HFZ Series LONG LIFE WITH EXTRA ELECTROLYTIC CAPACITOR

Extra lower impedance with temperature range -55~+105℃

Load life of 2000~5000 hours

Impedance 5~25% less than HKZ series

RoHS & REACH compliant, Halogen-free

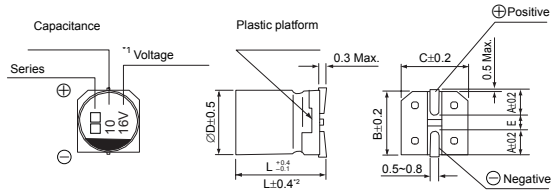
SPECIFICATIONS

<table>
<tr><th>Items</th><th>Characteristics</th></tr>
<tr><td>Operation Temperature Range</td><td>-55 ~ +105°C</td></tr>
<tr><td>Voltage Range</td><td>6.3 ~ 100V</td></tr>
<tr><td>Capacitance Range</td><td>3.3 ~ 8200μF</td></tr>
<tr><td>Capacitance Tolerance</td><td>±20% at 120Hz, 20°C</td></tr>
<tr><td>Leakage Current</td><td>Leakage current ≤0.01CV or 3μA (∅4~∅10), whichever is greater (after 2 minutes application of rated voltage at 20°C)
Leakage current ≤0.03CV or 4μA (∅12.5~∅18), whichever is greater (after 1 minute application of rated voltage at 20°C)

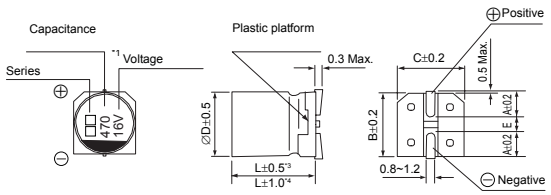
C: Nominal capacitance (μF) , V: Rated voltage (V)</td></tr>
<tr><td>Dissipation Factor (tan δ)</td><td>Measurement frequency：120Hz, Temperature：20°C
<table>
<tr><td>Rated Voltage (V)</td><td></td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63~80</td><td>100</td></tr>
<tr><td rowspan="2">tan δ (max.)</td><td>∅4~∅10</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>0.07</td></tr>
<tr><td>∅12.5~∅18</td><td>0.26</td><td>0.19</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.10</td><td>0.08</td><td>0.07</td></tr>
</table></td></tr>
<tr><td>Stability at Low Temperature</td><td>Measurement frequency：120Hz
<table>
<tr><td>Rated Voltage (V)</td><td></td><td>6.3 ~ 16</td><td>25 ~ 100</td></tr>
<tr><td rowspan="3">Impedance Ratio
ZT/Z20 (max.)</td><td>Z(-25°C) / Z(20°C)</td><td>2</td><td>2</td></tr>
<tr><td>Z(-40°C) / Z(20°C)</td><td>3</td><td>3</td></tr>
<tr><td>Z(-55°C) / Z(20°C)</td><td>4</td><td>3</td></tr>
</table></td></tr>
<tr><td>Load Life</td><td>After 5000 hrs. (2000 hrs. for ∅4~∅6.3×5.8) application of the rated voltage at 105°C, they meet the characteristics listed below.
<table>
<tr><td>Capacitance Change</td><td>Within ±30% of initial value</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></td></tr>
<tr><td>Shelf Life</td><td>After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>After reflow soldering and restored at room temperature, they meet the characteristics listed below.
<table>
<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></td></tr>
<tr><td>Marking</td><td>Black print on the case top.</td></tr>
</table>

DRAWING (Unit: mm)

(∅4~∅6.3×7.7)



(∅8×10.5~∅18)



*1. Voltage mark for 6.3V is [6V]
*2. Applicable to ∅6.3×7.7
*3. Applicable to ∅8×10.5~∅10
*4. Applicable to ∅12.5~∅18

DIMENSIONS (Unit: mm)

ØD x L	4 x 5.8	5 x 5.8	6.3 x 5.8	6.3 x 7.7	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	18 x 16.5	18 x 18.5
A	2.0	2.2	2.6	2.6	3.0	3.3	3.3	4.9	4.9	5.8	6.2	6.2
B	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0	19.0	19.0
C	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0	19.0	19.0
E ± 0.2	1.0	1.4	1.9	1.9	3.1	4.7	4.7	4.7	4.7	6.4	6.4	6.4
L	5.8	5.8	5.8	7.7	10.5	10.5	13.5	13.5	16.0	16.5	16.5	18.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE

WV / Code / µF		6.3			10			16		
		Case size	Impedance	Ripple current	Case size	Impedance	Ripple current	Case size	Impedance	Ripple current
10	106							4 × 5.8	1.35	90
15	156							4 × 5.8	1.35	90
22	226	4 × 5.8	1.35	90	4 × 5.8	1.35	90	5 × 5.8	0.76	160
33	336	5 × 5.8 (4 × 5.8)	0.76 (1.35)	160 (90)	5 × 5.8	0.76	160	6.3 × 5.8	0.44	240
47	476	5 × 5.8 (4 × 5.8)	0.76 (1.35)	160 (90)	6.3 × 5.8	0.44	240	6.3 × 5.8 (5 × 5.8)	0.44 (0.76)	240 (160)
56	566	5 × 5.8	0.76	160	6.3 × 5.8	0.44	240	6.3 × 5.8	0.44	240
68	686	6.3 × 5.8	0.44	240	6.3 × 5.8	0.44	240	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)
100	107	6.3 × 5.8	0.44	240	6.3 × 7.7	0.34	300	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)
150	157	6.3 × 5.8	0.44	240	6.3 × 7.7	0.34	300	6.3 × 7.7	0.34	300
220	227	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)	6.3 × 7.7	0.34	300	8 × 10.5 (6.3 × 7.7)	0.17 (0.34)	600 (300)
330	337	8 × 10.5	0.17	600	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 10.5 (8 × 10.5)	0.08 (0.17)	850 (600)
470	477	8 × 10.5	0.17	600	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)
680	687	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 10.5	0.09	850	10 × 13.5 (10 × 10.5)	0.07 (0.09)	950 (850)
1000	108	10 × 10.5 (8 x 10.5)	0.09 (0.17)	850 (600)	10 × 13.5 (10 × 10.5)	0.07 (0.09)	950 (850)	12.5 × 16 (12.5 × 13.5)	0.055 (0.06)	1200 (1100)
1500	158	10 × 13.5	0.09	950	12.5 × 13.5	0.06	1100	16 × 16.5	0.05	1450
2200	228	12.5 × 13.5	0.06	1100	12.5 × 16	0.055	1200	16 × 16.5	0.05	1450
3300	338	12.5 × 16	0.055	1200	16 × 16.5	0.05	1260	16 × 16.5	0.05	1450
4700	478	16 × 16.5	0.05	1450	16 × 16.5	0.05	1450	18 × 16.5	0.048	1500
6800	688	18 × 16.5	0.048	1500	18 × 16.5	0.048	1500			
8200	828	18 × 16.5	0.048	1500						

WV / Code / µF		25			35			50		
		Case size	Impedance	Ripple current	Case size	Impedance	Ripple current	Case size	Impedance	Ripple current
4.7	475				4 × 5.8	1.35	90	5 × 5.8	1.52	85
10	106	4 × 5.8	1.35	90	5 × 5.8	0.76	160	6.3 × 5.8 (5 × 5.8)	0.88 (1.35)	165 (115)
15	156	5 × 5.8	0.76	160	5 × 5.8	0.76	160	6.3 × 5.8	0.88	165
22	226	6.3 × 5.8 (5 × 5.8)	0.44 (0.76)	240 (160)	6.3 × 5.8	0.44	240	6.3 × 7.7 (6.3 × 5.8)	0.68 (0.88)	195 (165)
33	336	6.3 × 5.8	0.44	240	6.3 × 5.8	0.44	240	6.3 × 7.7	0.68	195
47	476	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.88)	300 (165)	8 × 10.5 (6.3 × 7.7)	0.34 (0.68)	350 (195)
56	566	6.3 × 7.7	0.34	300	6.3 × 7.7	0.34	300	8 × 10.5	0.34	350
68	686	6.3 × 7.7	0.34	300	8 × 10.5	0.17	600	8 × 10.5	0.34	350
100	107	8 × 10.5 (6.3 × 7.7)	0.17 (0.34)	600 (300)	8 × 10.5	0.17	600	10 × 10.5 (8 × 10.5)	0.18 (0.34)	670 (350)
150	157	8 × 10.5 (6.3 × 7.7)	0.16 (0.34)	600 (300)	10 × 10.5	0.09	850	10 × 13.5 (10 × 10.5)	0.14 (0.18)	780 (670)
220	227	8 × 10.5	0.17	600	10 × 10.5 (8 × 10.5)	0.09 (0.16)	850 (600)	(10 × 13.5) (10 × 10.5)	(0.14) (0.26)	(780) (750)
330	337	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	(10 × 13.5) (10 × 10.5)	(0.07) (0.10)	(950) (850)	12.5×13.5	0.12	900
470	477	10 × 13.5 (10 × 10.5)	0.07 (0.09)	950 (850)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	0.06 (0.07) (0.10)	1100 (1000) (950)	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	0.08 (0.10) (0.08)	1250 (1050) (1100)
680	687	12.5 × 13.5	0.06	1100	12.5 × 16 (12.5 × 13.5)	0.055 (0.06)	1200 (1100)	16 × 16.5	0.073	1250
1000	108	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	0.05 (0.055) (0.06)	1450 (1200) (1100)	16 × 16.5	0.05	1450	18 × 16.5	0.073	1250
1500	158	16 × 16.5	0.05	1450	18 × 16.5	0.048	1500	18 × 16.5	0.066	1500
2200	228	16 × 16.5	0.05	1450	18 × 18.5	0.038	1750			
3300	338	18 × 16.5 (18 × 18.5)	0.048 (0.048)	1500 (1500)						

•Case size ØD×L(mm), Impedance (Ω) at 20°C, 100KHz, Ripple current (mA rms) at 105°C, 100KHz

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & IMPEDANCE

WV / Code / μF		63			80			100		
		Case size	Impedance	Ripple current	Case size	Impedance	Ripple current	Case size	Impedance	Ripple current
3.3	335				5 × 5.8	5.0	25			
4.7	475	5 × 5.8	3.0	50	6.3 × 5.8	3.0	40			
10	106	6.3 × 7.7 (6.3 × 5.8)	1.2 (1.5)	120 (80)	6.3 × 7.7	2.4	60	8 × 10.5	1.3	130
22	226	8 × 10.5 (6.3 × 7.7)	0.65 (1.2)	250 (120)	8 × 10.5	1.3	130	10 × 10.5 (8 × 10.5)	0.7 (1.3)	200 (160)
33	336	8 × 10.5	0.65	250	10 × 10.5	0.7	200	10 × 13.5	0.7	200
47	476	10 × 10.5 (8 × 10.5)	0.5 (0.65)	300 (250)	10 × 13.5	0.45	300	12.5 × 13.5	0.32	500
68	686	12.5 × 13.5 (10 × 10.5)	0.16 (0.5)	800 (300)	12.5 × 13.5	0.32	500	12.5 × 13.5	0.32	500
100	107	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	0.16 (0.25) (0.5)	800 (400) (300)	12.5 × 13.5 (10 × 13.5)	0.32 (0.18)	500 (750)	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	0.17 (0.26) (0.32)	795 (550) (500)
150	157	12.5 × 13.5 (10 × 13.5)	0.16 (0.25)	800 (650)	12.5 × 13.5	0.32	500	12.5 × 16	0.26	550
220	227	12.5 × 13.5	0.16	800	12.5 × 16 (12.5 × 13.5)	0.26 (0.12)	550 (900)	18 × 16.5	0.15	850
330	337	16 × 16.5	0.082	900	16 × 16.5	0.17	795	18 × 16.5	0.15	850
470	477	16 × 16.5	0.082	900	18 × 16.5	0.15	850	18 × 18.5	0.15	950
680	687	18 × 16.5	0.08	1150	18 × 18.5	0.15	950			
1000	108	18 × 18.5	0.06	1250						

•Case size ∅D×L(mm), Impedance (Ω) at 20°C, 100KHz, Ripple current (mA rms) at 105°C, 100KHz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

Frequency			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient	Ø4 ~ Ø10	4.7 ~ 68μF	0.35	0.50	0.64	0.83	1.00
		100 ~ 1500μF	0.40	0.55	0.70	0.85	1.00
	Ø12.5 ~ Ø18	~ 68μF	0.40	0.55	0.70	0.85	1.00
		100 ~ 680μF	0.45	0.65	0.80	0.90	1.00
		1000 ~ 4700μF	0.65	0.85	0.95	1.00	1.00

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

◆ How to order

HFZ	106	M	0035	0405	R	-
↓	↓	↓	↓	↓	↓	↓
Type	Capacitance code	Tolerance	Rated Voltage	Size Code	Package	Additional characters may be added for special requirements
HFZ	pF Code: 1st two digits represent significant figures 3rd digit represents mulitplier (number of zeros to follow) 106 = 10uF 107 = 100uF	M: +/-20%	Code 0035: 35VDC For DC Voltage 0006: 6.3VDC 0035: 35VDC 0100: 100VDC	Code 0405: Size 4x5.8mm Size for V-chip E-cap 0405: Size 4x5.8mm 1010: Size 10x10.5mm 1818: Size 18x18.5mm	R: Tape & Reel	