4 MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

PACKING

● BULK PACKING QUANTITY(pcs) / BOX

SIZE		BULK (QUANTITY)		
ØD	L(mm)	V-Bag	INNER BOX	MIDDLE BOX
4	5, 7	500	10000	40000
5	5, 7, 11	500	7000	28000
6.3	5, 7, 11	500	6000	24000
8	5, 7	500	5000	20000
	11.5	300	3600	14400
10	12.5	200	2400	9600
	16	200	2000	8000
	20, 25	200	1600	6400
	30	100	1200	4800
12.5	16	100	1200	4800
	20	100	1000	4000
	25	100	900	3600
	30	100	800	3200
16	16	–	800	3200
	20	–	600	2400
	25	–	500	2000
	31.5, 35.5, 40	–	400	1600
	45, 50	–	250	1000
18	16	–	600	2400
	20	–	500	2000
	25, 31.5	–	400	1600
	35.5, 40	–	300	1200
	45, 50	–	250	1000

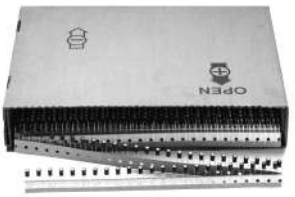
● CUTTING PACKING QUANTITY(pcs) / BOX

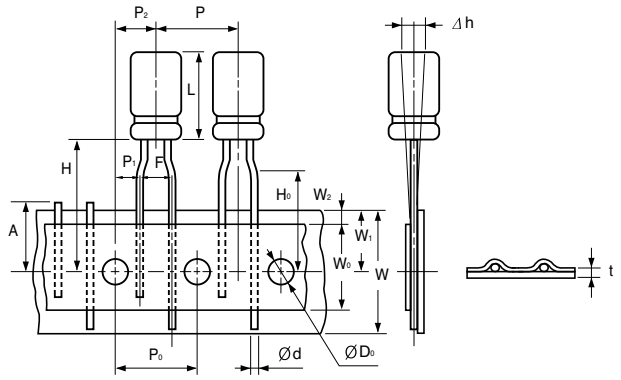
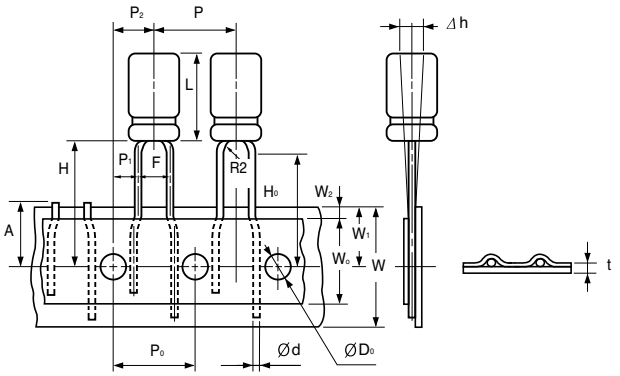
SIZE		CUTTING (QUANTITY)		
ØD	L(mm)	V-Bag	INNER BOX	MIDDLE BOX
4	5, 7	500	9000	36000
5	5, 7, 11	500	7000	28000
6.3	5, 7, 11	500	6000	24000
8	5, 7	500	5000	20000
	11.5	300	3600	14400
10	12.5	–	800	12800
	16	–	600	9600
	20	–	500	8000
	25	–	400	6400
	30	–	350	5600
12.5	16	–	400	6400
	20	–	300	4800
	25	–	250	4000
16	16, 20, 25	–	400	1200
	31.5, 35.5	–	400	1200
	40 ↑	–	400	1200
18	16, 20, 25	–	300	900
	31.5, 35.5	–	300	900
	40 ↑	–	300	900
20	41	–	240	720
22	35.5 ↓	–	200	600
	40 ↑	–	200	600

TAPING

● Lead Taping Capacitors for Automatic Insertion

● Ammo



DRAWING I	DRAWING II
	

● DIMENSIONS

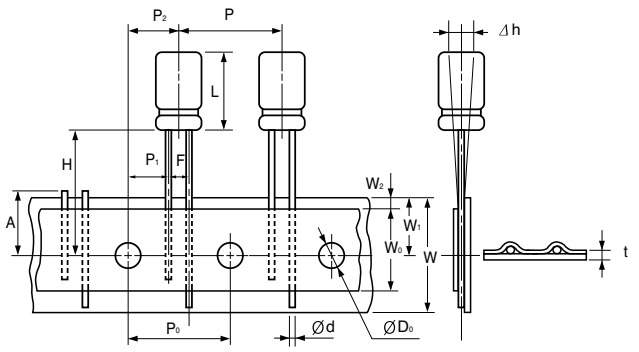
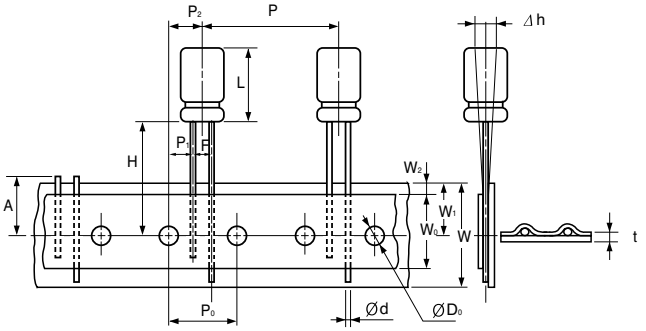
Unit : mm

Applicable Drawing No.			II			III			I						
Description	Symbol	Tolerance	Ø4	Ø5		Ø6.3		Ø8	Ø4	Ø5		Ø6.3		Ø8	
Case Height	L	*Note	5, 7	5	7~11	5	7~11	5	5, 7	5	7~11	5	7~11	5	9, 11.5
Lead Dia.	Ød	±0.05	0.45	0.45	0.5	0.45	0.5	0.45	0.45	0.45	0.5	0.45	0.5	0.45	0.6
Body Pitch	P	±1.0	12.7			12.7		12.7	12.7					12.7	12.7
Feeding Hole Pitch	P_0	±0.2	12.7			12.7		12.7	12.7					12.7	12.7
Feeding Hole Alignment	P_1	±0.7	5.1			5.1		5.1	3.85					3.85	3.85
Feeding Hole Alignment	P_2	±1.0	6.35			6.35		6.35	6.35					6.35	6.35
Lead Center Spacing	F	$^{+0.6}_{-0.2}$	2.5			2.5		2.5	5.0					5.0	5.0
Body Inclination	Δh	±2.0	0			0		0	0					0	0
Tape Width	W	±0.5	18.0			18.0		18.0	18.0					18.0	18.0
Adhesive Tape Width	W_0	min.	9.5			9.5		9.5	9.5					9.5	12.5
Feeding Hole Alignment	W_1	±0.5	9.0			9.0		9.0	9.0					9.0	9.0
Adhesive Tape Margin	W_2	max.	2.0			2.0		2.0	2.0					2.0	2.0
Length from Seating Plane	H	±0.5	18.0			17.5		18.5	18.5 (5, 7mm L = 17.5)					17.5	20.0
Lead Clinch Height	H_0	±0.5	17.0			—		—	16.5					16.5	16.5
Feeding Hole Dia.	ØD_0	±0.2	4.0			4.0		4.0	4.0					4.0	4.0
Total Tape Thickness	t	±0.2	0.6			0.6		0.6	0.6					0.6	0.6
Cut Lead Height	A	max.	11.0			11.0		11.0	11.0					11.0	11.0
Taping Code Ammo	⊕ leader		PC			PC		PE	PA					PA	PG

* Note : Refer to the drawing of each series for tolerance.

TAPING

Lead Taping Capacitors for Automatic Insertion

DRAWING Ⅲ	DRAWING Ⅳ
	

DIMENSIONS

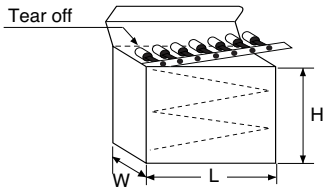
Unit : mm

Applicable Drawing No.			Ⅲ	Ⅲ	Ⅳ	Ⅳ	Ⅳ
Description	Symbol	Tolerance	Ø10	Ø12.5		Ø16	Ø18
Case Height	L	max.	27.0	27.0		37.5	37.5
Lead Dia.	Ød	±0.05	0.6	0.6		0.8	0.8
Body Pitch	P	±1.0	12.7	15.0	25.4	30.0	30.0
Feeding Hole Pitch	P_0	±0.2	12.7	15.0	12.7	15.0	15.0
Feeding Hole Alignment	P_1	±0.7	3.85	5.0	3.85	3.75	3.75
Feeding Hole Alignment	P_2	±1.0	6.35	7.5	6.35	7.5	7.5
Lead Center Spacing	F	$^{+0.6}_{-0.2}$	5.0	5.0		7.5	7.5
Body Inclination	Δh	±2.0	0	0		0	0
Tape Width	W	±0.5	18.0	18.0		18.0	18.0
Adhesive Tape Width	W_0	min.	12.5	12.5		12.5	12.5
Feeding Hole Alignment	W_1	±0.5	9.0	9.0		9.0	9.0
Adhesive Tape Margin	W_2	max.	2.0	2.0		2.0	2.0
Length from Seating Plane	H	±0.5	18.5	18.5		18.5	18.5
Feeding Hole Dia.	$ØD_0$	±0.2	4.0	4.0		4.0	4.0
Total Tape Thickness	t	±0.2	0.6	0.7		0.7	0.7
Cut Lead Height	A	max.	11.0	11.0		11.0	11.0
Taping Code / Ammo	⊕ leader		PA	PH	PL	PA	PA

PACKAGING Q'ty(pcs.)/Box

Unit : mm

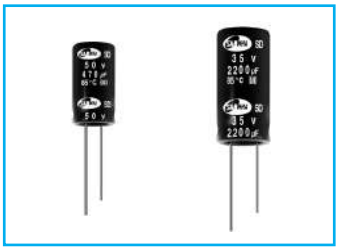
Ammo



Size		Ammo			
ØD	Case Height	L	H	W	Q'ty
4	5, 7	332	230	42	2500
5	5, 7	332	230	42	2000
	11	332	230	49	
6.3	5, 7	332	230	42	1500
	11	332	230	49	
8	5, 7	332	230	42	1000
	11.5	332	230	49	
10	12.5, 16	332	190	51	500
	20, 25	332	190	59	
12.5	16, 20, 25	342	240	62	400
16	16, 20, 25	342	240	62	250
	31.5, 35.5	342	240	74	
18	16, 20, 25	342	240	62	200
	31.5, 35.5	342	240	74	

SD Standard, For General Purposes Series

Solvent Proof
WV≦100V



SD ⇨ RD
Wide temp.

- Standard series for general purposes
- High voltage, high capacitance series
- Voltage range of 6.3~500V
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	WV: 6.3 ~ 450 / 500; Temperature range: -40 ~ +85°C / -25 ~ +85°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)	Capacitance > 1000μF : tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	100	160 ~ 250	350 ~ 500
tanδ	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25	35	50~100	160	200~350	400~450	500
Z-25°C/Z+20°C	5	4	3	2	2	2	4	6	10	12
Z-40°C/Z+20°C	12	10	8	5	4	3	6	8	12	–

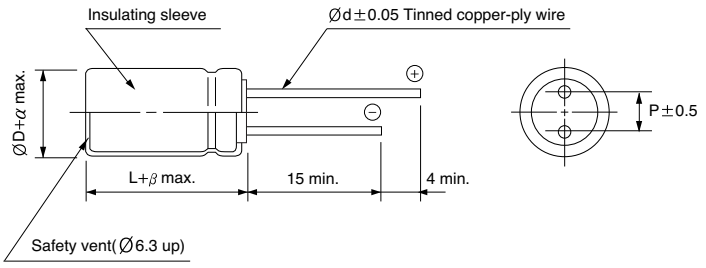
Load life (after application of the rated voltage for 2000 hours at 85°C)

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
tanδ	Less than 200% of specified value

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
α	0.5							1.0
β	1.5			2.0				3.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
6.3~100	~ 47	0.75	1.00	1.55	2.00	2.00	2.00
	68 ~ 680	0.80	1.00	1.35	1.50	1.62	1.75
	1000 ~	0.85	1.00	1.15	1.15	1.32	1.50
160~500	~ 220	0.80	1.00	1.40	1.60	1.70	1.80
	330 ~	0.90	1.00	1.13	1.15	1.32	1.50

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

SD series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

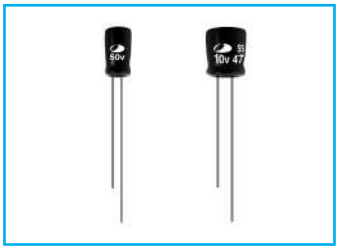
WV / μF	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	500
1.0						5×11 21	5×11 23	5×11 23							
1.5						5×11 26	5×11 28	5×11 28						8×11.5 32	
2.2						5×11 32	5×11 34	5×11 34						8×11.5 33	
3.3						5×11 39	5×11 42	5×11 42	6.3×11 45	6.3×11 45	6.3×11 48	8×11.5 53	8×11.5 56	8×11.5 50	
4.7						5×11 46	5×11 50	5×11 50	6.3×11 53	6.3×11 57	6.3×11 57	8×11.5 66	10×12.5 73	10×12.5 72	10×16 69
6.8						5×11 56	5×11 60	5×11 60	8×11.5 76	8×11.5 76	8×11.5 76	10×12.5 88	10×12.5 87	10×16 86	10×16 76
10						5×11 68	5×11 72	5×11 76	8×11.5 96	8×11.5 96	10×12.5 107	10×12.5 107	10×16 115	10×20 115	12.5×25 178
15						5×11 83	5×11 89	6.3×11 89	10×12.5 131	10×16 143	10×16 143	10×20 156	12.5×20 165	12.5×20 164	
22						5×11 101	5×11 108	6.3×11 124	10×12.5 156	10×16 173	10×16 170	12.5×20 222	12.5×20 218	12.5×25 217	16×25 265
33						5×11 123	6.3×11 151	8×11.5 178	10×16 209	10×20 232	10×20 247	16×20 297	12.5×25 296	16×25 294	16×31.5 310
47					5×11 131	★6.3×11 169	6.3×11 181	8×11.5 222	10×20 293	10×20 293	12.5×20 319	16×20 353	16×25 387	16×31.5 384	18×31.5 412
68				5×11 144	★6.3×11 182	6.3×11 203	8×11.5 256	10×12.5 293	12.5×20 391	12.5×25 426	16×20 425	16×25 465	16×31.5 488	16×35.5 503	18×35.5 457
100			5×11 162	★ 5×11 181	6.3×11 220	8×11.5 291	8×11.5 311	10×16 388	12.5×25 516	16×25 516	16×25 564	18×31.5 592	18×35.5 667	18×40 546	
150			★ 5×11 198	6.3×11 246	8×11.5 318	10×12.5 414	10×12.5 422	10×20 528	16×20 632	16×25 691	16×31.5 726	18×40 845	18×40 863	22×45 1283	
220	5×11 201	★ 5×11 218	6.3×11 276	6.3×11 327	8×11.5 386	10×12.5 501	10×16 586	12.5×20 737	16×25 873	18×31.5 962	18×35.5 988	22×41 1112	22×45 1183		
330	★6.3×11 283	6.3×11 307	6.3×11 359	8×11.5 431	10×12.5 549	10×16 672	10×20 784	12.5×25 1002	16×35.5 1152	18×35.5 1206	22×41 1495				
470	6.3×11 338	6.3×11 366	8×11.5 476	10×12.5 550	10×16 740	10×20 875	12.5×20 1098	16×25 1328	18×40 1434	22×41 1495					
680	8×11.5 480	8×11.5 520	8×11.5 600	10×16 754	10×20 947	12.5×20 1235	12.5×25 1440	16×31.5 1643	22×41 1831						
1000	8×11.5 581	10×12.5 659	10×12.5 796	10×16 942	12.5×20 1306	12.5×25 1633	16×25 1937	18×31.5 1965							
2200	10×16 983	10×16 1051	10×20 1331	12.5×20 1542	16×25 2032	16×31.5 2220	18×31.5 2445								
3300	10×20 1286	12.5×20 1545	12.5×20 1686	16×25 2194	16×31.5 2502	18×31.5 2765	18×40 2987								
4700	12.5×20 1736	12.5×25 1903	12.5×25 2129	16×25 2448	16×35.5 2905	18×40 3272									
6800	12.5×25 2129	16×25 2332	16×25 2577	18×31.5 3114	18×40 3408	← Case size ØD×L (mm) ← Ripple current (mA rms) at 85˚C, 120Hz									
10000	16×25 2629	16×31.5 2830	16×31.5 3176	18×40 3544											
15000	16×35.5 2959	16×35.5 3284	18×35.5 3656												
22000	18×40 3733	18×40 3843	22×41 4012												

SS Standard, Height 7mmL Series

Miniaturized Solvent Proof

RK ⇧ Wide temp.

NS ⇦ SS Non-polar



- Super miniature series with 7mmL height
- Suited for use in compact audio equipment
- 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 = 0.01CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 4 / 6.3 / 10 / 16 / 25 / 35, 40 / 50 / 63 tanδ: 0.35 / 0.24 / 0.20 / 0.16 / 0.14 / 0.12 / 0.10 / 0.10
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16, 25 / 35 ~ 63 Z-25˚C/Z+20˚C: 6 / 4 / 3 / 2 / 2 Z-40˚C/Z+20˚C: 12 / 8 / 6 / 4 / 3
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
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 (See page 94)

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		40		50		63	
1.0															4×7	14	4×7	14
1.5															4×7	17	4×7	17
2.2															4×7	21	4×7	21
3.3															4×7	25	4×7	25
4.7															4×7	30	4×7	30
6.8											4×7	33	4×7	33	4×7	37	5×7	42
10									4×7	37	4×7	40	4×7	40	5×7	51	5×7	51
15							4×7	43	4×7	46	5×7	57	5×7	57	6.3×7	72	6.3×7	72
22					4×7	46	4×7	52	5×7	64	5×7	69	6.3×7	80	6.3×7	88		
33	4×7	43	4×7	52	4×7	57	5×7	73	5×7	78	6.3×7	98	6.3×7	98				
47	4×7	51	4×7	62	5×7	78	5×7	87	6.3×7	108								
68	5×7	71	5×7	86	5×7	94	6.3×7	122										
100	5×7	86	5×7	104	6.3×7	132	6.3×7	148										
150	6.3×7	122	6.3×7	148	6.3×7	162												
220	6.3×7	148	6.3×7	179														

Ripple current (mA rms) at 85˚C, 120Hz

Case size ØD×L (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

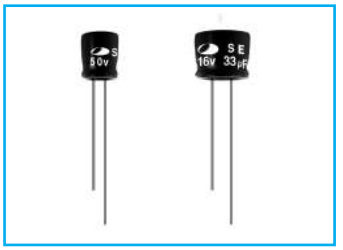
μF \ Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 47	0.75	1.00	1.55	2.00	2.00	2.00
68 ~	0.80	1.00	1.35	1.50	1.62	1.75

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

SE Standard, Height 5mmL Series

Miniaturized Solvent Proof

RE
Wide temp.
NE SE
Non-polar



- Ultra miniature series with 5mmL height
- Suitable to replace tantalum capacitors at low cost
- 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 = 0.01CV or 4μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 4 / 6.3 / 10 / 16 / 25 / 35 / 50 / 63 tanδ: 0.35 / 0.24 / 0.20 / 0.16 / 0.13 / 0.12 / 0.09 / 0.09
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16 ~ 63 Z-25˚C/Z+20˚C: 6 / 4 / 3 / 2 Z-40˚C/Z+20˚C: 12 / 8 / 6 / 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
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 (See page 95)

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50		63	
1.0													4×5	13	4×5	13
1.5													4×5	16	4×5	16
2.2											4×5	17	4×5	19	4×5	19
3.3									4×5	20	4×5	20	4×5	24	5×5	27
4.7							4×5	21	4×5	23	4×5	24	5×5	33	5×5	33
6.8					4×5	23	4×5	25	4×5	28	5×5	34	5×5	39	6.3×5	46
10	4×5	21	4×5	25	4×5	28	4×5	31	5×5	40	5×5	41	6.3×5	56	6.3×5	56
15	4×5	26	4×5	31	4×5	34	5×5	44	5×5	49	6.3×5	59	6.3×5	68	8×5	81
22	4×5	31	4×5	37	5×5	47	5×5	53	6.3×5	69	6.3×5	72	8×5	98	8×5	98
33	4×5	38	5×5	53	5×5	58	6.3×5	76	6.3×5	84	8×5	104	8×5	120		
47	4×5	45	5×5	63	6.3×5	81	6.3×5	91	8×5	119	8×5	124				
68	5×5	63	6.3×5	89	6.3×5	98	6.3×5	109	8×5	143						
100	5×5	89	6.3×5	108	8×5	140	8×5	157	8×5	174						
150	6.3×5	109	8×5	157	8×5	172	8×5	192								
220	6.3×5	133	8×5	190	8×5	208										
330	8×5	192														

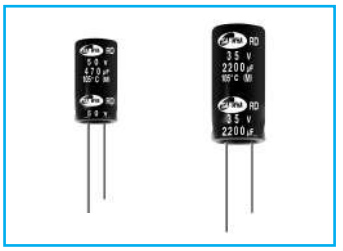
Ripple current (mA rms) at 85˚C, 120Hz
Case size ØD×L (mm)

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 47	0.75	1.00	1.55	2.00	2.00	2.00
68 ~	0.80	1.00	1.35	1.50	1.62	1.75

RD Wide Temperature Range Series

Solvent Proof
WV≦100V



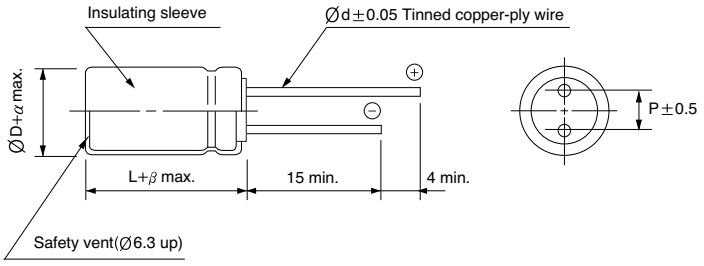
- Standard series for general purpose
- High CV value
- Wide operating temperature range of -55 ~ +105˚C
- Complied to the RoHS directive

SD ⇨ RD
Wide temp.

Item	Characteristics
Operating temperature range	WV: 6.3 ~ 100 / 160 ~ 450 / 500 Temperature range: -55 ~ +105˚C / -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)	Capacitance > 1000μF : tanδ increases by 0.02 for each 1000μF from below value. WV: 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 100 / 160~250 / 350~500 tanδ: 0.28 / 0.24 / 0.20 / 0.16 / 0.14 / 0.12 / 0.10 / 0.08 / 0.15 / 0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 / 50~100 / 160 / 200~350 / 400~450 / 500 Z-25˚C/Z+20˚C: 5 / 4 / 3 / 2 / 2 / 2 / 4 / 6 / 10 / 12 Z-40˚C/Z+20˚C: 12 / 10 / 8 / 5 / 4 / 3 / 6 / 8 / 12 / –
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 ØD: ØD ≦ 8 / ØD ≧ 10 Life time: 1000 hours / 2000 hours
Shelf life (at 105˚C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20˚C by the KS C IEC 60384 - 4

DRAWING

Unit : mm



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
α	0.5							1.0
β	1.5			2.0				3.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
6.3~100	~ 47	0.75	1.00	1.55	2.00	2.00	2.00
	68 ~ 680	0.80	1.00	1.35	1.50	1.62	1.75
	820 ~	0.85	1.00	1.15	1.15	1.32	1.50
160~500	~ 220	0.80	1.00	1.40	1.60	1.70	1.80
	330 ~	0.90	1.00	1.13	1.15	1.32	1.50

RD series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3		10		16		25	
	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz
68							5×11	108
82							6.3×11	137
100					5×11	119	6.3×11	151
150			5×11	134	6.3×11	167	6.3×11	185
220	5×11	146	5×11	162	6.3×11	203	6.3×11	224
330	6.3×11	206	6.3×11	228	6.3×11	248	8×11.5	324
470	6.3×11	246	6.3×11	272	8×11.5	349	8×11.5	386
680	8×11.5	348	8×11.5	386	8×11.5	420	10×12.5	540
820	8×11.5	382	10×12.5	493	10×16	587	10×20	708
1000	8×11.5	422	10×12.5	544	10×16	648	10×20	820
1500	10×16	621	10×16	680	10×20	797	12.5×20	1017
2200	10×16	713	10×16	774	10×20	898	12.5×20	1100
	10×20	778	10×20	844	12.5×20	1055	12.5×25	1235
3300	12.5×16	983	12.5×20	1148	12.5×20	1184	16×25	1562
4700	12.5×20	1219	12.5×20	1272	12.5×25	1459	16×25	1752
			12.5×25	1421	16×25	1657	16×31.5	1916
6800	12.5×25	1480	16×25	1737	16×25	1811	16×35.5	2176
					16×31.5	1982	18×35.5	2335
10000	16×25	1807	16×31.5	2172	16×31.5	2140	18×35.5	2497
15000	16×31.5	2128	16×35.5	2323	18×35.5	2545		
	16×35.5	2233	18×35.5	2482				
22000	18×31.5	2411						

WV / Item / μF	35		50		63		100	
	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz	ØD×L (mm)	Ripple current (mA rms) 105°C 120Hz
2.2			5×11	24	5×11	26		
3.3			5×11	29	5×11	32	5×11	32
4.7			5×11	35	5×11	38	5×11	38
6.8			5×11	42	5×11	46	5×11	46
10			5×11	51	5×11	56	5×11	56
15			5×11	62	5×11	68	6.3×11	78
22			5×11	75	5×11	83	6.3×11	95
33			5×11	92	6.3×11	116	8×11.5	139
47	5×11	96	6.3×11	127	6.3×11	139	10×12.5	190
68	6.3×11	132	8×11.5	180	8×11.5	197	10×16	251
82	6.3×11	145	8×11.5	198	8×11.5	216	10×16	290
100	6.3×11	160	8×11.5	218	8×11.5	239	10×16	304
150	8×11.5	231	8×11.5	267	10×12.5	340	10×20	406
220	8×11.5	280	10×12.5	376	10×16	451	12.5×20	564
330	10×12.5	400	10×16	504	10×20	603	16×25	856
470	10×16	521	10×20	657	12.5×20	844	16×25	1021
680	10×20	684	12.5×20	927	12.5×25	1107	16×31.5	1344
820	12.5×20	880	12.5×25	1050	16×25	1300	16×35.5	1627
1000	12.5×20	974	12.5×25	1226	16×25	1490	18×35.5	1835
1500	12.5×25	1136	16×25	1442	16×35.5	1770		
	16×20	1188	16×31.5	1578	18×31.5	1812		
2200	16×25	1426	16×31.5	1709	16×35.5	1891		
3300	16×35.5	1857	16×35.5	1794	18×40	2689		
	18×31.5	1900	18×35.5	2152				
4700	16×35.5	2073						
	18×35.5	2224						
6800	18×40	2510						

RD series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	160		200		250		350	
	ØD×L (mm)	Ripple current (mA rms) 105℃ 120Hz	ØD×L (mm)	Ripple current (mA rms) 105℃ 120Hz	ØD×L (mm)	Ripple current (mA rms) 105℃ 120Hz	ØD×L (mm)	Ripple current (mA rms) 105℃ 120Hz
2.2	6.3×11	23	6.3×11	23	6.3×11	23	6.3×11	23
3.3	6.3×11	29	6.3×11	29	6.3×11	30	8×11.5	34
4.7	6.3×11	34	6.3×11	34	8×11.5	40	8×11.5	40
			8×11.5	40			10×12.5	47
6.8	6.3×11	41	8×11.5	49	10×12.5	56	10×12.5	56
			10×12.5	56			10×16	62
10	8×11.5	59	8×11.5	59	10×12.5	68	10×16	75
	10×12.5	68	10×12.5	68				
15	10×12.5	84	10×12.5	84	10×16	92	10×16	92
	10×16	92	10×16	92			10×20	100
22	10×12.5	102	10×16	111	10×16	111	12.5×20	143
	10×16	111			10×20	121		
33	10×16	136	10×20	149	10×20	149	12.5×25	190
	10×20	149			12.5×20	175		
47	10×20	177	12.5×20	208	12.5×20	203	16×25	252
	12.5×20	208			12.5×25	227		
68	12.5×25	273	16×20	279	12.5×25	267	16×31.5	332
82	12.5×25	302	16×25	333	16×25	333	18×31.5	391
100	12.5×25	331	16×25	368	16×25	368	18×31.5	432
150	16×25	450	16×25	450	16×31.5	450	18×35.5	554
220	16×31.5	596	18×31.5	641	18×35.5	671	22×41	721
			18×35.5	671	18×40	694		
330	18×31.5	784	18×40	863	22×41	968		
470	18×40	1030	22×41	1155				
680	22×41	1390						

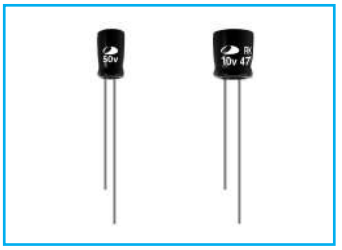
WV / Item / μF	400		450		500	
	ØD×L (mm)	Ripple current (mA rms) 105℃ 120Hz	ØD×L (mm)	Ripple current (mA rms) 105℃ 120Hz	ØD×L (mm)	Ripple current (mA rms) 105℃ 120Hz
2.2	8×11.5	28	8×11.5	23		
3.3	8×11.5	34	10×12.5	33		
	10×12.5	39	10×16	36		
4.7	10×12.5	47	10×12.5	39	10×16	59
6.8	10×16	62	10×16	52	10×16	72
10	10×16	75	10×20	68	12.5×25	88
	10×20	82	12.5×20	80		
15	12.5×20	118	12.5×20	96	12.5×30	115
22	12.5×20	140	12.5×25	127	16×25	159
	12.5×25	155	16×25	144		
33	16×25	211	16×25	177	16×31.5	207
47	16×25	252	16×31.5	231	18×31.5	261
68	16×31.5	332	16×35.5	291	18×35.5	335
	18×31.5	356				
82	18×31.5	391	18×31.5	327	18×40	370
100	18×35.5	453	18×40	420		
150	22×41	596				

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

RK Wide Temperature Range, Height 7mmL Series

Solvent Proof

SS ⇨ RK
Wide temp.

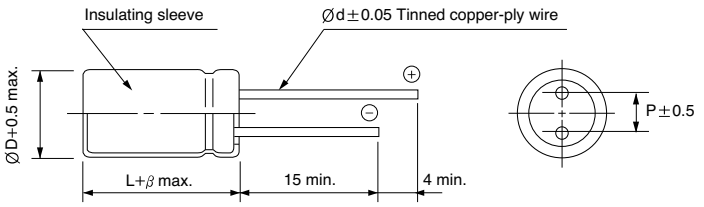


- Super miniature series with 7mmL height
- High performance and excellent temperature characteristics
- Wide operating temperature range of -55 ~ +105˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 4 / 6.3 / 10 / 16 / 25 / 35 / 50 / 63 tanδ: 0.35 / 0.22 / 0.19 / 0.15 / 0.12 / 0.12 / 0.10 / 0.10
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16 / 25, 35 / 50, 63 Z-25˚C/Z+20˚C: 6 / 4 / 3 / 2 / 2 / 2 Z-40˚C/Z+20˚C: 12 / 10 / 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
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	4	5	6.3
P	1.5	2.0	2.5
Ød	0.45	0.5	0.5
β	1.0	1.5	1.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50		63	
1.0													4×7	9.1	4×7	9.1
2.2													4×7	14	5×7	16
3.3											4×7	15	5×7	19	6.3×7	22
4.7									4×7	18	5×7	21	6.3×7	26	6.3×7	26
6.8							4×7	19	5×7	25	5×7	25	6.3×7	32		
10					4×7	21	4×7	24	5×7	30	6.3×7	35				
22			4×7	29	5×7	36	5×7	40	6.3×7	52						
33	4×7	28	5×7	40	6.3×7	51	6.3×7	57								
47	4×7	33	5×7	47	6.3×7	60										
68	5×7	46	6.3×7	67												

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

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

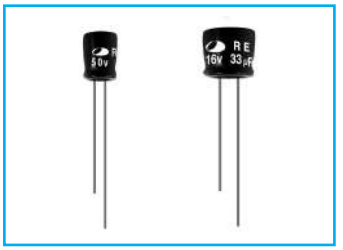
μF \ Frequency	60Hz	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 47	0.75	1.00	1.55	2.00	2.00	2.00
68 ~	0.80	1.00	1.35	1.50	1.62	1.75

RE Wide Temperature Range, Height 5mmL Series

Miniaturized Solvent Proof

- Ultra miniature series with 5mmL height
- Wide operating temperature range of -55 ~ +105˚C
- Suitable to replace tantalum capacitors at low cost
- Complied to the RoHS directive

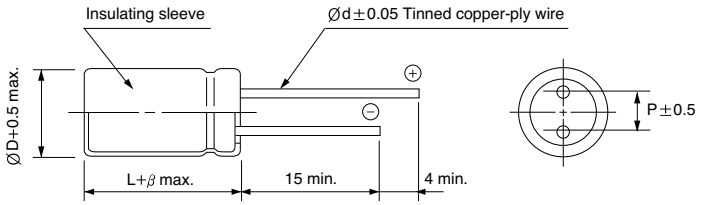
SE ⇨ RE (Wide temp.)



Item	Characteristics
Operating temperature range	-55 ~ +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: 4 / 6.3 / 10 / 16 / 25 / 35 / 50 tanδ: 0.35 / 0.27 / 0.23 / 0.19 / 0.15 / 0.13 / 0.11
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 4 / 6.3 / 10 / 16 / 25~50 Z-25˚C/Z+20˚C: 7 / 3 / 3 / 2 / 2 Z-40˚C/Z+20˚C: 12 / 8 / 5 / 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 ±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

Unit : mm



ØD	4	5	6.3	8
P	1.5	2.0	2.5	2.5
Ød	0.45	0.45	0.45	0.45
β	1.0	1.5		

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	4		6.3		10		16		25		35		50	
1.0													4×5	7.7
1.5													4×5	9.4
2.2													4×5	11
3.3											4×5	13	4×5	14
4.7									4×5	14	4×5	15	5×5	19
6.8									4×5	17	5×5	21	5×5	23
10			4×5	15	4×5	17	4×5	18	5×5	24	5×5	26	6.3×5	33
15	4×5	17	4×5	19	4×5	21	5×5	26	5×5	29	6.3×5	37	6.3×5	40
22	4×5	20	4×5	23	5×5	29	5×5	32	6.3×5	42	6.3×5	45	8×5	58
33	4×5	25	5×5	32	5×5	35	6.3×5	45	6.3×5	51	8×5	65	8×5	71
47	4×5	29	5×5	39	6.3×5	49	6.3×5	54	8×5	72	8×5	77		
68	5×5	41	6.3×5	55	6.3×5	59	8×5	77	8×5	87				
100	5×5	50	6.3×5	66	8×5	85	8×5	93						
150	6.3×5	71	8×5	96	8×5	104								
220	8×5	102	8×5	116										

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	2.00	2.00	2.00
68 ~	0.80	1.00	1.35	1.50	1.62	1.75

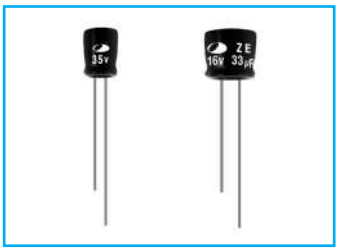
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

ZE High Ripple Current, Height 5mmL Series

Miniaturized Solvent Proof Low Impedance

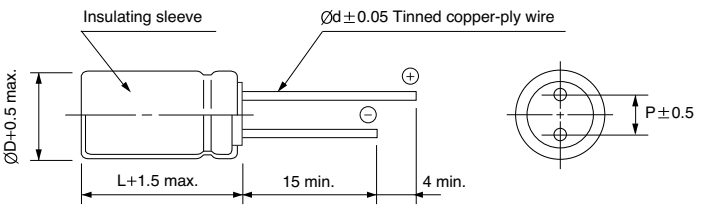
- Super miniature series with 5mmL height
- High ripple current & high temperature with RE series
- Load life of 2000 hours at 105˚C
- Complied to the RoHS directive

RE ⇒ ZE
High Ripple



Item	Characteristics
Operating temperature range	-55 ~ +105˚C
Leakage current	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)	WV: 6.3 / 10 / 16 / 25 / 35 tanδ: 0.22 / 0.20 / 0.18 / 0.14 / 0.12
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 6.3 / 10 / 16 / 25 / 35 Z-25˚C / Z+20˚C: 3 / 3 / 2 / 2 / 2 Z-40˚C / Z+20˚C: 9 / 7 / 5 / 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 ±20% 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
P	2.0	2.5
Ød	0.45	0.45

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

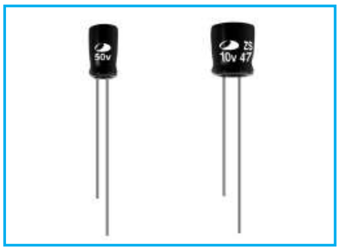
WV / Item / μF	6.3			10			16			25			35		
	ØD×L (mm)	Imp.(Ω) max. 20˚C 100kHz	Ripple current (mA rms) 105˚C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20˚C 100kHz	Ripple current (mA rms) 105˚C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20˚C 100kHz	Ripple current (mA rms) 105˚C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20˚C 100kHz	Ripple current (mA rms) 105˚C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20˚C 100kHz	Ripple current (mA rms) 105˚C 100kHz
1													5×5	2.40	100
1.5													5×5	2.40	100
2.2													5×5	2.40	100
3.3													5×5	2.40	100
4.7													5×5	2.40	100
6.8													5×5	2.40	100
10										5×5	2.40	100	5×5	2.40	100
15							5×5	2.40	100	5×5	2.40	100	5×5	2.40	100
22							5×5	2.40	100	5×5	2.40	100	6.3×5	0.75	140
33	5×5	2.40	100	5×5	2.40	100	5×5	2.40	100	6.3×5	0.75	140	6.3×5	0.75	140
47	5×5	2.40	100	5×5	2.40	100	6.3×5	0.75	140	6.3×5	0.75	140			
68	6.3×5	0.75	140	6.3×5	0.75	140	6.3×5	0.75	140						
100	6.3×5	0.75	140	6.3×5	0.75	140									

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.35	0.55	0.75	0.87	1.00
47 ~	0.40	0.60	0.80	0.90	1.00

ZS High Ripple Current, Height 7mmL Series

Miniaturized　Solvent Proof　Low Impedance

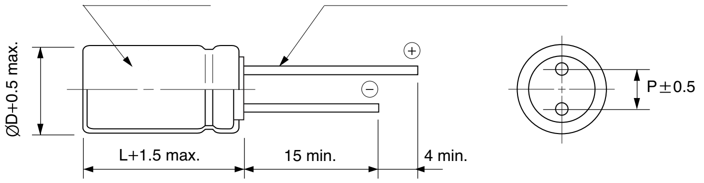


- Super miniature series with 7mmL height
- High ripple current compared with RK series
- Load life of 2000 hours at 105°C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +105°C
Leakage current	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)	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)	WV: 6.3 / 10 / 16 / 25 / 35 / 50 Z-25°C / Z+20°C: 2 / 2 / 2 / 2 / 2 / 2 Z-40°C / Z+20°C: 6 / 4 / 3 / 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 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	0.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV	6.3			10			16			25			35			50		
Item / μF	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
2.2																5×7	2.00	165
4.7																5×7	2.00	165
10																6.3×7	0.90	235
22													5×7	1.40	165	6.3×7	0.90	260
33	5×7	1.40	165	5×7	1.40	165	5×7	1.40	165	5×7	1.40	165	6.3×7	0.70	235	8×7	0.50	350
47	5×7	1.40	165	5×7	1.40	165	5×7	1.40	165	6.3×7	0.70	235	8×7	0.34	350	8×7	0.50	450
68	6.3×7	0.70	235	6.3×7	0.70	235	6.3×7	0.70	235	6.3×7	0.70	235	8×7	0.34	350			
100	6.3×7	0.70	235	6.3×7	0.70	235	6.3×7	0.70	235	8×7	0.34	350						
150	6.3×7	0.70	235	6.3×7	0.70	235	8×7	0.34	350									
220	8×7	0.34	350	8×7	0.34	350												
330	8×7	0.34	350															

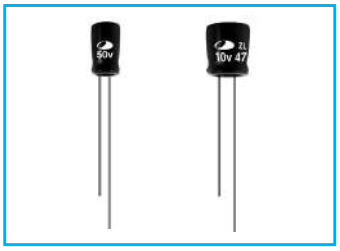
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.35	0.55	0.75	0.87	1.00
47 ~ 150	0.40	0.60	0.80	0.90	1.00
220 ~	0.50	0.65	0.85	0.92	1.00

MINIATURE TYPES

ZL High Ripple Current, Height 7mmL Series

Miniaturized | Solvent Proof | Low Impedance



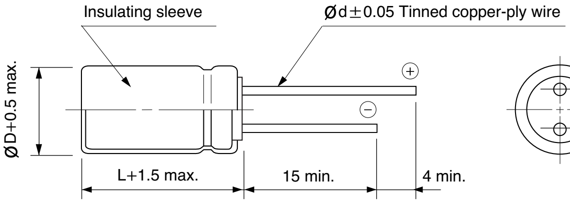
- Super miniature series with 7mmL height
- Load life of 3000 hours at 105°C
- Complied to the RoHS directive

ZS ⇨ ZL
High Ripple

Item	Characteristics						
Operating temperature range	-40 ~ +105°C						
Leakage current	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)	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)	WV	6.3	10	16	25	35	50
	Z-25°C / Z+20°C	2	2	2	2	2	2
	Z-40°C / Z+20°C	6	4	3	3	3	3
Load life	After an application of DC bias voltage plus the rated AC ripple current for 3000 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					
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	0.5

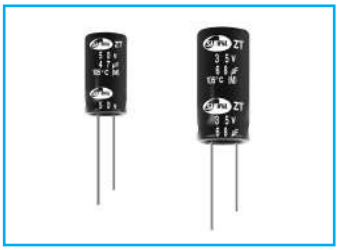
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16			25			35			50		
	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Imp.(Ω) max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
2.2																5×7	1.00	165
10																6.3×7	0.45	235
22													5×7	0.84	165	6.3×7	0.45	235
33	5×7	0.84	165	5×7	0.84	165	5×7	0.84	165	5×7	0.84	165	6.3×7	0.42	235	8×7	0.30	350
47	5×7	0.84	165	5×7	0.84	165	5×7	0.84	165	6.3×7	0.42	235	8×7	0.20	350	8×7	0.25	350
68	6.3×7	0.42	235	6.3×7	0.42	235	6.3×7	0.42	235	6.3×7	0.42	235	8×7	0.20	350			
100	6.3×7	0.42	235	6.3×7	0.42	235	6.3×7	0.42	235	8×7	0.20	350						
150	6.3×7	0.42	235	6.3×7	0.42	235	8×7	0.20	350									
220	8×7	0.20	350	8×7	0.20	350												
330	8×7	0.20	350															

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT (See page 97)

ZT Long Life, Height 7mmL Series

Solvent Proof



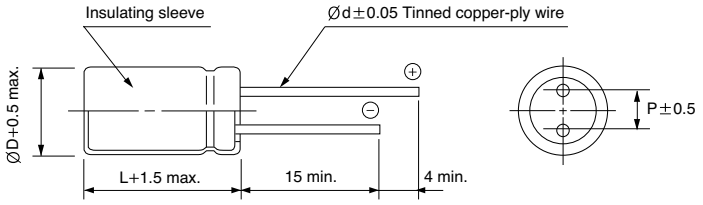
- Super miniature series with 7mmL height
- Load life of 5000 hours at 105˚C
- Complied to the RoHS directive, Halogen-Free

ZL ⇨ ZT
Long life

Item	Characteristics						
Operating temperature range	-40 ~ +105˚C						
Leakage current max.	I = 0.01CV or 3μA (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	0.40	0.35	0.30	0.25	0.20	0.20
Low temperature characteristics (Impedance ratio at 120Hz)	WV	6.3	10	16	25	35	50
	Z-25˚C/Z+20˚C	6	4	4	3	3	3
	Z-40˚C/Z+20˚C	12	10	8	6	6	6
Load life (after application of the rated voltage for 5000 hours at 105˚C)	Leakage current	Less than specified value					
	Capacitance change	Within ±30% of initial value					
	tanδ	Less than 300% 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	5	6.3	8
P	2.0	2.5	3.5
Ød	0.5	0.5	0.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	6.3		10		16		25		35		50	
2.2											5×7	165
10											6.3×7	235
22									5×7	165	6.3×7	260
33	5×7	165	5×7	165	5×7	165	5×7	165	6.3×7	235	8×7	350
47	5×7	165	5×7	165	5×7	165	6.3×7	235	8×7	350	8×7	450
68	6.3×7	235	6.3×7	235	6.3×7	235	6.3×7	235	8×7	350		
100	6.3×7	235	6.3×7	235	6.3×7	235	8×7	350				
150	6.3×7	235	6.3×7	235	8×7	350						
220	8×7	350	8×7	350								
330	8×7	350										

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

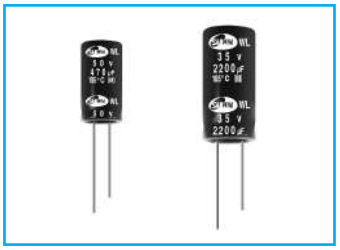
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.25	0.50	0.75	0.90	1.00
47 ~	0.30	0.55	0.80	0.90	1.00

WL Low Impedance Series

Long Life | Solvent Proof WV≦100V | Low Impedance

WL ⇨ WF
Long life



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

Item	Characteristics
Operating temperature range	WV: 6.3 ~ 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)	Capacitance > 1000μF : tanδ increases by 0.02 for each 1000μF from below value.

WV	6.3	10	16	25	35	50	63	100	160~250	350~500
tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.20

Low temperature characteristics (Impedance ratio at 120Hz)

WV	6.3	10	16	25 ~ 100	160 ~ 250	350 ~ 450	500
Z-25˚C/Z+20˚C	4	3	2	2	3	6	8
Z-40˚C/Z+20˚C	8	6	4	3	4	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.

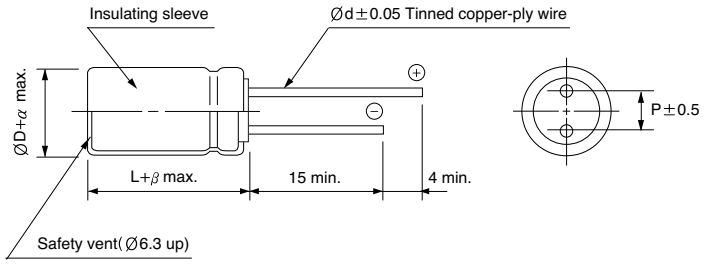
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

Life time	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
WV≦ 100	2000 hours	3000 hours	5000 hours
WV > 100	2000 hours		

Shelf life (at 105˚C)	After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value. The measurement shall be performed at 20˚C by the KS C IEC 60384 - 4

DRAWING

Unit : mm



ØD	5	6.3	8	10	12.5	16	18	20	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0
Ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8	1.0
α	0.5							1.0	
β	1.5			2.0				3.0	

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.40	0.65	0.82	0.91	1.00
47 ~ 220	0.50	0.70	0.84	0.92	1.00
330 ~ 680	0.55	0.75	0.86	0.93	1.00
820 ~ 1500	0.60	0.80	0.88	0.94	1.00
2200 ~	0.70	0.85	0.90	0.95	1.00

WL 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	0.90	180	5×11	0.90	180
22	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
33	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180	5×11	0.70	180
47	5×11	0.65	180	5×11	0.65	180	5×11	0.65	180	5×11	0.65	180
100	5×11	0.65	180	5×11	0.65	180	6.3×11	0.30	280	6.3×11	0.30	280
150	6.3×11	0.30	280	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.20	450
220	6.3×11	0.30	280	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.20	450
330	6.3×11	0.30	280	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.10	660
470	8×11.5	0.14	450	8×11.5	0.14	450	10×12.5	0.10	660	10×16	0.080	850
680	10×12.5	0.10	660	10×12.5	0.10	660	10×16	0.080	850	10×20	0.054	1100
1000	10×12.5	0.10	660	10×16	0.080	850	10×20	0.054	1100	12.5×20	0.050	1400
1500	10×20	0.054	1100	10×20	0.054	1100	12.5×20	0.050	1400	16×20	0.030	2100
2200	12.5×20	0.050	1400	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.030	2100
3300	12.5×20	0.050	1400	12.5×25	0.038	1700	16×25	0.030	2100	16×31.5	0.025	2600
4700	16×25	0.030	2100	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.022	3000
6800	16×25	0.030	2100	16×31.5	0.025	2600	18×35.5	0.022	3000			
10000	16×31.5	0.025	2600	18×35.5	0.022	3000						
15000	18×35.5	0.022	3000									

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

WL series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

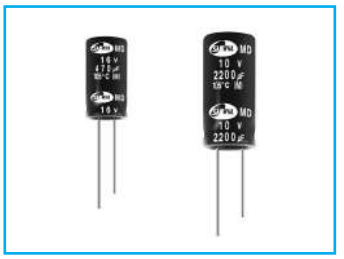
WV / Item / μF	160		200		250		350	
	ØD×L (mm)	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Ripple current (mA rms) 105°C 100kHz
1	6.3×11	45						
10	10×12.5	230			10×16	300	10×16	180
22	10×16	440	10×20	440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

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

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 87)

● 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	12.5 × 20	0.013	3230
2200	10 × 20	0.011	2805	12.5 × 20	0.009	3230			
3300	12.5 × 20	0.009	3230						

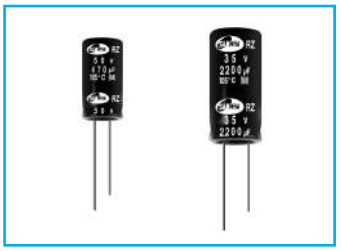
● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

RZ Low Impedance Series

Long Life Solvent Proof Low Impedance



- Low impedance at high frequency
- High reliability withstanding 5000 hours load life at 105˚C (2000/3000 hours for smaller case sizes as specified below)
- Ideally suited for use in switching power supplies
- Complied to the RoHS directive

RZ ⇨ RP
Long life

Item	Characteristics
Operating temperature range	-55 ~ +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
tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.08

Low temperature characteristics (Impedance ratio at 120Hz)				
WV	6.3, 10	16 ~ 35	50, 63
Z-55˚C/Z+20˚C	4	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 ±20% of initial value
tanδ	Less than 200% of specified value

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

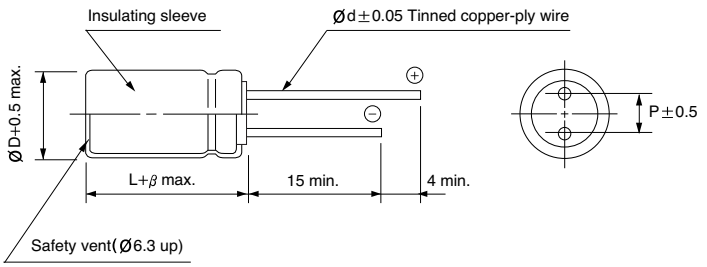
Shelf life (at 105˚C)

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

Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
tanδ	Less than 150% of specified value

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	0.40	0.65	0.82	0.91	1.00
47 ~ 220	0.50	0.70	0.84	0.92	1.00
330 ~ 680	0.55	0.75	0.86	0.93	1.00
1000 ~ 1500	0.60	0.80	0.88	0.94	1.00
2200 ~	0.70	0.85	0.90	0.95	1.00

RZ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

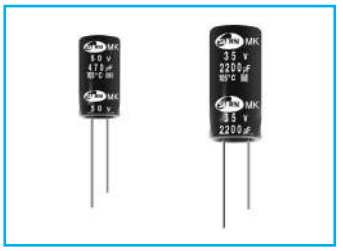
WV / Item / μF	6.3			10			16			25		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
33										5×11	0.80	155
47							5×11	0.80	155	6.3×11	0.55	210
68				5×11	0.80	155	6.3×11	0.50	220	6.3×11	0.36	260
100	5×11	0.85	150	6.3×11	0.55	210	6.3×11	0.35	265	8×11.5	0.24	383
150	6.3×11	0.49	225	6.3×11	0.35	265	8×11.5	0.23	388	8×11.5	0.16	460
220	6.3×11	0.30	285	8×11.5	0.24	387	8×11.5	0.16	460	10×12.5	0.13	600
330	8×11.5	0.20	292	8×11.5	0.16	460	10×12.5	0.12	625	10×16	0.095	750
470	10×12.5	0.14	575	10×12.5	0.13	600	10×16	0.09	770	10×20	0.065	1020
680	10×16	0.11	700	10×16	0.09	770	10×20	0.065	1020	12.5×20	0.046	1392
1000	10×20	0.075	950	10×20	0.060	1060	12.5×20	0.047	1411	12.5×25	0.036	1660
1500	12.5×20	0.055	1220	12.5×20	0.045	1417	12.5×25	0.036	1660	16×20	0.034	1770
2200	12.5×20	0.043	1438	12.5×25	0.034	1710	16×20	0.033	1800	16×25	0.028	2051
3300	12.5×25	0.034	1710	16×20	0.031	1850	16×25	0.027	2095	16×35.5	0.020	2680
4700	16×25	0.032	1935	16×31.5	0.023	2420	16×35.5	0.020	2680	18×40	0.018	2960
6800	16×31.5	0.024	2370	16×35.5	0.020	2680	18×35.5	0.018	2900			
10000	16×40	0.020	2750	18×40	0.017	3040						
15000	18×40	0.018	2960									

WV / Item / μF	35			50			63		
	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	4.00	36			
1.5				5 × 11	3.80	45			
2.2				5 × 11	3.50	54			
3.3				5 × 11	3.00	66			
4.7				5 × 11	2.20	81			
6.8				5 × 11	1.80	91			
10				5 × 11	1.80	115	5 × 11	1.80	135
15				5 × 11	1.60	145	6.3 × 11	1.00	185
22	5 × 11	0.75	160	6.3 × 11	1.40	195	6.3 × 11	1.00	215
33	6.3 × 11	0.49	225	6.3 × 11	1.20	240	8 × 11.5	0.80	320
47	6.3 × 11	0.34	270	8 × 11.5	0.80	344	8 × 11.5	0.80	365
68	8 × 11.5	0.24	384	8 × 11.5	0.65	410	10 × 12.5	0.23	495
100	8 × 11.5	0.16	460	10 × 16	0.40	581	10 × 20	0.16	750
150	10 × 12.5	0.12	625	10 × 20	0.30	820	12.5 × 20	0.12	950
220	10 × 16	0.09	770	12.5 × 20	0.20	1040	12.5 × 20	0.085	1140
330	10 × 20	0.060	1060	12.5 × 20	0.12	1281	12.5 × 25	0.060	1420
470	12.5 × 20	0.046	1401	12.5 × 25	0.085	1500	16 × 25	0.055	1700
680	12.5 × 25	0.036	1660	16 × 20	0.060	1630	16 × 31.5	0.032	2050
1000	16 × 20	0.034	1770	16 × 31.5	0.040	2120	18 × 35.5	0.029	2280
1500	16 × 31.5	0.028	2385	16 × 40	0.035	2410			
2200	16 × 35.5	0.020	2680	18 × 40	0.030	2560			
3300	18 × 40	0.017	3040						

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

MK High Ripple Current Series

Low Impedance　Solvent Proof



- Ripple current compared with RZ 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

RZ ⇨ MK
Miniature 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	63	100
tanδ	0.22	0.19	0.16	0.14	0.12	0.10	0.08	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 the initial value
tanδ	Less than 200% of the specified value

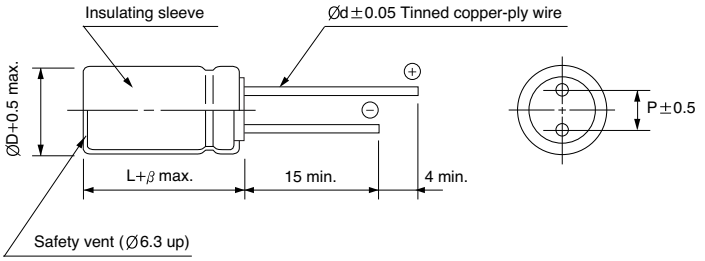
ØD	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
Life time	2000 hours	3000 hours	5000 hours

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	0.40	0.65	0.82	0.94	1.00
47 ~ 220	0.50	0.70	0.84	0.96	1.00
330 ~ 680	0.55	0.75	0.86	0.96	1.00
820 ~ 1800	0.60	0.80	0.88	0.97	1.00
2200 ~	0.70	0.85	0.90	0.97	1.00

MK series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	6.3			10			16			25		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
10							5×11	0.525	250	5×11	0.85	250
22	5×11	0.525	250	5×11	0.525	250	5×11	0.525	270	5×11	0.525	270
33	5×11	0.525	270	5×11	0.525	270	5×11	0.525	290	5×11	0.525	290
47	5×11	0.450	290	5×11	0.450	290	5×11	0.450	310	5×11	0.500	310
100	5×11	0.450	310	5×11	0.450	310	5×11	0.450	310	6.3×11	0.225	460
							6.3×11	0.300	405			
150	6.3×11	0.300	405	6.3×11	0.300	405	6.3×11	0.225	460	8×11.5	0.160	760
220	6.3×11	0.225	460	6.3×11	0.225	460	8×11.5	0.108	760	8×11.5	0.160	950
330	6.3×11	0.225	505	8×11.5	0.150	760	8×11.5	0.108	950	10×12.5	0.088	1280
390	8×11.5	0.108	550	8×11.5	0.150	760	8×15	0.098	1000	8×15	0.098	1430
							10×12.5	0.098	1000	10×12.5	0.098	1430
470	8×11.5	0.108	950	8×11.5	0.150	950	8×11.5	0.108	950	10×12.5	0.098	1430
							8×15	0.098	1100	10×16	0.065	1785
							10×12.5	0.088	1280	10×20	0.060	1785
560	8×15	0.098	1000	8×15	0.098	1100	8×20	0.088	1280	8×20	0.088	1900
	10×12.5	0.098	1050	10×12.5	0.098	1100	10×16	0.088	1280	10×16	0.088	1900
680	10×12.5	0.088	1280	8×15	0.098	1280	10×16	0.065	1785	10×16	0.065	1900
				10×12.5	0.088					10×20	0.050	2270
820	10×16	0.075	1300	10×12.5	0.088	1400	10×16	0.065	1785	10×20	0.050	2300
1000	10×16	0.065	1785	8×20	0.088	1600	8×20	0.088	2000	10×20	0.050	2400
				10×12.5			10×16	0.065				
				10×16	0.065	1785	10×20	0.050	2270	12.5×20	0.043	2950
1200				10×16	0.065	2200				12.5×20	0.043	3100
1500	10×20	0.050	2270	10×20	0.050	2270	12.5×20	0.043	2450	12.5×25	0.029	3470
										16×20	0.029	3600
1800	10×20	0.050	2300	12.5×20	0.043	2350	12.5×25	0.029	2950	12.5×25	0.029	3650
2200	12.5×20	0.043	2950	10×20	0.05	2650						
				12.5×20	0.043	2950	12.5×25	0.029	3460	12.5×25	0.029	3700
										16×25	0.024	3890
3300	12.5×20	0.040	3000	12.5×25	0.029	3140	16×25	0.024	3500	16×31.5	0.024	3900
				16×20								
4700	16×25	0.024	3114	16×25	0.024	3200	16×31.5	0.024	3600	18×35.5	0.022	3950
6800	16×25	0.024	3114	16×31.5	0.024	3312	18×35.5	0.022	3700			
10000	16×31.5	0.024	3312	18×35.5	0.022	3420						
15000	18×35.5	0.022	3420									

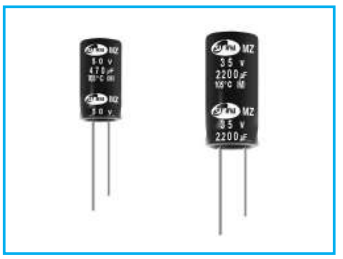
MK series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	35			50			63			100		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
1.0				5×11	3.00	250						
2.2				5×11	3.00	250				5×11	3.000	125
3.3				5×11	1.50	250	5×11	2.000	165	5×11	2.000	125
4.7	5×11	0.525	250	5×11	1.50	270	5×11	2.000	165	5×11	2.000	125
10	5×11	0.525	270	5×11	0.750	290	5×11	0.800	165	6.3×11	1.200	205
22	5×11	0.525	290	5×11	0.500	310	6.3×11	0.500	265	8×11.5	0.600	355
33	5×11	0.450	310	6.3×11	0.300	405	6.3×11	0.500	265	10×12.5	0.250	450
47	6.3×11	0.330	460	6.3×11	0.300	460	8×11.5	0.300	500	8×15	0.300	500
										10×16	0.200	580
56	6.3×11	0.330	460	8×11.5	0.160	580	10×12.5	0.160	680	10×16	0.160	750
100	8×11.5	0.160	760	8×11.5	0.160	950	10×16	0.100	945	10×20	0.150	800
				8×15	0.108	960				12.5×20	0.100	1045
150	8×11.5	0.160	950	10×12.5	0.088	1280	10×20	0.080	1100	12.5×25	0.080	1195
220	8×15	0.098	1030	10×16	0.065	1785	12.5×20	0.070	1300	16×25	0.060	1600
	10×12.5	0.088	1280									
330	10×16	0.065	1785	10×20	0.050	2270	12.5×20	0.050	1495	16×31.5	0.040	1750
390	8×20	0.088	1830	10×20	0.050	2270	12.5×25	0.039	1600	16×31.5	0.040	1750
470	8×20	0.088	1930	12.5×20	0.043	2950	16×20	0.035	1990	18×40	0.030	2060
	10×16	0.065										
	10×20	0.050	2270									
680	10×20	0.050	2400	12.5×25	0.029	3460	16×25	0.030	2780			
	12.5×20	0.043	2950									
1000	12.5×20	0.043	3100	16×25	0.027	3890	16×35.5	0.020	2835			
	12.5×25	0.032	3460									
1500	12.5×25	0.029	3500	16×31.5	0.024	3900						
	16×20	0.027	3600									
	16×25	0.024	3890									
2200	16×31.5	0.024	3900	18×35.5	0.022	3950						
3300	18×35.5	0.022	3950									

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

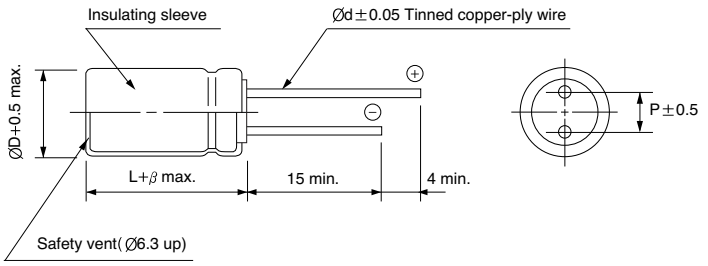
ØD	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
Life time	2000 hours	3000 hours	5000 hours

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 ~ 220	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

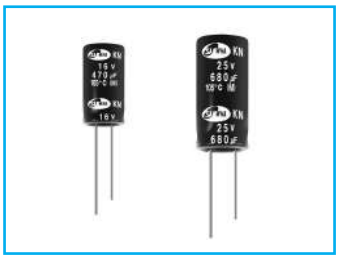
WV / Item / μF	6.3			10			16			25		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
10							5×11	0.35	250	5×11	0.60	250
22	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250	5×11	0.40	250
33	5×11	0.35	250	5×11	0.35	250	5×11	0.35	250	5×11	0.40	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	0.085	760	8×11.5	0.10	760
330	6.3×11	0.15	405	8×11.5	0.12	760	8×11.5	0.085	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	12.5×20	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									

KN

Low Imp., High Ripple Current Series

Low Impedance | Miniaturized | 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
- Complied to the RoHS directive

MK ⇨ KN
High Ripple

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3㎂ whichever is greater (after 2 minutes) I = 0.03CV or 4㎂ whichever is greater (after 1 minute)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	Capacitance > 1000㎌ : tanδ increases by 0.02 for each 1000㎌ from below value.

WV	10	16	25	35	50
tanδ	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 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.

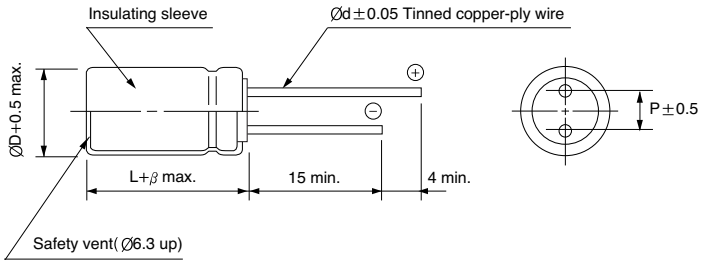
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

Case Size	ØD ≦ 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
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

㎌ \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 47	0.18	0.70	0.90	0.94	1.00
56 ~ 100	0.27	0.73	0.92	0.95	1.00
120 ~ 270	0.49	0.73	0.92	0.96	1.00
330 ~ 680	0.55	0.77	0.94	0.97	1.00
820 ~ 1500	0.60	0.80	0.96	0.98	1.00
2200 ~	0.70	0.85	0.98	0.99	1.00

KN series

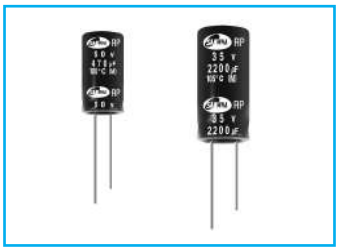
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	10			16			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
47							5 × 11	0.150	405
56				5 × 11	0.150	405	6.3 × 11	0.065	760
100	5 × 11	0.150	405	6.3 × 11	0.065	760	8 × 11.5	0.060	850
220	6.3 × 11	0.065	760	8 × 11.5	0.060	850	8 × 11.5	0.036	1000
330	8 × 11.5	0.060	850	8 × 11.5	0.036	1000	8 × 15	0.028	1250
							10 × 12.5	0.027	1430
470	8 × 11.5	0.036	1000	8 × 15	0.028	1250	8 × 20	0.020	1600
				10 × 12.5	0.027	1430	10 × 16	0.020	1820
680	8 × 15	0.028	1250	8 × 20	0.020	1600	10 × 20	0.014	2180
	10 × 12.5	0.027	1430	10 × 16	0.020	1820	12.5 × 16	0.018	2200
820	10 × 12.5	0.025	1500	10 × 16	0.018	2000	12.5 × 20	0.013	2360
1000	8 × 20	0.020	1600	10 × 20	0.014	2180	12.5 × 20	0.013	2480
	10 × 16	0.020	1820	12.5 × 16	0.018	2200			
1200	10 × 20	0.014	2180	12.5 × 20	0.013	2360	12.5 × 20	0.013	2600
	12.5 × 16	0.018	2200						
1500	12.5 × 20	0.013	2360	12.5 × 20	0.013	2480	12.5 × 25	0.012	2900
2200	12.5 × 20	0.013	2480	12.5 × 25	0.012	2900			
3300	12.5 × 25	0.012	3200						

WV / Item / μF	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
33	5 × 11	0.150	405			
47	6.3 × 11	0.100	550	6.3 × 11	0.140	405
56	6.3 × 11	0.065	760	6.3 × 11	0.140	580
100	8 × 11.5	0.050	850	8 × 11.5	0.072	760
150	8 × 11.5	0.036	1000	10 × 12.5	0.061	1030
220	8 × 15	0.028	1250	10 × 16	0.042	1430
	10 × 12.5	0.027	1430			
270	8 × 20	0.020	1600	12.5 × 16	0.042	1700
330	10 × 16	0.020	1820	10 × 20	0.030	1820
470	10 × 20	0.014	2180	12.5 × 20	0.027	2360
	12.5 × 16	0.018	2200			
560	12.5 × 20	0.015	2360	12.5 × 25	0.020	2500
680	12.5 × 20	0.015	2480			
1000	12.5 × 25	0.015	2900			

RP Low Impedance Series

Low Impedance | Long Life | Solvent Proof



- High reliability long life(10000 hours)
- Operating temperature −55 ~ +105˚C
- Enabled high ripple current by a reduction of impedance at high frequency
- Ideally suited for use in switching power supply, main board
- Complied to the RoHS directive

RZ ⇨ RP
Long life

Item	Characteristics
Operating temperature range	-55 ~ +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
tanδ	0.22	0.19	0.16	0.14	0.12	0.10

| **Low temperature characteristics (Impedance ratio at 120Hz)** | |

WV	6.3	10	16 ~ 25	35 ~ 50
Z-55˚C/Z+20˚C	3	3	3	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.

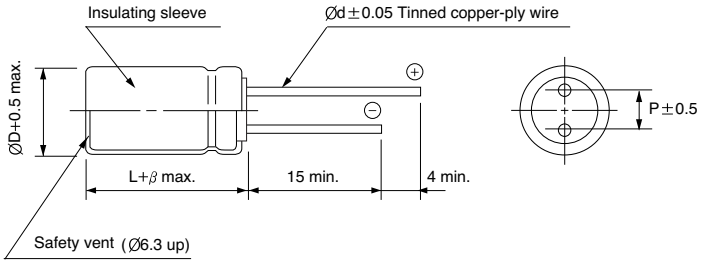
Leakage current	Less than specified value
Capacitance change	Within ±20% of initial value
tanδ	Less than 200% of specified value

ØD	ØD = 5, 6.3	ØD = 8	ØD = 10	ØD ≧ 12.5
Life time	4000 hours	6000 hours	7000 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	0.40	0.65	0.82	0.91	1.00
47 ~ 270	0.50	0.70	0.84	0.92	1.00
330 ~ 680	0.55	0.75	0.86	0.93	1.00
820 ~ 1800	0.60	0.80	0.88	0.94	1.00
2200 ~	0.70	0.85	0.90	0.95	1.00

RP series

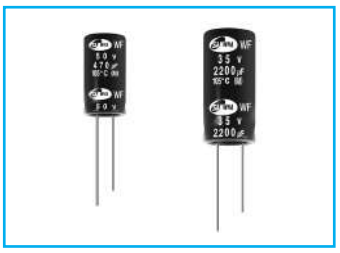
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

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	0.65	180
68				5 × 11	0.65	180	6.3 × 11	0.30	280
100	5 × 11	0.65	180	5 × 11	0.65	180	6.3 × 11	0.30	280
150	5 × 11	0.65	280	6.3 × 11	0.30	280	6.3 × 11	0.30	280
220	6.3 × 11	0.30	280	6.3 × 11	0.30	280	8 × 11.5	0.14	450
330	6.3 × 11	0.30	280	8 × 11.5	0.14	450	8 × 11.5	0.14	450
470	8 × 11.5	0.14	450	8 × 11.5	0.14	450	10 × 12.5	0.10	660
680	10 × 12.5	0.10	660	10 × 12.5	0.10	660	10 × 16	0.08	850
1000	10 × 12.5	0.10	660	10 × 16	0.08	850	10 × 20	0.054	1100
1500	10 × 20	0.054	1100	10 × 20	0.054	1100	12.5 × 20	0.050	1400
2200	12.5 × 20	0.050	1400	12.5 × 20	0.050	1400	12.5 × 25	0.038	1700
3300	12.5 × 20	0.050	1400	12.5 × 25	0.038	1700	16 × 25	0.030	2100
4700	16 × 25	0.030	2100	16 × 31.5	0.030	2100	16 × 25	0.025	2600
6800	16 × 25	0.030	2100	16 × 31.5	0.025	2600	16 × 35.5	0.022	3000
10000	16 × 31.5	0.025	2600	18 × 35.5	0.022	3000			
15000	18 × 35.5	0.022	3000						

WV / Item / μF	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
1.0							5 × 11	3.5	40
2.2							5 × 11	3.0	55
3.3							5 × 11	2.6	65
4.7							5 × 11	2.3	90
6.8							5 × 11	1.4	120
10							5 × 11	1.4	120
22				5 × 11	0.70	180	5 × 11	1.2	150
33	5 × 11	0.70	180	5 × 11	0.65	180	6.3 × 11	0.85	200
47	5 × 11	0.65	180	6.3 × 11	0.30	280	6.3 × 11	0.70	250
68	6.3 × 11	0.30	280	8 × 11.5	0.14	450	8 × 11.5	0.24	340
100	6.3 × 11	0.30	280	8 × 11.5	0.14	450	8 × 11.5	0.24	340
150	8 × 11.5	0.14	450	8 × 11.5	0.14	450	10 × 12.5	0.17	490
220	8 × 11.5	0.14	450	10 × 12.5	0.10	660	10 × 16	0.12	650
330	10 × 12.5	0.10	660	10 × 16	0.080	850	10 × 20	0.10	810
470	10 × 16	0.080	850	10 × 20	0.054	1100	12.5 × 20	0.085	1100
680	10 × 20	0.054	1100	12.5 × 20	0.050	1400	12.5 × 25	0.065	1200
1000	12.5 × 20	0.050	1400	12.5 × 25	0.038	1700	16 × 31.5	0.043	1600
1500	16 × 25	0.030	1400	16 × 31.5	0.030	2100	16 × 31.5	0.038	2000
2200	16 × 25	0.030	2100	16 × 31.5	0.025	2600	18 × 35.5	0.034	2300
3300	16 × 31.5	0.025	2600	18 × 35.5	0.022	3000			
4700	18 × 35.5	0.022	3000						

WF High ripple current, Extremely Low Impedance Series

Low Impedance | Long Life | Solvent Proof



- Operating temperature range of −40 ~ +105˚C
- Extremely low impedance at high frequency
- High reliability withstanding 10000 hours load life at 105˚C
- For E-meter
- Complied to the RoHS directive

WL ⇒ WF
Long life

Item	Characteristics
Operating temperature range	-40 ~ +105˚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	0.19	0.16	0.14	0.12	0.10	0.09	0.08

Low temperature characteristics (Impedance ratio at 120Hz)					
WV	6.3	10	16	25 ~ 100
Z-40˚C/Z+20˚C	8	6	4	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.

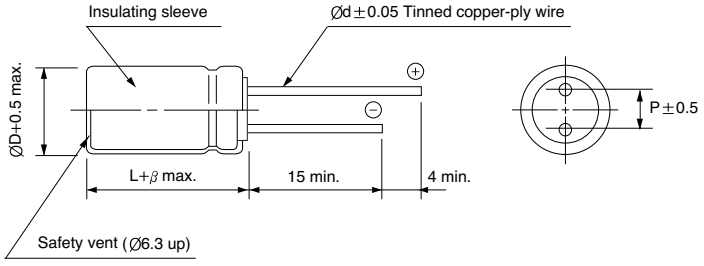
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

ØD	ØD = 5, 6.3	ØD = 8, 10	ØD ≧ 12.5
Life time	5000 hours	7000 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	0.40	0.65	0.82	0.91	1.00
47 ~ 220	0.50	0.70	0.84	0.92	1.00
330 ~ 470	0.55	0.75	0.86	0.93	1.00
~ 1000	0.60	0.80	0.88	0.94	1.00
2200 ~	0.70	0.85	0.90	0.95	1.00

WF series

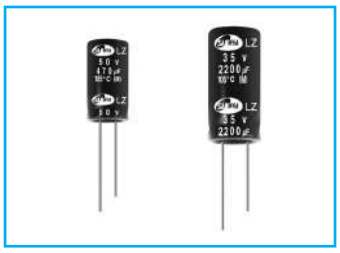
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

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
33										5×11	0.90	150
47							5×11	0.90	150	5×11	0.90	150
100	5×11	0.90	150	5×11	0.90	150	6.3×11	0.40	250	6.3×11	0.40	250
220	6.3×11	0.40	250	6.3×11	0.40	250	8×11.5	0.25	400	8×11.5	0.25	400
330	6.3×11	0.40	250	8×11.5	0.25	400	8×11.5	0.25	400	10×12.5	0.16	580
470	8×11.5	0.25	400	8×11.5	0.25	400	10×12.5	0.16	580	10×16	0.120	770
1000	10×12.5	0.16	580	10×16	0.120	770	10×20	0.078	1050	12.5×20	0.062	1300
2200	12.5×20	0.062	1300	12.5×20	0.062	1300	12.5×25	0.048	1650	16×25	0.034	1850
3300	12.5×20	0.062	1300	12.5×25	0.048	1650	16×25	0.034	1850	16×31.5	0.029	2000
4700	16×25	0.034	1850	16×25	0.034	1850	16×31.5	0.029	2000	18×35.5	0.025	2200
6800	16×25	0.034	1850	16×31.5	0.029	2000	18×35.5	0.025	2200			
10000	16×31.5	0.029	2000	18×35.5	0.025	2200						
15000	18×35.5	0.025	2200									

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	4.0	50				5×11	4.5	20
2.2				5×11	2.5	55				5×11	3.0	30
3.3				5×11	2.2	65				5×11	2.7	40
4.7				5×11	1.9	88				5×11	2.5	65
10				5×11	1.5	100	5×11	2.3	87	6.3×11	1.2	140
22				5×11	0.9	150	6.3×11	1.30	140	8×11.5	0.63	160
33	5×11	0.90	150	6.3×11	0.40	250	6.3×11	1.20	140	10×12.5	0.43	230
47	6.3×11	0.4	250	6.3×11	0.4	400	8×11.5	0.63	210	10×12.5	0.43	230
										10×16	0.31	290
100	8×11.5	0.25	400	8×11.5	0.25	500	10×12.5	0.43	300	12.5×16	0.23	750
										12.5×20	0.16	
220	10×12.5	0.16	580	10×16	0.12	770	12.5×20	0.210	520	16×25	0.073	900
330	10×16	0.120	770	10×20	0.08	1050	12.5×20	0.160	660	16×25	0.073	900
390	10×20	0.095	900	10×20	0.075	1170	12.5×25	0.140	700	12.5×34.5	0.073	1650
470	10×20	0.078	1050	12.5×20	0.062	1300	12.5×25	0.120	750			
1000	12.5×25	0.048	1650	16×25	0.034	1850	16×31.5	0.054	1390			
2200	16×31.5	0.029	2000	18×35.5	0.025	2200						
3300	18×35.5	0.025	2200									

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

MK ⇨ 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.

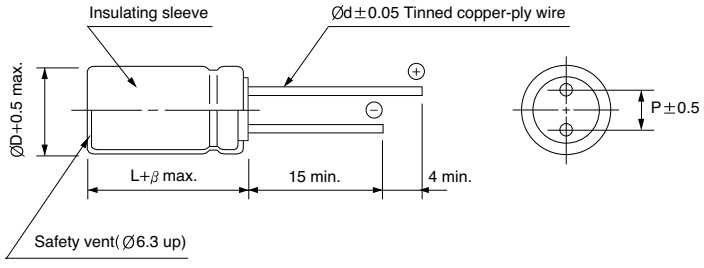
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

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
47 ~ 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

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

LZ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

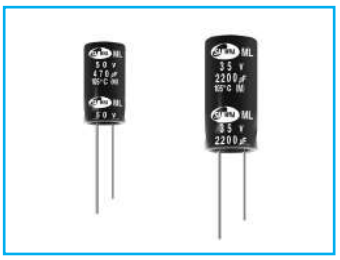
WV / Item / μF	6.3			10			16		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz
47	5 × 11	0.600	300	5 × 11	0.600	300	5 × 11	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	0.400	345	6.3×11	0.450	345	8×11.5	0.500	490
100	6.3×11	0.400	345	6.3×11	0.350	500	8×11.5	0.300	724
				8×11.5	0.300	540			
120	6.3×11	0.400	345	8×11.5	0.250	540	8×11.5	0.200	950
150	8×11.5	0.250	740	8×11.5	0.250	945	10×12.5	0.120	979
180	8×11.5	0.200	740	8×11.5	0.190	945	8×20	0.120	1200
							10×12.5	0.120	1190
220	8×11.5	0.180	740	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			
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

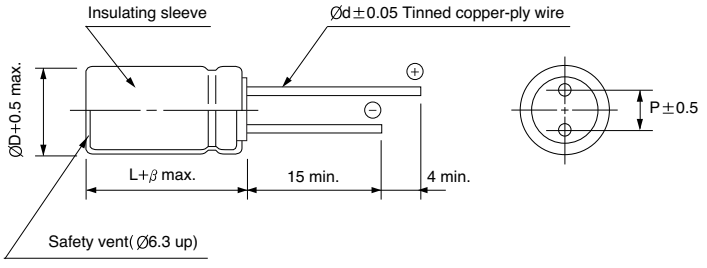
ØD	ØD = 5, 6.3	ØD = 8	ØD ≧ 10
Life time	6000 hours	8000 hours	10000 hours

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
47 ~ 220	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

ML series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

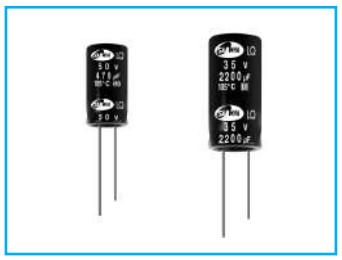
WV / Item / μF	6.3			10			16			25		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
10							5×11	0.45	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°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
10	5×11	0.55	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	12.5×20	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			

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	0.08

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	

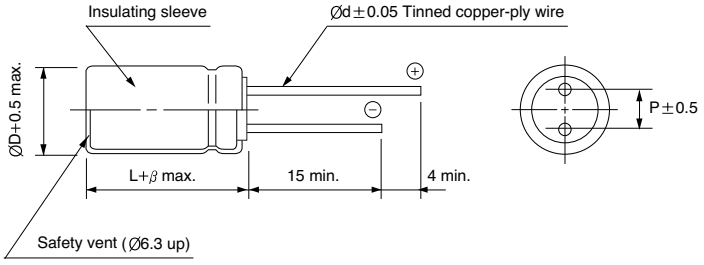
ØD	Life time (hrs)		
	6.3Vdc	10~50Vdc	63~120Vdc
Ø5 ~ Ø6.3	6000	7000	6000
Ø8×11.5L	8000	9000	8000
Ø8×15L ~ 20L	9000	10000	9000
Ø10×12.5L	9000		
Ø10×16L ~ 25L Ø12.5 ~	10000		

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	12.5×20	0.027	2600
820	8×11.5	0.075	945	10×12.5	0.053	1700	8×20	0.041	1960				12.5×20	0.025	2900
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	2900
1200	10×12.5	0.053	1500	10×16	0.036	2000				12.5×20	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	2900	12.5×30	0.018	3660
													16×20	0.021	3330
1800	10×16	0.036	1760	10×20	0.027	2500	12.5×20	0.024	2600	12.5×25	0.024	3200	16×25	0.017	3810
2200				12.5×20	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	12.5×20	0.024	3000	12.5×25	0.018	3200						
3300	12.5×20	0.023	2250	12.5×25	0.022	3200	12.5×30	0.017	3660	16×25	0.016	3810			
							16×20	0.020	3300						
3900	12.5×20	0.024	2480												
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	16×20	0.020	3250												
8200	16×25	0.016	3630												

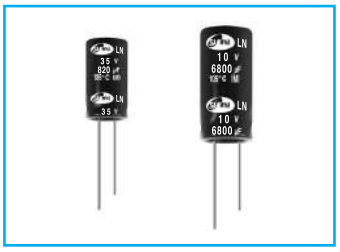
WV / Item / μF	50			63			80			100			120		
	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 105℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (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	0.130	1140			
100	8×11.5	0.120	950	8×15	0.180	990	10×16	0.140	1040	10×20	0.105	1430			
										12.5×16	0.105	1430	12.5×20	0.062	1750
120	8×15	0.082	1230	10×12.5	0.110	990				12.5×20	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	12.5×20	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	12.5×20	0.060	1990	12.5×30	0.042	2400				16×35.5	0.029	2860
							16×20	0.048	1950						
390	12.5×20	0.030	2240	12.5×20	0.050	1990				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				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	16×25	0.021	3510	16×31.5	0.023	2950	18×35.5	0.027	3510						
1200							18×40	0.026	3860						
2200				18×40	0.020	3200									

New

LN

Low Imp., High Ripple Current Series

Low Impedance | Long Life | Solvent Proof



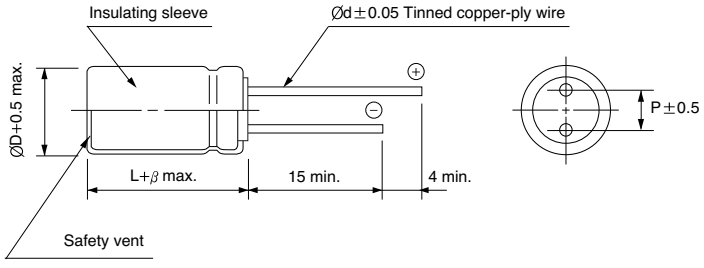
- Higher ripple current compared with LQ series
- Enabled high ripple current by a reduction of impedance at high frequency range
- High reliability withstanding 10000 hours load life at 105˚C
- Complied to the RoHS directive

LQ ⇨ LN (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: 10 / 16 / 25 / 35 tanδ: 0.18 / 0.15 / 0.13 / 0.11
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 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
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
P	5.0	5.0	7.5
Ød	0.6	0.6	0.8
β	2.0		

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 560	0.50	0.85	0.95	0.98	1.00
680 ~ 1800	0.60	0.87	0.95	0.98	1.00
2200 ~ 3900	0.75	0.90	0.95	0.98	1.00
4700 ~ 12000	0.85	0.95	0.98	0.99	1.00

LN 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
820				10 × 16	0.032	2000
1000				10 × 16	0.032	2000
1200	10 × 16	0.032	2000	10 × 20	0.024	2500
1500	10 × 16	0.032	2000	10 × 20	0.024	2500
1800	10 × 20	0.024	2500	12.5 × 20	0.020	2600
2200	12.5 × 20	0.020	2600	12.5 × 20	0.020	2900
3300	12.5 × 20	0.020	2900	12.5 × 25	0.017	3200
3900	12.5 × 25	0.017	3200	16 × 20	0.017	3575
4700	16 × 20	0.017	3575	16 × 25	0.015	3810
5600	16 × 25	0.015	3810	16 × 25	0.015	3810
6800	16 × 25	0.015	3810	16 × 31.5	0.012	4000
8200	16 × 31.5	0.012	4000	16 × 35.5	0.011	4200
10000	16 × 31.5	0.012	4000			
12000	16 × 35.5	0.011	4200			

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
390				10 × 16	0.032	2000
470				10 × 16	0.032	2000
560				10 × 20	0.024	2500
680	10 × 16	0.032	2000	12.5 × 20	0.020	2600
820	10 × 20	0.024	2500	12.5 × 20	0.020	2600
	10 × 16	0.032	2000	12.5 × 20	0.020	2900
1000	10 × 20	0.024	2500	12.5 × 20	0.020	2600
1200	12.5 × 20	0.020	2600	12.5 × 25	0.017	3200
1500	12.5 × 20	0.020	2900	16 × 20	0.017	3575
1800	12.5 × 25	0.017	3200	16 × 25	0.015	3600
2200	12.5 × 25	0.017	3200	16 × 25	0.015	3700
2200	16 × 20	0.017	3575			
3300	16 × 25	0.015	3810	16 × 31.5	0.013	3800
3900	16 × 25	0.014	3810	16 × 35.5	0.012	4000
4700	16 × 31.5	0.014	4000			
5600	16 × 35.5	0.013	4200			

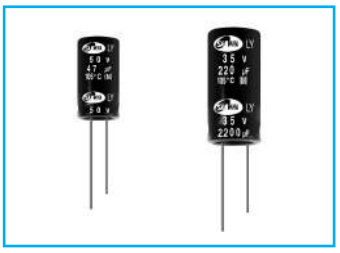
Upgrade

LY

Miniature, Long Life, For LED Lighting Series

Long Life Solvent Proof

WF ⇨ LY
Long life

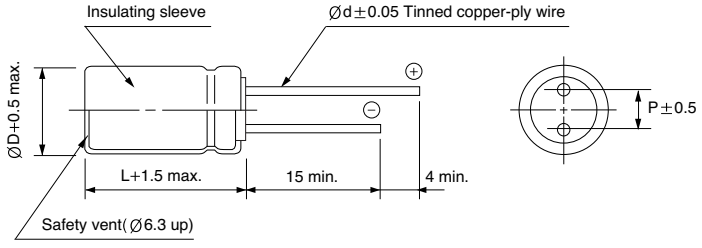


- Miniature, long life
- For LED Lighting
- High reliability withstanding 10000 hours load life at 105˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA 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 / 63 / 100 tanδ: 0.45 / 0.35 / 0.30 / 0.22 / 0.19 / 0.17 / 0.15
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 10 / 16 / 25 / 35 / 50 / 63 / 100 Z-25˚C/Z+20˚C: 3 / 2 / 2 / 2 / 2 / 2 / 2 Z-25˚C/Z+20˚C: 8 / 6 / 3 / 3 / 4 / 4 / 4
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

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

LY series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

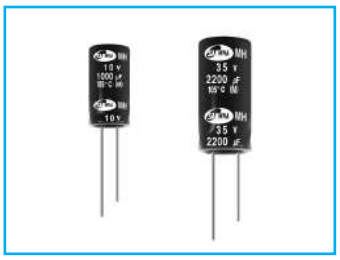
WV / Item / μF	10			16			25		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
33							5×11	1.50	172
47				5×11	1.20	193	5×11	0.60	193
100	5×11	0.60	193	6.3×11	0.60	277	6.3×11.5	0.45	277
220	6.3×11	0.50	277	8×11.5	0.45	436	8×11.5	0.20	436
330	8×11.5	0.40	436	8×11.5	0.40	436			

WV / Item / μF	35			50			63		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
1.0				5×11	3.50	35			
2.2				5×11	2.50	46			
3.3				5×11	2.00	92			
4.7				5×11	2.00	106			
10				5×11	1.60	119			
22				5×11	1.60	145	6.3×11	1.20	265
33	5×11	0.60	193	6.3×11	1.50	251	6.3×11	1.20	265
47	6.3×11	0.50	277	6.3×11	0.70	251	8×11.5	0.30	270
100	8×11.5	0.35	436	8×11.5	0.45	356			
220	8×15	0.30	473						

WV / Item / μF	100		
	ØD×L (mm)	Impedance (Ω)max. 20°C 100kHz	Ripple current (mA rms) 105°C 100kHz
1.0	8×11.5	1.20	264
2.2	8×11.5	1.20	264
3.3	8×11.5	0.30	264

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	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 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.

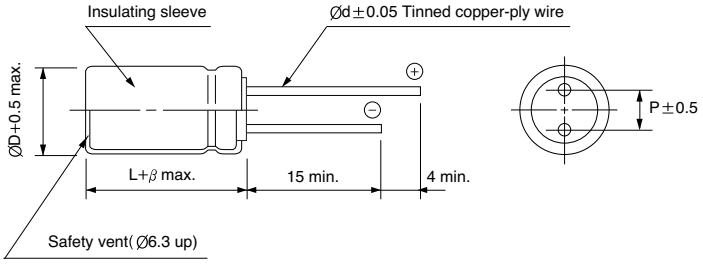
Leakage current	Less than specified value
Capacitance change	Within ±25% of initial value
tanδ	Less than 200% of specified value

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

Shelf life (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 ~ 220	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

MH series

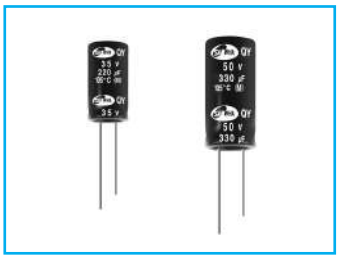
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

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	0.35	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			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
10	5 × 11	0.35	250	5 × 11	0.55	250	5 × 11	0.60	250
22	5 × 11	0.35	250	5 × 11	0.50	250	5 × 11	0.45	250
33	5 × 11	0.35	250	5 × 11	0.45	250	6.3 × 11	0.25	405
47	5 × 11	0.30	250	6.3 × 11	0.30	405	6.3 × 11	0.20	405
56	6.3 × 11	0.27	405	6.3 × 11	0.20	405	6.3 × 11	0.20	405
68	6.3 × 11	0.27	405	8 × 11.5	0.10	540	8 × 11.5	0.15	540
100	6.3 × 11	0.20	405	8 × 11.5	0.10	760	8 × 11.5	0.12	760
150	8 × 11.5	0.14	760	8 × 11.5	0.10	760	10 × 12.5	0.061	1030
220	8 × 11.5	0.12	760	10 × 12.5	0.053	1030	10 × 16	0.038	1430
330	10 × 12.5	0.053	1030	10 × 12.5	0.053	1330	10 × 20	0.032	1820
390	10 × 12.5	0.053	1250	10 × 16	0.048	1550	12.5 × 20	0.031	2000
470	10 × 12.5	0.050	1330	10 × 16	0.041	1760	12.5 × 20	0.030	2360
560	10 × 16	0.050	1800	10 × 20	0.037	2100	12.5 × 25	0.027	2450
680	10 × 16	0.040	1760	12.5 × 20	0.026	2360	12.5 × 25	0.022	2770
1000	10 × 20	0.033	1960	12.5 × 20	0.026	2480	16 × 25	0.018	3460
1500	12.5 × 20	0.029	2550	16 × 20	0.022	3250	16 × 31.5	0.015	3680
2200	16 × 20	0.022	3250	16 × 25	0.018	3630			
3300	16 × 25	0.018	3630						

QY Long Life Series

Solvent Proof

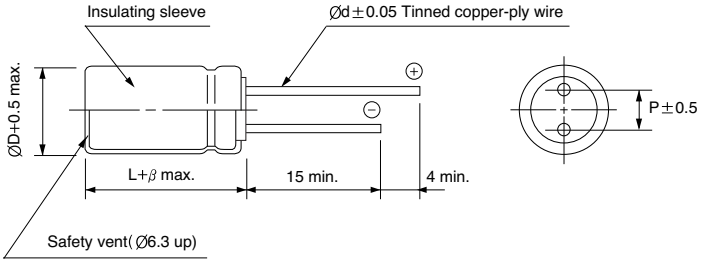


· High reliability withstanding 13000 hours load life at 105˚C
· Complied to the RoHS directive, Halogen-Free

Item	Characteristics
Operating temperature range	-25 ~ +105˚C
Leakage current max.	I = 0.01CV or 3μA (after 2 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 35 / 50; tanδ: 0.22 / 0.19
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 35 / 50; Z-25˚C/Z+20˚C: 3 / 3
Load life (after application of the rated voltage for 13000 hours at 105˚C)	Leakage current: Less than specified value; Capacitance change: Within ±30% of initial value; tanδ: Less than 300% 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	6.3	8		10	12.5
L	-	7	11.5	-	-
P	2.5	3.5	3.5	5.0	5.0
Ød	0.5	0.5	0.6	0.6	0.6
β	1.5			2.0	

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	35		50	
22			6.3 × 11	228
47	6.3 × 11	205	6.3 × 11	228
			8 × 7	228
			8 × 11.5	450
100	8 × 11.5	550	10 × 16	700
220	10 × 16	800	12.5 × 20	990
330	10 × 20	1030	12.5 × 25	1250
470	12.5 × 20	1320	12.5 × 30	1585
560	12.5 × 25	1500		

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

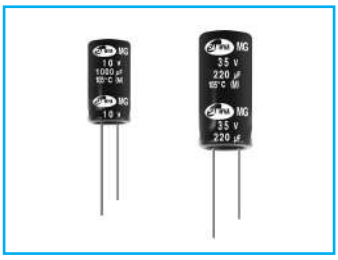
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 22	0.25	0.50	0.75	0.90	1.00
47 ~	0.30	0.55	0.80	0.90	1.00

MG Long Life Series

- Long Life
- For LED Lighting
- High reliability withstanding 20000 hours load life at 105˚C
- Complied to the RoHS directive

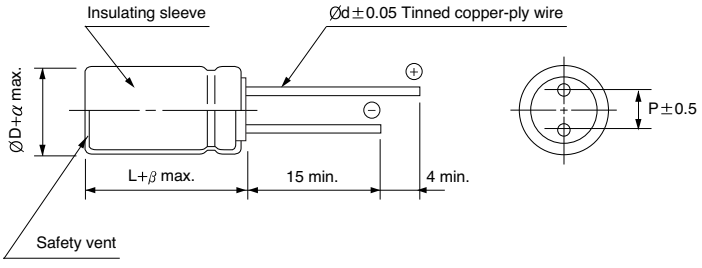
MH ⇒ MG
Long life



Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.03CV or 4㎂ whichever is greater (after 1 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 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: 3 / 3 / 3 / 3
Load life (after application of the rated voltage for 20000 hours at 105˚C)	Leakage current: Less than specified value Capacitance change: Within ±30% of initial value tanδ: Less than 300% 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
α	0.5			
β	2.0			

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

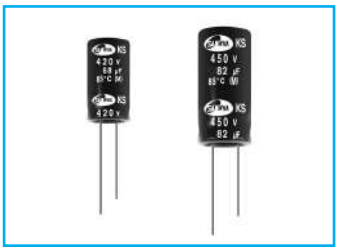
㎌ \ WV	10		16		25		35	
100					10 × 12.5	420	10 × 16	672
220			10 × 12.5	504	10 × 12.5	840	10 × 20	1008
330	10 × 12.5	504	10 × 16	672	10 × 16	1008	12.5 × 20	1344
470	10 × 12.5	672	10 × 20	806	10 × 20	1344	12.5 × 20	1680
680	10 × 16	806	12.5 × 20	1008	12.5 × 20	1008	12.5 × 25	1879
1000	10 × 20	1008	12.5 × 25	1680	12.5 × 25	1680	16 × 25	2184
2200	12.5 × 25	1680	16 × 25	2016				
3300	16 × 25	2016	16 × 31.5	2184				
4700	16 × 31.5	2184						

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

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
Coefficient	0.75	0.8	0.9	0.95	1.00

KS For PSU, Long Life Series

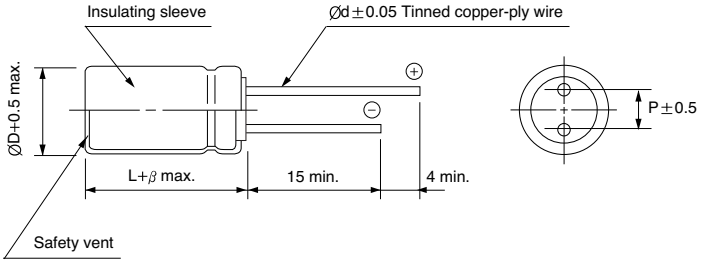


- High reliability withstanding 8000 hours load life at 85˚C
- Suitable for CFL, adapter and power supply
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-25 ~ +85˚C
Leakage current max.	I = 0.02CV+25μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	Rated Voltage(V) 420 450 500 tanδ 0.2 0.2 0.2
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	20
P		7.5	7.5	10.0
Ød		0.8	0.8	0.8
β	L≤40mm	2.0		-
	L>40mm	3.0		

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	420		450		500	
47					16 × 35.5	474
56					16 × 40	552
68	16 × 31.5	726	16 × 35.5	738	16 × 40	648
					16 × 45	
			18 × 31.5	738	18 × 40	
82	16 × 40	768	16 × 40	834	16 × 40	684
			18 × 31.5	834		
100	16 × 40	960	16 × 45	990	16 × 50	924
			18 × 35.5	990		
120	16 × 45	1122	16 × 50	1056	20 × 41	1035
150			18 × 45	1146		

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

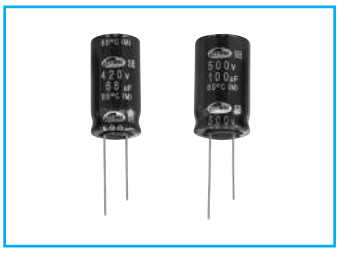
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

SB High Ripple Current, Long Life Series

Long Life

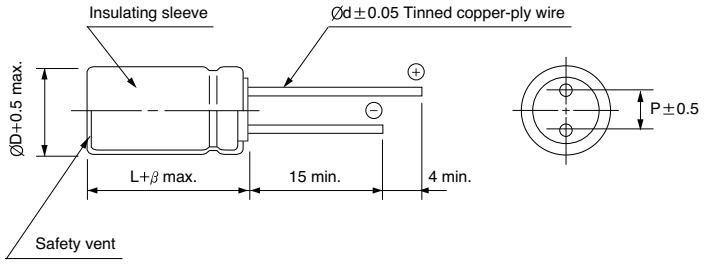


· High reliability withstanding 10000 hours load life at 85˚C
· Suitable for CFL, adapter and power supply
· Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-25 ~ +85˚C
Leakage current max.	I = 0.02CV+25μA (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

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

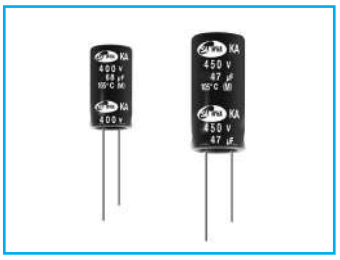
WV \ Frequency	120Hz	1kHz	10kHz	50kHz, 100kHz
420 ~ 500V	1.00	1.40	1.50	2.00

KA

For PSU, High Ripple Current Series

· High ripple current
· Operating tempersture range of -40 ~ +105˚C
· Complied to the RoHS directive

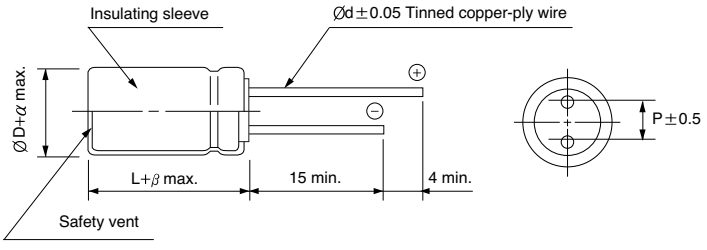
WL ⇨ KA
Long Life



Item	Characteristics
Operating temperature range	WV: 400 ~ 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.	0.2max. at 120Hz, 20˚C
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 400 ~450 / 500; Z-25˚C/Z+20˚C: 6 / 8; Z-40˚C/Z+20˚C: 10 / -
Load life	After an application of DC bias voltage plus the rated AC ripple current for 3000 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
α	0.5				1.0
β	2.0				3.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 33	0.40	0.65	0.82	0.91	1.00
47 ~ 150	0.50	0.70	0.84	0.92	1.00

KA series

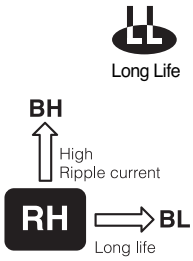
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

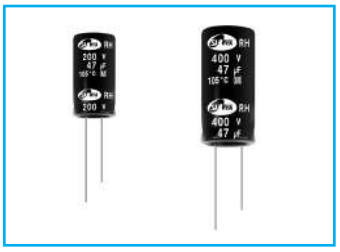
WV / Item / μF	400		420		450		500	
	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz
3.3					10×20	150		
4.7					10×20	200		
10	10×16	176			10×20	230	12.5×20	240
	10×20	180						
22	12.5×25	300			12.5×25	525	12.5×30	420
							16×25	470
33	16×20	600			16×25	600	18×25	580
47	16×25	700	16×25	630	16×25	660	16×35.5	650
					16×31.5	720	18×31.5	650
					18×25	720	18×35.5	700
56			16×31.5	740	16×31.5	800	16×40	740
			18×25		18×25	800		
68	16×31.5	1100	16×31.5	810	16×31.5	900	16×45	820
							18×40	900
82	16×35.5	1150	16×40	960	16×40	1115	16×50	1000
			18×31.5	960	18×31.5	1115	18×40	1000
100	18×35.5	1200	16×40	1100			16×50	1250
			18×35.5	1100	16×40	1500	18×45	1250
					18×35.5	1500	20×41	1250
120	18×40	1270	16×50	1250	16×50	1500	20×41	1370
			18×40	1250	18×40	1500		
150	20×41	1380			20×41	1600		

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

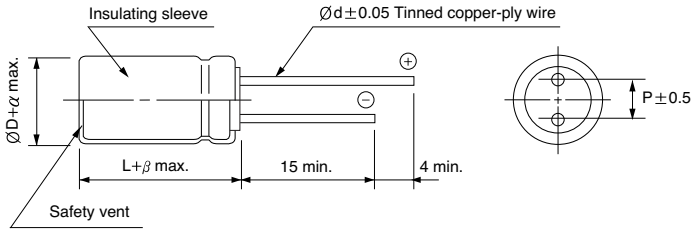




Item	Characteristics
Operating temperature range	WV: 160 ~ 450 / 500; Temperature range: -40 ~ +105˚C / -25 ~ +105˚C
Leakage current max.	I = 0.02CV + 15μA (after 5 minutes)
Capacitance tolerance	±20% at 120Hz, 20˚C
Dissipation factor max. (at 120Hz, 20˚C)	WV: 160 / 200 / 250 / 350 / 400 / 420 / 450 / 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
α	0.5				1.0	
β	2.0				3.0	

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 × 12.5	260	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 × 12.5	180	10 × 12.5	180	10 × 16	180		
6.8	10 × 16	200	10 × 16	200	10 × 16	200		
10	10 × 20	280	10 × 20	280	10 × 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		

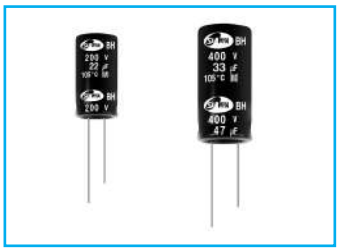
Ripple current (mA rms) at 105°C, 100kHz
Case size ØD×L (mm)

BH

For PSU, High Ripple Current Series

Long Life

RH ⇨ BH
High Ripple



- Higher ripple current compared with RH series
- Operating tempersture range of -40 ~ +105˚C
- High reliability withstanding 5000 hours load life at 105˚C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +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 / 450 / 500 tanδ: 0.15 / 0.15 / 0.20 / 0.24 / 0.24 / 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 200 / 250 / 350 / 400 / 450 / 500 Z-25˚C/Z+20˚C: 3 / 3 / 3 / 3 / 3 / 3 Z-40˚C/Z+20˚C: 11 / 11 / 11 / 11 / 11 / 11
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 87)

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
22	8 × 20	300	8 × 23	350	10 × 30	500	12.5 × 20	700
	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	← Ripple current (mA rms) at 105˚C, 100kHz			
100	12.5 × 30	1550	↑		← Case size ØD×L (mm)			
	16 × 25	1630						

WV	Cap.(μF)	ØD×L(mm)	Rated ripple current (mA rms)105˚C				
			120Hz	1kHz	10kHz	50kHz	100kHz≦
450	8.2	8×20	160	280	360	380	400
500	4.7	8×20	70	120	160	216	240
	5.6	8×20	120	210	270	285	300

● FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

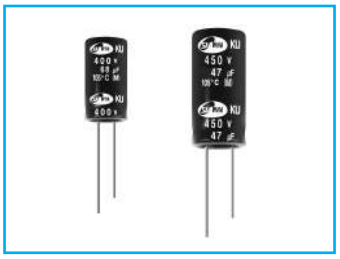
μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
~ 4.7	0.40	0.60	0.80	0.90	1.00
6.8 ~ 10	0.40	0.70	0.90	0.95	1.00
22 ~	0.50	0.80	0.90	0.95	1.00

KU

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

RH ⟹ KU
High Ripple



Item	Characteristics
Operating temperature range	WV: 400 ~ 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.	0.24max. at 120Hz, 20˚C
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 400 ~450 / 500 Z-25˚C/Z+20˚C: 6 / 6 Z-40˚C/Z+20˚C: 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 (See page 87)

Unit : mm

● 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

KU series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	400		420		450		500	
	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 105°C,100kHz
1.0	10×12.5	108						
2.2	10×12.5	120	10×12.5	120	10×12.5	120		
3.3	10×12.5	154	10×12.5	154	10×12.5	154		
4.7	10×16	216	10×16	216	10×20	216		
6.8	10×16	240	10×16	240	10×20	240		
10	10×20	336	10×20	336	12.5×20	360	12.5×20	360
15	12.5×16	336					12.5×25	432
22	12.5×25	516	12.5×25	516	12.5×25	516	16×25	504
33	16×25	768	16×25	792	16×25	768	16×31.5	672
47	16×31.5	900	16×31.5	900	16×31.5	840	18×35.5	840
56			18×25	900	18×25	900	18×35.5	888
68	16×31.5	1056	16×31.5	1080	16×35.5	1200	16×45	1080
82	16×35.5	1200	16×40	1260	16×35.5	1242	16×45	1236
100	18×35.5	1344	16×45	1440	16×45	1450	16×50	1320
120	18×40	1500	18×40	1536	16×50	1620	20×41	1570
150	20×41	1656	20×41	1800				

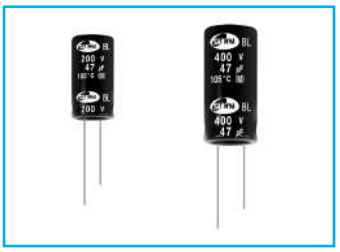
BL

For PSU, High Ripple Current, Long Life Series

Long Life

- High ripple current
- Operating temperature range of -40 ~ +105˚C
- For power supply and adapter
- Complied to the RoHS directive

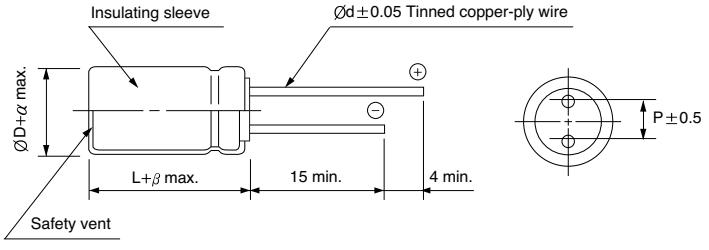
RH ⇨ BL
Long life



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
α	0.5					1.0
β	1.5	2.0				3.0

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

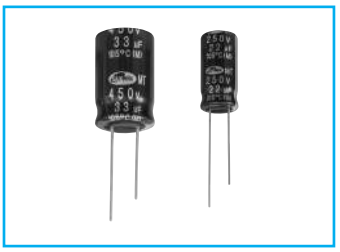
μF \ WV	160		200		250		350	
4.7					8 × 11.5	193		
6.8					8 × 11.5	220	10 × 16	264
					10 × 12.5	230		
10	10 × 16	320	10 × 16	320	10 × 16	320	8 × 20	315
							10 × 20	340
22	10 × 16	500	10 × 16	500	10 × 20	500	12.5 × 20	424
33	10 × 20	650	10 × 20	650	12.5 × 20	770	16 × 20	605
47	10 × 20	750	12.5 × 20	840	12.5 × 20	980	16 × 25	800
68	12.5 × 20	970	12.5 × 25	970	16 × 20	1080	18 × 25	1020
82	12.5 × 25	1250	16 × 20	1125			18 × 31.5	1090
					16 × 20	1190		
100	12.5 × 25	1250	16 × 20	1230	18 × 25	1425		
150	16 × 25	1610	18 × 25	1740	18 × 25	2000		

μF \ WV	400		420		450		500	
1	8 × 11.5	72			8 × 11.5	100		
2.2	8 × 11.5	99			8 × 11.5	110		
3.3	8 × 11.5	160			8 × 11.5	160		
3.9	8 × 11.5	170			8 × 15	180		
4.7	8 × 15	175			8 × 20	240		
	10 × 12.5	230			10 × 16	240		
6.8	8 × 20	230			10 × 16	265		
	10 × 16	265						
10	10 × 20	340	10 × 20	360	10 × 20	385	12.5 × 25	385
15					10 × 20	385		
22	12.5 × 25	520	12.5 × 25	520	12.5 × 20	485	16 × 25	675
					12.5 × 25	485	16 × 31.5	820
			16 × 20	520	16 × 25	675		
33	16 × 25	775	16 × 25	825	18 × 25	845	18 × 35.5	870
47	18 × 25	1020	18 × 31.5	1015	18 × 31.5	1060	18 × 35.5	1000
68	18 × 31.5	1050	18 × 25	1090	18 × 25	1200	18 × 35.5	1200
			18 × 31.5	1125	18 × 31.5	1200	18 × 40	1300
82	18 × 35.5	1150	18 × 31.5	1210	18 × 35.5	1270	16 × 50	1350
100	18 × 40	1210	18 × 35.5	1270	18 × 35.5	1330		
			18 × 40	1330	18 × 40	1400		
120					18 × 40	1450		
150					20 × 41	1550		

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

MT For Display, 12000 hours at 105˚C Series

Long Life

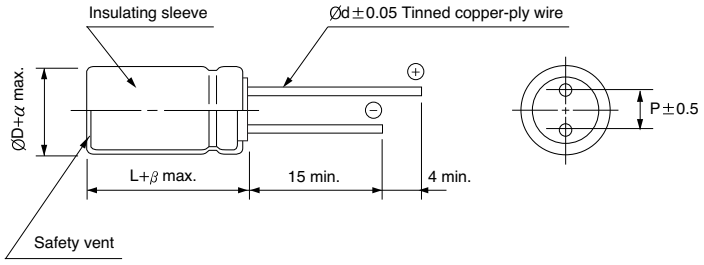


· High reliability withstanding 12000 Hours load life at 105˚C
· For power supply and adapter
· Complied to the RoHS directive

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
α	0.5				1.0
β	2.0				3.0

● 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						

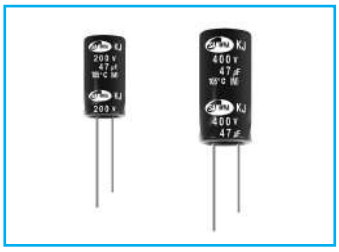
μF \ WV	400		420		450		500	
10	10 × 16	135	10 × 20	135	10 × 20	135	12.5 × 20	165
22	12.5 × 20	270	12.5 × 20	225	12.5 × 25	296	16 × 20	260
27	12.5 × 25	285	12.5 × 20	254	12.5 × 25	305	16 × 25	329
33	12.5 × 25	320	16 × 20	345	16 × 20	364	16 × 25	350
39	12.5 × 30	320	16 × 25	345	16 × 25	400	16 × 31.5	413
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						

Ripple current (mA rms) at 105°C, 120Hz

Case size ØD×L (mm)

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

KJ For PSU, High Ripple, Long Life Series

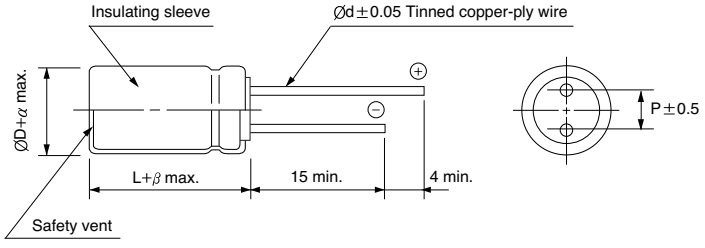


· High reliability withstanding 12000 hours load life at 105˚C
· Suitable for CFL, adapter and power supply
· Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +105˚C (160 ~ 450WV), -25 ~ +105˚C (500WV)
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: 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 / 10 / 10 / 10 / 10 / -
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
α	0.5					1.0
β	1.5	2.0				3.0

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

WV	Frequency / μF	120Hz	300Hz	1kHz	10kHz	50kHz	100kHz≦
160~450	~ 15	0.30	0.50	0.60	0.90	0.95	1.00
	22 ~ 47	0.40	0.50	0.70	0.90	0.95	1.00
	68 ~	0.50	0.60	0.80	0.90	0.95	1.00
500	~ 39	0.40	0.50	0.70	0.90	0.95	1.00
	47 ~	0.50	0.60	0.80	0.90	0.95	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						

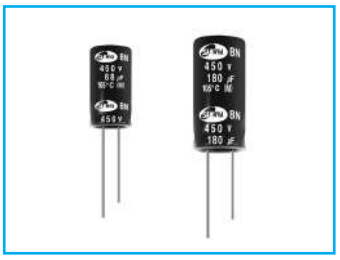
μF \ WV	400		420		450		500	
1	8 × 11.5	72			8 × 11.5	90		
2.2	8 × 11.5	99			8 × 11.5	105		
3.3	8 × 11.5	160			8 × 11.5	145		
3.9	8 × 11.5	171			8 × 15	165		
4.7	8 × 15	176			8 × 20	242		
	10 × 12.5	242			10 × 12.5	242		
6.8	8 × 20	231			10 × 16	363		
	10 × 16	308			10 × 20	440		
10	10 × 20	462	10 × 20	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)

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

BN For Network, High Ripple, 12000 hours at 105˚C Series

Long Life

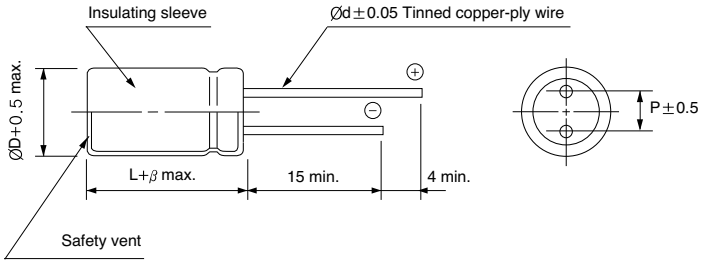


· High reliability withstanding 12000 hours load life at 105˚C
· For DC-DC convertor
· Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +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: 400 ~ 500 tanδ: 0.24
Low temperature characteristics (Impedance ratio at 120Hz)	WV: 400, 450 / 500 Z-25˚C/Z+20˚C: 6 / 6 Z-40˚C/Z+20˚C: 6 / 11
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 ±30% of initial value tanδ: Less than 300% 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		18
P		7.5
Ød		0.8
β	L≤40mm	2.0
	L≥40mm	3.0

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF \ WV	400		450		500	
47	18 × 25	1150	18 × 25	1200	18 × 25	1350
68	18 × 25	1300	18 × 25	1500	18 × 31.5	1550
82	18 × 31.5	1400	18 × 31.5	1600	18 × 35.5	1650
100	18 × 31.5	1500	18 × 31.5	1700	18 × 40	1750
120	18 × 35.5	1700	18 × 35.5	1900	18 × 45	1950
150	18 × 40	1850	18 × 40	2000	18 × 50	2050
180	18 × 45	2050	18 × 45	2180		

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

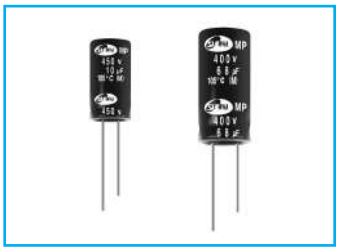
FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

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

MP

For Display, 15000 hours at 105˚C Series

Long Life



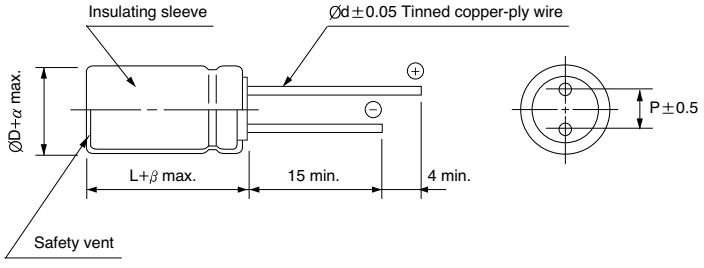
· High reliability withstanding 15000 hours load life at 105˚C
· For power supply and adapter
· Complied to the RoHS directive

MT ⇨ MP
Long life

Item	Characteristics
Operating temperature range	-40 ~ +105˚C
Leakage current max.	I = 0.04CV+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: 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
P	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.8	0.8
α	0.5			
β	2.0			

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

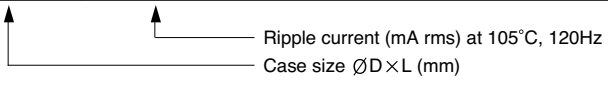
μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
10 ~ 82	1.00	1.75	2.25	2.35	2.50
100 ~ 470	1.00	1.67	2.05	2.15	2.25

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	12.5 × 20	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						



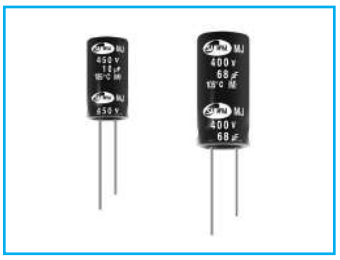
MJ

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

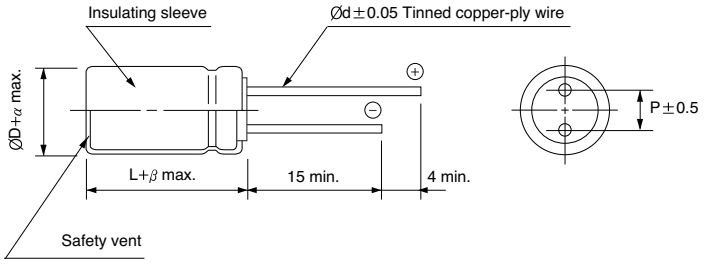
MP ⇨ MJ
Long life



Item	Characteristics
Operating temperature range	-40 ~ +105˚C (160 ~ 450WV), -25 ~ +105˚C (500WV)
Leakage current max.	I = 0.04CV + 100㎂ (after 1 minute) 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 ∅10) 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
α	0.5				1.0
β	2.0				3.0

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

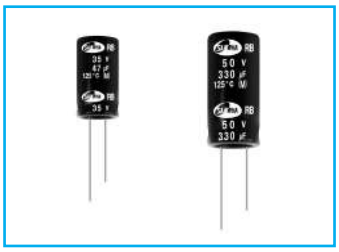
μF \ WV	160		200		250		350	
6.8					10 × 12.5	119	10 × 12.5	105
10					10 × 12.5	160	10 × 16	149
15			10 × 12.5	150	10 × 16	220	10 × 20	197
22	10 × 12.5	221	10 × 16	243	10 × 20	240	12.5 × 20	297
	10 × 16	243						
27	10 × 16	264	10 × 20	280	10 × 20	270	12.5 × 20	314
33	10 × 16	270	10 × 20	308	12.5 × 20	323	12.5 × 25	325
39	10 × 20	320	12.5 × 20	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	85			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 × 20	296	16 × 25	260
					12.5 × 25	296		
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	18 × 50	800
							22 × 41	800
120	18 × 40	1003	18 × 45	900	18 × 50	940	22 × 51	960
150	18 × 50	1192						

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

RB High Temperature, For 125˚C Use Series

Solvent Proof
WV≦100V

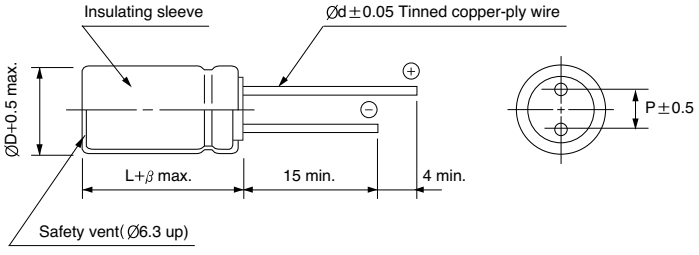


· Load life of 2000 hours at 125˚C
· For Electronic Control unit and other high temperature applications
· Complied to the RoHS directive

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	1 ~ 33	0.44	0.56	0.78	0.89	0.94	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	12.5×20	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	12.5×20	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				

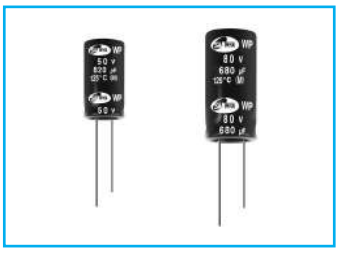
RB series

● 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
2.2			8×11.5	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
2.2	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		

WP 125°C, Low ESR, Long Life Series



- Downsize and long life
- Low ESR at -40°C
- Endurance with ripple current : 5000 hours at 125°C
- Complied to the RoHS directive

Item	Characteristics
Operating temperature range	-40 ~ +125°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 Voitafe(V)	35	50	80	100
tanδ	0.12	0.10	0.10	0.10

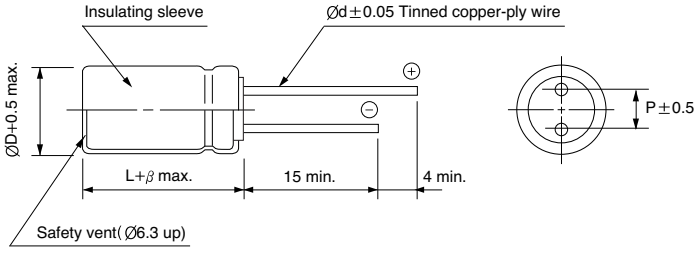
Low temperature characteristics (Impedance ratio at 120Hz)					
	WV	35	50	80	100
	Z-25°C/Z+20°C	2	2	2	2
	Z-40°C/Z+20°C	4	4	4	4

Load life (after application of the rated voltage for 5000 hours at 125°C)		
	Leakage current	Less than specified value
	Capacitance change	Within ±30% of initial value
	tanδ	Less than 300% of specified value

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	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

μF \ Frequency	120Hz	1kHz	10kHz	50kHz	100kHz≦
270 ~ 560	0.50	0.85	0.95	0.99	1.00
680 ~ 1800	0.60	0.90	0.95	0.99	1.00
2200 ~ 3300	0.75	0.90	0.95	0.99	1.00
4700 ~	0.85	0.95	0.98	0.99	1.00

WP series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

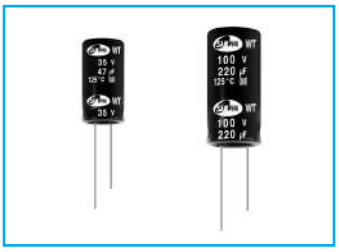
WV / Item / μF	35			50		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz
470				12.5 × 20	0.065	1500
560	10 × 20	0.070	1700	12.5 × 25	0.060	1700
680	12.5 × 20	0.044	1820	12.5 × 25	0.048	1900
				16 × 20	0.043	2040
820	12.5 × 25	0.042	2100	12.5 × 25	0.043	2150
				12.5 × 30	0.041	2150
1000	12.5 × 25	0.033	2400	16 × 25	0.031	2620
				18 × 20	0.039	2240
1200	12.5 × 30	0.029	2560	16 × 31.5	0.027	2940
	16 × 20	0.034	2280	18 × 25	0.029	2750
1500	18 × 20	0.032	2490	16 × 35.5	0.023	3300
1800	16 × 25	0.026	3100	18 × 31.5	0.026	3140
2200	16 × 31.5	0.023	3160	16 × 40	0.020	3720
	18 × 25	0.024	3200	18 × 35.5	0.022	3510
2700	16 × 35.5	0.020	3590	18 × 40	0.018	3940
	18 × 31.5	0.022	3390			
3300	16 × 40	0.017	4300			
	18 × 35.5	0.019	4200			
4700	18 × 40	0.016	4600			

WV / Item / μF	80			100		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz
270				18 × 20	0.091	1690
300				16 × 25	0.079	1990
330	12.5 × 30	0.085	1790	16 × 31.5	0.065	2200
	16 × 20	0.085	1790			
470	16 × 25	0.061	2140	16 × 35.5	0.056	2500
	12.5 × 30	0.10	2140			
	18 × 20	0.07	1910			
560	16 × 31.5	0.053	2330	16 × 40	0.046	2700
	18 × 25	0.049	2280			
680	16 × 25	0.045	2300	18 × 40	0.039	2880
	16 × 35.5	0.044	2580			
820	16 × 40	0.036	2900			
	18 × 35.5	0.035	2890			
1200	18 × 40	0.030	3210			

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

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

Low Impedance　Solvent Proof



- 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

RB ⇨ WT
Long life
Low Imp.

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)

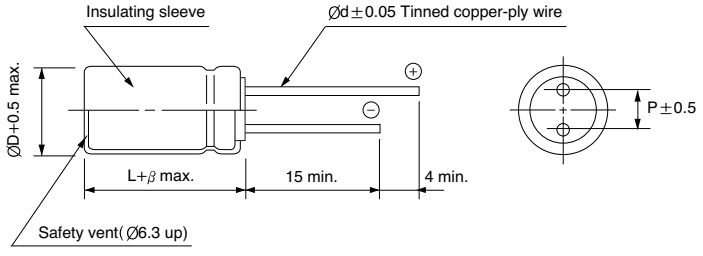
Capacitance change	Within ±30% of initial value
tanδ	Less than 300% of the specified value
Leakage current	Less than specified value

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

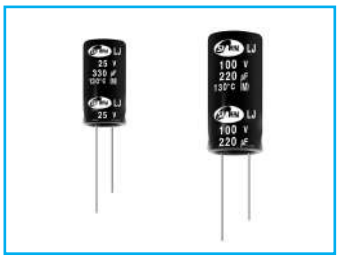
WV / Item / μF	6.3			10			16			25		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 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	12.5×20	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℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 125℃ 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	0.70	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	12.5×20	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						
680	12.5×25	0.05	1900	16×31.5	0.05	2430						

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)

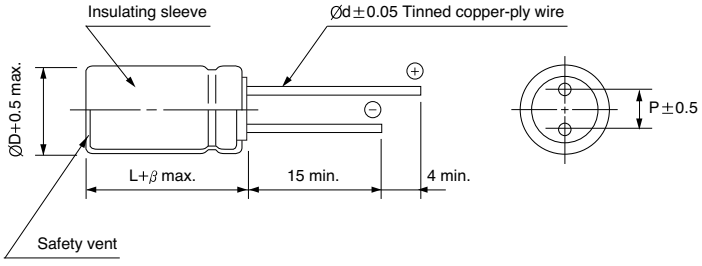
Rated voltage (Vdc)	10 ~ 100WV	200, 400WV
Capacitance change	Within ±30% of initial value	Within ±20% of initial value
tanδ	Within ±300% of initial value	Within ±200% of initial value
Leakage current	Less than specified value	

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	1.000	100
10													8×11.5	0.800	200
22													8×11.5	0.800	260
33													8×11.5	0.600	300
47													8×11.5	0.600	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	0.220	360	8×11.5	0.220	360	10×12.5	0.150	620	10×16	0.100	800	12.5×20	0.065	1000
470	10×12.5	0.150	620	10×12.5	0.150	620	10×16	0.100	800	10×20	0.073	960	12.5×25	0.051	1200
1000	10×20	0.070	960	10×20	0.070	960	12.5×20	0.060	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									

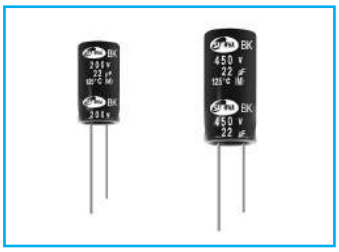
WV / Item / μF	63			100			200		400	
	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	IMP. (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	Ripple current (mA rms) 130℃ 100kHz	ØD×L (mm)	Ripple current (mA rms) 130℃ 100kHz
1.0									8×11.5	65
1.5									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	1.000	220	8×20	240		
							10×16	240		
33	8×11.5	0.500	250	10×12.5	0.670	260	10×20	320		
47	10×12.5	0.370	400	10×16	0.330	330				
100	10×16	0.300	450	12.5×20	0.170	670				
220	12.5×20	0.120	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

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

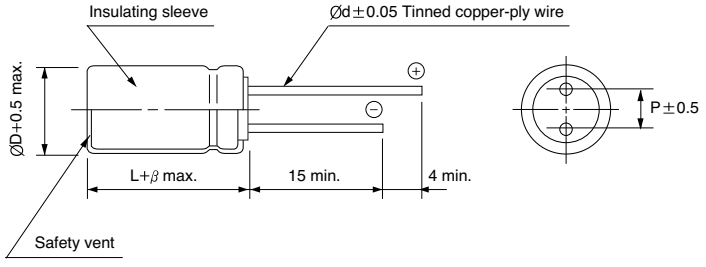
RH ⇨ BK
High Temp.



Item	Characteristics
Operating temperature range	-25 ~ +125˚C
Leakage current max.	I = 0.03CV+15μA (CV≦1000), I = 0.02CV+25μA (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 160 200 250 350 400 450 Z-25˚C/Z+20˚C 3 3 3 6 6 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	135	10 × 12.5	135		
3.3					10 × 12.5	135	10 × 16	180	10 × 16	150		
4.7	10 × 12.5	135	10 × 12.5	150	10 × 12.5	150	10 × 16	195	10 × 20	255	12.5 × 20	156
					10 × 16	180	10 × 20	255				
10	10 × 12.5	165	10 × 12.5	195	10 × 16	210	12.5 × 20	375	12.5 × 20	375	12.5 × 20	232
	10 × 16	210	10 × 16	240	10 × 20	255						
22	10 × 20	420	10 × 20	420	12.5 × 20	450					16 × 25	415
33	12.5 × 20	600	12.5 × 20	600	12.5 × 25	675					16 × 31.5	548
47	12.5 × 25	780	12.5 × 25	780								

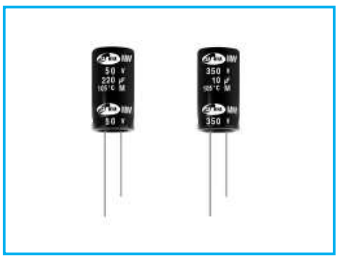
Ripple current (mA rms) at 125˚C, 100kHz
Case size ØD×L (mm)

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

MW High Ripple Current Series

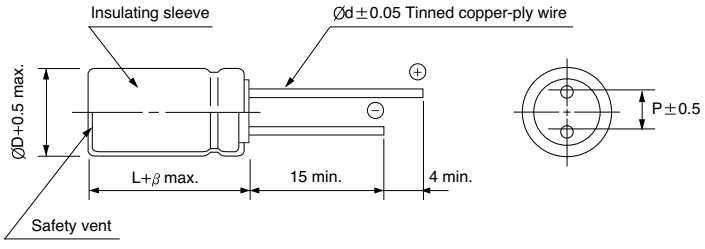
- Load life of 5000 hours at 105˚C
- Voltage range 25 ~ 500V
- Complied to the RoHS directive



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	1.0

Vdc	Cap.(μF)	ØD×L (mm)	Rated ripple current (mA rms / 105˚C)		
			120Hz	50kHz	100kHz
25	470	10×12.5	680	1987	2092
35	330		680	1862	1960
50	220		495	1568	1650
160	27		240	608	640
200	22		220	565	595
250	6.8		123	323	340
250	15		174	485	510
350	10		145	394	415
400	8.2		132	342	360
450	3.3		92	292	307
500	4.7		88	181	190

VP 135°C, Long Life, Low Impedance Series

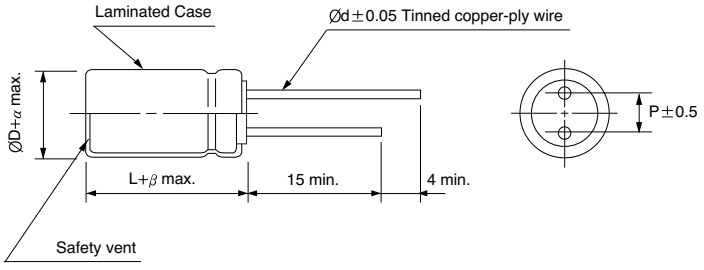
- Applied Laminated case series
- Suited for automobile applications
- Complied to the RoHS directive
- AEC-Q200 compliant. Please contact us for details

RB ⇨ VP
Long Life
High Temp.

Item	Characteristics
Operating temperature range	-40 ~ +135°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 Voitafe(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 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

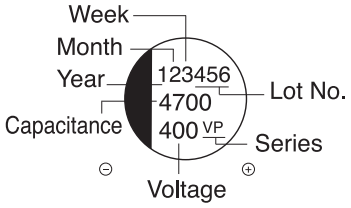
DRAWING

Unit : mm

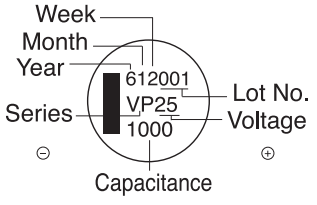


ØD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.8	0.8
α	0.5			
β	2.0			

(Ø10)



(Ø12.5≤)



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	0.98	0.99	1.00

VP series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	10			16		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 135℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 135℃ 100kHz
470	10 × 12.5	0.15	690	10 × 12.5	0.10	960
1000	10 × 20	0.07	1005	10 × 20	0.060	1150
2200	12.5 × 25	0.050	1280	12.5 × 25	0.060	1430
3300	12.5 × 30	0.050	1900	12.5 × 30	0.050	2300
4700	16 × 25	0.035	2200	16 × 25	0.035	2440
5600	18 × 25	0.030	3300	18 × 25	0.030	3660
6800	18 × 31.5	0.028	3600	18 × 31.5	0.028	4000

WV / Item / μF	25			35		
	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 135℃ 100kHz	ØD×L (mm)	Impedance (Ω)max. 20℃ 100kHz	Ripple current (mA rms) 135℃ 100kHz
220				10 × 12.5	0.15	620
330				10 × 16	0.10	800
470	10 × 20	0.10	1130	10 × 20	0.070	960
1000	12.5 × 25	0.060	1800	12.5 × 30	0.040	1430
1500	12.5 × 30	0.055	2000	16 × 25	0.038	2100
2200	12.5 × 30	0.050	2300	18 × 25	0.035	2500
	16 × 25	0.050	2200			
3300	18 × 25	0.045	3300	18 × 25	0.032	2700
				18 × 31.5	0.032	3800
3900	18 × 25	0.040	3400	18 × 25	0.032	2900
	18 × 31.5	0.040	3600	18 × 35.5	0.032	3900
4700	16 × 25	0.035	2870			
	18 × 31.5	0.040	3600			

VQ 150˚C, High Temperature Range Series

· Applied Laminated case series
· Suited for automobile applications
· Complied to the RoHS directive
· AEC-Q200 compliant. Please contact us for details

VP ⇨ VQ
High Temp.

Item	Characteristics
Operating temperature range	-40 ~ +150˚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 Voitafe(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

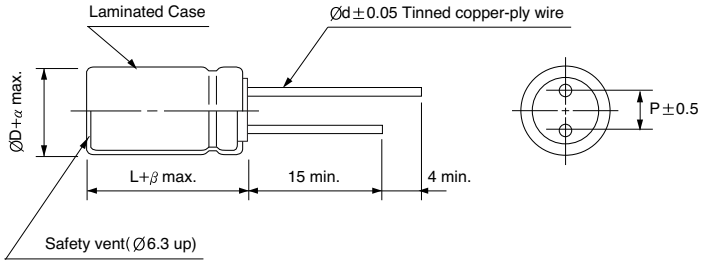
Load life (after application of the rated voltage for 1000 hours at 150˚C)

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

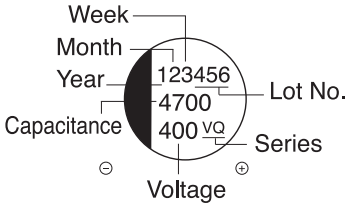
DRAWING

Unit : mm

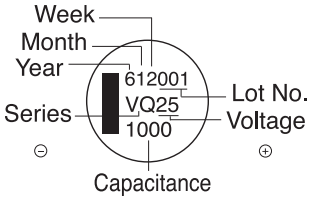


ØD	10	12.5	16	18
P	5.0	5.0	7.5	7.5
Ød	0.6	0.6	0.8	0.8
α	0.5			
β	2.0			

(Ø10)



(Ø12.5)



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

VQ series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV / Item / μF	10		16		25		35	
	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz
82							10 × 12.5	620
100							10 × 16	660
220					10 × 16	660	12.5 × 20	700
330			10 × 16	660	12.5 × 20	760	12.5 × 25	840
470	10 × 12.5	660	10 × 20	760	12.5 × 25	840	12.5 × 30	1000
							16 × 25	1000
1000	10 × 20	760	12.5 × 25	840	16 × 25	1100	18 × 31.5	1700
2200	12.5 × 25	840	16 × 25	1100	18 × 31.5	1700		
3300	16 × 25	1100	18 × 31.5	1700				
4700	18 × 25	1700						
5600	18 × 31.5	1900						

WV / Item / μF	50		63		80		100	
	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz	ØD×L(mm)	Ripple current (mA rms) 150°C,100kHz
33							10 × 12.5	260
47					10 × 12.5	260	10 × 16	330
56			10 × 12.5	450	10 × 16	330	10 × 16	390
68			10 × 16	650	10 × 16	390	10 × 20	465
100	10 × 16	700	10 × 20	820	10 × 20	465	12.5 × 20	670
220	12.5 × 20	890	12.5 × 25	1000	12.5 × 25	670	12.5 × 30	1100
330	12.5 × 25	1000	12.5 × 30	1300			18 × 31.5	1500
470	12.5 × 30	1200	16 × 25	1500	18 × 25	1600	18 × 31.5	1750
560	16 × 25	1300	18 × 25	1650	18 × 31.5	1700		
680			18 × 31.5	1850	18 × 31.5	1900		

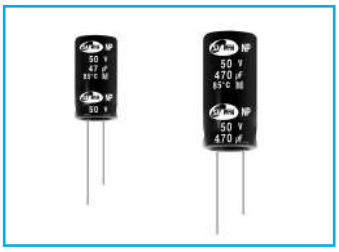
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

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

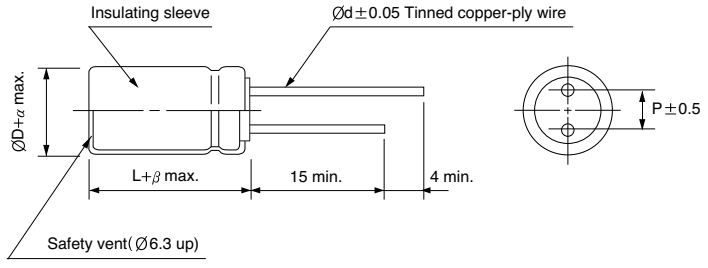
Load life (after application of the rated voltage for 2000 hours at 85˚C)

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
α	0.5							1.0
β	1.5			2.0				3.0

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

NP series

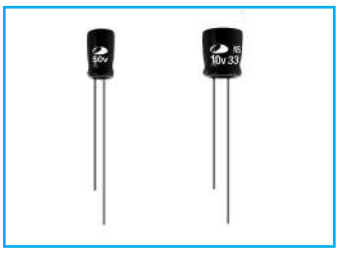
● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

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										

MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

NS Non-Polarized, Height 7mmL Series

Non-polarized Solvent Proof



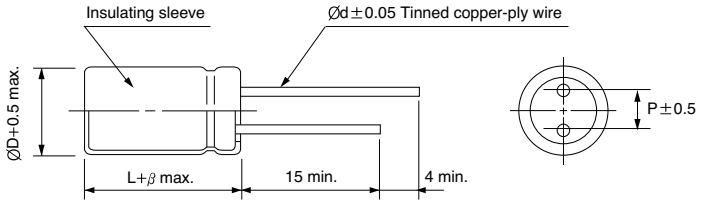
- Non-polarized series with 7mmL height
- Load life of 2000 hours at 85˚C
- Complied to the RoHS directive

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

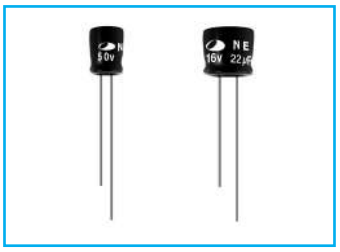
Frequency	50Hz	120Hz	1kHz	10kHz≦
Coefficient	0.75	1.00	1.55	2.00

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

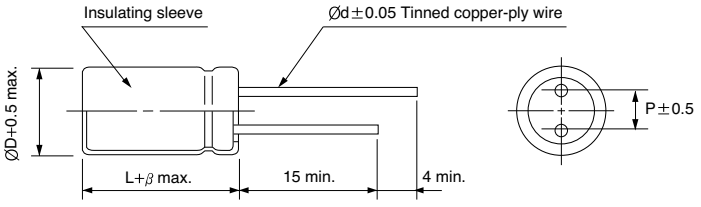
SE ⇨ NE
Non-polar



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

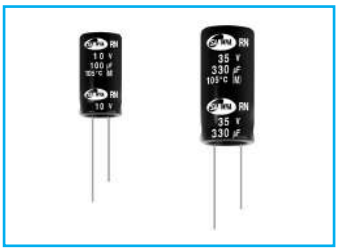
MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

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

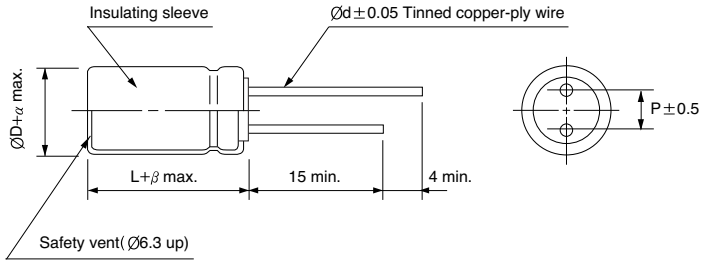
Load life (after application of the rated voltage for 1000 hours at 105˚C)

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
α	0.5							1.0
β	1.5			2.0				3.0

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	
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								