RoHS

MESSRS:

APPROVAL NO	710-005
DATE	2017.08.06

ALUMINUM ELECTROLYTIC

CAPACITOR

APPROVAL SHEET

CATALOG TYPE	NHA 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 (孔长硕)

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

样式：H-1001-011 A4（210×297）

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Specifications of NHA Series

Item	Characteristics		
Rated Voltage Range	6.3 ~ 100V_{DC}	160 ~ 400V_{DC}	450 ~ 500V_{DC}
Operating Temperature Range	- 55 ~ + 105 ℃	- 40 ~ + 105 ℃	- 25 ~ + 105 ℃
Capacitance Tolerance	±20% <M> (at 20℃, 120Hz)		
Leakage Current (at 20 ℃)	After 1 minute:0.03CV(μA) or 4 μA,whichever is greater After 2 minutes:0.01CV(μA) or 3 μA,whichever is greater Where, C = Nominal capacitance(μF) V = Rated Voltage(V_{DC})	After 1 minute: C_RV_R≤1000: 0.1C_RV_R+40; C_RV_R>1000: 0.04C_RV_R+100	After 5 minutes: C_RV_R≤1000: 0.03C_RV_R+15; C_RV_R>1000: 0.02C_RV_R+25

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

Rated Voltage(VDC)	6.3	10	16	25	35	50	63	100	160~250	350~500
TANδ (Max)	0.34	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.20	0.24

When the capacitance exceeds 1000μF,0.02 shall be added every 1000μF increase.

Temperature Characteristics (Impedance ratio at 120Hz)

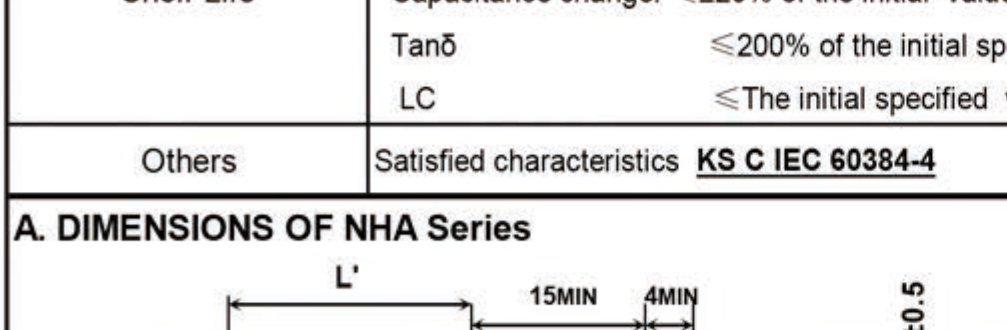
Rated Voltage(VDC)	6.3	10	16	25	35	50	63~100	160	200~400	450~500
Z (-25℃) /Z (20℃)	5	4	3	2	2	2	3	3	6	6
Z (-40℃) /Z (20℃)	12	10	8	5	4	3	4	5	6	-

Load Life: The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.(where,1000 hours ≤8Φ)
- Capacitance change: ≤±20% of the initial value
- Tanδ ≤200% of the initial specified value
- LC ≤The initial specified value

Shelf Life: 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.
- Capacitance change: ≤±20% of the initial value
- Tanδ ≤200% of the initial specified value
- LC ≤The initial specified value (Where, 200% for ≥ WV 160V_{DC})

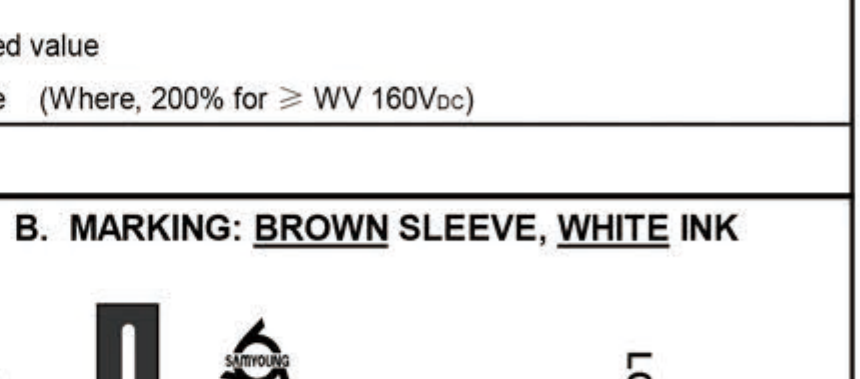
Others: Satisfied characteristics **KS C IEC 60384-4**

A. DIMENSIONS OF NHA Series



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
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10
ΦD'	ΦD+0.5max							
L'	L+1.5max		L+2.0max					

B. MARKING: BROWN SLEEVE, WHITE INK



FRONT VIEW OF CAPACITOR BACK VIEW OF CAPACITOR

李波	范立波	吕阿勇

ALUMINUM ELECTROLYTIC CAPACITOR	APPROVAL NO. 710-005

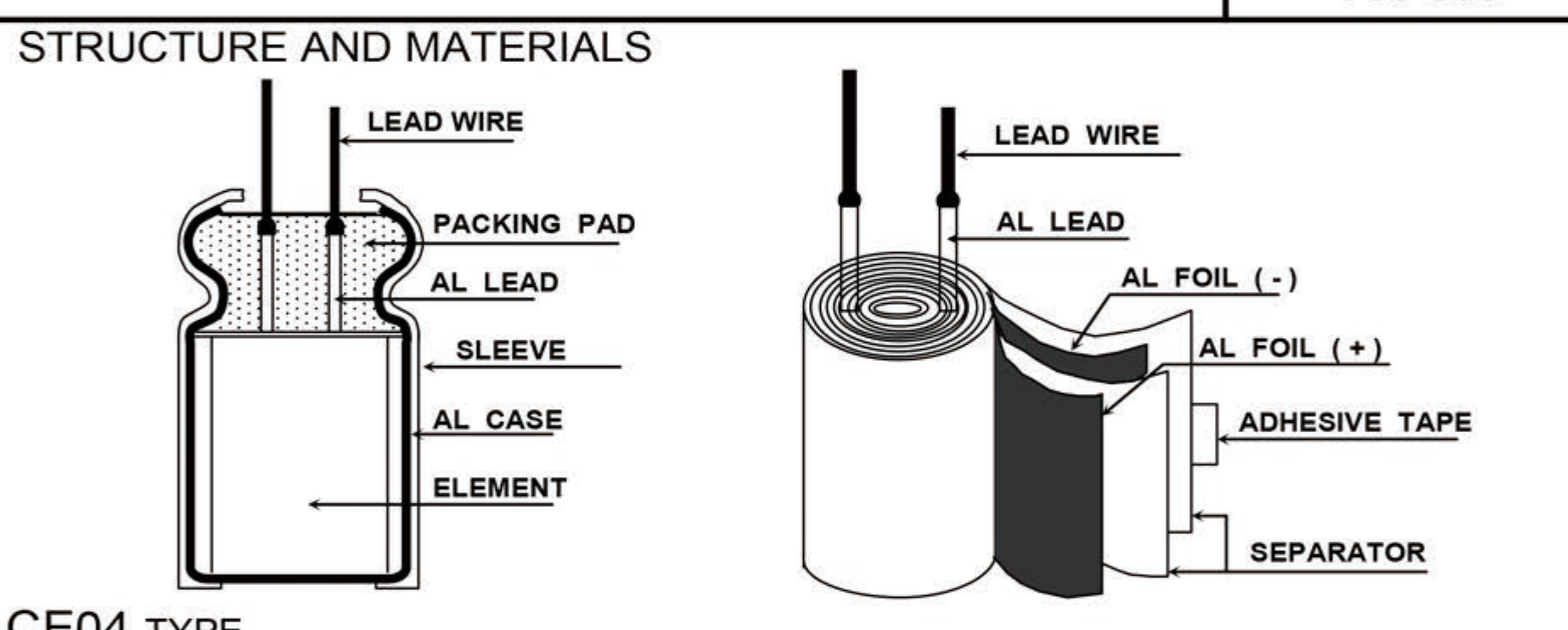
RATINGS OF NHA SERIES

CAP \ WV	6.3	10	16	25	35	50	63	80	100	160	200	250	350	400	420	450	500
0.1						5X11 2.1	5X11 3.2		5X11 3.6								
0.22						5X11 3.2	5X11 4.3		5X11 4.8								
0.33						5X11 6.3	5X11 7.2		5X11 7.8								
0.47						5X11 10	5X11 11		5X11 12	6.3X11 12	6.3X11 12	6.3X11 12	6.3X11 12	6.3X11 11			
0.68						5X11 12	5X11 13		5X11 14	6.3X11 14	6.3X11 15	6.3X11 15	6.3X11 15				
1						5X11 13	5X11 15		5X11 16	6.3X11 14	6.3X11 15	6.3X11 17	6.3X11 18	6.3X11 19		6.3X11 14	6.3X11 13
2.2						5X11 18	5X11 19		5X11 21	6.3X11 20	6.3X11 24	6.3X11 27	8X11.5 29	6.3X11 28 8X11.5 30		6.3X15 16 8X11.5 25	8X11.5 22
3.3						5X11 30	5X11 33		5X11 34	6.3X11 35	6.3X11 36	6.3X11 37	8X11.5 38	10X12.5 41		8X11.5 30 10X12.5 35	10X16 32
4.7				5X11 25	5X11 27	5X11 37	5X11 39		5X11 40	6.3X11 41	6.3X11 43	8X11.5 45	8X11.5 45	8X11.5 46 10X12.5 48		10X12.5 35 10X16 42	8X11.5 22 10X16 40
6.8				5X11 31	5X11 33	5X11 44	5X11 48		5X11 49	8X11.5 52	8X11.5 54	8X11.5 56	10X16 62	10X12.5 59 10X16 65		10X16 55 10X20 59	10X20 55
10			5X11 35	5X11 37	5X11 40	5X11 54	5X11 59		5X11 59	8X11.5 60	8X11.5 62	10X16 74	10X12.5 64 10X20 79	10X16 79 10X20 85		10X16 69 10X20 76 12.5X20 80	12.5X20 72
15														10X20 85		12.5X20 85	12.5X20 72
18										8X11.5 60							
22		5X11 48	5X11 53	5X11 56	5X11 67	5X11 79	5X11 87 6.3X11 87		6.3X11 100	10X16 111	10X16 113	10X20 127	12.5X16 138 12.5X20 150	10X25 157 12.5X16 140 12.5X20 157		12.5X20 125 12.5X25 130	16X25 132
33	5X11 52	5X11 56	5X11 60	5X11 75	5X11 80	5X11 97	6.3X11 122		8X11.5 144	10X20 156	10X20 158	12.5X20 184	12.5X25 189	12.5X20 157 12.5X25 165 16X20 210		12.5X25 150 12.5X30 189	16X31.5 178
47	5X11 61	5X11 66	5X11 77	5X11 80	5X11 101	6.3X11 133	6.3X11 146		8X11.5 171 8X15 189	10X20 202	12.5X16 206 12.5X20 210	12.5X25 238	16X20 246	12.5X30 265 16X20 210 16X25 280		16X25 223 16X31.5 240 18X20 215	18X31.5 200
56					5X11 110											18X25 268	
68	5X11 69	5X11 83	5X11 92	5X11 113	6.3X11 138	6.3X11 156	8X11.5 207		10X16 264	12.5X20 274	12.5X20 265 12.5X25 288	16X20 300	16X31.5 348	16X31.5 376 16X35.5 384 18X20 300		18X20 290 18X31.5 338 18X35.5 349	
82											12.5X20 380			18X25 340 16X31.5 376			
100	5X11 90	5X11 100	5X11 125	5X11 141 6.3X11 159	6.3X11 168	8X11.5 229	8X11.5 235 10X12.5 251 10X16 255		10X16 321 10X20 349	12.5X25 360	16X20 366	16X25 405	16X35.5 447	16X31.5 376 18X25 340 18X31.5 415 18X40 461		18X31.5 400 22X30 414	
120			5X11 125		8X11.5 180						16X20 380 12.5X30 330	18X25 411 18X31.5 470		18X31.5 437	18X31.5 380	18X40 425	
150										16X20 505				18X31.5 437 18X35.5 439			
180											18X20 558			18X40 605			
220	5X11 153	5X11 170 6.3X11 194	6.3X11 213	6.3X11 238 8X11.5 260	8X11.5 294	10X12.5 395	10X16 474	12.5X16 480	12.5X20 572	16X25 656	16X31.5 684	18X31.5 690 18X35.5 710 18X40 730	22X45 780				
330	6.3X11 216	6.3X11 239	6.3X11 265	6.3X11 293 8X11.5 340	8X15 398	10X16 529	10X20 633		16X20 810	18X31.5 848	16X35.5 700 18X35.5 866 18X40 880	22X40 900					
470	6.3X11 258	6.3X11 286	8X11.5 366	8X11.5 406 8X15 447 10X12.5 471	8X20 440 10X16 547	10X20 690	12.5X20 886	12.5X25 890	16X25 1072	18X31.5 848 22X35 1130	18X40 880 22X40 1156						
560					12.5X16 600		16X20 1050				18X45 900						
680	8X11.5 365	8X11.5 405	8X11.5 366 8X15 455	10X16 620	10X20 580 12.5X16 777	12.5X20 973	12.5X25 1160		16X31.5 1364	22X45 1463							
820								16X31.5 1210									
1000	8X11.5 443	8X15 542	10X16 680	10X16 756 10X20 765	12.5X16 940 12.5X20 960	12.5X20 973 12.5X25 1287	16X25 1565 16X31.5 1580	18X31.5 1600	18X40 2020								
1200	8X15 490																
1500						16X31.5 1424	16X40 1650										
2200	10X16 772	10X20 886	12.5X16 1019 12.5X20 1108	12.5X20 1188 12.5X25 1297	16X20 1394 16X25 1394	16X31.5 1724	18X35.5 1938										
3300	10X20 1032	12.5X20 1205	12.5X25 1389	12.5X30 1330 16X20 1535 16X25 1646	16X25 1500 16X31.5 1808	18X35.5 2260											
4700	12.5X20 1280	12.5X25 1492	12.5X30 1550 16X20 1610	16X25 1646 16X31.5 2012	18X35.5 2335												
6800	12.5X25 1554	16X25 1824	16X31.5 2081	18X35.5 2452	18X40 2642												
10000	16X25 1897	16X31.5 2082	18X31.5 2365	18X40 2692													
15000	16X35.5 2344																

← CASE SIZE ØD X L(mm)
← Rated Ripple Current (mArms) at 105℃,120Hz

ALUMINUM ELECTROLYTIC CAPACITORS	APPROVAL NO. 710-005

STRUCTURE AND MATERIALS



CE04 TYPE

MINIATURE SIZED TYPE CAPACITORS COMPONENT

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

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

AIX_3 is dissociated with water:

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

※MANUFACTURING SITE

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

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Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

Samyoung Electronics:

CLZ50VC330M12.5*13.5_12.5TP MVK50VC10M5*5_5.0TP NXA25VB100M6.3*11_2.5TP
TDA200VS1000M25.4*50_VS NXA25VB1000M10*20_LO TLC315VS1000M35*50_VS
MVK16VC220M6.3*8_6.3TP NFA200VB22M10*20_5.0TP NXA50VB22M5*11_LO NXA50VB330M10*16_LO
NXA63VB470M12.5*20_5.0TP NXB16VB47M5*11_2.5TP TDC450VS470M35*35_VS
NXB16VB10M5*11_2.5TP NXH50VB100M8*11.5_LO NXA10VB220M6.3*11_2.5TP
NXA16VB1000M10*16_LO NXA50VB1000M16*25_LO BXA35VC47M6.3*6_6.3TP
MVK25VC100M6.3*8_6.3TP NFA450VB10M10*20_5.0TP NXA10VB220M6.3*11_5.0TP
TLS450VS680M35*50_VS MVK25VC10M4*5_4.0TP NFC450VB120M18*31.5_LO
NXA50VB47M6.3*11_2.5TP TDC400VS680M35*40_VS MVK16VC47M5*5_5.0TP NXA100VB330M16*25_LO
NXA50VB220M10*12.5_LO