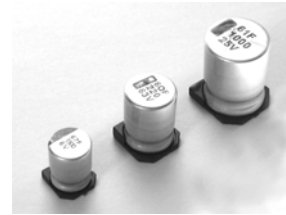


# CZF SERIES

Chip type, For surface mounting

## Long Life with Extra Lower Impedance

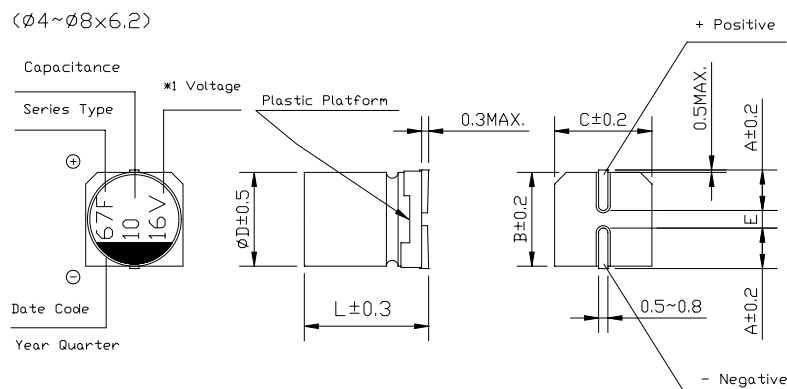
- Extra low impedance with temperature range -55°C to +105°C and load life of 2000~5000 hours.
- Impedance 5~25% less than CXZ series.
- Lead-free reflow soldering is available subject to customers' request.



## ◆ Specifications

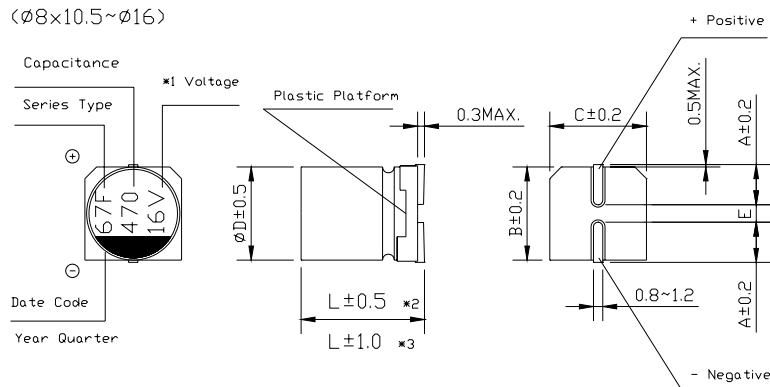
Items	Performance Characteristics																																											
Operating Temperature Range	-55~+105°C																																											
Voltage Range	6.3~100V																																											
Capacitance Range	3.3~4700 μF																																											
Capacitance 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(μA), 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(μA), 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>80</th> <th>100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Tan δ (max)</td> <td>φ4~φ10</td> <td>0.26</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.08</td> <td>0.07</td> </tr> <tr> <td>φ12.5~φ16</td> <td>0.26</td> <td>0.22</td> <td>0.18</td> <td>0.16</td> <td>0.14</td> <td>0.10</td> <td>0.08</td> <td>0.08</td> <td>0.07</td> </tr> </tbody> </table>	Rated voltage (V.DC)		6.3	10	16	25	35	50	63	80	100	Tan δ (max)	φ4~φ10	0.26	0.19	0.16	0.14	0.12	0.10	0.08	0.08	0.07	φ12.5~φ16	0.26	0.22	0.18	0.16	0.14	0.10	0.08	0.08	0.07											
Rated voltage (V.DC)		6.3	10	16	25	35	50	63	80	100																																		
Tan δ (max)	φ4~φ10	0.26	0.19	0.16	0.14	0.12	0.10	0.08	0.08	0.07																																		
	φ12.5~φ16	0.26	0.22	0.18	0.16	0.14	0.10	0.08	0.08	0.07																																		
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>80</th> <th>100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance ratio</td> <td>Z(-25°C)/Z(20°C)</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C)/Z(20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td rowspan="2">ZT/Z20 (max)</td> <td>Z(-55°C)/Z(20°C)</td> <td>4</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	Rated voltage (V.DC)		6.3	10	16	25	35	50	63	80	100	Impedance ratio	Z(-25°C)/Z(20°C)	2	2	2	2	2	2	2	2	2	Z(-40°C)/Z(20°C)	3	3	3	3	3	3	3	3	3	ZT/Z20 (max)	Z(-55°C)/Z(20°C)	4	4	4	3	3	3	3	3	3
Rated voltage (V.DC)		6.3	10	16	25	35	50	63	80	100																																		
Impedance ratio	Z(-25°C)/Z(20°C)	2	2	2	2	2	2	2	2	2																																		
	Z(-40°C)/Z(20°C)	3	3	3	3	3	3	3	3	3																																		
ZT/Z20 (max)	Z(-55°C)/Z(20°C)	4	4	4	3	3	3	3	3	3																																		
	Load Life	After 5000 hours' (2000 hours' for φ4~φ6.3 and φ8×6.2, 3000 hours' for φ8×10.5~φ10×13.5) application of rated voltage at 105°C, capacitors meet the characteristics requirements listed at right . <table border="1" style="width: 100%; text-align: center;"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±30% of the initial value</td> </tr> <tr> <td>Tan δ</td> <td>200% or less of the initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Initial specified value or less</td> </tr> </tbody> </table>	Capacitance Change	Within ±30% of the initial value	Tan δ	200% or less of the initial specified value	Leakage Current	Initial specified value or less																																				
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Tan δ	200% or less of the initial specified value																																											
Leakage Current	Initial specified value or less																																											
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;"> <tbody> <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> </tbody> </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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Leakage Current	Initial specified value or less																																											
Applicable Standards	JIS C-5141 and JIS C-5102																																											

## ◆ Dimensions & Marking



**CZF 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 — 1<sup>st</sup> digit for Year; 2<sup>nd</sup> digit for Quarter, 4 quarter codes in one year are 1, 4, 7, 0; 3<sup>rd</sup> character for Series; FZ Series = F.

(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 & Impedance

WV		6.3			10			16		
Cap. (μF)		0J			1A			1C		
10	100							4×5.8	1.35	90
15	150							4×5.8	1.35	90
22	220	4×5.8	1.35	90	4×5.8	1.35	90	5×5.8 (4×5.8)	0.70 (1.35)	160 (90)
33	330	5×5.8 (4×5.8)	0.70 (1.35)	160 (90)	5×5.8 (4×5.8)	0.70 (1.35)	160 (90)	6.3×5.8 (5×5.8)	0.36 (0.70)	240 (160)
47	470	5×5.8 (4×5.8)	0.70 (1.35)	160 (90)	6.3×5.8 (5×5.8)	0.36 (0.70)	240 (160)	6.3×5.8 (5×5.8)	0.36 (0.70)	240 (160)
56	560	5×5.8	0.70	160	6.3×5.8	0.36	240	6.3×5.8	0.36	240
68	680	6.3×5.8 (5×5.8)	0.36 (0.70)	240 (160)	6.3×5.8	0.36	240	6.3×7.7 (6.3×5.8)	0.26 (0.36)	300 (240)
100	101	6.3×5.8 (5×5.8)	0.36 (0.70)	240 (160)	6.3×7.7 (6.3×5.8)	0.26 (0.36)	300 (240)	6.3×7.7 (6.3×5.8)	0.26 (0.36)	300 (240)
150	151	6.3×5.8	0.36	240	6.3×7.7	0.26	300	6.3×7.7	0.26	300
220	221	6.3×7.7 (6.3×5.8) (8×6.2)	0.26 (0.36) (0.26)	300 (240) (300)	6.3×7.7 (8×6.2)	0.26 (0.26)	300 (300)	8×10.5 (6.3×7.7)	0.16 (0.26)	600 (300)
330	331	6.3×7.7 (8×6.2)	0.26	300	10×10.5 (8×10.5)	0.08 (0.16)	850 (600)	10×10.5 (8×10.5)	0.08 (0.16)	850 (600)
470	471	8×10.5	0.16	600	10×10.5 (8×10.5)	0.08 (0.16)	850 (600)	10×10.5 (8×10.5)	0.08 (0.16)	850 (600)
680	681	10×10.5 (8×10.5)	0.08 (0.16)	850 (600)	10×10.5	0.08	850	10×13.5 (10×10.5)	0.07 (0.08)	950 (850)
1000	102	10×10.5 (8×10.5)	0.08 (0.16)	850 (600)	10×13.5 (10×10.5)	0.07 (0.08)	950 (850)	16×16.5 (12.5×16) (12.5×13.5)	0.05 (0.055) (0.06)	1450 (1200) (1100)
1500	152	10×13.5 (10×10.5)	0.07 (0.08)	950 (850)	12.5×13.5	0.06	1100	16×16.5	0.05	1450
2200	222	12.5×13.5	0.06	1100	12.5×16	0.055	1200			
3300	332	12.5×16	0.055	1200	16×16.5	0.05	1450	Case Size	Impedance	Ripple Current
4700	472	16×16.5	0.05	1450						

Maximum Impedance (Ω) at 20°C 100kHz, Ripple Current (mA rms) at 105°C 100kHz



**CZF SERIES**

Chip type, For surface mounting

◆ Standard size & Maximum permissible ripple current & Impedance

WV Cap. (μF)		25			35			50		
		1E			1V			1H		
4.7	4R7				4x5.8	1.35	90	5x5.8 (4x5.8)	1.52 (2.9)	85 (60)
10	100	4x5.8	1.35	90	5x5.8 (4x5.8)	0.70 (1.35)	160 (90)	6.3x5.8 (5x5.8)	0.88 (1.52)	165 (85)
15	150	5x5.8	0.70	160	5x5.8	0.70	160	6.3x5.8	0.88	165
22	220	6.3x5.8 (5x5.8)	0.36 (0.70)	240 (160)	6.3x5.8 (5x5.8)	0.36 (0.70)	240 (160)	6.3x7.7 (6.3x5.8) (8x6.2)	0.68 (0.88) (0.68)	195 (165) (195)
33	330	6.3x5.8 (5x5.8)	0.36 (0.70)	240 (160)	6.3x5.8 (8x6.2)	0.36 (0.26)	240 (300)	6.3x7.7 (8x6.2)	0.68	195
47	470	6.3x7.7 (6.3x5.8) (8x6.2)	0.26 (0.36) (0.26)	300 (240) (300)	6.3x7.7 (6.3x5.8) (8x6.2)	0.26 (0.36) (0.26)	300 (240) (300)	6.3x7.7 (8x6.2)	0.68	195
56	560	6.3x7.7 (6.3x5.8)	0.26 (0.36)	300 (240)	6.3x7.7	0.26	300	8x10.5	0.34	350
68	680	6.3x7.7	0.26	300	6.3x7.7	0.26	300	8x10.5	0.34	350
100	101	6.3x7.7 (8x6.2)	0.26	300	8x10.5	0.16	600	10x10.5 (8x10.5)	0.18 (0.34)	670 (350)
150	151	8x10.5 (6.3x7.7)	0.16 (0.26)	600 (300)	10x10.5 (8x10.5)	0.08 (0.16)	850 (600)	10x10.5	0.18	670
220	221	8x10.5	0.16	600	10x10.5 (8x10.5)	0.08 (0.16)	850 (600)	10x13.5 (10x10.5)	0.14 (0.18)	780 (670)
330	331	10x10.5 (8x10.5)	0.08 (0.16)	850 (600)	10x10.5	0.08	850	12.5x13.5	0.12	900
470	471	10x13.5 (10x10.5)	0.07 (0.08)	950 (850)	12.5x13.5 (10x13.5)	0.06 (0.07)	1100 (950)	16x16.5 (12.5x16)	0.08 (0.10)	1250 (1050)
680	681	12.5x13.5	0.06	1100	12.5x16	0.055	1200			
1000	102	16x16.5 (12.5x16)	0.05 (0.055)	1450 (1200)	16x16.5	0.05	1450	Case Size	Impedance	Ripple Current
1500	152	16x16.5	0.05	1450						

Maximum Impedance (Ω) at 20°C 100kHz, Ripple Current (mA rms) at 105°C 100kHz

◆ Standard size & Maximum permissible ripple current & Impedance

WV Cap. (μF)		63			80			100		
		1J			1K			2A		
3.3	3R3				5x5.8	5.0	25			
4.7	4R7	5x5.8	3.0	50	6.3x5.8	3.0	40			
10	100	6.3x7.7 (6.3x5.8)	1.2 (1.5)	120 (80)	6.3x7.7 (8x6.2)	2.4	60	8x10.5	1.3	130
22	220	8x10.5 (6.3x7.7) (8x6.2)	0.65 (1.2) (1.2)	250 (120) (120)	8x10.5	1.3	130	10x10.5 (8x10.5)	0.7 (1.3)	200 (130)
33	330	8x10.5	0.65	250	8x10.5	1.3	130	10x10.5	0.7	200
47	470	8x10.5	0.65	250	10x10.5	0.7	200	12.5x13.5 (10x13.5)	0.32 (0.60)	500 (250)
68	680	12.5x13.5 (8x10.5)	0.16 (0.65)	800 (250)	12.5x13.5	0.32	500	12.5x13.5	0.32	500
100	101	12.5x13.5 (10x10.5)	0.16 (0.35)	800 (400)	12.5x13.5	0.32	500	16x16.5 (12.5x16)	0.17 (0.26)	795 (550)
150	151	12.5x13.5 (10x13.5)	0.16 (0.25)	800 (650)	12.5x13.5	0.32	500			
220	221	12.5x13.5 (10x13.5)	0.16 (0.25)	800 (650)	12.5x16	0.26	550	Case Size	Impedance	Ripple Current
330	331	16x16.5	0.082	1400	16x16.5	0.17	795			

Maximum Impedance (Ω) at 20°C 100kHz, Ripple Current (mA rms) at 105°C 100kHz



**CZF SERIES**

Chip type, For surface mounting

◆ Frequency Correction Factor of Rated Ripple Current

Frequency Capacitance ( μ F)		50Hz	120Hz	300Hz	1kHz	10kHz~
Φ4~Φ10	4.7~68	0.35	0.50	0.64	0.83	1.00
	100~1500	0.40	0.55	0.70	0.85	1.00
Φ12.5~Φ16	~68	0.40	0.55	0.70	0.85	1.00
	100~680	0.45	0.65	0.80	0.90	1.00
	1000~4700	0.65	0.85	0.95	1.00	1.00

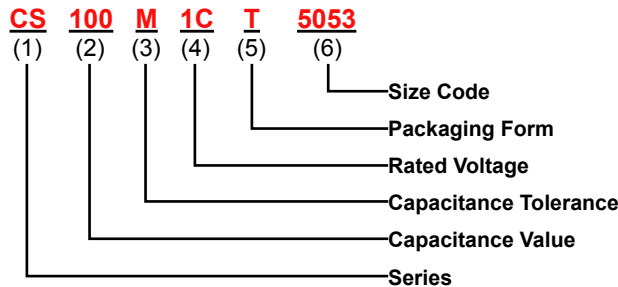
# ORDERING INFORMATION (SMD)



Daewoo Components Corp.

## Surface Mount Part Numbering System Example:

**CS** = SMD Series, **100** = 10µF, **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 (µF)  
 First two digits are significant figures  
 Third digit denotes the number of zeros  
 Use R for decimal point for values less than 10µF

#### Examples:

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

### (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	±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