Messrs.

Date	2016.11.29
Approval No.	843 - 1626

SYQD(SHENZHEN YAZE)

APPROVAL SHEET

Aluminum electrolytic capacitors

Catalog Type	CLZ 35 VC 100 M (Ø8 × 10L)
User Part No.	
Applied To	
Reference	Halogen-Free

Samyoung Electronics Co.,Ltd.

General manager of production engineering group

CHOI SEONG ROK

User Approval

Approval No. :

Address	KOREA	47, Sagimakgol-ro, Jungwon-gu,Seongnam-si, Gyeonggi-do
	CHINA	No.5 Changjiang Road Pingdu-city, Shandong-province

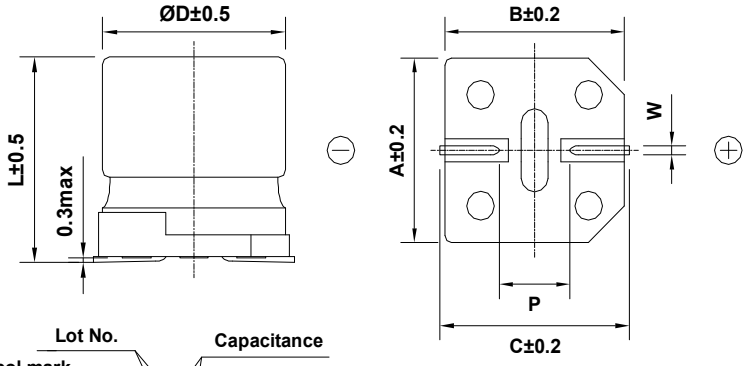
ALUMINUM ELECTROLYTIC CAPACITORS

APPROVAL NO. 843 - 1626

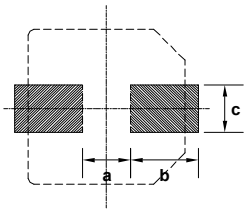
CLZ 35 VC 100 (M)

SERIES	CLZ
RATING	35 V 100 ㎌
CASE SIZE	Ø8 × 10L

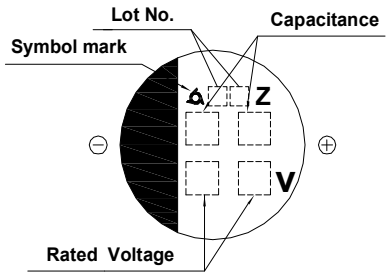
A. DIAGRAM OF DIMENSION



Recommended Solder land on PC board



: Solder land on PC board



Case code	ØD	L	A	B	C	W	P	a	b	c
H10	8	10	8.3	8.3	9.0	0.7-1.1	3.1	3.1	4.2	2.2

C. ELECTRICAL CHARACTERISTICS

A. OPERATING TEMPERATURE RANGE : -40 ~ +125℃

B. RATED VOLTAGE : 35 V_{DC}

C. SURGE VOLTAGE : 44 V_{DC}

D. CAPACITANCE TOLERANCE : ± 20% at 20℃, 120㎐

E. LEAKAGE CURRENT : Lower 35 ㎂ , after 2 minutes at 20℃

F. DISSIPATION FACTOR (TAN δ) : Lower 0.14 at 20℃ , 120㎐

G. RATED RIPPLE CURRENT : 220 mArms at 125℃ , 100㎑

H. RATED RIPPLE CURRENT MULTIPLIERS (Frequency Multipliers) :

Freq.(㎐)	120	1k	10k	100k
Factor	0.93	0.97	1.00	1.00

I. TEMPERATURE CHARACTERISTIC (Max. Impedance ratio) :

Z(-25℃) / Z(20℃)	2
Z(-40℃) / Z(20℃)	3

(at 120㎐)

J. LOAD LIFE : The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 5,000 hours at 125℃.

- # Capacitance change ≤ ± 30% of the initial value
- # Tanδ ≤ 300 % of the initial specified value
- # Leakage Current ≤ The initial specified value

K. SHELF LIFE : The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied. The rated voltage shall be applied to the capacitors 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
- # Tanδ ≤ 300 % of the initial specified value
- # Leakage Current ≤ 500 % of the initial specified value

L. CLEANING CONDITIONS : Solvent-proof → Refer to Cleaning conditions (Page 6)

M. OTHERS : Satisfied charateristics KS C IEC 60384-4

※ ESR(20℃,100㎑) : 0.40 (Ω) ↓

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■SURFACE MOUNT TYPE

TAPING DIMENSIONS

FIG1

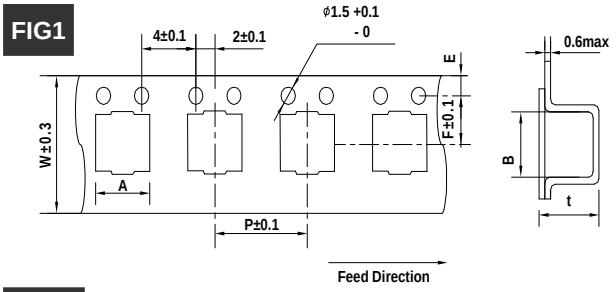


FIG2

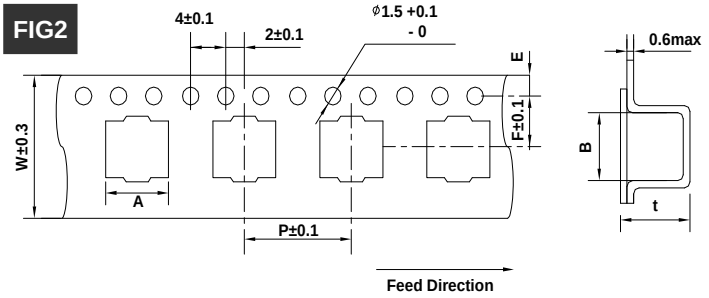


FIG3

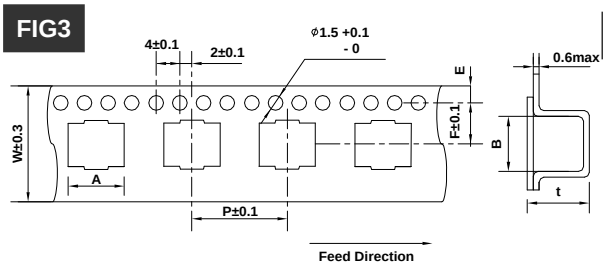
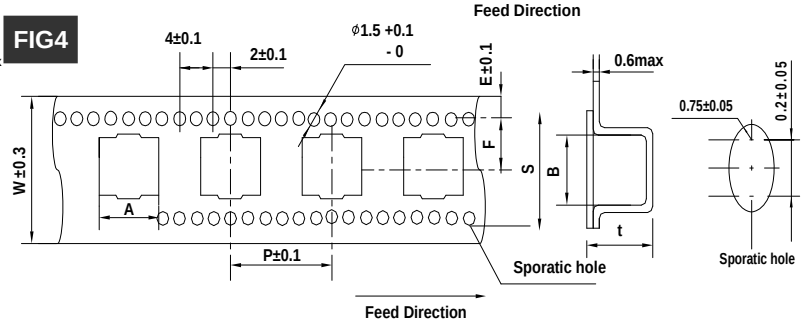
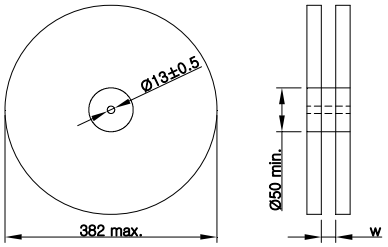


FIG4



SERIES	CASE CODE	FIG	W	A	B	F	E	P	t	s
AL CHIP	Ø3(B55)	1	12	3.5±0.2	3.5±0.2	5.5	1.75±0.1	8	5.9±0.2	-
	Ø4(D55,D56,D60)	1	12	4.7±0.2	4.7±0.2	5.5	1.75±0.1	8	5.7±0.2(D55,D56) 6.3±0.2(D60)	-
	Ø5(E55,E56,E60)	2	12	5.7±0.2	5.7±0.2	5.5	1.75±0.1	12	5.7±0.2(E55,E56) 6.3±0.2(E60)	-
	Ø6.3(F55,F56,F60)	2	16	7.0±0.2	7.0±0.2	7.5	1.75±0.1	12	5.7±0.2(F55,F56) 6.3±0.3(F60)	-
	Ø6.3X8(F80)	2	16	7.0±0.2	7.0±0.2	7.5	1.75±0.1	12	8.2±0.2	-
	Ø8X6(H63)	2	16	8.7±0.2	8.7±0.2	7.5	1.75±0.1	12	6.8±0.2	-
	Ø8X10(H10)	3	24	8.7±0.2	8.7±0.2	11.5	1.75±0.1	16	11.0±0.2	-
	Ø10X10(J10)	3	24	10.7±0.2	10.7±0.2	11.5	1.75±0.1	16	11.0±0.2	-
	Ø12.5X13.5(K14)	4	32	13.4±0.2	13.4±0.2	14.2	1.75±0.1	24	14.0±0.2	28.4±0.1

REEL

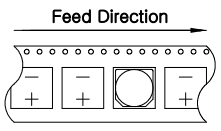


QUANTITY PER REEL

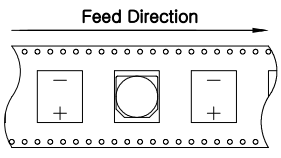
SERIES	CASE CODE	W(mm)	Q'TY(PCS/REEL)	Q'TY(PCS/BOX)
AL CHIP	Ø3(B55)	14	2,000	20,000
	Ø4(D55,D56,D60)	14	2,000	20,000
	Ø5(E55,E56,E60)	14	1,000	10,000
	Ø6.3(F55,F56,F60)	18	1,000	10,000
	Ø6.3X8L(F80)	18	900	9,000
	Ø8X6L(H63)	18	1,000	10,000
	Ø8X10L(H10)	26	500	3,000
	Ø10X10L(J10)	26	500	3,000
	Ø12.5X13.5L(K14)	34	200	1,000

ORIENTATION OF POLARITY

●AL CHIP



<Ø3 ~ Ø10>



<Ø12.5>

PART NUMBERING SYSTEM

CLZ 35 VC 100 M H10 TP

- TP: With tape
- H10: Case code
- M: Capacitance tolerance(±20%)
- 100: Nominal capacitance code
- VC: Lead type
- 35: Rated voltage
- CLZ: Series names

Capacitance	code
0.1㎌	R1
0.47㎌	R47
1.0㎌	1
4.7㎌	4R7
10㎌	10
100㎌	100

ALUMINUM ELECTROLYTIC CAPACITORS

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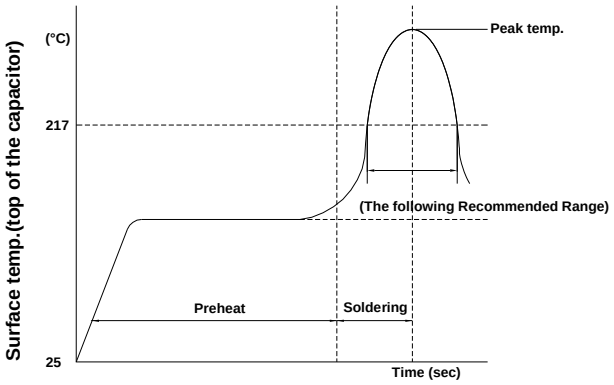
RECOMMENDED Pb-FREE REFLOW SOLDERING CONDITIONS

Al chip - CLZ

The following conditions are recommended for air or infrared reflow soldering of the surface mount capacitors onto a glass epoxy circuit board of 90X50X0.8mm(with resist)by cream solder (eutectic solder).
The temperatures shown are the surface temperature values of the top of the capacitor.



TEMPERATURE PROFILE

CASE CODE	Time of Preheat temp. (from 150℃ to 200℃)	Time to be maintained above 217℃	Time to be maintained above 230℃	Peak Temp. (℃)	Reflow Cycle
B55,D55,D56, E55,F55,F60,F80, H63,H10,J10,K14	60~100 Sec	60~70 Sec	20~30 Sec	250 (10Sec↓)	1 TIME
L17,L22, M17,M22	60~100 Sec	50~60 Sec	-	230 (10Sec↓)	1 TIME

◆PRECAUTIONS FOR USERS

Soldering method

The capacitors of Alchip CLZ series have no capability to withstand such dip or wave soldering as totally immerses components into a solder bath.

Reflow soldering

Reflow the capacitors within Recommended Reflow Soldering Conditions. Verify no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult us if other reflow conditions are employed.

1.Location of components;Temperature increases at the edge of PC board more than the center.

2.Population of PC Board;The less the component population is,the more temperature rises.

3.Material of PC Board;A ceramic made board needs more heat than a glass epoxy made board. The heat increase may cause damage of the capacitors.

4.Thickness of PC board;A thicker board needs more heat than a thinner board. The heat increase may damage the capacitors.

5.Size-of PC board;A larger board needs more heat than a smaller board. The heat increase may damage the capacitors.

6.Location of infrared ray lamps;IR reflow as well as hot plate re-flow applies heat only on the reverse side of the PC board to lessen heat stress to the capacitors.

Rework of soldering

Avoid reflow soldering more than once.Use a soldering iron for rework. Do not exceed an iron tip temperature of 300℃and an exposure time of 5 seconds.

Mechanical stress

Do not grab the capacitors to life the PC board and give stress to the capacitor. Avoid bending the PC board. These may damage the capacitors.

Cleaning assembly board

For the cleaning conditions,see last page.
Immediately after solvent cleaning, remove residual solvent for at least 10 minutes with an air knife. The solvent is so insufficiently dry for a long period of time the capacitors may be corroded.

Coating on assembly board

1.Before curing coating material,remove the cleaning solvents from the assembly board.

2.Before conformal coating, a chloride free pre-coat material is recommended to use for lessening stress to the capacitors.

Molding with resin

Internal chemical reaction gradually produces gas in the capacitor;then, internal pressure is increasing. If the end seal of the capacitor is completely molded with a resin, the gas stays inside the capacitor. It will face dangerous situation. The chloring contained resin will penetrate into the end seal, reach the inside element, and cause damage of the capacitor.

Others

Precautions to users for Aluminum Electrolytic Capacitors shall be referred.

ELECTROLYTIC ALUMINUM CAPACITORS

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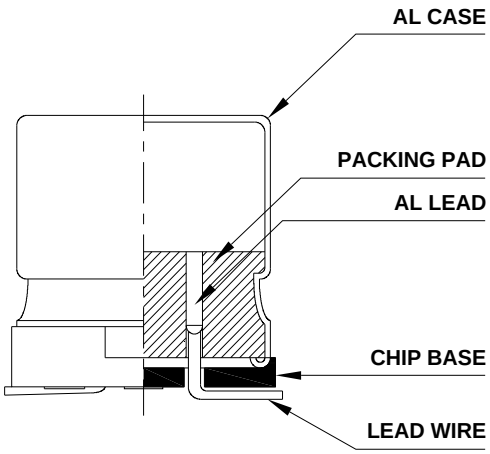
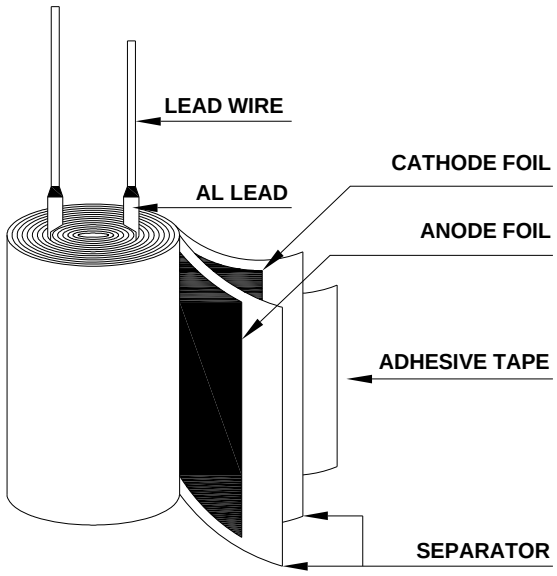
STRUCTURE AND MATERIALS





SURFACE MOUNT TYPE CAPACITORS COMPONENT

PART NAME	MATERIALS	VENDER
LEAD WIRE	TINNED COPPER - PLY WIRE(Pb-FREE)	KISTRON (KOREA/CHINA) KOHOKU (JAPAN/CHINA) NANTONG HONGYANG (CHINA)
AL LEAD	ALUMINUM 99.92 %	KISTRON (KOREA/CHINA) KOHOKU (JAPAN/CHINA) NAN TONG HUI FENG (CHINA) NANTONG HONGYANG
PACKING PAD	SYNTHETIC RUBBER	SUNG NAM (KOREA/CHINA) CCW (CHINA)
CHIP BASE	PPA (POLY PHTHAL AMIDE)	BASE (KOREA) ZICVISION SANKYO TOHOKU (JAPAN) VIVID (CHINA)
AL CASE	COATED ALUMINUM	D.N Tech / HA NAM (KOREA) LINAN AOXING (CHINA) UPTODATE (JAPAN) RAI HATOME
ANODE FOIL	FORMED ALUMINUM 99.9 % OVER	SAM YOUNG (KOREA) K.D.K / JCC / MATSUSHITA (JAPAN) BECROMAL (ITALY) HEC / NANTONG (CHINA)
CATHODE FOIL	ETCHED ALUMINUM 98.0 % OVER	K.D.K (JAPAN) K-JCC (KOREA) ELECON / WU JIANG FEILO (CHINA)
SEPARATOR	INSULATION PAPER	N.K.K (JAPAN) KAN (CHINA)
ADHESIVE TAPE	POLY PHENYLENE SULFIDE OR POLY IMIDE FILM	DAEIL / SWECO (KOREA) NITTO / NICHIBAN (JAPAN)

PRECAUTIONS AND GUIDELINES TO USERS

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

1. Electrolytic capacitors for DC application require polarization.

Confirm the polarity. If uesd 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. (Note1).

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. Other wise, 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 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 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 voltages are as follows:

Rated Voltage(WV)	4	6.3	10	16	25	35	50	63	80	100	160	200	250	315	350	400	420	450	500	550	600
Surge Voltage(SV)	5	8	13	20	32	44	63	79	100	125	200	250	300	365	400	450	470	500	550	600	650

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 halogenate'd 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	Trichlene
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 affected by halogen ions, particularly by chloride and bromine 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 important check point for quality 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 erosion.

When using latex-based adhesive on the capacitor's 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 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, whereby 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 / Indonesia)