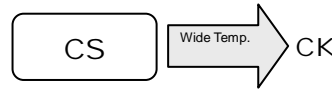


STANDARD

- Operating with general temperature range -40 ~ +85°C
- Load life of 2000 hours

- Comply with the RoHS directive

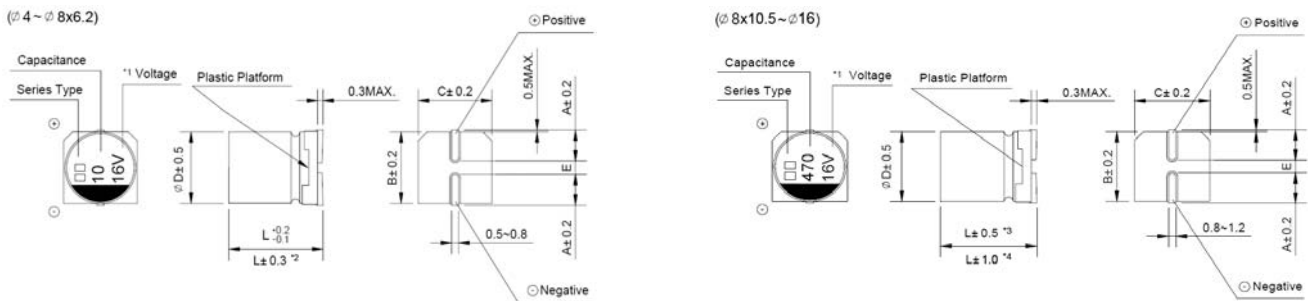
RoHS



SPECIFICATIONS

Items	Characteristics																																															
Operation Temperature Range	-40 ~ +85°C																																															
Voltage Range	4 ~ 100V																																															
Capacitance Range	0.1 ~ 6800μF																																															
Capacitance Tolerance	±20% at 120Hz, 20°C																																															
Leakage Current	Leakage current (∅4~∅10) ≦ 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (∅12.5~∅16) ≦ 0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage)																																															
Dissipation Factor (tan δ)	Measurement frequency : 120Hz, Temperature : 20°C <table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">tan δ (max.)</td> <td>∅4~∅10</td> <td>0.35</td> <td>0.26</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.12</td> <td>0.10</td> <td>0.10</td> </tr> <tr> <td>∅12.5~∅16</td> <td>0.42</td> <td>0.38</td> <td>0.34</td> <td>0.30</td> <td>0.26</td> <td>0.22</td> <td>0.18</td> <td>0.14</td> <td>0.10</td> </tr> </tbody> </table>	Rated Voltage (V)	4	6.3	10	16	25	35	50	63	100	tan δ (max.)	∅4~∅10	0.35	0.26	0.20	0.16	0.14	0.12	0.12	0.10	0.10	∅12.5~∅16	0.42	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10																
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Stability at Low Temperature	Measurement frequency : 120Hz <table border="1"> <thead> <tr> <th colspan="2">Rated Voltage (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td>∅4~∅10</td> <td>Z(-25°C) / Z(20°C)</td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td></td> <td>Z(-40°C) / Z(20°C)</td> <td>15</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td rowspan="2">ZT/Z20 (max.)</td> <td rowspan="2">∅12.5~∅16</td> <td>Z(-25°C) / Z(20°C)</td> <td>7</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>17</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> </tr> </tbody> </table>	Rated Voltage (V)		4	6.3	10	16	25	35	50	100	Impedance Ratio	∅4~∅10	Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2		Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3	ZT/Z20 (max.)	∅12.5~∅16	Z(-25°C) / Z(20°C)	7	5	4	3	2	2	2	Z(-40°C) / Z(20°C)	17	12	10	8	5	4	3
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Load Life	After 2000 hours application of the rated voltage at 85°C, they meet the characteristics listed below. <table border="1"> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value (Within ±30% of initial value for 4V)</td> </tr> <tr> <td>Dissipation Factor</td> <td>200% or less of initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>initial specified value or less</td> </tr> </table>	Capacitance Change	Within ±20% of initial value (Within ±30% of initial value for 4V)	Dissipation Factor	200% or less of initial specified value	Leakage Current	initial specified value or less																																									
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Shelf Life	After leaving capacitors under no load at 85°C for 1000 hours, they meet the specified value for load life characteristics listed above.																																															
Resistance to Soldering Heat	After reflow soldering and restored at room temperature, they meet the characteristics listed below. <table border="1"> <tr> <td>Capacitance Change</td> <td>Within ±10% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>initial specified value or less</td> </tr> <tr> <td>Leakage Current</td> <td>initial specified value or less</td> </tr> </table>	Capacitance Change	Within ±10% of initial value	Dissipation Factor	initial specified value or less	Leakage Current	initial specified value or less																																									
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Marking	Black print on the case top.																																															

DRAWING (Unit: mm)



*1. Voltage mark for 6.3V is [6V]

*2. Applicable to ∅6.3x7.7

*3. Applicable to ∅8x10.5~∅10

*4. Applicable to ∅12.5~∅16

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□ DIMENSIONS (Unit: mm)

∅D x L	4 x 5.4	5 x 5.4	6.3 x 5.4	6.3 x 7.7	8 x 6.2	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E ± 0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.4	5.4	5.4	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF	WV Code	4		6.3		10		16		25	
		0G		0J		1A		1C		1E	
4.7	4R7									4 x 5.4	19
10	100							4 x 5.4	25	5 x 5.4 (4 x 5.4)	28 (20)
15	150							4 x 5.4	28	5 x 5.4	34
22	220			4 x 5.4	31	5 x 5.4 (4 x 5.4)	35 (28)	5 x 5.4 (4 x 5.4)	39 (28)	6.3 x 5.4 (5 x 5.4)	52 (35)
33	330	4 x 5.4	26	5 x 5.4 (4 x 5.4)	39 (31)	5 x 5.4 (4 x 5.4)	43 (32)	6.3 x 5.4 (5 x 5.4)	57 (40)	6.3 x 5.4 (5 x 5.4)	63 (42)
47	470	4 x 5.4	34	5 x 5.4 (4 x 5.4)	47 (36)	6.3 x 5.4 (5 x 5.4)	59 (43)	6.3 x 5.4 (5 x 5.4)	68 (44)	6.3 x 5.4	68
56	560	4 x 5.4	39	5 x 5.4	46	6.3 x 5.4	57	6.3 x 5.4	74	6.3 x 5.4	82
68	680	5 x 5.4	45	6.3 x 5.4 (5 x 5.4)	62 (52)	6.3 x 5.4	72	6.3 x 5.4	80	6.3 x 5.4	94
100	101	5 x 5.4	61	6.3 x 5.4 (5 x 5.4)	71 (55)	6.3 x 5.4	76	6.3 x 5.4 (8 x 6.2)	86 (200)	6.3 x 7.7 (8 x 6.2)	130 (91)
150	151	6.3 x 5.4	74	6.3 x 5.4	78	6.3 x 5.4	88	6.3 x 7.7	135	8 x 10.5 (6.3 x 7.7)	200 (130)
220	221	6.3 x 5.4	82	6.3 x 5.4	95	6.3 x 7.7 (8 x 6.2)	150 (250)	8 x 10.5 (6.3 x 7.7) (8 x 6.2)	215 (150) (135)	8 x 10.5	250
330	331	6.3 x 7.7	150	6.3 x 7.7 (8 x 6.2)	150 (300)	8 x 10.5	280	8 x 10.5	280	10 x 10.5 (8 x 10.5)	340 (310)
470	471	6.3 x 7.7	150	8 x 10.5 (6.3 x 7.7)	300 (150)	10 x 10.5 (8 x 10.5)	320 (300)	10 x 10.5 (8 x 10.5)	420 (330)	10 x 10.5	400
680	681	8 x 10.5	300	8 x 10.5	300	10 x 10.5	380	10 x 10.5	450	10 x 13.5	550
1000	102	8 x 10.5	330	10 x 10.5 (8 x 10.5)	430 (330)	10 x 10.5	450	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	710 (550) (490)	12.5 x 13.5	820
1500	152	10 x 10.5	450	10 x 13.5 (10 x 10.5)	650 (450)	10 x 13.5	650	12.5 x 13.5	750	12.5 x 16	1000
2200	222	10 x 13.5 (10 x 10.5)	620 (480)	12.5 x 13.5 (10 x 13.5)	890 (720)	12.5 x 13.5	960	16 x 16.5 (12.5 x 16)	1150 (1000)	16 x 16.5	1250
3300	332	10 x 13.5	700	12.5 x 16 (12.5 x 13.5)	1000 (900)	16 x 16.5 (12.5 x 16)	1300 (1050)	16 x 16.5	1350		
4700	472	12.5 x 13.5	850	16 x 16.5	1400	16 x 16.5	1450			Case size	Ripple current
6800	682	16 x 16.5 (12.5 x 16)	1350 (900)								

μF	WV Code	35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			4 x 5.4	1.0	4 x 5.4	1.0		
0.22	R22			4 x 5.4	2.3	4 x 5.4	2.3		
0.33	R33			4 x 5.4	3.5	4 x 5.4	3.5		
0.47	R47			4 x 5.4	5.0	4 x 5.4	5.0		
1	010			4 x 5.4	10	4 x 5.4	10	4 x 5.4	10
1.5	1R5			4 x 5.4	12	4 x 5.4	12	6.3 x 5.4	15
2.2	2R2			4 x 5.4	15	4 x 5.4	15	6.3 x 5.4	20
3.3	3R3	4 x 5.4	18	4 x 5.4	18	5 x 5.4	20	6.3 x 7.7 (6.3 x 5.4) (8 x 6.2)	45 (28) (50)
4.7	4R7	4 x 5.4	20	5 x 5.4 (4 x 5.4)	23 (19)	6.3 x 5.4 (5 x 5.4)	30 (23)	6.3 x 7.7 (6.3 x 5.4) (8 x 6.2)	50 (30) (50)
10	100	5 x 5.4 (4 x 5.4)	30 (20)	6.3 x 5.4 (5 x 5.4)	34 (27)	6.3 x 7.7 (6.3 x 5.4)	55 (34)	8 x 10.5 (6.3 x 7.7) (8 x 6.2)	110 (50) (50)
22	220	6.3 x 5.4	54	6.3 x 5.4 (8 x 6.2)	60 (120)	8 x 10.5 (6.3 x 7.7) (8 x 6.2)	140 (70) (35)	10 x 10.5 (8 x 10.5)	180 (120)
33	330	6.3 x 5.4 (8 x 6.2)	60 (130)	6.3 x 7.7 (8 x 6.2)	85 (65)	8 x 10.5 (6.3 x 7.7)	160 (85)	10 x 10.5	190
47	470	6.3 x 5.4 (8 x 6.2)	70 (165)	10 x 10.5 (8 x 10.5) (6.3 x 7.7)	130 (110) (90)	10 x 10.5 (8 x 10.5)	230 (170)	Case size	Ripple current

*Case size ∅DxL(mm), ripple current (mA rms) at 85°C 120Hz

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□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV		35		50		63		100	
μF	Code	1V		1H		1J		2A	
56	560	6.3 × 7.7	80	6.3 × 7.7	110	10 × 10.5	250		
68	680	6.3 × 7.7	110	8 × 10.5	170	10 × 10.5	260		
100	101	8 × 10.5 (6.3 × 7.7)	175 (120)	10 × 10.5 (8 × 10.5)	240 (200)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	380 (290) (280)	12.5 × 13.5	440
150	151	8 × 10.5	220	10 × 10.5	240	10 × 13.5	310		
220	221	10 × 10.5 (8 × 10.5)	310 (270)	10 × 13.5 (10 × 10.5)	400 (320)	12.5 × 13.5 (10 × 13.5)	580 (330)	16 × 16.5	700
330	331	10 × 10.5	350	12.5 × 13.5 (10 × 13.5)	600 (420)	16 × 16.5 (12.5 × 16)	820 (720)		
470	471	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	600 (530) (400)	16 × 16.5 (12.5 × 16)	850 (740)	16 × 16.5	950		
680	681	12.5 × 13.5 (10 × 13.5)	750 (560)	16 × 16.5	950			Case size	Ripple current
1000	102	16 × 16.5 (12.5 × 16)	1100 (800)						

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 85°C 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

Frequency		50Hz	120Hz	300Hz	1KHz	10KHz~	
Coefficient	Ø4 ~ Ø10	0.1 ~ 68μF	0.70	1.00	1.17	1.36	1.50
		100 ~ 3300μF	0.85	1.00	1.08	1.20	1.30
	Ø12.5 ~ Ø16	~ 68μF	0.75	1.00	1.35	1.57	2.00
		100 ~ 680μF	0.80	1.00	1.23	1.34	1.50
		1000 ~ 6800μF	0.85	1.00	1.10	1.13	1.15

- Taping specifications are given in page 11.
- Please refer to page 12 for the minimum package quantity.

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