RoHS

MESSRS: 深圳亚泽科技	APPROVAL NO	710 - 060
	DATE	2015.02.03

ALUMINUM ELECTROLYTIC

CAPACITOR

APPROVAL SHEET

CATALOG TYPE	NXQ SERIES
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 长孔硕

USER APPROVAL:

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

APPROVAL NO. 710 - 060	ALUMINUM ELECTROLYTIC CAPACITOR	PAGE: 1 OF 5 DATE: 2015.02.03

Specifications of NXQ Series

Item	Characteristics
Rated Voltage Range	6.3 ~ 120 V_{DC}
Operating Temperature Range	- 40 ~ + 105 ℃
Capacitance Tolerance	±20% <M> (at 20℃ ,120Hz)
Leakage Current (at 20 ℃)	After 2 minutes: 0.01CV (μA) or 3 μA,whichever is greater Where,C =Nominal capacitance（μF ） V =Rated Voltage（V_{DC}）

Dissipation Factor (TANδ) (at 20℃, 120Hz)

Rated voltage(V_{DC})	6.3	10	16	25	35	50	63	80~120
TANδ(Max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08

※ When the Capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.

Temperature Characteristics (Max.Impedance ratio)

Z(-25℃) / Z(20℃)	2
Z(-40℃) / Z(20℃)	3

(at 120Hz)

Load Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied（the peak voltage shall not exceed the rated voltage） with the rated ripple current at 105℃ for the specified period of time.

Capacitance change :≤± 30% the of initial Value (6.3 ~ 10V_{DC})

Capacitance change :≤± 25% the of initial Value(16 ~ 120V_{DC})

TANδ :≤200% of the initial specified value

Leakage current :≤ The initial specified value

ΦD	Life Time		
	6.3VDC	10 ~ 50VDC	63 ~ 120VDC
Φ5 ~ Φ6.3	6000 hours	7000 hours	6000 hours
Φ8x11.5L	8000 hours	9000 hours	8000 hours
Φ8x15L~ 20L	9000 hours	10000 hours	9000 hours
Φ10x12.5L	9000 hours		
Φ10x16L~ 25L	10000 hours		
Φ12.5 ~			

Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied.The rated voltage shall be applied to the capacitor for a minimum of 30 minutes,at least 24 hours and not more than 48 hours before the measurements.

Capacitance change :≤± 30% of the initial Value(6.3 ~ 10VDC)

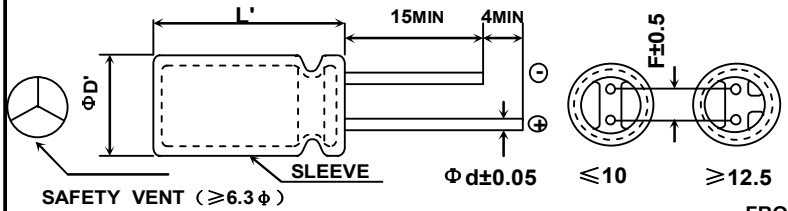
Capacitance change :≤± 25% of the initial Value(16 ~ 120VDC)

TANδ :≤200% of the initial specified value

Leakage current :≤The initial specified value

Others Satisfies characteristic **KS C IEC 60384-4**

A.DIAGRAM OF DIMENSION



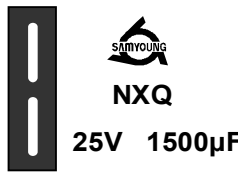
When ΦD≤8,ΦD'≤ΦD+0.5,and L'≤L+1.5

When ΦD＞8,ΦD'≤ΦD+0.5,and L'≤L+2.0

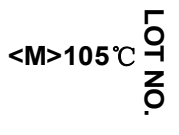
ΦD	5	6.3	8	10	12.5	16	18
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

※Φ10x12L,L'≦L+1.5

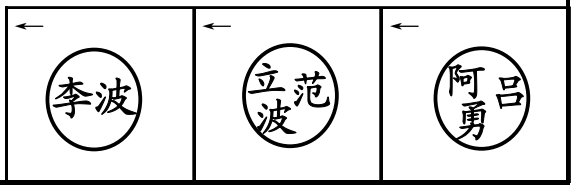
B.MARKING:WITH DARK BROWN SLEEVE, SILVER INK



FRONT VIEW OF CAPACITOR



BACK VIEW OF CAPACITOR



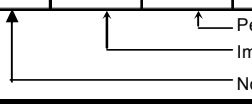
ALUMINUM ELECTROLYTIC CAPACITOR

APPROVAL NO: 710 - 060

RATINGS OF NXQ Series

VDC	6.3			10			16			25			35		
ΦD×L	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE
5×11	220	0.40	345	150	0.40	450	120	0.40	450	68	0.40	450	47	0.40	450
6.3×11	470	0.17	540	330	0.17	700	270	0.17	700	150	0.17	700	100	0.17	700
8×11.5	820	0.075	945	560	0.075	1200	470	0.075	1200	330	0.075	1200	180	0.075	1200
8×15	1000	0.059	1250	680	0.059	1600	560	0.059	1600	390	0.059	1600	220	0.059	1600
8×20	1500	0.041	1500	1000	0.041	1960	820	0.041	1960	560	0.041	1960	330	0.041	1960
10×12.5	1200	0.053	1500	820	0.053	1700	680	0.053	1700	470	0.053	1700	270	0.053	1700
10×16	1800	0.038	1760	1200	0.038	2000	1000	0.038	2000	680	0.038	2000	390	0.038	2000
10×20	2700	0.028	1960	1800	0.028	2500	1500	0.028	2500	1000	0.028	2500	560	0.028	2500
10×25	3300	0.024	2250	2200	0.024	2900	1800	0.024	2900	1200	0.024	2900	680	0.024	2900
12.5×20	3900	0.025	2480	2700	0.025	2600	2200	0.025	2600	1500	0.025	2600	820	0.025	2600
12.5×25	4700	0.019	2900	3300	0.019	3050	2700	0.019	3050	1800	0.019	3050	1200	0.019	3050
12.5×30	5600	0.018	3450	4700	0.018	3500	3300	0.018	3500	2200	0.018	3500	1500	0.018	3500
12.5×35	6800	0.016	3570	5600	0.016	3600	3900	0.016	3600	2700	0.016	3600	1800	0.016	3600
16×20	6800	0.021	3250	4700	0.021	3250	3300	0.021	3250	2200	0.021	3250	1500	0.021	3250
16×25	8200	0.017	3630	5600	0.017	3630	4700	0.017	3630	3300	0.017	3630	1800	0.017	3630

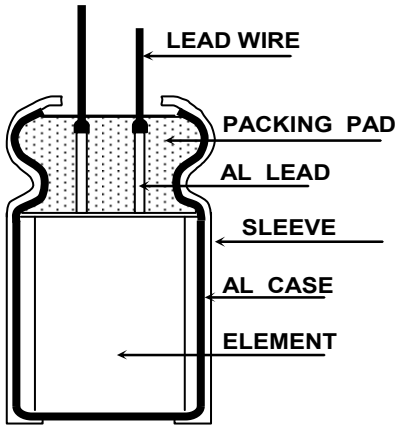
VDC	50			63			80			100			120		
ΦD×L	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE	CAP.(μF)	IMP.	RIPPLE
5×11	27	0.48	310	18	0.71	240	12	1.2	220	8.2	1.2	220			
6.3×11	56	0.22	500	47	0.28	420	27	0.46	370	18	0.46	370			
8×11.5	100	0.12	950	82	0.18	720	47	0.29	620	33	0.29	620	22	0.29	620
8×15	120	0.082	1230	100	0.13	990	56	0.2	780	47	0.2	780	33	0.2	780
8×20	180	0.058	1580	150	0.096	1200	82	0.16	1040	68	0.16	1040	47	0.16	1040
10×12										47	0.17	780	33	0.17	780
										56	0.17	780			
10×12.5	150	0.073	1280	120	0.11	990	68	0.17	780	47	0.17	780	33	0.17	780
										56	0.17	780			
10×16	220	0.053	1650	180	0.076	1200	100	0.11	1040	68	0.11	1040	47	0.11	1040
10×20	330	0.038	2060	270	0.056	1570	150	0.084	1430	100	0.084	1430	68	0.084	1430
10×25	390	0.032	2240	330	0.046	1990	180	0.069	1620	120	0.069	1620	100	0.069	1620
12.5×16							150	0.11	1430	100	0.11	1430	68	0.11	1430
12.5×20	470	0.032	2200	390	0.041	1990	220	0.062	1750	150	0.062	1750	100	0.062	1750
12.5×25	680	0.025	2500	470	0.031	2460	270	0.047	2210	220	0.047	2210	120	0.047	2210
12.5×30	820	0.023	3100	560	0.028	2760	330	0.042	2400	270	0.042	2400	150	0.042	2400
12.5×35	1000	0.021	3250	680	0.024	3040	390	0.036	2600	330	0.036	2600	180	0.036	2600
12.5×40							470	0.032	2860	390	0.032	2860	220	0.032	2860
16×20	820	0.026	2730	560	0.032	2150	330	0.048	1950	270	0.048	1950	150	0.048	1950
16×25	1000	0.022	3010	820	0.025	2550	470	0.038	2430	390	0.038	2430	220	0.038	2430
16×31.5							560	0.032	2640	470	0.032	2640	270	0.032	2640
16×35.5							680	0.029	2860	560	0.029	2860	330	0.029	2860
16×40							820	0.027	3510	680	0.027	3510	390	0.027	3510
18×20							470	0.045	2270	390	0.045	2270	220	0.045	2270
18×25	1500	0.019	3290				680	0.036	2500	470	0.036	2500	270	0.036	2500
18×31.5							820	0.03	2860	560	0.03	2860	390	0.03	2860
18×35.5							1000	0.027	3510	680	0.027	3510	470	0.027	3510
18×40							1200	0.026	3860	820	0.026	3860	560	0.026	3860

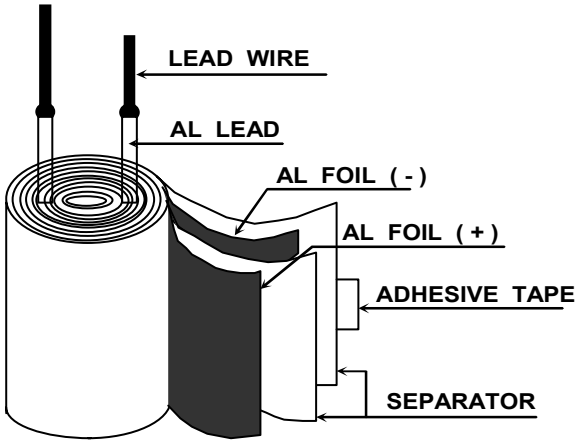


ALUMINUM ELECTROLYTIC CAPACITORS

APPROVAL NO. 710 - 060

STRUCTURE AND MATERIALS





CE04 TYPE

MINIATURE SIZED TYPE CAPACITORS COMPONENT

PART NAME	MATERIALS	VENDER	
LEAD WIRE	TINNED COPPER - PLY WIRE(Pb-FREE)	KISTRON KOHOKU NANTONG HONG YANG	(KOREA/CHINA) (JAPAN/CHINA) (CHINA)
AL LEAD	ALUMINUM 99.92 % OVER	KANG WON AUTO FITTING NAN TONG HUI FENG NANTONG HONG YANG KOHOKU KISTRON	 (CHINA) (JAPAN/CHINA) (KOREA/CHINA)
PACKING PAD	SYNTHETIC RUBBER	SUNG NAM CCW/ZHE JIANG TIAN TAI ZHE JIANG TIAN HUA	(KOREA/CHINA) (CHINA)
SLEEVE	P.E.T(Poly Ethlylene Terephthalate Resin)	MOO DEUNG SUZHOU QILIAN YUN LIN PLASTIC	(KOREA/CHINA) (CHINA)
AL CASE	ALUMINUM 99.0 % OVER	ZHANG JIA GANG LIAN YI LIN AN AO XING NANTONG CHUANGJIA DONG NAM D.N TECH/HA NAM	 (CHINA) (KOREA/CHINA)
AL FOIL ⊕	FORMED ALUMINUM 99.9 % OVER	K.D.K/JCC/MATSUSHITA SAM YOUNG BECROMAL SATMA HEC XINJIANG JOINWORLD HUAFENG / HISTAR /RAOIO LUXON/LITON	(JAPAN) (KOREA) (ITALY) (FRANCE) (CHINA) (TAIWAN)
AL FOIL ⊖	ETCHED ALUMINUM 98.0 % OVER	K-JCC K.D.K AFT/INCULCU/SHENGHONG ELECON/WU JIANG FEILO	(KOREA) (JAPAN) (CHINA)
SEPARATOR	INSULATION PAPER	KAN/LUNAN SPO N.K.K	(CHINA) (GERMANY) (JAPAN)
ADHESIVE TAPE	POLY PROPYLENE OR POLY IMIDE FILM	NITTO/NICHIBAN DAEIL/SWECO	(JAPAN) (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 exceeding 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℃ 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 affectde.(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	$C_2Cl_3F_3$	Freon TF,Daiflon S-3
Fluorotrichloromethane	CCl_3F	Freon-11,Daiflon S-1
1,1,1-Trichloroethane	$F_2H_3Cl_3$	Chloroethane
Trichloroethylene	C_2HCl_3	Trichiene
Methyl Chloride	CH_3Cl	MC

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

◎Isopropyl 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 affeceted 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℃~80℃ 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 explainedas 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:

$$RX + H_2O \rightarrow ROH + H^+ + X^-$$

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

$$Al_2O_3 + 6H^+ + 6X^- \rightarrow 2ALX_3 + 3H_2O$$

AlX_3 is dissociated with water:

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

※MANUFACTURING SITE

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