

■ LCL 系列铝电解电容器

LCL Series Aluminum Electrolytic Capacitor

◆特征

Feature

*长寿命、高可靠性: 105℃5000 小时

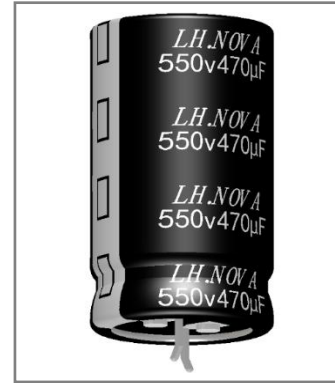
Longer life and High reliability: 105℃5000 hours.

* 耐大纹波电流

High ripple current

* 符合 RoHS

Compliant to the RoHS Directive



◆应用 Application

* 适用于高级电源设备、变频器等其他高可靠电子产品

Ideally suited for high professional power supply unit, frequency converters and other electronic products.

◆型号表示法 Part Number

8	122	VB	M	A050	CL	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	MD	250	2530	Φ25x30	N	LH.NOVA	1	105℃	0	散装品 Bulk
		MF	350	3030	Φ30x30						
		VA	400	A050	Φ35x50						
		VB	450	A060	Φ35x60						
		VC	500								
		VF	550								
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		
271	270uF	K	±10%	CL	LCL	0	黑色 Black	1	正常品		
471	470uF	V	± ²⁰ ₁₀ %					E	长焊针品		
561	560uF	M	±20%					F	短焊针品		
680	680uF	A	特殊								
821	820uF										
102	1000uF										

◆主要特性表
Main specifications

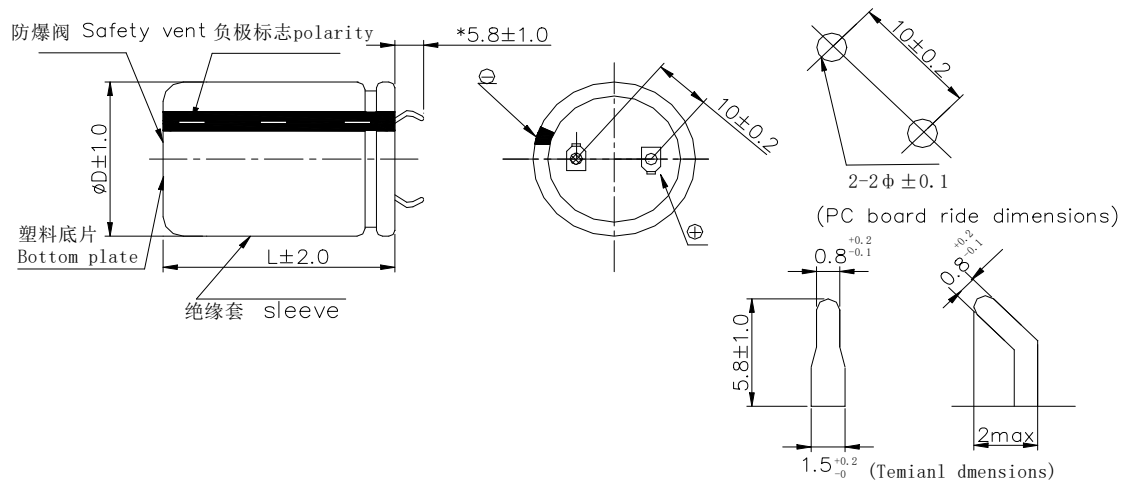
项目 Item	主要特性 Performance Characteristics			
额定工作电压范围 Rated Voltage Range	250~550V.DC			
使用温度范围 Operating Temperature Range	250~300V.DC : -40℃~+105℃ 315~550V.DC : -25℃~+105℃			
标称静电容量范围 Nominal Capacitance Range	220~1800μF			
静电容量允许偏差 Capacitance Tolerance	±20% (M, +20℃, 120Hz)			
漏电流 Leakage Current (20℃)	额定工作电压(V) Rated working voltage		250~550	
	漏电流 Leakage current		5 分钟后 $I \leq 3 \sqrt{CV}$ (μA) After 5 min. $I \leq 3 \sqrt{CV}$ (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	250~420	450~500	550
	DF(MAX) (20℃, 120Hz)	0.15	0.20	0.25

高低温特性 Characteristic at high and low temperature	电容器根据下表的次序处理				
	The capacitor shall be subjected in turn to the procedures specified below.				
	阶段 Step		温度 Temperature	时间 Time	
	1		20±2℃	热平衡状态	
	2		-40(-25)℃	*2 hours	
	3		20±2℃	热平衡状态	
	4		105℃	*2 hours	
	5		20±2℃	热平衡状态	
	* 电容器放置在每一温度下，待阻抗或电容量稳定后方可测试。				
	* The capacitor should be stored at each temperature until measured impedance or capacitance are stabilized .				
	阶段 2 Step 2	阻抗比（对阶段 2） Impedance ratio	见阻抗特性 refer to Impedance Stability		
	阶段 4 Step 4	静电容量变化率（对阶段 4） Change in capacitance	-20～+20% within -20～+20% of step 1		
		漏电流 Leakage Current	规定值 5 倍以下 Less than 500% of the specified value		
	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。 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。 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.					
阻抗特性 Impedance Stability					
	额定工作电压(V) Rated working voltage		160~250	315~420	450~550
	阻抗比(120Hz)	z-25℃/z+20℃	4	7	10
	Impedance Ratio	z-40℃/z+20℃	8	12	-

高温负荷特性 Load life	在 $105\pm 2^{\circ}\text{C}$ 环境中施加额定工作电压和最大允许纹波电流 5000 小时后,在标准大气条件下放置 16 小时后测试, 然后测试参数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 $+105\pm 2^{\circ}\text{C}$ for 5000 hours, It shall be subjected to standard atmospheric for 16 hours, after which measurement shall be made. 1、电容量变化率: $\pm 20\%$ 初始测量值以内 Capacitance change : $\pm 20\%$ initial measured value 2、漏电流: $\leq$ 初始规定值 Leakage current: $\leq$ initial specified value 3、损耗角正切值 $\leq 200\%$ 初始规定值 Dissipation factor: $\leq 200\%$ initial specified value 4.外观: (1) 无可见损伤和无电解质漏出 No remarkable damage and electrolyte leakage (2) 底部允许轻微鼓起 Bottom allowed slightly plumped <table border="1" data-bbox="518 869 898 1037"> <thead> <tr> <th>壳号 Size</th><th>判定基准 Criterion</th></tr> </thead> <tbody> <tr> <td>$< \phi 25$</td><td>$\leq 1.0\text{mm}$</td></tr> <tr> <td>$\phi 25\sim 30$</td><td>$\leq 1.5\text{mm}$</td></tr> <tr> <td>$\geq \phi 35$</td><td>$\leq 2.0\text{mm}$</td></tr> </tbody> </table>	壳号 Size	判定基准 Criterion	$< \phi 25$	$\leq 1.0\text{mm}$	$\phi 25\sim 30$	$\leq 1.5\text{mm}$	$\geq \phi 35$	$\leq 2.0\text{mm}$
壳号 Size	判定基准 Criterion								
$< \phi 25$	$\leq 1.0\text{mm}$								
$\phi 25\sim 30$	$\leq 1.5\text{mm}$								
$\geq \phi 35$	$\leq 2.0\text{mm}$								
高温贮存特性 Shelf life	在 $105\pm 2^{\circ}\text{C}$ 环境无负荷放置 1000 小时后, 根据 JIS-C-5101-4, 加额定电压 30min, 常温放置 24~48 后测试, 电容器的性能符合下面要求: After leaving capacitors under no load at $+105^{\circ}\text{C}$ for 1000 hours, According to JIS-C-5101-4, apply the rated DC voltage for 30 minutes and store the capacitors under room temperature for 24-48 hours. The capacitors meet the characteristics listed as below: 1、电容量变化率: $\pm 20\%$ 初始测量值以内 Capacitance change : $\pm 20\%$ initial measured value 2、漏电流: $\leq 200\%$ 初始规定值 Leakage current: $\leq 200\%$ initial specified value 3、损耗角正切值 $\leq 200\%$ 初始规定值 Dissipation factor: $\leq 200\%$ initial specified value								

◆产品结构

Product Structure



◆尺寸表、允许纹波、纹波电流频率因子、温度因子

Dimensions and ripple current, frequency coefficient and temperature coefficient.

纹波电流频率因子

Ripple current frequency coefficient

频率 Frequency(Hz)		50(60)	120	300	1K	10K	>50K
系数 Factor	160~250WV	0.80	1.00	1.17	1.32	1.45	1.50
	315~550WV	0.80	1.00	1.16	1.30	1.41	1.43

温度因子

Temperature Coefficients

温度 Temperature (°C)	+40	+55	+70	+85	+105
系数 Factor	3.0	2.8	2.5	2.0	1.0

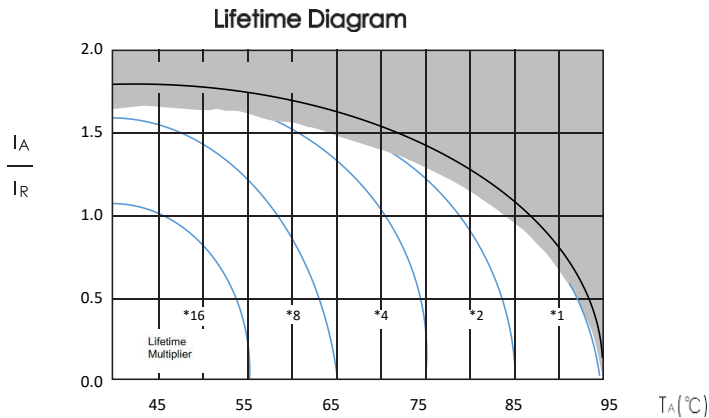
尺寸表与允许纹波电流

Dimensions and ripple current

Rated voltage	Rated capacitance	Case size	Rated ripple current
额定电压(V)	标称容量(μ F)	尺寸 D×L(mm)	额定纹波电流
			(A rms/105°C/120Hz)
250	470	$\phi 25 \times 30$	1.850
250	1000	$\phi 35 \times 40$	3.100
315	680	$\phi 30 \times 40$	2.530
315	1000	$\phi 35 \times 50$	3.159

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
			(A rms/105°C/120Hz)
315	1200	φ35X50	3.475
315	1500	φ35X60	4.185
315	1800	φ35X60	4.970
400	680	φ35X60	2.800
400	1000	φ35X60	3.489
400	1200	φ35X65	4.175
450	220	φ22X45	1.353
450	220	φ30X30	1.400
450	220	φ30X35	1.490
450	270	φ30X35	1.480
450	330	φ30X35	1.627
450	390	φ35X35	1.740
450	470	φ30X45	1.920
450	470	φ35X35	1.895
450	470	φ35X50	2.200
450	560	φ30X45	2.118
450	680	φ35X50	2.600
450	820	φ35X60	3.040
450	1200	φ35X80	3.500
500	270	φ25X50	1.480

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
			(A rms/105°C/120Hz)
500	330	φ30X45	1.605
500	330	φ30X50	1.680
500	390	φ35X50	1.890
500	470	φ35X50	2.000
500	470	φ35X60	2.160
500	680	φ35X60	2.242
500	820	φ35X70	2.636
525	270	φ25X55	1.286
550	220	φ30X50	1.321
550	270	φ35X45	1.425
550	330	φ35X55	1.610
550	390	φ35X60	1.840
550	560	φ35X75	2.494
550	680	φ35X80	2.540

◆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，85°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

产品尺寸	纸盒	隔条	数量只/盒	外箱	盒/箱	数量/箱
Φ22*25-30	D25-43:0BZD2543-H6H	F204:0BZF204-H8H	108	B-8	10	1080
Φ22*35-40	D25-53:0BZD2553-H6H	F205:0BZF205-H8H		B-8	8	864
Φ22*45-50	D25-63:0BZD2563-H6H	F206:0BZF206-H8H		B-9	6	648
Φ25*25-30	D25-43:0BZD2543-H6H	F204:0BZF204-H8H	88	B-8	10	880
Φ25*35-40	D25-53:0BZD2553-H6H	F205:0BZF205-H8H		B-8	8	704
Φ25*45-50	D25-63:0BZD2563-H6H	F206:0BZF206-H8H		B-9	6	528
Φ25*55-60	D25-76:0BZD2576-H6H	F207:0BZF207-H8H		B-8	6	528
Φ25*65-70	D25-83:0BZD2583-H6H	F208:0BZF208-H8H		B-9	4	352
Φ25*75-80	D25-93:0BZD2593-H6H	F209:0BZF209-H8H		B-9	4	352
Φ25*85-90	D25-03:0BZD2503-H6H	F210:0BZF210-H8H		B-8	4	352
Φ30*25-30	D35-43:0BZD3543-H6H	F214:0BZF214-H8H	63	B-6	10	630
Φ30*35-40	D35-53:0BZD3553-H6H	F215:0BZF215-H8H		B-6	8	504
Φ30*45-50	D35-63:0BZD3563-H6H	F216:0BZF216-H8H		B-7	6	378
Φ30*55-60	D35-76:0BZD3576-H6H	F217:0BZF217-H8H		B-6	6	378
Φ30*65-70	D35-83:0BZD3583-H6H	F218:0BZF218-H8H		B-7	4	252
Φ30*75-80	D35-93:0BZD3593-H6H	F219:0BZF219-H8H		B-7	4	252
Φ30*85-90	D35-03:0BZD3503-H6H	F220:0BZF220-H8H		B-6	4	252
Φ35*25-30	D35-43:0BZD3543-H6H	F214:0BZF214-H8H	48	B-6	10	480
Φ35*35-40	D35-53:0BZD3553-H6H	F215:0BZF215-H8H		B-6	8	384
Φ35*45-50	D35-63:0BZD3563-H6H	F216:0BZF216-H8H		B-7	6	288
Φ35*55-60	D35-76:0BZD3576-H6H	F217:0BZF217-H8H		B-6	6	288
Φ35*65-70	D35-83:0BZD3583-H6H	F218:0BZF218-H8H		B-7	4	192
Φ35*75-80	D35-93:0BZD3593-H6H	F219:0BZF219-H8H		B-7	4	192
Φ35*85-90	D35-03:0BZD3503-H6H	F220:0BZF220-H8H		B-6	4	192

◆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 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, 其电气特性将在短时期内劣化直至损坏。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.

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

*波峰焊接条件

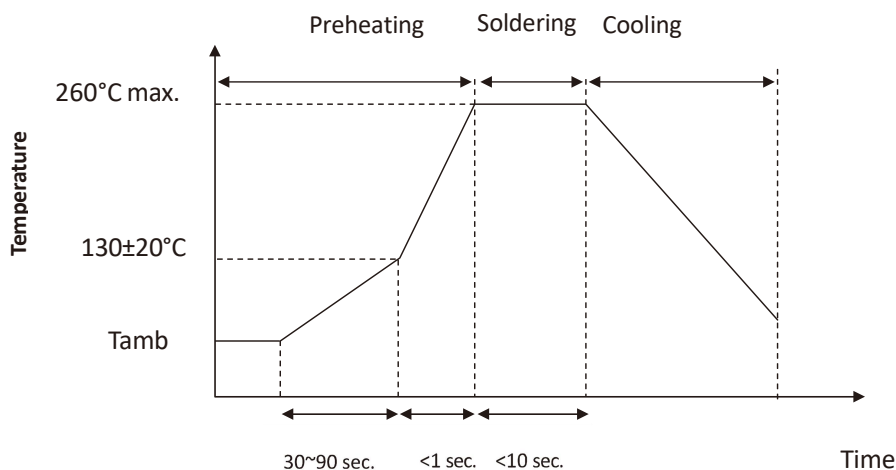
预热: 105°C

波峰焊: 260±5°C 10±1 秒以下 (或 380±10°C 3±0.5 秒以下: 手焊)

*Wave Soldering Conditions

Preheating: 105°C

Wave Soldering: 260±5°C for ≤10±1 seconds (or 380±10°C for ≤3±0.5 seconds for manual soldering)



◆其它说明 Others

*本产品不含铅、镉等元素

This product does not include Plumbum or Cadmium.

■修订履历 Revision History

版本 Version	日期 Date	修订内容 Revision Content	修订人 Reviser
QWH-24. 002	2024 年 7 月 30 日	全文格式修改	郭嘉敏
QWH-25. 001	2025 年 6 月 02 日	增加推荐安装方法	黄晓纯
QWH-26. 001	2026 年 8 月 28 日	增删部分规格产品	唐娜

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