MQ series

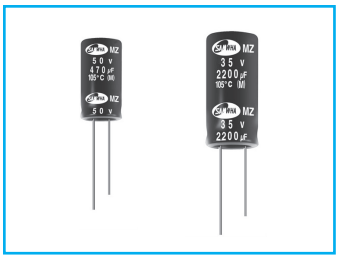
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16		
	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	0.525	250
22	5 × 11	0.525	250	5 × 11	0.525	250	5 × 11	0.525	270
33	5 × 11	0.525	270	5 × 11	0.525	270	5 × 11	0.525	290
47	5 × 11	0.450	290	5 × 11	0.450	290	5 × 11	0.450	310
100	5 × 11	0.450	310	5 × 11	0.450	310	6.3 × 11	0.225	405
150	6.3 × 11	0.225	405	6.3 × 11	0.225	405	6.3 × 11	0.225	460
220	6.3 × 11	0.225	460	6.3 × 11	0.225	460	8 × 11.5	0.108	760
330	6.3 × 11	0.225	505	8 × 11.5	0.108	760	8 × 11.5	0.108	950
470	8 × 11.5	0.108	950	8 × 11.5	0.108	950	10 × 12.5	0.088	1280
680	10 × 12.5	0.088	1280	10 × 12.5	0.088	1280	10 × 16	0.065	1785
1000	10 × 16	0.065	1785	10 × 16	0.065	1785	10 × 20	0.050	2270
1200				10 × 16	0.065	2200			
1500	10 × 20	0.050	2270	10 × 20	0.050	2270	12.5 × 20	0.043	2950
2200	12.5 × 20	0.043	2950	12.5 × 20	0.043	2950	12.5 × 25	0.029	3460

WV / Item / μF	25			35			50		
	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
4.7	5 × 11	0.525	250	5 × 11	0.525	250	5 × 11	1.50	270
10	5 × 11	0.525	250	5 × 11	0.525	270	5 × 11	0.750	290
22	5 × 11	0.525	270	5 × 11	0.525	290	5 × 11	0.390	310
33	5 × 11	0.525	290	5 × 11	0.450	310	6.3 × 11	0.255	405
47	5 × 11	0.450	310	6.3 × 11	0.225	460	6.3 × 11	0.210	460
100	6.3 × 11	0.225	460	8 × 11.5	0.108	760	8 × 11.5	0.108	950
150	8 × 11.5	0.108	760	8 × 11.5	0.108	950	10 × 12.5	0.088	1280
220	8 × 11.5	0.108	950	10 × 12.5	0.088	1280	10 × 16	0.065	1785
330	10 × 12.5	0.088	1280	10 × 16	0.065	1785	10 × 20	0.050	2270
470	10 × 16	0.065	1785	10 × 20	0.050	2270	12.5 × 20	0.043	2950
680	10 × 20	0.060	2270	12.5 × 20	0.043	2950	12.5 × 25	0.029	3460
1000	12.5 × 20	0.060	2950	12.5 × 25	0.029	3460	16 × 25	0.027	3890
1200	12.5 × 20	0.043	3100						
1500	16 × 20	0.024	3600	16 × 25	0.024	3890			
2200	16 × 25	0.024	3890						

MZ Ultra Low Impedance Series

Low Impedance | Miniaturized | Solvent Proof



- Low impedance compared with MK series
- Enabled high ripple current by a reduction of impedance at high frequency
- High reliability withstanding 5000 hours load life at 105˚C
  (2000 ~ 3000 hours for smaller case sizes as specified below)
- Complied to the RoHS directive

MK ⇨ MZ
Low Imp.

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minute)
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
tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08

Low temperature characteristics (Impedance ratio at 120Hz)

Z-40˚C / Z+20˚C	Z-25˚C / Z+20˚C
3	2

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

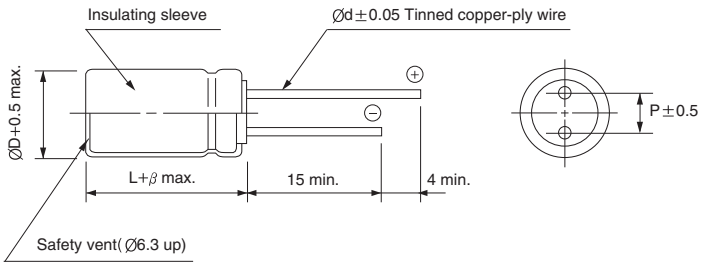
ØD	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
Life time	2000 hours	3000 hours	5000 hours

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



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.5			2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
1000 ~ 1500	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

MZ series

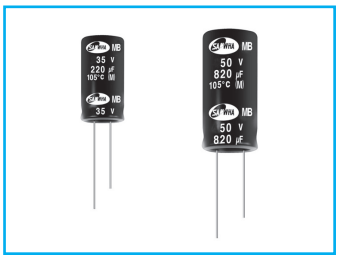
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

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
4.7										5×11	0.35	250
10							5×11	0.35	250	5×11	0.35	250
22	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250
33	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250
47	5×11	0.30	250	5×11	0.30	250	5×11	0.30	250	5×11	0.30	250
100	5×11	0.30	250	5×11	0.30	250	6.3×11	0.15	405	6.3×11	0.15	405
150	6.3×11	0.15	405	6.3×11	0.15	405	6.3×11	0.15	405	8×11.5	0.10	760
220	6.3×11	0.15	405	6.3×11	0.15	405	8×11.5	0.072	760	8×11.5	0.10	760
330	6.3×11	0.15	405	8×11.5	0.12	760	8×11.5	0.072	760	10×12.5	0.08	1030
470	8×11.5	0.072	760	8×11.5	0.10	760	10×12.5	0.053	1030	10×16	0.045	1430
680	10×12.5	0.053	1030	10×12.5	0.053	1030	10×16	0.038	1430	10×20	0.032	1820
1000	10×12.5	0.053	1030	10×16	0.038	1430	10×20	0.027	1820	12.5×20	0.025	2360
1500	10×20	0.027	1820	10×20	0.032	1820	12.5×20	0.025	2360	16×20	0.020	3460
2200	12.5×20	0.025	2360	12.5×20	0.025	2360	12.5×25	0.018	2770	16×25	0.015	3460
3300	12.5×20	0.025	2360	12.5×25	0.024	2770	16×25	0.015	3460	16×31.5	0.015	3680
4700	16×25	0.015	3460	16×25	0.015	3460	16×31.5	0.015	3680	18×35.5	0.014	3800
6800	16×25	0.015	3460	16×31.5	0.015	3680	18×35.5	0.014	3800			
10000	16×31.5	0.015	3680	18×35.5	0.014	3800						
15000	18×35.5	0.014	3800									

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	2.0	250						
2.2				5×11	2.0	250				5×11	2.0	125
3.3				5×11	1.0	250	5×11	2.0	165	5×11	2.0	125
4.7	5×11	0.35	250	5×11	1.0	250	5×11	2.0	165	5×11	2.0	125
10	5×11	0.35	250	5×11	0.55	250	5×11	0.80	165	6.3×11	0.50	205
22	5×11	0.35	250	5×11	0.45	250	6.3×11	0.50	265	8×11.5	0.30	355
33	5×11	0.30	250	6.3×11	0.25	405	6.3×11	0.50	265	10×12.5	0.25	450
47	6.3×11	0.15	405	6.3×11	0.20	405	8×11.5	0.30	500	10×16	0.20	580
100	8×11.5	0.072	760	8×11.5	0.105	760	10×16	0.10	945	12.5×20	0.10	1045
150	8×11.5	0.072	760	10×12.5	0.061	1030	10×20	0.08	1100	12.5×25	0.070	1195
220	10×12.5	0.065	1030	10×20	0.038	1430	10×25	0.07	1300	16×25	0.060	1600
330	10×16	0.038	1430	10×20	0.032	1820	12.5×20	0.04	1495	16×31.5	0.040	1750
470	10×20	0.027	1820	12.5×20	0.027	2360	16×20	0.035	1990	18×40	0.030	2060
680	12.5×20	0.025	2360	12.5×25	0.022	2770	16×25	0.030	2780			
1000	12.5×25	0.022	2770	16×25	0.018	3460	16×35.5	0.020	2835			
1500	16×25	0.018	3460	16×31.5	0.015	3680						
2200	16×31.5	0.015	3680	18×35.5	0.014	3800						
3300	18×35.5	0.014	3800									

MB Ultra Low Imp., High Ripple Current Series

Low Impedance | Miniaturized | Solvent Proof

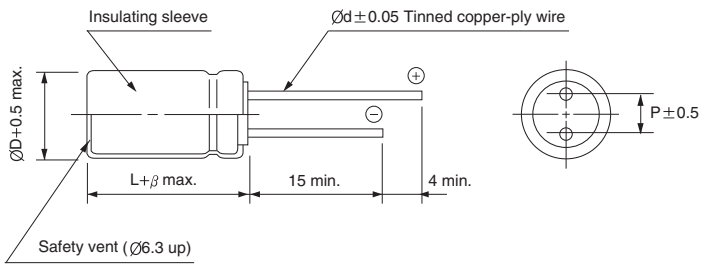


- Ultra low impedance
- High reliability withstanding 5000 hours load life at 105˚C
- For SMPS, IP-Board, Adaptor, Noise Filter, Charger
- Complied to the RoHS directive, Halogen-Free

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 tanδ: 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.08 When rated Capacitance is over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF.
Low temperature characteristics (Impedance ratio at 120Hz)	Z-40˚C/Z+20˚C: 3 ; Z-25˚C/Z+20˚C: 2
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 the initial value tanδ: Less than 200% of the specified value ØD: ØD = 5, 6.3 / ØD = 8 / ØD = 10 / ØD ≧ 12 Life time: 2000 hours / 3000 hours / 4000 hours / 5000 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



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.5			2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
1 ~ 180	0.40	0.75	0.90	0.95	1.00
220 ~ 560	0.50	0.85	0.94	0.96	1.00
680 ~ 1800	0.60	0.87	0.95	0.97	1.00
2200 ~ 3900	0.75	0.90	0.95	0.97	1.00
4700 ~ 18000	0.85	0.95	0.98	0.99	1.00

MB 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
68										5×11	0.300	250
100							5×11	0.300	250			
							6.3×11	0.150	385			
150				5×11	0.300	250				6.3×11	0.130	405
220	5×11	0.300	250				6.3×11	0.130	405	8×11.5	0.072	760
330				6.3×11	0.150	405				10×12.5	0.053	1030
				8×11.5	0.094	600						
390										8×15	0.060	818
470	6.3×11	0.130	405				8×11.5	0.072	760	10×12.5	0.053	1030
										10×16	0.038	1430
560				8×11.5	0.075	700				8×20	0.050	1260
680				8×11.5	0.072	760	8×15	0.060	818	10×16	0.038	1430
										10×20	0.023	1820
							10×12.5	0.053	1030	12.5×16	0.031	1452
820	8×11.5	0.072	760	10×12.5	0.053	1030				10×20	0.023	2000
1000				8×15	0.060	818	8×20	0.050	1260	10×20	0.025	1900
				10×12.5	0.053	1030	10×16	0.038	1430	10×25	0.022	2150
				10×16	0.038	1430						
1200	8×15	0.060	818	8×20	0.050	1260						
	10×12.5	0.053	1030									
1500	8×20	0.050	1260	10×16	0.038	1430	10×20	0.023	1820	12.5×20	0.021	2360
				10×20	0.023	1820						
				12.5×16	0.031	1452						
1800	10×16	0.038	1430				10×25	0.022	2150	12.5×25	0.020	2770
	12.5×16	0.031	1452									
2200	10×20	0.023	1820	10×25	0.022	2150	12.5×20	0.021	2360	12.5×25	0.020	3000
										16×20	0.021	3140
										18×20	0.023	2860
2700							12.5×25	0.020	2770	18×25	0.018	3611
3300	10×25	0.022	2150	12.5×20	0.021	2360	16×20	0.021	3140	16×25	0.019	3460
							18×20	0.023	2826			
3900	12.5×20	0.021	2360	12.5×25	0.020	2770	12.5×34.5	0.017	3400			
							18×25	0.018	3611			
4700	12.5×25	0.020	2770	16×20	0.021	3140	16×25	0.019	3460			
				18×20	0.023	2826						
5600	12.5×30	0.018	3290	16×25	0.019	3460	16×31.5	0.013	3680			
	16×20	0.021	3140									
	18×20	0.023	2826	18×25	0.018	3611						
6800	16×25	0.019	3460	16×31.5	0.013	3680						
8200	16×31.5	0.013	3680									
	18×25	0.018	3611									

MB series

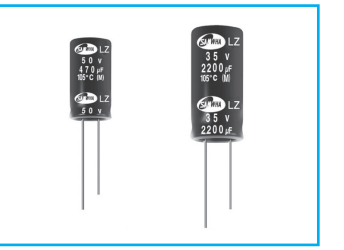
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	35			50			63			100		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
1.0				5×11	2.500	53						
2.2				5×11	2.500	56						
3.3				5×11	2.300	60				5×11	2.000	125
4.7				5×11	1.500	82				5×11	2.000	125
10				5×11	1.000	250	5×11	0.45	165	6.3×11	0.500	205
22				5×11	0.300	250				8×11.5	0.030	355
27				5×11	0.300	250						
33							6.3×11	0.300	265	10×12.5	0.250	450
47	5×11	0.300	250	6.3 11	0.140	350	8×11.5	0.200	500	10×16	0.200	580
56				6.3×11	0.140	385						
68							10×12.5	0.160	600			
100	6.3×11	0.130	405	8×11.5	0.072	724	10×16	0.100	945	12.5×20	0.100	1045
120				8×15	0.060	818						
150	8×11.5	0.072	760	10×12.5	0.061	979	10×20	0.080	1100	12.5×25	0.070	1195
180				8×20	0.050	1260						
220	10×12.5	0.053	1030	10×16	0.042	1370	10×25	0.070	1300	16×25	0.060	1600
270	8×15	0.060	818	12.5×16	0.042	1071						
330	10×12.5	0.053	1030	10×20	0.030	1580	10×25	0.070	1300	16×31.5	0.040	1750
390	8×20	0.050	1260									
470	10×16	0.038	1430	12.5×20	0.027	2050	16×20	0.035	1990	16×31.5	0.040	1750
	12.5×16	0.031	1452							18×40	0.030	2060
560	10×20	0.023	1820	12.5×25	0.020	2410						
680	10×20	0.023	1820				16×25	0.030	2780			
	10×25	0.022	2150									
820				16×20	0.023	2730						
1000	12.5×20	0.021	2360	16×25	0.021	3010	16×35.5	0.020	2835			
	12.5×25	0.020	2770	18×20	0.022	2850						
1200	12.5×25	0.020	2770	18×25	0.020	3140						
1500	16×20	0.021	3140									
	18×20	0.023	2860									
1800	16×25	0.019	3460									
	18×25	0.018	3611									
2200	16×25	0.019	3460									
	16×31.5	0.013	3680									

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

LZ Low Impedance, Long Life Series

Low Impedance | Long Life | Solvent Proof



- Operating temperature range of -40 ~ +105˚C
- Enabled high ripple current by a reduction of impedance at high frequency range
- High reliability withstanding 10000 hours load life at 105˚C (6000 / 8000 hours for as specified below)
- Complied to the RoHS directive

LK ⇒ LZ
Long life

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minute)
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.

Rated Voltage(V)	6.3	10	16	25	35	50
tanδ	0.22	0.19	0.16	0.14	0.12	0.10

Low temperature characteristics (Impedance ratio at 120Hz)	Z-40˚C / Z+20˚C	Z-25˚C / Z+20˚C
	3	2

Load life

After an application of DC bias voltage plus the rated AC ripple current for 10000 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.

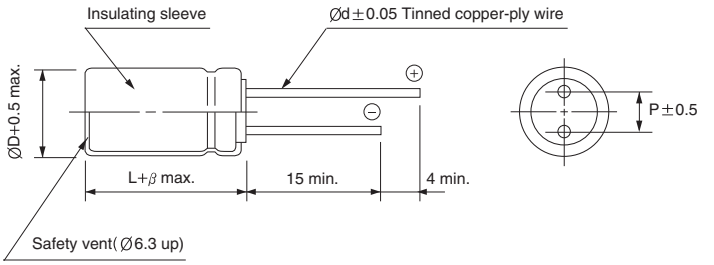
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

ØD	ØD = 5, 6.3	ØD = 8	ØD ≥ 10
Life time	6000 hours	8000 hours	10000 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



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.5			2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz
~ 33	0.32	0.60	0.80	0.90	1.00
39 ~ 270	0.40	0.63	0.82	0.91	1.00
330 ~ 680	0.45	0.67	0.84	0.92	1.00
820 ~ 1800	0.50	0.70	0.86	0.93	1.00
2200 ~	0.60	0.75	0.88	0.94	1.00

LZ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

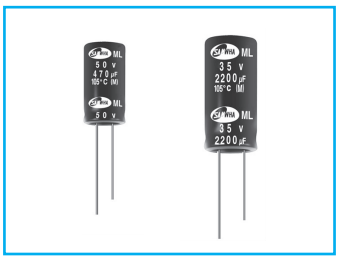
WV / Item / μF	6.3			10			16		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
47	5 × 11	0.600	300	5 × 11	0.600	300	5 × 11	0.600	300
100	5 × 11	0.600	345	5 × 11	0.600	345	6.3 × 11	0.300	345
150	6.3 × 11	0.300	345	6.3 × 11	0.300	345	6.3 × 11	0.300	540
220	6.3 × 11	0.300	345	6.3 × 11	0.300	345	8 × 11.5	0.200	540
330	6.3 × 11	0.300	540	8 × 11.5	0.250	608	8 × 11.5	0.200	945
470	8 × 11.5	0.140	540	8 × 11.5	0.200	630	10 × 12.5	0.105	945
680	10 × 12.5	0.105	945	10 × 12.5	0.105	945	8 × 20	0.105	945
							10 × 16	0.075	1250
820	10 × 12.5	0.105	945	10 × 16	0.075	945	10 × 20	0.054	1760
1000	10 × 16	0.075	1250	8 × 20	0.105	945	8 × 20	0.075	1250
				10 × 12.5	0.105	945	10 × 20	0.054	1760
				10 × 16	0.075	1250			
				10 × 20	0.054	1650			
1200	10 × 16	0.075	1500	10 × 16	0.075	1760	10 × 20	0.054	1960
1500	10 × 20	0.054	1760	10 × 20	0.054	1760	12.5 × 20	0.050	1960
1800	10 × 20	0.054	1760	10 × 20	0.054	1760	12.5 × 20	0.050	2250
2200	12.5 × 20	0.050	1960	12.5 × 20	0.050	1960	12.5 × 25	0.040	2480
2700	12.5 × 20	0.050	2250	12.5 × 25	0.040	2250	12.5 × 25	0.040	2900
3300	12.5 × 20	0.050	2480	12.5 × 25	0.040	2480	16 × 25	0.030	3250
3900	12.5 × 25	0.040	2480	16 × 25	0.030	2480	16 × 25	0.030	3570
4700	16 × 25	0.030	3250	16 × 25	0.030	3250	16 × 31.5	0.027	3630
5600	16 × 25	0.030	3570	16 × 25	0.030	3570			
6800	16 × 25	0.030	3630	16 × 31.5	0.027	3630			
8200	16 × 31.5	0.027	3700	18 × 35.5	0.025	3700			

WV / Item / μF	25			35			50		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
10							5×11	3.000	160
22							5×11	1.800	240
33							5×11	1.800	292
47				6.3×11	0.450	345	6.3×11	1.000	450
56				6.3×11	0.450	345	6.3×11	0.700	450
68	6.3×11	0.300	345	6.3×11	0.450	345	8×11.5	0.500	490
100	6.3×11	0.300	345	6.3×11	0.350	500	8×11.5	0.300	724
				8×11.5	0.300	540			
120	6.3×11	0.300	345	8×11.5	0.250	540	8×11.5	0.200	950
150	8×11.5	0.250	345	8×11.5	0.250	945	10×12.5	0.120	979
180	8×11.5	0.200	345	8×11.5	0.190	945	8×20	0.120	1200
							10×12.5	0.120	1190
220	8×11.5	0.180	345	8×11.5	0.190	945	8×20	0.120	1370
				10×12.5	0.105	945	10×16	0.075	1370
270	10×12.5	0.105	945	8×15	0.120	945	10×20	0.064	1580
				10×16	0.085	1250			
330	10×12.5	0.105	945	10×16	0.085	1330	10×20	0.064	1870
390	8×15	0.135	1250	10×20	0.054	1500	10×20	0.064	2050
	10×12.5	0.105	1250						
470	10×16	0.075	1330	8×20	0.095	1430	12.5×20	0.050	2050
				10×16	0.085	1600			
				10×20	0.054	1760			
560	8×20	0.075	1700	12.5×20	0.050	1960	12.5×25	0.040	2410
	10×20	0.054							
680	10×16	0.075	1760	10×20	0.054	1850	12.5×25	0.040	2410
	10×20	0.054		12.5×20	0.050	2250			
				10×25					
820	10×20	0.054	2300	12.5×25	0.040	2350	16×20	0.040	2730
	12.5×20	0.050							
1000	12.5×20	0.050	2350	12.5×25	0.040	2480	16×25	0.036	3010
1200	12.5×20	0.050	2480	16×20	0.040	2900			
1500	16×20	0.040	2480	16×25	0.030	3250			
1800	16×20	0.040	2900	16×25	0.030	3570			
2200	12.5×30	0.040	2900	16×31.5	0.027	3630			
	16×25	0.030	3250						
2700	16×25	0.030	3570						
3300	16×31.5	0.027	3630						

ML

Ultra Low Impedance, Long Life Series

Low Impedance | Miniaturized | Solvent Proof



- Long Life compared with MZ series
- Enabled high ripple current by a reduction of impedance at high frequency
- High reliability withstanding 10000 hours load life at 105˚C (6000/8000 hours for as specified below)
- Complied to the RoHS directive

MZ ⇒ ML (Long life)

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minute)
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
tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08

Low temperature characteristics (Impedance ratio at 120Hz)	Z-40˚C / Z+20˚C	Z-25˚C / Z+20˚C
	3	2

Load life

After an application of DC bias voltage plus the rated AC ripple current for 10000 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.

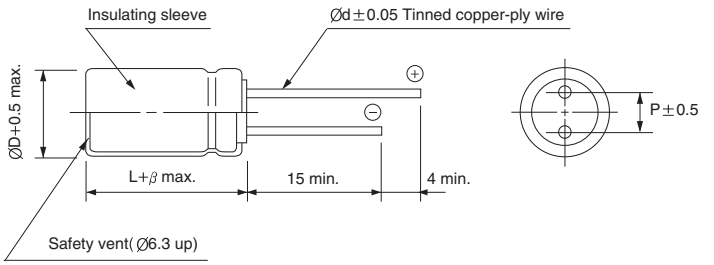
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

ØD	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
Life time	6000 hours	8000 hours	10000 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



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.5			2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.42	0.70	0.90	0.95	1.00
39 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

ML series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16			25		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
10							5×11	0.45	250	5×11	0.65	250
22	5×11	0.35	250	5×11	0.35	250	5×11	0.45	250	5×11	0.50	250
33	5×11	0.35	250	5×11	0.35	250	5×11	0.45	250	5×11	0.45	250
47	5×11	0.30	250	5×11	0.30	250	5×11	0.45	250	5×11	0.40	250
100	5×11	0.30	250	5×11	0.30	250	6.3×11	0.25	405	6.3×11	0.20	405
150	6.3×11	0.15	405	6.3×11	0.15	405	6.3×11	0.20	405	8×11.5	0.14	760
220	6.3×11	0.15	405	6.3×11	0.15	405	8×11.5	0.15	760	8×11.5	0.12	760
330	6.3×11	0.15	405	8×11.5	0.13	760	8×11.5	0.10	760	10×12.5	0.055	1030
390	6.3×11	0.15	405	8×11.5	0.11	760	8×11.5	0.10	760	8×15	0.072	1250
470	8×11.5	0.11	630	8×11.5	0.11	760	10×12.5	0.053	1030	10×12.5	0.055	1330
560	8×11.5	0.11	760	10×12.5	0.053	900	10×12.5	0.053	1100	8×20	0.072	1800
680	10×12.5	0.053	1030	10×12.5	0.053	1030	10×16	0.038	1430	10×16	0.040	1760
1000	10×12.5	0.053	1030	10×12.5	0.053	1330	10×16	0.038	1760	10×20	0.033	1960
1500	10×20	0.027	1820	10×20	0.030	1820	10×20	0.030	1960	12.5×20	0.029	2550
2200	12.5×20	0.025	2360	12.5×20	0.027	2360	12.5×25	0.023	2770	16×20	0.022	3250
3300	12.5×20	0.025	2360	12.5×20	0.027	2480	16×20	0.020	3250	16×25	0.018	3630
4700	16×25	0.015	3460	16×20	0.022	3250	16×25	0.018	3630			
6800	16×25	0.015	3460	16×25	0.018	3630						
10000	16×31.5	0.015	3680	18×31.5	0.015	3700						

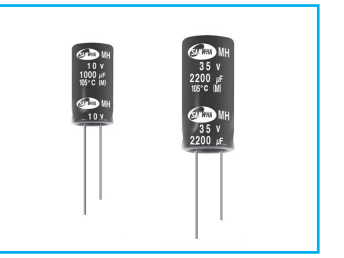
WV / Item / μF	35			50			63			100		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
10	5×11	0.55	250	5×11	0.60	250	5×11	1.00	165	6.3×11	0.80	205
22	5×11	0.50	250	5×11	0.45	250	6.3×11	0.53	265	8×11.5	0.45	355
33	5×11	0.45	250	6.3×11	0.25	405	6.3×11	0.45	265	10×12.5	0.25	450
47	6.3×11	0.30	405	6.3×11	0.20	405	8×11.5	0.20	500	10×12.5	0.20	580
56	6.3×11	0.20	405	6.3×11	0.20	405	8×11.5	0.17	540	10×16	0.20	630
68	8×11.5	0.10	540	8×11.5	0.15	540	10×12.5	0.15	760	10×16	0.20	700
100	8×11.5	0.10	760	8×11.5	0.12	760	10×12.5	0.160	825	10×20	0.18	800
										12.5×16	0.110	975
150	8×11.5	0.10	760	10×12.5	0.061	1030	8×20	0.120	1200	12.5×20	0.090	1195
							10×20	0.080				
220	10×12.5	0.053	1030	10×16	0.038	1430	10×25	0.070	1300	16×25	0.060	1600
330	10×12.5	0.053	1330	10×20	0.032	1820	12.5×20	0.050	1495	16×25	0.040	1750
470	8×20	0.038	1600	12.5×20	0.030	2360	12.5×25	0.040	1990	18×31.5	0.035	2060
	10×16	0.041	1760									
680	12.5×20	0.026	2360	12.5×25	0.022	2770	16×25	0.030	2780			
1000	12.5×20	0.026	2480	16×25	0.018	3460	16×35.5	0.020	2835			
1500	16×20	0.022	3250	16×31.5	0.015	3680						
2200	16×25	0.018	3630				18×40	0.02	3500			

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

New

MH Low Imp., Long Life Series

Low Impedance | Miniaturized | Solvent Proof



- Long Life compared with ML series
- High reliability withstanding 12000 hours load life at 105˚C (7000/9000 hours for as specified below)
- Complied to the RoHS directive

ML ⇒ MH
Long life

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minute)
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
tanδ	0.22	0.19	0.16	0.14	0.12

Low temperature characteristics (Impedance ratio at 120Hz)	Z-40˚C / Z+20˚C	Z-25˚C / Z+20˚C
	3	2

Load life

After an application of DC bias voltage plus the rated AC ripple current for 12000 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.

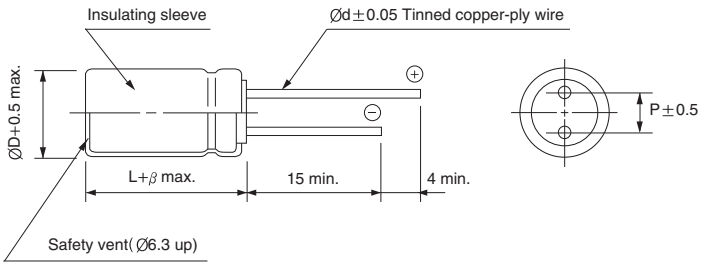
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

ØD	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
Life time	7000 hours	9000 hours	12000 hours

Shelf life (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



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.5			2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

MH series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

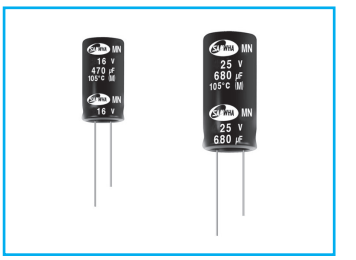
WV / Item / μF	6.3			10			16		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
10							5 × 11	0.35	250
22	5 × 11	0.35	250	5 × 11	0.35	250	5 × 11	0.35	250
33	5 × 11	0.35	250	5 × 11	0.35	250	5 × 11	0.35	250
47	5 × 11	0.30	250	5 × 11	0.30	250	5 × 11	0.30	250
100	5 × 11	0.30	250	5 × 11	0.30	250	6.3 × 11	0.25	405
150	6.3 × 11	0.15	405	6.3 × 11	0.15	405	6.3 × 11	0.20	405
220	6.3 × 11	0.15	405	6.3 × 11	0.15	405	8 × 11.5	0.15	760
330	6.3 × 11	0.15	405	8 × 11.5	0.13	760	8 × 11.5	0.10	760
390	6.3 × 11	0.15	405	8 × 11.5	0.11	760	8 × 11.5	0.10	760
470	8 × 11.5	0.11	630	8 × 11.5	0.11	760	10 × 12.5	0.053	1030
560	8 × 11.5	0.11	760	10 × 12.5	0.053	760	10 × 12.5	0.053	1100
680	10 × 12.5	0.053	1030	10 × 12.5	0.053	1030	10 × 16	0.038	1430
1000	10 × 12.5	0.053	1030	10 × 12.5	0.053	1330	10 × 16	0.038	1760
1500	10 × 20	0.027	1820	10 × 20	0.030	1820	10 × 20	0.030	1960
2200	12.5 × 20	0.025	2360	12.5 × 20	0.027	2360	12.5 × 25	0.023	2770
3300	12.5 × 20	0.025	2360	12.5 × 20	0.027	2480	16 × 20	0.020	3250
4700	16 × 25	0.015	3460	16 × 25	0.022	3250	16 × 25	0.018	3630
6800	16 × 25	0.015	3460	16 × 25	0.018	3630			
10000	16 × 31.5	0.015	3680	18 × 31.5	0.015	3700			

WV / Item / μF	25			35		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
10	5 × 11	0.35	250	5 × 11	0.55	250
22	5 × 11	0.35	250	5 × 11	0.50	250
33	5 × 11	0.35	250	5 × 11	0.45	250
47	5 × 11	0.30	250	6.3 × 11	0.30	405
56	6.3 × 11	0.27	405	6.3 × 11	0.20	405
68	6.3 × 11	0.27	405	8 × 11.5	0.10	540
100	6.3 × 11	0.20	405	8 × 11.5	0.10	760
150	8 × 11.5	0.14	760	8 × 11.5	0.10	760
220	8 × 11.5	0.12	760	10 × 12.5	0.053	1030
330	10 × 12.5	0.053	1030	10 × 12.5	0.053	1330
390	10 × 12.5	0.053	1250	10 × 16	0.048	1550
470	10 × 12.5	0.050	1330	10 × 16	0.041	1760
560	10 × 16	0.050	1800	10 × 20	0.037	2100
680	10 × 16	0.040	1760	12.5 × 20	0.026	2360
1000	10 × 20	0.033	1960	12.5 × 20	0.026	2480
1500	12.5 × 20	0.029	2550	16 × 20	0.022	3250
2200	16 × 20	0.022	3250	16 × 25	0.018	3630
3300	16 × 25	0.018	3630			

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

MN High Ripple Current, Ultra Low Impedance Series

Low Impedance　Solvent Proof



- High ripple current compared with MZ series
- Enabled high ripple current by a reduction of impedance at high frequency range
- High reliability withstanding 5000 hours load life at 105˚C
  (3000 hours for smaller case sizes as specified below)
- Complied to the RoHS directive

MZ ⇨ MN
High Ripple

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minute)
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
tanδ	0.22	0.19	0.16	0.14	0.12	0.10

Low temperature characteristics (Impedance ratio at 120Hz)

Z-40˚C / Z+20˚C	Z-25˚C / Z+20˚C
3	2

Load life (after application of the rated voltage for 5000 hours at 105˚C)

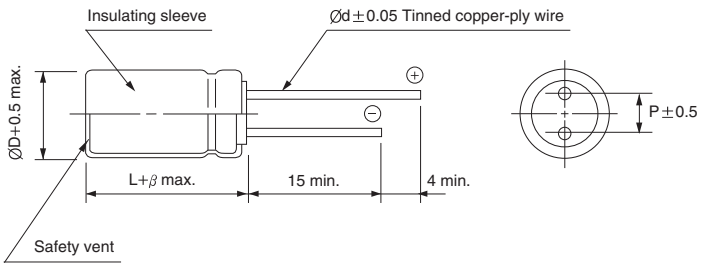
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

ØD	ØD = 8	ØD = 10
Life time	3000 hours	5000 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



ØD	8	10
P	3.5	5.0
Ød	0.6	0.6
β	1.5	2.0

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

MN series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16		
	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
470							8 × 11.5	0.036	1260
680				8 × 11.5	0.036	1449	8 × 15	0.028	1655
							10 × 12.5	0.026	1710
820	8 × 11.5	0.036	1318						
1000				8 × 15	0.028	1895	8 × 20	0.021	2070
				10 × 12.5	0.026	1958	10 × 16	0.019	2215
1500	8 × 20	0.016	2048	8 × 20	0.021	2158	10 × 20	0.015	2820
	10 × 12.5	0.026	1780	10 × 16	0.019	2310			
1800	10 × 16	0.019	2310	10 × 20	0.013	2945	10 × 25	0.014	3095
2200	10 × 20	0.013	2945	10 × 25	0.012	3234			
3300	10 × 25	0.012	3234						

WV / Item / μF	25			35			50		
	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
100							8 × 11.5	0.096	1195
120							8 × 15	0.080	1714
150							10 × 12.5	0.083	1773
180							8 × 20	0.065	2077
220	8 × 11.5	0.036	1255	8 × 11.5	0.073	1559	10 × 16	0.057	2184
270				8 × 15	0.059	2255	10 × 20	0.042	2554
330				10 × 12.5	0.053	2409	10 × 25	0.037	2889
390	8 × 15	0.028	1640	8 × 20	0.041	2618			
470	10 × 12.5	0.026	1695	10 × 16	0.038	2805			
560	8 × 20	0.019	2055	10 × 20	0.028	2880			
680	10 × 16	0.019	2200	10 × 25	0.024	3150			
820	10 × 20	0.016	2805						
1000	10 × 25	0.015	3080						

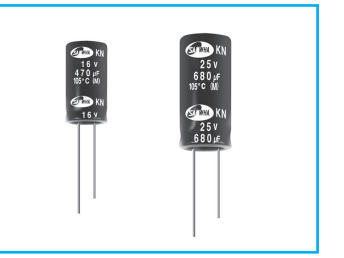
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

New

KN

High Ripple Current,
Ultra Low Impedance Series

Low Impedance　Solvent Proof



- High ripple current compared with MN series
- Enabled high ripple current by a reduction of impedance at high frequency range
- High reliability withstanding 5000 hours load life at 105˚C
  (3000 hours for smaller case sizes as specified below)
- Complied to the RoHS directive

MN ⇨ KN
High Ripple

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minute)
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	10	16	25	35
tanδ	0.19	0.16	0.14	0.12

Low temperature characteristics (Impedance ratio at 120Hz)	Z-40˚C / Z+20˚C	Z-25˚C / Z+20˚C
	3	2

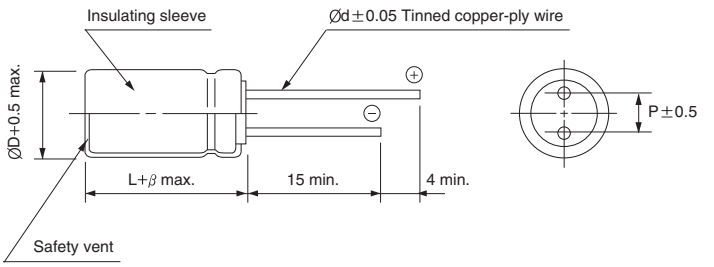
Load life (after application of the rated voltage for 5000 hours at 105˚C)		
	Leakage current	Less than specified value
	Capacitance change	Within ±25% of initial value
	tanδ	Less than 200% of specified value

ØD	ØD = 8	ØD = 10
Life time	3000 hours	5000 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



ØD	5	6.3	8	10	12.5
P	2.0	2.5	3.5	5.0	5.0
Ød	0.5	0.5	0.6	0.6	0.6
β	1.5			2.0	

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

KN series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

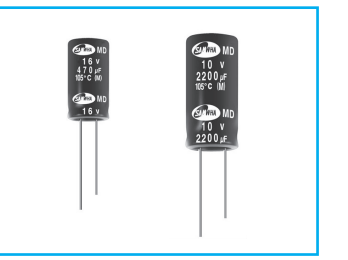
WV / Item / μF	10			16		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
56				5 × 11	0.150	405
100	5 × 11	0.150	405			
120				6.3 × 11	0.065	760
220	6.3 × 11	0.065	760			
330				8 × 11.5	0.036	1000
470	8 × 11.5	0.036	1000	8 × 15	0.028	1260
				10 × 12.5	0.027	1430
680	8 × 15	0.028	1250	8 × 20	0.020	1655
	10 × 12.5	0.027	1449	10 × 16	0.020	1820
1000	8 × 20	0.020	1895	10 × 20	0.014	2180
	10 × 16	0.020	1958	12.5 × 16	0.018	2215
1200	10 × 20	0.014	2180	10 × 25	0.013	2360
	12.5 × 16	0.018	2200			
1500	10 × 25	0.013	2360	12.5 × 20	0.013	2820
2200	12.5 × 20	0.013	2945	12.5 × 25	0.012	3095
3300	12.5 × 25	0.012	3234			

WV / Item / μF	25			35		
	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
33				5 × 11	0.150	405
47	5 × 11	0.150	405			
56				6.3 × 11	0.065	760
100	6.3 × 11	0.065	760			
150				8 × 11.5	0.036	1000
220	8 × 11.5	0.036	1255	8 × 15	0.028	1559
				10 × 12.5	0.027	1430
270				8 × 20	0.020	2255
330	8 × 15	0.028	1640	10 × 16	0.020	2409
	10 × 12.5	0.027	1640			
470	8 × 20	0.020	1695	10 × 20	0.014	2805
	10 × 16	0.020	1820	12.5 × 16	0.018	2805
560				10 × 25	0.013	2880
680	10 × 20	0.014	2200	12.5 × 20	0.013	3150
	12.5 × 16	0.018	2200			
820	10 × 25	0.013	2805			
1000	12.5 × 20	0.013	3080	12.5 × 25	0.012	3300
1500	12.5 × 25	0.012	3100			

MD High Ripple Current, Ultra Low Impedance Series

Low Impedance Solvent Proof

MZ ⇒ MD
High Ripple



- High ripple current compared with MZ series
- Enabled ripple current with extremely low impedance at high frequency range
- High reliability withstanding 2000 hours load life at 105˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes) I = 0.03CV or 4μA whichever is greater (after 1 minute)
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 tanδ: 0.22 / 0.19 / 0.16
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 Z-40˚C / Z+20˚C: 3 / 3 / 3
Load life	After an application of DC bias voltage plus the rated AC ripple current for 2000 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
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 (See page 131)

Unit : mm

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16		
	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
470							8 × 11.5	0.021	1340
680				8 × 11.5	0.021	1340	8 × 15	0.020	1850
							10 × 12.5	0.020	1960
820	8 × 11.5	0.021	1340						
1000				8 × 15	0.020	1850	8 × 20	0.016	2350
				10 × 12.5	0.016	1960	10 × 16	0.016	2460
1500	10 × 12.5	0.016	1960	8 × 20	0.013	2350	10 × 20	0.014	2805
				10 × 16	0.013	2460			
1800	10 × 16	0.013	2460	10 × 20	0.011	2805	10 × 25	0.013	3230
2200	10 × 20	0.011	2805	10 × 25	0.009	3230			
3300	10 × 25	0.009	3230						

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF / Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 820	0.55	0.77	0.94	0.97	1.00
1000 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

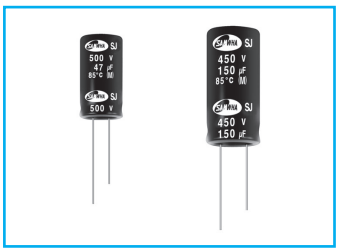
SJ

For PSU, Long Life Series

Long Life

SD ⇨ SJ
Long life

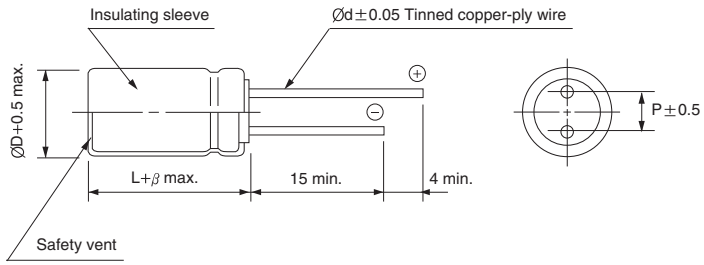
- High reliability withstanding 8000 hours load life at 85˚C
- Suitable for CFL, adapter and power supply
- Complied to the RoHS directive



Item	Characteristics
Operating temperature range	-25 ~ +85˚C
Leakage current max.	I = 0.02CV+25㎂A (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	Rated Voltage(V): 420 / 450 / 500 — tanδ: 0.20 / 0.20 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 420 / 450 / 500 — Z(-25˚C) / Z(+20˚C): 6 / 6 / 6
Load life (after application of the rated voltage for 8000 hours at 85˚C)	Leakage current: Less than specified value; Capacitance change: Within ±20% of initial value; tanδ: Less than 200% of specified value
Shelf life (at 85˚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



ØD	16	18
P	7.5	7.5
Ød	0.8	0.8
β L≤40mm	2.0	
β L>40mm	3.0	

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	420		450		500	
47					16 × 35.5	395
56					16 × 40	460
68	16 × 31.5	605	16 × 35.5	615	16 × 40	540
					16 × 45	
			18 × 31.5	615	18 × 40	
82	16 × 31.5	640	16 × 40	695	16 × 50	570
			18 × 31.5	695		
100	16 × 40	800	16 × 40	825	16 × 50	770
			18 × 35.5	825		
120	16 × 45	935	16 × 50	880		
150			16 × 50	955		

Ripple current (mA rms) at 85˚C, 120Hz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV \ Frequency	120Hz	1kHz	10kHz	50kHz, 100kHz
420 ~ 500V	1.00	1.40	1.50	2.00

SB

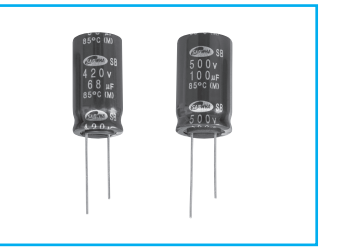
High Ripple Current, Long Life Series

Long Life

- High ripple current compared with SJ series
- High reliability withstanding 10000 hours load life at 85˚C
- Suitable for CFL, adapter and power supply
- Complied to the RoHS directive

SJ ⟹ SB

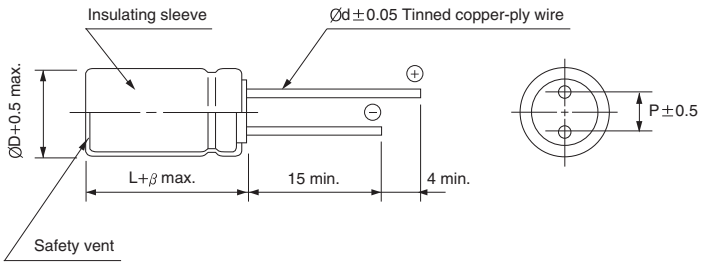
High Ripple
Long Life



Item	Characteristics
Operating temperature range	-25 ~ +85˚C
Leakage current max.	I = 0.02CV+25㎂ (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	Rated Voltage(V) 420 450 500 tanδ 0.20 0.20 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV 420 450 500 Z(-25˚C) / Z(+20˚C) 6 6 6
Load life (after application of the rated voltage for 10000 hours at 85˚C)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value
Shelf life (at 85˚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



ØD	16	18
P	7.5	7.5
Ød	0.8	0.8
β L≤40mm	2.0	
β L>40mm	3.0	

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

㎌ \ WV	420		450		500	
47					16 × 35.5	430
56					16 × 40	500
68	16 × 31.5	660	16 × 35.5 18 × 31.5	760	16 × 45 18 × 40	590
82	16 × 31.5	700	16 × 40 18 × 31.5	900	16 × 50	620
100	16 × 40	870	16 × 40 18 × 35.5	920	16 × 50	900
120	16 × 45	1020	16 × 50	960		
150			16 × 50	1040		

Ripple current (mA rms) at 85˚C, 120Hz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

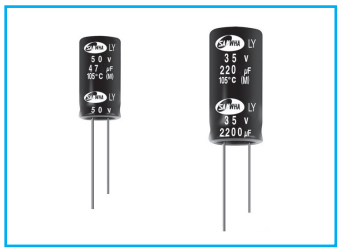
WV \ Frequency	120Hz	1kHz	10kHz	50kHz, 100kHz
420 ~ 500V	1.00	1.40	1.50	2.00

LY Miniature, Long Life, For LED Lighting Series

Long Life Solvent Proof

- Miniature, long life
- For LED Lighting
- High reliability withstanding 10000 hours load life at 105˚C
- Complied to the RoHS directive

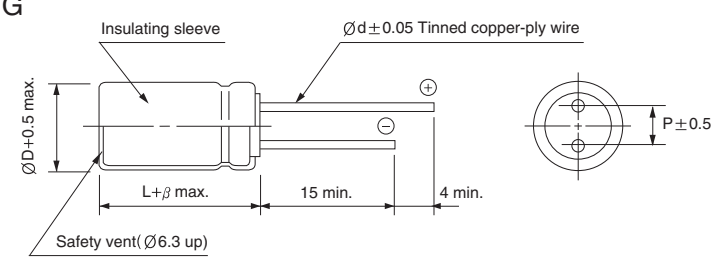
WF ⇨ LY
Long life



Item	Characteristics
Operating temperature range	-25 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA wichever is greater (after 2 minutes) I = 0.03CV or 4μA wichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 10 / 16 / 25 / 35 / 50 tanδ: 0.45 / 0.35 / 0.30 / 0.22 / 0.19
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 / 50 Z-25˚C/Z+20˚C: 8 / 6 / 4 / 4 / 3
Load life (after application of the rated voltage for 10000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±25% of the initial value tanδ: Less than 200% of the specified value
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



ØD	5	6.3	8
P	2.0	2.5	3.5
Ød	0.5	0.5	0.6
β	1.5		

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	10		16		25		35		50	
	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	ØD×L (mm)	Ripple current (mA rms) 105˚C 100kHz
1									5×11	32
2.2									5×11	42
3.3									5×11	84
4.7									5×11	96
10									5×11	108
22									5×11	132
33					5×11	156	5×11	175	6.3×11	228
47			5×11	175	5×11	175	6.3×11	252	6.3×11	228
100	5×11	175	6.3×11	252	6.3×11.5	252	8×11.5	396	8×11.5	324
220	6.3×11	252	8×11.5	396	8×11.5	396	8×15	430		
330	8×11.5	396	8×11.5	396						

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~	0.55	0.73	0.92	0.96	1.00

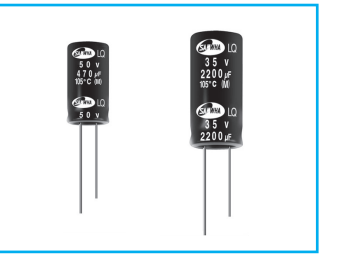
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

Upgrade

LQ

Low Imp., High Ripple Current Series

Low Impedance | Miniaturized | Solvent Proof



- For LED Lighting
- High reliability withstanding 10000 hours load life at 105˚C (6000 ~ 9000 hours for smaller case sizes as specified below)
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
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	80	100	120
tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08	0.8

Low temperature characteristics (Impedance ratio at 120Hz)	
Z-25˚C / Z+20˚C	2
Z-40˚C / Z+20˚C	3

Load life

After an application of DC bias voltage plus the rated AC ripple current for 10000 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.

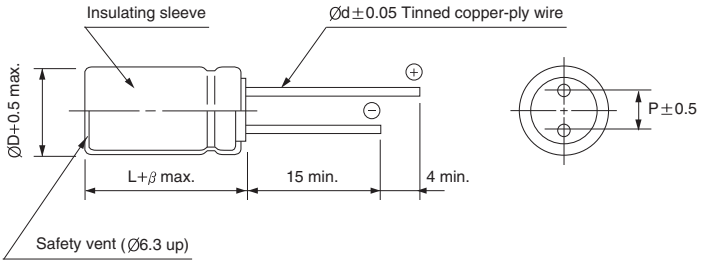
Rated voltage (Vdc)	6.3 ~ 10	16 ~ 120
Capacitance change	Within ±30% of initial value	Within ±25% of initial value
tanδ	Less than 200% of specified value	
Leakage current	Less than specified value	

ØD	Life time (hrs)		
	6.3Vdc	10 ~ 50Vdc	63 ~ 120Vdc
Ø5 ~ Ø6.3	6000	7000	6000
Ø8×11.5L	8000	9000	8000
Ø8×15L ~ 20L	9000	10000	9000
Ø10×12.5L	9000		
Ø10×16L ~ 25L Ø12.5 ~	10000		

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



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.5			2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.42	0.70	0.90	0.95	1.00
47 ~ 270	0.50	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1800	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

LQ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

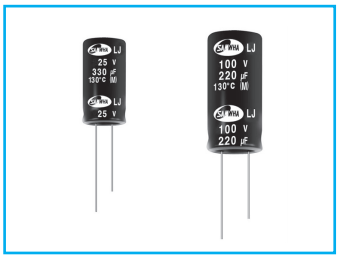
WV / Item / μF	6.3			10			16			25			35		
	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
100										5×11	0.400	450	6.3×11	0.170	700
120							5×11	0.400	450						
150				5×11	0.400	450				6.3×11	0.170	700			
180													8×11.5	0.075	1200
220	5×11	0.400	345										8×15	0.065	1600
270													10×12.5	0.053	1700
330				6.3×11	0.170	700				8×11.5	0.090	1200	8×20	0.041	1960
390										8×15	0.065	1600	10×16	0.038	2000
470	6.3×11	0.170	540							10×12.5	0.053	1700	10×16	0.038	2100
560				8×11.5	0.110	1200	8×15	0.059	1600	8×20	0.041	1960	10×20	0.030	2500
680				8×15	0.059	1600	10×12.5	0.053	1700	10×16	0.039	2000	10×25	0.027	2900
820	8×11.5	0.075	945	10×12.5	0.053	1700	8×20	0.041	1960				12.5×20	0.025	2600
1000	8×15	0.059	1250	10×16	0.041	1960	10×16	0.036	2000	10×20	0.030	2500	12.5×20	0.025	2800
1200	10×12.5	0.053	1500	10×16	0.036	2000				10×25	0.028	2900	12.5×25	0.022	3200
1500	8×20	0.041	1500				10×20	0.027	2500	12.5×20	0.026	2600	12.5×30	0.018	3660
													16×20	0.021	3330
1800	10×16	0.036	1760	10×20	0.027	2500	10×25	0.024	2600	12.5×25	0.024	3200	12.5×34.5	0.016	4120
													16×25	0.017	3810
2200				10×25	0.027	2900	12.5×20	0.023	2900	12.5×30	0.017	3660			
										16×20	0.020	3330			
2700	10×20	0.027	1960	10×20	0.024	2600	12.5×25	0.018	3200	12.5×34.5	0.015	4120			
3300	10×25	0.023	2250	12.5×25	0.018	3200	12.5×30	0.017	3660	16×25	0.016	3810			
							16×20	0.020	3300						
3900	12.5×20	0.024	2480				12.5×34.5	0.015	4120						
4700	12.5×25	0.018	2900	12.5×30	0.018	3660	16×25	0.016	3810						
				16×25	0.016	3300									
5600	12.5×30	0.017	3450	16×25	0.016	3810									
6800	12.5×34.5	0.015	3570												
	16×20	0.020	3250												
8200	16×25	0.016	3630												

WV / Item / μF	50			63			80			100			120		
	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
27	5×11	0.480	310				6.3×11	0.460	370						
33										8×11.5	0.450	620	8×15	0.200	780
47	6.3×11	0.380	400	6.3×11	0.350	420	8×11.5	0.290	620	8×15	0.350	780	8×20	0.160	1040
										10×12.5	0.250	780	10×16	0.110	1040
56	6.3×11	0.220	500				8×15	0.200	780	10×12.5	0.250	780			
68							10×12.5	0.170	780	8×20	0.250	1040	10×20	0.084	1430
										10×16	0.130	1040	12.5×16	0.110	1430
82				8×11.5	0.240	720	8×20	0.160	1040	10×16	0.105	1140			
100	8×11.5	0.120	950	8×15	0.180	990	10×16	0.140	1040	10×20	0.105	1430	10×25	0.069	1620
										12.5×16	0.105	1430	12.5×20	0.062	1750
120	8×15	0.082	1230	10×12.5	0.110	990				10×25	0.075	1620	12.5×25	0.047	2210
150	10×12.5	0.073	1280	8×20	0.096	1200	10×20	0.084	1430	12.5×20	0.070	1750	12.5×30	0.042	2400
							12.5×16	0.110	1430				16×20	0.048	1950
180	8×20	0.065	1580	10×16	0.076	1200	10×25	0.069	1620						
220	10×16	0.050	1650				12.5×20	0.062	1750	12.5×25	0.060	2210	16×25	0.038	2430
270				10×20	0.070	1570	12.5×25	0.047	2210	12.5×30	0.040	2400	16×31.5	0.032	2640
										16×20	0.046	1950	18×25	0.036	2500
330	10×20	0.036	2060	10×25	0.060	1990	12.5×30	0.042	2400	12.5×34.5	0.038	2600	16×35.5	0.029	2860
							16×20	0.048	1950						
390	10×25	0.030	2240	12.5×20	0.050	1990	12.5×34.5	0.036	2600	12.5×40	0.030	2860	16×40	0.027	3510
										16×25	0.036	2430	18×31.5	0.030	2860
										18×20	0.045	2270			
470	12.5×20	0.030	2300	12.5×25	0.039	2460	12.5×40	0.032	2860	16×31.5	0.030	2640	18×35.5	0.027	3510
							16×25	0.038	2430	18×25	0.034	2500			
							18×20	0.045	2270						
560				12.5×30	0.035	2760	16×31.5	0.032	2640	16×35.5	0.028	2860	18×40	0.026	3860
				16×20	0.032	2380				18×31.5	0.029	2860			
680	12.5×25	0.024	2800	12.5×34.5	0.024	3040	16×35.5	0.029	2860	16×40	0.026	3510			
							18×25	0.036	2500	18×35.5	0.026	3510			
820	12.5×30	0.022	3370	16×25	0.025	2890	16×40	0.027	3510	18×40	0.025	3860			
	16×20	0.025	3070				18×31.5	0.030	2860						
1000	12.5×34.5	0.020	3810	16×31.5	0.023	2950	18×35.5	0.027	3510						
	16×25	0.021	3510												
1200							18×40	0.026	3860						
2200				18×40	0.020	3200									

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

LJ 130˚C, Long Life, Low Impedance Series

Low Impedance | Miniaturized | Solvent Proof WV≦100V



- For LED Lighting, LED Display
- High reliability withstanding 4000 hours load life at 130˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +130˚C(10 ~ 100WV), -25 ~ +130˚C(200, 400WV)
Leakage current max.	WV ≦ 100: I = 0.01CV or 3μA whichever is greater (after 2 min.); I = 0.03CV or 4μA whichever is greater (after 1 min.) WV > 100: I = 0.02CV + 15μA (after 5 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	10	16	25	35	50	63	100	200	400
tanδ	0.19	0.16	0.14	0.12	0.1	0.09	0.08	0.15	0.2

Low temperature characteristics (Impedance ratio at 120Hz)

WV	10	16	25	35	50	63	100	200	400
Z-25˚C/Z+20˚C	3	2	2	2	2	2	2	3	6
Z-40˚C/Z+20˚C	6	4	3	3	3	3	3	-	-

Load life (after application of the rated voltage for 4000 hours at 130˚C)

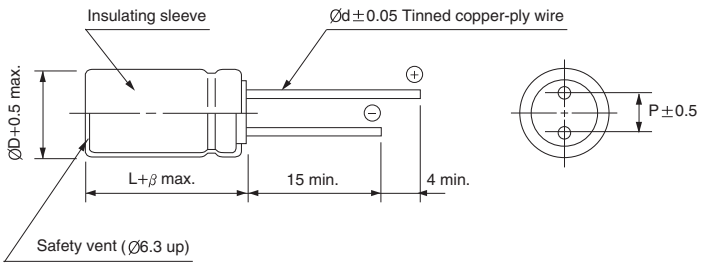
Rated voltage (Vdc)	10 ~ 100WV	200, 400WV
Capacitance change	Within ±30% of initial value	Within ±20% of initial value
tanδ	Within ±300% of initial value	Within ±200% of initial value
Leakage current	Less than specified value	

ØD	Life time(hrs)	
	~100V	200, 400V
ØD = 6.3	1,000	-
ØD = 8,10	2,000	3,000
ØD ≥ 12.5	4,000	-

Shelf life (at 130˚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



ØD	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.6	0.8	0.8
β	1.5	2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≦
10~100	~ 4.7	0.42	0.60	0.80	0.90	1.00
	10 ~ 33	0.55	0.75	0.90	0.95	1.00
	47 ~ 330	0.70	0.85	0.95	0.98	1.00
	470 ~ 1500	0.75	0.90	0.98	1.00	1.00
	2200 ~	0.80	0.95	1.00	1.00	1.00
200, 400	~ 5.6	0.20	0.40	0.80	0.90	1.00
	6.8 ~ 15	0.30	0.60	0.90	0.95	1.00
	22 ~	0.50	0.80	0.90	0.95	1.00

LJ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

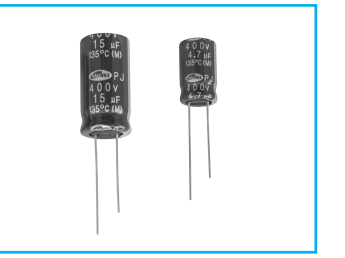
WV / Item / μF	10			16			25			35			50		
	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz
4.7													8×11.5	1.00	100
10													8×11.5	0.80	200
22													8×11.5	0.80	260
33													8×11.5	0.60	300
47													8×11.5	0.60	300
100										8×11.5	0.220	360	10×12.5	0.180	520
220							8×11.5	0.220	360	10×12.5	0.150	620	10×20	0.082	890
330	8×11.5	0.22	360	8×11.5	0.22	360	10×12.5	0.150	620	10×16	0.10	800	12.5×20	0.065	1000
470	10×12.5	0.15	620	10×12.5	0.15	620	10×16	0.100	800	10×20	0.073	960	12.5×25	0.051	1200
1000	10×20	0.07	960	10×20	0.07	960	12.5×20	0.06	1100	12.5×25	0.040	1430	16×31.5	0.037	2180
2200	12.5×25	0.040	1430	12.5×25	0.040	1430	16×31.5	0.034	2300	16×35.5	0.031	2550	18×40	0.029	2800
3300	16×25	0.038	1900	16×31.5	0.034	2300	16×35.5	0.031	2550	18×35.5	0.028	2800			
4700	16×31.5	0.034	2300	16×35.5	0.031	2550									

WV / Item / μF	63			100			200		400	
	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	Ripple current (mA rms) 130℃ 100kHz
1.0									8×11.5	65
1.5									8×11.5	75
									8×15	80
1.8									8×11.5	75
									8×15	85
2.2									8×11.5	75
									8×15	90
									8×20	110
2.7									8×15	95
									8×20	115
3.3									8×20	120
4.7				8×11.5	1.300	100	8×11.5	120	8×20	120
									10×16	125
5.6							8×11.5	130	10×16	130
							8×15	180	10×20	145
6.8							8×11.5	130	10×20	150
							8×15	180		
10				8×11.5	1.000	200	8×15	200		
							8×20	240		
15							8×15	200		
							8×20	240		
22				8×11.5	0.670	220	8×20	240		
							10×16	240		
33	8×11.5	0.50	250	10×12.5	0.45	260	10×20	320		
47	10×12.5	0.37	400	10×16	0.33	330				
100	10×16	0.30	450	12.5×20	0.17	670				
220	12.5×20	0.12	820	16×25	0.130	1100				
330	12.5×25	0.102	1000	16×31.5	0.100	1300				
470	16×25	0.089	1500	18×31.5	0.092	1600				
1000	16×31.5	0.076	1850							
1500	18×40	0.063	2350							

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

PJ High Temperature, For 135˚C Use Series

Solvent Proof

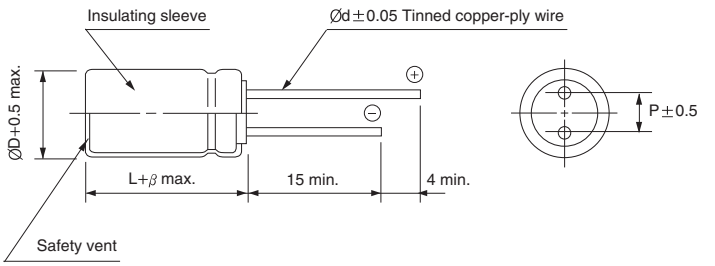


- For LED Lighting
- High reliability withstanding 3000 hours load life at 135˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +135˚C
Leakage current max.	I = 0.02CV +15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 200 / 250 / 400 / 450 tanδ: 0.15 / 0.15 / 0.20 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 200 / 250 / 400 / 450 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 3 Z-40˚C/Z+20˚C: 6 / 6 / 6 / 6
Load life (after application of the rated voltage for 3000 hours at 135˚C)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value tanδ: Less than 300% of specified value
Shelf life (at 135˚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



ØD	8	10	12.5
P	3.5	5.0	
Ød	0.6	0.6	0.6
β	1.5	2.0	

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	200		250		400		450	
1.0					8 × 11.5	65	8 × 11.5	65
2.2					8 × 11.5	75	8 × 11.5	75
3.3					8 × 20	120	8 × 20	120
4.7	8 × 11.5	120	8 × 11.5	125	8 × 20	120	8 × 20	120
5.6	8 × 11.5	130	8 × 11.5	140	10 × 16	130	10 × 16	130
6.8	8 × 11.5	130	8 × 11.5	140	10 × 20	150	10 × 20	150
10	8 × 15	200	10 × 12.5	210	10 × 20	180	10 × 20	180
15	8 × 20	240	10 × 16	250	12.5 × 20	200		
22	10 × 16	240	12.5 × 20	250				
33	10 × 20	320						

Ripple current (mA rms) at 135˚C, 100kHz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

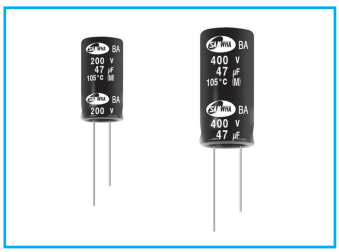
WV	Frequency / μF	120Hz	1kHz	10kHz	50kHz	100kHz≦
200~450	1 ~ 5.6	0.20	0.40	0.80	0.90	1.00
	6.8 ~ 15	0.30	0.60	0.90	0.95	1.00
	22 ~	0.50	0.80	0.90	0.95	1.00

BA

For PSU, Smaller Case Size Series

- 105˚C 2000 hours
- Smaller case size for energy saving lamp & ballast
- Complied to the RoHS directive

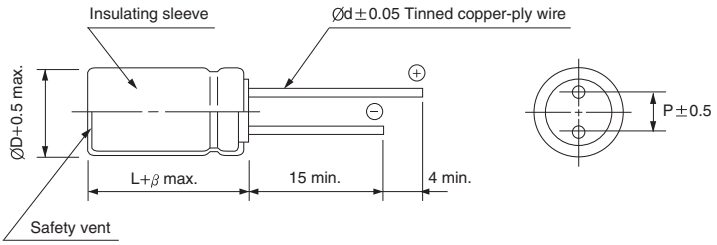
BA ⇨ RH
High reliability



Item	Characteristics
Operating temperature range	-40 ~ +105˚C (~ 250WV) -25 ~ +105˚C (~ 350WV)
Leakage current max.	I = 0.03CV + 15μA (CV≦1000) I = 0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 450 / 500 tanδ: 0.10 / 0.10 / 0.10 / 0.15 / 0.15 / 0.15 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 4 / 6 / 6 / 8 Z-40˚C/Z+20˚C: 4 / 4 / 4 / - / - / - / -
Load life	After an application of DC bias voltage plus the rated AC ripple current for 2000 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 ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.6	0.8	0.8
β	1.5	2.0			

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350		400		450		500	
1.0									8 × 11.5	27	10 × 12.5	27		
2.2							10 × 12.5	37	10 × 12.5	43	10 × 12.5	33		
3.3					10 × 12.5	44	10 × 12.5	53	10 × 16	58	10 × 16	51		
4.7			8 × 11.5	53	10 × 12.5	53	10 × 16	64	10 × 16	66	10 × 20	66		
10	10 × 12.5	77	10 × 12.5	86	10 × 16	88	10 × 20	110	10 × 20	125	12.5 × 20	101	12.5 × 25	96
22	10 × 16	140	10 × 16	140	10 × 20	168	12.5 × 20	175	12.5 × 25	196	16 × 25	168	16 × 25	188
33	10 × 20	206	10 × 20	206	12.5 × 20	223	16 × 20	240	16 × 25	260	18 × 25	228	18 × 25	224
47	10 × 20	266	12.5 × 20	266	12.5 × 25	297	16 × 25	311	18 × 25	317				
100	12.5 × 25	420	16 × 25	460	18 × 25	470								
220	18 × 25	500												

Ripple current (mA rms) at 105˚C, 120Hz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

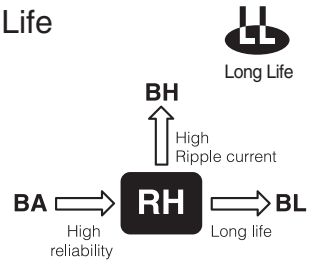
μF \ Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 47	0.75	1.00	1.55	1.90	2.00	2.00
100 ~	0.80	1.00	1.34	1.80	2.00	2.00

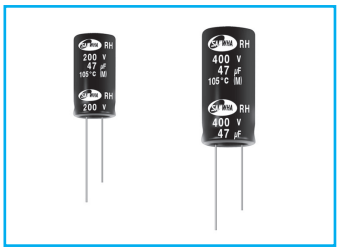
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

RH

For PSU High Ripple Current, Long Life Series

- High ripple current
- High reliability withstanding 5000 hours load life at 105˚C
- Suited for ballast application
- Complied to the RoHS directive

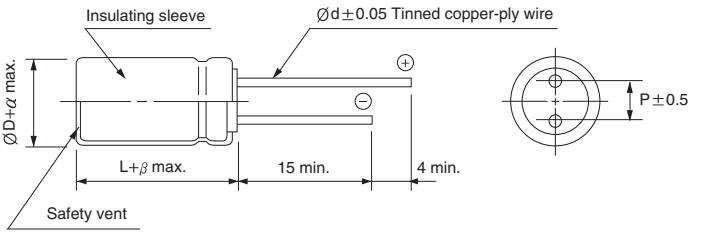




Item	Characteristics
Operating temperature range	WV: 160 ~ 450 / 500; Temperature range: -40 ~ +105˚C / -25 ~ +105˚C
Leakage current max.	I = 0.02CV + 15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500; tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.24 / 0.24 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 450 / 500; Z-25˚C/Z+20˚C: 3 / 3 / 3 / 4 / 6 / 6 / 6; Z-40˚C/Z+20˚C: 4 / 4 / 4 / 8 / 10 / 10 / -
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 ±20% of initial value; tanδ: Less than 200% of specified value
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



ØD	10	12.5	16	18	20	22
P	5.0	5.0	7.5	7.5	10.0	10.0
Ød	0.6	0.6	0.8	0.8	0.8	1.0
β	2.0				3.0	
α	0.5				1.0	

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 4.7	0.25	0.30	0.60	0.80	0.90	1.00
6.8 ~ 15	0.30	0.40	0.70	0.90	0.95	1.00
22 ~	0.40	0.50	0.80	0.90	0.95	1.00

RH series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
4.7							10 × 16	200
6.8			10 × 12.5	120	10 × 12.5	120	10 × 16	200
10	10 × 16	250	10 × 16	300	10 × 20	300	10 × 20	280
15					10 × 12.5	260		
22	10 × 16	360	10 × 16	360	12.5 × 20	600	12.5 × 20	350
	10 × 20	500	10 × 20	500				
33	10 × 20	500	10 × 20	500	12.5 × 20	600	16 × 20	500
			12.5 × 20	600				
47	12.5 × 20	600	12.5 × 20	660	12.5 × 25	720	16 × 25	660
68	12.5 × 25	600	12.5 × 25	760	16 × 25	920	16 × 31.5	800
82	16 × 20	760	16 × 20	880	16 × 25	1120	18 × 31.5	920
100	16 × 25	1100	16 × 25	1120	16 × 31.5	1200	18 × 31.5	1020
120	16 × 25	1180	16 × 31.5	1200	18 × 25	1200	18 × 31.5	1150
150	16 × 31.5	1300	16 × 31.5	1300	18 × 25	1250	18 × 40	1250
					18 × 31.5	1250		
220					18 × 35.5	1600		

μF \ WV	400		420		450		500	
1.0	10 × 12.5	90						
2.2	10 × 12.5	100	10 × 12.5	100	10 × 12.5	100		
3.3	10 × 12.5	128	10 × 12.5	128	10 × 12.5	128		
4.7	10 × 16	180	10 × 16	180	10 × 20	180		
6.8	10 × 16	200	10 × 16	200	10 × 20	200		
10	10 × 20	280	10 × 20	280	12.5 × 20	300	12.5 × 20	300
							12.5 × 25	360
15	12.5 × 16	280					12.5 × 25	360
22	12.5 × 25	430	12.5 × 25	430	12.5 × 20	430	16 × 25	420
					16 × 25	550		
33	16 × 25	640	16 × 25	660	16 × 31.5	700	16 × 31.5	560
47	16 × 31.5	750	16 × 31.5	750	16 × 31.5	700	18 × 35.5	700
56			18 × 25	750	18 × 25	750	18 × 35.5	740
68	16 × 31.5	880	16 × 31.5	900	18 × 25	900	18 × 35.5	900
					18 × 31.5	1000		
82	16 × 35.5	1000	16 × 35.5	1000	18 × 31.5	1035	18 × 40	1030
					18 × 35.5	1100		
100	18 × 35.5	1120	18 × 35.5	1170	18 × 35.5	1500	18 × 45	1100
							20 × 41	1200
120	18 × 40	1250	18 × 40	1280	18 × 40	1500		
150	20 × 41	1380	20 × 41	1500	20 × 41	1796		
180	20 × 41	1450	20 × 41	1600	22 × 45	1800		

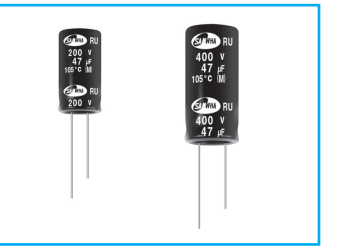
Ripple current (mA rms) at 105°C, 100kHz
Case size ØD×L (mm)

RU

For PSU, High Ripple Current Series

- High ripple current compared with RH series
- High reliability withstanding 5000 hours load life at 105˚C
- Suited for ballast application
- Complied to the RoHS directive

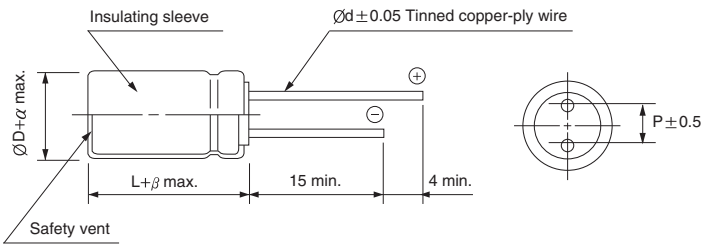
RH ⇨ RU
High Ripple



Item	Characteristics
Operating temperature range	WV: 160 ~ 450 — Temperature range: -40 ~ +105˚C; WV: 500 — Temperature range: -25 ~ +105˚C
Leakage current max.	I = 0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 — tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.20 / 0.20 / 0.20 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 450 / 500 — Z-25˚C/Z+20˚C: 3 / 3 / 3 / 4 / 6 / 6 / 6 — Z-40˚C/Z+20˚C: 4 / 4 / 4 / 8 / 10 / 10 / -
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 ±20% of initial value; tanδ: Less than 200% of specified value
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



ØD	10	12.5	16	18	20	22
P	5.0	5.0	7.5	7.5	10.0	10.0
Ød	0.6	0.6	0.8	0.8	0.8	1.0
β	2.0				3.0	
α	0.5				1.0	

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 8.2	0.30	0.56	0.78	0.90	1.00
10 ~ 47	0.35	0.60	0.80	0.90	1.00
68 ~	0.40	0.65	0.85	0.95	1.00

RU series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
6.8					10 × 12.5	250		
10	10 × 16	290	10 × 16	350	10 × 16	350	10 × 20	325
15	10 × 16	340	10 × 16	430	10 × 16	430	10 × 20	360
22	10 × 16	415	10 × 20	525	12.5 × 20	525	12.5 × 20	405
33	10 × 20	580	12.5 × 20	695	12.5 × 20	695	16 × 20	580
47	12.5 × 20	635	12.5 × 20	765	12.5 × 25	835	16 × 25	765
68	12.5 × 25	695	12.5 × 25	880	16 × 20	1000	18 × 25	925
					16 × 25	1065		
82	12.5 × 25	880	16 × 25	1100	16 × 25	1275	18 × 25	985
					18 × 25	1300		
100	16 × 20	1200	16 × 25	1275	18 × 25	1330	18 × 31.5	1180
120	16 × 25	1330	18 × 25	1390	18 × 25	1450	18 × 31.5	1330
150	16 × 25	1450	18 × 25	1500	18 × 25	1550	18 × 40	1450

μF \ WV	400		420		450		500	
3.3					10 × 12.5	180		
10	10 × 16	310	10 × 16	310	12.5 × 20	345	12.5 × 20	345
	10 × 20	325	10 × 20	325				
15	10 × 20	400	10 × 20	450	16 × 20	530	16 × 25	460
22	12.5 × 20	475	12.5 × 20	490	16 × 20	635	16 × 25	490
	12.5 × 25	500	12.5 × 25	520	16 × 25			
33	16 × 25	740	16 × 25	750	16 × 25	810	16 × 31.5	650
					18 × 20			
47	18 × 25	870	18 × 25	890	18 × 25	900	18 × 35.5	810
	16 × 31.5		16 × 31.5		16 × 31.5			
68	18 × 31.5	1020	18 × 31.5	1100	18 × 31.5	1160	18 × 35.5	1040
82	18 × 31.5	1160	18 × 31.5	1200	18 × 31.5	1250	18 × 40	1100
100	18 × 35.5	1300	18 × 35.5	1400	18 × 35.5	1450	20 × 41	1275
120	18 × 40	1450	18 × 40	1600	18 × 40	1620	22 × 45	1800
150	18 × 45	1500	18 × 45	1650	18 × 45	1700		
	20 × 41	1600	20 × 41	1750	20 × 41	1800		

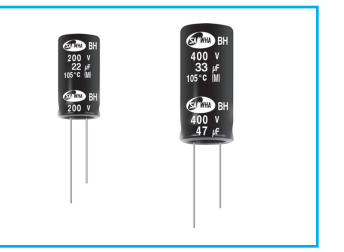
Ripple current (mA rms) at 105°C, 100kHz
Case size ØD×L (mm)

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

BH For PSU, High Ripple Current Series

Long Life

RH ⇨ BH
High Ripple



- Higher ripple current compared with RH series
- Operating tempersture range of -25 ~ +105˚C
- High reliability withstanding 5000 hours load life at 105˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-25 ~ +105˚C
Leakage current max.	I = 0.04CV + 100μA (after 1 minute) I = 0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 200 / 250 / 350 / 400 tanδ: 0.15 / 0.15 / 0.20 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 200 / 250 / 350 / 400 Z-25˚C/Z+20˚C: 3 / 3 / 6 / 6
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 ±20% of initial value tanδ: Less than 200% of specified value
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 (See page 153)

Unit : mm

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	200		250		350		400	
2.2							10 × 12.5	130
3.3					10 × 12.5	140	10 × 12.5	140
4.7					10 × 16	220	10 × 16	220
6.8					10 × 16	280	10 × 16	280
8.2					8 × 20	300	8 × 20	400
					10 × 16	300	10 × 20	400
10	10 × 16	320	10 × 16	320	8 × 20	300	8 × 23	400
					10 × 20	400	10 × 20	400
	8 × 20	300	8 × 23	350	10 × 30	500	12.5 × 20	700
22	10 × 20	550	10 × 20	550	12.5 × 20	650	12.5 × 25	780
					12.5 × 25	680		
33	12.5 × 20	700	12.5 × 20	800	16 × 25	910	16 × 25	920
47	12.5 × 20	980	12.5 × 25	1040	12.5 × 30	1050		
					18 × 20	1150		
68	12.5 × 20	1100	12.5 × 30	1300	16 × 31.5	1300		
	12.5 × 25	1300	16 × 25	1350				
82	16 × 20	1450	12.5 × 30	1450				
100	12.5 × 30	1550						
	16 × 25	1630						

← Ripple current (mA rms) at 105˚C, 100kHz
↑ Case size ØD×L (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

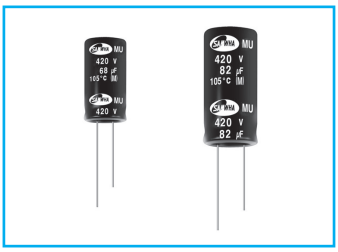
μF \ Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 4.7	0.30	0.40	0.60	0.80	0.90	1.00
6.8 ~ 10	0.35	0.40	0.70	0.90	0.95	1.00
22 ~	0.40	0.50	0.80	0.90	0.95	1.00

MU

For Display, 5000 hours at 105˚C Series

- High ripple current compared with RU series
- High reliability withstanding 5000 hours load life at 105˚C
- Complied to the RoHS directive

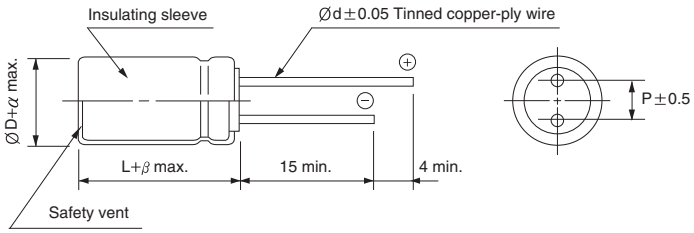
RU ⇨ MU
High Ripple



Item	Characteristics
Operating temperature range	WV: 160 ~ 450 / 500; Temperature range: -40 ~ +105˚C / -25 ~ +105˚C
Leakage current max.	I = 0.04CV + 100μA (after 1 minutes), I = 0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500; tanδ: 0.20 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500; Z-25˚C/Z+20˚C: 3 / 3 / 3 / 3 / 6 / 6 / 6 / 6; Z-40˚C/Z+20˚C: 4 / 4 / 4 / 6 / 6 / 6 / 6 / -
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 ±20% of initial value; tanδ: Less than 200% of specified value
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



ØD	10	12.5	16	18	20
P	5.0	5.0	7.5	7.5	10.0
Ød	0.6	0.6	0.8	0.8	0.8
β	2.0				3.0
α	0.5				1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 82	1.00	1.75	2.25	2.45	2.50
100 ~ 470	1.00	1.67	2.05	2.20	2.25

MU series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
10	10 × 16	102	10 × 16	110	10 × 12.5	110	10 × 16	135
22	10 × 16	195	10 × 16	200	10 × 16	195	12.5 × 20	270
27	10 × 16	222	10 × 16	222	10 × 20	240	12.5 × 20	285
33	10 × 16	245	10 × 20	280	12.5 × 20	294	12.5 × 25	290
39	10 × 16	265	10 × 20	305	12.5 × 20	322	12.5 × 25	320
47	10 × 20	335	10 × 20	335	12.5 × 20	400	16 × 25	410
			12.5 × 20	400				
68	12.5 × 20	400	12.5 × 20	447	12.5 × 25	540	16 × 25	550
			12.5 × 25	540	16 × 20	540		
82	12.5 × 20	450	12.5 × 25	560	16 × 20	600	18 × 25	625
			16 × 20	560				
100	12.5 × 25	525	16 × 25	652	16 × 25	652	18 × 31.5	743
	16 × 20	525			18 × 20	652		
120	12.5 × 25	580	16 × 25	714	16 × 25	714	18 × 35.5	840
	16 × 25	580						
150	16 × 25	750	16 × 25	760	18 × 25	820	18 × 35.5	942
180	16 × 25	810	16 × 31.5	850	18 × 31.5	920	18 × 40	1050
220	16 × 31.5	880	18 × 31.5	1000	18 × 31.5	1000		
	18 × 25	880						
270	16 × 35.5	1000	18 × 35	1150				
330	16 × 40	1142	18 × 40	1250				
	18 × 31.5	1119						
470	18 × 40	1401						

μF \ WV	400		420		450		500	
10	10 × 16	135	10 × 20	135	10 × 20	135	12.5 × 20	165
22	12.5 × 20	270	12.5 × 25	225	12.5 × 25	296	16 × 20	260
27	12.5 × 20	285	12.5 × 20	254	12.5 × 25	305	16 × 25	329
33	12.5 × 25	320	16 × 20	345	16 × 20	364	16 × 25	350
39	12.5 × 30	320	16 × 25	345	16 × 25	400	16 × 31.5	413
47	16 × 25	420	16 × 25	450	16 × 25	450	16 × 35.5	462
	18 × 20	436	18 × 20	450	18 × 20	450	18 × 31.5	468
68	16 × 31.5	540	18 × 25	520	18 × 25	560	16 × 45	630
	18 × 25	540	18 × 31.5	580	18 × 31.5	590	18 × 35.5	600
82	18 × 31.5	700	18 × 31.5	650	16 × 40	650	16 × 50	685
					18 × 31.5	670	18 × 40	670
100	18 × 31.5	743	16 × 45	770	16 × 45	770	18 × 45	800
	18 × 35.5	820	18 × 35.5	770	18 × 35.5	790	20 × 41	800
120	18 × 35.5	840	16 × 50	850	16 × 50	850	18 × 50	920
	18 × 40	912	18 × 40	850	18 × 40	850		
150	18 × 40	1020	18 × 45	1000				
			20 × 41	1000				
180	18 × 45	1080						
	20 × 41	1080						

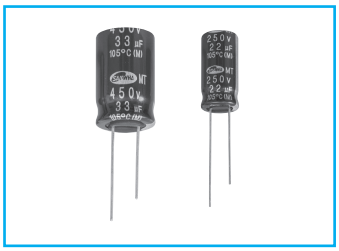
Ripple current (mA rms) at 105°C, 120Hz
Case size ØD×L (mm)

MT For Display, 12000 hours at 105˚C Series

Long Life

- High reliability withstanding 12000 Hours load life at 105˚C
- For power supply and adapter
- Complied to the RoHS directive

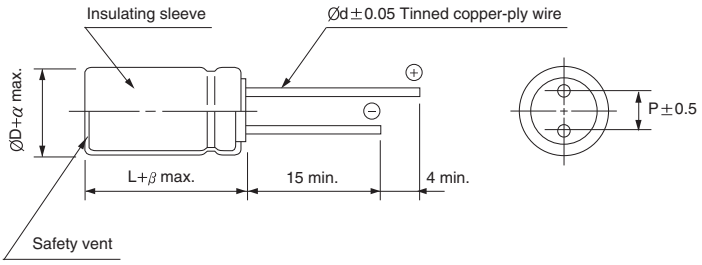
MU ⇨ MT
Long Life



Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.04CV+100μA (after 1 minutes) I = 0.02CV+25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 tanδ: 0.20 / 0.20 / 0.20 / 0.24 / 0.24 / 0.24 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 3 / 6 / 6 / 6 / 6 Z-40˚C/Z+20˚C: 4 / 4 / 4 / 6 / 6 / 6 / 6 / 6
Load life	After an application of DC bias voltage plus the rated AC ripple current for 12000 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 ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	10	12.5	16	18	20
P	5.0	5.0	7.5	7.5	10.0
Ød	0.6	0.6	0.8	0.8	0.8
β	2.0				3.0
α	0.5				1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

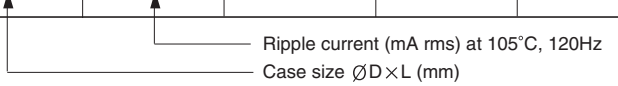
μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
10 ~ 82	1.00	1.75	2.25	2.45	2.50
100 ~ 470	1.00	1.67	2.05	2.20	2.25

MT series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
10	10 × 16	102	10 × 16	110	10 × 12.5	110	10 × 16	135
22	10 × 16	195	10 × 16	200	10 × 16	195	12.5 × 20	270
27	10 × 16	222	10 × 16	222	10 × 20	240	12.5 × 20	285
33	10 × 16	245	10 × 20	280	12.5 × 20	294	12.5 × 25	290
39	10 × 16	265	10 × 20	305	12.5 × 20	322	12.5 × 25	320
47	10 × 20	335	10 × 20	335	12.5 × 20	400	16 × 25	410
			12.5 × 20	400				
68	12.5 × 20	400	12.5 × 20	447	12.5 × 25	540	16 × 25	550
			12.5 × 25	540	16 × 20	540		
82	12.5 × 20	450	12.5 × 25	560	16 × 20	600	18 × 25	625
			16 × 20	560				
100	12.5 × 25	525	16 × 25	652	16 × 25	652	18 × 31.5	743
	16 × 20	525			18 × 20	652		
120	12.5 × 25	580	16 × 25	714	16 × 25	714	18 × 35.5	840
	16 × 25	580						
150	16 × 25	750	16 × 25	760	18 × 25	820	18 × 35.5	942
180	16 × 25	810	16 × 31.5	850	18 × 31.5	920		
220	16 × 31.5	880	18 × 31.5	1000	18 × 31.5	1000		
	18 × 25	880						
270	16 × 35.5	1000	18 × 35.5	1150				
330	16 × 40	1142	18 × 40	1250				
	18 × 31.5	1119						
470	18 × 40	1401						

μF \ WV	400		420		450		500	
10	10 × 16	135	10 × 20	135	10 × 20	135	12.5 × 20	165
22	12.5 × 20	270	12.5 × 20	225	12.5 × 25	296	16 × 20	260
27	12.5 × 25	285	12.5 × 20	254	12.5 × 25	305	16 × 25	329
33	12.5 × 25	320	16 × 20	345	16 × 20	364	16 × 25	350
39	12.5 × 30	320	16 × 25	345	16 × 25	400	16 × 31.5	413
47	16 × 25	420	16 × 25	450	16 × 25	450	16 × 35.5	462
	18 × 20	436	18 × 20	450	18 × 20	450	18 × 31.5	468
68	16 × 31.5	540	18 × 25	520	18 × 25	560	16 × 45	630
	18 × 25	540	18 × 31.5	580	18 × 31.5	590	18 × 35.5	600
82	18 × 31.5	700	18 × 31.5	650	16 × 40	650	16 × 50	685
					18 × 31.5	670	18 × 40	670
100	18 × 31.5	743	16 × 45	770	16 × 45	770	18 × 45	800
	18 × 35.5	820	18 × 35.5	770	18 × 35.5	790	20 × 41	800
120	18 × 35.5	840	16 × 50	850	16 × 50	850	18 × 50	920
	18 × 40	912	18 × 40	850	18 × 40	850		
150	18 × 40	1020	18 × 45	1000				
			20 × 41	1000				
180	20 × 41	1080						



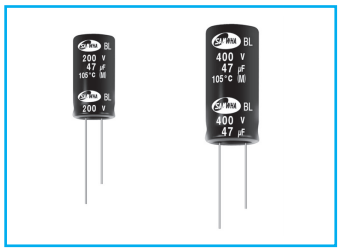
BL

For PSU, High Ripple Current, Long Life Series

Long Life

- High ripple current
- Operating temperature range of -25 ~ +105˚C
- For power supply and adapter
- Complied to the RoHS directive

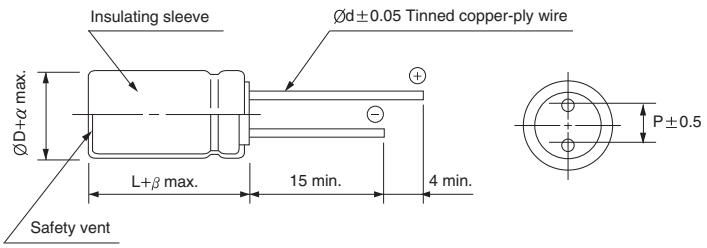
RH ⇨ BL
Long life



Item	Characteristics
Operating temperature range	-40 ~ +105˚C (160 ~ 450WV), -25 ~ +105˚C (500WV)
Leakage current max.	I = 0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.20 / 0.20 / 0.20 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 4 / 6 / 6 / 6 / 6 Z-40˚C/Z+20˚C: 4 / 4 / 4 / 6 / 6 / 6 / 6 / -
Load life	After an application of DC bias voltage plus the rated AC ripple current for 10000 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 ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	8	10	12.5	16	18	20
P	3.5	5.0	5.0	7.5	7.5	10.0
Ød	0.6	0.6	0.6	0.8	0.8	0.8
β	1.5	2.0				3.0
α	0.5					1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
Coefficient	0.35	0.50	0.80	0.90	0.95	1.00

BL series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
4.7					8 × 11.5	175		
6.8					8 × 11.5	200	10 × 16	240
					10 × 12.5	210		
10	10 × 16	275	10 × 16	275	8 × 15	265	8 × 20	385
					10 × 20	310	10 × 20	310
22	10 × 20	550	10 × 20	550	12.5 × 20	660	12.5 × 20	385
33	10 × 20	550	12.5 × 20	660	12.5 × 20	660	16 × 20	550
47	12.5 × 20	725	12.5 × 20	725	12.5 × 25	790	16 × 25	725
68	12.5 × 25	835	12.5 × 25	835	16 × 25	1010	18 × 25	925
			10 × 30	1045				
82	12.5 × 25	915	16 × 25	1050	12.5 × 30	1050	18 × 31.5	990
					16 × 25	1110		
100	16 × 25	1230	18 × 25	1230	18 × 25	1320		
150	18 × 25	1495	18 × 25	1495				

μF \ WV	400		420		450		500	
1	8 × 11.5	65			8 × 11.5	90		
2.2	8 × 11.5	90			8 × 11.5	105		
3.3	8 × 11.5	145			8 × 11.5	145		
3.9	8 × 11.5	155			8 × 15	165		
4.7	8 × 15	160			8 × 20	220		
	10 × 12.5	210			10 × 16	220		
6.8	8 × 20	210			10 × 16	240		
	10 × 16	240						
10	10 × 20	310	10 × 20	330	12.5 × 20	350	12.5 × 25	350
15					10 × 20	350		
22	12.5 × 25	475	12.5 × 25	475	12.5 × 20	440	16 × 25	615
					12.5 × 25	440	16 × 31.5	745
			16 × 20	475	16 × 25	615		
33	16 × 25	705	16 × 25	750	18 × 25	770	18 × 35.5	790
47	18 × 25	925	18 × 31.5	925	18 × 31.5	970	18 × 40	1100
68	18 × 31.5	955	18 × 25	990	18 × 25	1100	18 × 35.5	1100
			18 × 31.5	1025	18 × 31.5	1100	18 × 40	1165
82	18 × 35.5	1045	18 × 31.5	1100	18 × 35.5	1155	16 × 50	1210
100	18 × 40	1100	18 × 35.5	1155	18 × 35.5	1210		
			18 × 40	1210	18 × 40	1265		
120					18 × 40	1320		
150					20 × 41	1430		

Ripple current (mA rms) at 105°C, 100kHz
Case size ØD×L (mm)

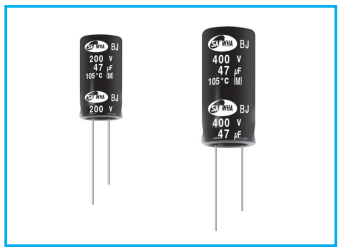
BJ

For PSU, High Ripple, Long Life Series

- High reliability withstanding 12000 hours load life at 105˚C
- Suitable for CFL, adapter and power supply
- Complied to the RoHS directive

Long Life

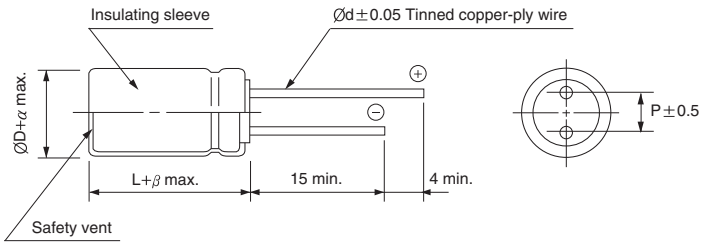
BL ⇨ BJ
Long life



Item	Characteristics
Operating temperature range	-40 ~ +105˚C (160 ~ 450WV), -25 ~ +105˚C (500WV)
Leakage current max.	I = 0.04CV + 100㎂ (after 1 minutes) I = 0.02CV + 25㎂ (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.20 / 0.20 / 0.20 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 6 / 6 / 6 / 6 / 6 Z-40˚C/Z+20˚C: 4 / 4 / 4 / 6 / 6 / 6 / 6 / -
Load life	After an application of DC bias voltage plus the rated AC ripple current for 12000 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 ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	8	10	12.5	16	18	20
P	3.5	5.0	5.0	7.5	7.5	10.0
Ød	0.6	0.6	0.6	0.8	0.8	0.8
β	1.5	2.0				3.0
α	0.5					1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / ㎌	120Hz	1kHz	10kHz	50kHz	100kHz≦
160~450	~ 15	0.30	0.60	0.90	0.95	1.00
	22 ~ 47	0.40	0.70	0.90	0.95	1.00
	68 ~	0.50	0.80	0.90	0.95	1.00
500	~ 39	0.40	0.70	0.90	0.95	1.00
	47 ~	0.50	0.80	0.90	0.95	1.00

BJ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
4.7					8 × 11.5	175	10 × 12.5	180
6.8					8 × 11.5	200	10 × 16	280
					10 × 12.5	290		
10	10 × 16	340	10 × 16	370	8 × 15	265	8 × 20	385
					10 × 16	370	10 × 20	450
22	10 × 16	520	10 × 20	580	10 × 20	580	12.5 × 20	675
27	10 × 16	555	10 × 20	625	10 × 20	600	12.5 × 20	713
33	10 × 16	690	10 × 20	750	12.5 × 20	775	16 × 20	780
39	10 × 20	690	12.5 × 20	763	12.5 × 20	805	16 × 20	800
47	10 × 20	840	12.5 × 20	1000	12.5 × 20	1000	16 × 25	1125
68	12.5 × 20	875	12.5 × 25	1080	16 × 20	1100	18 × 25	1220
			16 × 20	1100				
82	12.5 × 25	945	16 × 25	1120	16 × 20	1340	18 × 25	1370
100	12.5 × 25	1210	16 × 25	1304	16 × 25	1400	18 × 31.5	1490
	16 × 20				18 × 20			
120	16 × 25	1325	16 × 25	1428	18 × 25	1495	18 × 35.5	1680
150	16 × 25	1500	18 × 25	1570	18 × 25	1740	18 × 40	1884
180	16 × 25	1620	18 × 25	1600	18 × 31.5	1840	20 × 41	2100
220	18 × 25	1900	18 × 31.5	2020	18 × 35.5	2000		
270	16 × 35.5	2000	18 × 35.5	2300				
330	16 × 40	2280	18 × 40	2500				
470	18 × 45	2804						

μF \ WV	400		420		450		500	
1	8 × 11.5	65			8 × 11.5	90		
2.2	8 × 11.5	90			8 × 11.5	105		
3.3	8 × 11.5	145			8 × 11.5	145		
3.9	8 × 11.5	155			8 × 15	165		
4.7	8 × 15	160			8 × 20	220		
	10 × 16	220			10 × 16	220		
6.8	8 × 20	210			10 × 16	330		
	10 × 16	280			10 × 20	400		
10	10 × 20	420	10 × 20	420	10 × 20	400	12.5 × 20	413
					12.5 × 20	480		
15	12.5 × 20	480	12.5 × 20	480	12.5 × 20	480	12.5 × 25	440
					12.5 × 25	600		
22	12.5 × 25	720	12.5 × 25	745	12.5 × 25	890	16 × 25	675
			16 × 20	780	16 × 20	900		
27	16 × 20	730	16 × 20	875	16 × 20	950	16 × 25	823
33	16 × 20	960	12.5 × 30	980	16 × 25	1095	16 × 31.5	880
			16 × 25	1035	18 × 20		18 × 25	
39	16 × 20	1000	16 × 25	1050	16 × 25	1100	16 × 31.5	1033
47	16 × 25	1080	16 × 25	1125	18 × 25	1150	18 × 31.5	1033
	18 × 20							
68	16 × 31.5	1190	18 × 25	1150	18 × 31.5	1180	18 × 40	1200
82	18 × 31.5	1490	18 × 31.5	1450	18 × 35.5	1430	18 × 40	1340
100	18 × 35.5	1810	18 × 35.5	1700	18 × 35.5	1740	20 × 41	1600
					18 × 40	1740		
120	18 × 40	1824	18 × 40	1700	18 × 45	1740		
150	20 × 41	2040	20 × 41	2000				

Ripple current (mA rms) at 105°C, 100kHz
Case size ØD×L (mm)

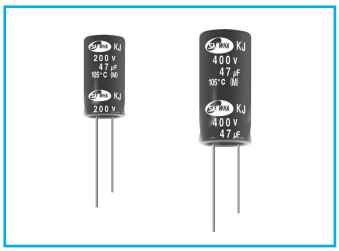
New

KJ

For PSU, High Ripple, Long Life Series

- High reliability withstanding 12000 hours load life at 105˚C
- Suitable for CFL, adapter and power supply
- Complied to the RoHS directive

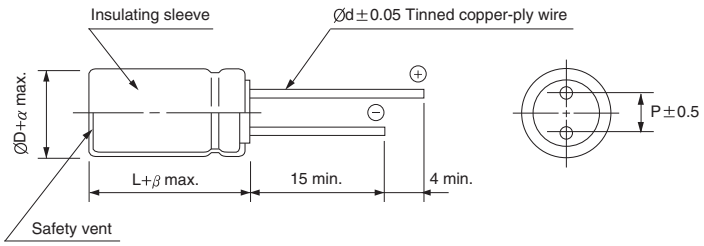
BJ ⇨ KJ
High Ripple



Item	Characteristics
Operating temperature range	-40 ~ +105˚C (160 ~ 450WV), -25 ~ +105˚C (500WV)
Leakage current max.	I = 0.04CV + 100μA (after 1 minutes) I = 0.02CV + 25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.20 / 0.20 / 0.20 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 6 / 6 / 6 / 6 / 6 Z-40˚C/Z+20˚C: 4 / 4 / 4 / 6 / 6 / 6 / 6 / -
Load life	After an application of DC bias voltage plus the rated AC ripple current for 12000 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 ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	8	10	12.5	16	18	20
P	3.5	5.0	5.0	7.5	7.5	10.0
Ød	0.6	0.6	0.6	0.8	0.8	0.8
β	1.5	2.0				3.0
α	0.5					1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	120Hz	300Hz	1kHz	10kHz	100kHz≦
160~450	~ 15	0.30	0.50	0.60	0.90	1.00
	22 ~ 47	0.40	0.50	0.70	0.90	1.00
	68 ~	0.50	0.60	0.80	0.90	1.00
500	~ 39	0.40	0.50	0.70	0.90	1.00
	47 ~	0.50	0.60	0.80	0.90	1.00

KJ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
4.7					8 × 11.5	193	10 × 12.5	198
6.8					8 × 11.5	220	10 × 16	308
					10 × 12.5	319		
10	10 × 16	358	10 × 16	407	8 × 15	292	8 × 20	424
					10 × 16	407	10 × 20	462
22	10 × 16	572	10 × 20	638	10 × 20	580	12.5 × 20	743
27	10 × 16	611	10 × 20	638	10 × 20	660	12.5 × 20	784
33	10 × 16	690	10 × 20	825	12.5 × 20	853	16 × 20	858
39	10 × 20	759	12.5 × 20	839	12.5 × 20	886	16 × 20	880
47	10 × 20	924	12.5 × 20	1100	12.5 × 20	1100	16 × 25	1130
68	12.5 × 20	924	12.5 × 25	1188	16 × 20	1210	18 × 25	1220
			16 × 20	1210				
82	12.5 × 25	1040	16 × 25	1232	16 × 20	1340	18 × 25	1380
100	12.5 × 25	1210	16 × 25	1434	16 × 25	1540	18 × 31.5	1617
	16 × 20				18 × 20			
120	16 × 25	1325	16 × 25	1571	18 × 25	1645	18 × 35.5	1848
150	16 × 25	1645	18 × 25	1727	18 × 25	1914	18 × 40	2072
180	16 × 25	1782	18 × 25	1760	18 × 31.5	2024	20 × 41	2310
220	18 × 25	2090	18 × 31.5	2222	18 × 35.5	2200		
270	16 × 35.5	2200	18 × 35.5	2530				
330	16 × 40	2508	18 × 40	2750				
470	18 × 45	3084						

μF \ WV	400		420		450		500	
1	8 × 11.5	72			8 × 11.5	90		
2.2	8 × 11.5	99			8 × 11.5	105		
3.3	8 × 11.5	160			8 × 11.5	145		
3.9	8 × 11.5	171			8 × 15	165		
4.7	8 × 15	176			8 × 20	242		
	10 × 16	242			10 × 16	242		
6.8	8 × 20	231			10 × 16	363		
	10 × 16	308			10 × 20	440		
10	10 × 20	462	10 × 20	462	10 × 20	440	12.5 × 20	413
					12.5 × 20	528		
15	12.5 × 20	528	12.5 × 20	528	12.5 × 20	528	12.5 × 25	440
					12.5 × 25	660		
22	12.5 × 25	792	12.5 × 25	745	12.5 × 25	890	16 × 20	500
			16 × 20	780	16 × 20	900	16 × 25	675
27	16 × 20	803	16 × 20	875	16 × 20	950	16 × 25	823
33	16 × 20	960	12.5 × 30	980	16 × 25	1095	16 × 31.5	880
			16 × 25	1035	18 × 20		18 × 25	
39	16 × 20	1000	16 × 25	1050	16 × 25	1100	16 × 31.5	1033
47	16 × 25	1188	16 × 25	1125	18 × 25	1150	18 × 25	1000
	18 × 20						18 × 31.5	1033
68	16 × 31.5	1309	18 × 25	1265	18 × 31.5	1180	18 × 35.5	1100
							18 × 40	1200
82	18 × 31.5	1639	18 × 31.5	1450	18 × 35.5	1430	18 × 35.5	1250
							18 × 40	1340
100	18 × 35.5	1810	18 × 35.5	1700	18 × 35.5	1740	18 × 45	1400
					18 × 40	1740	20 × 41	1600
120	18 × 40	2006	18 × 40	1700	18 × 45	1740		
150	20 × 41	2244	20 × 41	2000				

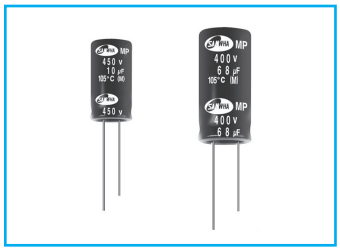
Ripple current (mA rms) at 105°C, 100kHz
Case size ØD×L (mm)

MP For Display, 15000 hours at 105˚C Series

Long Life

- High reliability withstanding 15000 hours load life at 105˚C
- For power supply and adapter
- Complied to the RoHS directive

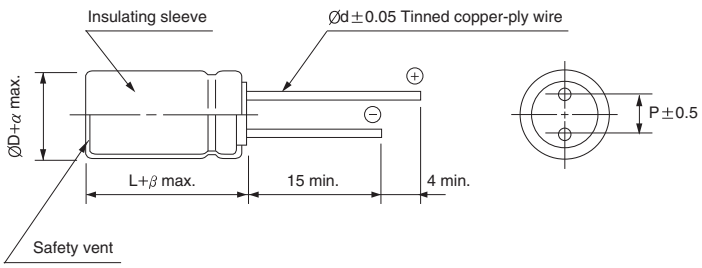
MT ⇨ MP
Long life



Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.04CV+100㎂A (after 1 minutes) I = 0.02CV+25㎂A (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 tanδ: 0.20 (160~250) / 0.24 (350~500)
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 3 / 6 / 6 / 6 / 6 Z-40˚C/Z+20˚C: 4 / 4 / 4 / 6 / 6 / 6 / 6 / 6
Load life	After an application of DC bias voltage plus the rated AC ripple current for 15000 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. (where 12000 hours for Ø10) Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	10	12.5	16	18	20
P	5.0	5.0	7.5	7.5	10.0
Ød	0.6	0.6	0.8	0.8	0.8
β	2.0				3.0
α	0.5				1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

㎌ \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
10 ~ 82	1.00	1.75	2.25	2.35	2.50
100 ~ 470	1.00	1.67	2.05	2.15	2.25

MP series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
10	10 × 12.5	110	10 × 12.5	110	10 × 12.5	160	10 × 16	149
15	10 × 12.5	150	10 × 12.5	150	10 × 16	220	10 × 20	197
22	10 × 12.5	243	10 × 16	243	10 × 20	240	12.5 × 20	297
27	10 × 16	264	10 × 20	280	10 × 20	270	12.5 × 20	314
33	10 × 16	270	10 × 20	308	12.5 × 20	323	12.5 × 25	325
39	10 × 20	320	10 × 25	350	12.5 × 20	354	12.5 × 30	352
47	10 × 20	369	12.5 × 20	440	12.5 × 25	460	16 × 20	451
68	12.5 × 20	480	12.5 × 25	594	12.5 × 30	610	16 × 31.5	623
82	12.5 × 25	525	16 × 20	616	16 × 25	680	18 × 25	688
100	12.5 × 25	575	16 × 25	717	16 × 31.5	717	18 × 31.5	817
120	12.5 × 30	670	16 × 25	785	16 × 31.5	804	18 × 35.5	924
	16 × 25	670						
150	16 × 25	825	16 × 31.5	813	16 × 35.5	902	18 × 40	1083
180	16 × 25	591	16 × 35.5	951	18 × 35.5	1012	18 × 45	1230
220	16 × 31.5	968	18 × 31.5	1100	18 × 40	1121		
	18 × 25	968						
270	16 × 35.5	1100	18 × 40	1290				
330	16 × 40	1231	18 × 45	1390				
	18 × 31.5	1231						
470	18 × 45	1626						

μF \ WV	400		420		450		500	
10	10 × 16	145	10 × 20	135	10 × 20	135	12.5 × 20	165
22	12.5 × 20	297	12.5 × 25	250	12.5 × 25	296	16 × 20	260
27	12.5 × 25	330	12.5 × 25	265	12.5 × 25	305	16 × 25	329
33	12.5 × 30	355	16 × 20	345	16 × 20	364	16 × 31.5	380
39	16 × 25	400	16 × 25	400	16 × 31.5	423	16 × 35.5	434
47	16 × 25	480	16 × 25	450	16 × 31.5	478	18 × 31.5	468
68	16 × 35.5	627	18 × 31.5	580	18 × 31.5	590	18 × 40	630
82	16 × 40	770	18 × 31.5	650	18 × 31.5	670	18 × 40	670
100	18 × 35.5	875	18 × 35.5	770	18 × 40	794	18 × 45	800
120	18 × 40	1000	18 × 45	900	18 × 45	940	18 × 50	920
150	18 × 45	1150						

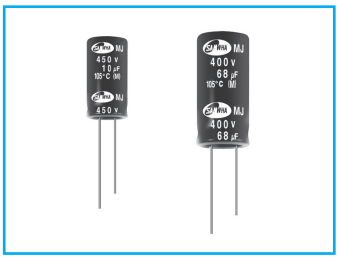
Ripple current (mA rms) at 105°C, 120Hz
Case size ØD×L (mm)

New

MJ

For PSU, High Ripple, 20000 hours at 105˚C Series

Long Life



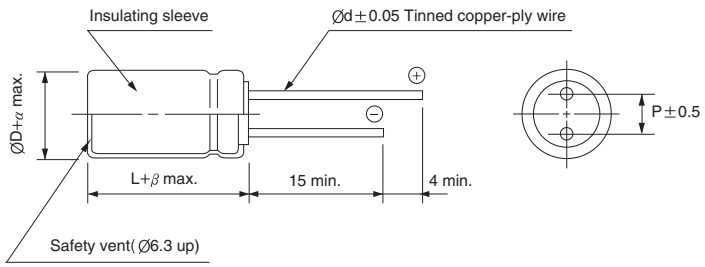
- High reliability withstanding 20000 hours load life at 105˚C
- For power supply and adapter
- Complied to the RoHS directive

MP ⇨ MJ
Long life

Item	Characteristics
Operating temperature range	-40 ~ +105˚C (160 ~ 450WV), -25 ~ +105˚C (500WV)
Leakage current max.	I = 0.04CV + 100㎂ (after 1 minutes) I = 0.02CV + 25㎂ (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 tanδ: 0.20 (160 ~ 250WV), 0.24 (350 ~ 500WV)
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 3 / 6 / 6 / 6 / 6 Z-40˚C/Z+20˚C: 4 / 4 / 4 / 6 / 6 / 6 / 6 / -
Load life	After an application of DC bias voltage plus the rated AC ripple current for 20000 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. (where 15000 hours for Ø10) Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	10	12.5	16	18	22
P	5.0	5.0	7.5	7.5	10.0
Ød	0.6	0.6	0.8	0.8	1.0
β	2.0				3.0
α	0.5				1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

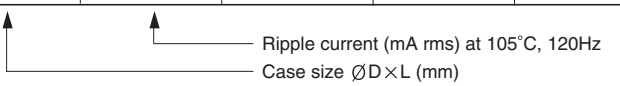
㎌ \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
3.3 ~ 82	1.00	1.75	2.25	2.35	2.50
100 ~ 470	1.00	1.67	2.05	2.15	2.25

MJ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350	
6.8					10 × 12.5	119	10 × 12.5	105
10					10 × 12.5	160	10 × 16	149
15			10 × 12.5	150	10 × 16	220	10 × 20	197
22	10 × 12.5	221	10 × 16	243	10 × 20	240	12.5 × 20	297
	10 × 16	243						
27	10 × 16	264	10 × 20	280	10 × 20	270	12.5 × 20	314
33	10 × 16	270	10 × 20	308	12.5 × 20	323	12.5 × 25	325
39	10 × 20	320	10 × 25	350	12.5 × 20	354	12.5 × 25	352
47	10 × 20	369	12.5 × 20	440	12.5 × 25	460	12.5 × 30	451
68	12.5 × 25	480	12.5 × 25	594	12.5 × 30	610	16 × 31.5	623
82	12.5 × 25	525	12.5 × 30	640	16 × 25	680	18 × 25	688
			16 × 20	616				
100	12.5 × 25	575	16 × 25	717	16 × 25	717	18 × 31.5	817
120	12.5 × 30	670	16 × 25	785	16 × 31.5	804	18 × 35.5	924
150	16 × 25	825	16 × 31.5	813	16 × 35.5	902	18 × 40	1083
180	16 × 25	891	16 × 35.5	951	18 × 31.5	1012	18 × 45	1230
220	16 × 31.5	968	18 × 31.5	1100	18 × 35.5	1121		
	18 × 25	968						
270	16 × 35.5	1100	18 × 40	1290				
330	18 × 31.5	1231	18 × 45	1390				
470	18 × 45	1626						

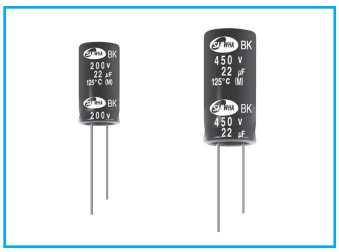
μF \ WV	400		420		450		500	
3.3							10 × 12.5	63
4.7					10 × 12.5	76	10 × 16	83
6.8					10 × 16	110	10 × 20	119
8.2	10 × 16	140	10 × 16	113	10 × 20	122	10 × 20	141
10	10 × 16	145	10 × 20	135	10 × 20	135	12.5 × 20	165
22	12.5 × 20	297	12.5 × 25	250	12.5 × 25	296	16 × 25	260
27	12.5 × 25	330	12.5 × 25	265	12.5 × 30	305	16 × 25	329
33	12.5 × 30	355	12.5 × 30	340	16 × 25	364	16 × 31.5	380
			16 × 20	345				
39	16 × 25	400	16 × 25	400	16 × 31.5	423	16 × 35.5	434
47	16 × 25	480	16 × 25	450	16 × 31.5	478	18 × 31.5	468
68	16 × 35.5	627	18 × 31.5	580	18 × 31.5	590	18 × 40	630
82	16 × 40	770	16 × 40	620	18 × 35.5	670	18 × 45	685
100	18 × 35.5	875	18 × 35.5	770	18 × 40	794	22 × 41	800
120	18 × 40	1003	18 × 45	900	18 × 50	940	22 × 51	960
150	18 × 50	1192						



BK For PSU, High Temperature Series

- High reliability withstanding 5000 hours load life at 125˚C
- Suitable for compact energy saving lamp
- Complied to the RoHS directive

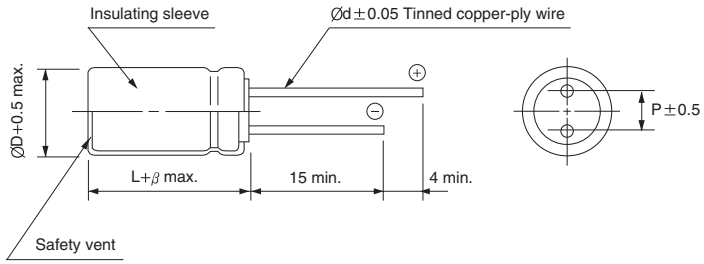
RH ⇒ BK
High Temp.



Item	Characteristics
Operating temperature range	-25 ~ +125˚C
Leakage current max.	I = 0.03CV+15㎂ (CV≦1000), I = 0.02CV+25㎂ (CV〉1000) (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	Rated Voltage(V): 160 / 200 / 250 / 350 / 400 / 450 tanδ: 0.15 / 0.15 / 0.15 / 0.20 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 350 ~ 450 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 6
Load life	After an application of DC bias voltage plus the rated AC ripple current for 5000 hours at 125˚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 ±20% of initial value tanδ: Less than 200% of specified value 450WV products are for 2000 hours.
Shelf life (at 125˚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



ØD	10	12.5	16
P	5.0	5.0	7.5
Ød	0.6	0.6	0.8
β	2.0		

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		350		400		450	
2.2							10 × 12.5	90	10 × 12.5	90		
3.3					10 × 12.5	90	10 × 16	120	10 × 16	100		
4.7	10 × 12.5	90	10 × 12.5	100	10 × 12.5	100	10 × 16	130	10 × 20	170	10 × 25	104
					10 × 16	120	10 × 20	170				
10	10 × 12.5	110	10 × 12.5	130	10 × 16	140	12.5 × 20	250	12.5 × 20	250	12.5 × 20	155
	10 × 16	140	10 × 16	160	10 × 20	170						
22	10 × 20	280	10 × 20	280	12.5 × 20	300					16 × 25	277
33	12.5 × 20	400	12.5 × 20	400	12.5 × 25	450					16 × 31.5	365
47	12.5 × 25	520	12.5 × 25	520								

Ripple current (mA rms) at 125˚C, 100kHz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

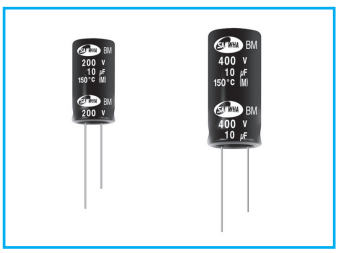
Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
Coefficient	0.30	0.40	0.70	0.90	0.95	1.00

BM

For PSU, 2000 hours at 150˚C
Series

- High reliability withstanding 2000 hours load life at 150˚C
- Suitable for compact energy saving lamp
- Complied to the RoHS directive

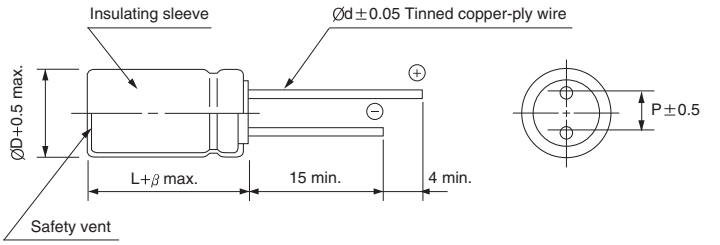
BK ⇨ BM
High Temp.



Item	Characteristics
Operating temperature range	-25 ~ +150˚C
Leakage current max.	I = 0.03CV or 4μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	Rated Voltage(V): 160 / 200 / 350 / 400 tanδ: 0.20 / 0.20 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 350 / 400 Z-25˚C/Z+20˚C: 3 / 3 / 6 / 6
Load life	After an application of DC bias voltage plus the rated AC ripple current for 2000 hours at 150˚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 ±20% of initial value tanδ: Less than 200% of specified value
Shelf life (at 150˚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



ØD	10	12.5
P	5.0	5.0
Ød	0.6	0.6
β	2.0	

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		350		400	
2.2					10 × 12.5	36	10 × 16	42
3.3					10 × 12.5	48	10 × 16	50
4.7					10 × 16	77	10 × 20	83
5.6					10 × 20	100	12.5 × 20	97
10	10 × 12.5	110	10 × 16	83	12.5 × 25	120	12.5 × 25	105
22	10 × 20	160	10 × 20	170				
33	12.5 × 20	230	12.5 × 20	210				
47	12.5 × 25	250	12.5 × 25	240				

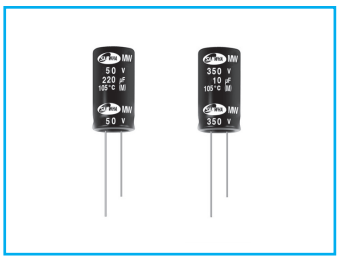
Case size ØD×L (mm)
Ripple current (mA rms) at 150˚C, 120Hz

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
Coefficient	0.75	1.00	1.50	1.75	1.77	1.80

MW High Ripple Current Series

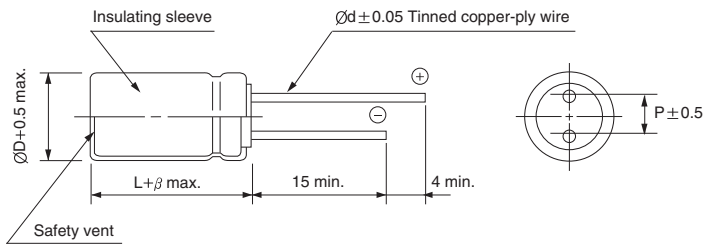
- Load life of 5000 hours at 105˚C
- Voltage range 25 ~ 500V
- Complied to the RoHS directive



Item	Characteristics
Operating temperature range	WV: 25 ~ 450 / 500; Temperature range: -40 ~ +105˚C / -25 ~ +105˚C
Leakage current max.	WV≤100: I = 0.01CV or 3μA whichever is greater (after 2 min.) I = 0.03CV or 4μA whichever is greater (after 1 min.); WV>100: I = 0.02CV+15μA (after 5 min.)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 25 / 35 / 50 / 160 / 200 / 250 / 350 / 400 / 450 / 500; tanδ: 0.14 / 0.12 / 0.10 / 0.15 / 0.15 / 0.15 / 0.20 / 0.24 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 25 / 35 / 50 / 160 / 200 / 250 / 350 / 400 / 450 / 500; Z-25˚C/Z+20˚C: 2 / 2 / 2 / 3 / 3 / 4 / 4 / 6 / 6 / 6; Z-40˚C/Z+20˚C: 3 / 3 / 3 / 4 / 4 / 4 / 8 / 10 / 10 / -
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. Rated voltage (Vdc): 25 ~ 50 / 160 ~ 500; Capacitance change: Within ±25% of initial value / Within ±20% of initial value; tanδ: Less than 200% of specified value; Leakage current: Less than specified value
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



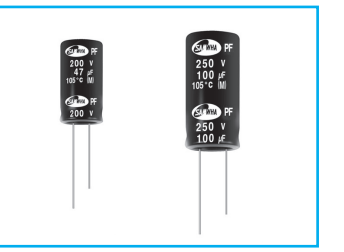
ØD	10
P	5.0
Ød	0.6
β	2.0

Vdc	Cap.(μF)	ØD×L (mm)	Rated ripple current (mA rms / 150˚C)		
			120Hz	50kHz	100kHz
25	470	10×12.5	628	1987	2092
35	330		588	1862	1960
50	220		495	1568	1650
160	27		192	608	640
200	22		179	565	595
250	6.8		102	323	340
250	15		153	485	510
350	10		125	394	415
400	8.2		108	342	360
450	3.3		92	292	307
500	4.7		57	181	190

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

PF High Ripple Current, High Reliability Series

Long Life

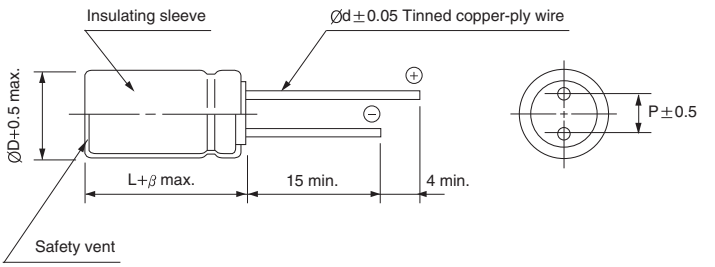


- High ripple current for diaplay module
- High reliability withstanding 10000 hours load life at 105˚C
- Suited for ballast application
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.02CV+15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 275 tanδ: 0.15 / 0.15 / 0.15 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 160 / 200 / 250 / 275 Z-40˚C/Z+20˚C: 4 / 4 / 4 / 4
Load life	After an application of DC bias voltage plus the rated AC ripple current for 10000 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 ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.8	0.8
β	2.0			

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	160		200		250		275	
10	10 × 16	320	10 × 16	320	10 × 16	320		
22	10 × 16	500	10 × 16	500	10 × 20	500	10 × 20	350
33	10 × 20	650	10 × 20	650	12.5 × 20	770	12.5 × 20	500
47	10 × 20	750	12.5 × 20	840	12.5 × 20	980	12.5 × 25	840
68	12.5 × 20	970	12.5 × 25	970	16 × 20	1080	16 × 25	970
82	12.5 × 25	1060	16 × 20	1125	16 × 20	1190	18 × 25	1100
100	12.5 × 25	1250	16 × 20	1230	16 × 25	1425	18 × 25	1400
120	16 × 20	1350	16×20, 18×20	1435	18 × 25	1660	18 × 31.5	1600
150	16 × 25	1610	18 × 25	1740	18 × 25	2000	18 × 35.5	1900
					18 × 31.5	2075		

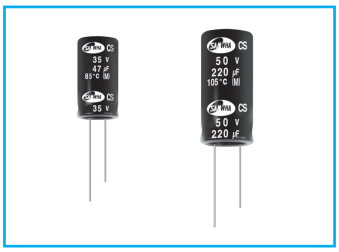
Ripple current (mA rms) at 105˚C, 100kHz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency(Hz)	50(60)Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
Coefficient	0.30	0.40	0.70	0.80	0.90	1.00

CS For Charger and Adapter Series

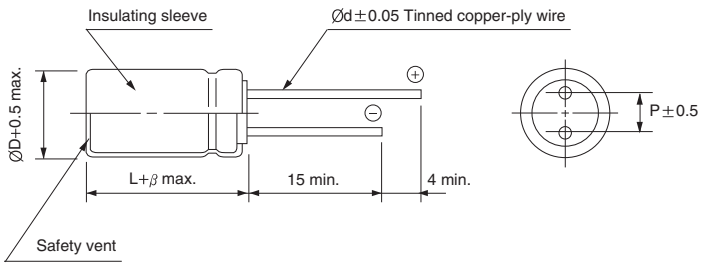
- Load life of 2000 hours at 105°C
- Voltage range 400 ~ 450V
- Complied to the RoHS directive



Item	Characteristics
Operating temperature range	-25 ~ +105°C
Leakage current max.	I = 0.02CV + 15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20°C
Dissipation factor max.	0.2max. at 120Hz, 20°C
Surge test (1.5kVDC: 5th interval 5 sec)	Appearance: Normal Leakage current: Less than specified value Capacitance change: Within initial value tanδ: Less than specified value
Load life (after application of the rated voltage for 2000 hours at 105°C)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value
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



ØD	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.8	0.8	0.8
β	1.5	2.0	2.0	2.0	2.0

* Note : Other case sizes, rated voltage or capacitance are available upon request.
Please check with us about individual size and dimensions.

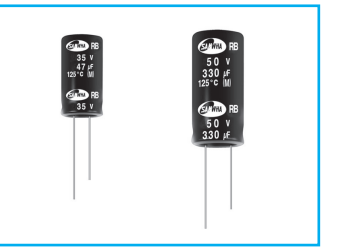
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

RB High Temperature, For 125˚C Use Series

- Load life of 2000 hours at 125˚C
- For Electronic Control unit and other high temperature applications
- Complied to the RoHS directive

Solvent Proof
WV≦100V

RB ⇨ VA
High Temp.



Item	Characteristics
Operating temperature range	WV≦50: -55 ~ +125˚C, WV≧63: -40 ~ +125˚C
Leakage current max.	WV≦50: I = 0.01CV or 3μA whichever is greater (after 2 minutes) WV≧63: 0.03CV +10μA(after 5 minutes)
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.

Rated Votage(V)	6.3	10	16	25	35	50	63 ~ 100	160 ~ 250
tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.15

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3 ~10	16 ~ 250
Z-25˚C/Z+20˚C	3	2
Z-40˚C/Z+20˚C	5	4

Load life (after application of the rated voltage for 2000 hours at 125˚C)

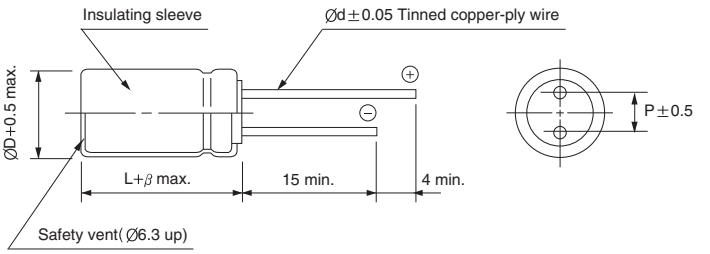
Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
tanδ	Less than 300% of specified value

Ø5, 6.3 and WV≧100 products are for 1000 hours

Shelf life (at 125˚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



ØD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
β	1.5			2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
6.3~100	~ 47	0.38	0.50	0.78	1.00	1.00	1.00
	68 ~ 680	0.46	0.57	0.77	0.86	0.93	1.00
	1000 ~	0.57	0.67	0.77	0.77	0.88	1.00
160~250	0.47 ~ 220	0.44	0.56	0.78	0.89	0.94	1.00
	330 ~	0.60	0.67	0.75	0.77	0.88	1.00

RB series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3		10		16	
	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz
47					5×11	165
68			5×11	165	6.3×11	230
100	5×11	160	6.3×11	220	6.3×11	280
150	6.3×11	240	6.3×11	280	8×11.5	410
220	6.3×11	300	8×11.5	410	8×11.5	485
330	8×11.5	310	8×11.5	485	10×12.5	660
470	10×12.5	605	10×12.5	635	10×16	815
680	10×16	740	10×16	815	10×20	1075
1000	10×20	1005	10×20	1120	12.5×20	1490
1500	10×25	1290	12.5×20	1495	12.5×25	1755
2200	12.5×20	1520	12.5×25	1805	16×20	1900
3300	12.5×25	1805	16×20	1955	16×25	2210
4700	16×25	2045	16×31.5	2555	16×35.5	2830
6800	16×31.5	2505	16×35.5	2830	18×35.5	3060
10000	16×40	2905	18×40	3210		
15000	18×40	3125				

WV / Item / μF	25		35		50	
	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz
1.0					5×11	40
1.5					5×11	50
2.2					5×11	55
3.3					5×11	70
4.7					5×11	85
6.8					5×11	95
10					5×11	120
15					5×11	155
22			5×11	170	6.3×11	205
33	5×11	165	6.3×11	240	6.3×11	255
47	6.3×11	220	6.3×11	285	8×11.5	365
68	6.3×11	275	8×11.5	405	8×11.5	435
100	8×11.5	405	8×11.5	485	10×16	615
150	8×11.5	485	10×12.5	660	10×20	865
220	10×12.5	635	10×16	815	10×25	1100
330	10×16	790	10×20	1120	12.5×20	1330
470	10×20	1075	12.5×20	1480	12.5×25	1585
680	12.5×20	1470	12.5×25	1755	16×20	1720
1000	12.5×25	1755	16×20	1870	16×31.5	2240
1500	16×20	1870	16×31.5	2520	16×40	2545
2200	16×25	2165	16×35.5	2830	18×40	2705
3300	16×35.5	2830	18×40	3210		
4700	18×40	3125				

RB series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

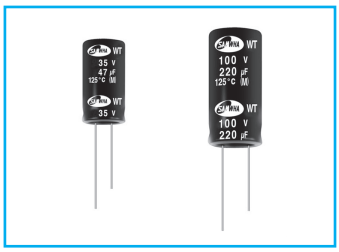
WV / Item / μF	63		100		160	
	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz
1.0			8×11.5	25	10×12.5	20
2.0			8×12.5	45	10×16	32
3.3			10×16	60	10×16	42
4.7			10×16	70	10×20	50
10	8×11.5	80	10×20	110	12.5×20	85
22	10×16	150	12.5×25	205	16×25	155
33	10×20	200	16×25	280	16×31.5	210
47	12.5×20	280	16×31.5	370		
100	12.5×25	445				

WV / Item / μF	200		250	
	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 125°C 100kHz
1.0	10×12.5	20	10×12.5	18
2.0	10×16	32	10×16	32
3.3	10×20	42	10×20	42
4.7	10×20	50	12.5×20	60
10	12.5×20	95	16×25	105
22	16×31.5	170		

WT High Temperature, For 125°C Use Long Life Series

Low Impedance Solvent Proof

RB ⇒ WT
Long life
Low Imp.



- Load life of 5000 hours at 125°C
- Low impedance at high frequency
- For electronic control unit and other high temperature applications
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +125°C
Leakage Current max.	I = 0.03CV or 3μA whichever is greater (after 2 minutes)
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
tanδ	0.22	0.20	0.16	0.14	0.12	0.10	0.10	0.08

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25	35	50	63	100
Z-25°C/Z+20°C	3	3	3	2	2	2	2	2
Z-40°C/Z+20°C	6	6	4	3	3	3	3	3

Load life (after application of the rated voltage for 5000 hours at 125°C)

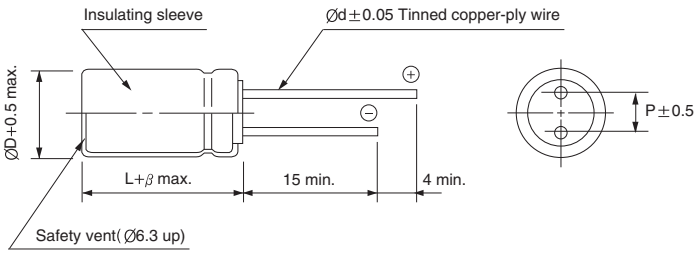
Capacitance change	Within ±30% of initial value
tanδ	Less than 300% of the specified value
Leakage current	Less than specified value

ØD	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
Life time	2000 hours	3000 hours	5000 hours

Shelf life (at 125°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



ØD	5	6.3	8	10	12.5	16
P	2.0	2.5	3.5	5.0	5.0	7.5
Ød	0.5	0.5	0.6	0.6	0.6	0.8
β	1.5			2.0		

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.20	0.50	0.80	0.90	1.00
47 ~ 100	0.25	0.60	0.90	0.95	1.00
150 ~ 220	0.35	0.70	0.92	0.96	1.00
330 ~ 680	0.45	0.75	0.95	0.97	1.00
1000 ~ 1500	0.50	0.80	0.96	0.98	1.00
2200 ~	0.55	0.85	0.98	0.99	1.00

WT 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) 125°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 125°C 100kHz
47										5×11	0.80	250
68				5×11	0.80	250	5×11	0.80	250	6.3×11	0.34	405
100	5×11	0.80	250	6.3×11	0.34	405	6.3×11	0.34	405	6.3×11	0.34	405
150	6.3×11	0.34	405	6.3×11	0.34	405	6.3×11	0.34	405	8×11.5	0.28	760
220	6.3×11	0.34	405	8×11.5	0.30	760	8×11.5	0.28	760	10×12.5	0.14	1030
330	8×11.5	0.28	760	8×11.5	0.28	760	10×12.5	0.14	1030	10×16	0.10	1430
470	10×12.5	0.14	1030	10×12.5	0.14	1030	10×16	0.10	1430	10×20	0.08	1500
680	10×16	0.10	1430	10×16	0.10	1430	10×20	0.06	1500	12.5×20	0.06	1720
1000	10×20	0.06	1500	10×20	0.06	1500	12.5×20	0.06	1720	12.5×25	0.05	1900
1500	10×25	0.06	1620	12.5×20	0.06	1720	12.5×25	0.05	1900			
2200	12.5×20	0.06	1720	12.5×25	0.05	1900						
3300	12.5×25	0.05	1900									

WV / Item / μF	35			50			63			100		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 125°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 125°C 100kHz
10												
22	5×11	0.80	250							10×12.5	0.80	480
33	6.3×11	0.34	405	8×11.5	0.70	300	8×11.5	1.50	150	10×12.5	0.80	480
47	6.3×11	0.34	405	8×11.5	0.60	440	10×12.5	0.59	530	10×16	0.65	630
68	8×11.5	0.28	760									
100	8×11.5	0.19	760	10×12.5	0.40	555	10×16	0.41	690	12.5×20	0.25	990
150	10×12.5	0.14	1030									
220	10×16	0.10	1430	10×20	0.15	930	12.5×20	0.16	1050	16×25	0.11	1500
330	10×25	0.06	1620	12.5×20	0.13	1330	12.5×25	0.12	1290	16×31.5	0.08	1790
470	12.5×20	0.06	1720	12.5×25	0.10	1650	12.5×34.5	0.10	1460			
680	12.5×25	0.05	1900	16×31.5	0.05	2430						

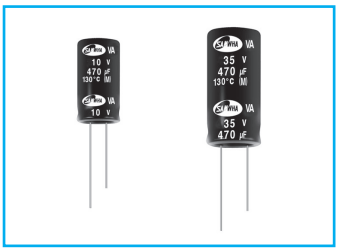
VA

130˚C, Long Life, Low Impedance Series

Low Impedance | Long Life | Solvent Proof

- Load life of 4000 hours at 130˚C
- Low impedance at high frequency
- For Electronic Control Unit and other high temperature applications
- Complied to the RoHS directive

RB ⇨ VA (High Temp.)



Item	Characteristics
Operating temperature range	-40 ~ +130˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 2 minutes)
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.

Rated Voltage(V)	10	16	25	35
tanδ	0.20	0.16	0.14	0.12

Low temperature characteristics (Impedance ratio at 120Hz)					
	WV	10	16	25	35
	Z-25˚C/Z+20˚C	3	2	2	2
	Z-40˚C/Z+20˚C	6	4	3	3

Load life (after application of the rated voltage for 4000 hours at 130˚C)

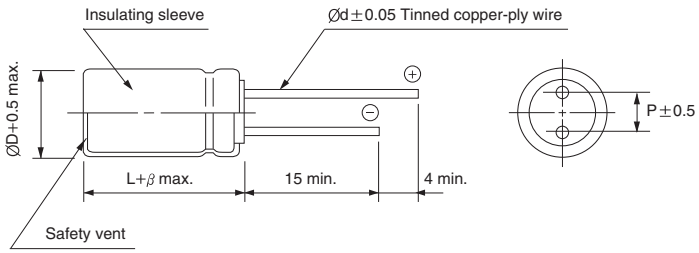
Leakage current	Less than specified value
Capacitance change	Within ±30% of initial value
tanδ	Less than 300% of specified value

ØD	ØD ≦ 10	ØD ≧ 12.5
Life time	2000 hours	4000 hours

Shelf life (at 130˚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



ØD	8	10	12.5	16	18
P	3.5	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.6	0.8	0.8
β	1.5	2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 330	0.50	0.85	0.95	0.97	1.00
470 ~ 1500	0.55	0.90	0.98	0.99	1.00
2200 ~	0.60	0.95	1.00	1.00	1.00

VA series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	10			16		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz
220						
330	8×11.5	0.22	360	8×11.5	0.22	360
470	10×12.5	0.15	620	10×12.5	0.15	620
1000	10×20	0.073	960	10×20	0.073	960
2200	12.5×25	0.040	1430	12.5×25	0.040	1430
3300	16×25	0.038	1900	16×31.5	0.034	2300
4700	16×31.5	0.034	2300	16×35.5	0.031	2550

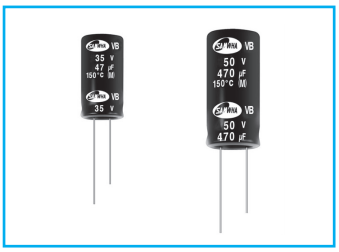
WV / Item / μF	25			35		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz
220	8×11.5	0.22	360	10×12.5	0.15	500
330	10×12.5	0.15	620	10×16	0.10	700
470	10×20	0.10	800	10×20	0.073	800
1000	12.5×25	0.055	1100	12.5×25	0.040	1100
2200	16×31.5	0.034	2300	16×35.5	0.031	2550
3300	16×35.5	0.031	2550	18×35.5	0.028	2800

VB 155˚C, High Temp, High Reliability Series

Solvent Proof

- Load life of 1000 hours at 155˚C use
- For Electronic Control Unit and other high temperature applications
- Complied to the RoHS directive

VA ⇨ VB
High Temp.



Item	Characteristics
Operating temperature range	-40 ~ +155˚C
Leakage current max.	I = 0.03CV or 4μA whichever is greater (after 1 minute)
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.

Rated Voltafe(V)	10	16	25	35	50	63	80	100
tanδ	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08

Low temperature characteristics (Impedance ratio at 120Hz)

WV	10	16	25	35	50	63	80	100
Z-25˚C/Z+20˚C	3	2	2	2	2	2	2	2
Z-40˚C/Z+20˚C	4	4	4	4	4	4	4	4

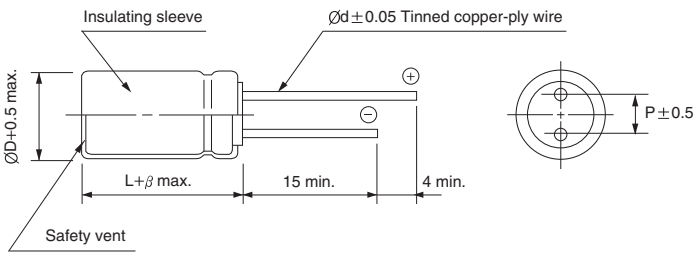
Load life (after application of the rated voltage for 1000 hours at 155˚C)

Leakage current	Less than specified value
Capacitance change	Within ±30% of initial value
tanδ	Less than 300% of specified value

Shelf life (at 155˚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



ØD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.8	0.8
β	2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

CV \ Frequency	120Hz	1kHz	50kHz	100kHz≦
1000 ≦ CV	0.67	0.91	0.95	1.00
1000 > CV	0.50	0.83	0.91	1.00

VB series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	10		16		25		35	
	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz
22							10 × 12.5	200
33							10 × 12.5	225
47							10 × 12.5	250
100					10 × 12.5	250	10 × 20	400
220			10 × 16	300	12.5 × 20	500	12.5 × 25	600
330	10 × 16	300	10 × 20	400	12.5 × 25	600	16 × 25	800
470	10 × 20	400	12.5 × 20	600	16 × 25	800	16 × 31.5	1000
1000	12.5 × 25	600	16 × 25	800	16 × 31.5	1000	18 × 40	1300
2200	16 × 31.5	1000	18 × 35.5	1200				
3300	18 × 35.5	1200	18 × 40	1300				
4700	18 × 40	1300						

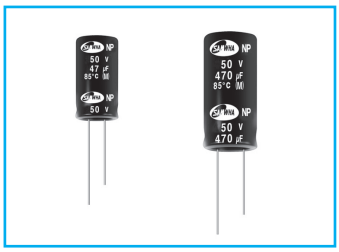
WV / Item / μF	50		63		80		100	
	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 155°C,100kHz
22							10 × 12.5	390
33					10 × 12.5	420	10 × 16	510
47					10 × 16	550	10 × 20	640
56			10 × 12.5	430	10 × 20	690	10 × 20	640
68			10 × 16	560	10 × 20	690	12.5 × 20	760
100	10 × 16	380	10 × 20	710	12.5 × 20	820	12.5 × 25	950
220	12.5 × 20	640	12.5 × 25	1040	16 × 25	1250	16 × 31.5	1380
330	16 × 20	770	16 × 20	1080	16 × 31.5	1480	18 × 31.5	1430
470	16 × 25	960	16 × 25	1280	18 × 31.5	1530		
560	16 × 31.5	1080	16 × 31.5	1520				
680	18 × 25	1190	16 × 35.5	1520				
1000	18 × 31.5	1420						

NP Non-Polarized Series

Non-polarized

Solvent Proof
WV≦100V

SD ⇨ NP
Non-polar



- Standard non-polarized series
- Designed for use in circuits with reversing polarity
- Higher voltage ratings available up to 250V
- Load life of 2000 hours at 85˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +85˚C
Leakage current max.	I = 0.03CV or 3μA whichever is greater (after 5 minutes)
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	80	100	160	200,250
tanδ	0.25	0.23	0.20	0.15	0.15	0.12	0.12	0.12	0.12	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25~100	160~250
Z-25˚C/Z+20˚C	4	3	2	2	3
Z-40˚C/Z+20˚C	10	8	6	4	5

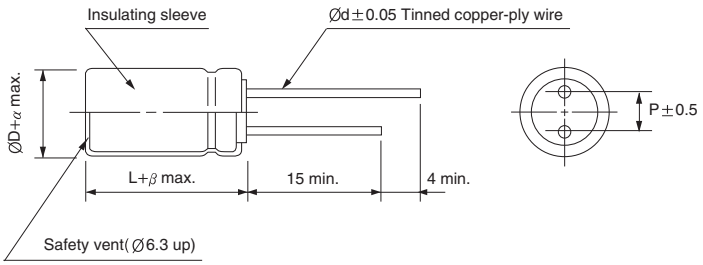
Load life (after application of the rated voltage for 2000 hours at 85˚C)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
tanδ	Less than 200% of specified value
Test method	Polarity reverse each 250 hours

Shelf life (at 85˚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



ØD	5	6.3	8	10	12.5	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0
β	1.5			2.0				3.0
α	0.5							1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	50Hz	120Hz	1kHz	10kHz≦
~ 47	0.75	1.00	1.55	2.00
68 ~ 680	0.80	1.00	1.34	1.50
1000 ~	0.85	1.00	1.13	1.15

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

NP series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

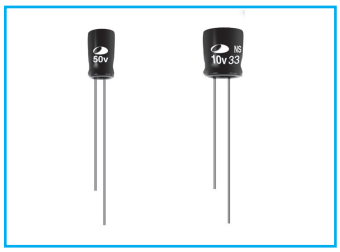
WV / μF	6.3	10	16	25	35	50	63	80	100	160	200	250
1.0						5×11 18	5×11 18	5×11 18	5×11 18			
1.5						5×11 21	5×11 21	5×11 21	5×11 21			
2.2						5×11 26	5×11 26	5×11 26	5×11 26			
3.3						5×11 32	5×11 32	5×11 32	5×11 32	10×16 49	10×16 42	10×20 46
4.7						5×11 38	5×11 38	5×11 38	6.3×11 44	10×16 59	10×20 55	12.5×20 63
6.8						5×11 46	5×11 46	6.3×11 52	8×11.5 62	10×20 77	12.5×20 78	12.5×20 78
10						5×11 55	6.3×11 64	6.3×11 64	8×11.5 75	12.5×20 109	12.5×20 95	12.5×25 103
15					5×11 61	6.3×11 78	6.3×11 78	8×11.5 92	10×12.5 107	12.5×20 134	12.5×25 127	16×25 140
22				5×11 73	6.3×11 84	6.3×11 94	8×11.5 111	10×12.5 129	10×16 142	12.5×25 177	16×25 170	16×31.5 186
33			5×11 78	6.3×11 103	6.3×11 103	8×11.5 136	10×12.5 158	10×16 173	10×20 189	16×25 240	16×35.5 239	18×35.5 256
47		5×11 87	6.3×11 107	6.3×11 123	8×11.5 145	10×12.5 189	10×16 207	10×20 226	12.5×20 265	16×35.5 329	18×40 321	
68	5×11 100	6.3×11 120	6.3×11 129	8×11.5 175	10×12.5 203	10×16 249	10×20 272	12.5×20 319	12.5×25 348	18×35.5 425		
100	6.3×11 139	6.3×11 145	8×11.5 184	10×12.5 247	10×16 270	10×20 329	10×20 329	12.5×20 387	16×25 468			
150	6.3×11 171	8×11.5 210	10×12.5 262	10×16 331	10×20 361	10×20 404	12.5×20 474	12.5×25 516	16×25 573			
220	8×11.5 244	10×12.5 295	10×16 347	10×20 437	10×20 437	12.5×20 574	12.5×25 625	16×25 694	16×35.5 797			
330	10×12.5 347	10×16 396	10×20 464	10×20 535	12.5×20 628	16×25 850	16×25 850	16×35.5 976	18×40 1098			
470	10×16 454	10×20 516	10×20 553	12.5×20 750	12.5×25 818	16×31.5 1110	16×35.5 1164	18×40 1311	22×41 1443			
680	10×20 595	12.5×20 729	12.5×20 781	12.5×25 984	16×25 1091	18×35.5 1503	18×40 1577	22×41 1736				
1000	12.5×20 847	12.5×20 883	12.5×25 1033	16×25 1323	16×35.5 1519	18×40 1912	22×41 2105					
1500	12.5×20 999	12.5×25 1132	16×25 1338	16×35.5 1748	18×40 1968	22×41 2386						
2200	12.5×25 1272	16×25 1463	16×35.5 1781	18×40 2254	22×41 2481							
3300	16×25 1672	16×35.5 1985	18×40 2360	22×41 2890								
4700	16×35.5 2221	18×40 2579	22×41 2987									
6800	18×41 2840	22×41 3214										
10000	22×41 3516	← Case size ØD×L (mm) ← Ripple current (mA rms) at 85°C, 120Hz										

NS Non-Polarized, Height 7mmL Series

Non-polarized Solvent Proof

- Non-polarized series with 7mmL height
- Load life of 2000 hours at 85˚C
- Complied to the RoHS directive

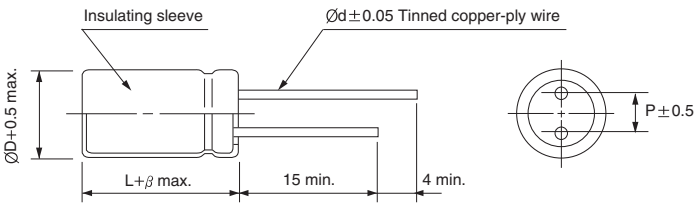
SS ⇨ NS
Non-polar



Item	Characteristics
Operating temperature range	-40 ~ +85˚C
Leakage current max.	I = 0.05CV or 10μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 40 / 50 / 63 tanδ: 0.24 / 0.20 / 0.17 / 0.16 / 0.15 / 0.14 / 0.12 / 0.10
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16~25 / 35~63 Z-25˚C/Z+20˚C: 4 / 3 / 2 / 2 Z-40˚C/Z+20˚C: 8 / 6 / 4 / 4
Load life (after application of the rated voltage for 2000 hours at 85˚C)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value Test method: Polarity reverse each 250 hours
Shelf life (at 85˚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



ØD	4	5	6.3
P	1.5	2.0	2.5
Ød	0.45	0.5	0.5
β	1.0	1.5	

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		40		50		63	
1.0													4×7	13	4×7	14
1.5													4×7	16	4×7	17
2.2													4×7	19	5×7	24
3.3							4×7	20	4×7	21	4×7	18	5×7	27	6.3×7	34
4.7					4×7	23	4×7	24	5×7	29	5×7	25	6.3×7	37	6.3×7	40
6.8			4×7	26	5×7	32	5×7	33	6.3×7	39	5×7	29				
10			4×7	31	5×7	39	6.3×7	47	6.3×7	48	6.3×7	41				
15	4×7	35	5×7	44	6.3×7	55										
22	5×7	49	6.3×7	62	6.3×7	67										
33	6.3×7	69	6.3×7	76												
47	6.3×7	83														

Ripple current (mA rms) at 85˚C, 120Hz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	50Hz	120Hz	1kHz	10kHz≦
Coefficient	0.75	1.00	1.55	2.00

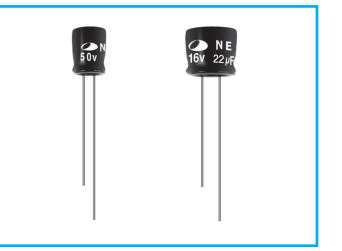
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

NE Non-Polarized, Height 5mmL Series

Miniaturized | Non-polarized | Solvent Proof

- Non-polarized and low profile series with 5mmL height
- Uniquely designed for use in lightweight and portable equipment
- Complied to the RoHS directive

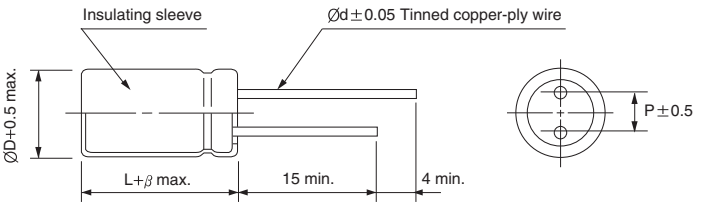
SE ⇨ NE
Non-polar



Item	Characteristics
Operating temperature range	-40 ~ +85˚C
Leakage current max.	I = 0.05CV or 10μA whichever is greater (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.24 / 0.20 / 0.17 / 0.17 / 0.15 / 0.15
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16, 25 / 35, 50 Z-25˚C/Z+20˚C: 4 / 3 / 2 / 2 Z-40˚C/Z+20˚C: 8 / 6 / 4 / 3
Load life (after application of the rated voltage for 1000 hours at 85˚C)	Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value Test method: Polarity reverse each 250 hours
Shelf life (at 85˚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



ØD	4	5	6.3
P	1.5	2.0	2.5
Ød	0.45	0.45	0.45
β	1.0	1.5	

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
1.0											4×5	10
1.5											4×5	12
2.2							4×5	14	4×5	15	5×5	17
3.3							5×5	20	5×5	21	5×5	21
4.7					4×5	21	5×5	24	5×5	25	6.3×5	30
6.8					5×5	29	6.3×5	33	6.3×5	36	6.3×5	36
10			4×5	28	5×5	35	6.3×5	41	6.3×5	43		
15	4×5	31	5×5	39	6.3×5	50						
22	5×5	43	6.3×5	55	6.3×5	60						
33	6.3×5	62	6.3×5	68								
47	6.3×5	74										

Ripple current (mA rms) at 85˚C, 120Hz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

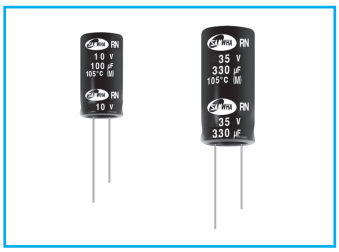
Frequency	50Hz	120Hz	1kHz	10kHz≦
Coefficient	0.75	1.00	1.55	2.00

RN Non-Polarized, Wide Temperature Range Series

Non-polarized Solvent Proof

- Wide operating temperature range of -40 ~ +105˚C
- Designed for use in circuits with reversing polarity
- Complied to the RoHS directive

RD ⇨ RN
Non-polar



Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.03CV or 3μA whichever is greater (after 5 minutes)
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	80	100
tanδ	0.24	0.20	0.16	0.16	0.14	0.12	0.12	0.12	0.12

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25 ~ 100
Z-25˚C/Z+20˚C	4	3	2	2
Z-40˚C/Z+20˚C	8	6	4	3

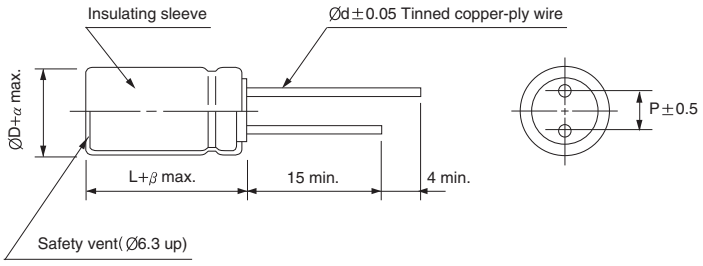
Load life (after application of the rated voltage for 1000 hours at 105˚C)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
tanδ	Less than 200% of specified value
Test method	Polarity reverse each 250 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



ØD	5	6.3	8	10	12.5	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0
β	1.5			2.0				3.0
α	0.5							1.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	50Hz	120Hz	1kHz	10kHz≦
~ 47	0.75	1.00	1.55	2.00
68 ~ 680	0.80	1.00	1.34	1.50
1000 ~	0.85	1.00	1.13	1.15

RN series

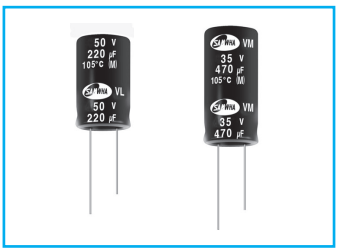
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / μF	6.3	10	16	25	35	50	63	80	100
1.0						5 × 11 11	5 × 11 12	5 × 11 12	5 × 11 13
1.5						5 × 11 14	5 × 11 15	5 × 11 15	5 × 11 16
2.2						5 × 11 17	5 × 11 18	5 × 11 18	5 × 11 19
3.3						5 × 11 21	5 × 11 23	6.3 × 11 26	6.3 × 11 27
4.7					5 × 11 23	5 × 11 25	6.3 × 11 31	6.3 × 11 31	8 × 11.5 39
6.8				5 × 11 26	5 × 11 27	6.3 × 11 34	6.3 × 11 37	8 × 11.5 44	10 × 12.5 54
10			5 × 11 31	5 × 11 31	6.3 × 11 38	6.3 × 11 41	8 × 11.5 53	10 × 12.5 62	10 × 12.5 65
15		5 × 11 34	5 × 11 38	6.3 × 11 44	8 × 11.5 55	8 × 11.5 60	10 × 12.5 76	10 × 12.5 76	10 × 16 88
22	5 × 11 38	5 × 11 41	6.3 × 11 53	8 × 11.5 63	8 × 11.5 67	10 × 12.5 84	10 × 16 101	10 × 16 101	
33	5 × 11 46	6.3 × 11 58	8 × 11.5 77	8 × 11.5 77	10 × 12.5 95	10 × 16 113	10 × 16 124	10 × 20 135	
47	6.3 × 11 63	6.3 × 11 69	8 × 11.5 92	10 × 12.5 106	10 × 16 125	10 × 20 147	10 × 20 161	12.5 × 20 189	
68	6.3 × 11 76	8 × 11.5 98	10 × 12.5 128	10 × 16 140	10 × 20 164	10 × 20 177	12.5 × 20 227	12.5 × 25 248	
100	8 × 11.5 109	10 × 12.5 139	10 × 16 170	10 × 20 185	10 × 20 198	12.5 × 20 251	12.5 × 25 300	16 × 25 333	
150	10 × 12.5 155	10 × 16 186	10 × 20 227	12.5 × 20 267	12.5 × 20 285	12.5 × 25 336	16 × 25 408	16 × 35.5 468	
220	10 × 12.5 188	10 × 20 246	12.5 × 20 323	12.5 × 20 323	12.5 × 25 376	16 × 25 451	16 × 35.5 567	18 × 35.5 609	
330	10 × 16 252	12.5 × 20 354	12.5 × 20 396	12.5 × 25 431	16 × 25 511	16 × 35.5 634	18 × 35.5 745	18 × 40 782	
470	10 × 20 328	12.5 × 20 422	12.5 × 25 515	16 × 25 571	16 × 35.5 701	18 × 35.5 812	18 × 40 933	22 × 41 1027	
680	12.5 × 20 464	12.5 × 25 554	16 × 25 687	16 × 35.5 788	18 × 35.5 904	18 × 40 1025	22 × 41 1236		
1000	12.5 × 25 613	16 × 25 745	16 × 35.5 956	18 × 35.5 1026	18 × 40 1151	22 × 41 1368			
1500	16 × 25 800	16 × 35.5 999	18 × 35.5 1184	18 × 40 1243	22 × 41 1451				
2200	16 × 35.5 1072	18 × 35.5 1242	18 × 40 1428	22 × 41 1572					
3300	18 × 35.5 1361	18 × 40 1534	22 × 41 1835	← Case size ØD×L (mm) ← Ripple current (mA rms) at 105°C, 120Hz					
4700	18 × 40 1650	22 × 41 1942							
6800	22 × 41 2060								

VM,VL

For Refolw Series

Solvent Proof
WV≦100V

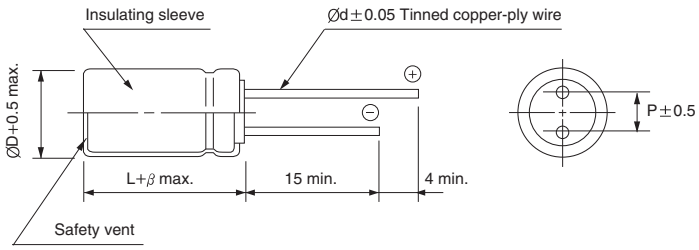


- Suitable for CFL, adapter and power supply
- VM series is load life of 5000 hours at 105˚C
- VL series is load life of 8000 hours at 105˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ 105˚C
Leakage current max.	WV ≦ 100: I = 0.01CV or 3μA whichever is greater (after 2 min.) WV > 100: I = 0.02CV + 25μA (after 5 min.)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 25 / 35 / 50 / 100 / 160 / 250 tanδ: 0.16 / 0.13 / 0.12 / 0.08 / 0.14 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 25 / 35 / 50 / 100 / 160 / 250 Z-40˚C/Z+20˚C: 5 / 4 / 3 / 3 / 6 / 8
Load life	After application of the rated voltage 5000(VM), 8000(VL) hours at 105˚C Leakage current: Less than specified value Capacitance change: Within ±20% of initial value tanδ: Less than 200% of specified value
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 after exposure for 24 hours at room temperature after application of DC reted voltage to the capacitors for 30 minutes.

DRAWING

Unit : mm



ØD	8	10
P	3.5	5.0
Ød	0.5	0.6
β	1.5	2.0

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	25		35		50		100		160		250	
15											8×20	375
22									8×20	375	10×16	469
33									8×20	469	10×20	625
47									10×20	625		
68							8×20	630				
82							10×16	725				
100							10×20	830				
180					8×20	760						
220					10×16	810						
330					10×20	890						
470	8×20	780	8×20	810								
560	8×20	930	10×20	1029								
680	10×16	1089	10×20	1295								
820	10×20	1351										
1000	10×20	1600										

Ripple current (mA rms) at 105˚C, 100kHz
Case size ØD×L (mm)

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	300Hz	1kHz	10kHz	100kHz≦
~ 33	0.32	0.60	0.80	0.90	1.00
39 ~ 270	0.40	0.63	0.82	0.91	1.00
330 ~ 1000	0.45	0.67	0.84	0.92	1.00

* Refer to page 162 for soldering recommendation.

Reflow soldering method for series of VM, VL

1. Recommended conditions for reflow soldering

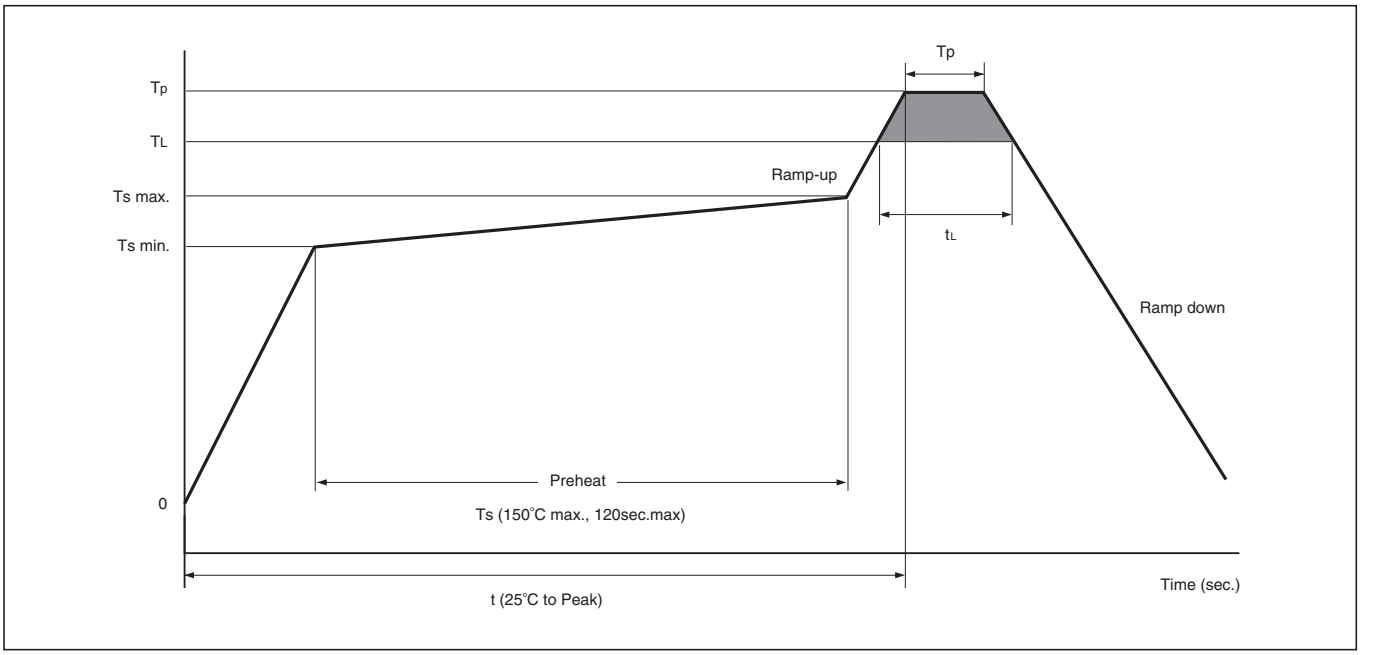
The aluminum electrolytic capacitor is subjected to soldering by reflow method.
Temperature and time conditions of reflow soldering shall be set as per each temperature profile shown below as a standard. The following are recommended conditions in the case of reflow soldering method for the aluminum electrolytic capacitor.

(1) The capacitor shall not be subjected to either flow or dip soldering method.

(2) Avoid soldering twice by reflow. The number of reflow time for aluminum electrolytic capacitor shall be once basically. If this type of capacitor has to be inevitably subjected to the reflow twice, enough cooling time between the first and the second reflow (at least more than 30 minutes) shall be taken to avoid the consecutive reflows by all means.

(3) On setting the reflow conditions, it shall be done lest the temperature at surface of the capacitor should exceed more than 175˚C

2. RECOMMENDED REFLOW SOLDERING CONDITIONS



Profile Feature		Soldering condition
		Ø8 ~ Ø10
Average Ramp-up Rate (T_L to T_P)		2˚C / second max.
Preheat	Temperature Min. (T_S min)	100˚C
	Temperature Max. (T_S max)	125˚C
	Time (T_S min to T_S max)	60 ~ 90 seconds
TS max to TL - Ramp-up Rate		2˚C / second max.
Time maintained above	Temperature (T_L)	140˚C
	Time (t_L)	40 ~ 60 seconds
Peak/classification Temperature (T_P)		175˚C
Time within 5˚C of actual peak temperature(T_P)		10 seconds max.
Ramp-Down rate		3˚C / second max.
Time 25˚C to peak temperature		6 minute max.