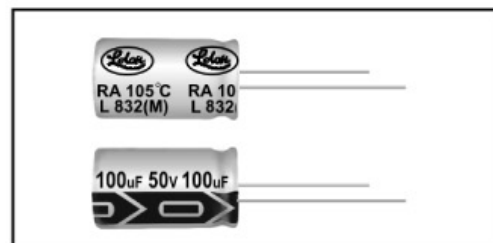


### Feature

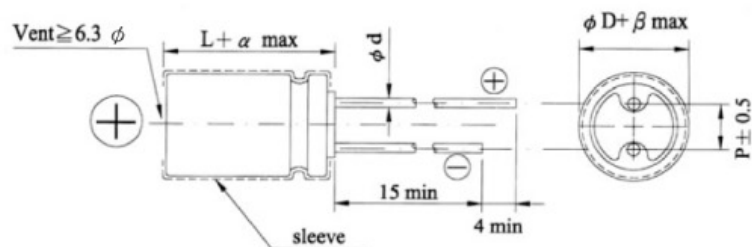
- 105°C, 1,000 hours assured
- Very low leakage current
- Use in high temperature industrial equipment
- RoHS Compliance



### SPECIFICATIONS

| Items                                       | Performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------|--------------------|------------------------------|--------------------|-----------------------------------|-----------------|------------------------|------|-------------|-----------------|-----------------|-----------------|------|------|------|------|------|----------------|------|-----------------|------|------|------|---|---|---|---|---|
| Operating Temperature Range                 | -40℃ ~ +105℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Capacitance Tolerance                       | ±20% (at 120Hz, 20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Leakage Current (at 20℃)                    | I = 0.002CV or 0.4 (μA) whichever is greater (after 2 minutes)<br>Where, C = rated capacitance in μF V = rated DC working voltage in V                                                                                                                                                                                                                                                                                                                                                                  |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Dissipation Factor<br>(Tan δ at 120Hz, 20℃) | <table><tr><td>Rated Voltage</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></tr><tr><td>Tan δ (max)</td><td>0.24</td><td>0.21</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> <p>When the capacitance exceeds 1,000 μF, 0.02 shall be added every 1,000 μF increase.</p>                                                                                                                                | Rated Voltage         | 6.3       | 10                 | 16                           | 25                 | 35                                | 50              | 63                     | 100  | Tan δ (max) | 0.24            | 0.21            | 0.16            | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |                |      |                 |      |      |      |   |   |   |   |   |
| Rated Voltage                               | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10                    | 16        | 25                 | 35                           | 50                 | 63                                | 100             |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Tan δ (max)                                 | 0.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.21                  | 0.16      | 0.14               | 0.12                         | 0.10               | 0.09                              | 0.08            |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Low Temperature Characteristics (at 120Hz)  | <p>Impedance ratio shall not exceed the values given in the table below.</p> <table><tr><td colspan="2">Rated Voltage</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></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>8</td><td>6</td><td>6</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table> | Rated Voltage         |           | 6.3                | 10                           | 16                 | 25                                | 35              | 50                     | 63   | 100         | Impedance Ratio | Z(-25℃)/Z(+20℃) | 4               | 3    | 3    | 2    | 2    | 2    | 2              | 2    | Z(-40℃)/Z(+20℃) | 8    | 6    | 6    | 4 | 4 | 3 | 3 | 3 |
| Rated Voltage                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6.3                   | 10        | 16                 | 25                           | 35                 | 50                                | 63              | 100                    |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Impedance Ratio                             | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4                     | 3         | 3                  | 2                            | 2                  | 2                                 | 2               | 2                      |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
|                                             | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 8                     | 6         | 6                  | 4                            | 4                  | 3                                 | 3               | 3                      |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Load Life Test                              | <table><tr><td>Test Time</td><td>1,000 hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Dissipation Factor</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 1,000 hrs at 105℃.</p>                                       | Test Time             | 1,000 hrs | Capacitance Change | Within ±20% of initial value | Dissipation Factor | Less than 200% of specified value | Leakage Current | Within specified value |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Test Time                                   | 1,000 hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Capacitance Change                          | Within ±20% of initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Dissipation Factor                          | Less than 200% of specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Leakage Current                             | Within specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Shelf Life Test                             | <table><tr><td>Test Time</td><td>1,000 hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Dissipation Factor</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hrs at 105℃ without voltage applied.</p>                                                     | Test Time             | 1,000 hrs | Capacitance Change | Within ±20% of initial value | Dissipation Factor | Less than 200% of specified value | Leakage Current | Within specified value |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Test Time                                   | 1,000 hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Capacitance Change                          | Within ±20% of initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Dissipation Factor                          | Less than 200% of specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Leakage Current                             | Within specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |           |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Ripple Current & Frequency Multipliers      | <table><tr><td>Freq.(Hz)<br/>Cap.(μF)</td><td>60(50)</td><td>120</td><td>500</td><td>1K</td><td>10K up</td></tr><tr><td>Under 100</td><td>0.75</td><td>1.00</td><td>1.35</td><td>1.55</td><td>1.90</td></tr><tr><td>100 &lt; C ≤ 1,000</td><td>0.83</td><td>1.00</td><td>1.23</td><td>1.32</td><td>1.45</td></tr><tr><td>1,000 up above</td><td>0.90</td><td>1.00</td><td>1.12</td><td>1.10</td><td>1.12</td></tr></table>                                                                              | Freq.(Hz)<br>Cap.(μF) | 60(50)    | 120                | 500                          | 1K                 | 10K up                            | Under 100       | 0.75                   | 1.00 | 1.35        | 1.55            | 1.90            | 100 < C ≤ 1,000 | 0.83 | 1.00 | 1.23 | 1.32 | 1.45 | 1,000 up above | 0.90 | 1.00            | 1.12 | 1.10 | 1.12 |   |   |   |   |   |
| Freq.(Hz)<br>Cap.(μF)                       | 60(50)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 120                   | 500       | 1K                 | 10K up                       |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| Under 100                                   | 0.75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.00                  | 1.35      | 1.55               | 1.90                         |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| 100 < C ≤ 1,000                             | 0.83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.00                  | 1.23      | 1.32               | 1.45                         |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |
| 1,000 up above                              | 0.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.00                  | 1.12      | 1.10               | 1.12                         |                    |                                   |                 |                        |      |             |                 |                 |                 |      |      |      |      |      |                |      |                 |      |      |      |   |   |   |   |   |

## DIAGRAM OF DIMENSIONS



Unit: mm

## LEAD SPACING AND DIAMETER

| $\phi D$ | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|----------|-----|-----|-----|-----|------|-----|-----|
| P        | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| $\phi d$ | 0.5 |     | 0.6 |     |      | 0.8 |     |
| $\alpha$ | 1.0 |     |     | 1.5 |      |     |     |
| $\beta$  | 0.5 |     |     |     |      |     |     |

Dimension:  $\phi D \times L(\text{mm})$

Ripple Current: mA/rms at 120 Hz, 105°C

## DIMENSION & PERMISSIBLE RIPPLE CURRENT

| $\mu\text{F}$ | V. DC<br>Contents | 6.3V (0J)         |       | 10V (1A)          |       | 16V (1C)          |       | 25V (1E)          |       | 35V (1V)          |       | 50V (1H)          |       | 63V (1J)          |       | 100V (2A)         |     |
|---------------|-------------------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-----|
|               |                   | $\phi D \times L$ | mA    | $\phi D \times L$ | mA    | $\phi D \times L$ | mA    | $\phi D \times L$ | mA    | $\phi D \times L$ | mA    | $\phi D \times L$ | mA    | $\phi D \times L$ | mA    | $\phi D \times L$ | mA  |
| 0.1           | 0R1               |                   |       |                   |       |                   |       |                   |       |                   |       | 5×11              | 1.3   |                   |       | 5×11              | 2.6 |
| 0.22          | R22               |                   |       |                   |       |                   |       |                   |       |                   |       | 5×11              | 2.9   |                   |       | 5×11              | 5.8 |
| 0.33          | R33               |                   |       |                   |       |                   |       |                   |       |                   |       | 5×11              | 4.4   |                   |       | 5×11              | 8   |
| 0.47          | R47               |                   |       |                   |       |                   |       |                   |       |                   |       | 5×11              | 7     |                   |       | 5×11              | 10  |
| 1             | 010               |                   |       |                   |       |                   |       |                   |       |                   |       | 5×11              | 13    |                   |       | 5×11              | 15  |
| 2.2           | 2R2               |                   |       |                   |       |                   |       |                   |       |                   |       | 5×11              | 20    |                   |       | 5×11              | 23  |
| 3.3           | 3R3               |                   |       |                   |       |                   |       |                   |       |                   |       | 5×11              | 25    |                   |       | 5×11              | 29  |
| 4.7           | 4R7               |                   |       |                   |       |                   |       | 5×11              | 26    | 5×11              | 28    | 5×11              | 30    | 5×11              | 32    | 5×11              | 34  |
| 10            | 100               |                   |       |                   |       | 5×11              | 35    | 5×11              | 38    | 5×11              | 41    | 5×11              | 46    | 5×11              | 50    | 6.3×11            | 56  |
| 22            | 220               |                   |       | 5×11              | 49    | 5×11              | 54    | 5×11              | 57    | 5×11              | 61    | 5×11              | 68    | 6.3×11            | 82    | 8×11.5            | 96  |
| 33            | 330               | 5×11              | 54    | 5×11              | 60    | 5×11              | 64    | 5×11              | 69    | 5×11              | 75    | 6.3×11            | 90    | 6.3×11            | 100   | 10×12.5           | 140 |
| 47            | 470               | 5×11              | 65    | 5×11              | 70    | 5×11              | 99    | 5×11              | 82    | 6.3×11            | 100   | 6.3×11            | 110   | 8×11.5            | 135   | 10×16             | 180 |
| 100           | 101               | 5×11              | 95    | 5×11              | 105   | 6.3×11            | 125   | 6.3×11            | 135   | 8×11.5            | 170   | 8×11.5            | 180   | 10×12.5           | 225   | 12.5×20           | 320 |
| 220           | 221               | 6.3×11            | 160   | 6.3×11            | 175   | 8×11.5            | 215   | 8×11.5            | 230   | 10×12.5           | 300   | 10×16             | 345   | 10×20             | 400   | 16×25             | 570 |
| 330           | 331               | 6.3×11            | 195   | 8×11.5            | 245   | 8×11.5            | 260   | 10×12.5           | 335   | 10×16             | 400   | 10×20             | 460   | 12.5×20           | 540   | 16×25             | 700 |
| 470           | 471               | 8×11.5            | 270   | 8×11.5            | 290   | 10×12.5           | 370   | 10×16             | 440   | 10×20             | 520   | 12.5×20           | 610   | 12.5×25           | 700   | 16×31.5           | 880 |
| 1,000         | 102               | 10×12.5           | 460   | 10×16             | 550   | 10×20             | 640   | 12.5×20           | 770   | 12.5×25           | 920   | 16×25             | 1,080 | 16×31.5           | 1,210 |                   |     |
| 2,200         | 222               | 12.5×20           | 810   | 12.5×20           | 860   | 12.5×25           | 1,000 | 16×25             | 1,170 | 16×31.5           | 1,340 | 18×35.5           | 1,530 |                   |       |                   |     |
| 3,300         | 332               | 12.5×20           | 960   | 12.5×25           | 1,100 | 16×25             | 1,300 | 16×31.5           | 1,460 | 18×35.5           | 1,650 |                   |       |                   |       |                   |     |
| 4,700         | 472               | 16×25             | 1,330 | 16×25             | 1,400 | 16×31.5           | 1,600 | 18×35.5           | 1,780 | 18×40             | 1,900 |                   |       |                   |       |                   |     |