

# HRN 系列 Series

## 特点 Features

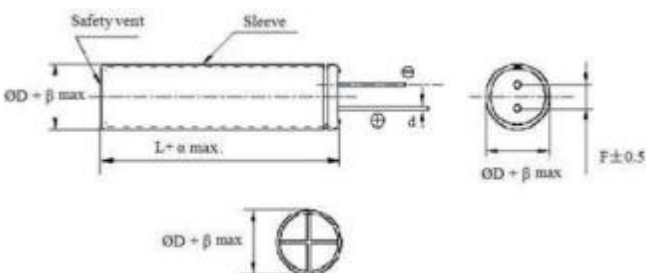
- 长寿命品105°C 2000小时。 Long Load life of 105°C 2000h .
- 体积Φ8×30~Φ13×60。 Body diameter of Φ8×30 to Φ13×60.
- 适合于超薄电视、承受高纹波电流。  
Used in super thin TV.with high ripple current capability.
- RoHS指令已对应完毕。  
Adapted to the RoHS directive.



## 主要技术性能 Specifications

| 项目 Items   | 特性 Characteristics  |                    |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--|---|--------------------|------|------|------|-------|-------|-----|-----|------|------|------|--------------------|------|------|------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 使用温度范围<br>Operating Temperature Range  | -40~+105°C  | -25~+105°C         |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 额定电压范围<br>Rated Voltage Range  | 16~100V   | 160~500V           |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 标称容量范围<br>Nominal Capacitance Range  | 22~2200μF   |                    |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 标称容量允许偏差<br>Capacitance Tolerance  | ±20%(+20°C, 120Hz)  |                    |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 漏电流<br>Leakage Current   | I≤0.02CV+15 (μA) 5分钟 (at 20°C, after 5 minutes)   |                    |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 损耗角正切值(tgδ)<br>Dissipation Factor (+20°C, 120Hz)   | <table border="1"> <tr> <td>U<sub>r</sub> (V)</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63~80</td> <td>100</td> </tr> <tr> <td>tgδ</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.08</td> </tr> </table>   | U <sub>r</sub> (V) | 16   | 25   | 35   | 50    | 63~80 | 100 | tgδ | 0.16 | 0.14 | 0.12 | 0.10               | 0.09 | 0.08 |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  | U <sub>r</sub> (V)  | 16                 | 25   | 35   | 50   | 63~80 | 100   |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  | tgδ   | 0.16               | 0.14 | 0.12 | 0.10 | 0.09  | 0.08  |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| <table border="1"> <tr> <td>U<sub>r</sub> (V)</td> <td>160</td> <td>200</td> <td>250</td> <td>400</td> <td>420</td> <td>450</td> <td>500</td> </tr> <tr> <td>tgδ</td> <td>0.18</td> <td>0.18</td> <td>0.18</td> <td>0.20</td> <td>0.22</td> <td>0.24</td> <td>0.24</td> </tr> </table> | U <sub>r</sub> (V)  | 160                | 200  | 250  | 400  | 420   | 450   | 500 | tgδ | 0.18 | 0.18 | 0.18 | 0.20               | 0.22 | 0.24 | 0.24 |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| U <sub>r</sub> (V)   | 160   | 200                | 250  | 400  | 420  | 450   | 500   |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| tgδ  | 0.18  | 0.18               | 0.18 | 0.20 | 0.22 | 0.24  | 0.24  |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 容量大于1000μF者, 每增加1000μF, 其损耗角正切值增加0.02<br>When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase.  |   |                    |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 温度特性 Temperature Characteristic<br>(Impedance ratio at 120Hz)  | <table border="1"> <tr> <td>U<sub>r</sub> (V)</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>400</td> <td>420</td> <td>450</td> <td>500</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>4</td> <td>4</td> <td>5</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </table> |                    |      |      |      |       |       |     |     |      |      |      | U <sub>r</sub> (V) | 16   | 25   | 35   | 50 | 63 | 100 | 160 | 200 | 250 | 400 | 420 | 450 | 500 | Z-25°C / Z+20°C | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 5 | 6 | 6 | 6 | 6 | Z-40°C / Z+20°C | 6 | 4 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - |
| U <sub>r</sub> (V)   | 16  | 25                 | 35   | 50   | 63   | 100   | 160   | 200 | 250 | 400  | 420  | 450  | 500                |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Z-25°C / Z+20°C  | 2   | 2                  | 2    | 2    | 2    | 2     | 4     | 4   | 5   | 6    | 6    | 6    | 6                  |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Z-40°C / Z+20°C  | 6   | 4                  | 3    | 3    | 3    | 3     | -     | -   | -   | -    | -    | -    | -                  |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 耐久性<br>Load Life   | +105°C加额定电压2000小时, 恢复16小时后:<br>After applying rated voltage for Load life of 2000h, at +105°C and then resumed for 16 hours:<br>电容量变化率 Capacitance change : ±20%初始测量值以内 ±20% of the initial measured value<br>漏电流 Leakage current : ≤初始规定值 ≤Initial specified value<br>损耗角正切值 Dissipation factor : ≤2倍初始规定值 ≤2times of the initial specified value  |                    |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 高温贮存<br>Shelf Life   | +105°C, 1000小时贮存后, 恢复16小时后:<br>After storage for 1000 hours at +105°C and then resumed for 16 hours<br>电容量变化率 Capacitance change : ±20%初始测量值以内 ±20% of the initial measured value<br>漏电流 Leakage current : ≤2倍初始规定值 ≤2times of the initial specified value<br>损耗角正切值 Dissipation factor : ≤2倍初始规定值 ≤2times of the initial specified value   |                    |      |      |      |       |       |     |     |      |      |      |                    |      |      |      |    |    |     |     |     |     |     |     |     |     |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |   |   |   |   |   |

## 外形图及尺寸表 Case Size Table



单位 Unit: mm

| D    | 8   | 10  | 13 |
|------|-----|-----|----|
| F    | 3.5 | 5.0 |    |
| d    | 0.6 |     |    |
| αMAX | 2.0 |     |    |
| βMAX | 0.5 |     |    |

## 频率修正系数 Frequency Coefficient

6.3~100V

| Frequency (Hz) \ CAP(μF) | 120  | 1K   | 10K  | 100K |
|--------------------------|------|------|------|------|
| 330~560                  | 0.50 | 0.85 | 0.94 | 1.00 |
| 680~1800                 | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200                     | 0.75 | 0.90 | 0.95 | 1.00 |

160~500V

| Freq.(Hz)   | 60   | 120  | 300  | 1K   | 10K  | ≥100K |
|-------------|------|------|------|------|------|-------|
| Coefficient | 0.80 | 1.00 | 1.25 | 1.45 | 1.50 | 1.50  |

## 尺寸 Dimensions

| WV \ CAP(μF) |     | 16V(1C) |       |        | 25V(1E) |       |        | 35V(1V) |       |        | 50V(1H) |       |        |
|--------------|-----|---------|-------|--------|---------|-------|--------|---------|-------|--------|---------|-------|--------|
|              |     | Size    | ESR   | Ripple | Size    | ESR   | Ripple | Size    | ESR   | Ripple | Size    | ESR   | Ripple |
| 330          | 331 |         |       |        |         |       |        |         |       |        | 8×30    | 0.065 | 1110   |
| 470          | 471 |         |       |        |         |       |        |         |       |        | 8×40    | 0.060 | 1400   |
| 680          | 681 |         |       |        |         |       |        | 8×30    | 0.045 | 1340   | 8×45    | 0.050 | 1600   |
| 820          | 821 |         |       |        | 8×30    | 0.06  | 1200   | 8×35    | 0.042 | 1450   | 8×55    | 0.045 | 1820   |
|              |     |         |       |        |         |       |        |         |       |        | 10×40   | 0.040 | 1750   |
| 1000         | 102 |         |       |        | 8×30    | 0.055 | 1300   | 8×40    | 0.036 | 1720   | 10×45   | 0.039 | 1950   |
| 1500         | 152 | 8×30    | 0.032 | 1600   | 8×45    | 0.040 | 1700   | 8×60    | 0.035 | 2080   |         |       |        |
|              |     |         |       |        |         |       |        | 10×40   | 0.035 | 1850   |         |       |        |
| 1800         | 182 | 8×35    | 0.028 | 1760   | 8×50    | 0.035 | 2000   | 10×45   | 0.034 | 2010   |         |       |        |
| 2200         | 222 | 8×40    | 0.027 | 1960   | 8×60    | 0.032 | 2200   |         |       |        |         |       |        |
|              |     |         |       |        | 10×40   | 0.032 | 2100   |         |       |        |         |       |        |

| WV \ CAP(μF) |     | 63V(1J) |       |        | 80V(1H) |       |        | 100V(2A) |       |        |
|--------------|-----|---------|-------|--------|---------|-------|--------|----------|-------|--------|
|              |     | Size    | ESR   | Ripple | Size    | ESR   | Ripple | Size     | ESR   | Ripple |
| 220          | 221 | 8×30    | 0.060 | 1150   | 8×40    | 0.058 | 1340   | 8×50     | 0.055 | 1540   |
| 330          | 331 | 8×40    | 0.058 | 1340   | 8×50    | 0.050 | 1620   | 10×45    | 0.050 | 1730   |
|              |     |         |       |        | 10×40   | 0.050 | 1640   |          |       |        |
| 470          | 471 | 8×50    | 0.045 | 1700   | 10×45   | 0.048 | 1765   | 10×60    | 0.038 | 2250   |
| 680          | 681 | 10×45   | 0.042 | 1900   |         |       |        |          |       |        |

Size φD×L(mm)

Maximum Allowable Ripple Current (mA rms) at 105°C 100kHz

Maximum ESR (Ω) at 20°C 100KHz

尺寸 Dimensions

| WV<br>CAP(μF) |     | 160V(2C) |        | 200V(2D) |        | 250V(2E) |        | 400V(2G) |        | 420V(2M) |        | 450V(2W) |        | 500V(2H) |        |
|---------------|-----|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|
|               |     | Size     | Ripple | Size     | Ripple | Size     | Ripple | Size     | Ripple | Size     | Ripple | Size     | Ripple | Size     | Ripple |
| 22            | 220 |          |        |          |        |          |        | 8×35     | 220    | 8×40     | 225    | 8×45     | 260    |          |        |
| 25            | 250 |          |        |          |        |          |        | 8×40     | 230    | 8×45     | 235    | 8×50     | 270    |          |        |
| 27            | 270 |          |        |          |        |          |        | 8×45     | 245    | 8×50     | 245    | 8×50     | 290    |          |        |
| 33            | 330 |          |        |          |        | 8×35     | 240    | 8×50     | 300    | 10×35    | 290    | 10×40    | 330    |          |        |
| 39            | 390 |          |        |          |        | 8×40     | 250    | 10×40    | 320    | 10×40    | 340    | 10×45    | 360    |          |        |
| 47            | 470 |          |        |          |        | 8×45     | 310    | 10×45    | 400    | 10×45    | 400    | 10×50    | 410    | 13×45    | 480    |
|               |     |          |        |          |        | 10×35    | 310    | 13×30    | 400    | 13×30    | 400    | 13×35    | 400    | 10×50    | 448    |
| 53            | 530 |          |        |          |        | 10×35    | 330    | 10×50    | 430    | 10×50    | 430    | 10×50    | 450    |          |        |
| 56            | 560 | 8×35     | 265    | 8×45     | 290    | 8×50     | 340    | 13×30    | 520    | 13×35    | 480    | 13×35    | 450    | 13×50    | 550    |
| 68            | 680 | 8×40     | 340    | 8×50     | 360    | 10×40    | 390    | 10×55    | 550    | 10×60    | 545    | 13×40    | 549    | 13×56    | 640    |
|               |     | 10×30    | 310    | 10×35    | 320    | 13×30    | 390    | 13×35    | 540    | 13×40    | 545    | 13×50    | 590    |          |        |
| 82            | 820 | 8×45     | 400    | 10×40    | 420    | 10×45    | 450    | 13×40    | 620    | 13×45    | 630    | 13×50    | 620    |          |        |
| 100           | 101 | 8×50     | 480    | 10×45    | 500    | 10×50    | 540    | 13×50    | 730    | 13×55    | 730    | 13×60    | 760    |          |        |
| 120           | 121 | 10×40    | 530    | 10×50    | 580    | 13×40    | 610    | 13×50    | 800    |          |        |          |        |          |        |
| 150           | 151 | 10×50    | 660    | 13×45    | 720    | 13×50    | 750    |          |        |          |        |          |        |          |        |
| 180           | 181 | 13×40    | 760    | 13×50    | 800    | 13×55    | 850    |          |        |          |        |          |        |          |        |
| 220           | 221 | 13×45    | 850    | 13×55    | 900    |          |        |          |        |          |        |          |        |          |        |
| 270           | 271 | 13×50    | 980    | 13×60    | 1050   |          |        |          |        |          |        |          |        |          |        |
| 330           | 331 | 13×55    | 1130   |          |        |          |        |          |        |          |        |          |        |          |        |

Size φD×L(mm)  
 Maximum Allowable Ripple Current (mA rms) at 105°C 120Hz