

ALUMINUM ELECTROLYTIC CAPACITORS



CES Series

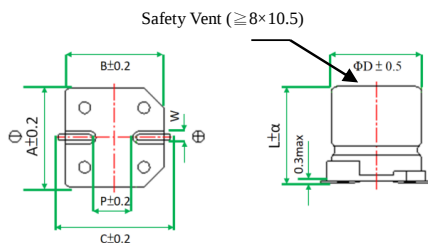
- Low Impedance
- Load life 1,000 to 2,000 hours at 105°C



◆ SPECIFICATIONS

Item	Performance Characteristics							
Category Temperature Range	-55 ~ +105°C							
Working Voltage Range	6.3 ~ 50Vdc							
Capacitance Range	1 ~ 3,300 μF							
Capacitance Tolerance	±20% (at 25°C and 120Hz)							
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V)		6.3	10	16	25	35	50
	tanδ(Max)	Φ4 ~ Φ10	0.22	0.20	0.16	0.14	0.12	0.12
		Φ12.5	0.26	0.22	0.18	0.16	0.14	0.12
	When nominal capacitance exceeds 1,000uF, add 0.02 to the value above for each 1,000uF increase.							
Leakage Current	(Φ 4~ Φ 10) I=0.01CV or 3μA whichever is greater impress the rated voltage for 2 minutes (Φ 12.5) I=0.03CV or 4μA whichever is greater impress the rated voltage for 1 minute I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)							
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V)		6.3	10	16	25	35	50
	Φ4~Φ10	Z(-25°C)/Z(+20°C)	2	2	2	2	2	2
		Z(-55°C)/Z(+20°C)	5	4	4	3	3	3
	Φ12.5	Z(-25°C)/Z(+20°C)	3	3	2	2	2	2
		Z(-55°C)/Z(+20°C)	10	8	6	4	3	3
	(at 120Hz)							
Endurance	The following specifications shall be satisfied when the capacitor are restored to 25°C after subjected to DC voltage with the rated voltage is applied for 2,000 hours (Φ 4~6.3×5.8,8×6.5 for 1,000 hours) at 105°C.							
	Capacitance change		≦ ±20% of the initial value					
	Dissipation factor(tanδ)		≦ 200% of the specified value					
	Leakage current		≦ specified value					
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 105°C without voltage applied.							
	Capacitance change		≦ ±20% of the initial value					
	Dissipation factor(tanδ)		≦ 200% of the specified value					
	Leakage current		≦ 200% of the specified value					
Others	Conforms to JIS-C-5101-18-2 (1999)							

◆ DIMENSIONS (mm)



Code	Size	ΦD	L	α	A	B	C	W	P
0458	4×5.8	4.0	5.8	+0.4 -0.1	4.3	4.3	5.0	0.5~0.8	1.0
0558	5×5.8	5.0	5.8	+0.4 -0.1	5.3	5.3	5.9	0.5~0.8	1.5
6358	6.3×5.8	6.3	5.8	+0.4 -0.1	6.6	6.6	7.3	0.5~0.8	2.1
6377	6.3×7.7	6.3	7.7	± 0.3	6.6	6.6	7.3	0.5~0.8	2.1
0865	8×6.5	8.0	6.5	± 0.3	8.3	8.3	8.8	0.5~0.8	2.2
08A5	8×10.5	8.0	10.5	± 0.5	8.3	8.3	9.1	0.8~1.2	3.1
10A5	10×10.5	10.0	10.5	± 0.5	10.3	10.3	11	0.8~1.2	4.6
10C5	10×12.5	10.0	12.5	± 0.5	10.3	10.3	11	0.8~1.2	4.6
12D5	12.5×13.5	12.5	13.5	± 1.0	12.8	12.8	13.8	0.8~1.2	4.6
1216	12.5×16	12.5	16.0	± 1.0	12.8	12.8	13.8	0.8~1.2	4.6

◆ MARKING

$\leq 4 \Phi$



5~6.3 Φ



$\geq 8 \Phi$



◆ **PART NUMBER SYSTEM (Example : 16V 100 μ F)**

Diagram illustrating the marking code for a capacitor, showing the relationship between the code digits and their corresponding specifications:

- C**: Series code (CES)
- 1**: Voltage code (16V)
- 0**: Capacitance code (100µF)
- 1**: Capacitance tolerance code (M: ±20%)
- M**: Lead forming Type code
- C**: Terminal length code
- B**: Size code (6377 : 6.3×7.7)
- 6377**: Special Request

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	IMP.D. (Ωmax/ 20°C, 100kHz)	Rated Ripple current (mAmps/ 105°C, 100kHz)	Part Number	
6.3 (0J)	22	4×5.8	3	60	CES0J220MCB0458	
	33	4×5.8	3	60	CES0J330MCB0458	
	33	5×5.8	1.8	95	CES0J330MCB0558	
	47	4×5.8	3	60	CES0J470MCB0458	
	47	5×5.8	1.8	95	CES0J470MCB0558	
	68	5×5.8	1.8	95	CES0J680MCB0558	
	68	6.3×5.8	1.0	140	CES0J680MCB6358	
	100	5×5.8	1.8	95	CES0J101MCB0558	
	100	6.3×5.8	1.0	140	CES0J101MCB6358	
	150	6.3×5.8	1.0	140	CES0J151MCB6358	
	150	6.3×7.7	0.6	230	CES0J151MCB6377	
	220	6.3×5.8	1.0	140	CES0J221MCB6358	
	220	6.3×7.7	0.6	230	CES0J221MCB6377	
	330	6.3×7.7	0.6	230	CES0J331MCB6377	
	470	8×10.5	0.3	450	CES0J471MCB08A5	
	680	8×10.5	0.3	450	CES0J681MCB08A5	
	1000	8×10.5	0.3	450	CES0J102MCB08A5	
	1000	10×10.5	0.15	670	CES0J102MCB10A5	
	1500	10×10.5	0.15	670	CES0J152MCB10A5	
	1500	10×12.5	0.13	750	CES0J152MCB10C5	
	2200	10×12.5	0.13	750	CES0J222MCB10C5	
	2200	12.5×13.5	0.11	820	CES0J222MCB12D5	
	3300	12.5×13.5	0.11	820	CES0J332MCB12D5	
	3300	12.5×16	0.09	950	CES0J332MCB1216	
10 (1A)	22	4×5.8	3	60	CES1A220MCB0458	
	22	5×5.8	1.8	95	CES1A220MCB0558	
	33	4×5.8	3	60	CES1A330MCB0458	
	33	5×5.8	1.8	95	CES1A330MCB0558	
	47	5×5.8	1.8	95	CES1A470MCB0558	
	47	6.3×5.8	1.0	140	CES1A470MCB6358	
	68	6.3×5.8	1.0	140	CES1A680MCB6358	
	100	6.3×5.8	1.0	140	CES1A101MCB6358	
	100	6.3×7.7	0.6	230	CES1A101MCB6377	
	150	6.3×5.8	1.0	140	CES1A151MCB6358	
	150	6.3×7.7	0.6	230	CES1A151MCB6377	
	220	6.3×7.7	0.6	230	CES1A221MCB6377	
	330	8×10.5	0.3	450	CES1A331MCB08A5	
	470	8×10.5	0.3	450	CES1A471MCB08A5	
	680	10×10.5	0.15	670	CES1A681MCB10A5	
	1000	10×10.5	0.15	670	CES1A102MCB10A5	
	1500	10×12.5	0.13	750	CES1A152MCB10C5	
	1500	12.5×13.5	0.11	820	CES1A152MCB12D5	
	2200	12.5×16	0.09	950	CES1A222MCB1216	
	16 (1C)	10	4×5.8	3	60	CES1C100MCB0458
		15	4×5.8	3	60	CES1C150MCB0458
		15	5×5.8	1.8	95	CES1C150MCB0558
		22	4×5.8	3	60	CES1C220MCB0458
		22	5×5.8	1.8	95	CES1C220MCB0558
33		5×5.8	1.8	95	CES1C330MCB0558	
33		6.3×5.8	1.0	140	CES1C330MCB6358	
47		5×5.8	1.8	95	CES1C470MCB0558	
47		6.3×5.8	1.0	140	CES1C470MCB6358	
68		6.3×5.8	1.0	140	CES1C680MCB6358	
68		6.3×7.7	0.6	230	CES1C680MCB6377	
100		6.3×5.8	1.0	140	CES1C101MCB6358	
100		6.3×7.7	0.6	230	CES1C101MCB6377	
150		6.3×7.7	0.6	230	CES1C151MCB6377	
220		6.3×7.7	0.6	230	CES1C221MCB6377	
220		8×6.5	0.6	230	CES1C221MCB0865	
220		8×10.5	0.3	450	CES1C221MCB08A5	
330		8×10.5	0.3	450	CES1C331MCB08A5	
330		10×10.5	0.15	670	CES1C331MCB10A5	
470		8×10.5	0.3	450	CES1C471MCB08A5	
470		10×10.5	0.15	670	CES1C471MCB10A5	
680		10×10.5	0.15	670	CES1C681MCB10A5	
1000		10×10.5	0.15	670	CES1C102MCB10A5	
1500		12.5×13.5	0.11	820	CES1C152MCB12D5	
2200	12.5×16	0.09	950	CES1C222MCB1216		
25 (1E)	4.7	4×5.8	3	60	CES1E4R7MCB0458	
	6.8	4×5.8	3	60	CES1E6R8MCB0458	
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CES Series

◆ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	IMPD. (Ωmax/ 20°C, 100kHz)	Rated Ripple current (mA _{rms} / 105°C, 100kHz)	Part Number
25 (1E)	680	10×12.5	0.13	750	CES1E681MCB10C5
	1000	12.5×13.5	0.11	820	CES1E102MCB12D5
	1500	12.5×16	0.09	950	CES1E152MCB1216
35 (1V)	1	4×5.8	3	60	CES1V010MCB0458
	1.5	4×5.8	3	60	CES1V1R5MCB0458
	2.2	4×5.8	3	60	CES1V2R2MCB0458
	3.3	4×5.8	3	60	CES1V3R3MCB0458
	4.7	4×5.8	3	60	CES1V4R7MCB0458
	6.8	5×5.8	1.8	95	CES1V6R8MCB0558
	10	4×5.8	3	60	CES1V100MCB0458
	10	5×5.8	1.8	95	CES1V100MCB0558
	15	5×5.8	1.8	95	CES1V150MCB0558
	22	5×5.8	1.8	95	CES1V220MCB0558
	22	6.3×5.8	1.0	140	CES1V220MCB6358
	33	6.3×5.8	1.0	140	CES1V330MCB6358
	47	6.3×5.8	1.0	140	CES1V470MCB6358
	47	6.3×7.7	0.6	230	CES1V470MCB6377
	68	6.3×7.7	0.6	230	CES1V680MCB6377
	100	6.3×7.7	0.6	260	CES1V101MCB6377
	100	8×10.5	0.3	450	CES1V101MCB08A5
	150	8×10.5	0.3	450	CES1V151MCB08A5
	220	8×10.5	0.3	450	CES1V221MCB08A5
	220	10×10.5	0.15	670	CES1V221MCB10A5
	330	10×10.5	0.15	670	CES1V331MCB10A5

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	IMPD. (Ωmax/ 20°C, 100kHz)	Rated Ripple current (mA _{rms} / 105°C, 100kHz)	Part Number
35 (1V)	470	10×10.5	0.15	670	CES1V471MCB10A5
	680	10×12.5	0.13	750	CES1V681MCB10C5
	680	12.5×13.5	0.11	820	CES1V681MCB12D5
	1000	12.5×16	0.09	950	CES1V102MCB1216
50 (1H)	1	4×5.8	5	30	CES1H010MCB0458
	1.5	4×5.8	5	30	CES1H1R5MCB0458
	2.2	4×5.8	5	30	CES1H2R2MCB0458
	3.3	4×5.8	5	30	CES1H3R3MCB0458
	4.7	5×5.8	3	50	CES1H4R7MCB0558
	6.8	6.3×5.8	2.0	70	CES1H6R8MCB6358
	10	6.3×5.8	2.0	70	CES1H100MCB6358
	15	6.3×5.8	2.0	70	CES1H150MCB6358
	22	6.3×5.8	2.0	70	CES1H220MCB6358
	22	6.3×7.7	1.0	120	CES1H220MCB6377
	33	6.3×7.7	1.0	120	CES1H330MCB6377
	47	6.3×7.7	1.0	120	CES1H470MCB6377
	68	8×10.5	0.6	300	CES1H680MCB08A5
	100	8×10.5	0.6	300	CES1H101MCB08A5
	150	10×10.5	0.3	500	CES1H151MCB10A5
	220	10×10.5	0.3	500	CES1H221MCB10A5
	330	10×12.5	0.25	580	CES1H331MCB10C5
	330	12.5×13.5	0.20	650	CES1H331MCB12D5
	470	12.5×16	0.15	700	CES1H471MCB1216

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

Size	Cap(μF)	Frequency (Hz)				
		50	120	300	1K	10K~
Φ4~Φ10	1~68	0.35	0.50	0.64	0.83	1.00
	100~2200	0.40	0.55	0.70	0.85	1.00
Φ12.5	~680	0.45	0.65	0.80	0.90	1.00
	1000~3300	0.65	0.85	0.95	1.00	1.00