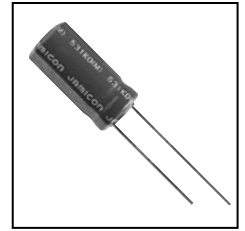


- High temperature 105°C and high reliability.
- Good reliability series for communication equipment and industrial measurement instruments.



## ● SPECIFICATION

| Item   | Characteristic   |      |  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|--|--|------|--|------|-------|------|--------|------|----------------------------------|------|---------|------|------|------|------|--|
| Operation Temperature Range                        | -40 ~ +105°C   |      |  |      |       |      |        |      | -25 ~ +105°C                     |      |         |      |      |      |      |  |
| Rated Working Voltage                              | 6.3 ~ 100VDC   |      |  |      |       |      |        |      | 160~450VDC                       |      |         |      |      |      |      |  |
| Capacitance Tolerance (120Hz 20°C)                 | ±20%(M)  |      |  |      |       |      |        |      | +50% -10%(T)                     |      |         |      |      |      |      |  |
| Leakage Current<br>(20°C)                          | $I \leq 0.01CV$ or $4 (\mu A)$   |      |  |      |       |      |        |      | $I \leq 0.03CV + 40 (\mu A)$ max |      |         |      |      |      |      |  |
|  | *Whichever is greater after 3 minutes<br>I : Leakage Current ( $\mu A$ ) C : Rated Capacitance ( $\mu F$ ) V : Working Voltage (V) |      |  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
| Surge Voltage<br>(20°C)                            | W.V.   | 6.3  | 10   | 16   | 25    | 35   | 50     | 63   | 100                              | 160  | 200     | 250  | 350  | 400  | 450  |  |
|  | S.V.   | 8    | 13   | 20   | 32    | 44   | 63     | 79   | 125                              | 200  | 250     | 300  | 400  | 450  | 500  |  |
| Dissipation Factor (tan $\delta$ )<br>(120Hz 20°C) | Add 0.02 per 1000 $\mu F$ for more than 1000 $\mu F$   |      |  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | W.V.   | 6.3  | 10   | 16   | 25    | 35   | 50     | 63   | 100                              | 160  | 200     | 250  | 350  | 400  | 450  |  |
|  | tan $\delta$   | 0.20 | 0.17   | 0.15 | 0.12  | 0.10 | 0.09   | 0.09 | 0.07                             | 0.15 | 0.12    | 0.10 | 0.15 | 0.15 | 0.15 |  |
| Low Temperature Stability                          | Impedance ratio at 120Hz   |      |  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | Rated Voltage (V)  |      | 6.3  |      | 10~16 |      | 25~100 |      | 160~250                          |      | 350~400 |      | 450  |      |      |  |
|  | -25°C / +20°C  |      | 4  |      | 3     |      | 2      |      | 4                                |      | 8       |      | 15   |      |      |  |
|  | -40°C / +20°C  |      | 8  |      | 6     |      | 4      |      | —                                |      | —       |      | —    |      |      |  |
| Load Life  | After 2000 hours application of W.V. at +105°C, the capacitor shall meet the following limits.                                     |      |  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | Capacitance Change   |      | $\leq \pm 25\%$ of initial value for 6.3~16W.V., $\leq \pm 20\%$ of initial value for 25~450W.V. |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | Dissipation Factor   |      | $\leq 200\%$ of initial specified value  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | Leakage current  |      | $\leq$ initial specified value   |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
| Shelf Life   | At +105°C no voltage application after 1000 hours the capacitor shall meet the following limits.<br>(with voltage treatment)       |      |  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | Capacitance Change   |      | $\leq \pm 20\%$ of initial value   |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | Dissipation Factor   |      | $\leq 200\%$ of initial specified value  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |
|  | Leakage current  |      | $\leq 200\%$ of initial specified value  |      |       |      |        |      |                                  |      |         |      |      |      |      |  |

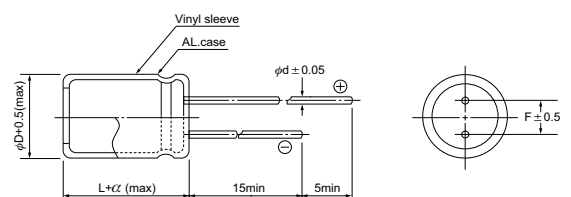
## ● DIMENSIONS (mm)

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

## ● RIPPLE CURRENT COEFFICIENTS

| Temperature(°C) | 65   | 85   | 105  |
|-----------------|------|------|------|
| Multiplier      | 1.80 | 1.50 | 1.00 |

| Frequency(Hz) | 60         | 120  | 1k   | $\geq 10k$ |
|---------------|------------|------|------|------------|
| W.V.          | Multiplier |      |      |            |
| 6.3~25V       | 0.80       | 1.00 | 1.15 | 1.20       |
| 35~100V       | 0.75       | 1.00 | 1.30 | 1.40       |
| 160~450V      | 0.70       | 1.00 | 1.40 | 1.60       |



● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)  
Max ripple current : mA(rms) 105°C 120Hz

| μF    | V(Code) |      | 6.3 (0J) |      | 10 (1A) |      | 16 (1C) |      |
|-------|---------|------|----------|------|---------|------|---------|------|
|       | Code    | Item | DxL      | R.C. | DxL     | R.C. | DxL     | R.C. |
| 47    | 470     |      |          |      |         | →    | 5x11    | 85   |
| 100   | 101     |      | 6.3x11   | 120  | 6.3x11  | 130  | 6.3x11  | 140  |
| 220   | 221     |      | 6.3x11   | 180  | 6.3x11  | 190  | 8x11.5  | 240  |
| 330   | 331     |      | 8x11.5   | 260  | 8x11.5  | 280  | 10x12.5 | 310  |
| 470   | 471     |      | 8x11.5   | 310  | 8x11.5  | 330  | 10x12.5 | 370  |
| 1000  | 102     |      | 10x12.5  | 470  | 10x16   | 570  | 10x20   | 660  |
| 2200  | 222     |      | 10x20    | 810  | 12.5x20 | 930  | 12.5x25 | 1090 |
| 3300  | 332     |      | 12.5x20  | 1020 | 12.5x25 | 1200 | 16x25   | 1270 |
| 4700  | 472     |      | 12.5x25  | 1260 | 16x25   | 1350 | 16x31.5 | 1560 |
| 6800  | 682     |      | 16x25    | 1430 | 16x31.5 | 1660 | 18x35.5 | 1940 |
| 10000 | 103     |      | 16x31.5  | 1730 | 18x35.5 | 2030 | 18x40   | 2200 |
| 15000 | 153     |      | 18x35.5  | 2120 | 18x40   | 2310 |         |      |

| μF   | V(Code) |      | 25 (1E) |      | 35 (1V) |      | 50 (1H) |      |
|------|---------|------|---------|------|---------|------|---------|------|
|      | Code    | Item | DxL     | R.C. | DxL     | R.C. | DxL     | R.C. |
| 0.47 | R47     |      |         |      |         | →    | 5x11    | 11   |
| 1    | 010     |      |         |      |         | →    | 5x11    | 16   |
| 2.2  | 2R2     |      |         |      |         | →    | 5x11    | 23   |
| 3.3  | 3R3     |      |         |      |         | →    | 5x11    | 29   |
| 4.7  | 4R7     |      |         |      |         | →    | 5x11    | 34   |
| 10   | 100     |      | 5x11    | 43   | 5x11    | 47   | 5x11    | 50   |
| 22   | 220     |      | 5x11    | 65   | 6.3x11  | 80   | 6.3x11  | 85   |
| 33   | 330     |      | 6.3x11  | 90   | 6.3x11  | 100  | 8x11.5  | 120  |
| 47   | 470     |      | 6.3x11  | 110  | 8x11.5  | 140  | 8x11.5  | 140  |
| 100  | 101     |      | 8x11.5  | 180  | 8x11.5  | 200  | 10x12.5 | 220  |
| 220  | 221     |      | 10x12.5 | 280  | 10x12.5 | 310  | 10x16   | 360  |
| 330  | 331     |      | 10x12.5 | 350  | 10x16   | 420  | 10x20   | 490  |
| 470  | 471     |      | 10x16   | 460  | 10x20   | 560  | 12.5x20 | 630  |
| 1000 | 102     |      | 12.5x20 | 790  | 12.5x25 | 960  | 16x25   | 1010 |
| 2200 | 222     |      | 16x25   | 1210 | 16x31.5 | 1440 | 18x35.5 | 1700 |
| 3300 | 332     |      | 16x31.5 | 1530 | 18x35.5 | 1840 | 18x40   | 2020 |
| 4700 | 472     |      | 18x35.5 | 1890 | 18x40   | 2100 |         |      |
| 6800 | 682     |      | 18x40   | 2170 |         |      |         |      |

| μF   | V(Code) |      | 63 (1J) |      | 100 (2A) |      |
|------|---------|------|---------|------|----------|------|
|      | Code    | Item | DxL     | R.C. | DxL      | R.C. |
| 0.47 | R47     |      |         | →    | 5x11     | 12   |
| 1    | 010     |      |         | →    | 5x11     | 18   |
| 2.2  | 2R2     |      |         | →    | 5x11     | 27   |
| 3.3  | 3R3     |      |         | →    | 5x11     | 33   |
| 4.7  | 4R7     |      |         | →    | 5x11     | 39   |
| 10   | 100     |      | 5x11    | 50   | 6.3x11   | 65   |
| 22   | 220     |      | 6.3x11  | 85   | 8x11.5   | 110  |
| 33   | 330     |      | 8x11.5  | 120  | 10x12.5  | 140  |
| 47   | 470     |      | 10x12.5 | 150  | 10x16    | 190  |
| 100  | 101     |      | 10x16   | 250  | 12.5x20  | 330  |
| 220  | 221     |      | 10x20   | 400  | 16x25    | 540  |
| 330  | 331     |      | 12.5x20 | 530  | 16x25    | 660  |
| 470  | 471     |      | 12.5x25 | 690  | 16x31.5  | 870  |
| 1000 | 102     |      | 16x31.5 | 1120 |          |      |

All blank voltage on sleeve marking is the same voltage as " → "point to.

● CASE SIZE & MAX RIPPLE CURRENT

Case size : D x L (mm)  
 Max ripple current : mA(rms) 105°C 120Hz

| μF   | V(Code) |      | 160 (2C) |      | 200 (2D) |      | 250 (2E) |      |
|------|---------|------|----------|------|----------|------|----------|------|
|      | Code    | Item | DxL      | R.C. | DxL      | R.C. | DxL      | R.C. |
| 0.47 | R47     |      | 6.3x11   | 13   | 6.3x11   | 14   | 6.3x11   | 15   |
| 1    | 010     |      | 6.3x11   | 19   | 6.3x11   | 20   | 8x11.5   | 26   |
| 2.2  | 2R2     |      | 6.3x11   | 28   | 6.3x11   | 30   | 8x11.5   | 38   |
| 3.3  | 3R3     |      | 8x11.5   | 40   | 8x11.5   | 43   | 10x12.5  | 49   |
| 4.7  | 4R7     |      | 8x11.5   | 48   | 10x12.5  | 55   | 10x12.5  | 60   |
| 10   | 100     |      | 10x12.5  | 75   | 10x16    | 90   | 10x20    | 110  |
| 22   | 220     |      | 10x20    | 140  | 10x20    | 140  | 12.5x20  | 170  |
| 33   | 330     |      | 12.5x20  | 180  | 12.5x20  | 190  | 12.5x25  | 220  |
| 47   | 470     |      | 12.5x25  | 230  | 12.5x25  | 250  | 16x25    | 270  |
| 100  | 101     |      | 16x25    | 340  | 16x31.5  | 400  | 16x35.5  | 460  |
| 220  | 221     |      | 18x35.5  | 630  | 18x40    | 710  |          |      |

| μF  | V(Code) |      | 350 (2V) |      | 400 (2G) |      | 450 (2W) |      |
|-----|---------|------|----------|------|----------|------|----------|------|
|     | Code    | Item | DxL      | R.C. | DxL      | R.C. | DxL      | R.C. |
| 1   | 010     |      | 10x12.5  | 19   | 10x12.5  | 20   | 10x18    | 20   |
| 2.2 | 2R2     |      | 10x16    | 32   | 10x18    | 35   | 12.5x20  | 33   |
| 3.3 | 3R3     |      | 10x20    | 43   | 12.5x20  | 48   | 12.5x25  | 45   |
| 4.7 | 4R7     |      | 12.5x20  | 55   | 12.5x20  | 55   | 16x25    | 55   |
| 10  | 100     |      | 12.5x25  | 85   | 12.5x25  | 90   | 16x31.5  | 85   |
| 22  | 220     |      | 16x31.5  | 140  | 16x31.5  | 150  | 16x35.5  | 140  |
| 33  | 330     |      | 18x35.5  | 200  | 18x35.5  | 210  | 18x40    | 190  |
| 47  | 470     |      | 18x40    | 250  | 18x40    | 260  |          |      |