

## ■ GR 系列铝电解电容器

### GR Series Aluminum Electrolytic Capacitor

#### ◆特征 Features

- \* 寿命: 105℃ 3000 小时  
Load life: 105℃ 3000 hours.
- \* 长寿命、高可靠性  
Longer life and High reliability.
- \* 符合 RoHS  
Compliant to the RoHS Directive.



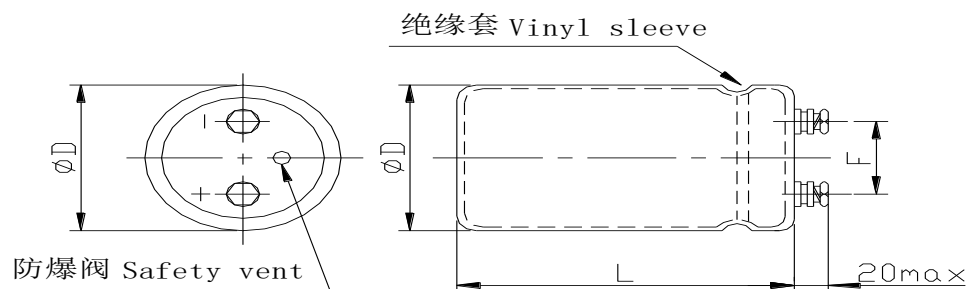
#### ◆应用 Application

- \* 适用高性能 UPS 不间断电源、高级电源设备、变频器等其他高可靠电子产品  
Suitable for high professional electronic devices such as UPS uninterruptible power supplies and inverters

#### ◆型号表示法 Part Number

8	822	MF	M	C100	GR	N	0	1	1	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	A100	Φ 35x100	N	LH.NOVA	1	105℃	0	散装品 Bulk
		LC	16	C100	Φ 65x100						
		LD	25	G130	Φ 76x130						
		MF	350	D120	Φ 80x120						
		VA	400	E140	Φ 90x140						
		VB	450								

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
391	390uF	K	±10%	GR	GR	0	黑色 Black	1	普通品 regular
822	8200uF	V	± <sup>20</sup> <sub>10</sub> %			1	深蓝色 Deep-blue	E	PET胶管 PET Sleeve
473	47000uF	M	±20%			7	棕色 Brown		
684	680000uF	Q	± <sup>30</sup> <sub>10</sub> %			9	绿色 Green		

**◆产品结构 Product Structure**


D±2.0 (mm)	L±3.0 (mm)	F±1.0 (mm)
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**◆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	10~100V.DC	160~450V.DC																																																							
使用温度范围 Operating Temperature Range	-40℃~+105℃	-25℃~+105℃																																																							
标称静电容量范围 Nominal Capacitance Range	390~680000μF																																																								
静电容量允许偏差 Capacitance Tolerance	±20% (M, +20℃, 120Hz)																																																								
漏电流 Leakage Current (20℃)	<table><tr><td>额定工作电压(V) Rated working voltage</td><td>10~450</td></tr><tr><td>漏电流 Leakage current</td><td>5 分钟后 I≤0.01CV( μ A)或 5(mA), 取小值 After 5 min, I≤0.01CV( μ A) or 5(mA), whichever is smaller.</td></tr></table>		额定工作电压(V) Rated working voltage	10~450	漏电流 Leakage current	5 分钟后 I≤0.01CV( μ A)或 5(mA), 取小值 After 5 min, I≤0.01CV( μ A) or 5(mA), whichever is smaller.																																																			
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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	<table><tr><td>WV(V) ΦD</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</td><td>160~250</td><td>350~450</td></tr><tr><td>35</td><td>0.75</td><td>0.60</td><td>0.40</td><td>0.30</td><td>0.25</td><td>0.20</td><td>0.20</td><td>0.15</td><td>0.15</td><td>0.20</td></tr><tr><td>51</td><td>1.00</td><td>0.70</td><td>0.50</td><td>0.50</td><td>0.30</td><td>0.25</td><td>0.20</td><td>0.20</td><td>0.15</td><td>0.20</td></tr><tr><td>65</td><td>1.30</td><td>0.80</td><td>0.70</td><td>0.60</td><td>0.50</td><td>0.30</td><td>0.25</td><td>0.25</td><td>0.20</td><td>0.25</td></tr><tr><td>76~90</td><td>1.50</td><td>1.00</td><td>0.80</td><td>0.70</td><td>0.60</td><td>0.40</td><td>0.30</td><td>0.25</td><td>0.20</td><td>0.25</td></tr></table>		WV(V) ΦD	10	16	25	35	50	63	80	100	160~250	350~450	35	0.75	0.60	0.40	0.30	0.25	0.20	0.20	0.15	0.15	0.20	51	1.00	0.70	0.50	0.50	0.30	0.25	0.20	0.20	0.15	0.20	65	1.30	0.80	0.70	0.60	0.50	0.30	0.25	0.25	0.20	0.25	76~90	1.50	1.00	0.80	0.70	0.60	0.40	0.30	0.25	0.20	0.25
WV(V) ΦD	10	16	25	35	50	63	80	100	160~250	350~450																																															
35	0.75	0.60	0.40	0.30	0.25	0.20	0.20	0.15	0.15	0.20																																															
51	1.00	0.70	0.50	0.50	0.30	0.25	0.20	0.20	0.15	0.20																																															
65	1.30	0.80	0.70	0.60	0.50	0.30	0.25	0.25	0.20	0.25																																															
76~90	1.50	1.00	0.80	0.70	0.60	0.40	0.30	0.25	0.20	0.25																																															

浪涌电压 Surge Test	<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>80</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</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>100</td><td>125</td><td>200</td><td>250</td><td>300</td><td>400</td><td>450</td><td>500</td></tr></table>															额定工作电压(V) Rated working voltage	10	16	25	35	50	63	80	100	160	200	250	350	400	450	浪涌电压(V) Surge voltage	13	20	32	44	63	79	100	125	200	250	300	400	450	500																							
	额定工作电压(V) Rated working voltage	10	16	25	35	50	63	80	100	160	200	250	350	400	450																																																					
	浪涌电压(V) Surge voltage	13	20	32	44	63	79	100	125	200	250	300	400	450	500																																																					
	施加表中所列浪涌电压，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℃																																																																			
	试验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 listed in the table above,1000 times of charging for 30 ± 5 s, 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.																																																																			
	电容量变化率:±20%初始测量值以内																																																																			
	Capacitance change: ±20% initial measured value																																																																			
	损耗角正切值≤200%初始规定值																																																																			
Dissipation factor: ≤200% initial specified value																																																																				
漏电流: ≤初始规定值																																																																				
Leakage current: ≤initial specified value																																																																				
低温特性 Low Temperature Characteristic	<table><tr><td colspan="5">额定工作电压(V) Rated working voltage</td><td colspan="5">10~100</td><td colspan="5">160~250</td><td colspan="5">350~450</td></tr><tr><td colspan="2" rowspan="2">阻抗比(120Hz) Impedance Ratio</td><td colspan="3">z-25℃/z+20℃</td><td colspan="5">4</td><td colspan="5">5</td><td colspan="5">9</td></tr><tr><td colspan="3">z-40℃/z+20℃</td><td colspan="5">12</td><td colspan="5">-----</td></tr></table>															额定工作电压(V) Rated working voltage					10~100					160~250					350~450					阻抗比(120Hz) Impedance Ratio		z-25℃/z+20℃			4					5					9					z-40℃/z+20℃			12					-----				
	额定工作电压(V) Rated working voltage					10~100					160~250					350~450																																																				
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z-40℃/z+20℃			12					-----																																																												
高温负荷特性 Load Life	在+105℃环境中施加额定工作电压和最大允许纹波电流 3000 小时后，电容器的性能符合下面要求：																																																																			
	After application of rated working voltage with max permissible ripple current specified at+105℃ for 3000 hours, capacitors meet the characteristics requirements measured at+20℃ listed at below:																																																																			
	电容量变化率:±20%初始测量值以内																																																																			
	Capacitance change : Within ±20% of initial measured value																																																																			
	损耗角正切值≤200%初始规定值																																																																			
高温贮存特性 Shelf Life	Dissipation factor: ≤200% initial specified value																																																																			
	漏电流: ≤初始规定值																																																																			
	Leakage current: ≤initial specified value																																																																			
	在+105℃环境中，无负荷放置 1000 小时后待温度恢复到 20℃，进行试验前处理（施加额定直流电压 60 分钟，并在室温下放置超过 24 小时）后进行测量时，应满足以下要求：																																																																			
	The following specifications shall be satisfied when the capacitors are restored to20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying rated working voltage for 60min.																																																																			
外观：无异状																																																																				
Appearance: No remarkable abnormality																																																																				
容量变化：在初始值±20%范围内																																																																				
Capacitance change: Within ±20% of the initial value.																																																																				

	损失角正切值: $\leq 200\%$ 规定值 Dissipation factor: $\leq 200\%$ specified value 漏电流: $\leq 200\%$ 规定值 Leakage current: $\leq 200\%$ specified value
稳态湿热 Resistance to Damp Heat (Steady State)	试验温湿度: $40 \pm 2^\circ\text{C}$ , 90~95%RH 试验时间: $500 \pm 8\text{h}$ 试验后, 电容器在标准大气条件下 2 小时, 然后测试参数 Test temperature and humidity: $40 \pm 2^\circ\text{C}$ , 90~95%RH Test time: $500 \pm 8\text{h}$ After completion of test, the capacitor shall be subjected to standard atmospheric conditions for 2 hours, after which measurements shall be made. 外观: 无异状 Appearance: No remarkable abnormality 容量变化: 在初始值 $\pm 10\%$ 范围内 Capacitance change: Within $\pm 10\%$ of the initial value. 损失角正切值: 不大于规定值 Dissipation factor: $\leq$ specified value 漏电流: 不大于规定值 Leakage current: $\leq$ specified value
防爆试验 Safety vent	在电容器两极施加反向直流电压, 其中通过的电流为: $\leq \phi 22$ 逆向电流 1A, $> \phi 22$ 逆向电流 10A Apply a reverse DC voltage to the two poles of the capacitor, where the current passing through is: $\leq \phi 22$ Inverse current 1A, $> \phi 22$ Inverse current 10A 防爆阀动作时: 应无引线、铝箔等散射, 无火花产生 When the vent operated, the capacitor shall not flame although gas discharge or expulsion of a part of the inside element is allowable. 如果防爆阀 30 分钟内动作, 则认为产品合格 If the vent does work with the voltage applied for 30 minutes, the test is considered to be passed.
低温放置 Low-temperature Storage Test	在 $-25 \pm 2^\circ\text{C}$ 环境下无负荷贮存 16 小时, 至少恢复 16 小时, 试验后检查外观, 测量电参数 The capacitors are stored with no voltage applied at a temperature of $-25 \pm 2^\circ\text{C}$ for 16 hours. Then it resumed 16 hours and measurements shall be made. 外观: 无异状 Appearance: No remarkable abnormality 容量变化: 在初始值 $\pm 10\%$ 范围内 Capacitance change: Within $\pm 10\%$ of the initial value. 损失角正切值: 不大于规定值 Dissipation factor: $\leq$ specified value 漏电流: 不大于规定值 Leakage current: $\leq$ specified value

耐溶剂性 Resistance to Solvents	溶剂: 异丙醇 温度: 20°C~25°C; 时间: 30±5S Solvent: Isopropylalcohol Temperature: 20°C~25°C Time: 30±5S  外观: 无异状 Appearance: No remarkable abnormality
振动试验 Resistance to Vibration	在 3 个互相垂直的方向分别施加 2 小时振动, 共 6 小时。 频率: 10-55Hz 振幅峰-峰值: 1.5mm. 振速: 1 分钟内振速 10~55~10Hz Direction and duration of vibration: 3 orthogonal directions mutually each for 2h, Total 6h. Vibration frequency range: 10-55Hz. Peak to peak amplitude: 1.5mm Sweep rate: 10 to 55 to 10Hz in about 1 min.  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

### ◆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

Frequency(Hz)		50(60)	100(120)	400	1K	≥10K
Coefficient	10~100WV	0.95	1.00	1.04	1.10	1.15
	160~250WV	0.90	1.00	1.08	1.15	1.20
	350~450WV	0.80	1.00	1.18	1.35	1.40

\*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(uF)	尺寸 ΦD×L(mm)	额定纹波电流
			(A rms/105°C/120Hz)
10	47000	35×80	6.6
	56000	35×80	7.5
	68000	35×100	7.6
	82000	35×120	9.0
	100000	51×80	10.2
	120000	51×80	11.0

Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(uF)	尺寸 ΦD×L(mm)	额定纹波电流
			(A rms/105°C/120Hz)
	150000	51×100	13.4
	180000	51×120	14.0
	220000	65×100	14.5
	270000	65×120	16.0
	330000	76×100	18.0
	390000	76×100	19.5
	470000	76×120	20.0
	560000	76×140	24.1
	680000	90×140	26.5
16	39000	35×80	5.3
	47000	35×80	6.4
	56000	35×100	7.6
	68000	35×100	8.5
	82000	35×120	9.5
	100000	51×80	10.4
	120000	51×100	11.8
	150000	51×100	12.4
	180000	51×120	13.5
	220000	65×100	16.2
	270000	65×120	18.0
	330000	76×100	19.5
	390000	76×120	25.3
	470000	76×140	26.2
	560000	76×150	27.6
	680000	90×140	29.9
25	22000	35×80	5.3
	27000	35×80	6.0
	33000	35×100	6.9
	39000	35×100	7.9
	47000	35×120	9.0
	56000	51×80	10.5
	68000	51×100	11.7
	82000	51×100	13.0
	100000	51×120	13.5
	120000	65×100	14.7
	150000	65×120	15.4
	180000	76×100	16.7
	220000	76×120	19.5

Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(uF)	尺寸 ΦD×L(mm)	额定纹波电流
			(A rms/105°C/120Hz)
	270000	76×140	22.3
	330000	76×150	26.0
	390000	90×140	27.2
35	15000	35×80	5.2
	18000	35×80	6.2
	22000	35×100	6.7
	27000	35×120	7.0
	33000	51×80	8.0
	39000	51×100	9.0
	47000	51×100	10.0
	56000	51×120	11.2
	68000	65×100	12.3
	82000	65×120	13.5
	100000	76×100	15.5
	120000	76×100	16.3
	150000	76×120	17.9
	180000	76×140	20.0
	220000	76×150	24.1
	270000	90×140	26.5
50	10000	35×80	4.8
	12000	35×80	5.3
	15000	35×100	5.5
	18000	35×100	5.7
	22000	35×120	7.5
	27000	51×80	7.5
	33000	51×100	9.3
	39000	51×100	9.4
	47000	51×120	11.7
	56000	65×100	12.4
	68000	65×120	15.1
	82000	76×100	15.5
	100000	76×100	16.3
	120000	76×120	19.1
	150000	76×140	23.4
	180000	90×140	23.7
63	8200	35×80	4.3
	10000	35×80	5.1
	12000	35×100	5.8

Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(uF)	尺寸 ΦD×L(mm)	额定纹波电流
			(A rms/105°C/120Hz)
	15000	35×120	6.9
	18000	51×80	7.8
	22000	51×80	8.1
	27000	51×100	9.3
	33000	51×120	11.2
	39000	65×100	12.2
	47000	65×120	13.5
	56000	65×140	15.6
	68000	76×100	17.0
	82000	76×120	18.1
	100000	76×140	21.6
	120000	90×140	22.5
80	4700	35×80	3.7
	5600	35×80	4.1
	6800	35×80	4.4
	8200	35×100	5.3
	10000	35×120	5.9
	12000	51×80	7.2
	15000	51×80	7.6
	18000	51×100	7.7
	22000	51×120	9.0
	27000	65×100	10.1
	33000	65×120	11.6
	39000	65×140	13.5
	47000	76×100	15.8
	56000	76×120	17.0
	68000	76×140	20.4
	82000	76×150	21.5
	100000	90×140	22.5
100	3300	35×80	4.0
	3900	35×80	4.3
	4700	35×80	4.7
	5600	35×100	5.0
	6800	35×120	5.6
	8200	51×80	6.3
	10000	51×100	6.8
	12000	51×100	7.3
	15000	51×120	8.7



Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(uF)	尺寸 ΦD×L(mm)	额定纹波电流
			(A rms/105°C/120Hz)
	18000	65×100	9.0
	22000	65×120	10.4
	27000	65×140	12.2
	33000	76×120	14.2
	39000	76×140	16.6
	47000	76×140	18.4
	56000	90×140	19.3
	68000	90×140	20.2
160	1200	35×80	2.4
	1500	35×80	2.7
	1800	35×80	2.8
	2200	35×100	3.2
	2700	35×120	3.5
	3300	35×120	4.0
	3900	51×100	4.5
	4700	51×100	5.3
	5600	51×120	5.8
	6800	65×100	6.5
	8200	65×120	7.5
	10000	76×100	8.3
	12000	76×120	9.3
	15000	76×140	11.5
	18000	90×140	13.0
	22000	90×140	14.3
200	820	35×80	2.0
	1000	35×80	2.3
	1200	35×80	2.4
	1500	35×100	2.9
	1800	35×100	3.0
	2200	35×120	3.4
	2700	51×80	3.9
	3300	51×100	4.8
	3900	51×120	5.5
	4700	65×100	6.3
	5600	65×100	6.4
	6800	65×120	7.4
	8200	76×100	8.5
	10000	76×120	9.5

Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(uF)	尺寸 $\Phi D \times L$ (mm)	额定纹波电流
			(A rms/105°C/120Hz)
	12000	76×140	10.5
	15000	90×140	12.5
	18000	90×140	13.3
250	680	35×80	1.8
	820	35×80	2.0
	1000	35×100	2.4
	1200	35×100	2.5
	1500	35×120	3.0
	1800	35×120	3.1
	2200	51×120	3.9
	2700	51×120	4.6
	3300	65×100	5.3
	3900	65×120	5.6
	4700	65×120	6.4
	5600	76×100	6.6
	6800	76×120	7.6
	8200	76×140	8.6
	10000	90×140	9.9
	12000	90×140	10.8
350	390	35×80	1.5
	470	35×80	1.7
	560	35×100	1.8
	680	35×100	2.1
	820	35×120	2.4
	1000	51×100	2.7
	1200	51×100	3.2
	1500	51×120	3.5
	1800	65×100	3.9
	2200	65×120	4.6
	2700	76×100	5.0
	3300	76×120	5.5
	3900	76×140	6.1
	4700	76×140	6.8
	5600	76×140	7.5
400	390	35×80	1.5
	470	35×100	1.8
	560	35×100	1.9
	680	51×80	2.4

Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(uF)	尺寸 $\Phi D \times L$ (mm)	额定纹波电流
			(A rms/105°C/120Hz)
	820	51×100	2.5
	1000	51×120	3.3
	1200	65×100	3.8
	1500	65×120	4.6
	1800	76×100	4.6
	2200	76×120	5.3
	2700	76×140	6.2
	3300	76×140	7.4
	3900	76×140	8.1
	4700	76×140	8.1
450	1500	65×100	3.8
	1800	65×120	4.8
	2200	76×100	5.1
	2700	76×120	5.5
	3300	76×140	6.5
	3900	76×140	6.7
	4700	76×140	7.2

### ◆包装 Packaging

直径 Diameter (mm)	泡沫卡直径 Foam card diameter (mm)	高度 Height (mm)	只/每盒 Pcs/box	塑料袋尺寸 Plastic bag size (mm)	外箱尺寸 Outsize box size (mm)
Φ51	Φ56	80-100	16 只	185×180×0.07	V-3(395X390X165)
Φ51	Φ56	110-130	16 只	250×200×0.07	V-2(395X390X195)
Φ51	Φ56	140-150	16 只	250×200×0.07	V-0(395X390X210)
Φ65	Φ70	80-100	16 只	185×180×0.07	V-3(395X390X165)
Φ65	Φ70	110-130	16 只	250×200×0.07	V-2(395X390X195)
Φ65	Φ70	140-150	16 只	250×200×0.07	V-0(395X390X210)
Φ76	Φ83	80-100	16 只	185×180×0.07	V-3(395X390X165)
Φ76	Φ83	110-130	16 只	250×200×0.07	V-2(395X390X195)
Φ76	Φ83	140-150	16 只	250×200×0.07	V-0(395X390X210)
Φ90	Φ97	80-100	9 只	185×180×0.07	V-3(395X390X165)
Φ90	Φ97	110-130	9 只	250×200×0.07	V-2(395X390X195)
Φ90	Φ97	140-150	9 只	250×200×0.07	V-0(395X390X210)

### ◆贮存方法 Storage Methods

- \* 请保管在室温  $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$ ，湿度 75%RH 以下的环境
- \* (1) 产品储存期限： $\leq 12$  个月；Storage life:  $\leq 12$  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:  $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$ , Ambient humidity: Less than 75% RH.

- \* (1) Storage life:  $\leq 12$  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 higher leakage current increase. Please take caution when selecting the storage location. The leakage decrease gradually as voltage is applied to the capacitor. The capacitor is subjected to aging before using, leakage may cause problems in the circuit.
- \* (7) Avoid storing the capacitors under such circumstances:
  - ① Environment of water splashing, high temperature, high humidity and dewing;
  - ② The environment that splashes oil, or is filled with gas oil;
  - ③ With 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

- \* (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，其电气特性将在短小时内劣化直至损坏。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°C 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、温度过高而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) When reverse voltage is applied on DC electrolytic capacitor, the capacitor will become short-circuited please use non-polarized capacitors in the circuit or the capacitor will be damage due to abnormal current flows through the capacitors since the circuit where the positive voltage may be applied to the cathode terminal.
- (2) 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) 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) Increased leakage current is common in aluminum capacitors which have been stored for long period of time. The Higher the storage temperature, the higher the leakage current increase, therefore please take precautions concerning the storage location. The leakage current decreases gradually as voltage is applied to the capacitor. In cases where increased leakage current causes problems in the circuit, apply voltage (aging) before using.
- (5) 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.
- (6) Its ambient temperature closely affects the life of an aluminum electrolytic capacitor. It is generally stated, that life doubles for each 10°C decrease in temperature.
- (7) 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.
- (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.

#### ◆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.