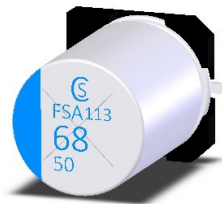


***CONDUCTIVE POLYMER HYBRID
ALUMINUM
ELECTROLYTIC CAPACITORS***



Application Guidelines

1. Polarity

The hybrid aluminum electrolytic capacitors is provided with positive and negative electrodes. Do not reverse the polarity when using. If it is used with the polarities reversed, its life may shorten because of increasing leakage current or short circuit.

2. Prohibited Circuits

Since problems can be expected due to leakage current increasing during soldering and other processes, capacitors cannot be used in the following circuits:

- (1) High impedance circuits
- (2) Coupling circuits
- (3) Time constant circuits
- (4) Connection of two or more capacitors in series for higher withstand voltage
- (5) Circuits to get bad influence by big leakage current

* In addition to the leakage current fluctuation above, the operational conditions such as characteristics at high and low temperature, damp heat and endurance stipulated in the specifications will affect the capacitance. The fluctuation of the capacitance may cause problem if it is used as a time constant capacitor, which is extremely sensitive to the fluctuation of the capacitance. Do not use it as a time constant capacitor. Additionally, please contact Taiwan Chinsan Electronic Industrial Co., Ltd. for usage of two or more capacitors in series for voltage proof.

3. Over-voltage

Over voltage exceeding the rated voltage may not be applied even for an instant as it may cause a short circuit.

4. Charge and Discharge

Do not use capacitors to applications with rapid charge and discharge cycles. Consult us about capacitors specially designed for rapid charge-discharge cycles.

5. Soldering

The soldering conditions are to be within the range prescribed in the specifications. If the specifications are not followed, there is possibility of the appearance becoming defective and increase of abnormal leakage current and capacity reduction when soldering is conducted under conditions that are harsher than those stipulated.

Sufficient PCB installation space (PCB means Printed Circuit Board after this). Sealing resin of capacitors may have a bulge. The design must give consideration to the standard of height and lead position displacement given in the specifications.

6. Use of Capacitors for Industrial Equipment's

To ensure reliability when the capacitors is used in industrial equipment's, design must allow for its capacitance, impedance and other characteristics.

7. Use of Capacitors for Equipment's regarding Human Life

In case of using in equipment's regarding human life (e.g. Space equipment, aeronautic equipment and atomic equipment etc.), be sure to talk over the matter with Taiwan Chinsan Electronic Industrial Co., Ltd. Don't use without recognition document of Taiwan Chinsan Electronic Industrial Co., Ltd.



8. Storage

- (1) Store capacitors with the temperature range between 15 to 35°C and the relative humidity of 75% or less without direct sunshine and store capacitors in the package states if possible.
- (2) Capacitors are recommended that you shall open the bag just before use and capacitors shall be used up.
- (3) Never store capacitors in which it is directly exposed to water, brine, oil or in condensation status.
- (4) Never store capacitors in any area filled with poisonous gases (including hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and ammonia).
- (5) Never store capacitors in any area to which ultraviolet and/or radial rays are radiated.

9. Cleaning

Concerning about HCFC, higher alcohol system, petroleum system, terrene system, water system with surface active agent and other solvents the washing way (separateness or combinations) by soak, ultrasonic wave, boil, vapor etc. is confirmed under the maker's recommendation. Please contact us if you require further details.

10. Notes on circuit designs for capacitors

10.1 Performance

Use capacitors within the rating and performance ranges defined in this specifications.

10.2 Operating temperature and ripple current

If capacitors is used at a temperature higher than the upper category temperature, or excess ripple current flows through capacitors, there are high possibilities of life cycle reduction or leakage current increasing to cause capacitors defective.

10.3 Leakage current

The leakage current of capacitors may increase slightly by soldering conditions. The application of DC voltage enables the capacitors to be repaired by itself and this leads the leakage current to be smaller gradually.

10.4 Applied voltage

For the reliability of capacitors, it is recommended that the voltage applied to the peak value of the ripple voltage should be less than the rated voltage.

10.5 Failure mode

The life ends mostly due to random failure mode, generally open circuit.

10.6 Insulation

Plastic coated case of capacitors can't guarantee the insulation. Do not use capacitors in areas requiring insulation.

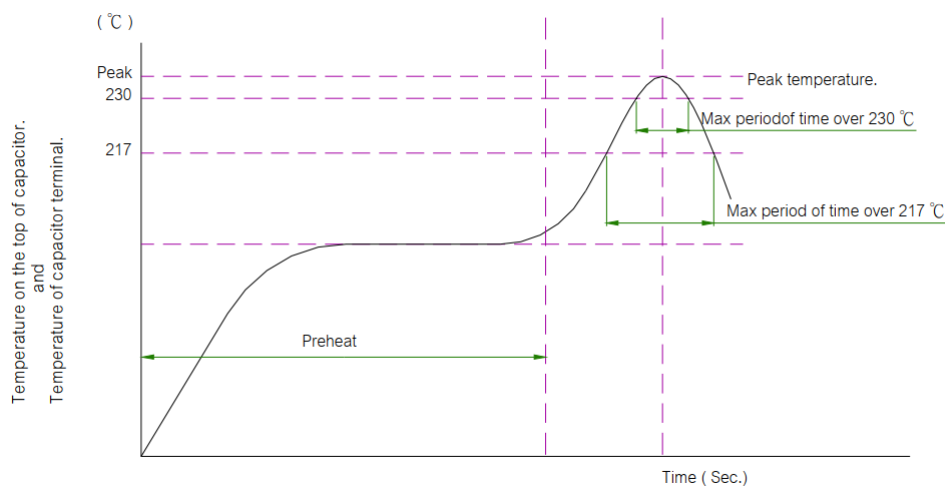
11. Soldering condition for capacitors

11.1 Wave soldering condition for DIP type

Wave soldering	Temperature	Time
Preheating	125°C Max	Within 120 sec
Soldering condition	260±5°C Max	Within 10 sec

11.2 Reflow soldering condition for SMD type

Preheating	>217°C	>230°C	Peak Temp	Reflow times
150°C~180°C 120sec Max	50sec Max	40sec Max	260°C MAX	1 cycle only
			250°C MAX	2 cycles allowed



12. Catalogs

Specifications in the catalogs are subject to change without notice. The data shown in the catalogs are not assured as the whole performance values, but typical values.

For more details, refer to JEITA RCR-2367C (March 2019) with the title “Safety Application Guide for fixed aluminum electrolytic capacitors for use in electronic equipment”.

CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS



◆ MARKING AND DATE CODE

Trade mark(Chinsan) Series Code Rated Capacitance Rated Voltage Negative Polarity CS BRA113 68 50 ≤ 6.3Φ ⊖ A¹¹³ 100 25 ⊕ ≥ 8Φ ⊖ CS BRA¹¹³ 68 50 ⊕																																																															
Trade Mark "CS"	Chinsan mark, Show on Dimension ≥ 8 Φ																																																														
Code (Date Code) (1) (2) (3) 1 1 3	(1)Week <table><tr><td>Code</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Week</td><td>The first week</td><td>The second week</td><td>The third week</td><td>The fourth week</td><td>The fifth week</td></tr></table> (2)Month <table><tr><td>Code</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>Month</td><td>Jan</td><td>Feb</td><td>Mar</td><td>Apr</td><td>May</td><td>Jun</td></tr><tr><td>Code</td><td>7</td><td>8</td><td>9</td><td>X</td><td>Y</td><td>Z</td></tr><tr><td>Month</td><td>July</td><td>Aug</td><td>Sep</td><td>Oct</td><td>Nov</td><td>Dec</td></tr></table> (3)Year <table><tr><td>Code</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>0</td></tr><tr><td>Year</td><td>2021</td><td>2022</td><td>2023</td><td>2024</td><td>2025</td><td>2026</td><td>2027</td><td>2028</td><td>2029</td><td>2030</td></tr></table>	Code	1	2	3	4	5	Week	The first week	The second week	The third week	The fourth week	The fifth week	Code	1	2	3	4	5	6	Month	Jan	Feb	Mar	Apr	May	Jun	Code	7	8	9	X	Y	Z	Month	July	Aug	Sep	Oct	Nov	Dec	Code	1	2	3	4	5	6	7	8	9	0	Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
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Series (Print Code)	<table><tr><td>Series</td><td>BRA</td><td>FSA</td></tr><tr><td>Φ 6.3</td><td>A</td><td>A</td></tr><tr><td>Φ 8~ Φ 10</td><td>BRA</td><td>FSA</td></tr></table>	Series	BRA	FSA	Φ 6.3	A	A	Φ 8~ Φ 10	BRA	FSA																																																					
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CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS



PART NUMBER SYSTEM

◆ Hybrid

Series	Rated Voltage	Capacitance	Tolerance	Lead Type	Lead Length	Case Dimension	Special Request
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
□ □ □	□ □	□ □ □	□	□	□	□ □ □ □	□ □ □ □ □ □ □

(1) Series

Series	SMD	FSA
	DIP	BRA

(2)

Rated Voltage

Code	1E	1V	1H	1J	1K
WV	25	35	50	63	80

(3) Capacitance

Code	220	680	151	102
μF	22	68	150	1000

(4) Capacitance Tolerance

Code	J	Q	R	K	V	M	H
%	± 5	+30 / -10	+20 / -0	± 10	+20 / -10	± 20	+20 / -5

(5) Lead Type

Code	N	C	P
Description	Long Lead	Cutting	Taping
Drawing	---	Fig 1	Fig 10,11,12

(6) Lead Length

Code	3	4	U	7	D	X	R	B	E	G	2	M	T	N
Length	3.5	4.5	5.5	7	4	2.3	2.5	2.8	3.1	3.3	2.5	3.5	3.8	+20mm min
Tolerance	±0.5					±0.2					±0.3			-15mm min

Taping Code

Code	Z	2	3	5
Lead Pitch: +0.8/-0.2	2.0	2.5	3.5	5.0

(7) Case Dimension

DIP Code	6307	6308	0809	1010	1012	1015	
Size	6.3×7	6.3×8	8×9	10×10	10×12	10×15	
SMD Code	6377	6309	08A5	1010	1012	10D5	10G5
Size	6.3×7.7	6.3×9	8×10.5	10×10	10×12	10×13.5	10×16.5

(8) Special Request

Code	R	F	U	E
Description	High Rated Ripple Current	Endurance	Convex Rubber	Low ESR
Code	X	---	---	---
Description	Pitch 2.5mm	---	---	---

CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS



FSA Series

- Low ESR at a high frequency range
- High ripple current capability
- Load life 4,000 hours at 125°C



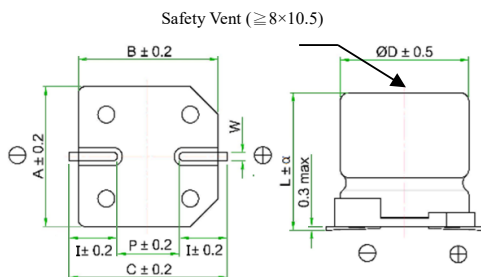
SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +125°C								
Working Voltage Range	25 ~ 80Vdc								
Surge Voltage	Rated Voltage ×1.15								
Capacitance Range	22 ~ 1000 μF								
Capacitance Tolerance	±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	$Z(-25^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.5$ at 100KHz $Z(-55^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 2.0$ at 100KHz								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 4,000 hours at 125°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>Dissipation factor(tanδ)</td><td>≤ 200% of the specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the specified value</td></tr> <tr> <td>Leakage current</td><td>≤ specified value</td></tr> </table>	Capacitance change	≤ ±30% of the initial value	Dissipation factor(tanδ)	≤ 200% of the specified value	ESR	≤ 200% of the specified value	Leakage current	≤ specified value
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Dissipation factor(tanδ)	≤ 200% of the specified value								
ESR	≤ 200% of the specified value								
Leakage current	≤ specified value								
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 85°C 85% RH. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>Dissipation factor(tanδ)</td><td>≤ 200% of the specified value</td></tr> <tr> <td>Leakage current</td><td>≤ specified value</td></tr> </table>	Capacitance change	≤ ±30% of the initial value	Dissipation factor(tanδ)	≤ 200% of the specified value	Leakage current	≤ specified value		
Capacitance change	≤ ±30% of the initial value								
Dissipation factor(tanδ)	≤ 200% of the specified value								
Leakage current	≤ specified value								
Other	Conforms to JIS-C-5101-18-2 (1999)								

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C.

※2 ESR should be measured at both of the terminal ends closest to the capacitor body.

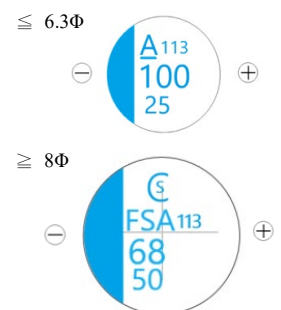
DIMENSIONS (mm)



LEAD

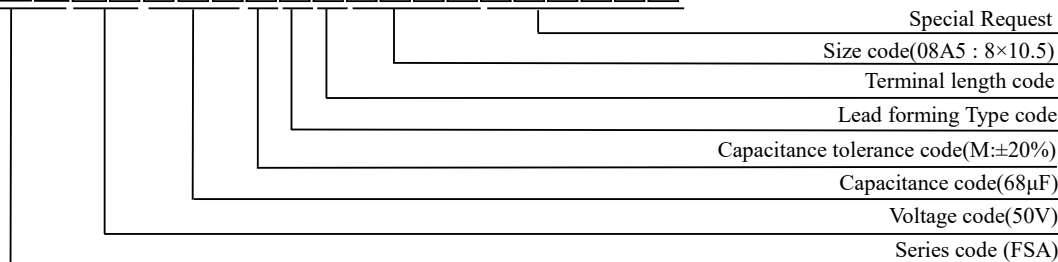
Code	ΦD	L	α	A	B	C	I	W	P
6377	6.3	7.7	0.3	6.6	6.6	7.3	2.60	0.5~0.8	2.1
6309	6.3	9	+1 0	6.6	6.6	7.3	2.60	0.7~1.1	2.1
08A5	8	10.5	0.5	8.3	8.3	9	2.90	0.7~1.1	3.2
1010	10	10	0.5	10.3	10.3	11	3.20	0.7~1.1	4.6
1012	10	12	0.5	10.3	10.3	11	3.20	0.7~1.1	4.6
10D5	10	13.5	0.5	10.3	10.3	11	3.20	0.7~1.1	4.6
10G5	10	16.5	0.5	10.3	10.3	11	3.20	0.7~1.1	4.6

MARKING



PART NUMBER SYSTEM (Example : 50V 68μF)

F S A I H 6 8 0 M C B 0 8 A 5



CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS



FSA Series

◆ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	ESR 100~300KHz (mΩmax)	Rated Ripple current (mA rms/ 125°C, 100KHz)	Tanδ max	Leakage Current (μA max)	Part Number
25 (1E)	100	6.3×7.7	30	1400	0.14	25	FSA1E101MCB6377
	150	6.3×9	30	1400	0.14	37.5	FSA1E151MCB6309
	220	8×10.5	27	1600	0.14	55	FSA1E221MCB08A5
	270	8×10.5	27	1600	0.14	67.5	FSA1E271MCB08A5
	330	8×10.5	27	1600	0.14	82.5	FSA1E331MCB08A5
	330	10×10	20	2000	0.14	82.5	FSA1E331MCB1010
	470	10×10	20	2300	0.14	117.5	FSA1E471MCB1010
35 (1V)	1000	10×16.5	14	4000	0.14	250	FSA1E102MCB10G5
	100	6.3×9	33	1500	0.12	35	FSA1V101MCB6309
	100	8×10.5	27	1600	0.12	35	FSA1V101MCB08A5
	150	8×10.5	27	1600	0.12	52.5	FSA1V151MCB08A5
	220	10×10	20	2000	0.12	77	FSA1V221MCB1010
	270	10×10	20	2000	0.12	94.5	FSA1V271MCB1010
	270	10×12	20	2200	0.12	94.5	FSA1V271MCB1012
	330	10×10	20	2000	0.12	115.5	FSA1V331MCB1010
	330	10×12	17	2400	0.12	115.5	FSA1V331MCB1012
	470	10×13.5	14	3500	0.12	164.5	FSA1V471MCB10D5
50 (1H)	680	10×16.5	14	4000	0.12	238	FSA1V681MCB10G5
	47	8×10.5	30	1250	0.10	23.5	FSA1H470MCB08A5
	68	8×10.5	30	1250	0.10	34	FSA1H680MCB08A5
	82	8×10.5	30	1250	0.10	41	FSA1H820MCB08A5
	100	10×10	28	1600	0.10	50	FSA1H101MCB1010
63 (1J)	120	10×10	28	1600	0.10	60	FSA1H121MCB1010
	33	8×10.5	40	1100	0.08	20.8	FSA1J330MCB08A5
	47	8×10.5	40	1100	0.08	29.61	FSA1J470MCB08A5
	56	10×10	30	1400	0.08	35.28	FSA1J560MCB1010
	68	10×10	30	1400	0.08	42.84	FSA1J680MCB1010
	82	10×10	30	1400	0.08	51.66	FSA1J820MCB1010
	100	10×10	30	1600	0.08	63	FSA1J101MCB1010
	100	10×12	22	1900	0.08	63	FSA1J101MCB1012
	150	10×16.5	19	2200	0.08	94.5	FSA1J151MCB10G5
80 (1K)	22	8×10.5	45	1050	0.08	17.6	FSA1K220MCB08A5
	39	10×10	36	1100	0.08	31.2	FSA1K390MCB1010
	47	10×10	36	1360	0.08	37.6	FSA1K470MCB1010
	56	10×12	36	1360	0.08	44.8	FSA1K560MCB1012
	100	10×16.5	36	1700	0.08	80	FSA1K101MCB10G5

BRA Series

- Low ESR at a high frequency range
- High ripple current capability
- Load life 4,000 hours at 125°C



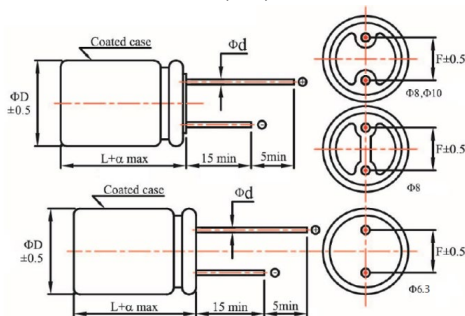
SPECIFICATIONS

Item	Performance Characteristics								
Category Temperature Range	-55 ~ +125°C								
Working Voltage Range	25 ~ 80Vdc								
Surge Voltage	Rated Voltage × 1.15								
Capacitance Range	22 ~ 1000 μF								
Capacitance Tolerance	±20% (at 25°C and 120Hz)								
ESR	See the standard ratings table (at 25°C, 100~300KHz)								
Dissipation Factor (tanδ)	See the standard ratings table (at 25°C, 120Hz)								
Leakage Current ※1	See the standard ratings table (Impress the rated voltage for 2 minutes)								
Low Temperature Characteristics Impedance Ratio	$Z(-25^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.5$ at 100KHz $Z(-55^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 2.0$ at 100KHz								
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 4,000 hours at 125°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>Dissipation factor(tanδ)</td><td>≤ 200% of the specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the specified value</td></tr> <tr> <td>Leakage current</td><td>≤ specified value</td></tr> </table>	Capacitance change	≤ ±30% of the initial value	Dissipation factor(tanδ)	≤ 200% of the specified value	ESR	≤ 200% of the specified value	Leakage current	≤ specified value
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ESR	≤ 200% of the specified value								
Leakage current	≤ specified value								
Damp Heat (Steady State)	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 85°C 85% RH. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>Dissipation factor(tanδ)</td><td>≤ 200% of the specified value</td></tr> <tr> <td>Leakage current</td><td>≤ specified value</td></tr> </table>	Capacitance change	≤ ±30% of the initial value	Dissipation factor(tanδ)	≤ 200% of the specified value	Leakage current	≤ specified value		
Capacitance change	≤ ±30% of the initial value								
Dissipation factor(tanδ)	≤ 200% of the specified value								
Leakage current	≤ specified value								
Other	Conforms to JIS-C-5101-4-1 (1998)								

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C.

※2 ESR should be measured at both of the terminal ends closest to the capacitor body.

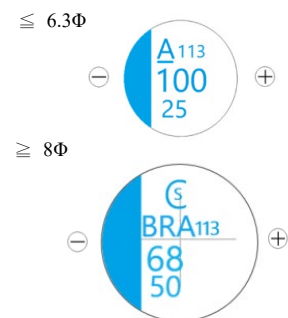
DIMENSIONS (mm)



LEAD

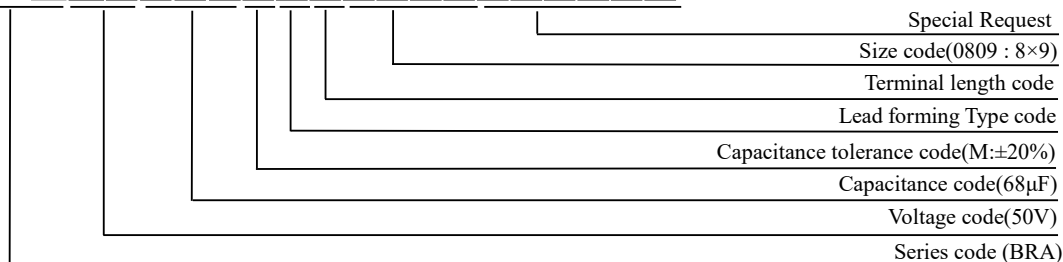
ΦD	6.3	6.3	8	10
Φd	0.45	0.6	0.6	0.6
L	7	8	9	10~15
α	1	1	1.5	1.5
F	2.5	2.5	3.5	5.0

MARKING



PART NUMBER SYSTEM (Example : 50V 68μF)

B R A 1 H 6 8 0 M N N 0 8 0 9



CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS



BRA Series

◆ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	ESR 100~300KHz (mΩmax)	Rated Ripple current (mA _{rms} /125°C, 100KHz)	Tanδ max	Leakage Current (μA max)	Part Number
25 (1E)	100	6.3×7	30	1400	0.14	25	BRA1E101MNN6307
	150	6.3×8	30	1400	0.14	37.5	BRA1E151MNN6308
	220	8×9	27	1600	0.14	55	BRA1E221MNN0809U
	270	8×9	27	1600	0.14	67.5	BRA1E271MNN0809U
	330	8×9	27	1600	0.14	82.5	BRA1E331MNN0809U
	330	10×10	20	2000	0.14	82.5	BRA1E331MNN1010U
	470	10×10	20	2300	0.14	117.5	BRA1E471MNN1010U
	1000	10×15	14	4000	0.14	250	BRA1E102MNN1015U
35 (1V)	100	6.3×8	33	1500	0.12	35	BRA1V101MNN6308
	100	8×9	27	1600	0.12	35	BRA1V101MNN0809U
	150	8×9	27	1600	0.12	52.5	BRA1V151MNN0809U
	220	10×10	20	2000	0.12	77	BRA1V221MNN1010U
	270	10×10	20	2000	0.12	94.5	BRA1V271MNN1010U
	270	10×12	20	2200	0.12	94.5	BRA1V271MNN1012U
	330	10×10	20	2000	0.12	115.5	BRA1V331MNN1010U
	330	10×12	17	2400	0.12	115.5	BRA1V331MNN1012U
	470	10×12	14	3500	0.12	164.5	BRA1V471MNN1012U
	680	10×15	14	4000	0.12	238	BRA1V681MNN1015U
50 (1H)	47	8×9	30	1250	0.10	23.5	BRA1H470MNN0809U
	68	8×9	30	1250	0.10	34	BRA1H680MNN0809U
	82	8×9	30	1250	0.10	41	BRA1H820MNN0809U
	100	10×10	28	1600	0.10	50	BRA1H101MNN1010U
	120	10×10	28	1600	0.10	60	BRA1H121MNN1010U
63 (1J)	33	8×9	40	1100	0.08	20.8	BRA1J330MNN0809U
	47	8×9	40	1100	0.08	29.61	BRA1J470MNN0809U
	56	10×10	30	1400	0.08	35.28	BRA1J560MNN1010U
	68	10×10	30	1400	0.08	42.84	BRA1J680MNN1010U
	82	10×10	30	1400	0.08	51.66	BRA1J820MNN1010U
	100	10×10	30	1600	0.08	63	BRA1J101MNN1010U
	100	10×12	22	1900	0.08	63	BRA1J101MNN1012SU
	150	10×15	19	2200	0.08	94.5	BRA1J151MNN1015U
80 (1K)	22	8×9	45	1050	0.08	17.6	BRA1K220MNN0809U
	39	10×10	36	1100	0.08	31.2	BRA1K390MNN1010U
	47	10×10	36	1360	0.08	37.6	BRA1K470MNN1010U
	56	10×12	36	1360	0.08	44.8	BRA1K560MNN1012U
	100	10×15	36	1700	0.08	80	BRA1K101MNN1015U