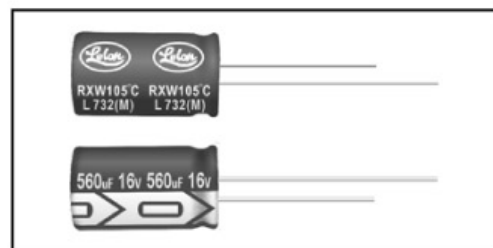


### Feature

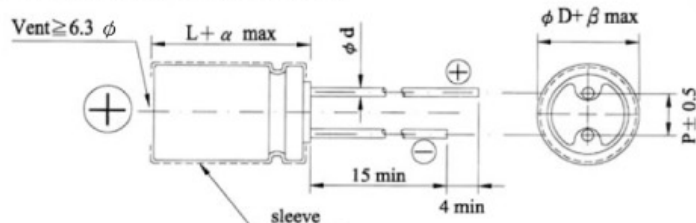
- 105°C, 4,000 ~ 7,000 hours assured
- Low ESR, suitable for switching power supplies
- Smaller size with large permissible ripple current
- RoHS Compliance



### SPECIFICATIONS

| Items                                        | Performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------|--------------------|------------------------------|--------------------|-----------------------------------|-----------------|------------------------|------|-------------|-----------------|-----------------|------|------|------|-----------|------|------|------|-----|-------------|-----|------|------|-----|----------------|-----|------|------|-----|
| Operating Temperature Range                  | -55℃ ~ +105℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Capacitance Tolerance                        | ±20% (at 120Hz, 20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Leakage Current (at 20℃)                     | I = 0.01CV or 3 (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 120 Hz, 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>0.22</td><td>0.19</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 1000 μF, 0.02 shall be added every 1000 μF increase.</p>                                                                                                                                                                                                            | Rated Voltage         | 6.3                                                                                                            | 10                 | 16                           | 25                 | 35                                | 50              | 63                     | 100  | Tan δ (max) | 0.22            | 0.19            | 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)                                  | 0.22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.19                  | 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>Impedance Ratio</td><td>Z(-55℃)/Z(+20℃)</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</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(-55℃)/Z(+20℃) | 3    | 3    | 3    | 3         | 3    | 3    | 3    | 3   |             |     |      |      |     |                |     |      |      |     |
| Rated Voltage                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 6.3                   | 10                                                                                                             | 16                 | 25                           | 35                 | 50                                | 63              | 100                    |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Impedance Ratio                              | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3                     | 3                                                                                                              | 3                  | 3                            | 3                  | 3                                 | 3               | 3                      |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Load Life Test                               | <table><tr><td>Test Time</td><td>4,000 hrs for ϕD ≤ 6.3 mm<br/>5,000 hrs for ϕD = 8 mm<br/>6,000 hrs for ϕD = 10 mm<br/>7,000 hrs for ϕD ≥ 12.5 mm</td></tr><tr><td>Capacitance Change</td><td>Within ±25% 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 4,000 ~ 7,000 hrs at 105℃.</p> | Test Time             | 4,000 hrs for ϕD ≤ 6.3 mm<br>5,000 hrs for ϕD = 8 mm<br>6,000 hrs for ϕD = 10 mm<br>7,000 hrs for ϕD ≥ 12.5 mm | Capacitance Change | Within ±25% of initial value | Dissipation Factor | Less than 200% of specified value | Leakage Current | Within specified value |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Test Time                                    | 4,000 hrs for ϕD ≤ 6.3 mm<br>5,000 hrs for ϕD = 8 mm<br>6,000 hrs for ϕD = 10 mm<br>7,000 hrs for ϕD ≥ 12.5 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Capacitance Change                           | Within ±25% 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 ±25% 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 ±25% of initial value | Dissipation Factor | Less than 200% of specified value | Leakage Current | Within specified value |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Test Time                                    | 1,000 hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Capacitance Change                           | Within ±25% of initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Dissipation Factor                           | Less than 200% of specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Leakage Current                              | Within specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                                                                                                                |                    |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| Ripple Current & Frequency Multipliers       | <table><tr><th>Freq.(Hz)<br/>Cap.(μF)</th><th>120</th><th>1K</th><th>10K</th><th>100K up</th></tr><tr><td>under ~ 33</td><td>0.42</td><td>0.70</td><td>0.90</td><td>1.0</td></tr><tr><td>39 ~ 270</td><td>0.5</td><td>0.73</td><td>0.92</td><td>1.0</td></tr><tr><td>330 ~ 680</td><td>0.55</td><td>0.77</td><td>0.94</td><td>1.0</td></tr><tr><td>820 ~ 1,800</td><td>0.6</td><td>0.80</td><td>0.96</td><td>1.0</td></tr><tr><td>2,200 ~ 15,000</td><td>0.7</td><td>0.85</td><td>0.98</td><td>1.0</td></tr></table>                                                              | Freq.(Hz)<br>Cap.(μF) | 120                                                                                                            | 1K                 | 10K                          | 100K up            | under ~ 33                        | 0.42            | 0.70                   | 0.90 | 1.0         | 39 ~ 270        | 0.5             | 0.73 | 0.92 | 1.0  | 330 ~ 680 | 0.55 | 0.77 | 0.94 | 1.0 | 820 ~ 1,800 | 0.6 | 0.80 | 0.96 | 1.0 | 2,200 ~ 15,000 | 0.7 | 0.85 | 0.98 | 1.0 |
| Freq.(Hz)<br>Cap.(μF)                        | 120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1K                    | 10K                                                                                                            | 100K up            |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| under ~ 33                                   | 0.42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.70                  | 0.90                                                                                                           | 1.0                |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| 39 ~ 270                                     | 0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.73                  | 0.92                                                                                                           | 1.0                |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| 330 ~ 680                                    | 0.55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.77                  | 0.94                                                                                                           | 1.0                |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| 820 ~ 1,800                                  | 0.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.80                  | 0.96                                                                                                           | 1.0                |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |
| 2,200 ~ 15,000                               | 0.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.85                  | 0.98                                                                                                           | 1.0                |                              |                    |                                   |                 |                        |      |             |                 |                 |      |      |      |           |      |      |      |     |             |     |      |      |     |                |     |      |      |     |

### DIAGRAM OF DIMENSIONS



### LEAD SPACING AND DIAMETER

Unit: mm

|          |     |     |     |     |      |     |     |
|----------|-----|-----|-----|-----|------|-----|-----|
| $\phi$ 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(mm)

Ripple Current: mA/rms at 100KHz, 105°C

### DIMENSION & PERMISSIBLE RIPPLE CURRENT

| VDC<br>Contents<br>$\mu$ F | 6.3V (0J)           |                                       |       |                                                | 10V (1A)            |                                       |       |                                                | 16V (1C)            |                                       |       |                                                | 25V (1E)            |                                       |       |                                                |
|----------------------------|---------------------|---------------------------------------|-------|------------------------------------------------|---------------------|---------------------------------------|-------|------------------------------------------------|---------------------|---------------------------------------|-------|------------------------------------------------|---------------------|---------------------------------------|-------|------------------------------------------------|
|                            | $\phi$ D $\times$ L | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz | $\phi$ D $\times$ L | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz | $\phi$ D $\times$ L | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz | $\phi$ D $\times$ L | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz |
|                            |                     | 20°C                                  | -10°C |                                                |                     | 20°C                                  | -10°C |                                                |                     | 20°C                                  | -10°C |                                                |                     | 20°C                                  | -10°C |                                                |
| 4.7                        |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |
| 10                         |                     |                                       |       |                                                |                     |                                       |       |                                                | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |
| 22                         | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |
| 33                         | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |
| 39                         |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |
| 47                         | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |
| 56                         |                     |                                       |       |                                                |                     |                                       |       |                                                | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |                     |                                       |       |                                                |
| 82                         |                     |                                       |       |                                                | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            |                     |                                       |       |                                                | 6.3 $\times$ 11     | 0.25                                  | 0.50  | 290                                            |
| 100                        | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 5 $\times$ 11       | 0.6                                   | 1.2   | 180                                            | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 6.3 $\times$ 11     | 0.25                                  | 0.50  | 290                                            |
| 120                        |                     |                                       |       |                                                |                     |                                       |       |                                                | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 6.3 $\times$ 15     | 0.23                                  | 0.46  | 430                                            |
| 150                        | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            |
| 180                        |                     |                                       |       |                                                | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 6.3 $\times$ 15     | 0.23                                  | 0.46  | 430                                            |                     |                                       |       |                                                |
| 220                        | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 6.3 $\times$ 11     | 0.25                                  | 0.5   | 290                                            | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            |
|                            |                     |                                       |       |                                                | 6.3 $\times$ 15     | 0.23                                  | 0.46  | 430                                            |                     |                                       |       |                                                |                     |                                       |       |                                                |
| 330                        | 6.3 $\times$ 11     | 0.25                                  | 0.500 | 290                                            | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            | 10 $\times$ 12.5    | 0.090                                 | 0.18  | 755                                            |
|                            | 6.3 $\times$ 15     | 0.23                                  | 0.46  | 430                                            |                     |                                       |       |                                                |                     |                                       |       |                                                | 8 $\times$ 15       | 0.085                                 | 0.17  | 730                                            |
| 470                        | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            | 10 $\times$ 12.5    | 0.090                                 | 0.18  | 755                                            | 10 $\times$ 16      | 0.068                                 | 0.136 | 1,050                                          |
|                            |                     |                                       |       |                                                |                     |                                       |       |                                                | 8 $\times$ 15       | 0.085                                 | 0.17  | 730                                            | 8 $\times$ 20       | 0.065                                 | 0.130 | 995                                            |
| 560                        | 8 $\times$ 11.5     | 0.117                                 | 0.234 | 555                                            |                     |                                       |       |                                                |                     |                                       |       |                                                | 10 $\times$ 20      | 0.052                                 | 0.104 | 1,220                                          |
| 680                        | 10 $\times$ 12.5    | 0.090                                 | 0.180 | 755                                            | 10 $\times$ 12.5    | 0.090                                 | 0.180 | 755                                            | 10 $\times$ 16      | 0.068                                 | 0.136 | 1,050                                          | 10 $\times$ 20      | 0.052                                 | 0.104 | 1,220                                          |
|                            |                     |                                       |       |                                                | 8 $\times$ 15       | 0.085                                 | 0.170 | 730                                            | 8 $\times$ 20       | 0.065                                 | 0.130 | 995                                            |                     |                                       |       |                                                |
| 820                        | 8 $\times$ 15       | 0.085                                 | 0.170 | 730                                            |                     |                                       |       |                                                | 10 $\times$ 20      | 0.052                                 | 0.104 | 1,220                                          | 10 $\times$ 25      | 0.045                                 | 0.090 | 1,440                                          |
|                            | 10 $\times$ 12.5    | 0.090                                 | 0.180 | 755                                            |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                |
| 1,000                      | 10 $\times$ 12.5    | 0.090                                 | 0.180 | 755                                            | 10 $\times$ 16      | 0.068                                 | 0.136 | 1,050                                          | 10 $\times$ 20      | 0.052                                 | 0.104 | 1,220                                          | 12.5 $\times$ 20    | 0.038                                 | 0.076 | 1,655                                          |
|                            |                     |                                       |       |                                                | 8 $\times$ 20       | 0.065                                 | 0.130 | 995                                            |                     |                                       |       |                                                | 10 $\times$ 30      | 0.035                                 | 0.070 | 1,815                                          |
| 1,200                      | 8 $\times$ 20       | 0.065                                 | 0.130 | 955                                            | 10 $\times$ 20      | 0.052                                 | 0.104 | 1,220                                          | 10 $\times$ 25      | 0.045                                 | 0.090 | 1,440                                          |                     |                                       |       |                                                |
|                            | 10 $\times$ 16      | 0.068                                 | 0.136 | 1,050                                          |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                |
| 1,500                      | 10 $\times$ 20      | 0.052                                 | 0.104 | 1,220                                          | 10 $\times$ 20      | 0.052                                 | 0.104 | 1,220                                          | 12.5 $\times$ 20    | 0.038                                 | 0.076 | 1,655                                          | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          |
|                            |                     |                                       |       |                                                | 10 $\times$ 25      | 0.045                                 | 0.090 | 1,440                                          | 10 $\times$ 30      | 0.035                                 | 0.070 | 1,815                                          | 12.5 $\times$ 25    | 0.030                                 | 0.060 | 1,945                                          |
| 1,800                      |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                | 12.5 $\times$ 30    | 0.025                                 | 0.050 | 2,310                                          |
|                            |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                | 16 $\times$ 20      | 0.029                                 | 0.058 | 2,205                                          |
| 2,200                      | 10 $\times$ 25      | 0.045                                 | 0.090 | 1,440                                          | 12.5 $\times$ 20    | 0.038                                 | 0.076 | 1,655                                          | 12.5 $\times$ 25    | 0.030                                 | 0.06  | 1,945                                          | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          |
|                            | 12.5 $\times$ 20    | 0.038                                 | 0.076 | 1,815                                          | 10 $\times$ 30      | 0.035                                 | 0.070 | 1,815                                          |                     |                                       |       |                                                | 18 $\times$ 20      | 0.028                                 | 0.056 | 2,490                                          |
|                            |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                | 12.5 $\times$ 35    | 0.022                                 | 0.044 | 2,510                                          |
| 2,700                      | 10 $\times$ 30      | 0.035                                 | 0.070 | 1,815                                          | 12.5 $\times$ 25    | 0.030                                 | 0.060 | 1,945                                          | 12.5 $\times$ 30    | 0.025                                 | 0.05  | 2,310                                          | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          |
|                            |                     |                                       |       |                                                |                     |                                       |       |                                                | 16 $\times$ 20      | 0.029                                 | 0.058 | 2,205                                          |                     |                                       |       |                                                |
| 3,300                      | 12.5 $\times$ 20    | 0.038                                 | 0.076 | 1,655                                          | 12.5 $\times$ 25    | 0.030                                 | 0.060 | 1,945                                          | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          | 16 $\times$ 31.5    | 0.018                                 | 0.036 | 3,010                                          |
|                            |                     |                                       |       |                                                | 12.5 $\times$ 30    | 0.025                                 | 0.050 | 2,310                                          | 12.5 $\times$ 35    | 0.022                                 | 0.044 | 2,510                                          | 18 $\times$ 25      | 0.020                                 | 0.040 | 2,740                                          |
| 3,900                      | 12.5 $\times$ 25    | 0.030                                 | 0.060 | 1,945                                          | 12.5 $\times$ 35    | 0.022                                 | 0.044 | 2,510                                          | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          | 16 $\times$ 35.5    | 0.016                                 | 0.032 | 3,150                                          |
|                            |                     |                                       |       |                                                | 16 $\times$ 20      | 0.029                                 | 0.058 | 2,205                                          | 18 $\times$ 20      | 0.028                                 | 0.056 | 2,490                                          | 18 $\times$ 31.5    | 0.016                                 | 0.032 | 3,635                                          |
| 4,700                      | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          | 16 $\times$ 31.5    | 0.018                                 | 0.036 | 3,010                                          | 18 $\times$ 35.5    | 0.015                                 | 0.030 | 3,680                                          |
|                            | 12.5 $\times$ 30    | 0.025                                 | 0.050 | 2,310                                          |                     |                                       |       |                                                | 18 $\times$ 25      | 0.020                                 | 0.040 | 2,740                                          |                     |                                       |       |                                                |
| 5,600                      | 12.5 $\times$ 35    | 0.022                                 | 0.044 | 2,510                                          | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          | 18 $\times$ 35.5    | 0.016                                 | 0.032 | 3,150                                          |                     |                                       |       |                                                |
|                            | 16 $\times$ 20      | 0.029                                 | 0.058 | 2,205                                          | 18 $\times$ 20      | 0.028                                 | 0.056 | 2,490                                          | 18 $\times$ 31.5    | 0.016                                 | 0.032 | 3,635                                          |                     |                                       |       |                                                |
| 6,800                      | 16 $\times$ 25      | 0.022                                 | 0.044 | 2,555                                          | 16 $\times$ 31.5    | 0.018                                 | 0.036 | 3,010                                          | 18 $\times$ 35.5    | 0.015                                 | 0.030 | 3,680                                          | 18 $\times$ 40      | 0.014                                 | 0.028 | 3,800                                          |
|                            | 18 $\times$ 20      | 0.028                                 | 0.056 | 2,490                                          | 18 $\times$ 25      | 0.020                                 | 0.040 | 2,740                                          |                     |                                       |       |                                                |                     |                                       |       |                                                |
| 8,200                      | 16 $\times$ 31.5    | 0.018                                 | 0.036 | 3,010                                          | 16 $\times$ 35.5    | 0.016                                 | 0.032 | 3,150                                          | 18 $\times$ 35.5    | 0.015                                 | 0.030 | 3,680                                          |                     |                                       |       |                                                |
|                            |                     |                                       |       |                                                | 18 $\times$ 31.5    | 0.016                                 | 0.032 | 3,635                                          |                     |                                       |       |                                                |                     |                                       |       |                                                |
| 10,000                     | 16 $\times$ 31.5    | 0.016                                 | 0.032 | 3,150                                          | 18 $\times$ 35.5    | 0.015                                 | 0.030 | 3,680                                          | 18 $\times$ 40      | 0.014                                 | 0.028 | 3,800                                          |                     |                                       |       |                                                |
|                            | 18 $\times$ 25      | 0.020                                 | 0.040 | 2,740                                          |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                |
| 12,000                     | 18 $\times$ 31.5    | 0.016                                 | 0.032 | 3,635                                          |                     |                                       |       |                                                |                     |                                       |       |                                                |                     |                                       |       |                                                |
| 15,000                     | 18 $\times$ 35.5    | 0.015                                 | 0.030 | 3,680                                          | 18 $\times$ 40      | 0.014                                 | 0.028 | 3,800                                          |                     |                                       |       |                                                |                     |                                       |       |                                                |

Remark: The case size of 16 $\times$ 20, 18 $\times$ 20 and 18 $\times$ 25 are used flat type rubber bung.

Dimension:  $\phi D \times L$ (mm)

Ripple Current: mA/rms at 100KHz, 105°C

**DIMENSION & PERMISSIBLE RIPPLE CURRENT**

| <div>VDC</div> <div>Contents</div> <div><math>\mu F</math></div> | 35V (1V)          |                                       |       |                                                | 50V (1H)          |                                       |       |                                                | 63V (1J)          |                                       |       |                                                | 100V (2A)         |                                       |       |                                                |
|------------------------------------------------------------------|-------------------|---------------------------------------|-------|------------------------------------------------|-------------------|---------------------------------------|-------|------------------------------------------------|-------------------|---------------------------------------|-------|------------------------------------------------|-------------------|---------------------------------------|-------|------------------------------------------------|
|                                                                  | $\phi D \times L$ | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz | $\phi D \times L$ | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz | $\phi D \times L$ | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz | $\phi D \times L$ | Impedance<br>( $\Omega$ , Max/100KHz) |       | Ripple<br>Current<br>(mA/rms, 105°C)<br>100KHz |
|                                                                  |                   | 20°C                                  | -10°C |                                                |                   | 20°C                                  | -10°C |                                                |                   | 20°C                                  | -10°C |                                                |                   | 20°C                                  | -10°C |                                                |
| 0.47                                                             |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                | 5×11              | 43                                    | 86    | 20                                             |
| 1                                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                | 5×11              | 20                                    | 40    | 30                                             |
| 2.2                                                              |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                | 5×11              | 9.8                                   | 19.6  | 44                                             |
| 3.3                                                              |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                | 5×11              | 6.6                                   | 13.2  | 58                                             |
| 4.7                                                              | 5×11              | 0.6                                   | 1.2   | 180                                            | 5×11              | 2.3                                   | 4.6   | 90                                             | 5×11              | 4.7                                   | 9.4   | 68                                             | 5×11              | 4.6                                   | 9.2   | 74                                             |
| 6.8                                                              |                   |                                       |       |                                                |                   |                                       |       |                                                | 5×11              | 2.5                                   | 5.0   | 95                                             | 5×11              | 3.5                                   | 7.0   | 95                                             |
| 10                                                               | 5×11              | 0.6                                   | 1.2   | 180                                            | 5×11              | 1.4                                   | 2.8   | 120                                            | 5×11              | 2.1                                   | 4.2   | 110                                            | 6.3×11            | 1.8                                   | 3.6   | 130                                            |
| 12                                                               |                   |                                       |       |                                                |                   |                                       |       |                                                | 5×11              | 2.0                                   | 4.0   | 145                                            |                   |                                       |       |                                                |
| 15                                                               |                   |                                       |       |                                                |                   |                                       |       |                                                | 6.3×11            | 1.2                                   | 2.4   | 160                                            | 8×11.5            | 0.83                                  | 1.66  | 180                                            |
| 18                                                               |                   |                                       |       |                                                | 5×11              | 1.3                                   | 2.6   | 155                                            |                   |                                       |       |                                                | 6.3×15            | 0.80                                  | 1.60  | 200                                            |
| 22                                                               | 5×11              | 0.6                                   | 1.2   | 180                                            | 5×11              | 1.2                                   | 2.4   | 170                                            | 6.3×11            | 0.71                                  | 1.42  | 250                                            | 8×11.5            | 0.68                                  | 1.36  | 230                                            |
| 27                                                               | 5×11              | 0.6                                   | 1.2   | 180                                            |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 33                                                               | 5×11              | 0.6                                   | 1.2   | 180                                            | 6.3×11            | 0.43                                  | 0.86  | 300                                            | 6.3×11            | 0.71                                  | 1.42  | 250                                            | 10×12.5           | 0.46                                  | 0.92  | 320                                            |
| 39                                                               |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                | 8×15              | 0.45                                  | 0.90  | 360                                            |
| 47                                                               | 6.3×11            | 0.25                                  | 0.5   | 290                                            | 6.3×11            | 0.43                                  | 0.86  | 300                                            | 6.3×15            | 0.70                                  | 1.40  | 330                                            |                   |                                       |       |                                                |
| 56                                                               | 6.3×11            | 0.25                                  | 0.5   | 290                                            | 6.3×15            | 0.40                                  | 0.80  | 360                                            | 8×11.5            | 0.342                                 | 0.684 | 405                                            | 10×16             | 0.37                                  | 0.74  | 420                                            |
| 68                                                               |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                | 8×20              | 0.37                                  | 0.74  | 420                                            |
| 82                                                               | 6.3×15            | 0.23                                  | 0.46  | 430                                            | 8×11.5            | 0.234                                 | 0.468 | 485                                            |                   |                                       |       |                                                | 10×20             | 0.30                                  | 0.60  | 490                                            |
| 100                                                              | 8×11.5            | 0.117                                 | 0.234 | 555                                            | 8×11.5            | 0.234                                 | 0.468 | 485                                            | 10×12.5           | 0.256                                 | 0.512 | 535                                            | 10×25             | 0.25                                  | 0.50  | 540                                            |
|                                                                  |                   |                                       |       |                                                |                   |                                       |       |                                                | 8×15              | 0.230                                 | 0.460 | 535                                            | 12.5×20           | 0.18                                  | 0.36  | 580                                            |
| 120                                                              |                   |                                       |       |                                                | 8×15              | 0.155                                 | 0.310 | 635                                            | 10×16             | 0.194                                 | 0.388 | 600                                            |                   |                                       |       |                                                |
|                                                                  |                   |                                       |       |                                                | 10×12.5           | 0.162                                 | 0.324 | 615                                            |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 150                                                              | 8×11.5            | 0.117                                 | 0.234 | 555                                            | 10×12.5           | 0.162                                 | 0.324 | 615                                            | 10×16             | 0.194                                 | 0.388 | 660                                            | 12.5×25           | 0.13                                  | 0.26  | 710                                            |
| 180                                                              |                   |                                       |       |                                                | 8×20              | 0.120                                 | 0.240 | 860                                            | 10×20             | 0.147                                 | 0.294 | 885                                            | 12.5×30           | 0.12                                  | 0.24  | 790                                            |
|                                                                  |                   |                                       |       |                                                | 10×16             | 0.119                                 | 0.238 | 850                                            | 12.5×16           | 0.150                                 | 0.300 | 1,020                                          | 16×20             | 0.13                                  | 0.26  | 750                                            |
| 220                                                              | 10×12.5           | 0.090                                 | 0.18  | 755                                            | 10×16             | 0.119                                 | 0.238 | 850                                            | 10×20             | 0.147                                 | 0.294 | 885                                            | 16×25             | 0.10                                  | 0.20  | 890                                            |
|                                                                  | 8×15              | 0.085                                 | 0.17  | 730                                            | 10×20             | 0.090                                 | 0.180 | 1,030                                          | 10×25             | 0.130                                 | 0.260 | 1,050                                          | 18×20             | 0.11                                  | 0.22  | 850                                            |
| 270                                                              |                   |                                       |       |                                                | 10×25             | 0.082                                 | 0.164 | 1,200                                          | 16×16             | 0.090                                 | 0.180 | 1,410                                          |                   |                                       |       |                                                |
| 330                                                              | 10×16             | 0.068                                 | 0.136 | 1,050                                          | 10×20             | 0.090                                 | 0.180 | 1,030                                          | 12.5×20           | 0.085                                 | 0.170 | 1,285                                          | 16×25             | 0.090                                 | 0.180 | 1,080                                          |
|                                                                  | 8×20              | 0.065                                 | 0.130 | 995                                            | 10×30             | 0.060                                 | 0.120 | 1,610                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 390                                                              | 10×20             | 0.052                                 | 0.104 | 1,220                                          | 12.5×20           | 0.063                                 | 0.126 | 1,480                                          | 12.5×25           | 0.070                                 | 0.140 | 1,720                                          | 18×25             | 0.083                                 | 0.166 | 1,260                                          |
|                                                                  |                   |                                       |       |                                                |                   |                                       |       |                                                | 18×16             | 0.086                                 | 0.172 | 1,690                                          |                   |                                       |       |                                                |
| 470                                                              | 10×20             | 0.052                                 | 0.104 | 1,220                                          |                   |                                       |       |                                                | 12.5×25           | 0.070                                 | 0.140 | 1,720                                          | 16×31.5           | 0.076                                 | 0.152 | 1,310                                          |
|                                                                  |                   |                                       |       |                                                | 12.5×20           | 0.060                                 | 0.120 | 1,500                                          | 12.5×30           | 0.055                                 | 0.110 | 2,090                                          |                   |                                       |       |                                                |
|                                                                  |                   |                                       |       |                                                |                   |                                       |       |                                                | 16×20             | 0.059                                 | 0.118 | 1,765                                          |                   |                                       |       |                                                |
| 560                                                              | 10×25             | 0.045                                 | 0.090 | 1,440                                          | 12.5×25           | 0.050                                 | 0.100 | 1,832                                          | 16×25             | 0.050                                 | 0.100 | 2,160                                          | 18×31.5           | 0.068                                 | 0.136 | 1,370                                          |
|                                                                  |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                | 18×35.5           | 0.064                                 | 0.128 | 1,410                                          |
| 680                                                              | 12.5×20           | 0.038                                 | 0.076 | 1,655                                          | 12.5×25           | 0.050                                 | 0.100 | 1,832                                          | 12.5×35           | 0.047                                 | 0.094 | 2,265                                          |                   |                                       |       |                                                |
|                                                                  | 10×30             | 0.035                                 | 0.070 | 1,815                                          | 16×20             | 0.048                                 | 0.096 | 1,835                                          | 18×20             | 0.055                                 | 0.110 | 2,290                                          |                   |                                       |       |                                                |
| 820                                                              |                   |                                       |       |                                                | 12.5×35           | 0.034                                 | 0.068 | 2,285                                          | 16×31.5           | 0.043                                 | 0.086 | 2,670                                          | 18×40             | 0.047                                 | 0.094 | 1,520                                          |
|                                                                  |                   |                                       |       |                                                | 18×20             | 0.042                                 | 0.084 | 2,420                                          | 18×25             | 0.043                                 | 0.086 | 2,585                                          |                   |                                       |       |                                                |
| 1,000                                                            | 12.5×25           | 0.030                                 | 0.060 | 1,945                                          | 16×25             | 0.034                                 | 0.068 | 2,235                                          | 16×31.5           | 0.043                                 | 0.086 | 2,670                                          |                   |                                       |       |                                                |
|                                                                  |                   |                                       |       |                                                |                   |                                       |       |                                                | 16×35.5           | 0.036                                 | 0.072 | 2,770                                          |                   |                                       |       |                                                |
| 1,200                                                            | 12.5×30           | 0.025                                 | 0.050 | 2,310                                          | 16×31.5           | 0.028                                 | 0.056 | 2,700                                          | 18×31.5           | 0.032                                 | 0.064 | 2,950                                          |                   |                                       |       |                                                |
|                                                                  | 16×20             | 0.029                                 | 0.058 | 2,205                                          | 18×25             | 0.029                                 | 0.058 | 2,610                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 1,500                                                            | 16×25             | 0.022                                 | 0.044 | 2,555                                          | 16×31.5           | 0.028                                 | 0.056 | 2,700                                          | 18×35.5           | 0.030                                 | 0.060 | 3,095                                          |                   |                                       |       |                                                |
|                                                                  | 12.5×35           | 0.022                                 | 0.044 | 2,510                                          | 16×35.5           | 0.025                                 | 0.05  | 2,790                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 1,800                                                            | 16×25             | 0.022                                 | 0.044 | 2,555                                          | 18×31.5           | 0.025                                 | 0.05  | 3,000                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |
|                                                                  | 18×20             | 0.028                                 | 0.056 | 2,490                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 2,200                                                            | 16×31.5           | 0.018                                 | 0.036 | 3,010                                          | 18×35.5           | 0.023                                 | 0.046 | 3,100                                          | 18×40             | 0.028                                 | 0.056 | 3,200                                          |                   |                                       |       |                                                |
|                                                                  | 18×25             | 0.020                                 | 0.040 | 2,740                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 2,700                                                            | 16×35.5           | 0.016                                 | 0.032 | 3,150                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |
|                                                                  | 18×31.5           | 0.016                                 | 0.032 | 3,635                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 3,300                                                            | 18×35.5           | 0.015                                 | 0.030 | 3,680                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |
| 4,700                                                            | 18×40             | 0.014                                 | 0.028 | 3,800                                          |                   |                                       |       |                                                |                   |                                       |       |                                                |                   |                                       |       |                                                |

Remark: The case size of 16×20, 18×20 and 18×25 are used flat type rubber bung.