

RoHS

MESSRS: 上海盈虹电子

APPROVAL NO 697-006

DATE 2016.05.18

ALUMINUM ELECTROLYTIC

CAPACITOR

APPROVAL SHEET

CATALOG TYPE	NHA SERIES
CATALOG TIPE	
USER PART NO.	
适用机种	
特记事项	Halogen-Free

QINGDAO SAMYOUNG ELECTRONICS CO.,LTD.

MANAGER OF DEVELOPMENT DEPARTMENT

GONG JANG SUG



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APPROVAL NO.:

SamYoung(Korea): 47,SAGIMAKGOL-RO,JUNGWON-GU,SEONGNAM-SI,GYEONGGI-DO,KOREA

SamYoung(China): No.5 CHANGJIANG ROAD, PINGDU-CITY, SHANDONG-PROVINCE, CHINA

样式: H-1001-011 A4 (210×297)



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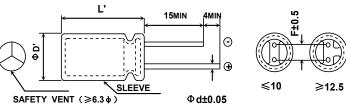
DATE: 2016.05.18

Specifications of NHA Series

Item	Characteristics												
Rated Voltage Range		6.3 ~ 100	V _{DC}				1	160 ~ 40	00V _{DC}			450 ~ 50	0VDC
Operating Temperature Range		- 55 ~ + 10		-	40 ~ +	105 ℃			- 25 ~ + 105 ℃				
Capacitance Tolerance						•	±20%	<m></m>				(at 20°	ர், 120Hz)
	Afte	er 1 minute:0.03CV(µA)	or 4	ŀμA,w	hicheve	r is grea	ter		After 1	minute		After 5 m	ninutes
Leakage Current	Aft	er 2 minutes:0.01CV(µA) or	3 μA,	whichev	er is gre	ater	C-1/	R≤1000	C _R V _R >10	00 C-	V _R ≤1000	C _R V _R >1000
(at 20 ℃)	Wr	ere, C = Nominal capa	citar	nce(µF	=)			CRV	₹ 1000	GRVR>10	UU CR	VR 1000	SRVR > 1000
		V = Rated Voltage	e(V _D	c)				0.10	RVR+40	0.04C _R V _R +	100 0.0	3C _R V _R +15 0	.02C _R V _R +25
Dissipation Factor (ΤΑΝδ)		Rated Voltage(VDC)	6.	.3	10	16	25	35	50	63	100	160~250	350~500
(20℃,120Hz)		TANδ (Max)	0.3	34	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.20	0.24
	7	When the capacitance e	хсеє	eds 10	000µF,0.	02 shall	be adde	ed every	1000µF	increase.			
Temperature Characteristics		Rated Voltage(VDC)		6.3	10	16	25	35	50	63~100	160	200~400	450~500
- Simporatara and accompany		Z (-25°C) /Z (20°C)		5	4	3	2	2	2	3	3	6	6
(Impedance ratio at 120Hz)		Z (-40℃) /Z (20℃)		12	10	8	5	4	3	4	5	6	-
Load Life	vo C: Ta	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 2,000 hours at 105°C.(where,1000 hours ≤8Φ) Capacitance change: ≤±20% of the initial value Tanō ≤200% of the initial specified value LC ≤The initial specified value											
		e following specification									after e	xposing the	m
		· 1,000 hours at 105℃ v e rated voltage shall be			•	•			,		st 24 h	nurs and no	t more
	The rated voltage shall be appled to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.												
Shelf Life	Capacitance change: ≤±20% of the initial value												
		-				al specif	ied valu	ie					
	L	C	≪Th	ne initi	al speci	fied valu	ue (W	here, 20	0% for 3	≥ WV 160	V _{DC})		

A. DIMENSIONS OF NHA Series

Others



Satisfied characteristics KS C IEC 60384-4

B. MARKING: BROWN SLEEVE, WHITE INK



FRONT VIEW OF CAPACITOR BACK VIEW OF CAPACITOR

	ΦD	5	6.3	8	10	12.5	16	18	22		
	Фd	0.5	0.5	0.6	0.6	0.6	0.8	8.0	0.8		
	F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10		
ĺ	ΦD'	ФD+0.5max									
ĺ	L'	L	+1.5ma	X		L.	+2.0ma	ıχ			







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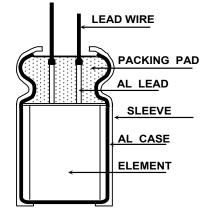
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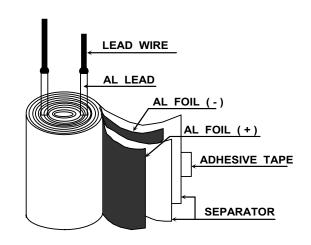
<u>ATIN</u>	GS C	F NE	IA SE	RIES	<u> </u>												
w w	6.3	10	16	25	35	50	63	80	100	160	200	250	350	400	420	450	5
0.1						5X11 2.1	5X11 3.2		5X11 3.6								
0.22						5X11 3.2 5X11	5X11 4.3 5X11		5X11 4.8 5X11								
0.33						6.3 5X11	7.2 5X11		7.8 5X11	6.3X11	6.3X11	6.3X11	6.3X11				
0.47						10 5X11	11 5X11		12 5X11	12 6.3X11	12 6.3X11	12 6.3X11	12 6.3X11				
1						12 5X11	13 5X11		14 5X11	14 6.3X11	15 6.3X11	15 6.3X11	15 6.3X11	6.3X11		6.3X11	6.3
<u> </u>						13 5X11	15 5X11		16 5X11	14 6.3X11	15 6.3X11	17 6.3X11	18 8X11.5	19 6.3X11		14 6.3X15	8X
2.2						18	19		21	20	24	27	29	28 8X11.5 30		16 8X11.5 25	2
3.3						5X11 30	5X11 33		5X11 34	6.3X11 35	6.3X11 36	6.3X11 37	8X11.5 38	10X12.5 41		10X12.5 35	102
4.7																10X12.5 35	8X
				5X11 25	5X11 27	5X11 37	5X11 39		5X11 40	6.3X11 41	6.3X11 43	8X11.5 45	8X11.5 45	10X12.5 48		10X16 42	10:
6.8				5X11	5X11	5X11	5X11		5X11	8X11.5	8X11.5	8X11.5	10X16	10X12.5 59 10X16		10X16 55 10X20	10:
				31	33	44	48		49	52	54	56	62 10X12.5	65 10X16		59 10X16	10.
10			5X11	5X11	5X11	5X11	5X11		5X11	8X11.5	8X11.5	10X16	64 10X20	78 10X20		69 10X20	12.5
10			35	37	40	54	59		59	60	62	74	79	86		76 12.5X20	7
15																80 12.5X20	12.5
18										8X11.5						85	7
		5X11 48	5X11 53	5X11 56	5X11 67	5X11 79	5X11 87		6.3X11 100	60 10X16 111	10X16 113	10X20 127	12.5X16 138	10X25 157		12.5X25 136	16
22							6.3X11 87						12.5X20 150	12.5X16 140			Ľ
														12.5X20 157			
33	EV44	5V11	5711	EV11	5014	5014	6 2 2 4 4		8744 5	10222	10222	12 5700	12 5705	12.5X20 157		12 5700	161
	5X11 52	5X11 56	5X11 60	5X11 75	5X11 80	5X11 97	6.3X11 122		8X11.5 144 8X11.5	10X20 156	10X20 158	12.5X20 184	12.5X25 189	16X20 210 12.5X30		12.5X30 189 16X25	16X
17	5X11	5X11	5X11	5X11	5X11	6.3X11	6.3X11		171 8X15	10X20	12.5X20	12.5X25	16X20	265 16X25		223 16X31.5	18X
47	61	66	77	80	101	133	146		189	202	220	238	246	280		240 18X20	2
56					5X11											215 18X25	
					110						12.5X20			16X31.5		268 18X20	
68											265			376 16X35.5 384		290 18X31.5 338	1
	5X11 69	5X11 83	5X11 92	5X11 113	6.3X11 138	6.3X11 156	8X11.5 207		10X16 264	12.5X20 274	12.5X25 288	16X20 300	16X31.5 348	18X20 300		18X35.5 349	
82														18X25 340			L
J.				E			0)/// -		4037.5		12.5X20 380			16X31.5 376		40.72	
				5X11 141			8X11.5 235		10X16 280					16X31.5 376 18X25		18X31.5 400	
100	5X11	5X11	5X11	6.3X11	6.3X11	8X11.5	10X12.5		10X20	12.5X25	16X20	16X25	16X35.5	18X25 340 18X31.5		22X30	_
	90	100	125	159	168	229	251 10X16		349	360	366	405	447	415 18X40		414	1
			5X11		8X11.5		255				16X20	18X25		461 18X31.5	18X31.5	18X40	
120			125		180						380 12.5X30	411 18X31.5		437	380	425	
										16X20 505	330	470		18X31.5 437			\vdash
150										505				437 18X35.5 439			
180											18X20 558			18X40 605			
								12.5X16 480				18X31.5 690					
220	5X11 153	5X11 170	6.3X11 213	238	8X11.5 294	10X12.5 395	10X16 474		12.5X20 572	16X25 656	16X31.5 684	18X35.5 710	22X45 780				
	6.3X11	6.3X11 194 6.3X11	6.3X11	8X11.5 260 6.3X11	8X15	10X16	10X20		16X20	18X31.5	16X35.5	18X40 730 22X40					_
005	216	239	265	293	398	529	633		810	848	700 18X35.5	900					
330				8X11.5							866 18X40						\vdash
				340 8X11.5	8X20					18X31.5	880 18X40						
470	6.3X11	6.3X11	8X11.5	406 8X15	420 10X16	10X20	12.5X20		16X25	848 22X35	22X40						\vdash
	258	286	366	447 10X12.5 471	547	690	886	890	1072	1130	1156						\vdash
560				7/1	12.5X16 600		16X20 1050				18X45 900						Т
680			8X11.5 366		10X20 580												
550	8X11.5 365	8X11.5 405	8X15 455	10X16 620	12.5X16 777	12.5X20 973	12.5X25 1160	403/	16X31.5 1364	22X45 1463							
820				10716		12 EV20	16>25	16X31.5 1210									\vdash
1000	8X11.5	8X15	10X16	10X16 680 10X20	12.5X20	12.5X20 973 12.5X25	16X25 1565 16X31.5	18X31.5	18X40								
1200	443 8X15	542	680	821	1023	1287	1580	1600	2020								-
1200	490					16X31.5	16X40										\vdash
2200	10X16	10X20	12.5X20	12.5X25	16X25	1424 16X31.5	1650 18X35.5										\vdash
	772	886	1108	1297 12.5X30	1497	1724	1938										
3300	10X20	12.5X20	12.5X25	1330 16X25	16X31.5	18X35.5	4	_	CASE SI	ZE ØD X	L(mm)	ne) at 105	TO 12011				H
	1032	1205	1389	1646 16X25 1646	1808	2260	-		rated Ri	ppiè Curri	ent (mArm	is) at 105	C, 120Hz				
4700	12.5X20 1280	12.5X25 1492	16X20 1610	16X31.5 2012	18X35.5 2335												
6800	12.5X25 1554	16X25 1824	16X31.5 2081	18X35.5 2452	18X40 2642												L
10000	16X25 1897	16X31.5 2082	18X31.5 2365	18X40 2692													
	16X35.5															Ι	_

ALUMINUM ELECTROLYTIC CAPACITORS

APPROVAL NO. 697-006







CE04 TYPE

MINIATURE SIZED TYPE CAPACITORS COMPONENT

PART NAME	MATERIALS	VENDER	
		KISTRON	(KOREA/CHINA)
LEAD WIRE	TINNED COPPER - PLY WIRE(Pb-FREE)	коноки	(JAPAN/CHINA)
		NANTONG HONG YANG	(CHINA)
		KANG WON AUTO FITTING	
		NAN TONG HUI FENG	(CHINA)
AL LEAD	ALUMINUM 99.92 % OVER	NANTONG HONG YANG	
		коноки	(JAPAN/CHINA)
		KISTRON	(KOREA/CHINA)
		SUNG NAM	(KOREA/CHINA)
PACKING PAD	SYNTHETIC RUBBER	CCW/ZHE JIANG TIAN TAI	(011114)
		ZHE JIANG TIAN HUA	(CHINA)
		MOO DEUNG	(KOREA/CHINA)
01 55)/5	B = 7 B + 5 4 + 4 B + 5 + 5	SUZHOU QILIAN	
SLEEVE	P.E.T(Poly Ethlylene Terephthalate Resin)	SHUN PENG PLASTIC	(CHINA)
		YUN LIN PLASTIC	
		ZHANG JIA GANG LIAN YI	
		LIN AN AO XING	(CHINA)
AL CASE	ALUMINUM 99.0 % OVER	NANTONG CHUANGJIA	
		DONG NAM	((6000000000000000000000000000000000000
		D.N TECH/HA NAM	(KOREA/CHINA)
		K.D.K/JCC/MATSUSHITA	(JAPAN)
		SAM YOUNG	(KOREA)
		BECROMAL	(ITALY)
AL FOIL ⊕	FORMED ALUMINUM 99.9 % OVER	SATMA	(FRANCE)
AL FOIL 🕀	FORMED ALUMINUM 99.9 % OVER	HEC	
		XINJIANG JOINWORLD	(CHINA)
		HUAFENG / NANTONG /RAOIO	
		LUXON/LITON	(TAIWAN)
		K-JCC	(KOREA)
AL EQU	ETCHED ALLIMINIUM OF A 9/ OVER	K.D.K	(JAPAN)
AL FOIL ⊖	ETCHED ALUMINUM 98.0 % OVER	AFT/INCULCU/SHENGHONG	(CHINA)
		ELECON/WU JIANG FEILO	(CHINA)
		KAN/LUNAN	(CHINA)
SEPARATOR	INSULATION PAPER	SPO	(GERMANY)
		N.K.K	(JAPAN)
ADDESIVE TARE	POLY PROPYLENE OR POLY IMIDE FILM	NITTO/NICHIBAN	(JAPAN)
ADDESIVE TAPE	FOLT PROPTLENE OR POLT IMIDE FILM	DAEIL/SWECO	(KOREA)

When using aluminum electrolytic capacitors, pay strict attention to the following:

1. Electrolytic capacitors for DC application require polarization.

Confirm the polarity. If used in reversed polarity, the circuit life may be shortened or the capacitor may be damaged. For use on circuits whose polarity is occasionally reversed, or whose polarity is unknown, use bi-polarized capacitors (BP-series). Also, note that the electrolytic capacitor cannot be used for AC application.

2. Do not apply a voltage exceeding the capacitor's voltage rating.

If a voltage execeeding the capacitor's voltage rating is applied, the capacitor may be damaged as leakage current increases. When using the capacitor with AC voltage superimposed on DC voltage, care must be exercised that the peak value of AC voltage does not exceed the rated voltage.

3. Do not allow excessive ripple current to pass.

Use the electrolytic capacitor at current values within the permissible ripple range. If the ripple current exceeds the specified value, request capacitors for high ripple current applications.

4. Ascertain the operating temperature range.

Use the electrolytic capacitors according to the specified operating temperature range. Usage at room temperature will ensure longer life.

5. The electrolytic capacitor is not suitable for circuits in which charge and discharge are frequently repeated.

If used in circuits in which charge and discharge are frequently repeated, the capacitance value may drop, or the capacitor may be damaged. Please consult our engineering department for assistance in these applications.

6. Apply voltage treatment to the electrolytic capacitor which has been allowed to stand for a long time.

If the electrolytic capacitor is allowed to stand for a long time, its withstand voltage is liable to drop, resulting in increased leakage current. If the rated voltage is applied to such a product, a large leakage current occurs and this generates internal heat, which damaged the capacitor. If the electrolytic capacitor is allowed to stand for a long time, therefore, use it after giving voltage treatment (Note 1). (However, no voltage treatment is required if the electrolytic capacitor is allowed to stand for less than 2 or 3 years at normal temperature.)

7. Be careful of temperature and time when soldering.

When soldering a printed circuit board with various, components, care must be taken that the soldering temperature is not too high and that the dipping time is not too long. Otherwise, there will be adverse effects on the electrical characteristics and insulation sleeve of electrolytic capacitors in the case of small-sized electrolytic capacitors, nothing abnormal will occur if dipping is performed at less than 260°C for less than 10 seconds.

8. Do not place a soldering iron on the body of the capacitor.

The electrolytic capacitor is covered with a vinyl sleeve. If the soldering iron comes in contact with the electrolytic capacitor body during wiring, damage to the vinyl sleeve and/or case may result in defective insulation, or improper protection of the capacitor element.

9. Cleaning circuit boards after soldering.

Some solvents have adverse effects on capacitors.

Please refer to the next page.

10.Do not apply excessive force to the lead wires or terminals.

If excessive force is applied to the lead wires and terminals, they may be broken or their connections with the internal elements may be affected. (For strength of terminals, refer to KS C IEC 60384-4(JIS C5101-1, JIS C5101-4)

11. Care should be used in selecting a storage area.

If electrolytic capacitors are exposed to high temperatures caused by such things as direct sunlight, the life of the capacitor may be adversely affected. Storage in a high humidity atmosphere may affect the solderability of lead wires and terminals.

12.Surge voltage.

The surge voltage rating is the maximum DC over-voltage to which the capacitor may be subjected for short periods not exceeding approximately 30 seconds at infrequent intervals of not more than six minutes. According to KS C IEC 60384-4, the test shall be conducted 1000 cycles at room temperature for the capacitors of characteristic KS C IEC 60384-4 or at the maximum operating temperature for the capacitors of characteristics B and C of KS C IEC 60384-4 with voltage applied through a series resistance of 1000 ohms without discharge. The electrical characteristics of the capacitor after the test are specified in KS C IEC 60384-4. Unless otherwise specified, the rated surge voltage are as follows:

Rated Voltage(V)	2	4	6.3	10	16	25	35	50	63	80	100	160	200	250	315	350	400	450	500
Rated Surge Voltage(V)	2.5	5	8	13	20	32	44	63	79	100	125	200	250	300	365	400	450	500	550

Note 1 Voltage treatment ... Voltage treatment shall be performed by increasing voltage up to the capacitor's voltage rating gradually while lowering the leakage current. In this case, the impressed voltage shall be in the range where the leakage current of the electrolytic capacitor is less than specified value. Meanwhile, the voltage treatment time may be effectively shortened if the ambient temperature is increased (within the operating temperature range).

Note 2 For methods of testing, refer to KS C IEC 60384-4, (JIS C 5101-1, JIS C 5101-4)



CLEANING CONDITIONS

Aluminum electrolytic capacitors that have been exposed to halogenated hydrocarbon cleaning and defluxing solvents are susceptible to attack by these solvents. This exposure can result in solvent penetration into the capacitors, leading to internal corrosion and potential failure.

Common type of halogenated cleaning agents are listed below.

Chemical Name	Structural Formula	Representatice Brand Name
Trichlorotrifluoroethane	C ₂ CI ₃ F ₃	Freon TF,Daiflon S-3
Fluorotrichloromethane	CCl₃F	Freon-11,Daiflon S-1
1,1,1-Trichloroethane	F ₂ H ₃ CI ₃	Chloroethane
Trichloroethylene	C ₂ HCI ₃	Trichiene
Methyl Chloride	CH₃CI	MC

We would like to recommend you the below cleaning materials for your stable cleaning condition taking the place of previous materials.

Olsopropyl Alcohol(IPA) or Water

Cleaning method: One of immersion, ultrasonic or vapor cleaning.

Maximum cleaning time: 5 minutes(Chip type: 2 minutes)

%Do not use AK225AES

Aluminum electrolytic capacitors are easily affected by halogen ions, particularly by chloride ions. Excessive amounts of halogen ions, if happened to enter the inside of the capacitors, will give corrosion accidents-rapid capacitance drop and vent open. The extent of corrosion accidents varies with kinds of electrolytes and seal-materials. Therefore, the prevention of halogen ion contamination is the most improtant check point for quality control in our procuction lines. At present, halogenated hydrocarbon-contained organic solvents such as Trichloroethylene, 1,1,1-Trichloroethane, and Freon are used to remove flux from circuit boards.

If electroytic capacitors are cleaned with such solvents, they may gradually penetrate the seal portion and cause the eosion. When using latex-based adhesive on the capacitors rubber end seal for adhesion to a PCB, corrosion may occur depending on the kind of solvent in the adhesive. Select an adhesive as an organic solvent with dissolved polymer that is not halogenated hydrocarbon. Hot air drying is required for eliminating the solvent between the product and the PCB at $50^{\circ}\text{C} \sim 80^{\circ}\text{C}$ after coating.

Followings are the penetration path of the halogenated solvent.

- ① Penetration between the rubber and the aluminum case
- 2 Penetration between the rubber and the lead wire
- 3 Penetration through the rubber

The inside of the capacitors, the mechanism of corrosion of aluminum electrolytic capacitors by halogen ions can be explained as follows:

Halides(RX) are absorbed and diffused into the seal portion. The halides then enter the inside of the capacitors and contact with the electrolyte of the capacitors. Where by halogen ions are made free by a hydrolysis with water in the electrolyte:

$$RX + H_2O \rightarrow ROH + H^{\dagger} + X^{-}$$

The halogen ions (X') react with the dielectric substance(Al_2O_3) of aluminum electrolytic capacitors:

$$AI_2O_3 + 6H^+ + 6X^- \rightarrow 2ALX_3 + 3H_2O$$

AIX₃ is dissociated with water:

$$ALX_3 + 3H_2O \rightarrow AL (OH)_3 + 3H^+ + 3X^-$$

****MANUFACTURING SITE**

- SamYoung Electronics Co.,Ltd.(Korea/China)

