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發行日	2009.04.29
承認願 No.	729 - 001

ALUMINUM ELECTROLYTIC CAPACITORS

APPROVAL SHEET

CATALOG TYPE	TDC 400 VS 1000 (M) (Ø35×60L)
CATALOG TIFE	
USER PART NO.	
適用機種	
特記事項	Halogen-Free

SAMYOUNG ELECTRONICS CO.,LTD. GENERAL MANAGER OF PRODUCTION ENGINEERING GROUP

> ROK CHOI SEONG

USER	承認欄
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APPROVAL NO.:

ADDRESS —	KOREA	146-1, SANGDAEWON-DONG, JOONGWON-GU, SUNGNAM-CITY, KYUNGKI-DO
	CHINA	No.5 CHANGJIANG ROAD PINGDU-CITY, SHANDONG-PROVINCE



ALUMINUM ELECTROLYTIC CAPACITORS

APPROVAL NO.

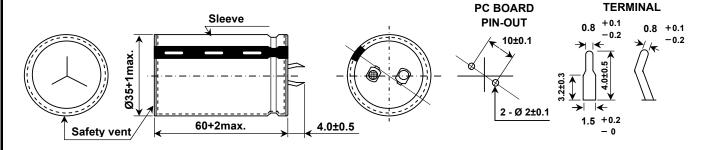
729 - 001

TDC 400 VS 1000 (M)

SERIES	TDC					
RATING	400 WV 1000 μF					
CASE SIZE	Ø 35 × 60 L					

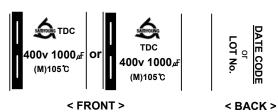
A. DIAGRAM OF DIMENSION

[UNIT:mm]



B. MARKING: BROWN SLEEVE & SILVER INK

< VIEW OF CAPACITOR >



< LOT No. : Sleeve or bottom plate marking. >

< DATE CODE : Sleeve marking. >

C. ELECTRICAL CHARACTERISTICS

A. OPERATING TEMPERATURE RANGE : <u>-25</u> ~ <u>+105℃</u>

B. RATED VOLTAGE : $\frac{400 \text{ V}_{DC}}{200 \text{ V}_{DC}}$: $\frac{450 \text{ V}_{DC}}{200 \text{ V}_{DC}}$

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

E. LEAKAGE CURRENT : Lower 3000 μA, after 5 minutes at 20 ℃

F. DISSIPATION FACTOR (Tan δ) : Lower <u>0.20</u> at 20 $^{\circ}$ C, 120 † Z G. MAX. RIPPLE CURRENT : <u>2.65 Arms</u> at <u>105 $^{\circ}$ C</u>, <u>120 † Z</u>

H.TEMPERATURE CHARACTERISTIC

(Max. Impedance ratio) : $Z(-25^{\circ}) / Z(20^{\circ}) = \underline{4}$ (at 120Hz)

I. LOAD LIFE : The following specifications shall be satisfied when the capacitors are restored to 20°C,

after the rated working voltage is applied for 2,000 hours at 105℃.

Capacitance change : $\leq \pm 20 \%$ of the initial value

Tanδ : ≤ 200 % of the initial specified value

Leakage current : ≤ The initial specified value

J. SHELF LIFE: The following specifications shall be satisfied when the capacitors are restored to 20°C,

after exposing them at 105℃ 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 : $\leq \pm 20 \%$ of the initial value

Tan δ : $\leq 200 \%$ of the initial specified value

Leakage current : ≤ The initial specified value

K. CLEANING CONDITIONS: Non-solvent proof → Refer to Cleaning conditions (Page 5)

L. OTHERS : Satisfied characteristics W of KS C 6421





ALUMINUM ELECTROLYTIC CAPACITORS

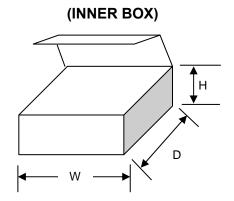
APPROVAL NO.

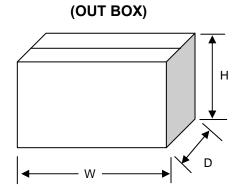
729 - 001

▶ PACKING SPEC.

1) BOX FORM

[UNIT:mm]





2) PACKING QUANTITY AND BOX DIMENSION

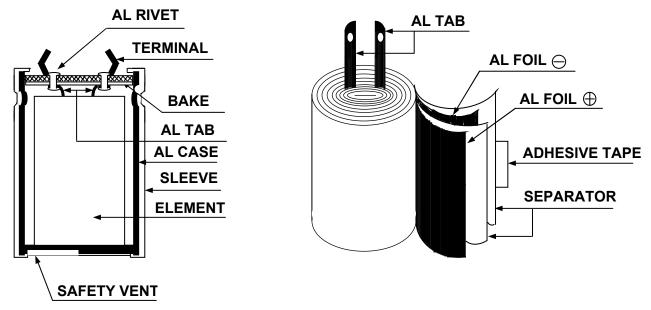
CAS	E SIZE	INNEI	R BOX	OUT	вох		
ØD	L	SIZE (W×D×H)	QUANTITY (PCS)	SIZE (W×D×H)	QUANTITY (PCS)		
20	50	267×267×75	150	305×290×275	450		
22	20~45	267×267×55	100	305×290×275	400		
22	50	267×267×75	100	305×290×275	300		
25.4	20~45	267×267×55	100	305×290×275	400		
25.4	50~60	267×267×75	100	305×290×275	300		
	20~40	313×313×55	100	350×335×270	400		
30	45~60	313×313×75	100	350×335×270	300		
	70	313×313×95	100	350×335×225	200		
	20~45	267×267×55	50	305×290×275	200		
35	50~60	267×267×75	50	305×290×275	150		
	70~80	313×313×95	313×313×95 80 350×335×225				
	30~45	313×313×55	50	350×335×270	200		
40	50~60	313×313×75	50	350×335×270	150		
	70~80	313×313×95	50	350×335×225	100		

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▶ STRUCTURE and MATERIALS



*** LARGE SIZED TYPE CAPACITORS COMPONENT**

PART NAME	MATERIALS	VENDER		
AL RIVET	ALUMINUM 99.9 %	SUNG NAM	(KOREA)	
TERMINIAL	CDCC (PL EDEE)	SUNG NAM	(KODEA)	
TERMINAL	SPCC (Pb-FREE)	MECTRON	(KOREA)	
BAKE	RUBBER + PAPER LAMINATE	ISOVOLTA	(AUSTRIA)	
AL TAB	ALUMINUM 99.9 % OVER	SAM A	(KOREA)	
ALIAD	ALGIMINOM 33.3 % OVER	DONG YANG	(JAPAN)	
SLEEVE	PET(Poly Ethylene Terephthalate Resin)	MOODEUNG	(KOREA)	
AL CASE	ALUMINUM 99.5 %	D.N TECH	(KOREA)	
AL CASE	ALUMINUM 99.3 //	DONG NAM	(KOKEA)	
		K.D.K / JCC	(JAPAN)	
	FORMED ALUMINUM 99.9 % OVER	BECROMAL	(ITALY)	
A1 FOU (1)		SAMYOUNG / INTERTEC	(KOREA)	
AL FOIL (+)		LITON	(TAIWAN)	
		SATMA	(FRANCE)	
		HEC / NAMTONG	(CHINA)	
		K.D.K	(JAPAN)	
AL FOIL (-)	ETCHED ALUMINUM 99.8 % OVER	K-JCC	(KOREA)	
_		ELECON	(CHINA)	
		N.K.K	(JAPAN)	
OFDADATOD	INSULATION PAPER	SPO / GRATZ	(GERMANY)	
SEPARATOR	INSULATION PAPER	MHD	(AMERICA)	
		KAN	(CHINA)	
ADHESIVE TAPE	POLY PROPYLENE FILM	DAI IL	(KOREA)	

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). (However, no volgae 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. 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 $^{\circ}$ C 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 C6035, KS C6421 (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 C6421, the test operating temperature for the capacitors of characteristics B and C of KS C6421 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 C6421. Unless otherwise specified, the rated wurge 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 6035, KS C 6421. (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 ₂ Cl ₃ F ₃	Freon TF , Daiflon S-3					
Fluorotrichloromethane	CCI 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	CH₃CI	MC					

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 vap or cleaning

Maximum cleaning time: 5 minutes

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 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.

However, if general types of aluminum electroytic capacitors, whose seal construc-tions are not solvent-proof, are cleaned with such solvents, the solvents may gradually penetrate the seal portion and erode.

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 (Al₂ O₃) of aluminum electrolytic capacitors:

$$Al_2O_3 + 6H^+ + 6X^- \rightarrow 2AIX_3 + 3H_2O$$

AIX₃ is dissociated with water:

$$AIX_3 + 3H_2O \rightarrow AI (OH)_3 + 3H^+ + 3X^-$$

*** MANUFACTURING SITE**

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