	0,15	0,6	0,89	25x35	ECS2VBW181M◊◊ΔΔ2535
	220	905	498	0,15	0,8	0,97	25x40	ECS2VBW221M◊◊ΔΔ2540
		905	498	0,15	0,8	0,98	30x30	ECS2VBW221M◊◊ΔΔ3030
	270	737	406	0,15	1,0	1,01	25x45	ECS2VBW271M◊◊ΔΔ2545
		737	406	0,15	0,9	1,05	30x30	ECS2VBW271M◊◊ΔΔ3030
	330	603	332	0,15	1,2	1,16	25x45	ECS2VBW331M◊◊ΔΔ2545
		603	332	0,15	1,5	1,19	30x40	ECS2VBW331M◊◊ΔΔ3040
	390	511	281	0,15	1,4	1,26	25x45	ECS2VBW391M◊◊ΔΔ2545
		511	281	0,15	1,4	1,29	30x40	ECS2VBW391M◊◊ΔΔ3040
	470	424	233	0,15	1,5	1,35	30x50	ECS2VBW471M◊◊ΔΔ3050
		424	233	0,15	1,5	1,41	35x40	ECS2VBW471M◊◊ΔΔ3540
	560	356	196	0,15	1,5	1,47	30x50	ECS2VBW561M◊◊ΔΔ3050
		356	196	0,15	1,5	1,51	35x50	ECS2VBW561M◊◊ΔΔ3550
	680	293	161	0,15	1,5	1,92	30x55	ECS2VBW681M◊◊ΔΔ3055
		293	161	0,15	1,5	1,97	35x50	ECS2VBW681M◊◊ΔΔ3550
	820	243	133	0,15	1,5	2,25	35x60	ECS2VBW821M◊◊ΔΔ3560
	1 000	199	139	0,15	1,5	2,50	35x60	ECS2VBW102M◊◊ΔΔ3560
400 (450) 2G	120	1658	863	0,15	0,5	0,64	22x30	ECS2GBW121M◊◊ΔΔ2230
		1658	863	0,15	0,5	0,70	25x25	ECS2GBW121M◊◊ΔΔ2525
	150	1327	690	0,15	0,6	0,73	25x30	ECS2GBW151M◊◊ΔΔ2530
		1327	690	0,15	0,6	0,75	30x25	ECS2GBW151M◊◊ΔΔ3025
400 (450) 2G	180	1106	575	0,15	0,7	0,82	25x35	ECS2GBW181M◊◊ΔΔ2535
		1106	575	0,15	0,7	0,85	30x25	ECS2GBW181M◊◊ΔΔ3025
	220	905	471	0,15	0,9	0,87	25x40	ECS2GBW221M◊◊ΔΔ2540
		905	471	0,15	0,9	0,86	30x30	ECS2GBW221M◊◊ΔΔ3030
	270	737	383	0,15	1,1	0,94	22x40	ECS2GBW271M◊◊ΔΔ2240
		737	383	0,15	1,1	0,99	30x35	ECS2GBW271M◊◊ΔΔ3035
	330	603	314	0,15	1,3	1,08	25x50	ECS2GBW331M◊◊ΔΔ2550
		603	314	0,15	1,3	1,11	30x40	ECS2GBW331M◊◊ΔΔ3040
	390	511	265	0,15	1,5	1,15	30x45	ECS2GBW391M◊◊ΔΔ3045
	470	424	220	0,15	1,5	1,28	30x50	ECS2GBW471M◊◊ΔΔ3050
		424	220	0,15	1,5	1,31	35x35	ECS2GBW471M◊◊ΔΔ3535
	560	355	185	0,15	1,5	1,50	30x50	ECS2GBW561M◊◊ΔΔ3050
		356	185	0,15	1,5	1,65	35x40	ECS2GBW561M◊◊ΔΔ3540
	680	293	153	0,15	1,5	1,90	35x50	ECS2GBW681M◊◊ΔΔ3550
	820	243	126	0,15	1,5	2,10	35x50	ECS2GBW821M◊◊ΔΔ3550
		243	126	0,15	1,5	2,20	35x60	ECS2GBW821M◊◊ΔΔ3560
	1 000	199	139	0,15	1,5	2,50	30x70	ECS2GBW102M◊◊ΔΔ3070
		199	139	0,15	1,5	2,60	35x60	ECS2GBW102M◊◊ΔΔ3560
420 (470) 2X	120	2211	1106	0,20	0,5	0,72	25x30	ECS2XBW121M◊◊ΔΔ2530
	150	1769	885	0,20	0,6	0,80	25x30	ECS2XBW151M◊◊ΔΔ2530
	180	1474	737	0,20	0,8	0,85	30x30	ECS2XBW181M◊◊ΔΔ3030
	220	1206	603	0,20	0,9	0,96	30x30	ECS2XBW221M◊◊ΔΔ3030
	270	983	492	0,15	1,1	1,06	30x35	ECS2XBW271M◊◊ΔΔ3035
	330	804	402	0,20	1,4	1,14	30x40	ECS2XBW331M◊◊ΔΔ3040
		804	402	0,20	1,4	1,20	35x30	ECS2XBW331M◊◊ΔΔ3530
	390	681	340	0,20	1,5	1,25	30x45	ECS2XBW391M◊◊ΔΔ3045
	470	565	282	0,20	1,5	1,28	30x50	ECS2XBW471M◊◊ΔΔ3050
		565	282	0,20	1,5	1,31	35x40	ECS2XBW471M◊◊ΔΔ3540
	560	474	237	0,20	1,5	1,45	30x50	ECS2XBW561M◊◊ΔΔ3050
		474	237	0,20	1,5	1,50	35x45	ECS2XBW561M◊◊ΔΔ3545
	680	391	196	0,20	1,5	1,90	35x50	ECS2XBW681M◊◊ΔΔ3550
	820	324	162	0,20	1,5	2,20	35x60	ECS2XBW821M◊◊ΔΔ3560
	1 000	265	139	0,15	1,5	2,60	35x65	ECS2XBW102M◊◊ΔΔ3565
450 (500) 2W	120	2211	1106	0,20	0,5	0,73	22x35	ECS2WBW121M◊◊ΔΔ2235
		2211	1106	0,20	0,5	0,75	25x25	ECS2WBW121M◊◊ΔΔ2525
	150	1769	885	0,20	0,7	0,82	25x30	ECS2WBW151M◊◊ΔΔ2530
	180	1474	737	0,20	0,8	0,86	30x30	ECS2WBW181M◊◊ΔΔ3030
	220	1206	603	0,20	1,0	0,94	22x50	ECS2WBW221M◊◊ΔΔ2250
		1206	603	0,20	1,0	0,95	30x30	ECS2WBW221M◊◊ΔΔ3030
	270	983	492	0,20	1,2	1,11	30x30	ECS2WBW271M◊◊ΔΔ3030
		983	492	0,20	1,2	1,15	30x35	ECS2WBW271M◊◊ΔΔ3035
	330	804	402	0,20	1,5	1,25	30x40	ECS2WBW331M◊◊ΔΔ3040
		804	402	0,20	1,5	1,26	35x30	ECS2WBW331T◊◊ΔΔ530
	390	681	340	0,20	1,5	1,31	30x40	ECS2WBW391M◊◊ΔΔ3040
		681	340	0,20	1,5	1,36	35x35	ECS2WBW391M◊◊ΔΔ3535
	470	565	282	0,20	1,5	1,50	30x45	ECS2WBW471M◊◊ΔΔ3045
		565	282	0,20	1,5	1,55	35x45	ECS2WBW471M◊◊ΔΔ3545
		565	282	0,20	1,5	1,50	35x50	ECS2WBW471M◊◊ΔΔ3550
	560	474	237	0,20	1,5	1,65	30x50	ECS2WBW561M◊◊ΔΔ3050
		474	237	0,20	1,5	1,70	35x50	ECS2WBW561M◊◊ΔΔ3550
	680	391	196	0,20	1,5	1,95	35x50	ECS2WBW681M◊◊ΔΔ3550
		391	196	0,20	1,5	2,00	35x60	ECS2WBW681M◊◊ΔΔ3560
	820	324	162	0,20	1,5	2,15	35x60	ECS2WBW821M◊◊ΔΔ3560
		324	162	0,20	1,5	2,20	35x65	ECS2WBW821M◊◊ΔΔ3565
	1 000	265	139	0,20	1,5	2,60	35x70	ECS2WBW102M◊◊ΔΔ3570
500 (550) 2H	100	2653	1327	0,20	0,1	0,67	22x35	ECS2HBW101M◊◊ΔΔ2235
	120	2211	1106	0,20	0,6	0,77	22x50	ECS2HBW121M◊◊ΔΔ2250
		2211	1106	0,20	0,6	0,81	25x35	ECS2HBW121M◊◊ΔΔ2535
	150	1769	885	0,20	0,8	0,85	25x40	ECS2HBW151M◊◊ΔΔ2540
		1769	885	0,20	0,8	0,88	30x30	ECS2HBW151M◊◊ΔΔ3030
	180	1474	737	0,20	0,9	1,01	25x50	ECS2HBW181M◊◊ΔΔ2550
		1474	737	0,20	0,9	1,06	30x35	ECS2HBW181M◊◊ΔΔ3035
	220	1206	603	0,20	1,1	1,12	30x35	ECS2HBW221M◊◊ΔΔ3035
		1206	603	0,20	1,1	1,17	35x30	ECS2HBW221M◊◊ΔΔ3530

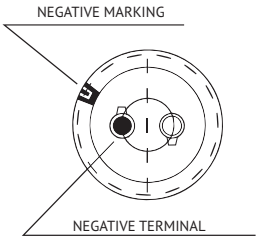
U_{RDC} (Surge Voltage) Code (V)	C_R Rated Capacitance (µF)	ESR_{max} Equivalent Series Resistance 20°C 120Hz (mΩ)	ESR_{typ} Equivalent Series Resistance 20°C 120Hz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I_{leak} Leakage Current (mA)	I_{RAC} Rated Ripple Current 105°C 120Hz (Arms)	Size øD x L (mm)	ORDER CODE ◊◊ = pin style & length ΔΔ = pin number Details: Page 6
500 (550) 2H	270	983	472	0,20	1,4	1,29	30x40	ECS2HBW271M◊◊ΔΔ3040
		983	472	0,20	1,4	1,34	35x35	ECS2HBW271M◊◊ΔΔ3535
	330	804	402	0,20	1,5	1,40	35x45	ECS2HBW331M◊◊ΔΔ3545
	390	681	340	0,20	1,5	1,60	35x50	ECS2HBW391M◊◊ΔΔ3550
	470	565	282	0,20	1,5	1,80	35x50	ECS2HBW471M◊◊ΔΔ3550
		565	282	0,20	1,5	1,80	35x60	ECS2HBW471M◊◊ΔΔ3560
	560	474	237	0,20	1,5	1,90	35x60	ECS2HBW561M◊◊ΔΔ3560
	680	391	196	0,20	1,5	2,20	35x70	ECS2HBW681M◊◊ΔΔ3570
550 (600) 2Y	150	1769	885	0,20	1,5	0,86	30x35	ECS2YBW151M◊◊ΔΔ3035
	180	1474	737	0,20	1,5	1,06	30x40	ECS2YBW181M◊◊ΔΔ3040
		1474	737	0,20	1,5	1,11	35x30	ECS2YBW181M◊◊ΔΔ3530
	220	1206	603	0,20	1,5	1,18	30x50	ECS2YBW221M◊◊ΔΔ3050
		1206	603	0,20	1,5	1,23	35x35	ECS2YBW221M◊◊ΔΔ3535
	270	983	492	0,20	1,5	1,31	35x45	ECS2YBW271M◊◊ΔΔ3545
	330	804	402	0,20	1,5	1,50	35x50	ECS2YBW331M◊◊ΔΔ3550
	390	681	340	0,20	1,5	1,67	35x60	ECS2YBW391M◊◊ΔΔ3560
	470	565	282	0,20	1,5	1,90	35x60	ECS2YBW471M◊◊ΔΔ3560
		565	282	0,20	1,5	1,95	35x70	ECS2YBW471M◊◊ΔΔ3570
	560	474	237	0,20	1,5	2,10	35x80	ECS2YBW561M◊◊ΔΔ3580

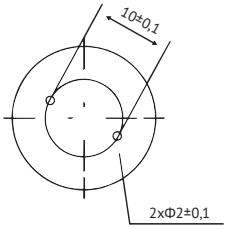
ORDER CODE SNAP-IN TYPE

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 = Electrolytric Capacitor	Snap-In **S**	6,3V **0J** 10V **1A** 16V **1C** 20V **1D** 25V **1E** 35V **1V** 40V **1G** 50V **1H** 63V **1J** 80V **1K** 100V **2A** 125V **2B** 160V **2C** 180V **2K** 200V **2D** 250V **2E** 315V **2F** 350V **2V** 385V **2J** 400V **2G** 415V **2P** 420V **2X** 450V **2W** 500V **2H** 550V **2Y** 575V **2Z** 600V **2S** 630V **J2**	CD 293 **BZ** CD 294 **BW** CD 295 **BC** CD 295S **BS** CD 296 **KC** CD 296L **FL** CD 297 **BB** CD 299 **PG** CD 29C **QC** CD 29CS **DS** CD 29H **QH** CD 29HD **QF** CD 29L **QL** CD 29U **CU** CD 29UH **UT** CD 840 **ZQ** CD 891 **ZJ** CD 892 **ZL** CD 895 **ZK**	0,1 **0R1** 0,47 **R47** 1,0 **010** 2,2 **2R2** 100 **101** 1 000 **102** 10 000 **103**	**±20%** **M** ±10% **K** +30/-10% **Q** +20/-0% **R** ±15% **L** +20/-10% **V**	4,0mm Pin Length **T/L4** **6,3mm Pin Length** **T/L6** Soldering Pin **S4** on request: alternative pin types ■ **= preferred**	**2 Pin** **P2** 3 Pin **P3** 4 Pin **P4** 5 Pin **P5** 6 Pin **P6**	22x40 **2240** 30x45 **3045** 35x80 **3580** 45x100 **45100** 50x105 **50105**	Standard **-** PVC **V** PET **E**	

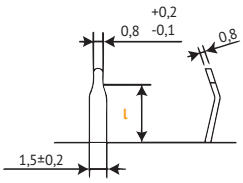
2 PIN TYPE: T6P2 / T4P2 STANDARD







MOUNTING HOLES



TERMINAL DIMENSIONS

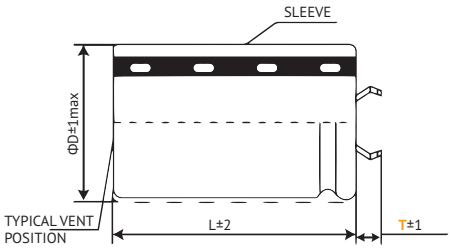
Standard Version: Self-Lock Terminal. Other terminal types and styles on request.
For diameter øD ⩾ 45mm the safety vent is typically placed at the side of the housing.

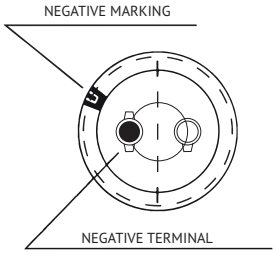
Terminal	T6 (preferred)	T4
Pin Length T	6,3 mm	4,0 mm
Pin Detail l	3,5 mm	2,5 mm

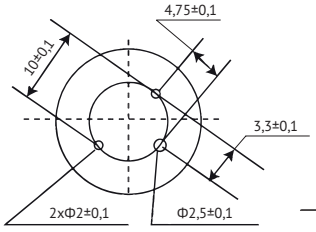
Max. Current Snap-In Terminal: 15A
For more current please ask for Lug-Terminals.

in mm

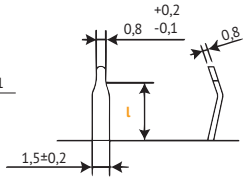
3 PIN TYPE: T4P3







MOUNTING HOLES



TERMINAL DIMENSIONS

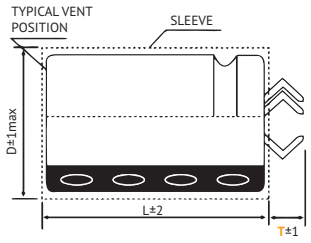
For diameter øD ⩾ 45mm the safety vent is typically placed at the side of the housing.

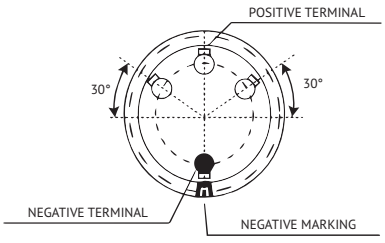
Terminal	T6	T4
Pin Length T	-	4,0 mm
Pin Detail l	-	2,5 mm

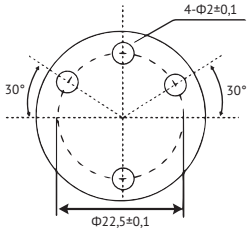
Max. Current Snap-In Terminal: 15A
For more current please ask for Lug-Terminals.

in mm

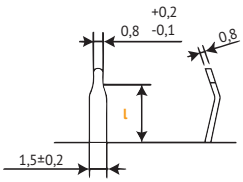
4 PIN TYPE: T6P4/T4P4 STANDARD







MOUNTING HOLES



TERMINAL DIMENSIONS

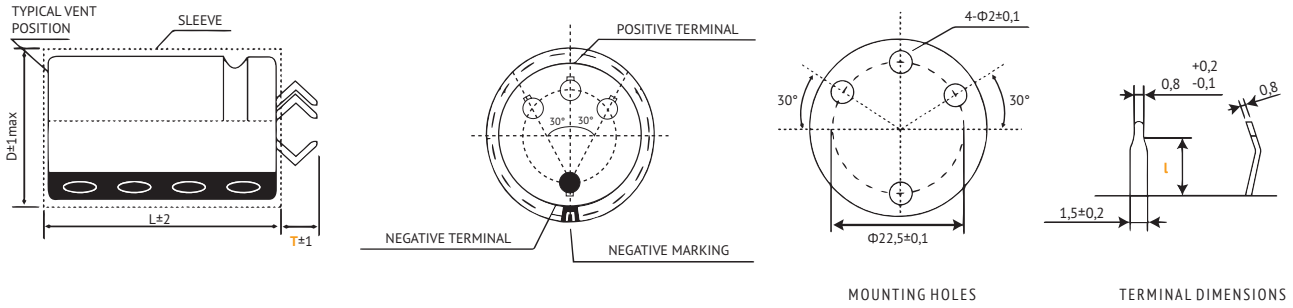
Standard Version: Non-Lock-Terminal. Other terminal types and styles on request.
For øD ⩾ 30mm only.
For diameter øD ⩾ 45mm the safety vent is typically placed at the side of the housing.

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



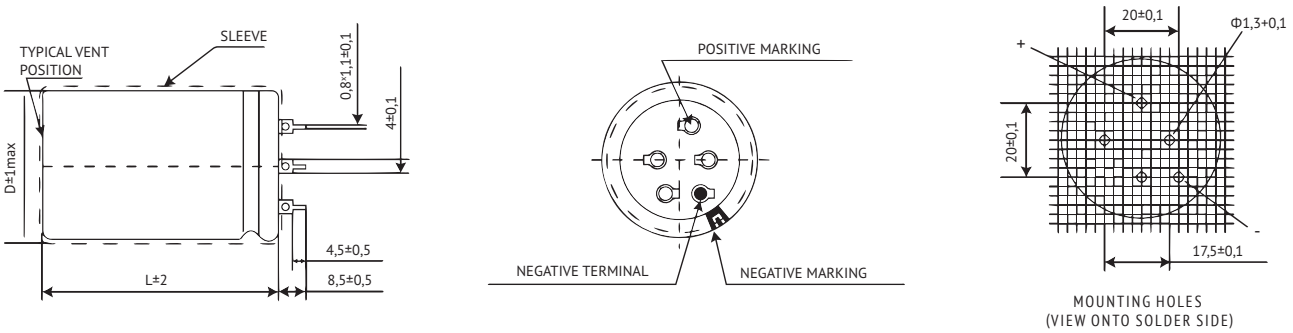
For øD ⩾ 30mm only. Other terminal types and styles on request.
For diameter øD ⩾ 45mm the safety vent is typically placed at the side of the housing.

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

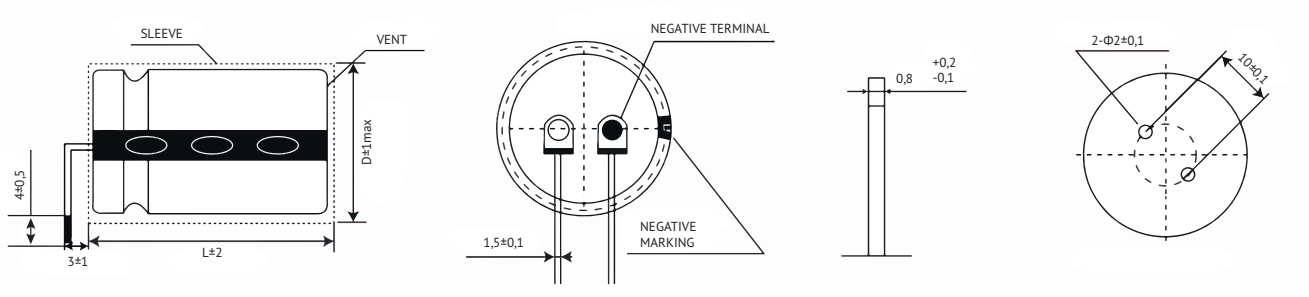


For øD ⩾ 30mm only.
For diameter øD ⩾ 45mm the safety vent is typically placed at the side of the housing.

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

in mm

EXAMPLE: AXIAL MOUNTING



For øD ⩾ 25mm 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.

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. 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. Never exceed a ripple voltage of $70V_{peak\text{-}peak}$ without additional approval of Jianghai.

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 10^6 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.

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 SMT 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. 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.

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 ⩽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
VERSION 9/2024

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.

STRUCTUAL 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 10K rule of Arrhenius. It is possible to estimate the Lifetime by rule of thumb: When the operational temperature is reduced by 10K, the Lifetime will double. The formula for $\mathbf{K_T}$ in detail is:

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

WHERE:

- T_0 Rated Temperature
- T_A Ambient Temperature

FREQUENCY CORRECTION FACTORS:

If the actual Ripple Currents are not given at the same frequency like I_0, correction factors need to be applied.

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

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)
- ΔT_0 Core Temperature Rise of the capacitor (typically 3,5 ~ 5K for T_0 = 105°C and 3,5 ~ 10K for T_0= 85°C, see databook value)
- K_i Basis, typically defined as

T_0 = 105°C	$I_A > I_R$:	K_i = 4
	$I_A \leq I_R$:	K_i = 2
T_0 = 85°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 and SMT 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:

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

$$K_V = 1$$

FOR: Radial and SMT Capacitors or $U_R \leqslant 160V$

$$K_V = 1$$

JIANGHAI ELECTROLYTIC CAPACITOR LIFETIME ESTIMATION FORMULA (incl. Safety Factors):

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

WITH TYPICAL VALUES:

T_0 = 105°C	$I_A > I_R$:	K_i=4
	$I_A \leqslant I_R$:	K_i=2
T_0 = 85°C		K_i=2

ΔT_0= depending on the series: 3,5~10K, see databook value

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

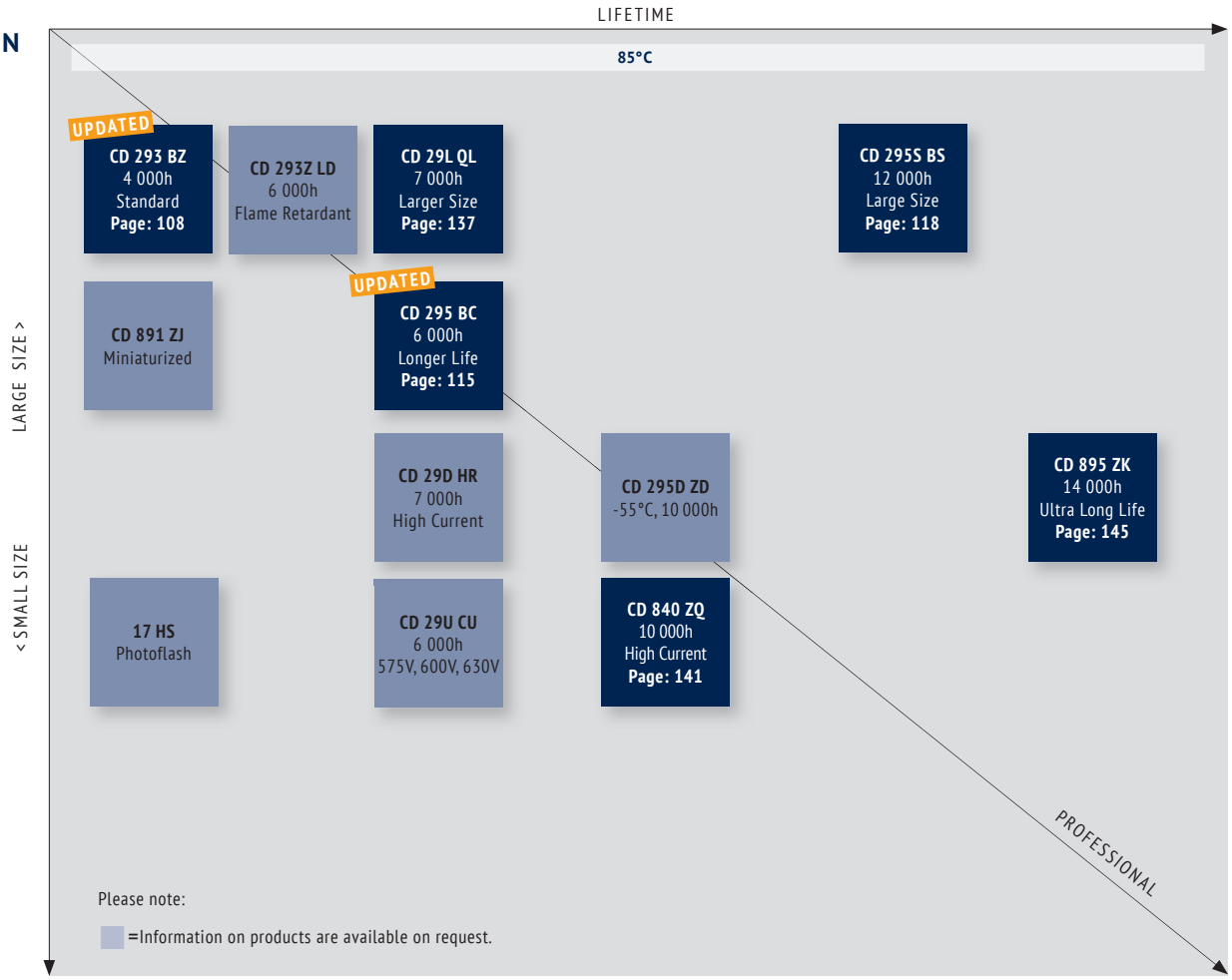
$$0 < \frac{U_A}{U_R} < 0{,}6 \rightarrow K_V = \left(\frac{U_A}{U_R}\right)^{-n} = 3{,}59$$

For $U_R \leqslant 160V$, Radial and SMT

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

OUR SNAP-IN IN RELATION TO ONE ANOTHER

SNAP-IN 85°C



SNAP-IN 105°C/ 125°C

