

# HCK Series 105°C V- chip Aluminum Electrolytic Capacitor

Operating with wide temperature range -40~+105°C

Load life of 2000 hours

RoHS & REACH compliant, Halogen-free

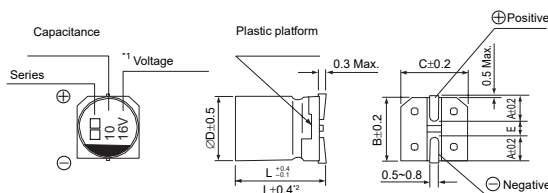


## SPECIFICATIONS

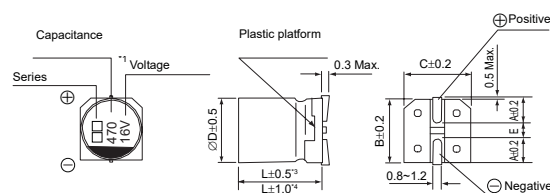
Items	Characteristics												
Operation Temperature Range	-40 ~ +105°C												
Voltage Range	4 ~ 450V												
Capacitance Range	0.1 ~ 8200μF												
Capacitance Tolerance	±20% at 120Hz, 20°C												
Leakage Current	Rated Voltage	6.3 ~ 100V	160 ~ 450V										
	Case size	∅4~∅10	∅12.5~∅18	∅6.3~∅18									
	Time	After 2 min. application of rated voltage at 20°C	After 1 min. application of rated voltage at 20°C	After 5 min. application of rated voltage at 20°C									
	Leakage current	≤0.01CV or 3μA, whichever is greater	≤0.03CV or 4μA, whichever is greater	≤0.04CV+100μA, whichever is greater									
C: Nominal capacitance (μF) , V: Rated voltage (V)													
Dissipation Factor (tan δ)	Measurement frequency : 120Hz, Temperature: 20°C												
	Rated Voltage (V)	4	6.3	10	16	25	35	50	63	100	160~250	350~450	
tan δ (max.)	∅4~∅10	0.42	0.30	0.26	0.22	0.16	0.14	0.12	0.10	0.10	0.20	0.25	
	∅12.5~∅18	0.45	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10	0.20	0.25	
Stability at Low Temperature	Measurement frequency : 120Hz												
	Rated Voltage (V)		4	6.3	10	16	25	35	50~63	100	160~250	350~450	
	Impedance Ratio ZT/Z20 (max.)	∅4~∅10	Z(-25°C)/Z(20°C)	7	4	3	2	2	2	2	3	2	3
			Z(-40°C)/Z(20°C)	15	8	6	4	4	3	3	4	3	6
	∅12.5~∅18	Z(-25°C)/Z(20°C)	7	5	4	3	2	2	2	2	2	4	
		Z(-40°C)/Z(20°C)	17	12	10	8	5	4	3	3	6	10	
Load Life	After 2000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.												
	Capacitance Change	Within ±20% of initial value for capacitors of 10V or more (Within ±30% of initial value for capacitors of 4V or less)											
	Dissipation Factor	200% or less of initial specified value											
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.												
	Leakage Current	initial specified value or less											
	Dissipation Factor	200% or less of initial specified value											
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											
	Leakage Current	initial specified value or less											
Marking	Black print on the case top.												

## 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)**

∅D x L	4 x 5.4	5 x 5.4	6.3 x 5.4	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
<b>A</b>	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>B</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
<b>C</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
<b>E ± 0.2</b>	1.0	1.4	1.9	1.9	3.1	4.7	4.7	4.7	4.7	6.4	6.4	6.4
<b>L</b>	5.4	5.4	5.4	7.7	10.5	10.5	13.5	13.5	16.0	16.5	16.5	18.5

**DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT**

\*Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 120Hz

WV Code		4		6.3		10		16		25	
μF		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
4.7	475							4 x 5.4	13	4 x 5.4	17
10	106							4 x 5.4	20	5 x 5.4 (4 x 5.4)	23 (20)
22	226	4 x 5.4	20	4 x 5.4	23	5 x 5.4 (4 x 5.4)	29 (22)	5 x 5.4 (4 x 5.4)	32 (25)	6.3 x 5.4 (5 x 5.4)	39 (32)
33	336	5 x 5.4 (4 x 5.4)	30 (25)	5 x 5.4 (4 x 5.4)	34 (30)	5 x 5.4 (4 x 5.4)	35 (30)	6.3 x 5.4 (5 x 5.4)	45 (35)	6.3 x 5.4 (5 x 5.4)	48 (35)
47	476	5 x 5.4 (4 x 5.4)	36 (30)	5 x 5.4 (4 x 5.4)	38 (35)	5 x 5.4	38	6.3 x 5.4 (5 x 5.4)	55 (40)	6.3 x 5.4	60
100	107	6.3 x 5.4 (5 x 5.4)	64 (54)	6.3 x 5.4 (5 x 5.4)	69 (59)	6.3 x 5.4 (5 x 5.4)	80 (60)	6.3 x 5.4	80	6.3 x 7.7 (6.3 x 5.4)	100 (80)
150	157	6.3 x 5.4	80	6.3 x 5.4	85	6.3 x 5.4	85	6.3 x 7.7	105	8 x 10.5 (6.3 x 7.7)	240 (120)
220	227	6.3 x 5.4	90	6.3 x 7.7 (6.3 x 5.4)	120 (95)	6.3 x 7.7 (6.3 x 5.4)	120 (95)	8 x 10.5 (6.3 x 7.7)	270 (120)	8 x 10.5	270
330	337	6.3 x 7.7	120	6.3 x 7.7	120	8 x 10.5 (6.3 x 7.7)	290 (135)	8 x 10.5	290	10 x 10.5 (8 x 10.5)	380 (290)
470	477	6.3 x 7.7	120	8 x 10.5 (6.3 x 7.7)	320 (120)	10 x 10.5 (8 x 10.5)	380 (320)	10 x 10.5 (8 x 10.5)	380 (290)	10 x 10.5	380
680	687	8 x 10.5	320	8 x 10.5	350	10 x 10.5 (8 x 10.5)	380 (350)	10 x 10.5	380	10 x 13.5	400
1000	108	8 x 10.5	320	10 x 10.5 (8 x 10.5)	410 (350)	10 x 10.5	410	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	550 (460) (410)	12.5 x 13.5	580
1500	158	10 x 10.5	410	10 x 13.5 (10 x 10.5)	450 (410)	10 x 13.5	460	12.5 x 13.5	550	12.5 x 16	850
2200	228	10 x 13.5 (10 x 10.5)	440 (410)	12.5 x 13.5 (10 x 13.5)	680 (560)	12.5 x 13.5	680	16 x 16.5 (12.5 x 16)	900 (750)	16 x 16.5	1050
3300	338	10 x 13.5	490	12.5 x 16 (12.5 x 13.5)	850 (810)	16 x 16.5	1000	16 x 16.5	1000	18 x 16.5	1150
4700	478	12.5 x 13.5	600	16 x 16.5	1000	16 x 16.5	1000	18 x 16.5	1225	18 x 18.5	1300
6800	688	16 x 16.5 (12.5 x 16)	950 (650)	18 x 16.5	1290	18 x 16.5	1290				
8200	828			18 x 18.5	1450	18 x 18.5	1450				

WV Code		35		50		63		100	
μF		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
0.1	104			4 x 5.4	2	4 x 5.4	2		
0.22	224			4 x 5.4	4	4 x 5.4	4		
0.33	334			4 x 5.4	4	4 x 5.4	4		
0.47	474			4 x 5.4	5	4 x 5.4	5		
1	105			4 x 5.4	8	4 x 5.4	8	4 x 5.4	8
2.2	225			4 x 5.4	12	4 x 5.4	12	6.3 x 5.4 (5 x 5.4)	14 (12)
3.3	335	4 x 5.4	13	4 x 5.4	14	5 x 5.4	17	6.3 x 7.7 (6.3 x 5.4)	55 (20)
4.7	475	4 x 5.4	17	5 x 5.4 (4 x 5.4)	20 (14)	5 x 5.4	20	6.3 x 7.7 (6.3 x 5.4)	50 (21)
10	106	5 x 5.4 (4 x 5.4)	27 (18)	6.3 x 5.4 (5 x 5.4)	32 (27)	6.3 x 7.7 (6.3 x 5.4)	58 (32)	8 x 10.5 (6.3 x 7.7)	77 (58)
22	226	6.3 x 5.4 (5 x 5.4)	44 (36)	6.3 x 7.7 (6.3 x 5.4)	58 (44)	8 x 10.5 (6.3 x 7.7)	100 (58)	10 x 10.5 (8 x 10.5)	126 (100)
33	336	6.3 x 5.4	50	6.3 x 7.7	65	8 x 10.5	140	10 x 10.5	150
47	476	6.3 x 7.7 (6.3 x 5.4)	80 (58)	8 x 10.5 (6.3 x 7.7)	170 (70)	10 x 10.5 (8 x 10.5)	160 (170)	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	250 (180) (160)
68	686							12.5 x 13.5 (10 x 13.5)	300 (180)

\*Case size ∅D×L(mm), ripple current (mA rms) at 105°C, 120Hz

## DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

 Case size  $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C, 120Hz

$\mu F$	WV Code	35		50		63		100		160	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
22	226									10 × 13.5	50
33	336									12.5 × 13.5	95
47	476									12.5 × 13.5 (16 × 16.5)	205 (240)
100	107	8 × 10.5 (6.3 × 7.7)	240 (92)	10 × 10.5 (8 × 10.5)	250 (210)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	400 (350) (310)	16 × 16.5 (12.5 × 13.5)	450 (380)	16 × 16.5	250
150	157	8 × 10.5	240	10 × 10.5	300	10 × 13.5	350				
220	227	10 × 10.5 (8 × 10.5)	250 (270)	10 × 13.5 (10 × 10.5)	280 (330)	16 × 16.5 (12.5 × 13.5)	560 (470)	16 × 16.5	550		
330	337	10 × 10.5	370	16 × 16.5 (12.5 × 13.5) (10 × 13.5)	600 (490) (295)	16 × 16.5 (12.5 × 16)	700 (510)	18 × 16.5	590		
470	477	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	520 (400) (370)	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	700 (550) (470)	16 × 16.5	750	18 × 18.5	980		
680	687	12.5 × 13.5	530	16 × 16.5	750	18 × 16.5	790				
1000	108	16 × 16.5 (12.5 × 16)	800 (600)	18 × 16.5	990						
1500	158	16 × 16.5	750								
2200	228	18 × 16.5	1050								

$\mu F$	WV Code	200		250		350		400		450	
		Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current	Size	Ripple current
3.3	335							10 × 13.5 (8 × 10.5)	40 (35)	10 × 13.5 (8 × 12.5)	40 (38)
4.7	475			10 × 13.5	65	10 × 13.5	45	10 × 13.5 (12.5 × 13.5)	45 (48)	10 × 13.5 (12.5 × 13.5)	42 45
10	106	10 × 13.5	75	10 × 13.5	70	12.5 × 13.5	50	12.5 × 13.5	50	12.5 × 13.5	70
22	226	12.5 × 13.5	105	12.5 × 13.5	105	16 × 16.5	85	16 × 16.5	85	16 × 16.5	85
33	336	12.5 × 13.5	120	16 × 16.5	180	18 × 16.5	100	18 × 16.5	100	18 × 16.5	100
47	476	16 × 16.5	220	16 × 16.5	220						
100	107	18 × 16.5	280	18 × 16.5	260						

 •Case size  $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C, 120Hz

## FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

Frequency		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient	$\varnothing 4 \sim \varnothing 10$	0.1 ~ 68 $\mu F$	0.70	1.00	1.17	1.36
		100 ~ 3300 $\mu F$	0.85	1.00	1.08	1.20
	$\varnothing 12.5 \sim \varnothing 18$	~ 68 $\mu F$	0.75	1.00	1.35	1.57
		100 ~ 680 $\mu F$	0.80	1.00	1.23	1.34
		1000 ~ 6800 $\mu F$	0.85	1.00	1.10	1.13

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

<b>HCK</b>	<b>106</b>	<b>M</b>	<b>0035</b>	<b>0405</b>	<b>R</b>	<b>-</b>
↓	↓	↓	↓	↓	↓	↓
<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>
HCK	pF Code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow) 106 = 10 $\mu F$ 107 = 100 $\mu F$	M: +/-20%	Code 0035: 35VDC For DC Voltage 0006: 6.3VDC 0035: 35VDC 0450: 450VDC	Code 0405: Size 4x5.4mm Size for V-chip E-cap 0405: Size 4x5.4mm 1010: Size 10x10.5mm 1818: Size 18x18.5mm	R: Tape & Reel	