ALUMINUM ELECTROLYTIC CAPACITOR

USER PART NO.

MESSRS:

APPROVAL SHEET

NHA SERIES CATALOG TYPE

SAME TO SAME OF LOW OR SAME SAME SAME SAME SAME SAME SAME SAME	
适 用 机 种	
特记事项	Halogen-Free
特记事项	Halogen-Free
QINGDAO SAMYOL	JNG ELECTRONICS CO.,L1

USER APPROVAL: APPROVAL NO.:

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

SamYoung Electronics Co., Ltd.

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

ALUMINUM ELECTROLYTIC CAPACITOR 710-005 DATE: Specifications of NHA Series

Characteristics Item 6.3 ~ 100V_{DC} 160 ~ 400V_{DC} Rated Voltage Range 450 ~ 500VDC - 40 ~ + 105 °C Operating Temperature Range - 55 ~ + 105 °C - 25 ~ + 105 °C

±20% <M>

After 1 minute

CRVR≤1000

0.1CRVR+40

50

0.12

50

2

63

0.10

63~100

3

35

0.14

35

2

After 2 minutes:0.01CV(µA) or 3 µA, whichever is greater Where, $C = Nominal capacitance(\mu F)$ $V = Rated Voltage(V_{DC})$ 6.3 10 16 25

6.3

5

0.24

10

4

10

0.20

16

3

8

0.16

25

2

After 1 minute:0.03CV(µA) or 4 µA, whichever is greater

After 5 minutes CRVR>1000 CRVR≤1000 CRVR>1000

0.20

6

160~250 350~500

200~400 450~500

0.24

0.04C_RV_R+100 | 0.03C_RV_R+15 | 0.02C_RV_R+25

100

0.09

160

3

(at 20°C, 120Hz)

A4 (210×297)

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2017.08.06

PAGE:

Dissipation Factor (ΤΑΝδ) Rated Voltage(VDC) (20°C, 120Hz) TANδ (Max) 0.34 When the capacitance exceeds 1000µF,0.02 shall be added every 1000µF increase. Rated Voltage(VDC)

Z (-25°C) /Z (20°C)

Z (-40°C) /Z (20°C)

样式: H-1001-011

APPROVAL NO.

Capacitance Tolerance

Leakage Current

(at 20 ℃)

Temperature Characteristics

(Impedance ratio at 120Hz)

L' 15MIN 4MIN NHA 16V 10000μF SAFETY VENT (≥6.3Φ) Φ d±0.05 FRONT VIEW OF CAPACITOR BACK VIEW OF CAPACITOR F 2.0 2.5 3.5 5.0 5.0 7.5 7.5 10) /2 (2	VILLIAN EN	12	10	8	5	4	3			5	6	
Tanδ				0.0	- 2						87.7		re resto	red to 2	0°C afte	er the r	ated	
The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. (where , 500 hours ≤8Φ) 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 Tanδ ≤200% of the initial specified value LC ≤The initial specified value (Where, 200% for ≥ WV 160Voc) Others Satisfied characteristics KS C IEC 60384-4 A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK NHA (M>105°C NHA Series) FRONT VIEW OF CAPACITOR BACK VIEW OF CAPA	Lo	ad Life		Capacitance change: ≤±20% of the initial value														
The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. (where , 500 hours ≤8Φ) 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 Tano ≤200% of the initial specified value LC ≤The initial specified value (Where, 200% for ≥ WV 160Voc) Others Satisfied characteristics KS C IEC 60384-4 A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK A. DIMENSIONS OF SAFETY VENT (≥6.3+) FRONT VIEW OF CAPACITOR BACK VI				Tanδ ≤200% of the initial specified value														
for 1,000 hours at 105℃ without voltage applied. (where , 500 hours ≤8Φ) 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. Capacitance change: ≤±20% of the initial value Tanō ≤200% of the initial specified value (Where, 200% for ≥ WV 160Voc) Others Satisfied characteristics KS C IEC 60384-4 A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK				LC ≤The initial specified value														
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. Capacitance change: ≤±20% of the initial value Tanō ≤200% of the initial specified value LC ≤The initial specified value (Where, 200% for ≥ WV 160Vpc) Others Satisfied characteristics KS C IEC 60384-4 A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK L' 15MIN 4MIN SLEEVE, WHITE INK A DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK A DIMENSIONS OF NHA Series FRONT VIEW OF CAPACITOR BACK VIEW OF CAPACITOR				The fo	ollowing	specific	ations	shall be	satisfie	d when th	е сара	citors a	re resto	red to 2	0°C afte	er expo	sing the	m
than 48 hours before the measurements. Capacitance change: ≤±20% of the initial value Tanō ≤200% of the initial specified value LC ≤The initial specified value (Where, 200% for ≥ WV 160Vpc) Others Satisfied characteristics KS C IEC 60384-4 A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK AM>105℃ NHA AM>				for 1,0	000 hou	rs at 10	5°C with	out vol	age ap	plied. (wh	nere, 5	00 hour	rs ≤8Φ)					
Shelf Life Capacitance change: ≤±20% of the initial value Tanδ ≤200% of the initial specified value (Where, 200% for ≥ WV 160Vpc)				[이번 대통령 : [전 전 전 전 전 전 전 전 전 전 전 전 전 전 전 전 전 전														
Tanδ ≤200% of the initial specified value (Where, 200% for ≥ WV 160V _{DC}) Others Satisfied characteristics KS C IEC 60384-4 A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK				than 4	48 hours	s before	the mea	asurem	ents.									
C Sthe initial specified value (Where, 200% for ≥ WV 160Vpc)	Sh	elf Life		Capa	acitance	change	: ≤±20°	% of the	initial	value								
Others Satisfied characteristics KS C IEC 60384-4 A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK NHA				Tanō	j		≤2	00% of	the init	al specifie	ed valu	е						
A. DIMENSIONS OF NHA Series B. MARKING: BROWN SLEEVE, WHITE INK NHA				LC			≤1	he initia	al speci	fied value	e (Wh	nere, 20	0% for	≥ WV	160Vpc)			
L' 15ΜΙΝ ΜΙΝ ΝΗΑ Ν>105°C ΝΗΑ 16V 10000μF FRONT VIEW OF CAPACITOR BACK VIEW OF CAPA ΦD 5 6.3 8 10 12.5 16 18 22 Φd 0.5 0.5 0.6 0.6 0.6 0.8 0.8 0.8 0.8 F 2.0 2.5 3.5 5.0 5.0 7.5 7.5 10	0	thers		Satisfi	ed char	acteristi	cs KS	C IEC 6	0384-4									
L' 15ΜΙΝ ΜΙΝ ΝΗΑ ΝΗΑ 16V 10000μF FRONT VIEW OF CAPACITOR BACK VIEW OF CAPA ΦD 5 6.3 8 10 12.5 16 18 22 Φd 0.5 0.5 0.6 0.6 0.6 0.8 0.8 0.8 0.8 F 2.0 2.5 3.5 5.0 5.0 7.5 7.5 10	A DIMEN	ISIONS	OFN	IHA S	eries						B N	IARKI	NG: B	ROWN	N SI F	FVF	WHITE	INK
ФD 5 6.3 8 10 12.5 16 18 22 Фd 0.5 0.5 0.6 0.6 0.6 0.8 0.8 0.8 F 2.0 2.5 3.5 5.0 5.0 7.5 7.5 10	2	<u>↓ [-</u>					→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→<		10 E	≥12.5						:M>10	LOT NO.	
中d 0.5 0.5 0.6 0.6 0.8 0.8 0.8 F 2.0 2.5 3.5 5.0 5.0 7.5 7.5 10											FRO	NT VIE	W OF C	APACIT	TOR B	ACK \	/IEW OF	CAPACITOR
中d 0.5 0.5 0.6 0.6 0.8 0.8 0.8 F 2.0 2.5 3.5 5.0 5.0 7.5 7.5 10	ФД	5	6.3	8	10	12.5	16	18	22]	-			95			- qu	
	Фф	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8	1	8	←		-	_		-	
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L' L+1.5max L+2.0max	L'	L-	+1.5ma							1		200			C			
S Start Star	15 2	100	contact (CV4) is	esist.	DC .	5071	om Corporations											

4.7 5X11 5X11 5X11 5X11 6.8 5X11 5X11 5X11 5X11 5X11 5X11 5X11 5X11 10 15 18 5X11 5X11 87 6.3X11 22

5X11

101

5X11

RATINGS OF NHA SERIES

5X11

5X11

WV

0.22

0.33

0.47

0.68

1

2.2

3.3

33

47

ALUMINUM ELECTROLYTIC CAPACITOR

5X11

3.2 5X11

10 5X11

13 5X11

5X11

5X11

3.2 5X11

4.3 5X11

5X11

5X11

13 5X11

15 5X11

5X11

6.3X11

3.6 5X11

4.8 5X11

7.8 5X11

12 5X11

5X11 16 5X11

5X11

5X11

5X11

5X11

6.3X11

8X11.5

144 8X11.5

189

6.3X11

6.3X11

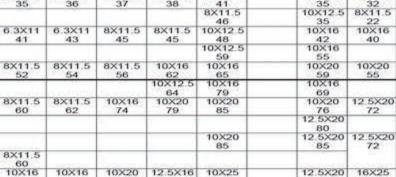
14 6.3X11

14 6.3X11

111

10X20

10X20



12.5X20 12.5X25

138 157 12.5X20 12.5X16

140 12.5X20 157 12.5X20

157 12.5X25

165 16X20

210 12.5X30

210 16X25

6.3X11

6.3X11

6.3X11

18 8X11.5

8X11.5

200

6.3X11

6.3X11

15 6,3X11

15 6.3X11

113

10X20

158 12.5X16

210

206 12.5X20 12.5X25

6.3X11 6.3X11

6.3X11

6.3X11

6.3X11

17 6.3X11

6.3X11

PAGE:

420

400

6.3X11

28 8X11.5

10X12.5

APPROVAL NO.

710-005

6.3X15

16 8X11.5

25 8X11.5 30 10X12.5

125 12.5X25

150

16X25

240 18X20

215 18X25

12.5X30 16X31.5

223 16X31.5 18X31.5

13 8X11.5

10X16

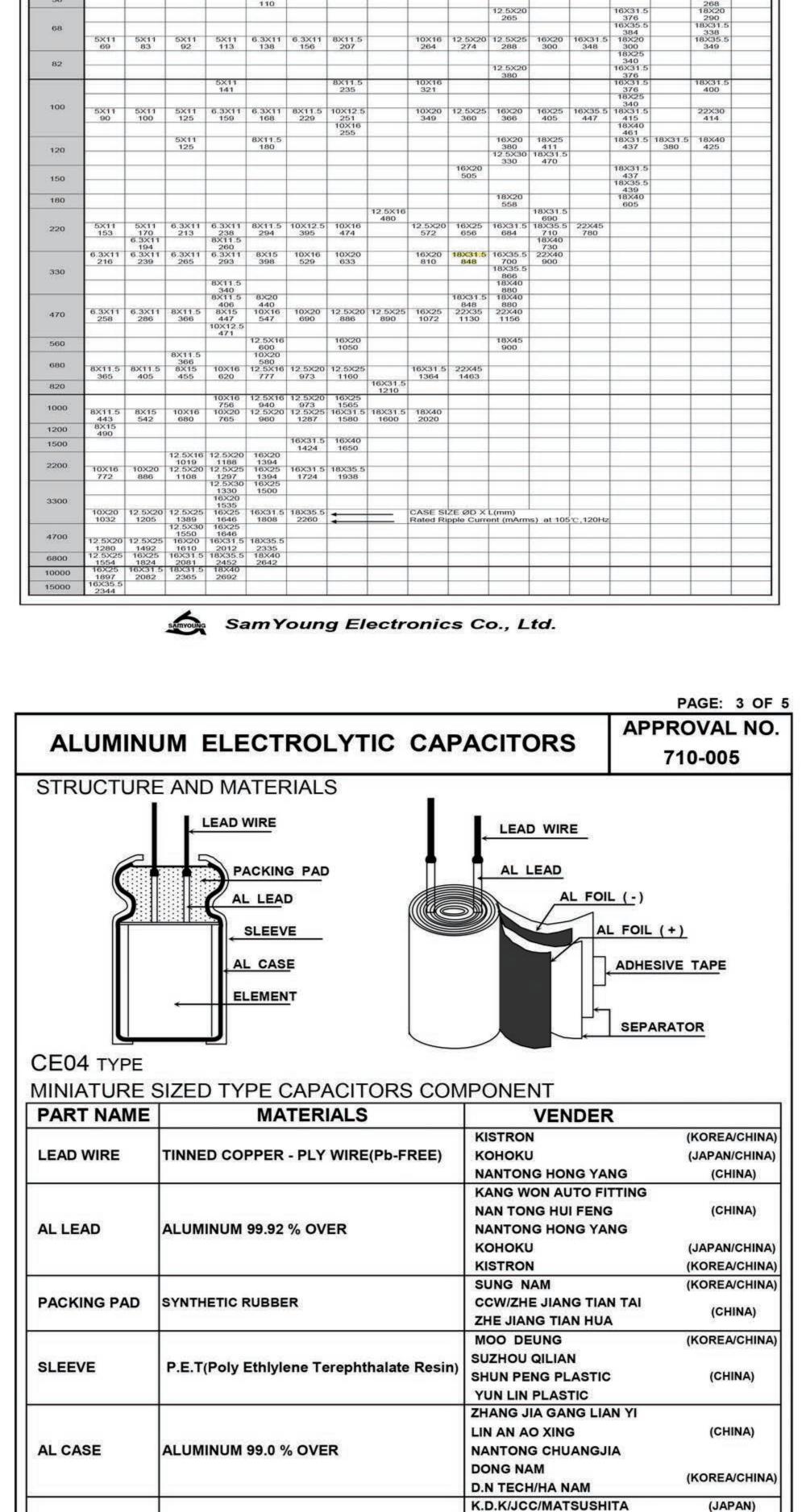
32 8X11.5

10X16

10X20

12.5X20

2 OF 5



SAM YOUNG

BECROMAL

LUXON/LITON

KAN/LUNAN

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HUAFENG / NANTONG /RAOIO

AFT/INCULCU/SHENGHONG

ELECON/WU JIANG FEILO

SATMA

K-JCC

K.D.K

SPO

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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-

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

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

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 allow-

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 abno-

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 protecti-

If excessive force is applied to the lead wires and terminals, they may be broken or their connections with the internal

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

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

50

63

Note 1 Voltage treatment ... Voltage treatment shall be performed by increasing voltage up to the capacitor's voltage ra-

63

elements may be affected. (For strength of terminals, refer to KS C IEC 60384-4(JIS C5101-1, JIS C5101-4)

N.K.K

HEC

(KOREA)

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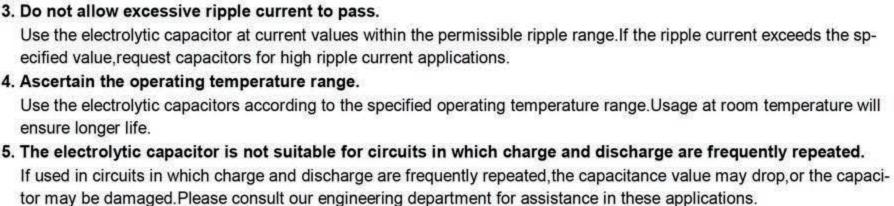
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PAGE:

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rmal will occur if dipping is performed at less than 260°C for less than 10 seconds.

series). Also, note that the electrolytic capacitor cannot be used for AC application.

FORMED ALUMINUM 99.9 % OVER

ETCHED ALUMINUM 98.0 % OVER

INSULATION PAPER

ADHESIVE TAPE POLY PROPYLENE OR POLY IMIDE FILM

1. Electrolytic capacitors for DC application require polarization.

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

value of AC voltage does not exceed the rated voltage.

ed to stand for less than 2 or 3 years at normal temperature.)

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

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

6.3

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10

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16

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7. Be careful of temperature and time when soldering.

on of the capacitor element.

Please refer to the next page.

terminals.

Rated Voltage(V)

Rated Surge Voltage(V)

12.Surge voltage.

Cleaning circuit boards after soldering.

Some solvents have adverse effects on capacitors.

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

2.5

5

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SEPARATOR

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: 80 | 100 | 160 | 200 | 250 | 315 | 350 | 400 | 450 | 500 79 | 100 | 125 | 200 | 250 | 300 | 365 | 400 | 450 | 500 | 550

ting 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) SamYoung Electronics Co., Ltd. PAGE: 5 OF 5

eosion. When using latex-based adhesive on the capacitors rubber end seal for adhesion to a PCB, corrosion may

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

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°C~80°C after coating.

Followings are the penetration path of the halogenated solvent.

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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. Structural Representatice Brand **Chemical Name** Formula Name Trichlorotrifluoroethane C₂CI₃F₃ Freon TF, Daiflon S-3 Fluorotrichloromethane CCI₃F Freon-11, Daiflon S-1 1,1,1-Trichloroethane F2H3Cl3 Chloroethane C2HCI3 Trichiene Trichloroethylene CH₃CI MC Methyl Chloride We would like to recommend you the below cleaning materials for your stable cleaning condition taking the place of previous materials. Sopropyl 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 hydrocarboncontained 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

 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: The halogen ions (X^-) react with the dielectric substance(Al_2O_3) of aluminum electrolytic capacitors: $Al_2O_3 + 6H^+ + 6X^- \rightarrow 2ALX_3 + 3H_2O$ AIX₃ is dissociated with water:



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NEV100M63DE NEV220M25DD-BULK NEV.33M100AA NEV4700M50HB NEV.47M100AA NEVH1.0M250AB NEVH3.3M250BB
NEVH3.3M450CC KME50VB100M-8X11.5 SG220M1CSA-0407 ES5107M016AE1DA ESX472M16B 476CKH100MSA 477RZS050M
UVX1V101KPA1FA UVX1V222MHA1CA KME25VB100M-6.3X11 VTL100S10 VTL470S10 511D336M250EK5D 052687X ECEA1CF471 EKXG451ELL820MM30S 686CKR050M NRE-S560M16V6.3X7TBSTF ERZA630VHN182UP54N UPL1A331MPH
NEV1000M6.3DE NEV100M16CB NEV100M50DD-BULK NEV2200M16FF NEV220M50EE NEV2.2M50AA NEV330M63EF
NEV4700M35HI NEV4.7M100BA NEV47M16BA NEV47M50CB-BULK NEVH1.0M350AB NEVH2.2M160AB NEVH3.3M350BC
TER330M50GM 477KXM035MGBWSA