

承認書編號 NO: SFAK2-1511000007

系列 SER.NO.: SJ

承認書

APPROVAL SHEET

FOR AL. ELECTROLYTIC CAPACITORS

承認
APPROVED BY:

SJ series

簽認後，請送回一份。

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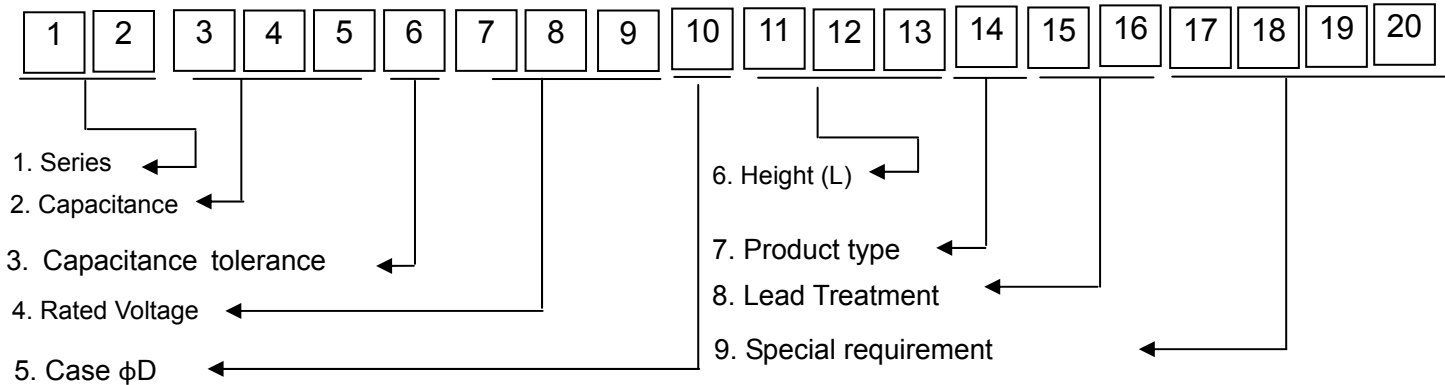


CapXon

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Part Number System

When placing and order for Aluminum Electrolytic Capacitors. Please observe following Catalog Part Number format that describes.



(1).Series

The series name.

(2).Capacitance

Capacitance is show in microfarad (μ F)

Capacitance (μ F)	0.1	0.47	1	4.7	10	100	1000	10000
Code	0R1	R47	010	4R7	100	101	102	103

(3).Capacitance tolerance

Tolerance%	± 5	± 10	± 20	± 30	-10to+30	-10to+50	-10to+20	-10to100	0to+20	-30to+0	± 15
Code	H	K	M	N	Q	T	V	W	Z	U	S
Tolerance%	0to+30	0to+40	0to+50	-5to+20	-8to+5	+5to+20	0to-20	-15to+20	-25to+20	-50to+0	-5to+30
Code	Y	X	A	J	E	I	B	P	L	O	C

For tolerance other than these and specified capacitance tolerance, please specify the value on the order sheet.

(4).Voltage (W.V)

Voltage (W.V)	6.3	10	16	25	35	50	63	80	100	160	200	220	250	350	400	420	450	500
Code	6R3	010	016	025	035	050	063	080	100	160	200	220	250	350	400	420	450	500

(5).Case (ϕ D: mm)

Diameter	3	4	5	6.3	7.3	8	10	12	13	16	18	20	22	25	30	35	40	42	45	51	63.5	76.2	89	14.5	12.5
Code	A	B	C	E	7	F	G	H	I	J	K	L	M	N	O	P	Q	U	V	R	S	T	X	Y	Z

(6). Height (L: mm)

Description	5	5.5	7	7.7	8	11	11.5	12	12.5	14	16	20	21	25	25.5	31.5	35	35.5	41	47	52	83	98	118	141	151
Code	050	055	070	077	080	110	115	120	125	140	160	200	210	250	255	315	350	355	410	470	520	830	980	A18	A41	A51

(7). Product type

Type	Without Lead Treatment	With Lead Treatment
Code	A	E

(8). Lead Treatment (Radial type)

Description	Taping (Ammo Package)	Taping (Reel Package)	Lead Cutting	Lead Forming Cutting	Lead Forming only	Lead Crimping & Forming	Lead Cutting & Kink	Kink	Bending & Cutting	Forming & Kink
Code	TA、TB、TC、TD、TE、TF、ETC.	RA、RB、RC、RD、RE、 Etc.	CA	CF	FA	KF	CK	KA	CR、CL	EF

Remarks: The product of V- chip sticks a dish to process form is "TR".

(9) Special & appearance requirement (the 17th, 18th, 19th, 20th code)

Code	Special		Code	Special		Code	request characteristic		Code	Special
A	Terminals of Snap-in		H	Height requirement		R	Ripple current		U	Package & label
B	Rubber		I	L.C.		S	countermeasure			
C	Lead wire		K	Vent line		T	Temperature characteristic			
D	D.F.		L	Life		V	Vt, Electrolyte paper			
E	Electrolyte		N	Nude		M	Solder, technics, form, Case with pillar,			
F	Pitch		P	Sleeve, tray, print, PVC sleeve		Y	clip loop			
G	Fill glue		Q	Capacitance, CV, Break		Z	Impedance & ESR			

Remarks:

1. If it's without lead treatment & special requirement, the 15th code is blank.
2. If it's with lead treatment & without require special requirement, the 17th, 18th, 19th, 20th code is blank.
3. If it's without lead treatment, but with special requirement, the 15th, 16th code filled with 0.
4. If it's without lead treatment, but with special requirement, also exceeds 4 kinds, keystone characteristic is 4 codes.
5. If it's with lead treatment, but with 1 special requirement, only remark 17th code, latter three codes is blank.
6. If it's with lead treatment, but with 1 special requirement, and it is different from former data, the 17th is 0, the 18th code is characteristic.

Information

1. Maximum ripple current

1.1 Maximum RMS ripple current at +105°C, 120Hz.

1.2 When capacitors are operated at temperatures other than +105°C, and frequency other than 120Hz, the maximum RMS ripple currents must be multiplied by the factors shown in below table.

Multiplier for Ripple Current vs. Frequency:

CAP (uF) \ Frequency(Hz)	50(60)	120	400	1K	10K	50~100K
CAP ≤ 10	0.8	1.0	1.30	1.45	1.65	1.70
10<CAP ≤ 220	0.8	1.0	1.23	1.36	1.48	1.53

1.3 When frequency is different from specified condition shown as above, do not exceed the value obtained by multiplying the permissible maximum ripple current by the multiplier above. The ripple current verify methods according to JIS-C-5101-1(2010) No.: 4.23

☆ Note: 1) Ripple current corrected with working frequency

2) Check the generated heat of capacitor when ripple current is hard to measure in the circuit.

Promoted temperature by self-generating heat should be within 5°C.

2. Working Voltage (WV)

Make sure that no excess voltage (that is, higher than the rated voltage) is applied to capacitor. Please pay attention so that the peak voltage, which is DC voltage, overlapped by ripple current, will not exceed the rated voltage.

3. Insulating

General types of aluminum electrolytic capacitors are covered with a vinyl sleeve or the like. And this Sleeve is used for marking. When the internal element or the container is needed to be insulated, capacitors specially designed for insulation requirement are recommended to be used.

4. Soldering

4.1 When soldering a PC board with various components, too high soldering temperature or too long dipping time may cause secondary shrinking of the sleeve and then the container unnecessarily exposed.

The soldering must be done on the reverse of PC board.

4.2 Soldering may melt or break the sleeve when the sleeve is contacted with circuit boards. So the capacitors are recommended to be slightly apart from the circuit boards.

5. Vent

The capacitor ($\Phi \geq 10\text{mm}$) is provided with a safety vent on the bottom of the container. The vent would rupture in the event of the unsafe usage or misuse and relieve the internal higher pressure.

6. High Altitude

The capacitors can withstand those transportation conditions that temperature may range from -40°C to +105°C, and the altitude may reach 200,000 feet.

7. Cleaning agents:

If the capacitor is cleaned in halogenated agents for organic removing solder flux solvent, the agents may penetrate into the inside of capacitor, and may generate corrosion.

8. Environment-friendly policy

In the entire process of capacitor's production, including manufacture, packaging, storage and transportation, our company always comply with the related Environmental Protection Laws and Regulations of RoHS.

9. Mounting and Installation design according to EIAJ RCR-2367 standards.

1. Performance

Test environment:

Methods	Temperature (°C)	Relative humidity (RH)	Atomospheric (Kpa)
①	15~35	25~75%	86~106
②	25±10	40~60%	86~106
③	20±1	63~67%	86~106

Remark:

- ①: Normal testing & the test results without doubt.
- ②: Normal testing & the test results with doubt.
- ③: Testing it in standard laboratory & the test results still with judgement.

1-1.Leakage current (L.C.)

(Conditions)

Rated voltage shall be applied to capacitors in series with a resistor of $1000 \pm 10 \Omega$.

Then leakage current shall be measured at the end of a specified period after the capacitors reached the rated voltage across the terminals.

(Criteria)

$I \leq 0.01CV$ or $3 (\mu A)$ {I: Leakage Current(μA); C: Capacitance (μF); V: Rated voltage (V)}

After 1 minutes whichever is greater measured with rated working voltage applied.

1-2.Capacitance (Cap.)

(Conditions)

Measuring frequency : 120Hz±20%

Measuring voltage : 0.5Vrms max. +1.5 to 2.0VDC

Measuring circuit : Series equivalent circuit

(Criteria)

Shall be within the specified capacitance tolerance.

1-3.Dissipation factor(tanδ)

(Conditions)

Measuring frequency : 120Hz±20%

Measuring voltage : 0.5Vrms max. +1.5 to 2.0VDC

Measuring circuit : Series equivalent circuit

(Criteria)

W.V.(V)	6.3	10	16	25	35	50	63
D.F.(%)max.	24	20	16	14	12	10	9

1-4.Terminal strength

(1) Pull strength

(Conditions)

The capacitor body shall be held. A force shall be gradually applied to the lead wire in the direction of the axis of the lead wire up to the specified pull force, and retained for 10 ± 1 seconds.

Diameter of terminal (mm)	Pull force(N±10%)
$0.35 < d \leq 0.5$	5(0.51Kg)
$0.5 < d \leq 0.8$	10(1.02Kg)
$0.8 < d \leq 1.25$	20(2.04Kg)
SNAP-IN type terminal	40(4.08Kg)

(Criteria)

The lead wire shall neither loosen nor break away.

(2) Lead bending strength

(Conditions)

The capacitor shall be held so that the normal axis of the lead wire can be in a vertical position.

A weight equivalent to the specified load shall be hung on the end of the lead wire.

The capacitor body shall be inclined through 90° and returned to its normal position within 2 to 3 seconds. The consecutive bend shall then be in the opposite direction in the same manner.

Diameter of terminal (mm)	Pull force(N±10%)	Bends
$0.35 < d \leq 0.5$	2.5N(0.26 Kg)	2
$0.5 < d \leq 0.8$	5 N(0.51 Kg)	2
$0.8 < d \leq 1.25$	10N(1.02 Kg)	2
LUG type terminal	20N(2.04Kg)	2

SNAP-IN type terminals do not bending experiments, LUG terminal do bending test, bending angle of 45 degree centigrade.

(Criteria)

The lead wire shall neither loosen nor break away.

1-5.Soldering Heat Resistance Test

(Conditions)

Type of solder	: Sn-3Ag-0.5Cu
Flux	: Ethanol solution(25 wt.% rosin)
Solder temperature/immersion time	: 260(0~+3)°C for 10±1 seconds
Solder iron temperature/time	: 400±10°C for 5 to 6 seconds,3 times
Depth of immersion	: Up to 1.5-2.0mm from the root of the lead wire covered with a thermal shield plate
Speed of immersion	: 25±2.5mm/sec.

(Criteria)

Appearance	: No significant damage, legible marking, and no electrolyte leakage.
Capacitance change	: Within ±5% of initial value.
Tan δ	: Not more than the specified value
Leakage current	: Not more than the specified value

1-6. Solderability Test

(Conditions)

Type of solder	: Sn-3Ag-0.5Cu
Flux	: Ethanol solution (25 wt.% rosin)
Solder temperature	: 245±5°C
Depth of immersion	: Up to 1.5-2.0mm from the root of the lead wire covered with a thermal shield plate
Dipping time	: 2±0.5 seconds

(Criteria)

At least 95% of circumferential surface of the dipped portion of terminal shall be covered with new solder.

1-7. Temperature cycles

(Conditions)

Referring to JIS-C- 5101-1 (2010) No:1-10, the capacitor shall be subjected in turn to the procedures specified below:

Step	Temperature	Time (min.)	Cycles
1	Rated low working temperature (-40±3℃)	30±3	1 to 4 = 1cycle, total 10 cycles.
2	25±5℃	3	
3	Rated high working temperature (105±2℃)	30±3	
4	25±5℃	3	

Remark: If the highest working temp. over than 125℃, the using temp. tolerance is ±5℃.

(Criteria)

Capacitance change	: Within ±5% of initial value.
Tan δ	: Not more than the specified value
Leakage current	: Not more than the specified value
Appearance	: No leakage and damaged.

1-8. Vibration

(Conditions)

Vibration frequency range	: 2 to 3000Hz
Amplitude or Acceleration	: 0.75 mm (Half amplitude) or 98m/s ² (Whichever is less severe)
The vibration amplitude of P-P value	: 0mm~25mm
Test frequency	: 10-55-10Hz (Approximately 1 minute)
Direction and duration of vibration	: 3 orthogonal directions mutually each for 2h.(Total 6hrs)

(Criteria)

Capacitance change	: Within ±5% of initial value.
Tan δ	: Not more than the specified value
Leakage current	: Not more than the specified value
Appearance	: No leakage and damaged.

1-9. Damp Heat Steady State Test

(Conditions)

Test temperature	: +40±2℃
Relative humidity	: 90% to 95%RH
Test time	: 250 hours
After completion of test, the capacitors shall expose in the atmospheric condition for 16 hours, and then measurements shall be taken.	

(Criteria)

Capacitance change	: Within ±20% of initial value.
Tan δ	: Not more than 120% of the specified value
Leakage current	: Not more than the specified value
Appearance	: No leakage and damaged.

1-10.Endurance

(Conditions)

Capacitors shall be placed in an oven with application of the rated D.C voltage

Ambient temperature : $105 \pm 2^{\circ}\text{C}$

Specified test time : 2000 hours

(Criteria)

Capacitance change : Within $\pm 20\%$ of initial value. (4V: $\leq \pm 30\%$)

Tan δ : Not more than 200% of the specified value

Leakage current : Not more than the specified value

Appearance : No leakage and damaged.

1-11.Surge voltage test

(Conditions)

Test temperature : $+15$ to $+35^{\circ}\text{C}$

Series protective resistor : $1000 \pm 10\Omega$

Charge and discharge time : Charge period is 30s,
followed by a discharge period of 5.5 min.

Test cycle : 1000 cycles.

Rated voltage $\leq 315\text{V}$: Surge voltage shall be 1.15 times the rated voltage

Rated voltage $> 315\text{V}$: Surge voltage shall be 1.1 times the rated voltage

(Criteria)

Capacitance change : Within $\pm 15\%$ of initial value.

Tan δ : Not more than the specified value

Leakage current : Not more than the specified value

Appearance : No leakage and damaged.

1-12.High Temperature Storage

(Conditions)

The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000 hours at $105 \pm 2^{\circ}\text{C}$ without an applied voltage. Before the measurements, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.

(Criteria)

Capacitance change : Within $\pm 20\%$ of initial value.

Tan δ : Not more than 200% of the specified value

Leakage current : Not more than the specified value

Appearance : No leakage and damaged.

1-13.High and Low Temperature characteristics

(Conditions)

Step	Temperature [$^{\circ}\text{C}$]	Time
1	$+20 \pm 2$	/
2	-40 ± 3	2h
3	$+20 \pm 2$	15 ± 2 min.
4	$+105 \pm 2$	2h
5	$+20 \pm 2$	15 ± 2 min.

(Criteria)

Step 2: Impedance ratio shall not exceed the values shown in Table attached.

[120Hz]

Rated Voltage(V)	6.3	10	16	25	35	50	63
Z-25℃/Z+20℃	4	3	2	2	2	2	2
Z-40℃/Z+20℃	8	6	4	4	3	3	3

For capacitance value > 1000μF: 1). add 0.5 per another 1000μF for -25℃/+20℃

2). add 1.0 per another 1000 μF for -40℃/+20℃

Step 4. Capacitance change

: Within ±30% of initial value.

Tan δ

: Not more than the specified value.

Leakage current

: Shall not more than 800% of initial specified value.

2. Reference standard

SJ series is applicable to general-purpose grade capacitors of JIS-C-5101-1(2010)

The other test conditions shall comply with JIS-C-5101-4(2010).

3. Marking

The following items shall be marked on each capacitor. All marking shall be legible and permanent.

(Example)

(1) CapXon: Manufacturer: trademark

(2) 16V: Rated voltage

(3) 100μF: Nominal capacitance

(4) : (-)Polarity (Cathode indicate)

(5) 105℃: Maximum operating temperature.

(6) SJ: Series

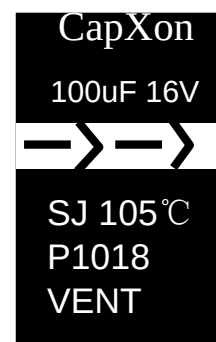
(7) P1018: Production date code

(P: PET Sleeve; 10: year 2010 18: the 18 week)

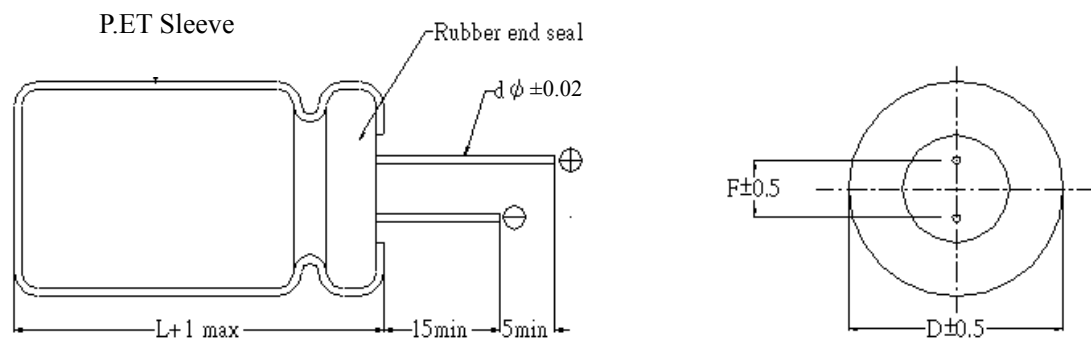
(8) VENT: Safety vent (≧ 6.3X11mm、8X7mm have mark of vent)

Front side:

Back side:



6. Diagram of Dimension (Unit = mm)



$D \phi$	4	5	6.3	8
F	1.5	2.0	2.5	3.5
$d \phi$	0.45		0.5	

Case Size

φ DxL(mm)

WV Cap(μF)	6.3		10		16		25	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
4.7							4x7	17
6.8					4x7	19	4x7	19
10					4x7	28	4x7	28
15							5x7	33
22	4x7	28	4x7	26	4x7	30	5x7	35
				32	4x7	35	5x7	43
33	4x7	32	5x7	48	5x7	42	6.3x7	45
	5x7	35			5x7	50	6.3x7	62
47	5x7	47	5x7	51	6.3x7	67	8x7	75
68	5x7	50	6.3x7	68	6.3x7	70	8x7	80
					8x7	78		
100	6.3x7	75	6.3x7	80	8x7	110	8x7	115
			8x7	95				
220	8x7	92	8x7	130				

WV Cap(μF)	35		50		63	
	Size	Ripple	Size	Ripple	Size	Ripple
0.1			4x7	1.5	4x7	1.5
0.15			4x7	1.8	4x7	1.8
0.22			4x7	2.5	4x7	2.5
0.33			4x7	3.5	4x7	3.5
0.47			4x7	5	4x7	6
0.68			4x7	7	4x7	7
1			4x7	10	4x7	12
1.5			4x7	13	4x7	14
2.2			4x7	20	4x7	20
3.3			4x7	26	5x7	28
4.7	4x7	22	4x7	27	5x7	29
			5x7	29	6.3x7	33
6.8	4x7	24	5x7	32	6.3x7	35
	5x7	28	6.3x7	33		
10	5x7	35	6.3x7	38	6.3x7	40
15	5x7	38	6.3x7	52	8x7	55
	6.3x7	45				
22	6.3x7	60	8x7	63	8x7	65
33	6.3x7	50	8x7	78		
	8x7	68				
47	8x7	80				
68	8x7	85				

Ripple Current (mA, rms) at 105°C 120Hz

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