

## HIGH VOLTAGE, LONG LIFE

### 高压长寿命品

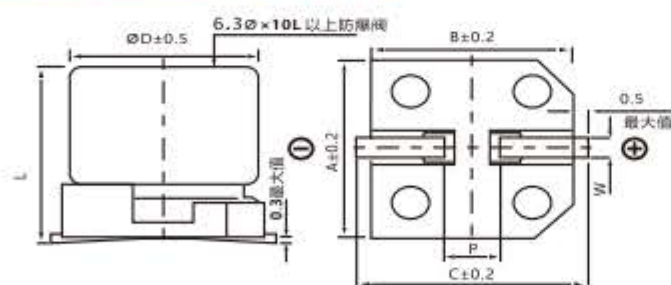
- Operating with wide temperature range  $-40\sim+105^{\circ}\text{C}$   
适用于  $-40\sim+105^{\circ}\text{C}$  的宽温范围
- Load life of 5000 hours  
负荷寿命5000 小时
- Comply with the RoHS directive  
符合 RoHS 指令



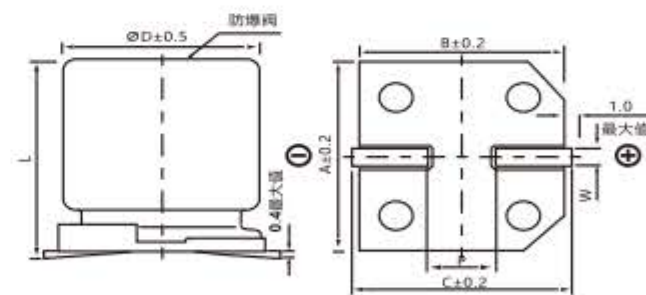
### SPECIFICATIONS 特性表

| Items 项目                                 | Characteristics 主要特性   |   |   |                          |   |  |                                       |               |  |   |
|--|--|---|---|--------------------------|---|--|---------------------------------------|---------------|--|---|
| Operation Temperature Range 使用温度范围       | $-40 \sim +105^{\circ}\text{C}$  |   |   |                          |   |  |                                       |               |  |   |
| Voltage Range 额定工作电压范围                   | 160 ~ 450V   |   |   |                          |   |  |                                       |               |  |   |
| Capacitance Range 静电容量范围                 | 3.3 ~ 47 $\mu\text{F}$   |   |   |                          |   |  |                                       |               |  |   |
| Capacitance Tolerance 静电容量允许偏差           | $\pm 20\%$ at 120Hz, $20^{\circ}\text{C}$  |   |   |                          |   |  |                                       |               |  |   |
| Leakage Current 漏电流                      | Leakage current $\leq 0.04\text{CV} + 100\mu\text{A}$ , (after 5 minutes application of rated voltage)<br>漏电流 $\leq 0.04\text{CV} + 100\mu\text{A}$ (施加额定工作电压 5 分钟后)   |   |   |                          |   |  |                                       |               |  |   |
| Dissipation Factor (tan $\delta$ ) 损耗角正切 | Measurement frequency 测试频率: 120Hz, Temperature 温度: $20^{\circ}\text{C}$  |   |   |                          |   |  |                                       |               |  |   |
|  | <table border="1"> <tr> <td>Rated Voltage (V) 额定工作电压</td> <td>160 ~ 250</td> <td>400, 450</td> </tr> <tr> <td>tan <math>\delta</math> (max.) 最大损耗角正切</td> <td>0.15</td> <td>0.20</td> </tr> </table>   | Rated Voltage (V) 额定工作电压                              | 160 ~ 250   | 400, 450                 | tan $\delta$ (max.) 最大损耗角正切                         | 0.15   | 0.20                                  |               |  |   |
| Rated Voltage (V) 额定工作电压                 | 160 ~ 250  | 400, 450  |   |                          |   |  |                                       |               |  |   |
| tan $\delta$ (max.) 最大损耗角正切              | 0.15   | 0.20  |   |                          |   |  |                                       |               |  |   |
| Stability at Low Temperature 低温特性        | Measurement frequency 测试频率: 120Hz  |   |   |                          |   |  |                                       |               |  |   |
|  | <table border="1"> <tr> <td>Rated Voltage (V) 额定工作电压</td> <td>160 ~ 250</td> <td>400, 450</td> </tr> <tr> <td>Impedance Ratio 阻抗比</td> <td><math>Z(-25^{\circ}\text{C}) / Z(20^{\circ}\text{C})</math></td> <td>3</td> </tr> <tr> <td>ZT/Z20 (max.)</td> <td><math>Z(-40^{\circ}\text{C}) / Z(20^{\circ}\text{C})</math></td> <td>6</td> </tr> </table>          | Rated Voltage (V) 额定工作电压                              | 160 ~ 250   | 400, 450                 | Impedance Ratio 阻抗比                                 | $Z(-25^{\circ}\text{C}) / Z(20^{\circ}\text{C})$ | 3                                     | ZT/Z20 (max.) | $Z(-40^{\circ}\text{C}) / Z(20^{\circ}\text{C})$ | 6 |
|  | Rated Voltage (V) 额定工作电压   | 160 ~ 250   | 400, 450  |                          |   |  |                                       |               |  |   |
| Impedance Ratio 阻抗比                      | $Z(-25^{\circ}\text{C}) / Z(20^{\circ}\text{C})$   | 3   |   |                          |   |  |                                       |               |  |   |
| ZT/Z20 (max.)                            | $Z(-40^{\circ}\text{C}) / Z(20^{\circ}\text{C})$   | 6   |   |                          |   |  |                                       |               |  |   |
|  |  |   |   |                          |   |  |                                       |               |  |   |
| Load Life 高温负荷特性                         | After 5000 hours application of the rated voltage at $105^{\circ}\text{C}$ , they meet the characteristics listed below.<br>在 $105^{\circ}\text{C}$ 环境中施加额定工作电压5000 小时后, 电容器的特性符合下表的要求。  |   |   |                          |   |  |                                       |               |  |   |
|  | <table border="1"> <tr> <td>Capacitance Change 静电容量变化率</td> <td>Within <math>\pm 30\%</math> of initial value 初始值的 <math>\pm 30\%</math> 以内</td> </tr> <tr> <td>Dissipation Factor 损耗角正切</td> <td>200% or less of initial specified value 不大于规范值的200%</td> </tr> <tr> <td>Leakage Current 漏电流</td> <td>initial specified value or less 大于规范值</td> </tr> </table> | Capacitance Change 静电容量变化率                            | Within $\pm 30\%$ of initial value 初始值的 $\pm 30\%$ 以内 | Dissipation Factor 损耗角正切 | 200% or less of initial specified value 不大于规范值的200% | Leakage Current 漏电流                              | initial specified value or less 大于规范值 |               |  |   |
|  | Capacitance Change 静电容量变化率   | Within $\pm 30\%$ of initial value 初始值的 $\pm 30\%$ 以内 |   |                          |   |  |                                       |               |  |   |
| Dissipation Factor 损耗角正切                 | 200% or less of initial specified value 不大于规范值的200%  |   |   |                          |   |  |                                       |               |  |   |
| Leakage Current 漏电流                      | initial specified value or less 大于规范值  |   |   |                          |   |  |                                       |               |  |   |
|  |  |   |   |                          |   |  |                                       |               |  |   |
| Shelf Life 高温贮存特性                        | After leaving capacitors under no load at $105^{\circ}\text{C}$ for 1000 hours, they meet the specified value for load life characteristics listed above. 在 $105^{\circ}\text{C}$ 环境中无负荷放置1000 小时后, 电容器的特性符合高温负荷特性中所列的规定值。   |   |   |                          |   |  |                                       |               |  |   |
|  |  |   |   |                          |   |  |                                       |               |  |   |
| Resistance to Soldering Heat 耐焊接热特性      | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>经过回流焊并冷却至室温后, 电容器的特性符合下表的要求。   |   |   |                          |   |  |                                       |               |  |   |
|  | <table border="1"> <tr> <td>Capacitance Change 静电容量变化率</td> <td><math>\pm</math> Within 10% of initial value 初始值的 <math>\pm 10\%</math> 以内</td> </tr> <tr> <td>Dissipation Factor 损耗角正切</td> <td>initial specified value or less 大于规范值</td> </tr> <tr> <td>Leakage Current 漏电流</td> <td>initial specified value or less 大于规范值</td> </tr> </table>                | Capacitance Change 静电容量变化率                            | $\pm$ Within 10% of initial value 初始值的 $\pm 10\%$ 以内  | Dissipation Factor 损耗角正切 | initial specified value or less 大于规范值               | Leakage Current 漏电流                              | initial specified value or less 大于规范值 |               |  |   |
|  | Capacitance Change 静电容量变化率   | $\pm$ Within 10% of initial value 初始值的 $\pm 10\%$ 以内  |   |                          |   |  |                                       |               |  |   |
| Dissipation Factor 损耗角正切                 | initial specified value or less 大于规范值  |   |   |                          |   |  |                                       |               |  |   |
| Leakage Current 漏电流                      | initial specified value or less 大于规范值  |   |   |                          |   |  |                                       |               |  |   |
|  |  |   |   |                          |   |  |                                       |               |  |   |
| Marking 标识                               | Black print on the case top. 铝壳顶部黑字印刷。   |   |   |                          |   |  |                                       |               |  |   |

### Diagram of Dimensions 尺寸图



$\Phi D=6.3\sim 10$  适用



$\Phi 12.5$  以上适用

### DIMENSIONS (Unit: mm) 尺寸表

| DXL         | 6.3X10.5       | 8X10.5         | 10X10.5        | 10X13.5        | 12.5X13.5      | 12.5X16      | 16X16.5        |
|-------------|----------------|----------------|----------------|----------------|----------------|--------------|----------------|
| A           | 6.6            | 8.3            | 10.3           | 10.3           | 13.0           | 13.0         | 17.0           |
| B           | 6.6            | 8.3            | 10.3           | 10.3           | 13.0           | 13.0         | 17.0           |
| C           | 7.2            | 9.2            | 11.2           | 11.2           | 13.7           | 13.7         | 18.0           |
| P $\pm 0.2$ | 2.0            | 3.1            | 4.4            | 4.4            | 4.4            | 4.4          | 6.4            |
| L           | 10.5 $\pm 0.5$ | 10.5 $\pm 0.5$ | 10.5 $\pm 0.5$ | 13.5 $\pm 0.5$ | 13.5 $\pm 0.5$ | 16 $\pm 0.5$ | 16.5 $\pm 0.5$ |



□ DRAWING(Unit:mm) 外形图



□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 规格尺寸及最大允许纹波电流

| μF  | WV Code 代码 | 160       |     | 200         |     | 250         |     | 400         |     | 450          |                     |
|-----|------------|-----------|-----|-------------|-----|-------------|-----|-------------|-----|--------------|---------------------|
|     |            | 2C        |     | 2D          |     | 2E          |     | 2G          |     | 2W           |                     |
| 1   | 010        |           |     |             |     |             |     | 6.3 × 10.5  | 28  | 8 × 10.5     | 32                  |
| 1.5 | 1R5        |           |     |             |     |             |     | 6.3 × 10.5  | 36  | 8 × 10.5     | 40                  |
| 2.2 | 2R2        |           |     |             |     | 6.3 × 10.5  | 56  | 6.3 × 10.5  | 44  | 10 × 10.5    | 50                  |
| 3.3 | 3R3        |           |     |             |     | 6.3 × 10.5  | 68  | 8 × 10.5    | 52  | 10 × 10.5    | 72                  |
| 3.9 | 3R9        |           |     |             |     | 8 × 10.5    | 82  | 8 × 10.5    | 64  | 10 × 13.5    | 84                  |
| 4.7 | 4R7        |           |     |             |     | 8 × 10.5    | 96  | 10 × 10.5   | 84  | 10 × 13.5    | 96                  |
| 5.6 | 5R6        |           |     |             |     | 10 × 10.5   | 106 | 10 × 10.5   | 96  | 12.5 × 13.5  | 116                 |
| 6.8 | 6R8        |           |     |             |     | 10 × 10.5   | 126 | 10 × 13.5   | 114 | 12.5 × 13.5  | 128                 |
| 8.2 | 8R2        |           |     |             |     | 10 × 13.5   | 135 | 10 × 13.5   | 122 | 16 × 16.5    | 140                 |
| 10  | 100        | 10 × 10.5 | 90  | 10 × 10.5   | 110 | 10 × 13.5   | 145 | 12.5 × 13.5 | 136 | 16 × 16.5    | 160                 |
| 12  | 120        | 10 × 10.5 | 95  | 10 × 10.5   | 120 | 10 × 13.5   | 150 | 12.5 × 13.5 | 156 |              |                     |
| 15  | 150        | 10 × 10.5 | 106 | 10 × 13.5   | 160 | 12.5 × 13.5 | 180 | 12.5 × 16   | 156 | Case size 尺寸 | Ripple current 纹波电流 |
| 22  | 220        | 10 × 13.5 | 140 | 12.5 × 13.5 | 180 | 12.5 × 13.5 | 200 | 16 × 16.5   | 186 |              |                     |

•Case size  $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C, 120Hz •尺寸 $\varnothing D \times L$ (mm), 纹波电流(mA rms)于105°C, 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 纹波电流频率补偿系数

| Frequency 频率   | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|----------------|------|-------|-------|------|--------|
| Coefficient 系数 | 0.80 | 1.00  | 1.25  | 1.40 | 1.60   |

● The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

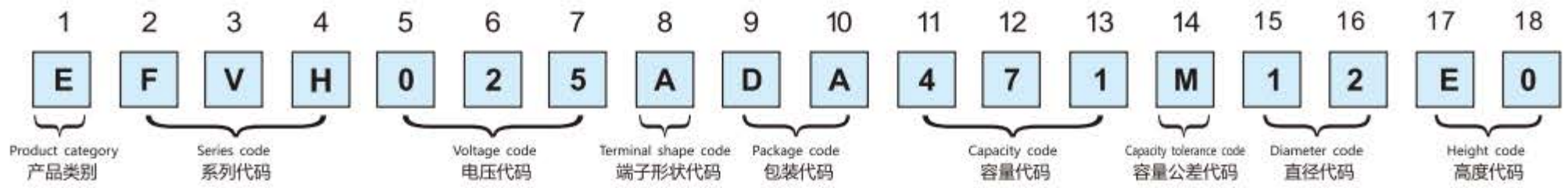
● 铝电解电容器由于在纹波电流叠加时自我发热，温度上升而老化，每升温10°C寿命减少一半；要想保持长寿命请在使用过程中降低纹波电流。

● Taping specifications are given in page 17 "Taping Specifications". 编带标准请参阅第 17 页“编带标准”。

● Please refer to page 18 "Package Quantity" for the minimum package quantity. 最小包装数量请参阅第 18 页“包装数量”。



## SMD EXPLANATION OF PART NUMBERS 贴片产品编码规则

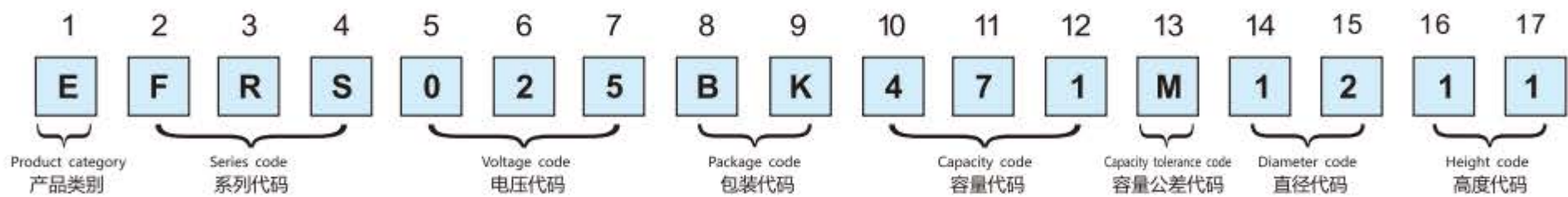


| (2, 3, 4)    |                        |            | (5, 6, 7)                   |            | (11, 12, 13)                  |            | (14)                      | (8) |            | (15, 16)               |            | (17, 18)             |            |
|--------------|------------------------|------------|-----------------------------|------------|-------------------------------|------------|---------------------------|-----|------------|------------------------|------------|----------------------|------------|
| Series<br>系列 | Voltage<br>(w.v)<br>电压 | Code<br>代码 | Capacitance<br>(uF)<br>静电容量 | Code<br>代码 | Cap. Tolerance<br>(%)<br>容量允许 | Code<br>代码 | Tape<br>端子类型              |     | Code<br>代码 | Diameter<br>(mm)<br>直径 | Code<br>代码 | Length<br>(mm)<br>高度 | Code<br>代码 |
| FVE          | 4                      | 4R0        | 0.1                         | 0R1        | ± 10                          | K          | No dummy terminal 无辅助端子   |     | A          | 4                      | 04         | 4.5                  | 45         |
| FVH          | 6.3                    | 6R3        | 0.22                        | R22        | ± 20                          | M          | With dummy terminal 有辅助端子 |     | G          | 5                      | 05         | 5.4                  | 54         |
| FVA          | 10                     | 010        | 1                           | 010        |                               |            |                           |     |            | 6.3                    | 06         | 5.8                  | 58         |
| FVZ          | 16                     | 016        | 4.7                         | 4R7        |                               |            |                           |     |            | 8                      | 08         | 6.5                  | 65         |
| FVR          | 25                     | 025        | 10                          | 100        |                               |            |                           |     |            | 10                     | 10         | 7.7                  | 77         |
| FVL          | 35                     | 035        | 47                          | 470        |                               |            |                           |     |            | 12.5                   | 12         | 10.2                 | A0         |
| FVM          | 50                     | 050        | 100                         | 101        |                               |            |                           |     |            | 16                     | 16         | 10.5                 | B0         |
| FVU          | 63                     | 063        | 470                         | 471        |                               |            |                           |     |            | 18                     | 18         | 13.5                 | E0         |
| FVG          | 100                    | 100        | 1000                        | 102        |                               |            |                           |     |            |                        |            | 16                   | G5         |
| FVB          | 160                    | 160        | 4700                        | 472        |                               |            |                           |     |            |                        |            | 16.5                 | H0         |
| FVN          | 250                    | 250        | 10000                       | 103        |                               |            |                           |     |            |                        |            | 21.5                 | N0         |
| FVD          | 350                    | 350        |                             |            |                               |            |                           |     |            |                        |            |                      |            |
| FVC          | 400                    | 400        |                             |            |                               |            |                           |     |            |                        |            |                      |            |

| (9, 10)           |                           |                  |            |    |
|-------------------|---------------------------|------------------|------------|----|
| Packaging<br>包装要求 | External diameter<br>纸盘外径 | Fit size<br>适合尺寸 | Code<br>代码 |    |
| Banding<br>编带     | Paper tray<br>纸盘          | 380              | ∅D4~18     | DA |
|                   | Glue tray<br>胶盘           | 330              | ∅D4~18     | DB |
|                   | Blistre box<br>吸塑盒        | -                | ∅D12.5~18  | TR |

## Radial EXPLANATION OF PART NUMBERS 插件产品编码规则



| (2, 3, 4)    |                        |            | (5, 6, 7)                   |            | (10, 11, 12)                  |            | (13)                   | (8, 9) |            | (14, 15)               |            | (16, 17)             |            |
|--------------|------------------------|------------|-----------------------------|------------|-------------------------------|------------|------------------------|--------|------------|------------------------|------------|----------------------|------------|
| Series<br>系列 | Voltage<br>(w.v)<br>电压 | Code<br>代码 | Capacitance<br>(uF)<br>静电容量 | Code<br>代码 | Cap. Tolerance<br>(%)<br>容量允许 | Code<br>代码 | Packaging<br>包装形式      |        | Code<br>代码 | Diameter<br>(mm)<br>直径 | Code<br>代码 | Length<br>(mm)<br>高度 | Code<br>代码 |
| FRA          | 4                      | 4R0        | 0.1                         | 0R1        | ± 10                          | K          | Long-legged bulk长脚散装   |        | BK         | 4                      | 04         | 4.5                  | 04         |
| FRS          | 6.3                    | 6R3        | 0.22                        | R22        | ± 20                          | M          | Long-legged taping长脚编带 |        | BA         | 5                      | 05         | 5.5                  | 05         |
| FRU          | 10                     | 010        | 1                           | 010        |                               |            |                        |        |            | 6.3                    | 06         | 6.0                  | 06         |
| FRK          | 16                     | 016        | 4.7                         | 4R7        |                               |            |                        |        |            | 8                      | 08         | 6.5                  | 06         |
| FBR          | 25                     | 025        | 10                          | 100        |                               |            |                        |        |            | 10                     | 10         | 7.0                  | 07         |
| FBU          | 35                     | 035        | 47                          | 470        |                               |            |                        |        |            | 12.5                   | 12         | 8.0                  | 08         |
|              | 50                     | 050        | 100                         | 101        |                               |            |                        |        |            | 16                     | 16         | 10                   | 10         |
|              | 63                     | 063        | 470                         | 471        |                               |            |                        |        |            | 18                     | 18         | 11                   | 11         |
|              | 100                    | 100        | 1000                        | 102        |                               |            |                        |        |            |                        |            | 11.5                 | 11         |
|              | 160                    | 160        | 4700                        | 472        |                               |            |                        |        |            |                        |            | 12                   | 12         |
|              | 250                    | 250        | 10000                       | 103        |                               |            |                        |        |            |                        |            | 16                   | 16         |
|              | 350                    | 350        |                             |            |                               |            |                        |        |            |                        |            |                      |            |
|              | 400                    | 400        |                             |            |                               |            |                        |        |            |                        |            |                      |            |

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[CS100UF10V167RV0144](#) [126RV0017](#) [VT47UF35V167RV0137](#) [CS220UF35V167RV0148](#) [126RV0010](#) [126RV0009](#)

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