



# 承 认 书

## PRODUCT SPECIFICATION

客户

CUSTOMER: Lomex

品名

DESCRIPTION: 铝电解电容(E-CAP)

系列

SERIES : (LE) 系列

规格

ITEM : 1500 $\mu$ F 6.3 V (  $\Phi$  8 X 16 )

物料编号

Customer P/NO: \_\_\_\_\_

风华编码

FENGHUA P/NO: 8152LAM0816LEN91E0

日期

DATE : 2023.11.14

APPROVED BY

Please Return One Copy with Your Approval  
承认后请寄回一份

|                   |                  |                                                                                      |
|-------------------|------------------|--------------------------------------------------------------------------------------|
| 拟制<br>Prepared By | 审核<br>Checked By | 批准<br>Approved By                                                                    |
| 郭嘉敏               | 袁智城              |  |

广东风华高新科技股份有限公司 Guangdong FengHua Advanced Technology Holding  
CO.,LTD.

地址: 广东省肇庆市端州区风华路 18 号风华电子工业园

电话/传真: 0758-2865650

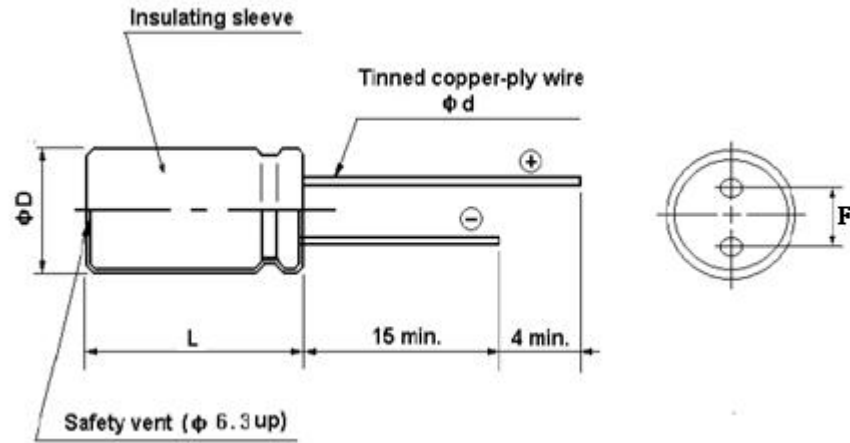
邮箱: Lhservice@china-fenghua.com

网址: <http://www.china-fenghua.com/>



修改记录

| 生效版本<br>REV. NO. | 更改原因<br>REASON | 更改内容<br>CONTENTS | 修订人<br>REVISER | 生效日期<br>EFFECTIVE<br>DATE |
|------------------|----------------|------------------|----------------|---------------------------|
| QWH-23.002       | 新建 New         | 新建 New           | 郭嘉敏            | 2023.11.14                |
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FIG

| No. | Customer<br>Part No. | FengHua<br>Part No. | List                              |                                  |                                             |                                                             |                                                   |                                             |                                     |                                  | Dimensions                                          |           |           |           |
|-----|----------------------|---------------------|-----------------------------------|----------------------------------|---------------------------------------------|-------------------------------------------------------------|---------------------------------------------------|---------------------------------------------|-------------------------------------|----------------------------------|-----------------------------------------------------|-----------|-----------|-----------|
|     |                      |                     | Specification<br>( $\mu$ F) (Vdc) | Tan $\delta$<br>(120Hz)<br>(Max) | Leakage<br>Current<br>( $\mu$ A)<br>(2 min) | Max<br>Ripple<br>Current<br>(mArms)<br>At 105°C<br>(100KHz) | Impedance<br>( $\Omega$ )Max<br>at 20°C<br>100kHz | Tolerance<br>on Rated<br>Capacitance<br>(%) | Operating<br>Temp.<br>Range<br>(°C) | Endurance<br>at 105°C<br>(Hours) | $\Phi$ D                                            | L         | d         | F         |
|     |                      |                     |                                   |                                  |                                             |                                                             |                                                   |                                             |                                     |                                  | ( $\leq \Phi 8 \pm 0.5$ )<br>( $> \Phi 8 \pm 1.0$ ) | $\pm 2.0$ | $\pm 0.1$ | $\pm 0.5$ |
| 1   | --                   | 8152LAM0816LEN91E0  | 1500uF/ 6.3V                      | 0.18                             | 94.5                                        | 900                                                         | 0.087                                             | -20~+20                                     | -40~+105                            | 3000                             | 8                                                   | 16        | 0.6       | 3.5       |



## 1. 概述 SCOPE

### 1.1 概述 SCOPE

本承认书规定了铝电解电容器的技术规范。

This specification contains descriptions of the quality of aluminum electrolytic capacitors.

### 1.2 参考标准 APPLICABLE SPECIFICATION

本承认书参考 JISC-5141 和 JISC-5102 制定。

This specification is made based on the Japanese Industrial Standard JISC-5141 Characteristics and JIS C-5102.

### 1.3 工作温度范围 OPERATING TEMPERATURE RANGE

工作温度范围是电容器在施加额定工作电压条件下，可以长期可靠工作的环境温度范围。

Operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage.

### 1.4 测试环境 CONDITION OF TEST

如果没有其他规定，标准的测试、检验环境条件如下所示：

环境温度：15℃~35℃

相对湿度：45%~75%

大气压力：86kPa~106kPa

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows:

Ambient temperature : 15℃ to 35℃

Relative humidity : 45% to 75%

Air pressure: 86kPa to 106kPa

如果对测试结果有异议，可以在以下条件测试：

环境温度：20±1℃

相对湿度：50%~60%

大气压力：86kPa~106kPa.

If there may be doubt on the results, measurements shall be made within the following limits:

Ambient temperature : 20±1℃

Relative humidity : 50% to 60%

Air pressure : 86kPa to 106kPa



## 2. 产品特性 PRODUCT CHARACTERISTICS

### 2.1 电气特性 Electrical Characteristics

| No.                                | 项目 Item                                                                                                                          | 测试方法和验收要求 Test method and Acceptance requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |         |         |                        |                                                                                                                                  |                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------|---------|------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 2.1.1                              | 额定工作电压<br>Rated Voltage                                                                                                          | 电压: 直流电压值+交流电压峰值 $\leq$ 额定电压<br>Voltage: DC voltage + peak ripple voltage $\leq$ Rated voltage<br><br>详见第 3 页 List<br>See list on page 3 for List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |         |         |                        |                                                                                                                                  |                                                                                        |
| 2.1.2                              | 电容量<br>Capacitance                                                                                                               | 测试频率: 120Hz( $\pm 20\%$ )<br>测试电路: 串联等效<br>测试电压: 0.5Vrms 以下+1.5~ 2.0VDC<br>Measuring frequency: 120Hz $\pm 20\%$<br>Measuring circuit: Series equivalent circuit<br>Measuring voltage: 0.5Vrms or less +1.5 to 2.0 VDC<br><br>详见第 3 页 List<br>See list on page 3 for List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |         |         |                        |                                                                                                                                  |                                                                                        |
| 2.1.3                              | 损耗角正切值<br>Dissipation factor                                                                                                     | 测试频率: 120Hz<br>测试电路: 串联等效<br>测试电压: 0.5Vrms 以下+1.5~ 2.0VDC<br>Measuring frequency: 120Hz<br>Measuring circuit: Series equivalent circuit<br>Measuring voltage: 0.5Vrms or less +1.5 to 2.0 VDC<br><br>详见第 3 页 List<br>See list on page 3 for List                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |         |         |                        |                                                                                                                                  |                                                                                        |
| 2.1.4                              | 漏电流<br>Leakage current                                                                                                           | 在电容器两端施加额定工作电压, 并串联 1000 $\pm$ 100 $\Omega$ 电阻, 在施加规定时间电压后, 测量漏电流<br>The rated voltage shall be applied across the capacitor and its protective resistor shall be 1000 $\pm$ 100 $\Omega$ . The leakage current shall then be measured after an electrification period of schedule time<br><table><tr><td>额定工作电压(V)<br/>Rated working voltage</td><td>6.3~100</td><td>160~450</td></tr><tr><td>漏电流<br/>Leakage current</td><td>2 分钟后 <math>I \leq 0.01CV(\mu A)</math> 或 3(<math>\mu A</math>), 取最大值<br/>After 2 min . <math>I \leq 0.01CV(\mu A)</math> or 3(<math>\mu A</math>), Whichever is greater.</td><td>2 分钟后<br/><math>I \leq 0.03CV(\mu A)+25(\mu A)</math><br/>After 2min : <math>I \leq 0.03CV(\mu A)+25(A)</math></td></tr></table><br>C: 标称静电容容量 ( $\mu F$ )    Nominal Capacitance in $\mu F$<br>V: 额定工作电压 (V)        Rated working voltage in V | 额定工作电压(V)<br>Rated working voltage | 6.3~100 | 160~450 | 漏电流<br>Leakage current | 2 分钟后 $I \leq 0.01CV(\mu A)$ 或 3( $\mu A$ ), 取最大值<br>After 2 min . $I \leq 0.01CV(\mu A)$ or 3( $\mu A$ ), Whichever is greater. | 2 分钟后<br>$I \leq 0.03CV(\mu A)+25(\mu A)$<br>After 2min : $I \leq 0.03CV(\mu A)+25(A)$ |
| 额定工作电压(V)<br>Rated working voltage | 6.3~100                                                                                                                          | 160~450                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                    |         |         |                        |                                                                                                                                  |                                                                                        |
| 漏电流<br>Leakage current             | 2 分钟后 $I \leq 0.01CV(\mu A)$ 或 3( $\mu A$ ), 取最大值<br>After 2 min . $I \leq 0.01CV(\mu A)$ or 3( $\mu A$ ), Whichever is greater. | 2 分钟后<br>$I \leq 0.03CV(\mu A)+25(\mu A)$<br>After 2min : $I \leq 0.03CV(\mu A)+25(A)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                    |         |         |                        |                                                                                                                                  |                                                                                        |



|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------|---------|---------|---------|---------|---------------|------------|-----|-----|-------|-------|-----|---------------|----------------------------|---|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|
| 2.1.5                                                                                                                                         | 温度特性<br>Temperature<br>characteristic                                                                                                                                                                                                                                                                                                           | <table><tr><td>阶段</td><td>温度 temperature</td><td>时间 Time</td></tr><tr><td>1</td><td>20±2℃</td><td>--</td></tr><tr><td>2</td><td>-25℃， -40℃</td><td>2h</td></tr><tr><td>3</td><td>20±2℃</td><td>15min</td></tr><tr><td>4</td><td>105℃</td><td>2h</td></tr></table>                                                                                                                                                             | 阶段                                   | 温度 temperature | 时间 Time | 1       | 20±2℃   | --      | 2             | -25℃， -40℃ | 2h  | 3   | 20±2℃ | 15min | 4   | 105℃          | 2h                         |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 阶段                                                                                                                                                                                                                                                                                                                                                                                                                            | 温度 temperature                       | 时间 Time        |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                             | 20±2℃                                | --             |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 2                                                                                                                                                                                                                                                                                                                                                                                                                             | -25℃， -40℃                           | 2h             |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 3                                                                                                                                                                                                                                                                                                                                                                                                                             | 20±2℃                                | 15min          |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 4                                                                                                                                                                                                                                                                                                                                                                                                                             | 105℃                                 | 2h             |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 阶段 1：测量容量和阻抗 （ z  20℃ 120Hz±20%）；                                                                                                                                                                                                                                                                                                                                                                                             |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 阶段 2：电容器恒温贮存 2 小时，在热平衡状态测阻抗（ z - 25, -40℃ 120Hz±20%）；                                                                                                                                                                                                                                                                                                                                                                         |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 阶段 3：测量容量和阻抗 （ z  20℃ 120Hz±20%）；                                                                                                                                                                                                                                                                                                                                                                                             |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 阶段 4：电容器恒温 105℃贮存 2 小时，在热平衡状态测电容量。                                                                                                                                                                                                                                                                                                                                                                                            |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| Step 1: Capacitance and impedance shall be measured. ( z  20℃ 120Hz ± 20%);                                                                   |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| Step 2: After the capacitor being stored for 2 hours,impedance shall be measured at thermal stability. ( z -25℃， -40℃ 120Hz±20%);             |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| Step 3: Capacitance and impedance shall be measured. ( z  20℃ 120Hz ± 20%);                                                                   |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| Step 4: After the capacitor being stored for 105℃ 2 hours, capacitance shall be measured. The measurement shall be made at thermal stability. |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               | <table><tr><td>额定工作电压<br/>Rated working voltage(Vdc)</td><td>6.3</td><td>10</td><td>16</td><td>25~100</td><td>160~250</td><td>350~450</td></tr><tr><td> z -25℃/ z 20℃</td><td>4</td><td>3</td><td>2</td><td>2</td><td>3</td><td>6</td></tr><tr><td> z -40℃/ z 20℃</td><td>8</td><td>6</td><td>4</td><td>3</td><td>8</td><td>8</td></tr></table> | 额定工作电压<br>Rated working voltage(Vdc)                                                                                                                                                                                                                                                                                                                                                                                          | 6.3                                  | 10             | 16      | 25~100  | 160~250 | 350~450 | z -25℃/ z 20℃ | 4          | 3   | 2   | 2     | 3     | 6   | z -40℃/ z 20℃ | 8                          | 6 | 4  | 3  | 8  | 8  |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| 额定工作电压<br>Rated working voltage(Vdc)                                                                                                          | 6.3                                                                                                                                                                                                                                                                                                                                             | 10                                                                                                                                                                                                                                                                                                                                                                                                                            | 16                                   | 25~100         | 160~250 | 350~450 |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| z -25℃/ z 20℃                                                                                                                                 | 4                                                                                                                                                                                                                                                                                                                                               | 3                                                                                                                                                                                                                                                                                                                                                                                                                             | 2                                    | 2              | 3       | 6       |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| z -40℃/ z 20℃                                                                                                                                 | 8                                                                                                                                                                                                                                                                                                                                               | 6                                                                                                                                                                                                                                                                                                                                                                                                                             | 4                                    | 3              | 8       | 8       |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| 2.1.6                                                                                                                                         | 耐浪涌电压<br>Surge test                                                                                                                                                                                                                                                                                                                             | 施加下表所列浪涌电压，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℃，然后在标准大气条件下放置达到热稳定，测试参数。                                                                                                                                                                                                                                                                                                                                      |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 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.                                                                                                                       |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | <table><tr><td>额定工作电压<br/>Rated working voltage(Vdc)</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><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td></tr><tr><td>浪涌电压(Vdc)<br/>Surge voltage</td><td>8</td><td>13</td><td>20</td><td>32</td><td>44</td><td>63</td><td>79</td><td>125</td><td>184</td><td>250</td><td>300</td><td>400</td><td>450</td></tr></table> | 额定工作电压<br>Rated working voltage(Vdc) | 6.3            | 10      | 16      | 25      | 35      | 50            | 63         | 100 | 160 | 200   | 250   | 350 | 400           | 浪涌电压(Vdc)<br>Surge voltage | 8 | 13 | 20 | 32 | 44 | 63 | 79 | 125 | 184 | 250 | 300 | 400 | 450 |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 | 额定工作电压<br>Rated working voltage(Vdc)                                                                                                                                                                                                                                                                                                                                                                                          | 6.3                                  | 10             | 16      | 25      | 35      | 50      | 63            | 100        | 160 | 200 | 250   | 350   | 400 |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
| 浪涌电压(Vdc)<br>Surge voltage                                                                                                                    | 8                                                                                                                                                                                                                                                                                                                                               | 13                                                                                                                                                                                                                                                                                                                                                                                                                            | 20                                   | 32             | 44      | 63      | 79      | 125     | 184           | 250        | 300 | 400 | 450   |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                      |                |         |         |         |         |               |            |     |     |       |       |     |               |                            |   |    |    |    |    |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |



## 2.2 环境可靠性特性 Environmental reliability characteristics

| No.   | 项目 Item                   | 测试方法和验收要求 Test method and Acceptance requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |         |      |      |      |      |       |      |
|-------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------|------|------|------|------|-------|------|
| 2.2.1 | 高温负荷试验<br>Load life test  | <div><div><div>试验温度：105±2℃,施加额定电压和额定纹波电流</div><div>试验时间：见右表</div><div>Test temperature:105 ± 2 ℃ , Application of the rated voltage and the rated ripple current,</div><div>Testing time: See Table</div><div>外观：无异状</div><div>Appearance: No remarkable abnormality</div><div>容量变化：在初始值±25%范围内</div><div>Variation of capacitance: Within ±25% of the initial value.</div><div>损失角正切值：≤200%规定值</div><div>Dissipation factor: ≤200% specified value</div><div>漏电流：不大于初始规定值</div><div>Leakage current: ≤specified value</div></div><table><tr><th>φ D</th><th>Time(h)</th></tr><tr><td>≤6.3</td><td>2000</td></tr><tr><td>8,10</td><td>3000</td></tr><tr><td>≥12.5</td><td>5000</td></tr></table></div>                                                          | φ D | Time(h) | ≤6.3 | 2000 | 8,10 | 3000 | ≥12.5 | 5000 |
| φ D   | Time(h)                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |      |      |      |      |       |      |
| ≤6.3  | 2000                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |      |      |      |      |       |      |
| 8,10  | 3000                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |      |      |      |      |       |      |
| ≥12.5 | 5000                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |         |      |      |      |      |       |      |
| 2.2.2 | 高温贮存试验<br>Shelf life test | <div><div><div>试验温度：105±2℃ 环境下无负荷贮存</div><div>试验时间：1000 小时</div><div>Test temperature: without voltage load at 105±2℃</div><div>Test time : 1000h</div><div>外观：无异状</div><div>Appearance: No remarkable abnormality</div><div>容量变化：在初始值±20%范围内</div><div>Variation of capacitance: Within ±20% of the initial value.</div><div>损失角正切值：≤200%规定值</div><div>Dissipation factor: ≤200% specified value</div><div>漏电流：≤200%规定值</div><div>Leakage current: ≤200% specified value</div></div></div>                                                                                                                                                                                                                                                                     |     |         |      |      |      |      |       |      |
| 2.2.3 | 防爆试验<br>Safety vent       | <div><div><div>以下试验只适用于铝壳直径≥Φ8 产品。</div><div>The following tests only apply to those products with vent products at diameter ≥Φ8 with vent.</div><div>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。</div><div>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.</div><div>应无引线、铝箔等散射，无火花产生</div><div>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.</div></div></div> |     |         |      |      |      |      |       |      |



|       |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.2.4 | 耐焊接热<br>Resistance to soldering heat           | 焊锡温度: $260 \pm 5^{\circ}\text{C}$ , 浸入时间: $10 \pm 1$ 秒, 浸入深度: 1.6mm<br>Solder bath temperature: $260 \pm 5^{\circ}\text{C}$ , Immersion time: $10 \pm 1$ sec.<br>Immersion depth: 1.6mm<br><br>外观: 无异状<br>Appearance: No remarkable abnormality<br>容量变化: 在初始值 $\pm 10\%$ 范围内<br>Variation of capacitance: Within $\pm 10\%$ of the initial value.<br>损失角正切值: 不大于规定值<br>Dissipation factor: $\leq$ specified value<br>漏电流: 不大于规定值<br>Leakage current: $\leq$ specified value                                                                                                                                                                        |
| 2.2.5 | 稳态湿热<br>Resistance to damp heat (steady state) | 试验温湿度: $40 \pm 2^{\circ}\text{C}$ , 90~95%RH<br>试验时间: $240 \pm 8$ h<br>试验后, 电容器在标准大气条件下 2 小时, 然后测试参数<br>Test temperature and humidity: $40 \pm 2^{\circ}\text{C}$ , 90~95%RH<br>Test time: $240 \pm 8$ h<br>After completion of test, the capacitor shall be subjected to standard atmospheric conditions for 2 hours, after which measurements shall be made.<br><br>外观: 无异状<br>Appearance: No remarkable abnormality<br>容量变化: 在初始值 $\pm 10\%$ 范围内<br>Variation of capacitance: Within $\pm 10\%$ of the initial value.<br>损失角正切值: 不大于规定值<br>Dissipation factor: $\leq$ specified value<br>漏电流: 不大于规定值<br>Leakage current: $\leq$ specified value |

### 2.3 机械特性 Mechanical Performance

| No.   | 项目 Item              | 测试方法和验收要求 Test method and Acceptance requirements                                                                                                                                                                                                                                                                                                                                                                       |
|-------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.3.1 | 可焊性<br>Solderability | 焊锡温度: $235 \pm 5^{\circ}\text{C}$<br>浸入时间: $2 \pm 0.5$ 秒<br>Temperature of solder: $235 \pm 5^{\circ}\text{C}$<br>Dipping time: $2 \pm 0.5$ sec.<br>This specification shall be met after the capacitors are stored under standard atmospheric conditions for 6 months.<br><br>浸入焊锡的引线表面积约 90% 以上应附着新锡。<br>At least 90% of circumferential surface of the dipping portion of terminal shall be covered with new solder. |





|                                                                                                                                                                                                       |                                 |                                                                                                                                                                                                                                                                                  |             |      |      |      |      |      |      |   |   |    |    |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|------|------|------|------|------|---|---|----|----|----|
| 2.3.2                                                                                                                                                                                                 | 端子强度<br>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 <math>\phi</math></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>                                                                              | 引线直径 $\phi$ | 0.45 | 0.50 | 0.60 | 0.80 | 1.00 | 拉力 N | 5 | 5 | 10 | 10 | 20 |
|                                                                                                                                                                                                       |                                 | 引线直径 $\phi$                                                                                                                                                                                                                                                                      | 0.45        | 0.50 | 0.60 | 0.80 | 1.00 |      |      |   |   |    |    |    |
|                                                                                                                                                                                                       |                                 | 拉力 N                                                                                                                                                                                                                                                                             | 5           | 5    | 10   | 10   | 20   |      |      |   |   |    |    |    |
|                                                                                                                                                                                                       |                                 | Tensile strength of terminal: A static 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 <math>\phi</math></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> | 引线直径 $\phi$                     | 0.45                                                                                                                                                                                                                                                                             | 0.50        | 0.60 | 0.80 | 1.00 | 拉力 N | 2.5  | 2.5  | 5 | 2 | 10 |    |    |
| 引线直径 $\phi$                                                                                                                                                                                           | 0.45                            | 0.50                                                                                                                                                                                                                                                                             | 0.60        | 0.80 | 1.00 |      |      |      |      |   |   |    |    |    |
| 拉力 N                                                                                                                                                                                                  | 2.5                             | 2.5                                                                                                                                                                                                                                                                              | 5           | 2    | 10   |      |      |      |      |   |   |    |    |    |
| 2.3.3                                                                                                                                                                                                 | 振动试验<br>Resistance to vibration | 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<br>Appearance: no visible mechanical damage<br>电容器应无接触不良开路或短路<br>The capacitor shall be no intermittent contacts, or open or short circuiting                                                                                                                         |             |      |      |      |      |      |      |   |   |    |    |    |
|                                                                                                                                                                                                       |                                 | 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<br>振幅峰-峰值：1.5mm.<br>振速：1 分钟内振速 10~55~10Hz<br>Direction and duration of vibration:<br>3 orthogonal directions mutually each for 2h , Total 6h.<br>Vibration frequency range :10-55Hz.<br>Peak to peak amplitude: 1.5mm<br>Sweep rate :10 to 55 to 10Hz in about 1 min. |             |      |      |      |      |      |      |   |   |    |    |    |
|                                                                                                                                                                                                       |                                 | 外观：无可见机械损伤<br>Appearance: no visible mechanical damage<br>电容器应无接触不良开路或短路<br>The capacitor shall be no intermittent contacts, or open or short circuiting                                                                                                                         |             |      |      |      |      |      |      |   |   |    |    |    |

### 3. 纹波电流频率因子 RIPPLE CURRENT FREQUENCY COEFFICIENT

| Frequency(Hz) |            | 50(60) | 100(120) | 1K   | 10K  | ≥100K |
|---------------|------------|--------|----------|------|------|-------|
| Cap(μF)       | 6.3~33     | 0.30   | 0.42     | 0.70 | 0.90 | 1.00  |
|               | 47~270     | 0.35   | 0.50     | 0.73 | 0.92 | 1.00  |
|               | 330~680    | 0.40   | 0.55     | 0.77 | 0.94 | 1.00  |
|               | 820~1800   | 0.45   | 0.60     | 0.80 | 0.96 | 1.00  |
|               | 2200~18000 | 0.50   | 0.70     | 0.85 | 0.98 | 1.00  |



4. 风华物料编码 FENGHUAPART NO SYSTEM

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|

| 代码<br>Code | 产品类别 Type                  |
|------------|----------------------------|
| 8          | 成品 Product                 |
| 1          | 素子 Element                 |
| 2          | 裸品 Semifinished<br>Product |

| 代码 Code | 标称容量<br>Nominal Capacitance |
|---------|-----------------------------|
| R22     | 0.22 $\mu$ F                |
| 1R0     | 1 $\mu$ F                   |
| 2R2     | 2.2 $\mu$ F                 |
| 220     | 22 $\mu$ F                  |
| 221     | 220 $\mu$ F                 |
| 222     | 2200 $\mu$ F                |
| 223     | 22000 $\mu$ F               |
| 224     | 220000 $\mu$ F              |
| 225     | 2200000 $\mu$ F             |
| 12A     | 125 $\mu$ F                 |
| 23A     | 235 $\mu$ F                 |
| 27A     | 275 $\mu$ F                 |

| 代码 Code | 电压 Voltage |
|---------|------------|
| LI      | 2.2V       |
| LO      | 4V         |
| LA      | 6.3V       |
| LB      | 10V        |
| LK      | 20V        |
| LC      | 16V        |
| LD      | 25V        |
| LE      | 35V        |
| LL      | 40V        |
| LF      | 50V        |
| LG      | 63V        |
| LJ      | 71V        |
| LH      | 80V        |
| MA      | 100V       |
| MR      | 110V       |
| MG      | 120V       |
| MH      | 125V       |
| MU      | 130V       |
| MB      | 160V       |
| MY      | 180V       |
| MC      | 200V       |
| MJ      | 220V       |
| MD      | 250V       |
| ME      | 280V       |
| MM      | 300V       |
| MP      | 310V       |
| MQ      | 315V       |
| MN      | 330V       |
| MF      | 350V       |
| MZ      | 385V       |
| VA      | 400V       |
| VE      | 420V       |
| VB      | 450V       |
| VH      | 475V       |
| VC      | 500V       |
| VD      | 525V       |
| VF      | 550V       |
| VG      | 600V       |

| 代码<br>Code | 尺寸 Dimensions<br>$\Phi$ DxL(mm) |
|------------|---------------------------------|
| 0407       | $\Phi$ 4X7                      |
| 0511       | $\Phi$ 5X11                     |
| AA12       | $\Phi$ 6.3X12                   |
| 0816       | $\Phi$ 8X16                     |
| 1016       | $\Phi$ 10X16                    |
| AG31       | $\Phi$ 11.5X31                  |
| 1220       | $\Phi$ 12X20                    |
| AB20       | $\Phi$ 12.5X20                  |
| 1320       | $\Phi$ 13X20                    |
| AD31       | $\Phi$ 13.5X31                  |
| 1425       | $\Phi$ 14X25                    |
| AC27       | $\Phi$ 14.5X27                  |
| 1525       | $\Phi$ 15X25                    |
| AE40       | $\Phi$ 15.5X40                  |
| 1635       | $\Phi$ 16X35                    |
| AF27       | $\Phi$ 17.5X27                  |
| 1820       | $\Phi$ 18X20                    |
| 2225       | $\Phi$ 22X25                    |

| 代码<br>Code | 误差<br>Tolerance      |
|------------|----------------------|
| J          | $\pm 5\%$            |
| K          | $\pm 10\%$           |
| V          | $\pm {}^{20}_{10}\%$ |
| M          | $\pm 20\%$           |
| Q          | $\pm {}^{30}_{10}\%$ |
| T          | $\pm {}^{50}_{10}\%$ |
| A          | 特殊                   |

| 代码<br>Code | 商标<br>Trademark |
|------------|-----------------|
| N          | LH.NOVA         |

| 代码<br>Code | 型号<br>Series |
|------------|--------------|
| SS         | SS           |
| SC         | SC           |
| WP         | WP           |
| LL         | LL           |
| LE         | LE           |
| LY         | LY           |
| LZ         | LZ           |
| RX         | RX           |
| RT         | RT           |
| RF         | RF           |
| FS         | FS           |
| RG         | RG           |
| RS         | RS           |
| RA         | RA           |
| AS         | AS           |
| RY         | RY           |
| RZ         | RZ           |
| RK         | RK           |
| RW         | RW           |
| RV         | RV           |
| TF         | TF           |
| TG         | TG           |
| NP         | NP           |
| HA         | HA           |
| HT         | HT           |

| 代码<br>Code | 胶管颜色<br>Sleeve Color |
|------------|----------------------|
| 0          | 黑色 Black             |
| 1          | 深蓝色 Deep-blue        |
| 4          | 紫色 Purple            |
| 5          | 墨绿色 Black-green      |
| 7          | 棕色 Brown             |
| 9          | 绿色 Green             |

| 代码<br>Code | 内码<br>Internal Code                                                            |
|------------|--------------------------------------------------------------------------------|
| 11         | 105 $^{\circ}$ C 普通品<br>105 $^{\circ}$ C regular                               |
| 15         | 105 $^{\circ}$ C 凸台胶粒<br>105 $^{\circ}$ C convex rubber                        |
| 1E         | 105 $^{\circ}$ C 普通品 PET 胶管<br>105 $^{\circ}$ C regular & PET Sleeve           |
| 1F         | 105 $^{\circ}$ C 凸台胶粒 PET 胶管<br>105 $^{\circ}$ C convex rubber & PET<br>Sleeve |
| 1S         | 105 $^{\circ}$ C 特殊品<br>105 $^{\circ}$ C Special                               |

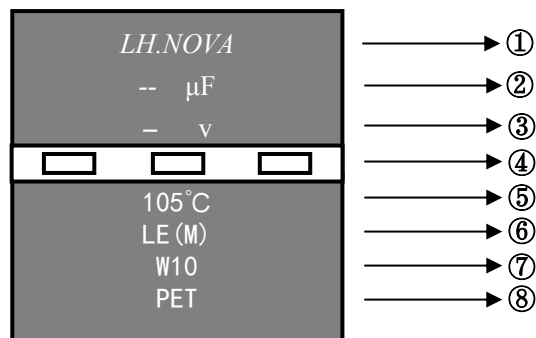
| 代码<br>Code | 产品脚型<br>Lead Forming Type                                        |
|------------|------------------------------------------------------------------|
| 0          | 散装品 Bulk                                                         |
| T          | 5mm 贴片编带品<br>5mm Chip tape                                       |
| A          | ( $\Phi$ 4~ $\Phi$ 6.3)2.5mm 脚距编带品;<br>2.5mm Tape                |
| F          | ( $\Phi$ 4~ $\Phi$ 8)5mm 脚距编带品;<br>5mm Tape                      |
| P          | 直径 $\Phi \geq \Phi$ 8mm 直脚方式编带<br>品 original type(vertical) tape |
| M          | 5mm 成型剪脚品 5mm Lead<br>forming                                    |
| C          | 原脚距型成型剪脚品<br>C Lead forming                                      |
| L          | L 型成型剪脚品<br>L Lead forming                                       |
| D          | ( $\Phi$ 4~ $\Phi$ 5)2.5mm 成型剪脚品<br>Lead forming                 |



## 5. 标记 MARKING

### 5.1 在电容器体上应注明如下内容:

The Following Items Shall Be Marked Indelibly On The Capacitor:



| 序号 No. | Items                                                           |
|--------|-----------------------------------------------------------------|
| ①      | 生产厂商商标 Manufacturer's name or trade mark                        |
| ②      | 电容量 Capacitance                                                 |
| ③      | 工作电压 Rated voltage                                              |
| ④      | 负极标志 Polarity of the terminals                                  |
| ⑤      | 上限工作温度 Maximum operating temperature                            |
| ⑥      | 系列代码及容量偏差代码 Series code and capacity deviation code             |
| ⑦      | 生产日期 Produce date<br>eg: W=2023(2001-2052:A-Z),10=10 月份 OCTOBER |
| ⑧      | 套管材质 Casing Material(PET)                                       |

### 5.2 标记颜色

#### Color

|                         |                 |
|-------------------------|-----------------|
| 套管颜色:<br>Sleeve color:  | 黑色 Black        |
|                         | 深蓝色 Deep-blue   |
|                         | 紫色 Purple       |
|                         | 墨绿色 Black-green |
|                         | 棕色 Brown        |
|                         | 绿色 Green        |
| 标记颜色:<br>Marking color: | 白色 white        |
|                         | 银色 silvery      |
|                         | 金色 golden       |



## 6. 包装 PACKING

### 6.1 包装标签内容 Package label content

|              |                       |              |                                |
|--------------|-----------------------|--------------|--------------------------------|
| 1) 客户物料号 P/N | Customer Material P/N | 2) 风华物料号 P/N | FENGHUA Material P/N           |
| 3) 批号        | Lot number            | 4) 数量        | Quantity                       |
| 5) 系列        | Series                | 6) 容量偏差      | Tolerance on Rated Capacitance |
| 7) 规格尺寸      | Specification         | 8) 日期        | Date                           |
| 9) RoHS 标识   | RoHS                  | 10) 二维码      | QR code                        |

其中批号的填写 Lot number

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|

类别 年份 月份 日期 区别号

流传单号码

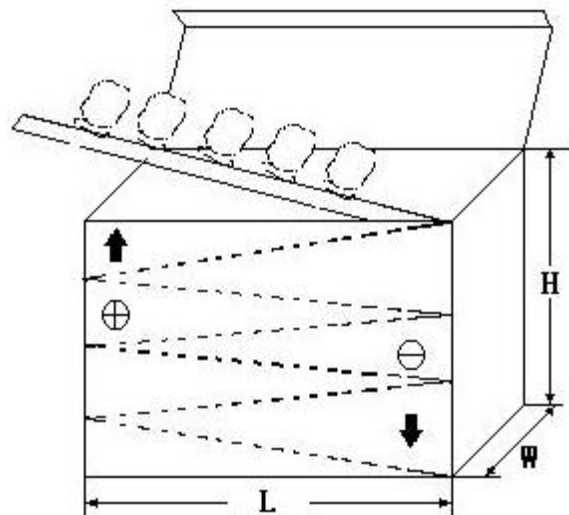
Sort Year Month Date Discriminate mark

Sequence number

### 6.2 编带产品按下图包装方式

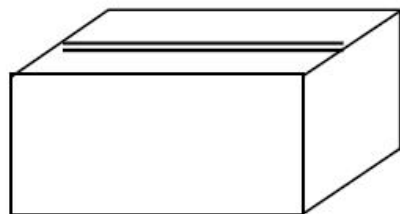
Taped capacitors are packed into carton, according to the following drawing

| ΦD    | Qty. (Pcs) | L≤22mm     | L=25±2mm   |
|-------|------------|------------|------------|
|       |            | L×W×H(mm)  | L×W×H(mm)  |
| Φ5    | 2000       | 328×235×50 | 328×235×57 |
| Φ6.3  | 1500       |            |            |
| Φ8    | 1000       |            |            |
| Φ10   | 600        |            |            |
| Φ12.5 | 400        |            |            |
| Φ16   | 250        |            |            |
| Φ18   | 200        |            |            |

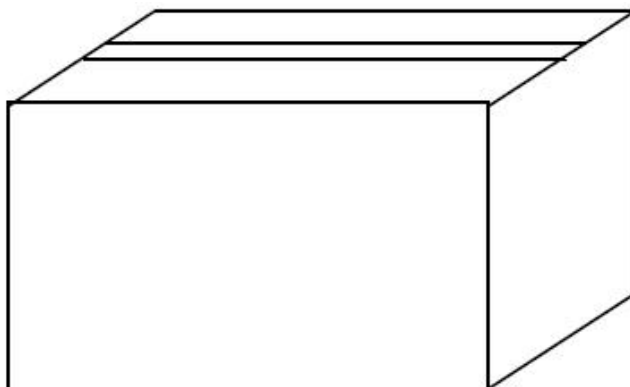


### 6.3 散包装按下图包装方式

Bulk packing capacitors are packed into PVC bag, inner box and carton according to the following drawings.



内盒  
Inner box

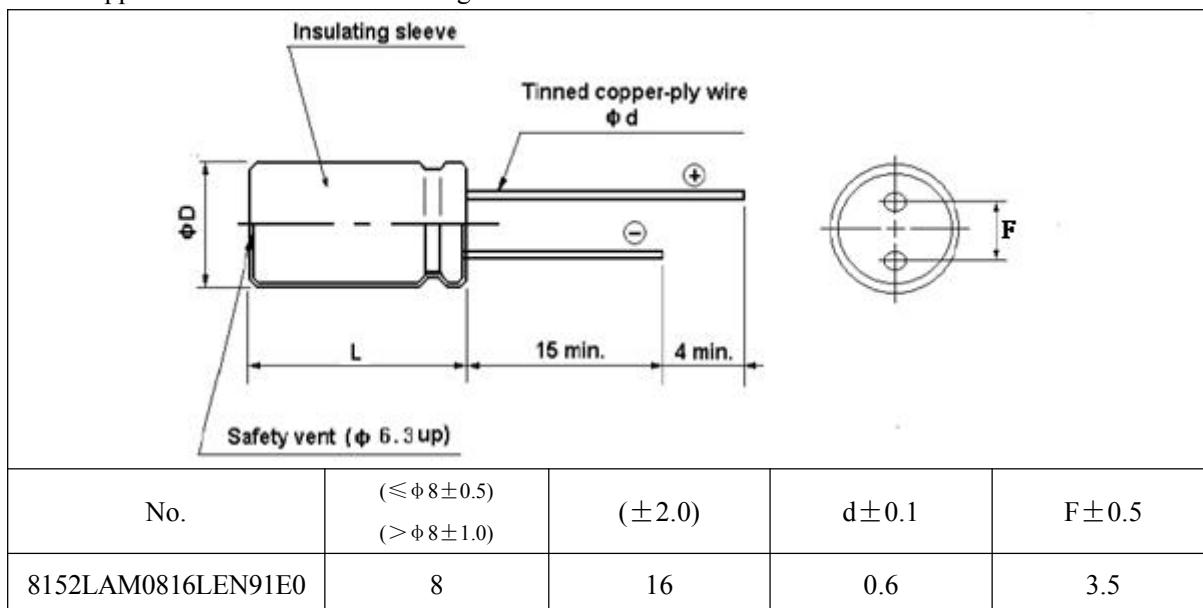


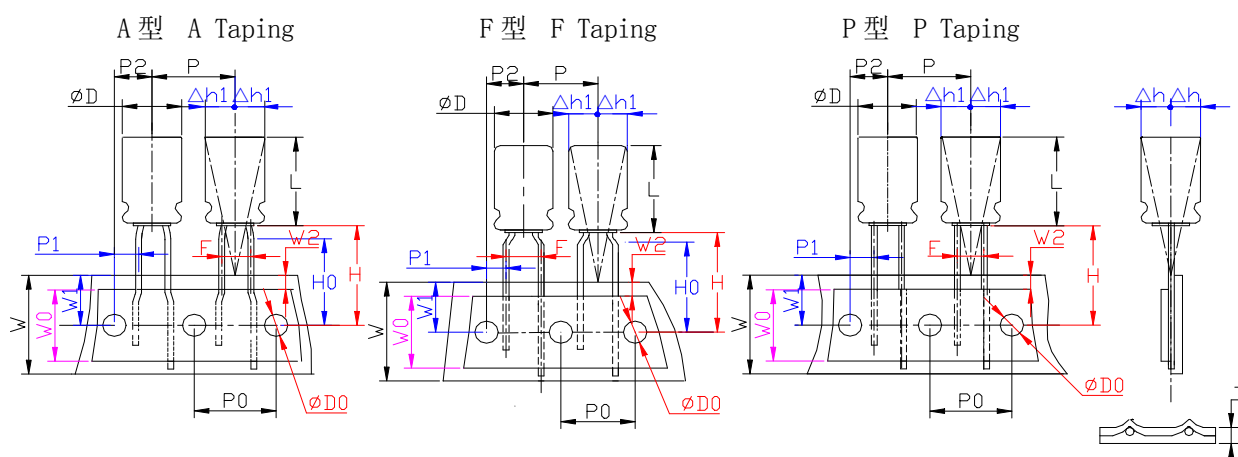
外箱  
carton



## 7. 产品外形结构和编带

### Product appearance structure and braiding



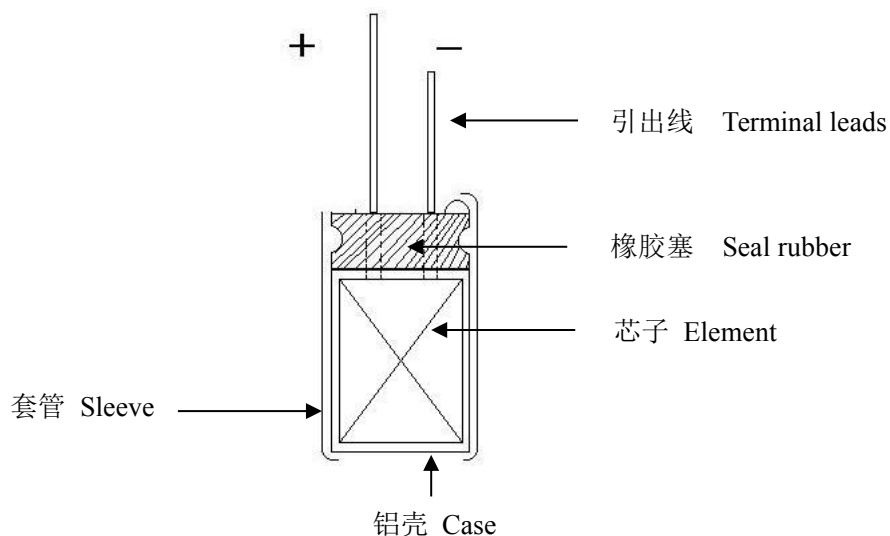


| 项目 Item                          | ΦD | Φ4        | Φ5 | Φ6.3 | Φ4        | Φ5 | Φ6.3 | Φ8    | Φ8       | Φ10  | Φ12~Φ13 | Φ16~Φ18 |
|----------------------------------|----|-----------|----|------|-----------|----|------|-------|----------|------|---------|---------|
| L±2.0                            |    | 5~16      |    |      | 5~16      |    |      | 7~20  | 7~20     | 9~20 | 16-25   | 16-25   |
| 代码 Taping code                   |    | A         |    |      | F         |    |      | P     |          |      |         |         |
| Φd±0.1                           |    | 0.45~0.50 |    |      | 0.45~0.50 |    |      | 0.60  |          | 0.60 | 0.60    | 0.8     |
| P±1.0                            |    | 12.70     |    |      | 12.70     |    |      | 12.70 |          | 15.0 |         | 30.0    |
| P <sub>0</sub> ±0.2              |    | 12.70     |    |      | 12.70     |    |      | 12.70 |          | 15.0 |         | 15.0    |
| P <sub>1</sub> ±0.5              |    | 5.10      |    |      | 3.85      |    |      | 4.60  | 3.85     | 5.00 |         | 3.75    |
| P <sub>2</sub> ±0.5              |    | 6.35      |    |      | 6.35      |    |      | 6.35  |          | 7.50 |         |         |
| F± <sup>0.5</sup> <sub>0.2</sub> |    | 2.50      |    |      | 5.00      |    |      | 3.50  | 5.00±0.5 |      |         | 7.5±0.5 |
| H±0.5                            |    | 18.5      |    |      |           |    |      |       |          |      |         |         |
| H <sub>0</sub> ±0.5              |    | 16.5      |    |      | 16.5      |    |      | -     |          |      |         |         |
| W±0.3                            |    | 18.00     |    |      |           |    |      |       |          |      |         |         |
| W <sub>0</sub> min               |    | 10.00     |    |      |           |    |      |       |          |      |         |         |
| W <sub>1</sub> ±0.5              |    | 9.00      |    |      |           |    |      |       |          |      |         |         |
| W <sub>2</sub> max               |    | 3.00      |    |      |           |    |      |       |          |      |         |         |
| ΦD <sub>0</sub> ±0.2             |    | 4.00      |    |      |           |    |      |       |          |      |         |         |
| △h max                           |    | 0.50      |    |      |           |    |      |       |          |      |         |         |
| △h <sub>1</sub> max              |    | 0.50      |    |      |           |    |      |       |          |      |         |         |
| t±0.2                            |    | 0.60      |    |      |           |    |      |       |          |      |         |         |

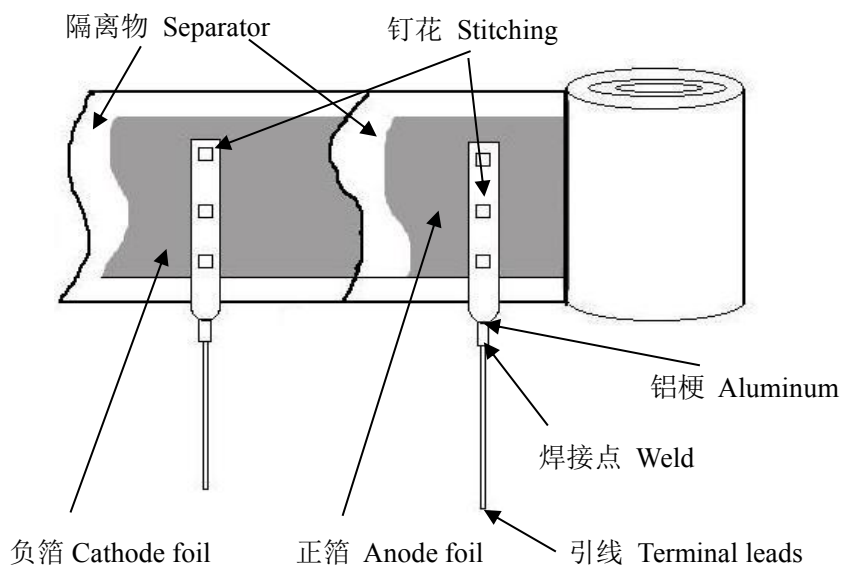


8. 材料组成清单 Material composition list

内部构造图及构成材料 INTERNAL CONSTRUCTION AND COMPONENTS



芯子分解图 Dicomposing figure of clement



| 序号<br>No. | 组成部分<br>Components  | 材料.规格.处理<br>Materials.Finish/Specification | 序号<br>No. | 组成部分<br>Components | 材料.规格.处理<br>Materials.Finish/Specification |
|-----------|---------------------|--------------------------------------------|-----------|--------------------|--------------------------------------------|
| 1         | 铝壳<br>Case          | 铝<br>Aluminum                              | 5         | 隔离物<br>Separator   | 电解纸<br>Paper                               |
| 2         | 套管<br>Sleeve        | 胶管<br>Sleeve                               | 6         | 正箔<br>Anode foil   | 高纯铝<br>Fine Aluminum                       |
| 3         | 封口塞<br>Seal         | 胶粒<br>rubber                               | 7         | 负箔<br>Cathode foil | 铝<br>Aluminum                              |
| 4         | 引线<br>Terminal lead | CP 线(钢、铜锡)<br>CP wire (Fe+Sn)              | 8         | 电解液<br>Electrolyte | 有机溶剂<br>Organic Solvent etc                |



## 9. 贮存方法 STORAGE METHODS

9.1 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)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) 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.

9.2 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

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.





## 10. 其它说明 OTHERS

### 10.1 本产品不含铅、镉等元素

This product does not include Plumbum or Cadmium.

### 10.2 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) 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

Important information on the application of aluminium electrolytic capacitors

(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) 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.
- (9) 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.