

Standard Capacitors

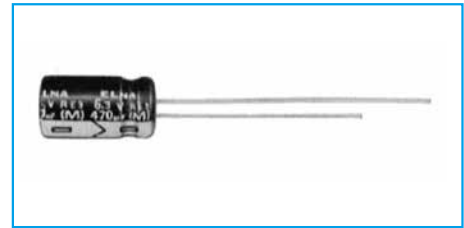
GREEN CAP

Anti-cleaning solvent 250V Max.

• Guarantees 2000 hours at 85°C.



High temperature



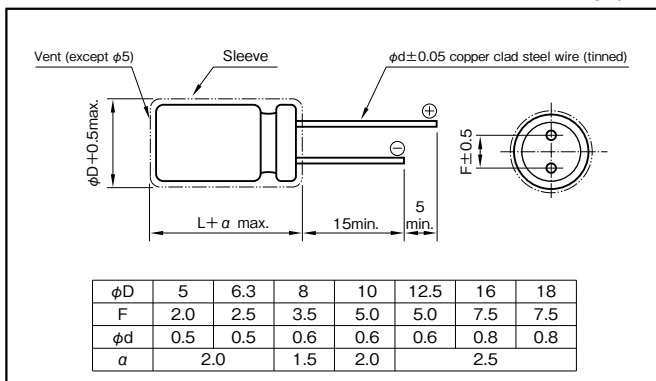
Marking color : White print on a blue sleeve

Specifications

| Item | Performance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|------------|------------|----------------------|---|--|------|------|------|------|------|------|------|------|-----|-----|------------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|----|----|---|---|---|---|---|----|----|----|----|----|----|----|
| Category temperature range (°C) | -40 to +85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tolerance at rated capacitance (%) | ±20 (20°C, 120Hz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage current (µA) | <table border="1"> <tr> <th>Rated voltage (V)</th> <th>6.3 to 100</th> <th>160 to 450</th> </tr> <tr> <td>Leakage current (µA)</td> <td>Less than 0.03CV or 4 whichever is larger (after 1 minute) Less than 0.01CV or 3 whichever is larger (after 2 minutes)</td> <td>CV ≤ 1000 : Less than 0.1CV+40 (after 1 minute) CV > 1000 : Less than 0.04CV+100 (after 1 minute)</td> </tr> </table> | Rated voltage (V) | 6.3 to 100 | 160 to 450 | Leakage current (µA) | Less than 0.03CV or 4 whichever is larger (after 1 minute) Less than 0.01CV or 3 whichever is larger (after 2 minutes) | CV ≤ 1000 : Less than 0.1CV+40 (after 1 minute) CV > 1000 : Less than 0.04CV+100 (after 1 minute) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Rated voltage (V) | 6.3 to 100 | 160 to 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| C : Rated capacitance (µF) V : Rated voltage (V) (20°C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tangent of loss angle (tanδ) | <table border="1"> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>315</th> <th>350</th> <th>400</th> <th>450</th> </tr> <tr> <td>tanδ (max.)</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.20</td> <td>0.20</td> <td>0.20</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> </tr> </table> | Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 315 | 350 | 400 | 450 | tanδ (max.) | 0.28 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.20 | 0.20 | 0.20 | 0.24 | 0.24 | 0.24 | 0.24 | | | | | | | | | | | | | | | |
| | Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 315 | 350 | 400 | 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| tanδ (max.) | 0.28 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.20 | 0.20 | 0.20 | 0.24 | 0.24 | 0.24 | 0.24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.02 is added to every 1000µF increase over 1000µF. (20°C, 120Hz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Characteristics at high and low temperature | <table border="1"> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>315</th> <th>350</th> <th>400</th> <th>450</th> </tr> <tr> <td rowspan="2">Impedance ratio (max.)</td> <td>Z-25°C/Z+20°C</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>Z-40°C/Z+20°C</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>15</td> <td>15</td> <td>15</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> </tr> </table> | Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 315 | 350 | 400 | 450 | Impedance ratio (max.) | Z-25°C/Z+20°C | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | Z-40°C/Z+20°C | 12 | 10 | 8 | 5 | 4 | 3 | 3 | 15 | 15 | 15 | 10 | 10 | 10 | 10 |
| | Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 315 | 350 | 400 | 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impedance ratio (max.) | Z-25°C/Z+20°C | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Z-40°C/Z+20°C | 12 | 10 | 8 | 5 | 4 | 3 | 3 | 15 | 15 | 15 | 10 | 10 | 10 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (120Hz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Endurance (85°C) (Applied ripple current) | Test time | 2000 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Leakage current | The initial specified value or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Percentage of capacitance change | Within ±20% of initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Tangent of the loss angle | 200% or less of the initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shelf life (85°C) | Test time : 1000hours ; other items are same as the endurance. Voltage application treatment : According to JIS C5101-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Applicable standards | JIS C5101-1, -4 1998 (IEC 60384-1 1992, -4 1985) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Outline Drawing

Unit : mm



Coefficient of Frequency for Rated Ripple Current

| Rated voltage (V) | Frequency (Hz) | CV (µF×WV) | | | | |
|-------------------|----------------|------------|-----|-----|-----|------|
| | | 50 · 60 | 120 | 1k | 10k | 100k |
| 6.3 to 16 | All CV value | 0.8 | 1 | 1.1 | 1.2 | 1.2 |
| | ≤1000 | 0.8 | 1 | 1.5 | 1.7 | 1.7 |
| 25 to 35 | 1000< | 0.8 | 1 | 1.2 | 1.3 | 1.3 |
| | ≤1000 | 0.8 | 1 | 1.6 | 1.9 | 1.9 |
| 50 to 100 | 1000< | 0.8 | 1 | 1.2 | 1.3 | 1.3 |
| | ≤1000 | 0.8 | 1 | 1.3 | 1.5 | 1.6 |
| 160 to 450 | All CV value | 0.8 | 1 | 1.3 | 1.5 | 1.6 |

Part numbering system (example : 16V1000µF)

| | | | | | | | | | | |
|-------------|---|----------------------|---|--------------------------|------------------------------|---------------|-----------------|---|---|-----------------------|
| RE3 | — | 16 | V | 102 | M | H4 | # | □ | — | □ |
| Series code | | Rated voltage symbol | | Rated capacitance symbol | Capacitance tolerance symbol | Casing symbol | Optional symbol | | | Taping/Forming symbol |

Casing symbol

| Size φD×L (mm) | Casing Symbol | Size φD×L (mm) | Casing Symbol |
|----------------|---------------|----------------|---------------|
| 5×11 | E3 | 12.5×25 | I6 |
| 6.3×11 | F3 | 16×25 | J6 |
| 8×11.5 | G3 | 16×31.5 | J7 |
| 10×12.5 | H3 | 16×35.5 | J8 |
| 10×16 | H4 | 18×31.5 | K7 |
| 10×20 | H5 | 18×35.5 | K8 |
| 12.5×20 | I5 | 18×40 | K9 |

Standard Ratings

| Rated voltage (V) | Item | 6.3 | | | 10 | | | 16 | | | 25 | | | 35 | | | 50 | | | 63 | | | 100 | | |
|-------------------|---------|-----------|------|----------------------|-----------|------|----------------------|-----------|------|----------------------|-----------|------|----------------------|-----------|------|----------------------|-----------|------|----------------------|-----------|------|----------------------|-----------|------|----------------------|
| | | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current |
| | | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) |
| 1 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 5×11 | 199 | 21 | — | — | — | 5×11 | 133 | 21 | |
| 2.2 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 5×11 | 90.5 | 31 | — | — | — | 5×11 | 60.3 | 30 | |
| 3.3 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 5×11 | 60.3 | 38 | — | — | — | 5×11 | 40.2 | 40 | |
| 4.7 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 5×11 | 42.3 | 45 | 5×11 | 35.3 | 45 | 5×11 | 28.2 | 45 | | |
| 10 | — | — | — | — | — | — | 5×11 | 33.2 | 50 | 5×11 | 26.5 | 55 | 5×11 | 23.2 | 59 | 5×11 | 19.9 | 66 | 5×11 | 16.6 | 66 | 6.3×11 | 13.3 | 75 | |
| 22 | — | — | — | — | — | — | 5×11 | 15.1 | 75 | 5×11 | 12.1 | 82 | 5×11 | 10.6 | 87 | 5×11 | 9.1 | 98 | 5×11 | 7.5 | 100 | 6.3×11 | 6.0 | 130 | |
| 33 | — | — | — | — | — | — | 5×11 | 10.1 | 92 | 5×11 | 8.0 | 100 | 5×11 | 7.0 | 107 | 5×11 | 6.0 | 126 | 6.3×11 | 5.0 | 140 | 8×11.5 | 4.0 | 180 | |
| 47 | — | — | — | 5×11 | 8.5 | 99 | 5×11 | 7.1 | 110 | 5×11 | 5.7 | 118 | 5×11 | 4.9 | 130 | 6.3×11 | 4.2 | 155 | 6.3×11 | 3.5 | 170 | 10×12.5 | 2.8 | 230 | |
| 100 | — | — | — | 5×11 | 3.8 | 146 | 5×11 | 3.3 | 160 | 6.3×11 | 2.7 | 199 | 6.3×11 | 2.3 | 214 | 8×11.5 | 2.0 | 298 | 8×11.5 | 1.7 | 298 | 10×20 | 1.3 | 370 | |
| 220 | 5×11 | 2.1 | 200 | 6.3×11 | 1.8 | 240 | 6.3×11 | 1.5 | 264 | 8×11.5 | 1.2 | 349 | 10×12.5 | 1.1 | 443 | 10×12.5 | 0.75 | 443 | 10×16 | 0.75 | 470 | 12.5×20 | 0.60 | 620 | |
| 330 | 6.3×11 | 1.4 | 270 | 6.3×11 | 1.2 | 290 | 8×11.5 | 1.0 | 383 | 10×12.5 | 0.81 | 510 | 10×12.5 | 0.70 | 542 | 10×16 | 0.60 | 595 | 10×20 | 0.50 | 710 | 12.5×25 | 0.40 | 760 | |
| 470 | 6.3×11 | 0.99 | 322 | 8×11.5 | 0.85 | 417 | 8×11.5 | 0.71 | 457 | 10×12.5 | 0.57 | 545 | 10×16 | 0.49 | 664 | 12.5×20 | 0.42 | 887 | 12.5×20 | 0.35 | 900 | 16×25 | 0.28 | 1000 | |
| 1000 | 8×11.5 | 0.47 | 546 | 10×12.5 | 0.40 | 650 | 10×16 | 0.33 | 791 | 10×20 | 0.27 | 996 | 12.5×20 | 0.23 | 1210 | 12.5×25 | 0.20 | 1400 | 16×25 | 0.17 | 1300 | 18×40 | 0.13 | 1380 | |
| 2200 | 10×20 | 0.23 | 1010 | 10×20 | 0.20 | 1080 | 12.5×20 | 0.17 | 1350 | 12.5×25 | 0.14 | 1660 | 16×25 | 0.12 | 1950 | 16×35.5 | 0.11 | 2340 | — | — | — | — | — | — | |
| 3300 | 10×20 | 0.16 | 1230 | 12.5×20 | 0.14 | 1430 | 12.5×25 | 0.12 | 1690 | 16×25 | 0.10 | 2030 | 16×35.5 | 0.090 | 2510 | 18×35.5 | 0.080 | 2810 | — | — | — | — | — | — | |
| 4700 | 12.5×20 | 0.12 | 1710 | 12.5×25 | 0.11 | 1780 | 16×25 | 0.092 | 2100 | 16×31.5 | 0.078 | 2650 | 18×35.5 | 0.071 | 2990 | — | — | — | — | — | — | — | — | — | |
| 6800 | 12.5×25 | 0.093 | 1930 | 16×25 | 0.083 | 2200 | 16×35.5 | 0.073 | 2580 | 18×35.5 | 0.063 | 3290 | — | — | — | — | — | — | — | — | — | — | — | — | |
| 10000 | 16×25 | 0.076 | 2450 | 16×35.5 | 0.070 | 2700 | 18×35.5 | 0.063 | 3130 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| 15000 | 16×35.5 | 0.062 | 2860 | 18×35.5 | 0.058 | 3100 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| 22000 | 18×40 | 0.053 | 3340 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | |

ALUMINUM

| Rated voltage (V) | Item | 160 | | | 200 | | | 250 | | | 315 | | | 350 | | | 400 | | | 450 | | | | |
|-------------------|---------|-----------|------|----------------------|-----------|-----|----------------------|-----------|-----|----------------------|-----------|-----|----------------------|-----------|-----|----------------------|-----------|-----|----------------------|-----------|-----|----------------------|---|---|
| | | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | Case | ESR | Rated ripple current | | |
| | | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | φD×L (mm) | (Ω) | (mA _{rms}) | | |
| 0.47 | 6.3×11 | 706 | 15 | 6.3×11 | 706 | 15 | 6.3×11 | 706 | 15 | 6.3×11 | 847 | 15 | 6.3×11 | 847 | 15 | 6.3×11 | 847 | 15 | 8×11.5 | 847 | 18 | | | |
| 1 | 6.3×11 | 332 | 22 | 6.3×11 | 332 | 22 | 6.3×11 | 332 | 22 | 6.3×11 | 398 | 22 | 6.3×11 | 398 | 22 | 6.3×11 | 398 | 22 | 8×11.5 | 398 | 25 | | | |
| 2.2 | 6.3×11 | 151 | 32 | 6.3×11 | 151 | 32 | 6.3×11 | 151 | 32 | 8×11.5 | 181 | 38 | 8×11.5 | 181 | 38 | 8×11.5 | 181 | 38 | 10×12.5 | 181 | 43 | | | |
| 3.3 | 6.3×11 | 101 | 40 | 6.3×11 | 101 | 40 | 8×11.5 | 101 | 48 | 10×12.5 | 121 | 53 | 10×12.5 | 121 | 53 | 10×12.5 | 121 | 54 | 10×16 | 121 | 59 | | | |
| 4.7 | 6.3×11 | 70.6 | 48 | 8×11.5 | 70.6 | 56 | 8×11.5 | 70.6 | 56 | 10×12.5 | 84.7 | 65 | 10×12.5 | 84.7 | 65 | 10×16 | 84.7 | 71 | 10×20 | 84.7 | 76 | | | |
| 10 | 8×11.5 | 33.2 | 81 | 10×12.5 | 33.2 | 94 | 10×16 | 33.2 | 101 | 10×20 | 39.8 | 115 | 10×20 | 39.8 | 115 | 12.5×20 | 39.8 | 123 | 12.5×20 | 39.8 | 123 | | | |
| 22 | 10×16 | 15.1 | 151 | 10×20 | 15.1 | 170 | 12.5×20 | 15.1 | 182 | 12.5×20 | 18.1 | 182 | 12.5×25 | 18.1 | 197 | 12.5×25 | 18.1 | 197 | 16×25 | 18.1 | 226 | | | |
| 33 | 10×20 | 10.1 | 202 | 12.5×20 | 10.1 | 223 | 12.5×25 | 10.1 | 243 | 16×25 | 12.1 | 277 | 16×25 | 12.1 | 277 | 16×25 | 12.1 | 277 | 16×31.5 | 12.1 | 304 | | | |
| 47 | 12.5×20 | 7.06 | 266 | 12.5×25 | 7.06 | 265 | 12.5×25 | 7.06 | 295 | 16×25 | 8.47 | 330 | 16×25 | 8.47 | 330 | 16×31.5 | 8.47 | 361 | 16×35.5 | 8.47 | 380 | | | |
| 100 | 12.5×25 | 3.32 | 422 | 16×25 | 3.32 | 483 | 16×31.5 | 3.32 | 528 | 18×31.5 | 3.98 | 567 | 18×31.5 | 3.98 | 567 | — | — | — | — | — | — | — | — | |
| 220 | 16×31.5 | 1.51 | 783 | 18×35.5 | 1.51 | 882 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| 330 | 18×35.5 | 1.01 | 1080 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

(Note) Rated ripple current : 85°C, 120Hz ; ESR : 20°C, 120Hz

MINIATURE ALUMINUM 85°C