

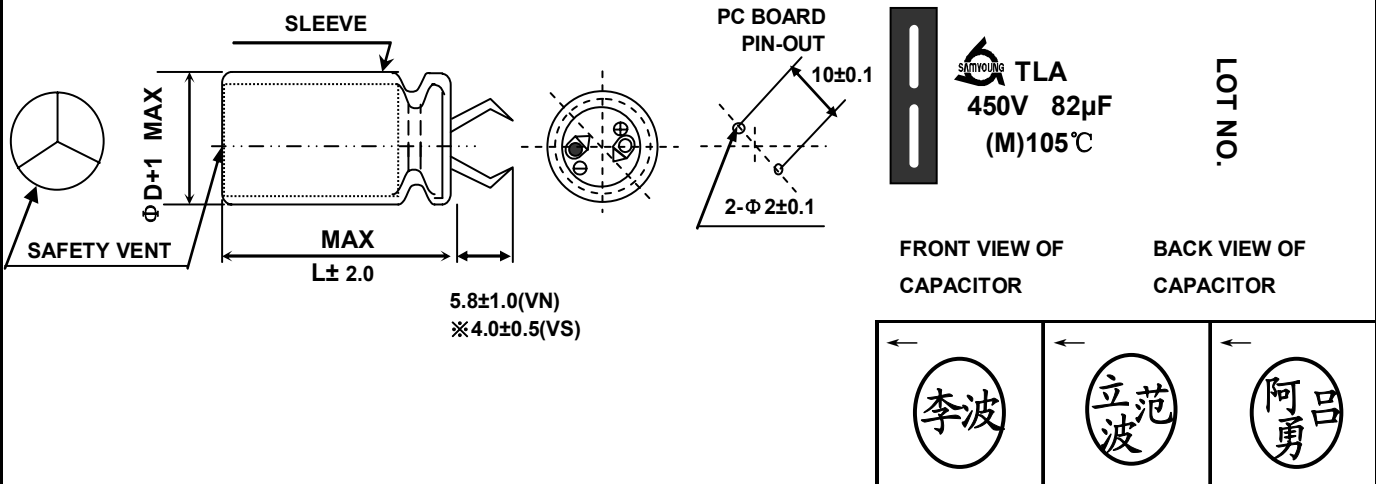
Specifications of TLA Series

Item	Characteristics		
Rated Voltage Range	160 ~ 500 V _{DC}		
Operating Temperature Range	-25 ~ +105°C		
Capacitance Tolerance	±20 % (M) (at 20°C, 120Hz)		
Leakage Current (at 20°C)	After 5 minutes, I = 0.02CV or 3mA, whichever is smaller Where, I : Leakage current(μA) C: Nominal capacitance(μF) V : Rated voltage(V _{DC})		
Dissipation Factor(TANδ) (20°C,120Hz)	Rated voltage(V _{DC})	160~500	
	Tanδ(Max)	0.20 (at 120Hz,20°C)	
Temperature Characteristics (Max.Impedance ratio)	Rated voltage(V _{DC})	160~400	420~500
	Z-25°C/Z+20°C	4	8 (at 120Hz)
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 3,000 hours at 105°C. Capacitance change: ≤±20% of the initial value Tanδ ≤200% of the initial specified value Leakage current ≤The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them at 105°C for 1,000 hours 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: ≤±20% of the initial value Tanδ ≤200% of the initial specified value Leakage current ≤The initial specified value		
Others	Satisfied characteristics <u>KS C IEC 60384-4</u>		

※For capacitors with CV products > 100,000, higher Tanδ value may apply.
 When the capacitance exceeds 1,000μF, 0.01 shall be added every 1,000μF increase.

DIMENSIONS OF TLA Series

MARKING: BROWN SLEEVE, SILVER INK



ALUMINUM ELECTROLYTIC CAPACITOR

APPROVAL NO.:
697-031

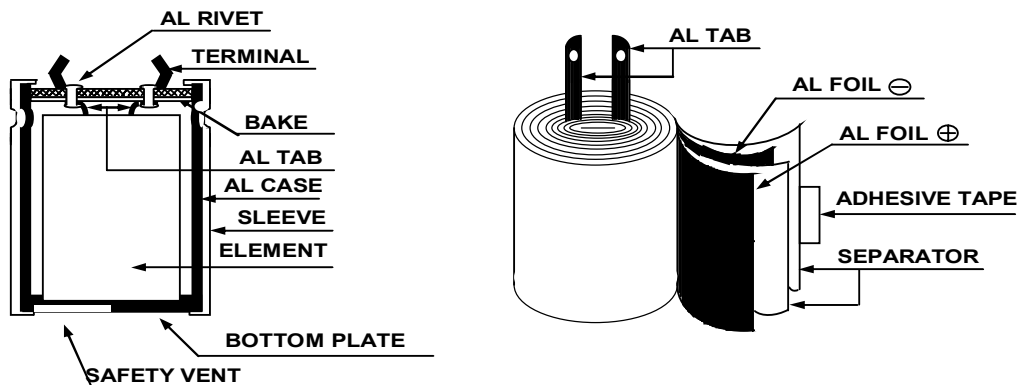
RATINGS OF TLA Series

WV (Vdc)	CAP (μF)	Case Size (mm) Φ×L	Ripple Current (Arms 105 °C /120Hz)	WV (Vdc)	CAP (μF)	Case Size (mm) Φ×L	Ripple Current (Arms105 °C /120Hz)	WV (Vdc)	CAP (μF)	Case Size (mm) Φ×L	Ripple Current (Arms105 °C /120Hz)	WV (Vdc)	CAP (μF)	Case Size (mm) Φ×L	Ripple Current (Arms105 °C /120Hz)					
160	330	22×25	1.20	250	470	30×30	1.65	400	330	30×30	1.10	500	56	25.4×30	0.46					
		22×25	1.30			35×25	1.65			30×40	1.44			30×30	0.48					
		25.4×25	1.26			22×50	1.67			35×30	1.44			22×40	0.45					
	390	22×30	1.55			560	25.4×40			1.80	390		25.4×50	1.46	68	25.4×60	1.51	82	25.4×35	0.53
		25.4×25	1.55				30×30			1.80			30×45	1.60		30×30	0.55			
		22×35	1.67				35×25			1.80			35×35	1.60		30×35	0.56			
	560	25.4×30	1.67		25.4×50		2.00		470	30×50			1.90	560	30×60	2.10	100	25.4×40	0.65	
		30×25	1.67		30×35		2.00			35×35			1.75		35×45	2.12		30×35	0.66	
		22×40	1.82		30×40		2.00			35×40			1.90		35×50	2.15		25.4×45	0.75	
	680	25.4×30	1.82		820	25.4×60	2.20			680	25.4×60		2.20	820	35×45	2.27	120	30×45	0.66	
		30×25	1.82			30×40	2.30				35×60		2.27		35×60	2.36		25.4×45	0.75	
		25.4×30	1.82			35×35	2.30				35×60		2.27		35×60	2.36		30×35	0.66	
	820	22×45	2.04			1000	30×50		2.47		820		35×40	2.47	820	22×25	0.50	150	30×40	0.76
			25.4×35				2.04		30×60				2.85	22×25		0.64	35×30		0.78	
			30×30				2.04		35×45				2.60	25.4×25		0.58	30×45		0.80	
		1000	35×25		2.04		1500		35×45	2.60			82	22×30	0.70	150	35×35	0.81		
			22×50		2.25				35×50	3.00				25.4×25	0.70		30×50	0.90		
			25.4×40		2.25				35×60	3.42				22×25	0.75		35×30	0.78		
	1200	30×30	2.25		315	390			25.4×40	0.80	120			25.4×30	0.75	180	35×40	0.93		
		35×25	2.25			470			30×40	1.20				30×25	0.73		30×60	1.10		
		25.4×45	2.49			680			30×50	1.50							35×35	0.85		
	1500	25.4×45	2.49			1000	1000		35×45	1.95			150	22×40	0.88	220	35×45	1.11		
			30×35				2.49		82	22×25				0.55	22×30		0.53	35×50	1.28	
			35×30				2.49		100	22×25				0.69	30×25		0.88	35×60	1.28	
1800		30×40	2.84	1200	120		22×30	0.75	180	25.4×35	0.88	330		35×60	1.50					
		35×30	2.84		150		25.4×25	0.75		22×45	0.95									
		30×45	3.32		150		25.4×30	0.83		25.4×35	0.95									
2200	35×45	3.50	1800		180	30×25	0.82	220		30×30	0.95									
	22×25	1.10			220	22×40	0.92			35×25	0.94									
	22×30	1.25			220	25.4×30	0.92			22×50	1.10									
270	25.4×25	1.25		2200	30×25	0.90	270		25.4×45	1.10										
	22×30	1.35			22×45	1.05			30×35	1.10										
	25.4×25	1.35			25.4×35	1.04			35×25	1.10										
330	22×35	1.35	3300		220	30×30		1.02	330	25.4×45	1.18									
	22×40	1.67			270	30×25		1.04		25.4×50	1.22									
	25.4×30	1.50			270	22×50		1.16		30×40	1.22									
470	30×25	1.50		4700	330	25.4×40	1.18	470		25.4×60	1.41									
	30×30	1.50			390	30×30	1.17			30×45	1.45									
	30×25	1.50			390	35×25	1.20			35×35	1.45									
560	22×45	1.67	5600		470	25.4×45	1.29		560	30×50	1.55									
	25.4×30	1.67			560	30×35	1.34			30×60	1.55									
	30×25	1.67			560	35×30	1.22			30×60	1.79									
680	22×45	1.78		6800	390	25.4×50	1.51	680		35×45	1.90									
	25.4×35	1.78			390	30×40	1.51			22×25	0.40									
	30×30	1.78			470	35×35	1.47			22×30	0.53									
820	35×25	1.78	8200		470	25.4×60	1.66		820	25.4×20	0.46									
	25.4×45	2.04			560	30×45	1.65			25.4×25	0.50									
	30×30	2.04			560	35×35	1.69			22×30	0.64									
1000	35×30	2.30		10000	680	30×50	1.85	1000		22×35	0.69									
	25.4×50	2.30			680	35×40	1.90			25.4×25	0.67									
	30×35	2.30			1000	35×60	2.70			25.4×30	0.69									
1200	25.4×60	2.66	12000		82	22×25	0.55		1200	30×25	0.64									
	30×40	2.65			82	22×25	0.64			30×25	0.80									
	35×35	2.65			100	22×30	0.70			35×25	0.73									
1500	30×50	3.08		15000	100	25.4×25	0.70	1500		22×45	0.88									
	35×40	3.08			120	22×35	0.75			25.4×30	0.84									
	30×60	3.49			120	25.4×25	0.75			25.4×35	0.88									
1800	35×45	3.48	18000		120	30×25	0.80		1800	30×30	0.88									
	22×25	0.78			150	22×40	0.88			35×25	0.75									
	22×30	1.00			150	25.4×25	0.84			22×60	1.00									
220	25.4×25	0.95		22000	180	25.4×30	0.88	2200		25.4×40	1.00									
	22×30	1.18			180	30×25	0.88			30×30	1.00									
	25.4×25	1.18			220	22×45	0.98			25.4×45	1.12									
330	22×35	1.30	33000		220	25.4×30	0.90		3300	30×30	1.06									
	25.4×25	1.18			220	25.4×35	0.98			30×35	1.12									
	25.4×35	1.30			270	30×30	0.98			30×30	1.12									
370	22×35	1.37		37000	270	35×25	0.98	3700		25.4×50	1.18									
	22×40	1.49			270	22×50	1.10			30×40	1.28									
	25.4×35	1.49			330	25.4×40	1.10			35×30	1.20									
470	30×25	1.49	47000		330	30×30	1.10		4700	35×35	1.28									
	22×45	1.65			330	30×30	1.10			25.4×50	1.18									
	25.4×35	1.65			370	35×25	1.00			30×40	1.38									
560	35×45	1.70		56000	390	25.4×45	1.22	5600		30×50	1.45									
	35×50	1.85			390	30×35	1.22			35×30	1.20									
	35×70	2.60			470	30×35	1.22			35×35	1.33									
680	35×70	2.60	68000		470	35×45	1.70		6800	35×40	1.45									
	22×35	0.75			560	35×40	1.64			35×40	1.45									
	22×45	0.88			680	35×50	1.85			35×40	1.45									
820	22×45	0.88		82000	820	35×50	1.85	8200		30×60	1.51									
	25.4×35	0.88			820	35×70	2.60			30×60	1.51									
	25.4×35	0.88			500	22×35	0.46			35×35	1.60									

ALUMINUM ELECTROLYTIC CAPACITORS

APPROVAL NO.
697-031

STRUCTURE and MATERIALS



* LARGE SIZED TYPE CAPACITORS COMPONENT

PART NAME	MATERIALS	VENDER
AL RIVET	ALUMINUM 99.9 %	KYUNG-WON (KOREA) MECTRON/TNS (KOREA/CHINA) NAN TONG CHUANG JIA (CHINA)
TERMINAL	SPCC (Pb-FREE)	KYUNG-WON (KOREA) MECTRON/TNS (KOREA/CHINA) NAN TONG CHUANG JIA (CHINA) JIANGYIN JINMA LVYE (CHINA)
BAKE	RUBBER + PAPER LAMINATE	ISOVOLTA (AUSTRIA) FINE POLYMER (KOREA) NAN TONG CHUANG JIA (CHINA) TNS (CHINA)
AL TAB	ALUMINUM 99.9 % OVER	KISTRON (KOREA) SAMYOUNG (KOREA) NANTONG HUIFENG (JAPAN) DONG YANG (JAPAN)
SLEEVE	P.E.T(Poly Ethylene Terephthalate Resin)	MOODEUNG (KOREA) YUNLIN PLASTIC (CHINA) SHUN PENG PLASTIC (CHINA) SUZHOU QILIAN (CHINA)
BOTTOM PLATE	P.P(Polypropylene)	SUNG NAM (KOREA)
AL CASE	ALUMINUM 99.5 %	D.N TECH/DONG NAM (KOREA) LINAN AOXING (CHINA) NANTONG XINLIAN/HAI BANG (CHINA) CHUANGJIA ELETROMECHANICAL (CHINA) NANTONG CHUANGJIA (ITALIA) PONTIGGIA (ITALIA)
AL FOIL ⊕	FORMED ALUMINUM 99.9 % OVER	SAMYOUNG (KOREA) K.D.K/JCC/MATSUSHITA (JAPAN) BECROMAL (ITALY) SATMA (FRANCE) HUAFENG/NANTONG/RAOIO (CHINA) HEC (CHINA) XINJIANG JOINWORLD (TAIWAN) LUXON/LITON (TAIWAN)
AL FOIL ⊖	ETCHED ALUMINUM 99.8 % OVER	K.D.K (JAPAN) K-JCC (KOREA) AFT/INCULCU/SHENGHONG (CHINA) ELECON/WU JIANG FEILO (CHINA)
SEPARATOR	INSULATION PAPER	N.K.K (JAPAN) SPO (GERMANY) LUNAN PAPER/KAN (CHINA)
ADHESIVE TAPE	POLY PROPYLENE OR POLY IMIDE FILM	DAEIL/SWECO (KOREA) NICHIBAN (JAPAN)



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°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	Representative Brand Name
Trichlorotrifluoroethane	C ₂ Cl ₃ F ₃	Freon TF, Daiflon S-3
Fluorotrichloromethane	CCl ₃ F	Freon-11, Daiflon S-1
1,1,1-Trichloroethane	F ₂ H ₃ Cl ₃	Chloroethane
Trichloroethylene	C ₂ HCl ₃	Trichiene
Methyl Chloride	CH ₃ Cl	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 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 control in our production 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.

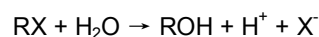
If electrolytic capacitors are cleaned with such solvents, they may gradually penetrate the seal portion and cause the corrosion. When using latex-based adhesive on the capacitors rubber end seal for adhesion to a PCB, corrosion may occur depending on the kind of solvent in the adhesive. Select an adhesive 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°C~80°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:



The halogen ions (X⁻) react with the dielectric substance (Al₂O₃) of aluminum electrolytic capacitors:



ALX₃ is dissociated with water:



※ MANUFACTURING SITE

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

