

产品应用

Product Application

目前在汽车电子、网络、通信、家用电子、照明行业以及军事、工业控制等所有电子领域的新一代整机中几乎全部采用了SMT技术，SMT已成为二十一世纪电子信息产业的重要支柱技术之一。而本公司生产的V-CHIP 即片式铝电解电容器便是一种薄型、无引线、高可靠、性能稳定能够满足整机高密度组装之表面贴装技术（SMT）的超小型电子元器件；其广泛应用于通信（如无线电话、程控交换机等），网络电子（如LCD、扫描仪、复印机、打印机、网络电视机顶盒、保安安防等），汽车电子（如车载电话、汽车音响、电子燃油系统、GPS全球定位系统等），家用电子（如数字电视、数字机顶盒、蓝光DVD等），工业电子（如开关电源、逆变器、监控器、变频器、数控设备、医疗器材、仪器仪表、激光加工设备等）；可预知：随着电子技术日新月异的发展，片式铝电解电容器的应用领域仍将不断拓宽，终将在铝电解电容器家族中大放异彩！

SMT(surface mounting technology)has already become one pillar of Electronic information industries in 21st century,it is used in almost all the electronic field:car electronics,internet, communication, domestic electronics, lighting industry ,as well as military affairs,industrial control,etc. Our V-Chip Aluminum Electrolytic Capacitor, is a subminiature electronics component which is thin,without lead,high reliability,stable performance and can definitely meet the requirement of SMT.It is widely used in communication(such as cordless phones, SPC exchange,etc.),net electronics(such as LCD,scanners, copier, Printers, Network Tv-set Box, security,etc.), car electronics(such as Car Telephones,Car Acoustics,Electronic Blow System,GPS), domestic electronics(such as Digital TV,Set-top Boxes, blu-ray DVD), industrial electronics(such as swithing Mode Power Supply,Inverters,Monitor,Frequency Changer,CNC Equipement, medical equipment, instrument and apparatus,Laser Processing,etc.).What we can presuppose is that with the advancements of electrical technology,V-Chip Aluminum Electrolytic Capacitors will be used more widely and they must be standing under the spotlight in some day.

应用案例

Product Application



● 产品编码解析

Explanation of Part Number

Series

Rated Voltage

Capacitance

Tol.

Case Size

Type/Code

Series	R.W Voltage (V)	Code	Capacitance (μ F)	Code	Cap.Tol	Code	Case Size	Code	Type	Code
US	4	0G	0.1	0R1	± 5	J	4*5.4	0405	Lead type	EG
UT	6.3	0J	0.22	R22	± 10	K	5*5.4	0505		
UE	10	1A	0.33	R33	± 15	L	6.3*5.4	0605		
UZ	16	1C	0.47	R47	± 20	M	6.3*7.7	0607		
UN	25	1E	1	010	± 30	N	6.3*10.2	0610		
UH	35	1V	1.5	1R5	+20-10	V	8*6.5	0806	Chip type	VG
UL	50	1H	2.2	2R2	+20-5	H	8*10.2	0810		
UV	63	1J	3.3	3R3	+10-20	C	8*12.5	0812		
UD	80	1K	4.7	4R7	+100-0	P	10*10.2	1010		
UW	100	2A	5.6	5R6	+30-10	Q	10*12.5	1012		
	160	2C	6.8	6R8	+20-0	R	10*13.5	1013		
	200	2D	8.2	8R2	+50-10	T	12.5*13.5	1213		
	250	2E	10	100	+75-10	U	12.5*16	1216		
	350	2V	12	120	+40-20	X	16*16.5	1616		
	400	2G	15	150	+50-20	S	16*21.5	1621		
	450	2W	22	220	+80-20	Z	18*16.5	1816		
	500	2H	33	330			18*21.5	1821		
			47	470			20*16.5	2016		
			56	560			20*21.5	2021		
			68	680						
			100	101						
			220	221						
			330	331						
			470	471						
			560	561						
			680	681						
			820	821						
			1000	102						
			1500	152						
			2200	222						
			3300	332						
			4700	472						
			6800	682						

● 编带规格/Taping Dimensions

Fig.1 (适用于 $D \leq \Phi 10\text{mm}$ 以下产品)

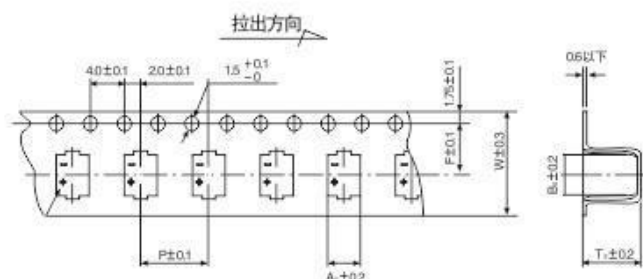
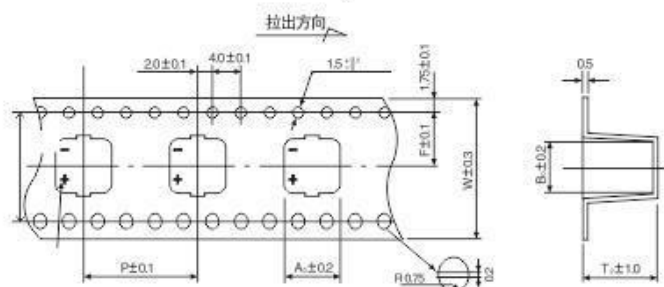
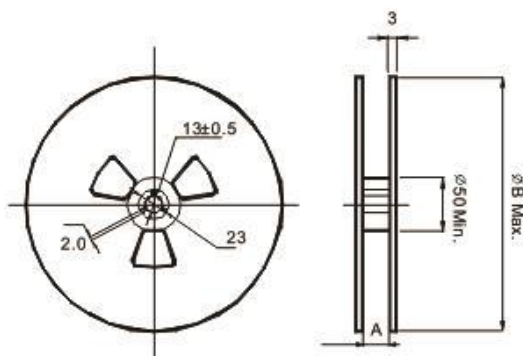


Fig. 2 (适用于 $D \geq \Phi 12.5\text{mm}$ 以上产品)



尺寸 Size	W (MM)	P (MM)	F (MM)	A0 (MM)	B0 (MM)	T2 (MM)	S	形状 Applicable
Φ4*5.4	12	8	5.5	4.7	4.7	5.8	---	Fig.1
Φ5*5.4	12	12	5.5	5.7	5.7	5.8	---	
Φ6.3*5.4	16	12	7.5	7.0	7.0	5.8	---	
Φ6.3*7.7	16	12	7.5	7.0	7.0	8.3	---	
Φ6.3*10.2	16	12	7.5	7.0	7.0	11.0	---	
Φ8*6.5	16	12	7.5	8.7	8.7	6.8	---	
Φ8*10.2	24	16	11.5	8.7	8.7	11.0	---	
Φ8*12.5	24	16	11.5	8.7	8.7	13.0	---	
Φ10*10.2	24	16	11.5	10.7	10.7	11.0	---	
Φ10*12.5	24	16	11.5	10.7	10.7	13.0	---	
Φ10*13.5	24	16	11.5	10.7	10.7	14.1	---	Fig.2
Φ12.5*13.5	32	24	14.2	14.0	14.0	14.1	28.4	
Φ12.5*16	32	24	14.2	14.0	14.0	16.4	28.4	
Φ16*16.5	44	28	20.2	17.5	17.5	16.9	40.4	
Φ16*21.5	44	28	20.2	17.5	17.5	21.9	40.4	
Φ18*16.5	44	32	20.2	19.5	19.5	16.9	40.4	
Φ18*21.5	44	32	20.2	19.5	19.5	21.9	40.4	
Φ20*16.5	44	36	20.2	21.5	21.5	16.9	40.4	
Φ20*21.5	44	36	20.2	21.5	21.5	22.0	40.4	

● 卷筒 / Taping Reel And Packing Quantity

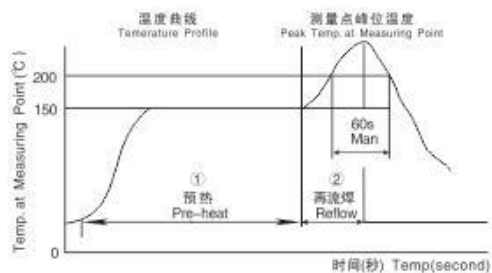


规格 Specification	卷装数量 Quantity/Reel	盒装数量 Quantity/Bag	A ± 0.3 (MM)	B ± 2 (MM)
Φ4*5.4	2000 pcs	20000 pcs	14	382
Φ5*5.4	1000 pcs	10000 pcs	14	382
Φ6.3*5.4	1000 pcs	10000 pcs	18	382
Φ6.3*7.7	1000 pcs	10000 pcs	18	382
Φ6.3*10.2	700 pcs	7000 pcs	18	382
Φ8*6.5	1000 pcs	10000 pcs	18	382
Φ8*10.2	500 pcs	5000 pcs	26	382
Φ8*12.5	400 pcs	4000 pcs	26	382
Φ10*10.2	500 pcs	5000 pcs	26	382
Φ10*12.5	400 pcs	4000 pcs	26	382
Φ10*13.5	300 pcs	3000 pcs	26	382
Φ12.5*13.5	200 pcs	1600 pcs	34	382
Φ12.5*16	200 pcs	1600 pcs	34	382
Φ16*16.5	125 pcs	250 pcs	46	332
Φ16*21.5	75 pcs	150 pcs	46	332
Φ18*16.5	125 pcs	250 pcs	46	332
Φ18*21.5	75 pcs	150 pcs	46	332
Φ20*16.5	100 pcs	200 pcs	46	332
Φ20*21.5	50 pcs	100 pcs	46	332

● 焊接方法和再流焊允许范围

Soldering method and allowable range of the reflow

焊接方式 Soldering Method	再流焊的允许范围 Allowable Range of Reflow
热板再流焊 Hot-Plate Reflow	电容量在再流焊后允许范围 Peak temp at capacitor Terminal (°C) 再流焊时间(秒) Reflow time(seconds)
红外线再流焊 Infrared-Ray Reflow	电容量在再流焊后允许范围 Peak temp at capacitor Terminal (°C) 再流焊时间(秒) Reflow time(seconds)

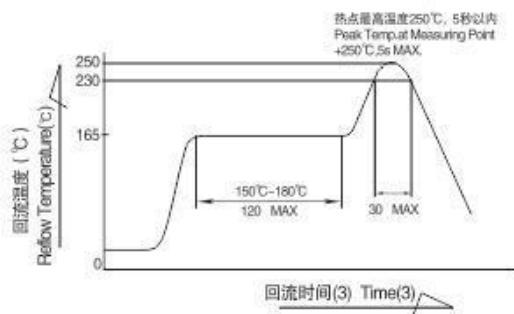


● 焊接方法和再流焊允许范围

Slodering method and allowable rang of the reflow

表一 $\phi 4 \sim \phi 10$ 一般品回流条件:

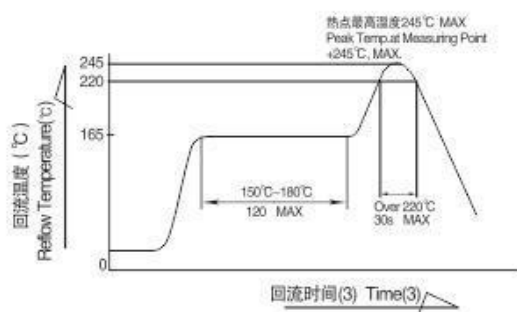
Table-1 $\phi 4 \sim \phi 10$ general goods reflow condition



- 预热为150~180℃、120秒以内。
Pre-heating shall be done at +150℃ to 180℃ and for 120 seconds.
- 电容器表面温度不可超过250℃。
The temperature at capacitor Top shall not exceed +250℃.
- 电容器表面的温度超过230℃的时间为30秒以内。
The duration for over +230℃ temperature at capacitor surface shall not exceed 30 seconds.
- 温度分布图的温度标准因回流方式不同而不同。
The standard temperature profile differs by every reflow method.
- 回流次数最多2次，但在第1次和第2次之间要留出充分的产品冷却时间。
Reflow shall be done within 2 cycles, please make sure the parts have enough cooling down time between the first and second soldering process.
- 超出容许范围使用时请咨询我们。
Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

表二 $\phi 8 * 6.5$ 回流条件:

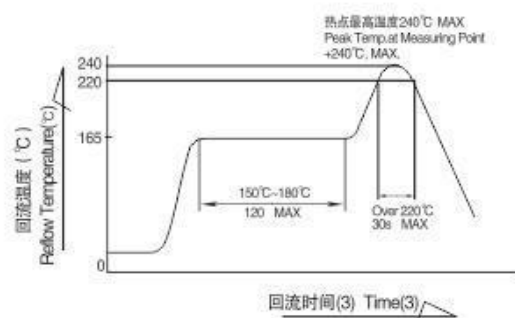
Table-2 $\phi 8 * 6.5$ reflow condition



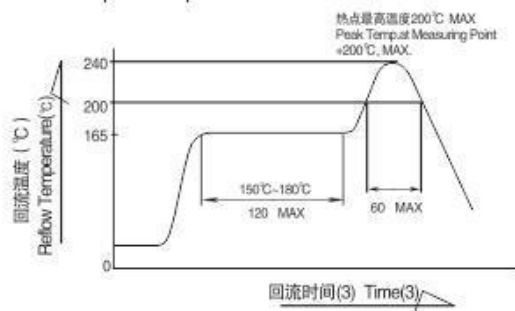
- 预热为150~180℃、120秒以内。
Pre-heating shall be done at +150℃ to 180℃ and for 120 seconds.
- 电容器表面温度不可超过245℃。
The temperature at capacitor Top shall not exceed +245℃.
- 电容器表面的温度超过220℃的时间为30秒以内。
The duration for over +220℃ temperature at capacitor surface shall not exceed 30 seconds.
- 温度分布图的温度标准因回流方式不同而不同。
The standard temperature profile differs by every reflow method.
- 回流次数最多2次，但在第1次和第2次之间要留出充分的产品冷却时间。
Reflow shall be done within 2 cycles, please make sure the parts have enough cooling down time between the first and second soldering process.
- 超出容许范围使用时请咨询我们。
Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

表三 WV160V - 450V 回流条件:

Table-3 WV160V-450V reflow condition



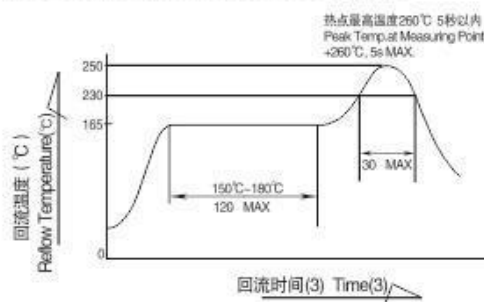
- 预热为150~180℃、120秒以内。
Pre-heating shall be done at +150℃ to 180℃ and for 120 seconds.
- 电容器表面温度不可超过240℃。
The temperature at capacitor Top shall not exceed +240℃.
- 电容器表面的温度超过220℃的时间为30秒以内。
The duration for over +220℃ temperature at capacitor surface shall not exceed 30 seconds.
- 温度分布图的温度标准因回流方式不同而不同。
The standard temperature profile differs by every reflow method.
- 回流次数最多2次，但在第1次和第2次之间要留出充分的产品冷却时间。
($\phi 6.3$: 仅限1次。)
Reflow shall be done within 2 cycles, please make sure the parts have enough cooling down time between the first and second soldering process.
($\phi 6.3$: 1 cycle only)
- 超出容许范围使用时请咨询我们。
Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

表四 $\phi 12.5 \sim \phi 20$ 回流条件:Table-4 $\phi 12.5 \sim \phi 20$ reflow condition

- 预热为150~180℃、120秒以内。
Pre-heating shall be done at +150℃ to 180℃ and for 120 seconds.
- 电容器表面温度不可超过240℃。
The temperature at capacitor Top shall not exceed +240℃.
- 电容器表面的温度超过200℃的时间为60秒以内。
The duration for over +200℃ temperature at capacitor surface shall not exceed 60 seconds.
- 温度分布图的温度标准因回流方式不同而不同。
The standard temperature profile differs by every reflow method.
- 回流次数最多2次,但在第1次和第2次之间要留出充分的产品冷却时间。
Reflow shall be done within 2 cycles, please make sure the parts have enough cooling down time between the first and second soldering process.
- 超出容许范围使用时请咨询我们。
Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

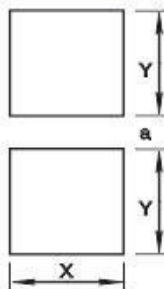
表五 125℃产品回流条件:

Table-5 125℃ product reflow conditions



- 预热为150~180℃、120秒以内。
Pre-heating shall be done at +150℃ to 180℃ and for 120 seconds.
- 电容器表面温度不可超过260℃。
The temperature at capacitor Top shall not exceed +260℃.
- 电容器表面的温度超过230℃的时间为60秒以内。
The duration for over +230℃ temperature at capacitor surface shall not exceed 60 seconds.
- 温度分布图的温度标准因回流方式不同而不同。
The standard temperature profile differs by every reflow method.
- 回流次数最多2次,但在第1次和第2次之间要留出充分的产品冷却时间。
($\phi 8 \times 6.5L$, 仅限1次。)
Reflow shall be done within 2 cycles, please make sure the parts have enough cooling down time between the first and second soldering process.
($\phi 8 \times 6.5L$, 1 cycle only)
- 超出容许范围使用时请咨询我们。
Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

表面安装推荐尺寸 Recommended Land Size



预热进行条件: 不超过+150℃和90秒。

Pre-heating shall be done less than +150℃ and for 90 seconds.

电容器顶部的温度不可超过+260℃。

The temperature at capacitor top shall not exceed +260℃.

电容器顶部的温度在+200℃以上时, 持续时间不超过60秒。

The duration for over +200℃ at capacitor top shall not exceed 60 seconds.

不同的再流焊方法, 其温度曲线不同。

The standard temperature profile differs by every reflow method.

如果电容器承受的条件与再流焊的允许范围不同, 请与我们联系。

If the conditions capacitors can bear are different, from the allowable range of reflow.

尺寸 Size	X	Y	a	尺寸 Size	X	Y	a
$\phi 4$	1.6	2.6	1.0	$\phi 12.5$	4.0	7.5	7.0
$\phi 5$	1.6	3.0	1.4	$\phi 16$	6.0	8.5	9.5
$\phi 6.3$	1.6	3.5	1.9	$\phi 18$	6.0	9.5	10.5
$\phi 8$	2.5	3.5	3.0	$\phi 20$	6.0	9.5	12.5
$\phi 10$	2.5	4.0	4.0				

片式铝电解电容器品种一览表

V-chip Schedule of Aluminum Electrolytic Capacitors Variety

类别 Class	系列 Series	Features 特点	温度(℃) Temperature	额定电压 Rated Voltage (V.DC)	容量Capacitance	寿命 LoadLife	页次 Page
贴片 V-Chip Surface Mount Type	US	标准品 Standard product	-40℃~+85℃	4~100V	0.1μF ~ 2200μF	2000H	19~20
	UT	宽温标准品 Wide temperature standard	-55℃~+105℃	4~100V	0.47μF ~ 1500μF	2000H	21~22
	UE	低阻抗 Low impedance & Low ESR	-55℃~+105℃	6.3~50V	0.1μF ~ 1500μF	2000H	23~24
	 UZ	超低阻抗品 Extre lower impedance	-55℃~+105℃	6.3~35V	4.7μF ~ 1500μF	2000H	25~26
	UN	无极性品 Bi-polarized	-55℃~+105℃	6.3~50V	0.1μF ~ 100μF	1000H	27~28
	UL	宽温长寿命品 Wide long life product	-55℃~+105℃	6.3~100V	4.7μF ~ 1500μF	3000~5000H	29~30
	UH	高可靠品 Reliable product	-40℃~+125℃	10~450V	1μF ~ 4700μF	1000~5000H	31~32
	 UV	LED 电源驱动经济品 LED power driver-economy goods	-40℃~+105℃	160~450V	1μF ~ 22μF	3000H	33~34
	UD	LED 电源驱动标准品 LED power driver Standard	-40℃~+105℃	160~450V	1μF ~ 22μF	6000H	35~36
	UW	长寿命品 Long life product	-40℃~+105℃	6.3~450V	1μF ~ 1000μF	10000H	37~38

UT 片式铝电解电容

UT Chip Type Aluminum Electrolytic Capacitors



■ 产品特点 Features

- 产品直径 Case diameter Φ 4mm~ Φ 12.5mm
- 适用于再回流焊 Reflow soldering is available
- 适用于高密度表面组装 Available for high density surface mounting
- 寿命105℃ 2000 小时标准品 Life time 105℃ 2000hrs standard product
- 性能稳定, 可靠性高 High stability and reliability
- ROHS 指令已对应完毕 Adapted to the RoHS directive

■ 主要技术性能 Specifications

项目 Items	特性 Characteristics																																																														
工作温度范围 Category Temperature Range	-55℃~+105℃																																																														
额定电压范围 Rated Voltage Range	4~100V.DC																																																														
标称电容量范围 NominalCapacitance Range	1μF ~ 2200 μ F																																																														
标称电容量允许偏差 NominalCapacitance Tolerance	± 20%(120Hz,+20 ℃)																																																														
泄漏电流范围 Leakage Current(MAX)	I=0.01CV(μ A) or 3 (μ A) after 2 minutes I=Leakage Current(μ A) C=Nominal Capacitance(μ F) V=Rated Voltage(V)																																																														
损耗角正切值 Dissipation Factor(MAX) Tan δ (20℃,120Hz)	<table><tr><td>Rated Voltage(V)</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td>Tanδ</td><td>0.35</td><td>0.30</td><td>0.24</td><td>0.20</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.14</td><td>0.14</td></tr></table>										Rated Voltage(V)	4	6.3	10	16	25	35	50	63	100	Tanδ	0.35	0.30	0.24	0.20	0.18	0.16	0.14	0.14	0.14																																	
Rated Voltage(V)	4	6.3	10	16	25	35	50	63	100																																																						
Tanδ	0.35	0.30	0.24	0.20	0.18	0.16	0.14	0.14	0.14																																																						
耐久性 Load Life	+105℃施加额定工作电压2000H后, 放置16H, 电容器应满足以下要求。 After applying rated voltage with max ripple current for 2000hrs at 105℃,and then resumed 16 hours, the capacitors shall meet the following requirements <table><tr><td>Capacitance Change</td><td>± 30%初始值以内</td><td colspan="8">Within ± 30% of the initial value</td></tr><tr><td>Dissipation Factor</td><td>≤200%初始值以内</td><td colspan="8">Not more than 200% of the specified value</td></tr><tr><td>Leakage Current</td><td>≤ 初始规定值</td><td colspan="8">Not more than the specified value</td></tr></table>										Capacitance Change	± 30%初始值以内	Within ± 30% of the initial value								Dissipation Factor	≤200%初始值以内	Not more than 200% of the specified value								Leakage Current	≤ 初始规定值	Not more than the specified value																														
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Dissipation Factor	≤200%初始值以内	Not more than 200% of the specified value																																																													
Leakage Current	≤ 初始规定值	Not more than the specified value																																																													
高温贮存 Shelf Life	+105℃, 贮存1000H后, 放置16H, 电容器应满足以下要求。 After storage for 1000hrs at 105℃, then resumed 16 hours, the capacitors shall meet the following requirements <table><tr><td>Capacitance Change</td><td>± 30%初始值以内</td><td colspan="8">Within ± 30% of the initial value</td></tr><tr><td>Dissipation Factor</td><td>≤200%初始值以内</td><td colspan="8">Not more than 200% of the specified value</td></tr><tr><td>Leakage Current</td><td>≤300%初始值以内</td><td colspan="8">Within 300% of initial specified value</td></tr></table>										Capacitance Change	± 30%初始值以内	Within ± 30% of the initial value								Dissipation Factor	≤200%初始值以内	Not more than 200% of the specified value								Leakage Current	≤300%初始值以内	Within 300% of initial specified value																														
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耐焊接热 Resistance to Soldering Heat	在250℃的条件下, 电容器在热板上保持30秒, 然后从热板上取出电容器, 让其在室温下恢复, 电容器应满足以下要求。 The capacitors shall be kept on then hot plate maintained at 250℃ for 30 seconds.After removing from the hot plate and restored at room temperature, they meet the following requirement: <table><tr><td>Capacitance Change</td><td>± 10%初始值以内</td><td colspan="8">Within ± 10% of the initial value</td></tr><tr><td>Dissipation Factor</td><td>≤ 初始规定值</td><td colspan="8">Not more than the initial specified value</td></tr><tr><td>Leakage Current</td><td>≤ 初始规定值</td><td colspan="8">Not more than the initial specified value</td></tr></table>										Capacitance Change	± 10%初始值以内	Within ± 10% of the initial value								Dissipation Factor	≤ 初始规定值	Not more than the initial specified value								Leakage Current	≤ 初始规定值	Not more than the initial specified value																														
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低温特性及阻抗比 Low Temperature Stability Impedance Ratio (MAX) 120Hz	<table><tr><td colspan="2">Rated Voltage (V)</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td></tr><tr><td rowspan="2">Z-25℃/Z+20℃ (120Hz)</td><td>< Φ8</td><td>7</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>≥ Φ8</td><td>7</td><td>5</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td rowspan="2">Z-40℃/Z+20℃ (120Hz)</td><td>< Φ8</td><td>15</td><td>8</td><td>8</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td></tr><tr><td>≥ Φ8</td><td>15</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table>										Rated Voltage (V)		4	6.3	10	16	25	35	50	63	100	Z-25℃/Z+20℃ (120Hz)	< Φ8	7	4	3	2	2	2	2	2	2	≥ Φ8	7	5	4	3	2	2	2	2	2	Z-40℃/Z+20℃ (120Hz)	< Φ8	15	8	8	4	4	3	3	3	3	≥ Φ8	15	10	8	6	4	3	3	3	3
Rated Voltage (V)		4	6.3	10	16	25	35	50	63	100																																																					
Z-25℃/Z+20℃ (120Hz)	< Φ8	7	4	3	2	2	2	2	2	2																																																					
	≥ Φ8	7	5	4	3	2	2	2	2	2																																																					
Z-40℃/Z+20℃ (120Hz)	< Φ8	15	8	8	4	4	3	3	3	3																																																					
	≥ Φ8	15	10	8	6	4	3	3	3	3																																																					
其它 Other	IEC 60384 JIS-C5101																																																														

■ 尺寸图 Dimensions

Fig. 1 (Φ4~Φ10)

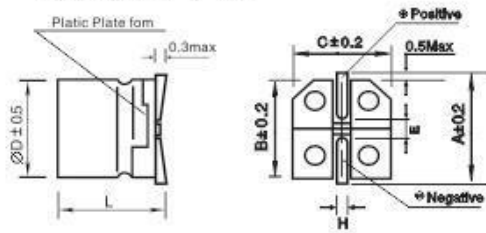
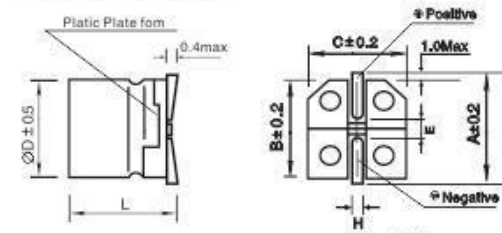


Fig. 2 (≥ Φ12.5)



单位: mm

ΦD	L	A	B	C	E	H	Fig.No.
4	5.4 ± 0.3	5.0	4.3	4.3	1.0	0.5~0.9	1
5	5.4 ± 0.3	6.0	5.3	5.3	1.5	0.5~0.9	1
6.3	5.4 ± 0.3	7.2	6.6	6.6	2.1	0.5~0.9	1
6.3	7.7 ± 0.3	7.2	6.6	6.6	2.1	0.5~0.9	1
8	6.5 ± 0.5	9.1	8.3	8.3	3.1	0.8~1.1	1
8	10.2 ± 0.5	9.1	8.3	8.3	3.1	0.8~1.1	1
10	10.2 ± 0.5	11.1	10.3	10.3	4.5	0.8~1.1	1
12.5	13.5 ± 0.5	13.7	13.0	13.0	4.4	1.0~1.4	2

■ 标准品一览表 Standard Size

V	6.3		10		16		25		35		50		63		100	
μF	D×Lmm	mA	D×Lmm	mA	D×Lmm	mA	D×Lmm	mA	D×Lmm	mA	D×Lmm	mA	D×Lmm	mA	D×Lmm	mA
1											4×5.4	8.0	4×5.4	7.2	4×5.4	7.2
2.2											4×5.4	12	4×5.4	12	6.3×5.4	15
3.3									4×5.4	14	4×5.4	14	5×5.4	14	6.3×5.4	22
4.7							4×5.4	14	4×5.4	15	4×5.4	14	5×5.4	17	6.3×5.4	23
											5×5.4	17	6.3×5.4	22	6.3×7.7	38
10					4×5.4	17	4×5.4	15	4×5.4	15	5×5.4	23	6.3×5.4	26		
							5×5.4	21	5×5.4	22	6.3×5.4	25	6.3×7.7	41	6.3×7.7	38
22	4×5.4	22	4×5.4	21	4×5.4	21	5×5.4	26	5×5.4	30						
			5×5.4	26	5×5.4	28	6.3×5.4	37	6.3×5.4	40	6.3×5.4	43	6.3×7.7	53	8×10.2	90
33	4×5.4	23	4×5.4	23			5×5.4	30	6.3×5.4	45						
	5×5.4	28	5×5.4	34	5×5.4	29	6.3×5.4	45	8×6.5	86	6.3×7.7	63	8×10.2	116	10×10.2	136
47	4×5.4	26	5×5.4	31	5×5.4	33	6.3×5.4	49	6.3×5.4	54						
	5×5.4	34	6.3×5.4	42	6.3×5.4	48	8×6.5	93	6.3×7.7	75	6.3×7.7	66	8×10.2	125	10×10.2	148
													10×10.2	168		
100	5×5.4	40	5×5.4	40	6.3×5.4	63			6.3×7.7	87	8×10.2	146				
	6.3×5.4	52	6.3×5.4	55	6.3×7.7	72	6.3×7.7	93	8×10.2	125	10×10.2	178	10×10.2	200	12.5×13.5	276
	6.3×5.4	69	6.3×5.4	78	6.3×7.7	110			8×10.2	195						
220	6.3×7.7	108	6.3×7.7	110			8×10.2	183			10×10.2	230	10×10.2	230	12.5×13.5	380
			8×6.5	110	8×6.5	110			10×10.2	230						
330	6.3×7.7	108	8×10.2	108	8×10.2	201	8×10.2	228	10×10.2	247	12.5×13.5	360				
470	6.3×7.7	125	6.3×7.7	160	8×10.2	240										
	8×10.2	214	8×10.2	214	10×10.2	300	10×10.2	286	10×10.2	286						
680	8×10.2	214	10×10.2	277	10×10.2	322	12.5×13.5	440	12.5×13.5	440						
1000	8×10.2	235														
	10×10.2	310	10×10.2	320	10×10.2	347	12.5×13.5	500								
1500	10×10.2	320	12.5×13.5	540	12.5×13.5	540										
2200	12.5×13.5	600	12.5×13.5	600												

mA额定纹波电流 Rated ripple current(mA, 105℃, 120Hz)

■ 纹波电流修正系数 Multiplier For Ripple Current

● 频率系数 Frequency coefficient

频率 Frequency	50Hz	120Hz	300Hz	1kHz	≥ 10kHz
系数 Coefficient	0.70	1.00	1.17	1.36	1.50

注: 以上所提供的设计及特性参数仅供参考, 任何修改不做预先通知, 如在使用上有疑问, 请在采购前与我们联系, 以便提供技术上的协助。
Note: all designs and specifications are for reference only and are subject to change without prior notice, if any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

铝电解电容器相关知识

1. 忽略纹波电流时的寿命推算

一般而言，铝电解电容器的寿命与周围的环境温度有很大的关系，其寿命可以由以下公式计算：

$$L = L_0 \times 2^{\frac{(T_0 - T)}{10}} \dots\dots\dots (1)$$

其中， L : 温度 T 时的寿命
 L_0 : 温度 T_0 时的寿命

与温度比较，降压使用对电容器的寿命影响很小，可忽略不计。

2. 考虑纹波电流时寿命的推算

叠加纹波电流，由于内部等效串联电阻(ESR)引起发热，从而影响电容器的使用寿命，产生的热量可由下公式计算

$$P = I^2 R \dots\dots\dots (2)$$

其中， I : 纹波电流(Arms)
 R : 等效串联电阻(Ω)

其中， ΔT : 电容器中心的温升($^{\circ}\text{C}$)

I : 纹波电流(Arms)

R : ESR(Ω)

A : 电容器的表面积(cm^2)

H : 散热系数($1.5 \sim 2.0 \times 10^{-3} \text{W}/\text{cm}^2 \times ^{\circ}\text{C}$)

$$\Delta T = \frac{I^2 R}{A \cdot H} \dots\dots\dots (3)$$

由于发热引起的温升

上面公式(3)显示电容器的温度上升与纹波电流的平方以及等效串联电阻ESR成正比，与电容器的表面积成反比，因此，纹波电流的大小决定着产生热量的大小，且影响其使用寿命，电容器的类型以及使用条件影响着 ΔT 值的大小，一般情况下 $\Delta T < 5^{\circ}\text{C}$ ，下图表示纹波电流引起的温升的测量点



测试结果:

(1) 考虑到环境温度和纹波电流时的寿命公式

$$L = L_0 \times 2^{\frac{(T_0 - T)}{10}} \times K^{\frac{(-\Delta T)}{10}} \dots\dots\dots (4)$$

其中， L_0 : 直流工作电压下的使用寿命
($K=2$, 纹波电流允许的范围)
($K=4$, 超过纹波电流范围时)
 T_0 : 最高使用温度
 T : 工作温度
 ΔT : 中心温升

(2) 电容器工作在额定的纹波电流和上限温度时，电容器的寿命可通过转化(4)式得到，如下：

$$L = L_0 \times 2^{\frac{(T_0 - T)}{10}} \times K^{\frac{(\Delta T_0 - \Delta T)}{10}} \dots\dots\dots (5)$$

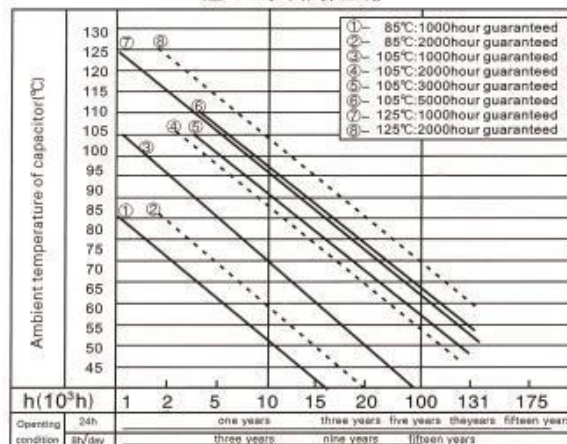
其中， L_0 : 工作在额定纹波电流和最高工作温度下的寿命(h)
 ΔT_0 : 最高工作温度下的电容器中心容许温升。

(3) 考虑纹波电流，环境温度时可由(5)式得到下式

$$L = L_0 \times 2^{\frac{(T_0 - T)}{10}} \times K^{[1 - (\frac{I}{I_0})^2]} \times \frac{\Delta T_0}{10} \dots\dots\dots (6)$$

其中， L_0 : 最高工作温度下的额定纹波电流(Arms)
 I : 叠加的纹波电流(Arms)

(图2-1 寿命推算曲线)



由于直接测量电容器的内部温升存在着困难，下表列出了表面温度和内部核心温度的换算关系。

直径	~10	12.5~16	18	22	25	30	35
中心/表面	1.1	1.2	1.25	1.3	1.4	1.6	1.65

寿命的推算公式，原则上适用于周围环境温度为 $+40^{\circ}\text{C}$ 最高工作温度范围内，但由于封口材料的老化等因素，实际的推算寿命时间一般最大为15年。