

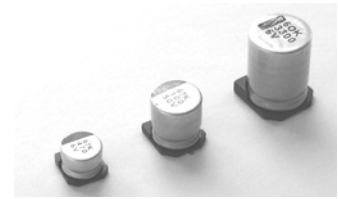


CLK SERIES

Chip type, For surface mounting

3000~5000 Hours Load Life

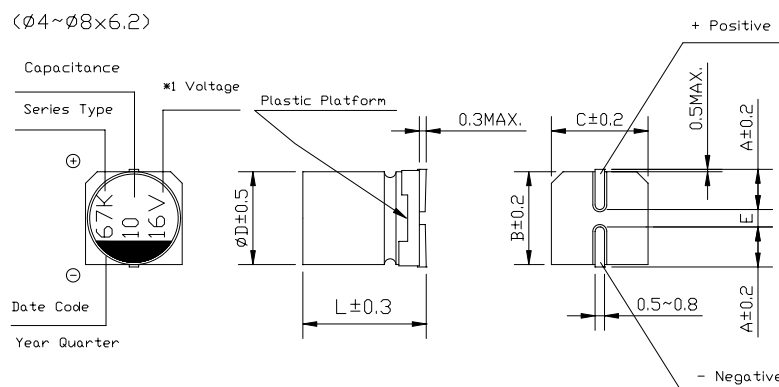
- Load life of 3000~5000 hours with temperature up to +105°C.
- Lead-free reflow soldering is available subject to customers' request.



◆ Specifications

Items	Performance Characteristics																																														
Operating Temperature Range	-55~+105°C																																														
Voltage Range	6.3~100V																																														
Capacitance Range	0.1~3300 μ F																																														
Capacitance Tolerance	±20% at 120 Hz, 20°C																																														
Leakage Current	For φ4~φ10, after 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3(μ A), whichever is greater. For φ12.5~φ16, after 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4(μ A), whichever is greater.																																														
Tan δ	Measurement frequency: 120Hz, Temperature: 20°C <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">Rated voltage (V.DC)</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>φ4~φ10</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.13</td> <td>0.12</td> <td>0.12</td> <td>0.12</td> </tr> <tr> <td>φ12.5~φ16</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>0.18</td> <td>0.18</td> </tr> </tbody> </table>	Rated voltage (V.DC)		6.3	10	16	25	35	50	63	100	Tan δ (max)	φ4~φ10	0.28	0.24	0.20	0.16	0.13	0.12	0.12	0.12	φ12.5~φ16	0.38	0.34	0.30	0.26	0.22	0.18	0.18	0.18																	
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Stability at Low Temperature	Measurement frequency: 120Hz <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">Rated voltage (V.DC)</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">Impedance ratio</td> <td rowspan="2">φ4~φ10</td> <td>Z(-25°C)/Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-55°C)/Z(20°C)</td> <td>10</td> <td>7</td> <td>5</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td rowspan="2">ZT/Z20 (max)</td> <td rowspan="2">φ12.5~φ16</td> <td>Z(-25°C)/Z(20°C)</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-55°C)/Z(20°C)</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	Rated voltage (V.DC)		6.3	10	16	25	35	50	63	100	Impedance ratio	φ4~φ10	Z(-25°C)/Z(20°C)	4	3	2	2	2	2	2	Z(-55°C)/Z(20°C)	10	7	5	3	3	3	3	ZT/Z20 (max)	φ12.5~φ16	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	2	Z(-55°C)/Z(20°C)	12	10	8	5	4	3	3
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Impedance ratio	φ4~φ10	Z(-25°C)/Z(20°C)	4	3	2	2	2	2	2																																						
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ZT/Z20 (max)	φ12.5~φ16	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	2																																						
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Load Life	After 5000 hours' (3000 hours' for φ4~φ6.3 and φ8×6.2) application of rated voltage at 105°C, capacitors meet the characteristics requirements listed at right <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Capacitance Change</td> <td>Within ±30% of the initial value</td> </tr> <tr> <td>Tan δ</td> <td>300% or less of the initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Initial specified value or less</td> </tr> </table>	Capacitance Change	Within ±30% of the initial value	Tan δ	300% or less of the initial specified value	Leakage Current	Initial specified value or less																																								
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Shelf Life	After leaving capacitors under no load at 105°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 requirements listed at right. <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Capacitance Change</td> <td>Within ±10% of the initial value</td> </tr> <tr> <td>Tan δ</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 the initial value	Tan δ	Initial specified value or less	Leakage Current	Initial specified value or less																																								
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Applicable Standards	JIS C-5141 and JIS C-5102																																														

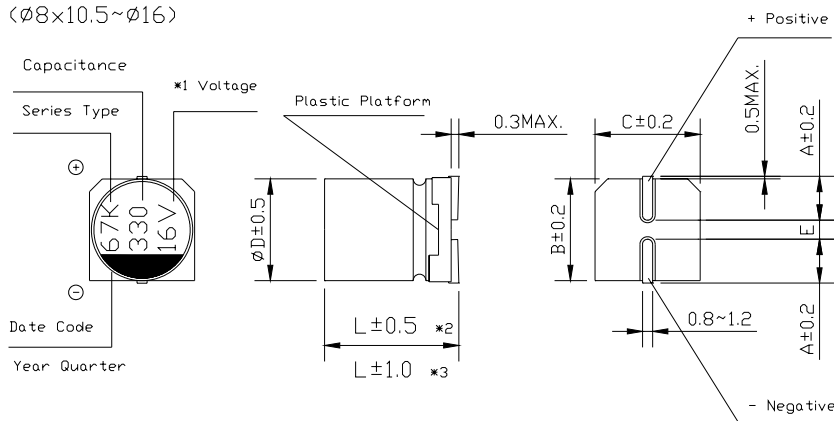
◆ Dimensions & Marking





CLK SERIES

Chip type, For surface mounting



*1 Voltage mark [6V] represents 6.3V for $\phi 4 \sim \phi 10$; *2 $[L \pm 0.5]$ is applicable to $\phi 8 \times 10.5 \sim \phi 10$; *3 $[L \pm 1.0]$ is applicable to $\phi 12.5 \sim \phi 16$.
 Re: Date code and series type — 1st digit for Year; 2nd digit for Quarter, 4 quarter codes in one year are 1, 4, 7, 0; 3rd character for Series; KL Series = K.

		(mm)									
D×L	$\phi 4 \times 5.8$	$\phi 5 \times 5.8$	$\phi 6.3 \times 5.8$	$\phi 6.3 \times 7.7$	$\phi 8 \times 6.2$	$\phi 8 \times 10.5$	$\phi 10 \times 10.5$	$\phi 10 \times 13.5$	$\phi 12.5 \times 13.5$	$\phi 12.5 \times 16$	$\phi 16 \times 16.5$
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	5.8	5.8	5.8	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

◆ Standard size & Maximum permissible ripple current

WV Cap. (μF)		6.3		10		16		25	
		0J		1A		1C		1E	
10	100					4×5.8	18	5×5.8	27
22	220	4×5.8	22	5×5.8	30	5×5.8	30	6.3×5.8	44
33	330	5×5.8	35	5×5.8	36	6.3×5.8	48	6.3×5.8	50
47	470	5×5.8	38	6.3×5.8	50	6.3×5.8	50	6.3×7.7 (8×6.2)	63
100	101	6.3×5.8	69	6.3×7.7 (8×6.2)	81	6.3×7.7 (8×6.2)	81	8×10.5	116
150	151	6.3×7.7 (8×6.2)	85	8×10.5	125	8×10.5	125	10×10.5	320
220	221	6.3×7.7 (8×6.2)	120	8×10.5	141	10×10.5	216	10×10.5	320
330	331	8×10.5	290	10×10.5	290	10×10.5	290	10×10.5	320
470	471	10×10.5	320	10×10.5	320	10×10.5	320	12.5×13.5 (10×13.5)	400 (350)
680	681	10×10.5	320	10×10.5	320	10×13.5	420	12.5×13.5	415
1000	102	10×10.5	410	10×13.5	390	12.5×13.5	550	12.5×13.5	460
1500	152	10×13.5	450	12.5×13.5	480	12.5×13.5	650	12.5×16	700
2200	222	12.5×13.5	680	12.5×16 (12.5×13.5)	750 (510)	16×16.5	800		
3300	332	12.5×16 (12.5×13.5)	850 (800)	16×16.5	800			Case Size	Ripple Current

Ripple Current (mA rms) at 105°C 120Hz



CLK SERIES

Chip type, For surface mounting

◆ Standard size & Maximum permissible ripple current

WV Cap. (μF)		35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			4×5.8	1.0				
0.22	R22			4×5.8	2.6				
0.33	R33			4×5.8	3.2				
0.47	R47			4×5.8	5				
1	010			4×5.8	8				
2.2	2R2			4×5.8	12				
3.3	3R3			4×5.8	17			6.3×7.7 (8×6.2)	30
4.7	4R7	4×5.8	16	5×5.8	22			8×10.5	50
10	100	5×5.8	27	6.3×5.8	32	6.3×7.7 (8×6.2)	45	8×10.5	55
22	220	6.3×5.8	44	6.3×7.7 (8×6.2)	58	8×10.5	65	10×10.5	70
33	330	6.3×7.7 (8×6.2)	57	8×10.5	140	10×10.5	80	10×10.5	80
47	470	8×10.5	92	10×10.5	310	10×10.5	90	12.5×13.5 (10×13.5)	250 (150)
68	680							12.5×13.5	300
100	101	10×10.5	151	10×10.5	310	10×13.5	150	16×16.5 (12.5×16) (12.5×13.5)	600 (420) (380)
150	151	10×10.5	290	10×10.5	310				
220	221	10×10.5	375	12.5×13.5 (10×13.5)	340 (320)	12.5×13.5	470		
330	331	12.5×13.5 (10×13.5)	380 (375)	12.5×16 (12.5×13.5)	600 (500)	16×16.5 (12.5×16)	650 (550)		
470	471	12.5×13.5	520	16×16.5	700				
680	681	12.5×13.5	550						
1000	102	16×16.5 (12.5×16)	750 (600)					Case Size	Ripple Current

Ripple Current (mA rms) at 105°C 120Hz

◆ Frequency Correction Factor of Rated Ripple Current

Frequency Capacitance (μF)		50Hz	120Hz	300Hz	1kHz	10kHz~
		Φ4~Φ10		0.70	1.00	1.17
Φ12.5~Φ16	~68	0.75	1.00	1.35	1.57	2.00
	100~470	0.80	1.00	1.23	1.34	1.50
	680~3300	0.85	1.00	1.10	1.13	1.15

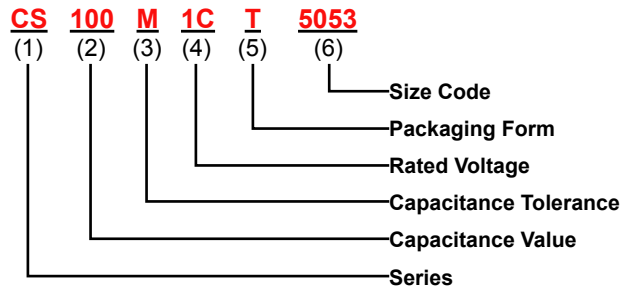
ORDERING INFORMATION (SMD)



Daewoo Components Corp.

Surface Mount Part Numbering System Example:

CS = SMD Series, **100** = 10 μ F, **M** =20% Tolerance, **1C** = W.V = 16 Volts, **TR** = Tape & Reel, **5053** = Case size (Dia x H) = 5.0 x 5.3mm



(1) Series

See quick guide on website.
 Surface mount (CS, CU, CZ, CZH, CN, CK)
 Example: CS = 2000hrs @ 85°C
 CU = 1000hrs @ 105°C

(5) Packaging Form Code

Surface Mount	T	Tape & Reel for Surface Mount
	XX	Tape & Reel SMD 13" Reels (330mm)

(2) Capacitance Value Code

Capacitance expressed in micro Farads (μ F)
 First two digits are significant figures
 Third digit denotes the number of zeros
 Use R for decimal point for values less than 10 μ F

Examples:

CODE	Capacitance
R10	0.1 μ F
R68	0.68 μ F
1R0	1.0 μ F
100	10 μ F
680	68 μ F
471	470 μ F
102	1000 μ F
103	10000 μ F

(6) Size Code

Size Code	Dimensions (mm)	
	Diameter	Length
3054	3.0	5.4
4053	4.0	5.3
4055	4.0	5.5
5053	5.0	5.3
5055	5.0	5.5
6353	6.3	5.3
6355	6.3	5.5
6357	6.3	5.7
6377	6.3	7.7
8069	8.0	6.3
8010	8.0	10.0
1010	10.0	10.0
1213	12.5	13.5
1216	12.5	16.0

(3) Capacitance Tolerance Code

CODE	Cap. Tol.
M	\pm 20%

(4) Rated Voltage Code

CODE	Voltage	CODE	Voltage
	4.0V	2A	100V
0J	6.3V	2C	160V
1A	10V	2D	200V
1C	16V	2E	250V
1E	25V	2V	350V
1V	35V	2G	400V
1H	50V	2W	450V