

HKH HIGH RELIABILITY ELECTROLYTIC CAPACITOR

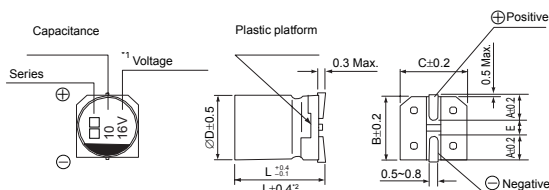
High temperature range up to +125°C
Suitable for automotive equipment
Load life of 1000~5000 hours
RoHS & REACH compliant, Halogen-free

SPECIFICATIONS

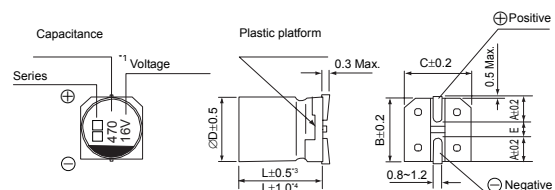
Items	Characteristics										
Operation Temperature Range	-40 ~ +125°C										
Voltage Range	10 ~ 450V										
Capacitance Range	3.3 ~ 4700μF										
Capacitance Tolerance	±20% at 120Hz, 20°C										
Leakage Current	Leakage current ≤0.03CV or 4μA (10V~100V), whichever is greater (after 2 minutes application of rated voltage at 20°C)										
	Leakage current ≤0.04CV + 100μA (160V~450V), whichever is greater (after 2 minutes application of rated voltage at 20°C)										
	C: Nominal capacitance (μF) , V: Rated voltage (V)										
Dissipation Factor (tan δ)	Measurement frequency : 120Hz, Temperature : 20°C										
	Rated Voltage (V)		10	16	25	35	50	63	100	160~250	400,450
	tan δ (max.)		0.24	0.20	0.16	0.14	0.14	0.18	0.18	—	—
			0.22	0.18	0.16	0.14	0.12	0.14	0.10	0.20	0.20
Stability at Low Temperature	Measurement frequency : 120Hz										
	Rated Voltage (V)			10	16	25	35~100	160~250	400,450		
	Impedance Ratio	04~010	Z(-25°C) / Z(20°C)	4	3	2	2	—	—		
			Z(-40°C) / Z(20°C)	10	8	6	4	—	—		
	ZT/Z20 (max.)	012.5~018	Z(-25°C) / Z(20°C)	4	3	2	2	3	6		
Z(-40°C) / Z(20°C)			8	6	4	3	6	10			
Load Life	The characteristics listed below shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for the specified time at 125°C.										
	Size (mm)			Life time (hours)							
	06.3			1000							
	0D8, 010 (10~100V)			2000							
	0D12.5~18 (160~450V)			2000							
	0D12.5~18 (10~100V)			5000							
	Capacitance Change			Within ±30% of initial value							
	Dissipation Factor			300% or less of initial specified value							
Leakage Current			initial specified value or less								
Shelf Life	After leaving capacitors under no load at 125°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.										
	Capacitance Change			Within ±10% of initial value							
	Dissipation Factor			initial specified value or less							
	Leakage Current			initial specified value or less							
Marking	Black print on the case top.										

DRAWING (Unit: mm)

(Ø4~Ø6.3×7.7)



(Ø8×10.5~Ø18)



*1. Voltage mark for 6.3V is [6V]
*2. Applicable to Ø6.3×7.7

*3. Applicable to Ø8×10.5~Ø10
*4. Applicable to Ø12.5~Ø18

Dimension table in next page.

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
A	2.0	2.2	2.6	2.6	3.0	3.3	3.3	4.9	4.9	5.8	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
C	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0	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
L	5.8	5.8	5.8	7.7	10.5	10.5	13.5	13.5	16.0	16.5	18.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & ESR

WV		10				16				25			
Parameter µF		Case size ØDxL (mm)	E.S.R. (Ω) 20°C	E.S.R. (Ω) -40°C	Ripple current (mA rms) at 125°C, 100KHz	Case size ØDxL (mm)	E.S.R. (Ω) 20°C	E.S.R. (Ω) -40°C	Ripple current (mA rms) at 125°C, 100KHz	Case size ØDxL (mm)	E.S.R. (Ω) 20°C	E.S.R. (Ω) -40°C	Ripple current (mA rms) at 125°C, 100KHz
33	336									6.3 x 5.8	3.3	66	45
47	476					6.3 x 5.8	3.3	66	43	6.3 x 7.7	2.3	46	68
100	107	6.3 x 7.7	2.3	46	72	8 x 10.5	1.0	20	115	8 x 10.5	1.0	20	126
220	227	8 x 10.5	1.0	20	136	10 x 10.5	0.7	13.4	175	10 x 10.5	0.7	13.4	211
330	337	10 x 10.5	0.7	13.4	188	10 x 13.5	0.5	9.5	280	12.5 x 13.5 (10x13.5)	0.14 (0.5)	2.1 (9.5)	750 (270)
470	477	10 x 13.5	0.5	9.5	300	12.5 x 13.5	0.14	2.1	750	12.5 x 13.5	0.14	2.1	750
680	687					16 x 16.5 (12.5x13.5)	0.10 (0.14)	1.5 (2.1)	1000 (750)	16 x 16.5	0.10	1.5	1000
1000	108	12.5 x 16 (12.5x13.5)	0.11 (0.14)	1.5 (2.1)	900 (750)	16 x 16.5	0.10	1.5	1000	16 x 16.5	0.10	1.5	1000
2200	228	16 x 16.5	0.10	1.5	1000	18 x 16.5	0.09	1.5	1100				
3300	338	18 x 16.5	0.09	1.5	1100								
4700	478	18 x 16.5	0.09	1.5	1100								

WV		35				50			
Parameter µF		Case size ØDxL (mm)	E.S.R. (Ω) 20°C	E.S.R. (Ω) -40°C	Ripple current (mA rms) at 125°C, 100KHz	Case size ØDxL (mm)	E.S.R. (Ω) 20°C	E.S.R. (Ω) -40°C	Ripple current (mA rms) at 125°C, 100KHz
10	106	6.3 x 5.8	3.3	66	38	6.3 x 7.7 (6.3 x 5.8)	2.3 (3.3)	46 (66)	50 (38)
22	226	6.3 x 5.8	3.3	66	39	6.3 x 7.7	2.3	46	50
33	336	6.3 x 7.7	2.3	46	62	8 x 10.5	1.0	20	83
47	476	8 x 10.5	1.0	20	92	10 x 10.5	0.7	13.4	111
100	107	10 x 10.5	0.7	13.4	151	12.5 x 13.5	0.23	3.5	550
220	227	12.5 x 13.5 (10 x 13.5)	0.14 (0.5)	2.1 (9.5)	750 (260)	16 x 16.5 (12.5 x 13.5)	0.15 (0.23)	2.3 (3.5)	850 (550)
330	337	12.5 x 13.5	0.14	2.1	750	16 x 16.5 (12.5 x 16)	0.15 (0.18)	2.3 (2.7)	850 (700)
470	477	16 x 16.5 (12.5 x 16)	0.10 (0.11)	1.5 (1.5)	1000 (900)	16 x 16.5	0.15	2.3	850
1000	108	18 x 16.5	0.10	1.5	1000				

WV		63				100			
Parameter µF		Case size ØDxL (mm)	E.S.R. (Ω) 20°C	E.S.R. (Ω) -40°C	Ripple current (mA rms) at 125°C, 100KHz	Case size ØDxL (mm)	E.S.R. (Ω) 20°C	E.S.R. (Ω) -40°C	Ripple current (mA rms) at 125°C, 100KHz
10	106	6.3 x 7.7	2.3	115	42	8 x 10.5	1.00	50	53
22	226	8 x 10.5	1.0	50	56	10 x 10.5	0.70	35	63
33	336	10 x 10.5	0.7	35	77	10 x 13.5	0.45	22.5	130
47	476	10 x 13.5	0.45	22.5	150	12.5 x 13.5	0.33	16.5	450
68	686					12.5 x 16	0.26	13	550
100	107	12.5 x 13.5	0.25	12.5	500	16 x 16.5	0.24	12	650
220	227	12.5 x 16	0.20	10	600				
330	337	16 x 16.5	0.18	9	820				



DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

WV Code μF	160		200		250		400		450	
	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
3.3	335								12.5 × 16	65
4.7	475						12.5 × 13.5	70	16 × 16.5	85
6.8	685						16 × 16.5	100		
10	106	12.5 × 13.5	100	12.5 × 13.5	100	12.5 × 16	110			
22	226	16 × 16.5	180	16 × 16.5	180					

•Case size ØD×L(mm), ripple current (mA rms) at 125°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

Frequency			50Hz	120Hz	1KHz	10KHz~	100KHz~
Coefficient	10~100V	10 ~ 100μF	0.35	0.40	0.75	0.90	1.00
		220 ~ 470μF	0.35	0.50	0.85	0.94	1.00
		680 ~ 2200μF	0.40	0.60	0.85	0.95	1.00

Frequency		50Hz	120Hz	300Hz	1KHz	10KHz	100KHz~
Coefficient	160~450V	0.75	1.00	1.25	1.50	1.75	1.80

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

<u>HKH</u>	<u>106</u>	<u>M</u>	<u>0035</u>	<u>0405</u>	<u>R</u>	<u>-</u>
↓	↓	↓	↓	↓	↓	↓
<u>Type</u>	<u>Capacitance code</u>	<u>Tolerance</u>	<u>Rated Voltage</u>	<u>Size Code</u>	<u>Package</u>	<u>Additional characters may be added for special requirements</u>
HKH	pF Code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow) 106 = 10uF 107 = 100uF	M: +/-20%	Code 0035: 35VDC For DC Voltage 0035: 35VDC 0100: 100VDC 0450: 450VDC	Code 0405: Size 4x5.8mm Size for V-chip E-cap 0405: Size 4x5.8mm 1010: Size 10x10.5mm 1816: Size 18x16.5mm	R: Tape & Reel	

Note: Specification is subject to change without further notice. For more details and updates, please visit our website.