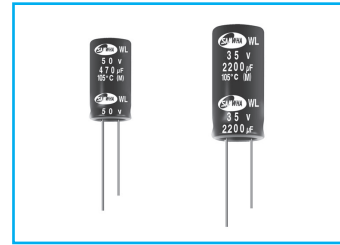


MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

WL Low Impedance Series

LL Long Life
S Solvent Proof WV ≤ 100V
IZI Low Impedance



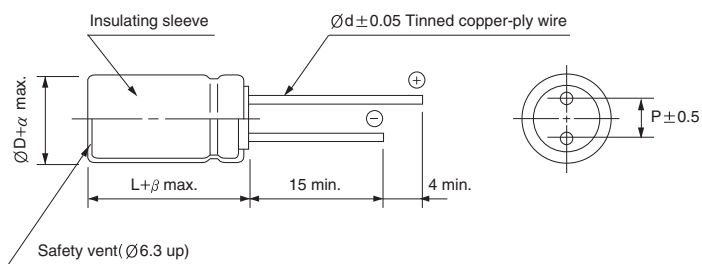
- Wide voltage compared with RZ series
- Operating temperature range of -40 ~ +105°C
- Low impedance at high frequency
- High reliability withstanding 5000 hours load life at 105°C
- For E-meter
- Complied to the RoHS directive

WL → **WF**
 Long life

| Item | Characteristics | | | | | | | | | | |
|--|--|-----------------------------------|------------|---------|----------|-----------|-----------|------|------|---------|---------|
| Operating temperature range | WV | 6.3 ~ 450 | | | | | | | | | |
| | Temperature range | -40 ~ +105°C | | | | | | | | | |
| Leakage current max. | WV ≤ 100 | WV > 100 | | | | | | | | | |
| | I = 0.01CV or 3µA whichever is greater (after 2 min.) I = 0.03CV or 4µA whichever is greater (after 1 min.) | | | | | | | | | | |
| Capacitance tolerance | ±20% at 120Hz, 20°C | | | | | | | | | | |
| Dissipation factor max. (at 120Hz, 20°C) | Capacitance > 1000µF : tanδ increases by 0.02 for each 1000µF from below value. | | | | | | | | | | |
| | WV | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 350~500 |
| Low temperature characteristics (Impedance ratio at 120Hz) | tanδ | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.15 | 0.20 |
| | WV | 6.3 | 10 | 16 | 25 ~ 100 | 160 ~ 250 | 350 ~ 450 | 500 | | | |
| | Z-25°C/Z+20°C | 4 | 3 | 2 | 2 | 3 | 6 | 8 | | | |
| Load life | After an application of DC bias voltage plus the rated AC ripple current for 5000 hours at 105°C. The measurement shall meet the following limits. The DC voltage plus the peak AC voltage combined must not exceed the rated voltage. | | | | | | | | | | |
| | Leakage current | Less than specified value | | | | | | | | | |
| | Capacitance change | Within ±25% of initial value | | | | | | | | | |
| | tanδ | Less than 200% of specified value | | | | | | | | | |
| | Life time | ∅D = 5, 6.3 | ∅D = 8 | ∅D ≥ 10 | | | | | | | |
| WV ≤ 100 | 2000 hours | 3000 hours | 5000 hours | | | | | | | | |
| WV > 100 | 2000 hours | | | | | | | | | | |
| Shelf life (at 105°C) | After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20°C by the KS C IEC 60384 - 4 | | | | | | | | | | |

● DRAWING

Unit : mm



| ∅D | 5 | 6.3 | 8 | 10 | 12.5 | 16 | 18 | 20 | 22 |
|----|-----|-----|-----|-----|------|-----|-----|------|------|
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 10.0 | 10.0 |
| ∅d | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 1.0 |
| α | 0.5 | | | | | | | 1.0 | |
| β | 1.5 | | 2.0 | | | | 3.0 | | |

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

| µF | Frequency | 120Hz | 1kHz | 10kHz | 50kHz | 100kHz ≤ |
|------------|-----------|-------|------|-------|-------|----------|
| ~ 33 | | 0.40 | 0.65 | 0.82 | 0.91 | 1.00 |
| 39 ~ 270 | | 0.50 | 0.70 | 0.84 | 0.92 | 1.00 |
| 330 ~ 680 | | 0.55 | 0.75 | 0.86 | 0.93 | 1.00 |
| 820 ~ 1800 | | 0.60 | 0.80 | 0.88 | 0.94 | 1.00 |
| 2200 ~ | | 0.70 | 0.85 | 0.90 | 0.95 | 1.00 |



MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

WL series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

| WV Item μF | 6.3 | | | 10 | | | 16 | | | 25 | | |
|------------------|--------------|--|--|--------------|--|--|--------------|--|--|--------------|--|--|
| | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz |
| 10 | | | | | | | 5×11 | 0.90 | 180 | 5×11 | 0.90 | 180 |
| 22 | 5×11 | 0.70 | 180 | 5×11 | 0.70 | 180 | 5×11 | 0.70 | 180 | 5×11 | 0.70 | 180 |
| 33 | 5×11 | 0.70 | 180 | 5×11 | 0.70 | 180 | 5×11 | 0.70 | 180 | 5×11 | 0.70 | 180 |
| 47 | 5×11 | 0.65 | 180 | 5×11 | 0.65 | 180 | 5×11 | 0.65 | 180 | 5×11 | 0.65 | 180 |
| 100 | 5×11 | 0.65 | 180 | 5×11 | 0.65 | 180 | 6.3×11 | 0.30 | 280 | 6.3×11 | 0.30 | 280 |
| 150 | 6.3×11 | 0.30 | 280 | 6.3×11 | 0.30 | 280 | 6.3×11 | 0.30 | 280 | 8×11.5 | 0.20 | 450 |
| 220 | 6.3×11 | 0.30 | 280 | 6.3×11 | 0.30 | 280 | 8×11.5 | 0.14 | 450 | 8×11.5 | 0.20 | 450 |
| 330 | 6.3×11 | 0.30 | 280 | 8×11.5 | 0.14 | 450 | 8×11.5 | 0.14 | 450 | 10×12.5 | 0.10 | 660 |
| 470 | 8×11.5 | 0.14 | 450 | 8×11.5 | 0.14 | 450 | 10×12.5 | 0.10 | 660 | 10×16 | 0.080 | 850 |
| 680 | 10×12.5 | 0.10 | 660 | 10×12.5 | 0.10 | 660 | 10×16 | 0.080 | 850 | 10×20 | 0.054 | 1100 |
| 1000 | 10×12.5 | 0.10 | 660 | 10×16 | 0.080 | 850 | 10×20 | 0.054 | 1100 | 12.5×20 | 0.050 | 1400 |
| 1500 | 10×20 | 0.054 | 1100 | 10×20 | 0.054 | 1100 | 12.5×20 | 0.050 | 1400 | 16×20 | 0.030 | 2100 |
| 2200 | 12.5×20 | 0.050 | 1400 | 12.5×20 | 0.050 | 1400 | 12.5×25 | 0.038 | 1700 | 16×25 | 0.030 | 2100 |
| 3300 | 12.5×20 | 0.050 | 1400 | 12.5×25 | 0.038 | 1700 | 16×25 | 0.030 | 2100 | 16×31.5 | 0.025 | 2600 |
| 4700 | 16×25 | 0.030 | 2100 | 16×25 | 0.030 | 2100 | 16×31.5 | 0.025 | 2600 | 18×35.5 | 0.022 | 3000 |
| 6800 | 16×25 | 0.030 | 2100 | 16×31.5 | 0.025 | 2600 | 18×35.5 | 0.022 | 3000 | | | |
| 10000 | 16×31.5 | 0.025 | 2600 | 18×35.5 | 0.022 | 3000 | | | | | | |
| 15000 | 18×35.5 | 0.022 | 3000 | | | | | | | | | |

| WV Item μF | 35 | | | 50 | | | 63 | | | 100 | | |
|------------------|--------------|--|--|--------------|--|--|--------------|--|--|--------------|--|--|
| | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Impedance (Ω)max. 20°C 100kHz | Ripple current (mA rms) 105°C 100kHz |
| 1.0 | | | | 5×11 | 3.0 | 40 | | | | | | |
| 2.2 | | | | 5×11 | 3.0 | 55 | | | | 5×11 | 2.5 | 52 |
| 3.3 | | | | 5×11 | 2.6 | 65 | 5×11 | 2.0 | 64 | 5×11 | 2.5 | 64 |
| 4.7 | 5×11 | 0.90 | 180 | 5×11 | 2.3 | 90 | 5×11 | 2.0 | 76 | 5×11 | 2.5 | 76 |
| 10 | 5×11 | 0.90 | 180 | 5×11 | 1.4 | 120 | 5×11 | 2.0 | 111 | 6.3×11 | 1.0 | 128 |
| 22 | 5×11 | 0.70 | 180 | 5×11 | 1.2 | 150 | 6.3×11 | 0.60 | 190 | 8×11.5 | 0.60 | 224 |
| 33 | 5×11 | 0.65 | 180 | 6.3×11 | 0.60 | 200 | 6.3×11 | 0.60 | 233 | 10×12.5 | 0.40 | 319 |
| 47 | 6.3×11 | 0.30 | 280 | 6.3×11 | 0.43 | 250 | 8×11.5 | 0.50 | 328 | 10×16 | 0.30 | 417 |
| 100 | 8×11.5 | 0.20 | 450 | 8×11.5 | 0.24 | 340 | 10×16 | 0.12 | 456 | 12.5×20 | 0.15 | 570 |
| 150 | 8×11.5 | 0.14 | 450 | 10×12.5 | 0.17 | 490 | 10×20 | 0.10 | 610 | 12.5×25 | 0.12 | 762 |
| 220 | 10×12.5 | 0.10 | 660 | 10×16 | 0.12 | 650 | 10×25 | 0.090 | 809 | 16×25 | 0.070 | 1250 |
| 330 | 10×16 | 0.080 | 850 | 10×20 | 0.10 | 810 | 12.5×20 | 0.085 | 1036 | 16×31.5 | 0.050 | 1404 |
| 470 | 10×20 | 0.054 | 1100 | 12.5×20 | 0.085 | 1100 | 16×20 | 0.050 | 1411 | 18×40 | 0.030 | 1980 |
| 680 | 12.5×20 | 0.050 | 1400 | 12.5×25 | 0.065 | 1200 | 16×25 | 0.043 | 1843 | 18×40 | 0.030 | 2050 |
| 820 | 12.5×25 | 0.045 | 1500 | 16×25 | 0.055 | 1300 | 18×25 | 0.035 | 1900 | 18×40 | 0.030 | 2215 |
| 1000 | 12.5×25 | 0.038 | 1700 | 16×25 | 0.043 | 1600 | 16×35.5 | 0.025 | 1967 | | | |
| 1500 | 16×25 | 0.030 | 2100 | 16×31.5 | 0.038 | 2000 | | | | | | |
| 2200 | 16×31.5 | 0.025 | 2600 | 18×35.5 | 0.034 | 2300 | | | | | | |
| 3300 | 18×35.5 | 0.022 | 3000 | | | | | | | | | |

MINIATURE TYPES

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

WL series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

| WV Item μF | 160 | | 200 | | 250 | | 350 | |
|------------------|--------------|---|--------------|---|------------------|---|--------------|---|
| | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz |
| 1 | 6.3×11 | 45 | | | | | | |
| 10 | 10×12.5 | 230 | | | 10×16 | 300 | 10×16 | 180 |
| 22 | 10×16 | 440 | 10×20 | 440 | 10×20 | 480 | 12.5×20 | 270 |
| 33 | 10×16 | 560 | 12.5×20 | 590 | 12.5×20 | 630 | 16×20 | 600 |
| 47 | 10×20 | 725 | 12.5×20 | 780 | 12.5×25 | 630 | 16×25 | 700 |
| 68 | 12.5×25 | 950 | 12.5×25 | 950 | 16×25 | 1000 | 16×31.5 | 1100 |
| 82 | | | | | 16×25 | 1100 | 16×35.5 | 1130 |
| 100 | 16×25 | 1280 | 16×25 | 1280 | 16×31.5 | 1400 | 18×31.5 | 1170 |
| 120 | | | | | | | 18×35.5 | 1200 |
| 150 | 16×25 | 1300 | 16×25 | 1500 | 18×25 18×31.5 | 1450 | 18×40 | 1250 |
| 220 | 16×31.5 | 1500 | 18×31.5 | 1700 | 18×35.5 18×40 | 1485 | | |
| 330 | 18×31.5 | 1700 | 18×35.5 | 1900 | | | | |

| WV Item μF | 400 | | 420 | | 450 | | 500 | |
|------------------|--------------|---|------------------|---|-----------------------------|---|-------------------------------|---|
| | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz | ØD×L (mm) | Ripple current (mA rms) 105°C 100kHz |
| 3.3 | | | | | 10×12.5 | 150 | | |
| 4.7 | | | | | 10×16 | 200 | | |
| 10 | 10×16 | 176 | | | 10×16 | 230 | 12.5×20 | 240 |
| 22 | 12.5×25 | 300 | | | 12.5×25 | 525 | 12.5×30 | 420 |
| 33 | 16×20 | 600 | | | 16×25 | 600 | 16×31.5 | 560 |
| 47 | 16×25 | 700 | 16×25 | 630 | 16×25 16×31.5 18×25 | 660 720 720 | 16×35.5 18×31.5 18×35.5 | 650 620 700 |
| 56 | | | 16×31.5 18×25 | 740 | 16×31.5 18×25 | 800 800 | 16×40 | 740 |
| 68 | 16×31.5 | 1100 | 16×35.5 18×25 | 810 | 16×35.5 18×31.5 | 900 900 | 16×45 18×40 | 820 900 |
| 82 | 16×35.5 | 1150 | 16×40 18×31.5 | 960 900 | 16×40 18×31.5 18×35.5 | 1115 1115 1200 | 16×50 18×40 | 1000 1000 |
| 100 | 18×35.5 | 1200 | 16×40 18×35.5 | 1100 | 16×40 18×35.5 | 1300 | 16×50 18×45 20×41 | 1250 1250 1250 |
| 120 | 18×40 | 1270 | 16×50 18×40 | 1250 1200 | 16×50 18×40 | 1500 1500 | 22×45 | 1370 |
| 150 | 20×41 | 1380 | | | 20×41 | 1600 | | |

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