



RoHS

MESSRS: _____

APPROVAL NO

710-282

DATE

2020.10.24

ALUMINUM ELECTROLYTIC

CAPACITOR

APPROVAL SHEET

CATALOG TYPE	TLC 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



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)



SamYoung Electronics Co., Ltd.

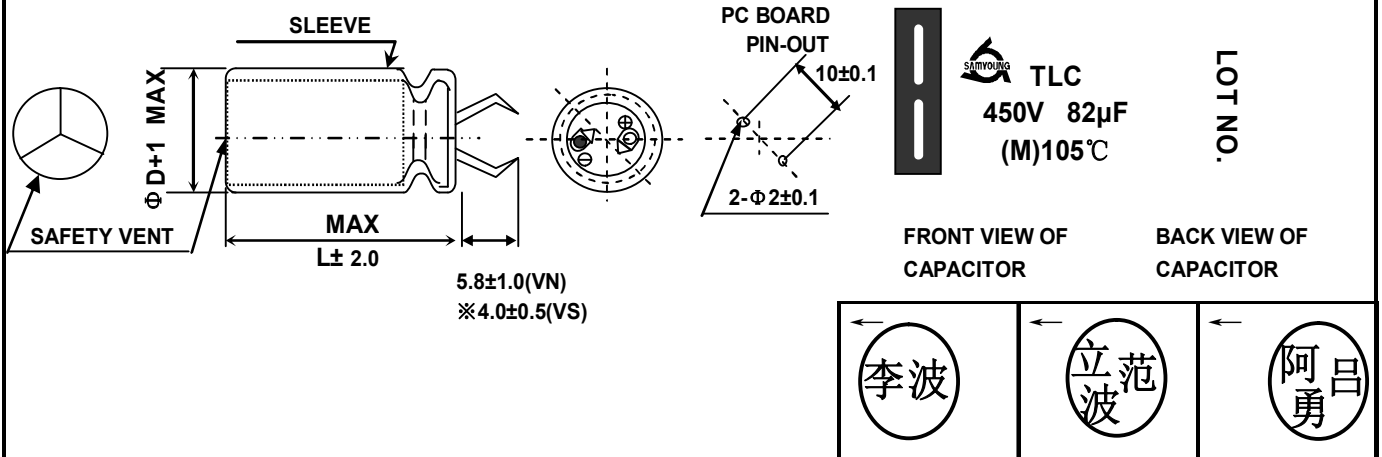
Specifications

Item	Characteristics							
Rated Voltage Range	10 ~ 100 V _{DC}				200 ~ 500 VDC			
Operating Temperature Range	-40 ~ +105°C				-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) (at 120Hz,20°C)	Rated voltage(V _{DC})	10	16	25	35	50~100	200~400	420~500
	Tanδ(Max)	0.60	0.45	0.30	0.25	0.20	0.15	0.20
Temperature Characteristics (Max.Impedance ratio) (at 120Hz)	Rated voltage(VDC)	10~16	25	35	50~63	80~100	200~400	420~500
	Z-25°C/Z+20°C	4	3	3	2	2	4	8
	Z-40°C/Z+20°C	15	10	8	6	5	-	-
Load Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105°C.</p> <p>Capacitance change: ≤±25% of the initial value Tanδ ≤250% of the initial specified value Leakage current ≤The initial specified value</p>							
Shelf Life	<p>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.</p> <p>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.</p> <p>Capacitance change: ≤±20% of the initial value Tanδ ≤150% of the initial specified value Leakage current ≤The initial specified value</p>							
Others	Satisfied characteristics KS C IEC 60384-4							

※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 TLC Series

MARKING: BROWN SLEEVE, SILVER INK



ALUMINUM ELECTROLYTIC CAPACITOR

APPROVAL NO.
710-282

RATINGS OF TLC Series

WV (VDC)	CAP (µF)	Case Size (mm)	Ripple Current	WV (VDC)	CAP (µF)	Case Size (mm)	Ripple Current	WV (VDC)	CAP (µF)	Case Size (mm)	Ripple Current	WV (VDC)	CAP (µF)	Case Size (mm)	Ripple Current	WV (VDC)	CAP (µF)	Case Size (mm)	Ripple Current	WV (VDC)	CAP (µF)	Case Size (mm)	Ripple Current					
10	6800	22x25	1.30	25	18000	30x50	3.64	63	3300	25.4x50	2.20	200	560	35x25	1.66	400	150	30x30	0.65	500	82	22x35	0.38	82	22x45	0.54		
	8200	22x30	1.49		18000	35x40	3.61		3300	35x30	2.18		560	25.4x50	1.85		150	35x25	0.68		82	25.4x30	0.40		22x45	0.54		
	10000	22x30	1.65		18000	35x45	4.00		3300	35x30	2.18		560	30x40	1.86		150	25.4x45	0.72		82	25.4x35	0.54		25.4x30	0.40		
	12000	25.4x25	1.64		22000	35x50	4.70		3900	30x40	2.41		680	22x50	1.92		180	30x35	0.74		100	30x35	0.5		25.4x40	0.55		
	15000	22x35	1.85		22000	22x25	1.10		3900	35x35	2.43		680	30x50	2.80		180	35x30	0.76		100	35x30	0.56		30x35	0.56		
	18000	25.4x30	1.85		2700	22x30	1.21		4700	30x50	2.80		680	35x40	2.78		150	25.4x50	1.16		120	25.4x45	0.71		35x40	0.71		
	22000	30x25	1.89		3300	22x30	1.42		4700	35x40	2.78		680	22x25	0.97		150	30x40	1.18		120	30x40	0.71		35x40	0.72		
	27000	22x35	1.85		3300	25.4x25	1.41		5600	35x45	3.04		680	22x30	1.12		180	35x40	1.26		150	35x40	1.33		35x40	0.72		
	33000	22x45	2.12		3900	22x35	1.58		6800	35x50	3.55		680	22x35	1.27		180	35x50	1.35		150	35x50	1.70		30x45	0.76		
	39000	25.4x35	2.16		3900	25.4x30	1.58		6800	22x25	0.97		680	22x30	1.12		150	22x25	0.57		150	35x30	0.8		35x30	0.8		
16	47000	22x50	2.45	35	4700	22x40	1.78	80	820	22x30	1.12	250	180	22x30	0.66	420	330	35x40	1.33	550	180	30x40	0.71	220	30x50	0.89		
	56000	25.4x40	2.43		4700	25.4x30	1.70		820	22x35	1.27		180	25.4x25	0.66		330	35x45	1.50		180	30x40	0.71		220	30x50	1.01	
	6800	30x30	2.37		4700	30x30	1.98		820	22x40	1.42		180	22x35	0.75		330	35x45	1.70		180	35x40	0.9		220	35x60	1.05	
	8200	35x25	2.42		4700	30x35	1.98		820	22x45	1.42		180	25.4x25	1.23		330	35x45	1.70		180	35x45	1.50		220	30x35	1.01	
	10000	25.4x45	2.62		4700	30x30	1.98		820	25.4x30	1.39		180	22x40	1.42		330	35x50	2.00		180	35x50	2.00		220	35x60	1.44	
	12000	30x35	2.73		4700	30x30	1.98		820	30x25	1.41		180	30x25	1.41		330	22x30	0.85		180	22x30	0.44		220	35x60	1.55	
	15000	35x30	2.79		4700	35x25	2.03		820	22x45	1.60		180	22x45	1.60		330	30x25	0.85		180	22x30	0.44		220	35x60	1.55	
	18000	25.4x50	3.11		4700	22x50	2.26		820	25.4x35	1.62		180	22x45	1.62		330	22x45	0.92		180	22x30	0.55		220	35x60	1.55	
	22000	30x40	3.13		4700	25.4x40	2.24		820	30x25	1.57		180	30x25	1.57		330	25.4x35	0.96		180	22x30	0.55		220	35x60	1.55	
	27000	35x30	3.00		4700	30x30	2.14		820	22x50	1.84		180	22x50	1.84		330	30x30	0.96		180	22x30	0.57		220	35x60	1.55	
25	33000	30x45	3.34	50	8200	35x25	2.20	100	1800	25.4x40	1.82	350	390	35x25	1.02	450	390	22x45	0.87	500	270	35x40	1.44	680	35x40	1.01		
	39000	35x35	3.49		8200	25.4x50	2.57		1800	30x30	1.78		390	22x50	1.08		390	25.4x40	1.07		450	22x45	0.87		680	35x40	1.01	
	47000	35x40	3.96		8200	30x35	2.50		1800	35x25	1.82		390	25.4x40	1.07		390	30x30	0.67		450	22x50	0.74		680	35x40	1.01	
	56000	35x40	3.96		8200	35x30	2.55		1800	25.4x50	2.11		390	30x30	1.04		390	30x30	0.67		450	22x50	0.74		680	35x40	1.01	
	68000	35x50	4.62		8200	30x40	2.55		1800	30x35	2.05		390	35x25	1.10		390	25.4x40	1.07		450	22x50	0.74		680	35x40	1.01	
	82000	22x25	1.44		8200	35x35	2.88		1800	35x30	2.09		390	25.4x50	1.22		390	30x35	1.04		450	22x50	0.74		680	35x40	1.01	
	100000	22x30	1.66		8200	30x50	3.32		1800	30x40	2.35		390	30x35	1.19		390	35x30	0.76		450	22x50	0.74		680	35x40	1.01	
	120000	25.4x25	1.66		8200	35x40	3.30		1800	35x35	2.37		390	35x30	1.22		390	35x30	0.76		450	22x50	0.74		680	35x40	1.01	
	150000	22x35	1.87		8200	18000	35x50		4.29	1800	30x50		2.75	390	30x40		1.35	390	35x30		0.76	450	22x50		0.74	680	35x40	1.01
	180000	25.4x30	1.87		8200	1500	22x25		1.02	1800	35x40		2.73	390	35x40		1.35	390	35x35		1.36	450	22x50		0.74	680	35x40	1.01
63	220000	22x40	2.12	63	18000	22x30	1.17	200	4700	35x50	3.46	400	680	30x50	1.58	500	680	30x45	1.10	680	30x45	1.10	820	35x35	1.10			
	270000	25.4x30	2.07		18000	25.4x25	1.17		4700	22x25	0.78		680	35x40	1.57		680	35x40	1.10		680	35x35		1.10	820	35x35	1.10	
	330000	30x25	2.11		18000	22x35	1.33		4700	22x25	0.85		680	25.4x45	1.75		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	
	390000	30x30	2.11		18000	22x35	1.33		4700	22x25	0.85		680	35x50	2.02		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	
	470000	30x35	2.11		18000	22x35	1.33		4700	22x25	0.85		680	35x50	2.02		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	
	560000	30x35	2.11		18000	22x35	1.33		4700	22x25	0.85		680	35x50	2.02		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	
	680000	30x35	2.11		18000	22x35	1.33		4700	22x25	0.85		680	35x50	2.02		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	
	820000	30x35	2.11		18000	22x35	1.33		4700	22x25	0.85		680	35x50	2.02		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	
	1000000	30x35	2.11		18000	22x35	1.33		4700	22x25	0.85		680	35x50	2.02		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	
	1200000	30x35	2.11		18000	22x35	1.33		4700	22x25	0.85		680	35x50	2.02		680	35x30	1.84		680	35x30		1.84	820	35x30	1.84	

Rated Ripple Current(Arms/105°C,120Hz)
Case Size Φ×L(mm)

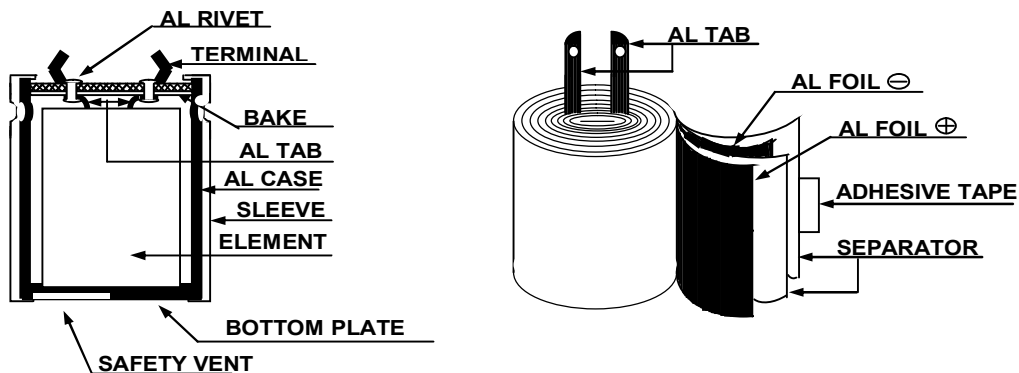


SamYoung Electronics Co., Ltd.

ALUMINUM ELECTROLYTIC CAPACITORS

APPROVAL NO.
710-282

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 (CHINA) 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 (CHINA) 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 (CHINA) 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	Trichlene
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.

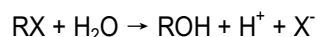
If electrolytic capacitors are cleaned with such solvents, they may gradually penetrate the seal portion and cause the corrosion. When using latex-based adhesive on the capacitors rubber end seal for adhesion to a PCB, corrosion may occur depending on the kind of solvent in the adhesive. Select an adhesive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

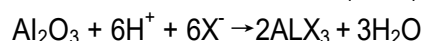
- ① Penetration between the rubber and the aluminum case
- ② Penetration between the rubber and the lead wire
- ③ Penetration through the rubber

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)

