



产品规格承认书

Product Specification for Approval

客 户 名: 立创商城

Customer:

产品品名: 铝电解电容器

Description: ALUMINUM ELECTROLYTIC CAPACITORS

规格型号: 见第三页清单

Specifications:

圣融达料号: 见第三页清单

Sincerity P/N:

客户料号: /

Customer P/N:

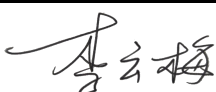
产品品牌: 圣融达 (商标 )

Product Brands: Sincerity(Trademark )

制作日期: 2024/10/21

Production Date:



客户承认Customer's Approval			圣融达承认Sincerity Approval		
接收Receive	审核Checked	批准Approved	制作Producer	审核Checked	批准Approved
					

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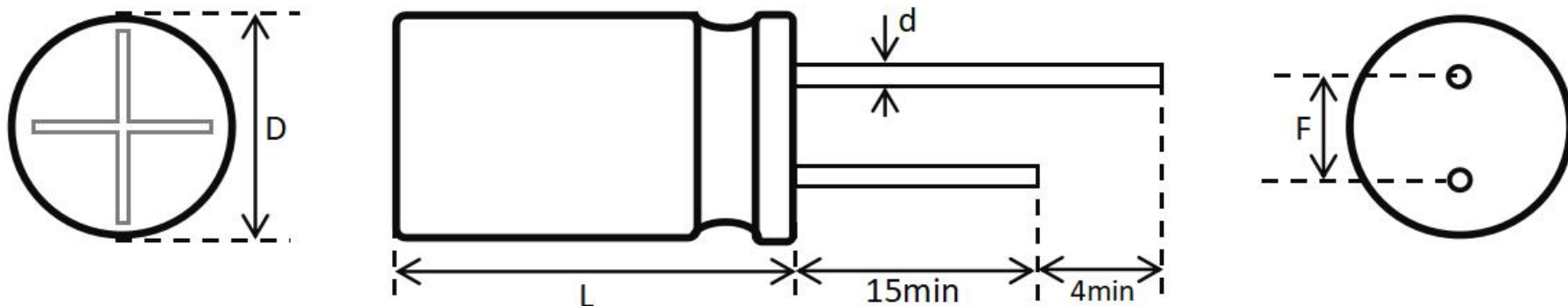
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客户Customer		立创商城													
备注REMARK															
产品型号	额定电压	标称容量	容量误差	损耗角	漏电流	纹波电流	ESR	寿命	温度范围	浪涌电压	产品尺寸 Dimensions (mm)				产品料号
Series	RATE VOLTAGE (V. DC)	Capacitance (uF)	Capacitance Tolerance (%)	DF tan δ (%) MAX	Leakage Current (uA) Max.	Ripple Current (mA) RMS at 105°C 120hz	Impedance at 20°C 100KHz (Ω)	Load Life (Hours)	Temperature Range (°C)	Surge Voltage (V. DC)	D	L	F ±0.5	d ±0.05	
											D: (D<20) ±0.5; (D≥20) ±1.0 L: (L<20) ±1.5; (L≥20) ±2.0				Product number
SM	35	100	±20	14	35	74	/	2000	-40+105	44	6.3	7	2.5	0.5	SM1V101M6L07CBH1B0LC
SM	16	100	±20	18	16	60	/	2000	-40+105	20	5	7	2.0	0.5	SM1C101M0507BBH1B0LC

CAP/DF: at 120Hz, $25 \pm 2^\circ\text{C}$

L.C: 6.3~120V.DC, $I \leq 0.01CV$ or $3 \mu\text{A}$, whichever is greater ; 160~550V.DC, $I \leq 0.02CV + 25 \mu\text{A}$ (C = CAP., V = WV), After 2 minute with rated working voltage applied.

产品外形图



注 Note	检测仪表Aest Instruments
	1、Cap:CHEN HWA 1061 LCZ METER
	2、LC:CHEN HWA CLC-202A

产品料号体系



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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系列

电压

标称容量

容量偏差

直径高度

产品脚距

产品颜色

产品温度

内部识别码

系列	代码
SS	SS
SM	SM
EC	EC
EL	EL
EF	EF
EL	EL
FJ	FJ
EM	EM
EB	EB
EG	EG
NP	NP
KH	KH
KP	KP
KF	KF
KT	KT
KR	KR
KI	KI
KJ	KJ
KC	KC
KB	KB
IS	IS
LJI	LJI
LP	LP
LF	LF
PC	PC
PH	PH
PZ	PZ
VT	VT
VZ	VZ

工作电压	代码
2.5	0F
4	0G
6.3	0J
8	0K
10	1A
12	1B
16	1C
25	1E
35	1V
50	1H
63	1J
80	1K
100	2A
120	2B
160	2C
200	2D
250	2E
300	2L
315	2F
330	2N
350	2V
400	2G
420	2M
450	2W
475	2X
500	2H
550	2Y
600	2K
630	2J

标称容量	代码
0.10	R10
0.22	R22
0.33	R33
0.47	R47
1.0	1R0
2.2	2R2
3.3	3R3
4.7	4R7
10	100
22	220
33	330
47	470
100	101
220	221
330	331
470	471
1000	102
2200	222
3300	332
4700	472
10000	103
22000	223
33000	333
47000	473

容量偏差	代码
-5+20%	G
-10+20%	V
-10+10%	K
-15+20%	Z
-20+20%	M
0+20%	R
0+30%	Q
0+50%	T
0+80%	S

产品尺寸	代码
5X11	0511
6X12	0612
6.3X12	6L12
8X12	0812
10X12.5	101C
10X16	1016
13X20	1320
16X21	1621
18X21	1821
22X25	2225
25X25	2525
30X30	3030
30X35	3035
35X30	3530
12.5X50	1C50
特殊尺寸	代码
0.5	A
1.5	B
2.5	C
3.5	D
4.5	E
5.5	F
6.5	G
7.5	H
8.5	J
9.5	K
0.2	M
0.3	L
0.4	N
0.7	P

印字温度	代码
85℃	S
105℃	H
130℃	G
产品脚距	代码
1.5	A
2.0	B
2.5	C
3.5	D
5.0	E
7.5	F
10	G
12.5	H

产品颜色	代码
黑底白字	A
黑底金字	B
咖啡白字	C
咖啡金字	D
紫底白字	E
紫底金字	F
绿底白字	G
绿底金字	H
黄底黑字	J
咖啡银字	K
红字	Y
黑字	Z

1. 概述 (Scope)

本承认书适用于 SM 系列径向型铝电解电容器。

This specification covers SM series Radial Type Aluminum Electrolytic Capacitors.

2. 参考标准 (Applicable Specification)

本承认书参考了 JIS - C - 5101 制订。

This approval sheet consulted the institute of JIS - C - 5101, JIC - C - 5141.

3. 测试环境 (Test Environment)

除非另有说明, 用以进行测量和试验的标准大气条件范围如下: 环境温度: $25 \pm 2^\circ\text{C}$, 相对湿度: $65 \pm 5\%$ 。

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows: Ambient temperature: $25 \pm 2^\circ\text{C}$ - Relative humidity: $65 \pm 5\%$.

4. 产品特性 (Product characteristics)

4.1 电学特性 (Electrical characteristics)

4.1.1 额定电压及工作温度: $-40 \sim 105^\circ\text{C}$ (6.3~50V.DC)

Rated voltage and Operating Temperature: $-40 \sim 105^\circ\text{C}$ (6.3~50V.DC)

4.1.2 电容量 (Capacitance)

[条件]: 测试频率 120Hz $\pm 20\%$

[Conditions]: Measuring frequency: 120Hz $\pm 20\%$

测试电路 串联等效电路

Measuring circuit: Series equivalent circuit

测试电压 1Vrms

Measuring voltage: 1Vrms

[标准]: 容量偏差 $\pm 20\%$

[Criteria]: Capacitance tolerance: $\pm 20\%$

4.1.3 损耗 (Dissipation Factor)

[条件]: 测试条件与 4.1.2 相同

[Conditions]: Test conditions are the same as 4.1.2 for Capacitance

[标准]: 见表 1

[Criteria]: See Table 1

表 1 (Table 1)

WV	6.3	10	16	25	35	50
tg δ	0.26	0.22	0.18	0.16	0.14	0.12

*容量大于 1000 μF 者, 每增加 1000 μF , 其损耗角正切值增加 0.02

*When the capacity is more than 1000 μF , the loss angle tangent increases by 0.02 for every 1000 μF increase

4.1.4 漏电流 (Leakage Current)

[条件]: 在电容器两端施加额定工作电压, 并串联 1000 $\Omega \pm 10\%$ 保护电阻, 漏电流在通电 2 分钟后测量。

[Conditions]: The rated voltage shall be applied across the capacitors and its protective resistor which shall be $1000\Omega \pm 10\%$. The leakage current shall then be measured after an electrification period of 2 min.

[标准] 直流: 6.3~50V.DC, $I \leq 0.01\text{CV}$ or $3\mu\text{A}$ 取较大者

[Criteria]: DC: 6.3~50V.DC, $I \leq 0.01\text{CV}$ or $3\mu\text{A}$, whichever is greater

I: 漏电流 (μA), C: 容量 (μF), V: 额定电压 (V)

I: Leakage Current (μA), C: Capacitance (μF), V: Rated voltage (V)

4.1.5 高低温特性 (High and Low Temperature Characteristic)

[条件]: 如下表

[Conditions]:	步骤 (step)	温度 (Temperature)	持续时间 (Duration)
	1	$20 \pm 2^{\circ}\text{C}$	/
	2	-40_{-3}^{+0}C	120min
	3	$20 \pm 2^{\circ}\text{C}$	/
	4	105_{-0}^{+3}C	120min

[标准] 阶段2: 阻抗值与阶段1相比, 不大于表2要求。

[Criteria]: Step 2: Comparison of impedance value with step 1, Not more than table 2 requires

阶段4: 容量值与阶段1相比, 变化在 $\pm 20\%$ 范围内。

Step 4: The capacity value is in the range of 20% as compared to stage 1

表2 (Table 2)

WV	6.3	10	16	25	35	50
$Z_{-25^{\circ}\text{C}} / Z_{+20^{\circ}\text{C}}$	4	3	3	2	2	2
$Z_{-40^{\circ}\text{C}} / Z_{+20^{\circ}\text{C}}$	8	6	6	4	4	3

4.1.6 浪涌电压 (Surge Voltage Test)

[条件]: 施加表3所列浪涌电压, 充电 30 ± 5 秒, 放电 330 ± 5 秒作为一个循环, 共进行1000个循环。

[Conditions]: Apply the surge voltage listed in Table 3, charge for 30 ± 5 seconds, discharge for 330 ± 5 seconds as a cycle, a total of 1000 cycles.

测试温度: $15 \sim 35^{\circ}\text{C}$

Test temperature: $15 \sim 35^{\circ}\text{C}$

然后在标准大气条件下放置达到热稳定, 测试各项参数。

And the capacitors shall be stored under standard atmospheric conditions to obtain thermal stability, after which the measurements shall be made.

[标准] 容量变化: 在初始值的 $\pm 20\%$ 之内。

[Criteria]: Capacitance Change: Within $\pm 20\%$ of initial value

损耗: 不超过200%表1规定值

Dissipation Factor: Not more than the 200% specified value in table 1.

漏电流: 满足4.1.4项要求

Leakage Current: To satisfy No. 4.1.4

表3 (Table 3)

WV	6.3	10	16	25	35	50
SV	8	13	20	32	44	63

4.2 机械特性 (Mechanical characteristics)

4.2.1 端子强度 (Mechanical Requirements)

4.2.1.1 抗拉 (Tensile strength of termination)

[条件]: 常温下, 沿引线下行方向, 在接线端子上施加拉力 (如下表), 维持 5 ± 1 秒。

[Conditions]: At Room temperature, along the lead line down the direction of the terminal on the application of tension (as shown in the following table), maintain 5 ± 1 seconds.

引线直径 Diameter of wire (mm)	0.45	0.5	0.6	0.8	1.0
拉力 Force (N)	5 (0.51kg)	5 (0.51kg)	10 (1.02kg)	10 (1.02kg)	20 (2.04kg)

4.2.1.2 抗弯 (Bending strength of termination)

[条件]: 常温下, 在电容器引线施加固定重力(如下表), 然后弯曲身体通过90度, 回到原来的位置。下一步以相同的速度, 将其朝相反方向弯曲到90度, 再次回到原来的位置。上述过程在5秒内完成。

[Conditions]: At Room temperature, apply fixed gravity to the capacitor leads (as shown in the table below), then bend the body through 90 degrees to return to its original position. Next, at the same speed, bend it in the opposite direction to 90 degrees and return to its original position again. The above process is completed in 5 seconds.

引线直径 Diameter of wire (mm)	0.45	0.5	0.6	0.8	1.0
拉力 Force (N)	5 (0.51kg)	5 (0.51kg)	10 (1.02kg)	10 (1.02kg)	20 (2.04kg)

[标准] 测量电容器应无接触不良、开路或短路现象, 外观无可见机械损伤。

[Criteria]: When the capacitor is measured, there shall be no intermittent contacts, or open or short-circuiting. There shall be no such mechanical damage.

4.2.2 Vibration (振动)

[条件]: 在 3 个互相垂直的方向分别施加 2 小时振动, 共 6 小时。

[Conditions]: Direction and duration of vibration: 3 orthogonal directions mutually each for 2h, total 6h. 频率: 10~55Hz。

Vibration Frequency Range :10~55Hz.

振幅: 1.5mm。

Peak to peak amplitude: 1.5mm.

振速: 1分钟内振速10~55~10Hz、

Sweep rate :10to55to10Hz in about 1 min.

[标准] 测量电容器应无接触不良、开路或短路现象, 外观无可见机械损伤。

[Criteria]: When the capacitor is measured, there shall be no intermittent contacts, or open or short-circuiting. There shall be no such mechanical damage.

4.2.3 Solder ability Test (可焊性)

[条件]: 焊锡温度: 245±5℃

[Conditions]: Temperature or solder: 245±5 ° C

浸入时间: 2±0.5 s

Dipping time: 2±0.5 s

[标准] 浸入焊锡的引线表面积 90%以上应附着新锡。

[Criteria]: At least 90% of circumferential surface of the dipping portion of termination shall be covered with new solder.

4.3 耐久性试验 (Durability test)

4.3.1 高温负荷 (Load Life Test)

[条件]: 试验温度: 105±2℃, 施加额定电压和额定纹波电流。

[Conditions]: Test temperature: 105±2° C, Application of the rated voltage and rated ripple current.

试验时间: 2000

Test time: 2000

[标准] 容量变化: 在初始值的±25% (16V~100V) 或±30% (6.3V~10V) 之内。

[Criteria]: Capacitance Change: Within ±25% (16V~100V) or ±30% (6.3V~10V) of initial value.

损耗: 不超过初始值的200%

Dissipation Factor: Not more than 200% of the specified value

漏电流: 满足4.1.4项要求

Leakage Current: To satisfy No. 4.1.4

外观: 无异常

Appearance: No remarkable abnormality

4.3.2 高温贮存 (Shelf Life Test)

- [条件]: 在 $105 \pm 2^\circ\text{C}$ 环境下无负荷贮存 1000_{-0}^{+48} 小时, 至少恢复16小时后。
- [Conditions]: The capacitors are then stored with no voltage applied at a temperature of $105 \pm 2^\circ\text{C}$ for 1000_{-0}^{+48} h and then resumed 16 hours.
- [标准] 容量变化: 在初始值的 $\pm 25\%$ 之内。
- [Criteria]: Capacitance Change: Within $\pm 25\%$ of initial value.
- 损耗: 不超过初始值的200%
- Dissipation Factor: Not more than 200% of the specified value
- 漏电流: 不超过初始值的200%
- Leakage Current: Not more than 200% of the specified value
- 外观: 无异常
- Appearance: No remarkable abnormality

4.3.3 耐焊接热 (Solder - Heat - Resistance)

- [条件]: 焊锡温度: $260 \pm 5^\circ\text{C}$
- [Conditions]: Solder Temperature: $260 \pm 5^\circ\text{C}$
- 浸入时间: 10 ± 1 s.
- Dipping time: 10 ± 1 s.
- 电路板: 1.6mm
- Printed wiring board: 1.6mm
- [标准] 容量变化: 在初始值的 $\pm 10\%$ 之内。
- [Criteria]: Capacitance Change: Within $\pm 10\%$ of initial value.
- 损耗: 不超过初始值
- Dissipation Factor: Not more than the specified value
- 漏电流: 满足4.1.4项要求
- Leakage Current: To satisfy No. 4.1.4
- 外观: 无异常
- Appearance: No remarkable abnormality

4.3.4 防爆 (Safety Vent)

- [条件]: 以下试验只适用于铝壳直径 $\geq \Phi 8$ 产品, 试验条件如下表。
- [Conditions]: The following tests only apply to those products with vent products at diameter $\geq \Phi 8$ with vent, The test conditions are shown in the following table.

电容直径 Capacitor diameter	施加电流 Applied Current	施加电压 Applied Voltage	排气时间 Vent Time
$\Phi \leq 22.4\text{mm}$	1A	反向额定电压 Reverse Rated Voltage	$\leq 30\text{min}$
$\Phi \geq 22.5\text{mm}$	10A	反向额定电压 Reverse Rated Voltage	$\leq 30\text{min}$

- [标准] 在测试期间或之后, 电容器不得有爆炸、闪光、火焰、火花或火焰, 亦不得有任何金属从外壳排出。
- [Criteria]: There shall be no explosion, flash, flame, spark or fire from the capacitor during or after the test, nor shall there be expulsion of any metal from the casing.

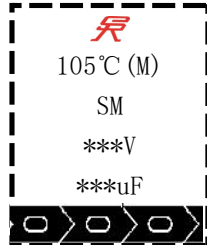
4.3.5 稳态湿热 (Resistance to damp heat)

- [条件]: 试验温度: $40 \pm 2^\circ\text{C}$
- [Conditions]: Test temperature: $40 \pm 2^\circ\text{C}$
- 相对湿度: $90 \sim 95\%$
- Relative humidity: $90 \sim 95\%$
- 试验时间: $500 \pm 8\text{h}$
- Test time: $500 \pm 8\text{h}$
- 试验后, 电容器在标准大气条件下 $1 \sim 2$ 小时, 然后测试参数。
- After completion of test, the capacitors shall be subject to standard atmospheric conditions for 1 to 2 hours, after which the measurements shall be made.

[标准]	容量变化:	在初始值的 $\pm 10\%$
[Criteria]:	Capacitance Change:	Within $\pm 10\%$ of initial value.
	损耗:	不超过初始值
	Dissipation Factor:	Not more than the specified value
	漏电流:	满足4.1.4项要求
	Leakage Current:	To satisfy No. 4.1.4
	外观:	无异常
	Appearance:	No remarkable abnormality

5. 套管丝印 (insulating bush Marking)

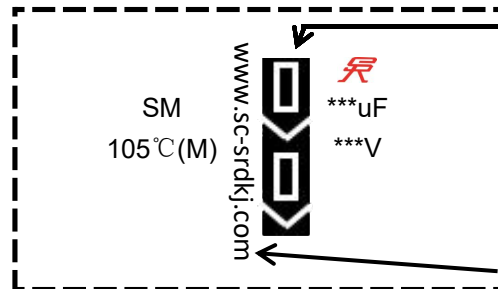
5.1 平行版 (直径 $\leq 6.3\text{mm}$)



商标 (Trademark)
额定温度 (Operating temperature)
型号 (Series)
工作电压 (Working voltage)
标称容量 (Norminal capacitance)
负极标志 (Polarity of the terminals)

5.2 垂直版 (直径 $\geq 8\text{mm}$)

型号 (Series)
额定温度和容量偏差



负极标志 (Polarity of the terminals)
商标 (Trademark)
工作电压和标称容量
(Working voltage
and Norminal capacitance)
公司网站 (Company website)

6. 最大纹波电流 (Maximum ripple current)

当电容器在不超过+105℃下工作, 以及频率不是120Hz时, 最大有效值纹波电流必须乘以下表所示的因数。

When capacitors are operated at temperatures other than +105° C, and frequency not 120Hz, the maximum RMS ripple currents must be multiplied by the factors shown in below table.

纹波电流频率修正系数 (Ripple current frequency coefficient)

频率 (Hz)	50/60	100/120	1K	10K	100K
容量 (uF)					
Cap < 68	0.75	1.00	1.35	1.50	1.50
Cap ≥ 68	0.80	1.00	1.20	1.30	1.30

纹波电流温度修正系数 (Multiplier for Ripple Current vs. Temperature)

Temperature℃	45	60	85	95	105
温度系数Temperature coefficient 实际纹波值/额定最大纹波值 Actualrmsripple / Ratedrmsmax.ripple	2.1	1.9	1.65	1.25	1

7. 包装 (Packing)
7.1 包装标签 (Packing label)

ELECTROLYTIC CAPACITOR			
CAP. /W. V.		MFD	WV
TYPE:		TOL: ±20%	
CASE SIZE:		Q	
QTY: PCS		C	
LOTNO:		环保产品	RoHS
DATE:			

7.2 袋装包装规范 (Bagging Packaging Specification)

ΦD×L (mm)	最小包装 (个/袋)	中箱包装 (个/盒) Small Box Capacity (PCS)	大箱包装 (个/箱) Carton Box Capacity (PCS)
			包装箱尺寸
			475*345*310
6.3*7	1000	10000	40000
5*7	1000	10000	40000

7.3 编带包装规范 (Braiding Packaging Specification)

产品直径 Capacitor diameter	小箱容量 (只) Small Box Capacity (PCS)	大箱容量 (只) Carton Box Capacity (PCS)
		包装箱尺寸
		485*345*280
Φ 5	2000	20000
Φ 6.3	1500	15000
Φ 8/8.2	1000	10000
Φ 10	600	6000
Φ 12.5/13	300	3000
Φ 16	250	2500
Φ 18	200	2000

8. 铝电解电容器存放环境与控制

Storage Conditions and Control for Aluminum Electrolytic Capacitor.

8.1 环境温度：5℃ ~ 35℃，环境相对湿度：75%以下。

Store the capacitor at a temperature of 5℃ to 35℃ and at a relative humidity of less than 75% .

8.2 存放环境不应有阳光直射，不宜高温。

Store the capacitor in low temperature places free from direct sun shine .

8.3 存放环境不能有盐分、油含量高的雾气。

Store the capacitor in places free from oil vapor、salt water vapor.

8.4 存放在远离氯气、氨气、硫化氢、亚硫酸、硝酸等有害气体含量高的地方。

Store the capacitor in places far from toxic gases(chlorine、ammonium、hydrogen sulfide、sulphurous acid、nitric acid , etc) .

8.5 储存环境不能有臭氧、紫外线或幅射。

Store the capacitor in place free from Ozone、ultraviolet ray or radiation .

8.6 产品储存期限：≤12个月

Storage life:≤12months

8.7 产品储存期限>12个月时，需充电后再使用。

If storage life>12months, the products need to be charged again before using;

8.8 存放时间超过3年的电解电容器应报废处理。

If Storage time more than 3 years, the products need to be discarded.

8.9 库存品有效期以套管上印刷的时间开始计算。

Expiry Date:calculating from the date marked on the sleeve.

8.10 请尽量以包装状态保管。

Please keep capacitors in the original package.

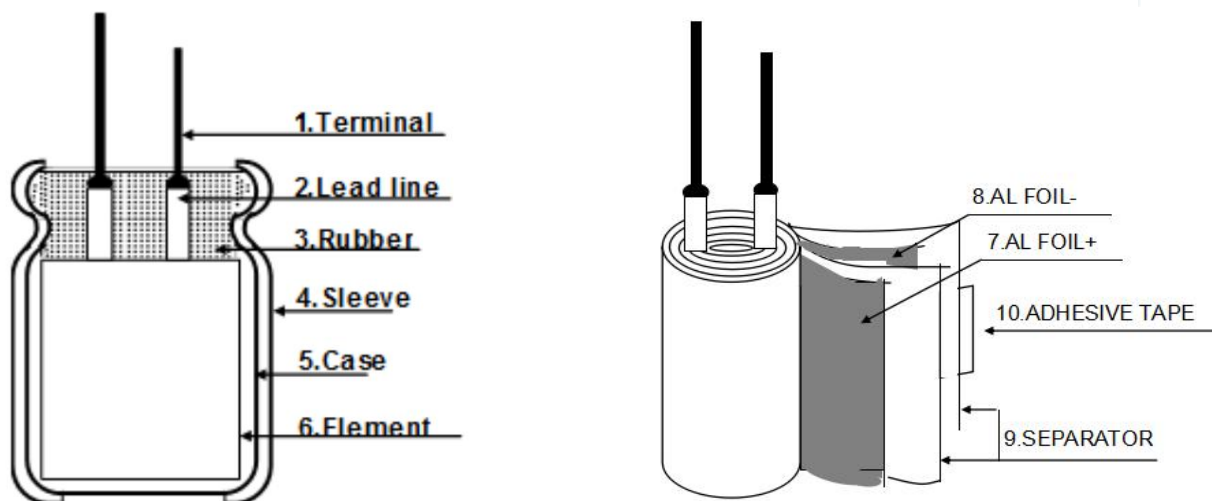
8.11 使用清洁剂之注意事项 (Detergent needing attention)

铝质电解电容器会受含有碳化氢卤素溶剂之侵蚀, 下列为各种安全与不安全之清洁剂, 为避免不必要的损失, 您所使用有关印刷基板之清洁剂名请事先告知本公司。

Hydrogen carbide liquid and halogen liquid can cause Aluminium Electrolytic Capacitor to corrode. Some of Safe and Unsafe detergent are as follows.

Safe 安全	Unsafe 不安全
Methanol/甲醇	1.1.2- trichloroethane/1.1.2- 三氯乙烷
Ethanol/乙醇	Tetrachloroethylene/四氯化碳
Propanol/丙醇	Chloroform(colorless volatilizable liquid)/哥罗仿(无色挥发性液体)
Butanol/丁醇	Dichloromethane/二氯甲烷
Detergent/去垢剂	Trichlorethylene/三氯甲烯
	Dimethybenzene/二甲苯

9. 铝电解电容器结构图 (The structure chart of solid electrolytic capacitors)



零件名称 PART NAME	材料 MATERIALS
1. CP线 Terminal	镀铜镀锡铁线 Tinned copper-ply wire
2. 引出线 Lead line	纯度为99.95%或99.97%的金属铝片 Aluminum, 99.95% or 99.97%
3. 封口橡胶 Rubber	EPT、IIR、EPT+IIR 橡胶 EPT、IIR、EPT+IIR rubber
4. 胶管 Sleeve	P. E. T (Polyethylene Terephthalate Resin)
5. 铝壳 Case	纯度为99.8%的金属铝 Aluminum, 99.8%
6. 电解液 Electrolyte	乙二醇、铵盐等 Ethylene glycol, ammonium salt, etc.
7. 正极箔 AL FOIL+	纯度99.99%或99.98%的化成铝箔 Formed aluminum, 99.99% or 99.98%
8. 负极箔 AL FOIL-	纯度99.7%或99.4%的腐蚀铝箔 Etched aluminum, 99.7% or 99.4%
9. 电解纸 SEPARATOR	纤维纸 fiber paper
10. 胶带 ADHESIVE TAPE	聚丙烯薄膜 POLY PROPYLENE FILM