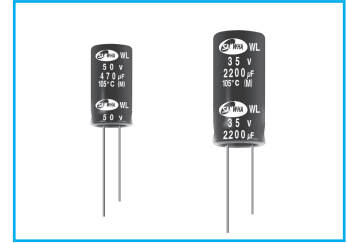


# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS



## WL Extremely Low Impedance Series



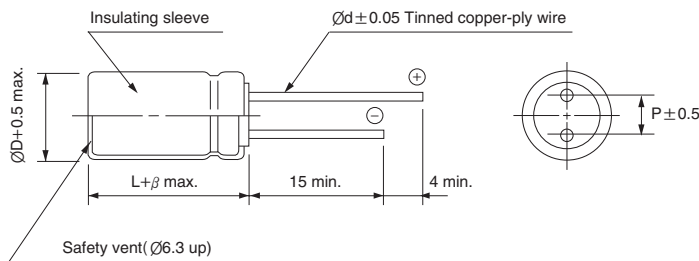
- Wide voltage compared with RZ series
- Operating temperature range of  $-40 \sim +105^{\circ}\text{C}$
- Extremely low impedance at high frequency
- High reliability withstanding 5000 hours load life at  $105^{\circ}\text{C}$  (2000/3000 hours for smaller case size as specified below)
- Complied to the RoHS directive



Item	Characteristics										
Operating temperature range	WV	6.3 ~ 100				160 ~ 350			400 ~ 450		
	Temperature range	$-40 \sim +105^{\circ}\text{C}$				$-40 \sim +105^{\circ}\text{C}$			$-25 \sim +105^{\circ}\text{C}$		
Leakage current max.	WV ≤ 100					WV > 100					
	I = 0.01CV or $3\mu\text{A}$ whichever is greater (after 2 min.) I = 0.03CV or $4\mu\text{A}$ whichever is greater (after 1 min.)					I = 0.02CV + $15\mu\text{A}$ (after 5 min.)					
Capacitance tolerance	$\pm 20\%$ at 120Hz, $20^{\circ}\text{C}$										
Dissipation factor max. (at 120Hz, $20^{\circ}\text{C}$ )	Capacitance > $1000\mu\text{F}$ : $\tan\delta$ increases by 0.02 for each $1000\mu\text{F}$ from below value.										
	WV	6.3	10	16	25	35	50	63	100	160~315	350~450
$\tan\delta$	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20	
Low temperature characteristics (Impedance ratio at 120Hz)	WV	6.3	10	16	25~100	160~250	315~450				
	Z- $25^{\circ}\text{C}/\text{Z}+20^{\circ}\text{C}$	4	3	2	2	3	8				
	Z- $40^{\circ}\text{C}/\text{Z}+20^{\circ}\text{C}$	8	6	4	3	4	-				
Load life (after application of the rated voltage for 5000 hours at $105^{\circ}\text{C}$ )	Leakage current		Less than specified value								
	Capacitance change		Within $\pm 25\%$ of initial value								
	$\tan\delta$		Less than 200% of specified value								
	Life time	$\varnothing D = 5, 6.3$	$\varnothing D = 8$	$\varnothing D \geq 10$							
	WV ≤ 100	2000 hours	3000 hours	5000 hours							
WV > 100	2000 hours										
Shelf life (at $105^{\circ}\text{C}$ )	After 1000 hours no load test, leakage current, capacitance and $\tan\delta$ are same as load life value.										

### ● DRAWING

Unit : mm



$\varnothing D$	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
$\varnothing d$	0.5	0.5	0.6	0.6	0.6	0.8	0.8
$\beta$	1.5			2.0			

### ● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$	Frequency(Hz)	120	1k	10k	100k $\leq$
~ 33		0.40	0.65	0.82	1.00
39 ~ 270		0.50	0.70	0.84	1.00
330 ~ 680		0.55	0.75	0.86	1.00
820 ~ 1800		0.60	0.80	0.88	1.00
2200 ~ 15000		0.70	0.85	0.90	1.00

# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

**WL** series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV Item μF	6.3			10			16			25		
	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
4.7										5×11	0.70	180
10							5×11	0.70	180	5×11	0.70	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	0.14	450
220	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.14	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		
	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	∅D×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
0.22				5×11	8.0	18						
0.47				5×11	5.0	25						
1.0				5×11	3.5	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	0.70	180	5×11	2.3	90	5×11	2.0	76	5×11	2.5	76
10	5×11	0.70	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	0.14	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			
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									

## WL series

### ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV Item $\mu\text{F}$	160			200			250		
	$\varnothing\text{D} \times \text{L}$ (mm)	Impedance ( $\Omega$ )max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	$\varnothing\text{D} \times \text{L}$ (mm)	Impedance ( $\Omega$ )max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	$\varnothing\text{D} \times \text{L}$ (mm)	Impedance ( $\Omega$ )max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
10							10 × 20	3.5	300
22	10 × 20	1.3	440	10 × 20	1.5	440	12.5 × 20	2.3	480
33	10 × 20	1.3	565	12.5 × 20	0.91	590	12.5 × 25	1.7	630
47	12.5 × 20	0.91	725	12.5 × 20	0.91	780	12.5 × 25	1.7	630
68	12.5 × 25	0.63	950	12.5 × 25	0.63	950	16 × 25	0.78	1000
100	16 × 25	0.27	1280	16 × 25	0.27	1280	16 × 31.5	0.63	1400
150	16 × 31.5	0.22	1300	18 × 25	0.27	1500	18 × 31.5	0.42	1450
220	16 × 31.5	0.22	1300	18 × 31.5	0.22	1700	18 × 40	0.35	1485
330	18 × 31.5	0.22	1700						

WV Item $\mu\text{F}$	350			400			450		
	$\varnothing\text{D} \times \text{L}$ (mm)	Impedance ( $\Omega$ )max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	$\varnothing\text{D} \times \text{L}$ (mm)	Impedance ( $\Omega$ )max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	$\varnothing\text{D} \times \text{L}$ (mm)	Impedance ( $\Omega$ )max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
3.3							10 × 20	6.5	150
4.7							12.5 × 20	3.6	200
10	10 × 20	2.9	180	10 × 20	2.9	180	12.5 × 25	2.5	315
22	12.5 × 20	2.1	270	12.5 × 25	1.3	300	16 × 25	1.7	570
33	16 × 20	0.91	600	16 × 20	0.91	600	16 × 31.5	1.1	620
47	16 × 25	0.73	700	16 × 25	0.73	700	18 × 31.5	0.93	900
68	16 × 31.5	0.49	1100	16 × 31.5	0.49	1100	18 × 35.5	0.71	980
100	18 × 31.5	0.40	1170	18 × 40	0.34	1250			