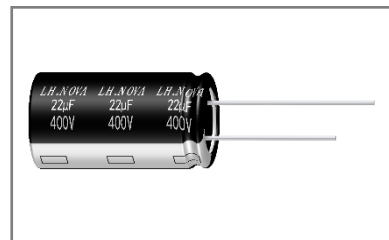


## ■ARW 系列铝电解电容器

### ARW Series Aluminum Electrolytic Capacitor

#### ◆特征 Features

- \* 寿命: 150℃ 2000 小时  
Load life: 150℃ 2000 hours.
- \* 耐高温  
High temperature.
- \* 符合 AEC-Q200  
Compliant to the AEC-Q200 Directive.
- \* 符合 RoHS  
Compliant to the RoHS Directive.

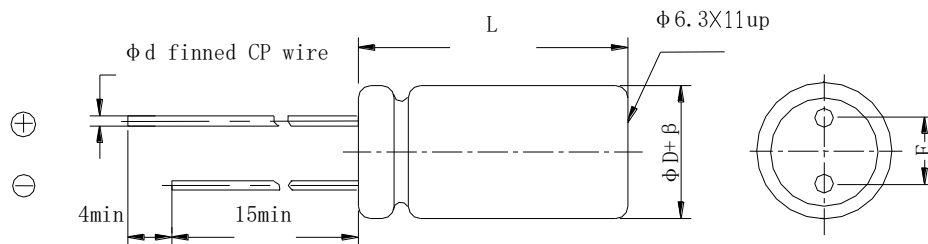


#### ◆应用 Application

- \* 适用于汽车模块电子产品、开关电源及其它各种电子产品  
Ideally suited for automobile modules, switching power supplies, and other electronic products.

#### ◆型号表示法 Part Number

8		470		LE		M		1016		AW		N		0		5		B		0			
代码 Code		产品类别 Type		代码 Code		电压 Voltage		代码 Code		尺寸 Dimensions ΦDxL(mm)		代码 Code		商标 Trademark		代码 Code		内码 Internal Code		代码 Code		产品脚型 Lead Forming Type	
8		成品 Product		LB		10		1016		Φ10x16		N		LH.NOVA		5		150℃		0		散装品 Bulk	
				LC		16		1020		Φ10x20										P		直脚方式 编带品 original type(vertical tape)	
				LD		25		AB20		Φ12.5x20													
				LE		35		1840		Φ18x40													
				LG		63																	
				MA		100																	
				VA		400																	
代码 Code		标称容量 Nominal Capacitance		代码 Code		误差 Tolerance		代码 Code		型号 Series		代码 Code		胶管颜色 Sleeve Color		代码 Code		内码 Internal Code					
2R2		2.2uF		K		±10%		K		±10%		AW		ARW		0		黑色 Black		B		汽车电子 Automotive electronics cartronics	
470		47uF		V		± <sup>20</sup> <sub>10</sub> %		V		± <sup>20</sup> <sub>10</sub> %						1		深蓝色 Deep-blue					
471		470uF		M		±20%		M		±20%						7		棕色 Brown					
472		4700uF		Q		± <sup>30</sup> <sub>10</sub> %		Q		± <sup>30</sup> <sub>10</sub> %						9		绿色 Green					

**◆产品结构 Product Structure**


$\beta(\text{mm})$	$\pm 0.5$			$\pm 1.0$					
$\Phi D(\text{mm})$	5	6.3	8	10	12.5		16	18	22
$F \pm 0.5(\text{mm})$	2.0	2.5	3.5	5.0			7.5		10.0
$\Phi d \pm 0.1(\text{mm})$	0.5		0.6			0.8	0.8		
$L(\text{mm})$	11,12		12,16	12,16,	16,20	25	16,20,25,30,35	20,25,30,35,40	25,30,35,40
	$L \pm 2.0$								

**◆主要特性表 Main specifications**

项目 Item	主要特性 Performance Characteristics									
额定工作电压范围 Rated Voltage Range	10~400V.DC									
使用温度范围 Operating Temperature Range	-40℃~+150℃									
标称静电容量范围 Nominal Capacitance Range	2.2~4700 μ F									
静电容量允许偏差 Capacitance Tolerance	±20% (M, +20℃, 120Hz)									
漏电流 Leakage Current (20℃)	额定工作电压(V) Rated working voltage	10~100				160~400				
	漏电流 Leakage current	2 分钟后 ≤0.01CV 或 3(μA),取最大值 After 2 min. ≤0.01CV or 3(μA), Whichever is greater.				2 分钟后 ≤0.03CV+25(μA) After 2 min . ≤0.03CV+25(μA)				
	C: 标称静电容量 (μF) Nominal Capacitance in μF V: 额定工作电压 (V) Rated working voltage in V									
损耗角正切 DF Dissipation Factor	额定工作电压(V) Rated working voltage	10	16	25	35	50	63	160	200	200~400
	DF(MAX) (20℃,120Hz)	0.20	0.16	0.14	0.12	0.12	0.12	0.11	0.20	0.25
	当容量值大于 1000μF 时, 每增加 1000μF, DF 值加 0.02 For capacitance of more than 1000μF, add 0.02 foreveryincrease of 1000μF.									

浪涌电压 Surge Voltage	<table><tr><td>额定工作电压(V) Rated working voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td></tr><tr><td>浪涌电压(V) Surge voltage</td><td>13</td><td>20</td><td>32</td><td>44</td><td>63</td><td>79</td><td>125</td><td>200</td><td>250</td><td>300</td><td>400</td><td>450</td></tr></table>														额定工作电压(V) Rated working voltage	10	16	25	35	50	63	100	160	200	250	350	400	浪涌电压(V) Surge voltage	13	20	32	44	63	79	125	200	250	300	400	450																																																										
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	施加表中所示浪涌电压，充电 30±5 秒，放电 5.5±0.5 分钟作为一个周期，共进行 1000 次。 测试温度： 15℃-35℃然后在标准大气条件下放置达到热稳定， 测试各参数。 Application of DC surge Voltage stated at table,1000 times of charging for 30 ± 5 sec.,discharging with a period of 5.5± 0.5 min.. Test temperature: 15℃ -35℃And the capacitor shall be stored under standard atmospheric conditions to obtain thermal stability, after which measurements shall be made.																																																																																																	
	容量变化：在初始值的± 20%以内。损耗角正切值不大于规定值的 200%。漏电流：不大于初始规定值 Capacitance change:Within ± 20% of the initial value Dissipation factor:Not more than 200% of the specified value.Leakage current: more than the initial specified value																																																																																																	
温度特性 Temperature Characteristic	电容器根据下表的次序处理，放置在每一温度下，待阻抗或电容量稳定后方可测试。 The capacitor shall be subjected in turn to the procedures specified below. The capacitor should be stored at each temperature until measured impedance or capacitance are stabilized.																																																																																																	
	<table><tr><td>阶段 Step</td><td colspan="6">温度 Temperature</td><td colspan="7">时间 Time</td></tr><tr><td>1</td><td colspan="6">20±2℃</td><td colspan="7">热平衡状态 Thermal balance</td></tr><tr><td>2</td><td colspan="6">下限类别温度 Lower temperature</td><td colspan="7">2 hours</td></tr><tr><td>3</td><td colspan="6">20±2℃</td><td colspan="7">热平衡状态 Thermal balance</td></tr><tr><td>4</td><td colspan="6">105±2℃</td><td colspan="7">2 hours</td></tr><tr><td>5</td><td colspan="6">20±2℃</td><td colspan="7">热平衡状态 Thermal balance</td></tr></table>														阶段 Step	温度 Temperature						时间 Time							1	20±2℃						热平衡状态 Thermal balance							2	下限类别温度 Lower temperature						2 hours							3	20±2℃						热平衡状态 Thermal balance							4	105±2℃						2 hours							5	20±2℃						热平衡状态 Thermal balance						
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	5	20±2℃						热平衡状态 Thermal balance																																																																																										
	阶段 1：测定容量，损耗和阻抗值。 Step 1: Capacitance,Dissipation Factor and impedance shall be measured.																																																																																																	
	阶段 2：放置 2 小时后，达到热平衡状态再测定容量，损耗和阻抗值。 Step 2: After the capacitor being stored for 2 hours, Capacitance, Dissipation Factor and impedance shall be Measured. The measurement shall be made at thermal stability.																																																																																																	
	阶段 4：放置 2 小时后，达到热平衡状态再测定容量，损耗和阻抗值。 Step 4: After the capacitor being stored for 2 hours, Capacitance, Dissipation Factor and impedance shall be Measured. The measurement shall be made at thermal stability.																																																																																																	
	阻抗比（阶段 2 对阶段 1）Impedance ratio																																																																																																	
<table><tr><td colspan="2">额定工作电压(V) Rated working voltage</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160~250</td><td>350~400</td></tr><tr><td>阻抗比(120Hz)</td><td>z-25℃/z+20℃</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td><td>3</td><td>3</td><td>6</td></tr><tr><td>Impedance Ratio</td><td>z-40℃/z+20℃</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>3</td><td>6</td><td>12</td></tr></table>														额定工作电压(V) Rated working voltage		10	16	25	35	50	63	100	160~250	350~400	阻抗比(120Hz)	z-25℃/z+20℃	2	2	2	2	2	3	3	3	6	Impedance Ratio	z-40℃/z+20℃	4	4	4	4	4	4	3	6	12																																																				
额定工作电压(V) Rated working voltage		10	16	25	35	50	63	100	160~250	350~400																																																																																								
阻抗比(120Hz)	z-25℃/z+20℃	2	2	2	2	2	3	3	3	6																																																																																								
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静电容量变化率（阶段 4 对阶段 1）：阶段 1 的±20% Capacitance change: within ±20% of step 1																																																																																																		
漏电流（阶段 4）：规定值 5 倍以下 Leakage Current: Less than 500% of the specified value.																																																																																																		

<p>高温负荷特性 Load life</p>	<p>在 <math>150\pm 2^{\circ}\text{C}</math> 环境施加额定工作电压和最大允许纹波电流到规定寿命后, 电容器的性能符合下面要求:</p> <p>After application of rated working voltage with max permissible ripple current specified at <math>150\pm 2^{\circ}\text{C}</math> for specified life time, capacitors meet the characteristics requirements measured listed at below:</p> <p>电容量变化率: <math>\pm 20\%</math> 初始测量值以内</p> <p>Capacitance change: <math>\pm 20\%</math> initial measured value</p> <p>漏电流: <math>\leq</math> 初始规定值</p> <p>Leakage current: <math>\leq</math> initial specified value</p> <p>损耗角正切值 <math>\leq 200\%</math> 倍初始规定值</p> <p>Dissipation factor: <math>\leq 200\%</math> initial specified value</p>
<p>高温贮存特性 Shelf life</p>	<p>试验温度: <math>150\pm 2^{\circ}\text{C}</math> 环境下无负荷贮存</p> <p>试验时间: 1000 小时</p> <p>Test temperature: without voltage load at <math>105\pm 2^{\circ}\text{C}</math></p> <p>Test time: 1000h</p> <p>外观: 无异状</p> <p>Appearance: No remarkable abnormality</p> <p>电容量变化率: <math>\pm 20\%</math> 初始测量值以内</p> <p>Capacitance change: <math>\pm 20\%</math> initial measured value</p> <p>漏电流: <math>\leq 200\%</math> 倍初始规定值</p> <p>Leakage current: <math>\leq 200\%</math> initial specified value</p> <p>损耗角正切值 <math>\leq 200\%</math> 倍初始规定值</p> <p>Dissipation factor: <math>\leq 200\%</math> initial specified value</p>
<p>温度循环 Temperature Cycling</p>	<p>试验温度: 高温: 上限类别温度、低温: 下限类别温度; 高低温暴露时间: 各 30 分钟; 转换时间: 小于 1 分钟; 循环次数: 1000 次; 试验结束后 (<math>24\pm 4</math>) 小时内进行测试。</p> <p>Expose to the upper and lower category temperatures for 30 minutes each, with a transition time of less than 1 minute between high and low temperatures, and cycle 1000 times. The test shall be conducted within <math>24\pm 4</math> hours after the end of the experiment.</p> <p>外观: 无可见损伤和电解质漏出</p> <p>Appearance: No remarkable damage and electrolyte leakage</p> <p>容量变化: 在初始值 <math>\pm 20\%</math> 范围内</p> <p>Variation of capacitance: Within <math>\pm 20\%</math> of the initial value.</p> <p>漏电流: <math>\leq 200\%</math> 倍初始规定值</p> <p>Leakage current: <math>\leq 200\%</math> initial specified value</p> <p>损耗角正切值 <math>\leq 200\%</math> 倍初始规定值</p> <p>Dissipation factor: <math>\leq 200\%</math> initial specified value</p>

耐焊接热 Resistance to soldering heat	焊槽法： 焊锡温度：260±5℃； 浸入时间：10±1 秒； 浸入深度：1.6mm Solderbath method Solderbath temperature：260±5℃ Immersion time：10±1sec. Immersion depth: 1.6mm 外观：无异状 Appearance: No remarkable abnormality 容量变化：在初始值±10%范围内 Variation of capacitance: Within ±10% of the initial value. 损耗角正切值：不大于规定值 Dissipation factor: ≤specified value 漏电流：不大于规定值 Leakage current: ≤specified value																								
防爆试验 Safety vent	以下试验只适用于铝壳直径≥Φ8 产品。 The following tests only apply to those products with vent products at diameter≥Φ8 with vent. 在电容器两极施加反向直流电压，其中通过的电流为 1A，在测试时防爆装置应能在 30 分钟内动作。 DC Application test: The capacitor shall be subjected to a reverse DC voltage. The current flowing through the capacitor shall be 1A. If the vent does work with the voltage applied for 30 minutes, the test is considered to be passed. 应无引线、铝箔等散射，无火花产生 The safety vent is actuated under the test conditions, thereby preventing terminals, metal pieces, etc, of the capacitor from scattering due to burst, the case from separating from the seal packing, or the capacitor from producing flame.																								
端子强度 Terminal strength	端子抗拉强度：沿电容器端子引线方向施加拉力(如下表)，10±1 秒。 <table><tr><td>引线直径 φ</td><td>0.45</td><td>0.50</td><td>0.60</td><td>0.80</td><td>1.00</td></tr><tr><td>拉力 N</td><td>5</td><td>5</td><td>10</td><td>10</td><td>20</td></tr></table> Tensile strength of terminal: Astatic load shall be applied to the terminal in the axial direction and acting in a direction away from the body for 10±1 sec. 端子抗弯强度：在电容器引线施加固定重力（如下表），然后 5 秒内完成将电容体弯折 90°后回到原位，再向相反方向弯折 90°后回到原位。 <table><tr><td>引线直径 φ</td><td>0.45</td><td>0.50</td><td>0.60</td><td>0.80</td><td>1.00</td></tr><tr><td>拉力 N</td><td>2.5</td><td>2.5</td><td>5</td><td>2</td><td>10</td></tr></table> Bending strength of terminal: Hang the specified dead weight, in about 5 sec then bend the body through 90°, return to the original position. Next bend it in opposite direction through 90° with the same speed, again return to the original position  外观：无可见机械损伤 Appearance: no visible mechanical damage 电容器应无接触不良开路或短路 The capacitor shall be no intermittent contacts, or open or short circuiting	引线直径 φ	0.45	0.50	0.60	0.80	1.00	拉力 N	5	5	10	10	20	引线直径 φ	0.45	0.50	0.60	0.80	1.00	拉力 N	2.5	2.5	5	2	10
引线直径 φ	0.45	0.50	0.60	0.80	1.00																				
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引线直径 φ	0.45	0.50	0.60	0.80	1.00																				
拉力 N	2.5	2.5	5	2	10																				

<p>耐溶剂性 Solvent Resistance</p>	<p>三种溶剂： 溶剂 a、在 20°C~30°C按下述配方构成混合溶剂：1）一份体积的分析纯异丙醇；2）三份体积的 80%体积的煤油和 20%体积的乙苯构成的混合液； 溶剂 b、三氯三氟乙烷，半水溶性的溶剂； 溶剂 c、在 63°C~70°C，按下述配方构成混合溶剂；1）42 份体积的去离子水； 2）一份体积的乙二醇-丁醚；3）一份体积的单乙醇胺； 将样品分成 3 组，分别浸在 a、b、c 三种溶剂 3min 后擦拭 10 次；擦拭后，立即按上述方法再重复 2 回，浸、刷共 3 回。然后用水洗清洗剂进行清洗，并在室温下对整个表面进行通风干燥。 The solventsolutions used in this test shall consist of the following： Solvent a: A mixture consisting of the following at 20°C~30°C： 1) One part by volume of isopropyl alcohol. 2) Three parts by volume of a mixture of 80% by volume of kerosene and 20% by volume ethyl benzene. Solvent b: Trichlorotrifluoroethane, semi water-soluble solvents. Solvent c: A mixture consisting of the following at 63°C~70°C： 1) Forty-two parts by volume of deionized water. 2) One part by volume of ethylene glycol butyl ether. 3) One part by volume of monoethanolamine. The specimens subjected to this test shall be divided into three groups of approximately equal size, were immersed in a, b, c three solvents solutions. The specimens shall be completely immersed for 3 minutes, immediately following immersing, each specimen shall be tested as follows: The bristle portion of the brush, shall be dipped in the solution until wetted and the specimen shall be brushed with normal hand pressure (approximately 2 to 3 ounce applied normal to the surface) for ten strokes on the portion of the specimen where has been applied. The brush stroke shall be directed in a forward direction across the surface of the specimen being tested. Immediately after brushing, the procedure shall be repeated two more times, for a total of three immersions, followed by brushing. After completion of the third immersion and brushing, the specimens shall be rinsed in approximately 25°C water and all surfaces sir-blown dry.  外观：无异状 Appearance: No remarkable abnormality 容量变化：在初始值±3%范围内 Capacitance change: Within ±3% of the initial value. 损耗角正切值：不大于规定值 Dissipation factor: ≤ specified value 漏电流：不大于规定值 Leakage current: ≤ specified value</p>
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<p>振动试验 Resistance To Vibration</p>	<p>在 X、Y、Z 三个互相垂直的方向分别进行 12 个循环，共 36 个循环，一个循环 20 分钟。 频率：10-2000Hz 加速度：5g. Perform 12 cycles in X, Y, and Z directions perpendicular to each other, for a total of 36 cycles, each lasting 20 minutes. Vibration frequency range: 10-2000Hz Acceleration: 5g</p> <p>外观：无可见机械损伤 Appearance: No visible mechanical damage 容量变化：在初始值±3%范围内 Capacitance change: Within ±3% of the initial value. 损耗角正切值：不大于规定值 Dissipation factor: ≤ specified value 漏电流：不大于规定值 Leakage current: ≤ specified value</p>
<p>可焊性 Solderability</p>	<p>焊锡温度：255±5℃ 浸入时间：5±0.5 秒 Temperature of solder: 255±5℃ Dipping time: 5±0.5sec. This specification shall be met after the capacitors are stored under standard atmospheric conditions for 6 months.</p> <p>浸入焊锡的引线表面积约 95%以上应附着新锡。 At least 95% of circumferential surface of the dipping portion of terminal shall be covered with new solder.</p>
<p>高温高湿 Biased Humidity</p>	<p>试验电压：额定电压 Test voltage: rated voltage 试验温湿度：85℃，85%RH Test temperature and humidity: 85℃，85%RH 试验时间：1000 小时 Test time: 1000 h 试验结束后 24±4 小时后进行测试 Measurement at 24±4 hours after test conclusion.</p> <p>外观：绝缘套管的剥落、剥落、碎裂、起泡或收缩是可以接受的。 Appearance: Peeling, flaking, chipping, bubbling or shrinking of insulation sleeve is acceptable. 容量变化：在初始值±20%范围内 Capacitance change: Within ±20% of the initial value. 损耗角正切值：≤150% 规定值 Dissipation factor: ≤ 150% of specified value 漏电流：≤150%规定值 Leakage current: ≤ 150% of specified value</p>

**◆尺寸表、允许纹波电流、纹波电流频率因子**
**Dimensions and ripple current and frequency coefficient**

\*纹波电流频率因子

Ripple current frequency coefficient

Freq(Hz) Cap(μF)	50(60)	100(120)	1K	10K	≥10k
2.2~33	0.30	0.40	0.75	0.92	1.00
47~1000	0.40	0.50	0.80	0.95	1.00
2200~4700	0.55	0.65	0.85	0.96	1.00

\*尺寸表与允许纹波电流

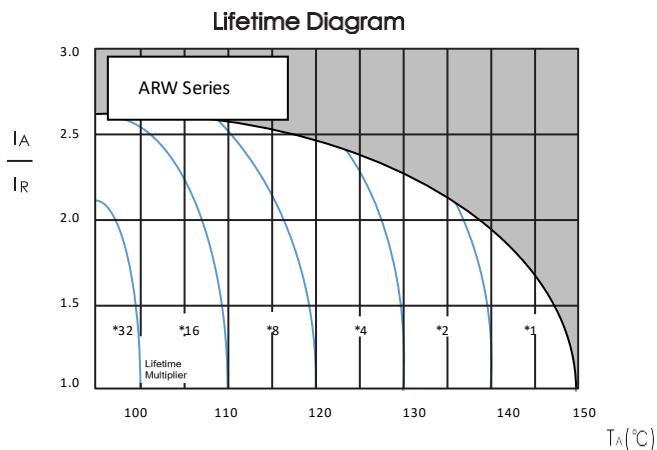
Dimensions and ripple current

Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(μF)	尺寸 D×L (mm)	额定纹波电流 (mA rms/150°C/100KHz)
10	470	10×16	352
	1000	12.5×20	570
	2200	16×30	1045
	3300	16×35	1093
	4700	18×35	1235
16	330	10×16	352
	470	10×20	437
	1000	12.5×25	570
	2200	16×35	1093
	3300	18×35	1235
25	220	10×16	352
	330	10×20	437
	470	12.5×20	570
	1000	16×31	1045
	2200	18×40	1302
35	100	10×16	352
	220	10×20	437
	330	12.5×20	570
	470	12.5×25	713
	1000	16×35	1093
50	100	10×20	285
	220	12.5×20	380
	330	12.5×25	475
	470	16×31	665
	1000	18×35	808
63	47	10×16	209
	100	12.5×20	333
	220	16×30	618



Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(μF)	尺寸 D×L (mm)	额定纹波电流
			(mA rms/150°C/100KHz)
	330	16×35	646
	470	18×35	713
160	15	10×16	138
	22	10×20	162
	33	12.5×20	209
200	10	10×16	119
	15	10×20	152
	22	12.5×20	190
	33	12.5×25	209
250	10	10×16	124
	15	10×20	162
	22	12.5×20	209
	33	16×20	333
350	3.3	10×16	50
	4.7	10×20	71
	6.8	12.5×20	95
	10	12.5×20	114
	15	12.5×20	143
	22	12.5×25	190
	33	16×25	333
400	2.2	10×16	34
	3.3	10×20	50
	4.7	12.5×20	71
	6.8	12.5×20	95
	10	12.5×20	114
	15	12.5×25	143
	22	16×25	285
	33	16×30	380

## ◆ 产品特征曲线 Product Characteristic Curve

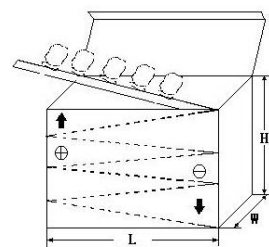


$I_A$  = 120Hz 时的实际纹波电流,  $I_R$  = 120Hz 时的额定纹波电流, 150°C  
使用寿命系数与环境温度和纹波电流负载的函数关系。

## ◆ 包装 Packaging

\* 编带产品包装规范与数量 Taped packaging quantity

直径 $\Phi D(\text{mm})$	数量 (只) Qty. (Pcs)	L(电容高度) $\leq 22\text{mm}$	L(电容高度) $= 25\pm 2\text{mm}$
		LxWxH(mm)	LxWxH(mm)
$\Phi 5$	2000	328x235x50	328x235x57
$\Phi 6.3$	1500		
$\Phi 8$	1000		
$\Phi 10$	600		
$\Phi 12.5$	400		
$\Phi 16$	250		
$\Phi 18$	200		



\* 散装品包装数量 Bulk packaging quantity

直径 $\Phi D(\text{mm})$ Diameter	高度 L(mm) Length	数量 (只/袋) Quantity (pcs/bag)	袋/盒 bag/box	内箱/外箱 Inner box/outer box	(只/箱) psc/box
$\Phi 4$	7-8	1000	15	4	60000
$\Phi 5$	5-7	1000	12	4	48000
$\Phi 5$	11	1000	10	4	40000
$\Phi 6.3$	5-7	1000	10	4	40000
$\Phi 6.3$	8-15	1000	8	4	32000
$\Phi 6.3$	15-20	1000	6	4	24000
$\Phi 8$	5-12	500	8	4	16000
$\Phi 8$	14-16	500	8	4	16000
$\Phi 8$	20	500	6	4	12000
$\Phi 10$	9-13	500	6	4	12000
$\Phi 10$	14-16	250	8	4	8000
$\Phi 10$	17-20	250	8	4	8000
$\Phi 10$	25-30	200	8	4	6400

Φ10	31-35	200	6	4	4800
Φ12-Φ13	16-28	200	6	4	4800
Φ12-Φ13	30-40	100	8	4	3200
Φ12-Φ13	45-55	100	6	4	2400
Φ16	15-20	100	8	4	3200
Φ16	21-30	100	6	4	2400
Φ16	31-40	50	10	4	2000
Φ18	15-20	100	6	2	1200
Φ18	25-30	50	8	2	800
Φ18	35-40	50	6	2	600
Φ18	41-50	25	10	2	500
Φ20	25-40	50	10	2	1000
Φ22	25-35	50	5	2	500
Φ22	≥40	25	10	2	500

### ◆ 贮存方法 Storage Methods

- \* 请保管在室温 5℃~35℃，湿度 75%RH 以下的环境
- \* (1) 产品储存期限：≤12 个月；Storage life: ≤12 months
- \* (2) 产品储存期限超 12 个月时，需充电后再使用
- \* (3) 产品储存时间超过 3 年的应报废处理
- \* (4) 库存有效期以套管上印刷的时间开始计算
- \* (5) 请尽量以包装状态保管
- \* (6) 当电容器长期储存后，漏电流会升高，温度越高，漏电流上升越快，因此应注意储存环境。如铝电解电容器的漏电流上升对电路有不良影响，请在使用前充电处理
- \* (7) 请避免在以下环境中保管
  - ① 溅水、高温高湿及结露的环境；
  - ② 溅油、或者充满气体油成分的环境；
  - ③ 充满酸性有毒气体（硫化氢、亚硫酸、亚硝酸、氯、溴、溴化甲烷等）的环境；
- \* We recommend the following conditions for storage: Ambient temperature: 5℃~35℃, Ambient humidity: Less than 75% RH.
- \* (1) Storage life: ≤12 months;
- \* (2) If storage life time is over 12 months, the products need to be recharged;
- \* (3) If storage life time is over three years, the product need to be discarded;
- \* (4) Expiry date: calculating from the date marked on the sleeve;
- \* (5) Please keep capacitors in the original package;
- \* (6) Leakage current tends to increase when capacitors have been stored for long period of time. The higher temperature, the faster leakage current rises. Please take caution when selecting the storage location. The leakage current decreases gradually as voltage is applied to the capacitor. If the rising leakage current may cause problems in the circuit, please charge the capacitor before using.
- \* (7) Avoid storing the capacitors under such circumstances:

- ①Environment of water splashing, high temperature, high humidity and dewing;
- ②The environment that splashes oil, or is filled with gas oil;
- ③With full of acid toxic gases environment such as( hydrogen sulfide , sulfurous acid, nitrous acid, chlorine , bromine, methyl bromide, etc.

### ◆铝电解电容器使用注意事项

#### Important information on the application of aluminum electrolytic capacitors

##### \*铝电解电容器使用注意事项

##### \* (1) 直流铝电解电容器应按正确的极性使用

当直流铝电解电容器被反极性接入电路时, 电容器会导致电子线路短路, 由此产生的电流会引致电容器损坏。若电路中有可能在负引线施加正极电压, 请选用无极性产品

##### \* (2) 在额定工作电压以下作用

当电容器上所施加电压高于额定工作电压时, 电容器的漏电流将上升, 其电气特性将在短时间内劣化直至损坏。请注意电压峰值勿超出额定工作电压

##### \* (3) 常规产品禁止作快速充放电使用

当常规电容器被用作快速充电用途。其使用寿命可能会因为容量下降, 温度急剧上升等而缩减。

##### \* (4) 施加纹波电流应小于额定值

施加纹波电流超过额定值后, 会导致电容器体过热, 容量下降, 寿命缩短。所施加纹波电压的峰值应小于额定工作电压。

##### \* (5) 使用环境温度

铝电解电容器的使用寿命会受到环境温度的影响。据科学统计, 使用环境温度下降 10℃其使用寿命增加 1 倍。

##### \* (6) 引出线强度

当拉力施加到电容器引出线, 该拉力将作用于电容器内部, 这将导致电容器内部短路, 开路或漏电流上升。在电容器焊装到电路板, 请勿强烈摇动电容器。

##### \* (7) 焊接过程耐热性

铝电解电容器装至电路板进行浸焊或波峰焊时, 其塑料套管可能因焊接时间过长、温度过高发生破裂或二次收缩。

##### \* (8) 电路板的安装孔距及安装位置

电路板安装孔的设计应与产品说明书的引线脚距相一致, 如果将电容器强行插入孔距不配套的电路板, 那么会有应力作用于引出线, 这将导致短路或漏电流上升。

##### \* (9) 铝电解电容可能会有残留电压, 请在使用前对电容器进行放电。

#### (1) DC aluminum electrolytic capacitors should be used according to the correct polarity

When a DC aluminum electrolytic capacitor is connected to a circuit with reverse polarity, the capacitor will cause a short circuit in the electronic circuit, and the resulting current will cause damage to the capacitor. If it is possible to apply positive voltage to the negative lead in the circuit, please choose a non-polar product.

#### (2) Function below rated operating voltage

When capacitor is used at higher voltage than the rated voltage, leakage current increases, characteristics drastically deteriorate and damage in a short period may occur as a result. Please take extra caution that the peak voltage should not exceed the rated voltage.

#### (3) Conventional capacitors are prohibited from being used for fast charging and discharging

When aluminum electrolytic capacitors for general purpose are employed in rapid charge and discharge application, its life may be shorted by capacitance decreasing, heat rising, etc.

(4) The applied ripple current should be less than the rated value

Excessive heat will reduce capacitance and result in shortened life of capacitor if ripple currents exceeding the specified rated value are applied. The peak value of the ripple voltage should be less than the rated voltage.

(5) Operating ambient temperature

Its ambient temperature closely affects the life of an aluminum electrolytic capacitor. It is generally stated, that life doubles for each  $10^{\circ}\text{C}$  decrease in temperature.

(6) Terminal Strength

When a strong force is applied to the lead wires or terminals, stress is put on the internal connections. This may result in short circuit, open circuit or increased leakage current. It is not advisable to bend or handle a capacitor after it has been soldered to the PCB board.

(7) Heat resistance during welding process

In the dip soldering process of PCB board with aluminum electrolytic capacitors mounted, secondary shrinkage or crack of PVC sleeve may be observed when solder temperature is too high or dipping time is too long.

(8) Installation pitch-row and installation position of circuit boards

PCB board must be designed so its hole coincides with the lead pitch (lead spacing) of the capacitor specified by the catalog or specifications. When a capacitor is forcibly inserted into an unmatched hole, a stress is put on the leads. This could result in a short circuit or increased leakage current.

(9) Aluminum electrolytic capacitors may have residual voltage, please discharge the capacitor before use.

### ◆推荐安装/焊接方法 Recommended Installation/Welding Methods

\*波峰焊接条件

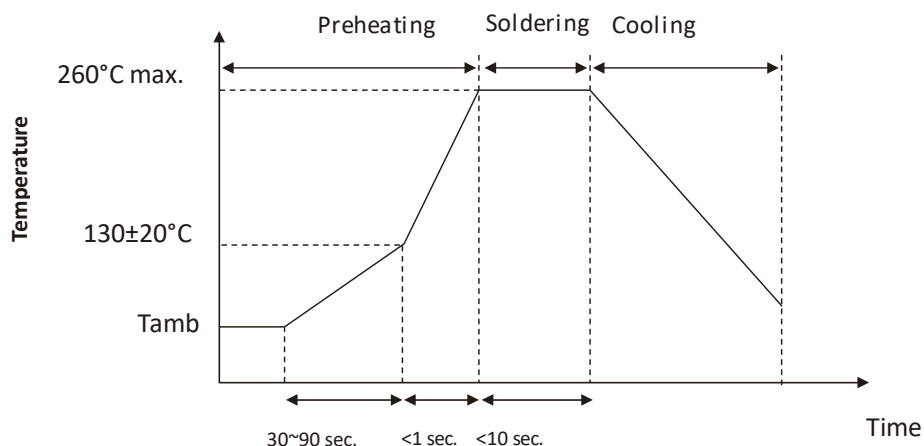
预热:  $105^{\circ}\text{C}$

波峰焊:  $260 \pm 5^{\circ}\text{C}$   $10 \pm 1$  秒以下 (或  $380 \pm 10^{\circ}\text{C}$   $3 \pm 0.5$  秒以下: 手焊)

\*Wave Soldering Conditions

Preheating:  $105^{\circ}\text{C}$

Wave Soldering:  $260 \pm 5^{\circ}\text{C}$  for  $\leq 10 \pm 1$  seconds (or  $380 \pm 10^{\circ}\text{C}$  for  $\leq 3 \pm 0.5$  seconds for manual soldering)



Note 1:  $(1 \sim 3^{\circ}\text{C})/\text{sec.}$

Note 2: Approx.  $200^{\circ}\text{C}/\text{sec.}$

Note 3:  $5^{\circ}\text{C}/\text{sec. (max.)}$

**◆其它说明 Others**

\*本产品不含铅、镉等元素

This product does not include Plumbum or Cadmium.

[illegible]

Note: The content provided above is the product specification. Fenghua reserves the right to modify this content without prior notice when the product remains unchanged. Any product changes will be notified to customers via PCN.