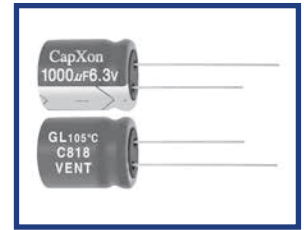


GL Series Low Impedance, Long Life

Features

- ◆ Low impedance for high frequency, Anti-Solvent Design.
- ◆ Long Life 2000 ~ 6000 hrs at 105°C depending on case size.
- ◆ Radial type for switching power supply.
- ◆ RoHS Compliant



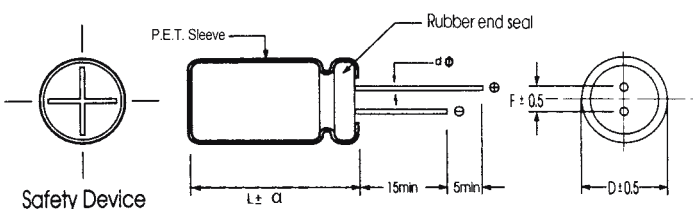
Specifications

| Item | Performance Characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|-----------------------|------------|-----------|------|-----|------|--------|------|-----------------|----|----|----|----|-----|-----|-----|-----------------|---|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|---|
| Operating Temperature Range | -55 to +105°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Voltage Range | 6.3 to 63 VDC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Range | 0.47 to 10000 µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (120Hz, +20°C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current (+20°C, max.) | I ≤ 0.01 CV or 3 (µA) After 2 minutes whichever is greater measured with rated working voltage applied. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor (tan δ, at 20°C, 120Hz) | <table border="1"> <tr> <th>Working Voltage (VDC)</th> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <th>D.F. (%)max</th> <td>20</td> <td>18</td> <td>16</td> <td>14</td> <td>12</td> <td>10</td> <td>9</td> </tr> </table> | | Working Voltage (VDC) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | D.F. (%)max | 20 | 18 | 16 | 14 | 12 | 10 | 9 | | | | | | | | | | | | | | | | |
| | Working Voltage (VDC) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D.F. (%)max | 20 | 18 | 16 | 14 | 12 | 10 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| For Capacitance > 1000 µF, add 2% per another 1000 µF. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low Temperature Characteristics (at 120Hz) | Impedance ratio max | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <th>Working Voltage(VDC)</th> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <th>Z-25°C / Z+20°C</th> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> </tr> <tr> <th>Z-40°C / Z+20°C</th> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <th>Z-55°C / Z+20°C</th> <td>8</td> <td>6</td> <td>5</td> <td>5</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table> | | Working Voltage(VDC) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | Z-25°C / Z+20°C | 4 | 3 | 2 | 2 | 1.5 | 1.5 | 1.5 | Z-40°C / Z+20°C | 6 | 4 | 3 | 3 | 2 | 2 | 2 | Z-55°C / Z+20°C | 8 | 6 | 5 | 5 | 4 | 4 | 4 |
| | Working Voltage(VDC) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Z-25°C / Z+20°C | 4 | 3 | 2 | 2 | 1.5 | 1.5 | 1.5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z-40°C / Z+20°C | 6 | 4 | 3 | 3 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z-55°C / Z+20°C | 8 | 6 | 5 | 5 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| For Capacitance > 1000 µF, add 0.5 per another 1000 µF for -25°C / +20°C add 1 per another 1000 µF for -40°C / +20°C add 1.5 per another 1000 µF for -55°C / +20°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Endurance | Test conditions Duration time :as right Ambient temperature :+105°C Applied voltage :Rated DC working voltage After test requirement at +20°C Capacitance change :≤ ±20% of the initial measured value Dissipation factor :≤ 200% of the initial specified value Leakage current :≤ The initial specified value | <table border="1"> <tr> <th>D φ</th> <th>Life hours</th> </tr> <tr> <td>5 - 6.3 φ</td> <td>2000</td> </tr> <tr> <td>8 φ</td> <td>3000</td> </tr> <tr> <td>≥ 10 φ</td> <td>6000</td> </tr> </table> | D φ | Life hours | 5 - 6.3 φ | 2000 | 8 φ | 3000 | ≥ 10 φ | 6000 | | | | | | | | | | | | | | | | | | | | | | | | |
| | D φ | Life hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 - 6.3 φ | 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 φ | 3000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥ 10 φ | 6000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shelf Life | Test conditions Duration time :1000Hrs Ambient temperature :+105°C Applied voltage :None After test requirement at +20°C:Same limits as Endurance. Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Multiplier for Ripple Current vs. Frequency

| CAP (µF) \ Frequency(Hz) | 50(60) | 120 | 400 | 1K | 10K | 50K-100K |
|--------------------------|--------|------|------|------|------|----------|
| CAP ≤ 10 | 0.47 | 0.59 | 0.76 | 0.85 | 0.97 | 1 |
| 10 < CAP ≤ 100 | 0.52 | 0.65 | 0.80 | 0.89 | 0.97 | 1 |
| 100 < CAP ≤ 1000 | 0.58 | 0.72 | 0.84 | 0.90 | 0.98 | 1 |
| 1000 < CAP | 0.63 | 0.78 | 0.87 | 0.91 | 0.98 | 1 |

Diagram of Dimensions:(unit:mm)



| D φ | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | 22 |
|-----|-----|-----|---------------|---------------|-----|-----|-----|----|
| F | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 10 |
| d φ | 0.5 | | L < 20 0.5 | L ≥ 20 0.6 | 0.6 | | 0.8 | |

| α | D < 18 | D = 18 | | D > 18 |
|---|--------|----------|----------|--------|
| | | L < 35.5 | L ≥ 35.5 | |
| | 1.5 | 1.5 | 2.0 | 2.0 |

Case Size

φ DxL(mm)

| WV Cap(μF) | 6.3 | | | 10 | | | 16 | | |
|---------------|---------|--------|-----------|---------|--------|-----------|---------|--------|-----------|
| | Size | Ripple | Impedance | Size | Ripple | Impedance | Size | Ripple | Impedance |
| 10 | | | | | | | 5x11 | 37 | 4.00 |
| 15 | | | | | | | 5x11 | 60 | 3.52 |
| 22 | | | | 5x11 | 56 | 2.60 | 5x11 | 70 | 2.00 |
| 27 | | | | 5x11 | 57 | 2.40 | 5x11 | 110 | 1.60 |
| 33 | | | | 5x11 | 58 | 2.20 | 5x11 | 130 | 1.26 |
| 39 | | | | 5x11 | 95 | 1.85 | 5x11 | 150 | 0.87 |
| 47 | | | | 5x11 | 120 | 1.20 | 5x11 | 190 | 0.52 |
| 56 | | | | 5x11 | 130 | 1.05 | 5x11 | 205 | 0.49 |
| 68 | | | | 5x11 | 145 | 0.89 | 5x11 | 210 | 0.45 |
| 82 | | | | 5x11 | 170 | 0.75 | 6.3x11 | 250 | 0.37 |
| 100 | 5x11 | 185 | 0.95 | 5x11 | 205 | 0.48 | 6.3x11 | 260 | 0.31 |
| 120 | 5x11 | 190 | 0.90 | 5x11 | 230 | 0.44 | 6.3x11 | 290 | 0.29 |
| 150 | 6.3x11 | 210 | 0.75 | 6.3x11 | 270 | 0.37 | 6.3x11 | 300 | 0.26 |
| 180 | 6.3x11 | 240 | 0.70 | 6.3x11 | 290 | 0.35 | 6.3x15 | 370 | 0.23 |
| | | | | | | | 8x11.5 | 368 | 0.24 |
| 220 | 6.3x11 | 300 | 0.55 | 6.3x11 | 330 | 0.28 | 6.3x15 | 470 | 0.20 |
| | | | | | | | 8x11.5 | 455 | 0.21 |
| 270 | 6.3x11 | 310 | 0.49 | 6.3x15 | 370 | 0.25 | 8x11.5 | 490 | 0.17 |
| | | | | 8x11.5 | 390 | 0.21 | | | |
| 330 | 6.3x15 | 320 | 0.34 | 6.3x15 | 445 | 0.15 | 8x11.5 | 550 | 0.12 |
| | 8x11.5 | 390 | 0.30 | 8x11.5 | 430 | 0.16 | | | |
| 470 | 6.3x15 | 435 | 0.25 | 8x11.5 | 555 | 0.115 | 8x16 | 745 | 0.092 |
| | 8x11.5 | 430 | 0.22 | | | | 10x12.5 | 722 | 0.095 |
| 560 | 8x11.5 | 480 | 0.20 | 8x11.5 | 620 | 0.095 | 10x12.5 | 780 | 0.082 |
| 680 | 8x11.5 | 510 | 0.18 | 8x16 | 630 | 0.090 | 10x16 | 920 | 0.074 |
| 820 | 8x16 | 620 | 0.14 | 8x20 | 870 | 0.084 | 10x16 | 1020 | 0.067 |
| 1000 | 8x16 | 710 | 0.10 | 8x20 | 1040 | 0.070 | 10x20 | 1180 | 0.050 |
| | 10x12.5 | 625 | 0.12 | 10x16 | 1010 | 0.072 | | | |
| 1200 | 10x16 | 810 | 0.095 | 10x16 | 1130 | 0.062 | 10x25 | 1370 | 0.047 |
| 1500 | 10x16 | 1050 | 0.074 | 10x20 | 1270 | 0.056 | 10x25 | 1470 | 0.041 |
| 1800 | 10x20 | 1200 | 0.065 | 10x25 | 1430 | 0.045 | 13x20 | 1630 | 0.038 |
| | | | | 13x20 | 1450 | 0.048 | | | |
| 2200 | 10x20 | 1300 | 0.060 | 13x20 | 1690 | 0.040 | 13x20 | 1800 | 0.035 |
| | 10x25 | 1400 | 0.057 | | | | 13x25 | 1950 | 0.033 |
| 2700 | 10x25 | 1400 | 0.055 | 13x20 | 1800 | 0.033 | 13x25 | 2050 | 0.031 |
| | 13x20 | 1410 | 0.052 | | | | | | |
| 3300 | 13x20 | 1500 | 0.048 | 13x25 | 1980 | 0.029 | 13x30 | 2410 | 0.025 |
| | | | | | | | 16x25 | 2340 | 0.028 |
| 4700 | 13x25 | 1800 | 0.032 | 13x30 | 2300 | 0.025 | 16x31.5 | 2650 | 0.022 |
| | 13x30 | 1950 | 0.025 | 16x25 | 2100 | 0.029 | 18x25 | 2570 | 0.024 |
| 6800 | 13x30 | 2020 | 0.024 | 16x31.5 | 2340 | 0.023 | 18x31.5 | 2700 | 0.020 |
| | 16x25 | 2230 | 0.021 | | | | | | |
| 8200 | 16x31.5 | 2530 | 0.020 | 16x35.5 | 2580 | 0.019 | 18x35.5 | 2830 | 0.018 |
| 10000 | 16x35.5 | 2740 | 0.019 | 18x31.5 | 2770 | 0.017 | 18x41 | 3300 | 0.015 |

Ripple Current (mA, rms) at 105°C 100KHz
 Max Impedance (Ω) at 20°C 100KHz

φ DxDL(mm)

| WV Cap(μF) | 25 | | | 35 | | | 50 | | | 63 | | |
|---------------|---------|--------|-----------|---------|--------|-----------|---------|--------|-----------|---------|--------|-----------|
| | Size | Ripple | Impedance | Size | Ripple | Impedance | Size | Ripple | Impedance | Size | Ripple | Impedance |
| 0.47 | | | | | | | 5x11 | 15 | 5.00 | 5x11 | 16 | 5.00 |
| 1 | | | | | | | 5x11 | 25 | 3.95 | 5x11 | 27 | 3.95 |
| 2.2 | | | | | | | 5x11 | 33 | 2.60 | 5x11 | 38 | 2.60 |
| 3.3 | | | | | | | 5x11 | 45 | 2.00 | 5x11 | 48 | 2.00 |
| 4.7 | | | | | | | 5x11 | 58 | 1.89 | 5x11 | 62 | 1.89 |
| 5.6 | | | | | | | 5x11 | 80 | 1.85 | 5x11 | 85 | 1.82 |
| 6.8 | | | | | | | 5x11 | 85 | 1.77 | 5x11 | 90 | 1.75 |
| 8.2 | | | | | | | 5x11 | 90 | 1.72 | 5x11 | 100 | 1.69 |
| 10 | 5x11 | 56 | 2.10 | 5x11 | 70 | 1.90 | 5x11 | 100 | 1.70 | 5x11 | 105 | 1.65 |
| 15 | 5x11 | 97 | 1.95 | 5x11 | 115 | 1.72 | 5x11 | 110 | 1.53 | 5x11 | 110 | 1.47 |
| 22 | 5x11 | 120 | 1.80 | 5x11 | 130 | 1.36 | 6.3x11 | 135 | 1.00 | 6.3x11 | 170 | 0.80 |
| 27 | 5x11 | 130 | 1.56 | 5x11 | 140 | 1.20 | 6.3x11 | 160 | 0.93 | 6.3x11 | 190 | 0.75 |
| 33 | 5x11 | 150 | 1.20 | 5x11 | 175 | 0.95 | 6.3x11 | 230 | 0.74 | 8x11.5 | 245 | 0.61 |
| 39 | 5x11 | 170 | 0.82 | 6.3x11 | 200 | 0.74 | 6.3x11 | 240 | 0.65 | 8x11.5 | 270 | 0.58 |
| 47 | 5x11 | 220 | 0.50 | 6.3x11 | 250 | 0.44 | 8x11.5 | 285 | 0.50 | 8x11.5 | 290 | 0.56 |
| 56 | 5x11 | 245 | 0.44 | 6.3x11 | 270 | 0.40 | 8x11.5 | 300 | 0.39 | 8x11.5 | 320 | 0.38 |
| 68 | 6.3x11 | 270 | 0.39 | 6.3x11 | 300 | 0.35 | 8x11.5 | 340 | 0.30 | 8x16 | 480 | 0.30 |
| 82 | 6.3x11 | 285 | 0.33 | 6.3x15 | 350 | 0.29 | 8x11.5 | 400 | 0.25 | 8x16 | 510 | 0.28 |
| 100 | 6.3x11 | 300 | 0.28 | 6.3x15 | 390 | 0.18 | 8x16 | 475 | 0.18 | 10x16 | 590 | 0.24 |
| | | | | 8x11.5 | 380 | 0.19 | | | | | | |
| 120 | 6.3x11 | 350 | 0.22 | 8x11.5 | 460 | 0.17 | 8x16 | 520 | 0.17 | 10x16 | 660 | 0.16 |
| 150 | 6.3x15 | 420 | 0.20 | 8x16 | 580 | 0.15 | 10x16 | 675 | 0.13 | 10x20 | 790 | 0.11 |
| 180 | 6.3x15 | 440 | 0.18 | 8x16 | 630 | 0.13 | 10x16 | 760 | 0.095 | 10x20 | 850 | 0.095 |
| | 8x11.5 | 435 | 0.19 | | | | | | | | | |
| 220 | 8x11.5 | 550 | 0.125 | 8x16 | 740 | 0.095 | 10x20 | 900 | 0.085 | 10x25 | 1020 | 0.082 |
| | | | | 10x12.5 | 720 | 0.098 | | | | | | |
| 270 | 8x11.5 | 620 | 0.095 | 8x20 | 830 | 0.086 | 10x20 | 950 | 0.075 | 13x20 | 1054 | 0.080 |
| | | | | 10x16 | 840 | 0.088 | | | | | | |
| 330 | 8x16 | 740 | 0.085 | 10x16 | 995 | 0.065 | 10x25 | 1050 | 0.068 | 10x30 | 1200 | 0.064 |
| | 10x12.5 | 720 | 0.082 | | | | | | | 13x25 | 1160 | 0.067 |
| 470 | 10x16 | 1040 | 0.065 | 10x20 | 1150 | 0.050 | 13x20 | 1490 | 0.048 | 16x25 | 1750 | 0.048 |
| 560 | 10x16 | 1070 | 0.061 | 10x25 | 1310 | 0.048 | 13x20 | 1550 | 0.045 | 16x25 | 1830 | 0.044 |
| 680 | 10x20 | 1280 | 0.052 | 13x20 | 1440 | 0.044 | 13x25 | 1840 | 0.041 | 16x31.5 | 2070 | 0.040 |
| 820 | 10x25 | 1460 | 0.043 | 13x20 | 1600 | 0.038 | 13x30 | 2060 | 0.036 | 16x31.5 | 2100 | 0.035 |
| 1000 | 10x25 | 1530 | 0.039 | 13x30 | 1950 | 0.036 | 13x40 | 2200 | 0.033 | 16x35.5 | 2450 | 0.031 |
| | 13x25 | 1580 | 0.038 | | | | 16x31.5 | 2130 | 0.030 | | | |
| 1200 | 13x25 | 1800 | 0.036 | 16x25 | 2200 | 0.029 | 16x31.5 | 2520 | 0.027 | 18x31.5 | 2500 | 0.026 |
| 1500 | 13x25 | 2020 | 0.032 | 16x31.5 | 2520 | 0.027 | 16x35.5 | 2700 | 0.026 | 18x35.5 | 2700 | 0.025 |
| 1800 | 13x30 | 2300 | 0.027 | 16x31.5 | 2560 | 0.026 | 18x31.5 | 2800 | 0.025 | 18x41 | 2900 | 0.024 |
| 2200 | 13x30 | 2480 | 0.025 | 16x31.5 | 2650 | 0.025 | 18x35.5 | 2900 | 0.024 | 18x41 | 2990 | 0.023 |
| | 16x25 | 2405 | 0.027 | 18x25 | 2570 | 0.026 | | | | | | |
| 2700 | 16x31.5 | 2670 | 0.024 | 18x31.5 | 2660 | 0.023 | 18x41 | 2970 | 0.021 | | | |
| 3300 | 16x31.5 | 2960 | 0.020 | 18x35.5 | 3000 | 0.020 | | | | | | |
| | 18x25 | 3050 | 0.022 | | | | | | | | | |
| 4700 | 16x41 | 3490 | 0.022 | 18x41 | 3300 | 0.019 | | | | | | |
| | 18x35.5 | 3520 | 0.021 | | | | | | | | | |
| 6800 | 18x41 | 3600 | 0.017 | | | | | | | | | |

Ripple Current (mA, rms) at 105°C 100KHz
Max Impedance (Ω) at 20°C 100KHz