

**UPGRADE!**

## MKC-P4-Series (Resin-encased Metallized Polyester Film Capacitors)

### Features

- Suitable for DC filter and DC link circuit
- Plastic case and filling resin materials conform to UL94V-0

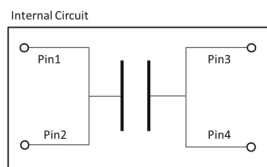
### Specifications

Items	Description
Operating Temperature range <sup>(1)</sup>	-40 ~ +105°C (voltage derating is required at $\geq +85^\circ\text{C}$ )
Rated Voltage $U_N$	450, 700, 800, 900, 1100 V.DC
Voltage test between terminals	$1.5 \times U_N / 10\text{s}$
Maximum ripple voltage $U_{AC}$ (peak to peak)	$0,2 \times U_{N,85^\circ\text{C}}$
Terminals	Tinned wired leads
Life Time Test /Standard	IEC 61071: 2007
Dielectric	Polypropylene
Electrode	No internal safety device (optional: segmented metallization design)
Case	UL94V-0
Filling material	UL94V-0
Environmental regulations	Comply with RoHS
Useful Life	> 170,000 hrs (at $U_N$ , 75°C hotspot)

### Dimension

Case (mm)			Terminal (mm)			Case dimension code
T	H	L	P1	P2	$\phi d$	
18.0	32.0	42.0	37.5	10.2	1.0	DGI
21.5	38.5	43.0	37.5	10.2	1.0	EHI
24.0	44.0	42.0	37.5	10.2	1.0	EII
25.0	45.0	57.5	52.5	10.2	1.2	FJL
30.0	45.0	42.0	37.5	20.3	1.0	GJI
30.0	45.0	57.5	52.5	20.3	1.2	GJL
30.0	55.0	42.0	37.5	20.3	1.0	GLI
35.0	50.0	57.5	52.5	20.3	1.2	HKL
35.0	60.0	57.5	52.5	20.3	1.2	HML
35.0	65.0	57.5	52.5	20.3	1.2	HNL
35.0	80.0	57.5	52.5	20.3	1.2	HQL
43.0	22.0	57.5	52.5	20.3	1.2	IEL
45.0	57.0	57.5	52.5	20.3	1.2	JLL
45.0	65.0	57.5	52.5	20.3	1.2	JNL
60.0	45.0	57.5	52.5	20.3	1.2	MJL

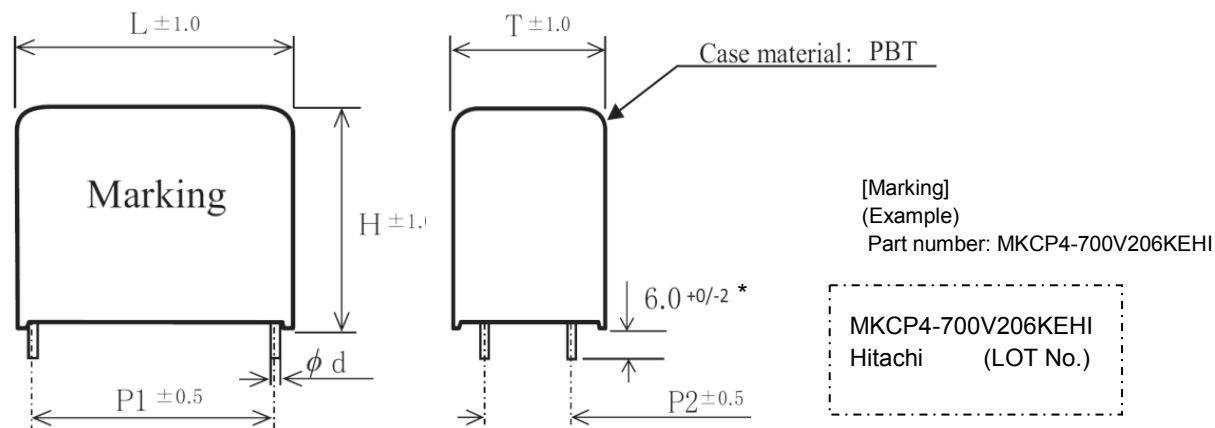
### Outline of drawings and dimensions



Part number: MKC-P4 Series 700 V.DC 20  $\mu\text{F} \pm 10\%$   
**MKC-P4 700V 206 K EHI**

— Case Dimension Code  
 — Cap. tolerance code  
 — Capacitance code  
 — Rated voltage code

Type of series



\* 6mm is standard length. Shorter length of 3.5mm is available on request. Part number suffix: "C".

# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

Rated Voltage $U_N$ : 450Vdc (70° C: 500Vdc, 85° C: 450Vdc, 105° C: 300Vdc)								Voltage test between terminals $U_{TT}$ : 675 Vdc /10s					
Nominal capacitance $C_N$ <sup>(2)</sup> (μF)	Dimensions						$dv/dt$ (V/μs)	Maximum peak current $\hat{i}$ <sup>(3)</sup> (A)	$I_{rms}$ [Arms] <sup>(4)</sup>	$ESR$ <sup>(5)</sup> (typ.) (mΩ)	$ESL$ <sup>(6)</sup> (typ.) (nH)	$R_{th}$ <sup>(7)</sup> (KW)	Part number <sup>(8)</sup>
	T (mm)	H (mm)	L (mm)	P1 (mm)	P2 (mm)	Ød (mm)							
20	21.5	38.5	43.0	37.5	10.2	1.0	40	800	12.0	6.0	18	13.0	MKCP4-450V206KEHI
25	24.0	44.0	42.0	37.5	10.2	1.0	40	1000	13.0	5.5	19	12.0	MKCP4-450V256KEII
30	21.5	38.5	43.0	37.5	10.2	1.0	40	800	12.0	6.0	18	13.0	MKCP4-450V306KEHI
35	30.0	45.0	42.0	37.5	20.3	1.0	40	1400	18.5	3.5	19	9.5	MKCP4-450V356KGJI
40	30.0	55.0	42.0	37.5	20.3	1.0	40	1600	18.5	3.5	21	9.5	MKCP4-450V406KGLI
40	25.0	45.0	57.5	52.5	10.2	1.2	20	800	13.5	6.0	19	11.0	MKCP4-450V406KFJL
45	25.0	45.0	57.5	52.5	10.2	1.2	20	900	13.5	6.0	19	11.0	MKCP4-450V456KFJL
50	30.0	45.0	57.5	52.5	20.3	1.2	20	1000	15.5	5.0	19	9.5	MKCP4-450V506KGJL
55	35.0	50.0	57.5	52.5	20.3	1.2	20	1300	20.5	4.0	21	8.0	MKCP4-450V556KHKL
60	35.0	50.0	57.5	52.5	20.3	1.2	20	1200	18.0	4.5	20	8.0	MKCP4-450V606KHKL
65	35.0	50.0	57.5	52.5	20.3	1.2	20	1300	20.5	4.0	21	8.0	MKCP4-450V656KHKL
70	35.0	50.0	57.5	52.5	20.3	1.2	20	1400	19.0	4.0	20	8.0	MKCP4-450V706KHKL
80	35.0	50.0	57.5	52.5	20.3	1.2	20	1600	20.5	3.5	21	8.0	MKCP4-450V806KHKL
85	35.0	60.0	57.5	52.5	20.3	1.2	20	1700	20.5	3.5	21	8.0	MKCP4-450V856KHML
90	35.0	60.0	57.5	52.5	20.3	1.2	20	1800	22.0	3.0	21	8.0	MKCP4-450V906KHML
180	35.0	80.0	57.5	52.5	20.3	1.2	14	2500	22.0	3.0	28	8.0	MKCP4-450V187KHQLP

Rated Voltage $U_N$ : 700Vdc (70° C: 800Vdc, 85° C: 700Vdc, 105° C: 500Vdc)								Voltage test between terminals $U_{TT}$ : 1050 Vdc /10s					
Nominal capacitance $C_N$ <sup>(2)</sup> (μF)	Dimensions						$dv/dt$ (V/μs)	Maximum peak current $\hat{i}$ <sup>(3)</sup> (A)	$I_{rms}$ [Arms] <sup>(4)</sup>	$ESR$ <sup>(5)</sup> (typ.) (mΩ)	$ESL$ <sup>(6)</sup> (typ.) (nH)	$R_{th}$ <sup>(7)</sup> (KW)	Part number <sup>(8)</sup>
	T (mm)	H (mm)	L (mm)	P1 (mm)	P2 (mm)	Ød (mm)							
10	18.0	32.0	42.0	37.5	10.2	1.0	40	400	8.0	12.0	17	15.5	MKCP4-700V106KDGI
20	21.5	38.5	43.0	37.5	10.2	1.0	40	800	12.0	6.0	18	13.0	MKCP4-700V206KEHI
22	24.0	44.0	42.0	37.5	10.2	1.0	40	880	13.5	5.5	19	12.0	MKCP4-700V226KEII
30	30.0	45.0	42.0	37.5	20.3	1.0	40	1200	17.0	4.0	19	9.5	MKCP4-700V306KGJI
30	25.0	45.0	57.5	52.5	10.2	1.2	20	600	12.0	8.0	19	11.0	MKCP4-700V306KFJL
35	30.0	45.0	42.0	37.5	20.3	1.0	40	1400	18.5	3.5	19	9.5	MKCP4-700V356KGJI
35	25.0	45.0	57.5	52.5	10.2	1.2	20	700	12.5	7.0	19	11.0	MKCP4-700V356KFJL
40	25.0	45.0	57.5	52.5	10.2	1.2	20	800	13.5	6.0	19	11.0	MKCP4-700V406KFJL
45	30.0	45.0	57.5	52.5	20.3	1.2	20	900	15.0	5.5	19	9.5	MKCP4-700V456KGJL
50	25.0	65.0	57.5	52.5	10.2	1.2	20	1000	17.3	4.0	22	11.0	MKCP4-700V506KFNLR
50	30.0	45.0	57.5	52.5	20.3	1.2	20	1000	14.2	5.5	20	9.5	MKCP4-700V506KGJL
55	35.0	50.0	57.5	52.5	20.3	1.2	20	1100	18.0	4.5	20	8.0	MKCP4-700V556KHKL
60	35.0	50.0	57.5	52.5	20.3	1.2	20	1200	19.0	4.0	20	8.0	MKCP4-700V606KHKL
65	35.0	50.0	57.5	52.5	20.3	1.2	20	1300	20.5	3.5	20	8.0	MKCP4-700V656KHKL
70	35.0	60.0	57.5	52.5	20.3	1.2	20	1400	20.5	3.5	21	8.0	MKCP4-700V706KHML
80	35.0	60.0	57.5	52.5	20.3	1.2	20	1600	21.5	3.0	21	8.0	MKCP4-700V806KHML
85	35.0	65.0	57.5	52.5	20.3	1.2	20	1700	22.0	3.0	22	8.0	MKCP4-700V856KHNL
90	45.0	57.0	57.5	52.5	20.3	1.2	20	1800	22.0	3.0	21	7.5	MKCP4-700V906KHNL
100	35.0	80.0	57.5	52.5	20.3	1.2	20	2000	22.0	3.0	28	8.0	MKCP4-700V107KHQL
100	45.0	65.0	57.5	52.5	20.3	1.2	20	2000	22.0	2.5	22	7.5	MKCP4-700V107KJNL
100	60.0	45.0	57.5	52.5	20.3	1.2	20	2000	22.0	2.5	19	6.0	MKCP4-700V107KMJL
120	35.0	80.0	57.5	52.5	20.3	1.2	20	2400	22.0	3.0	28	8.0	MKCP4-700V127KHQLP

Rated Voltage $U_N$ : 800Vdc (70° C: 960Vdc, 85° C: 800Vdc, 105° C: 560Vdc)								Voltage test between terminals $U_{TT}$ : 1200 Vdc /10s					
Nominal capacitance $C_N$ <sup>(2)</sup> (μF)	Dimensions						$dv/dt$ (V/μs)	Maximum peak current $\hat{i}$ <sup>(3)</sup> (A)	$I_{rms}$ [Arms] <sup>(4)</sup>	$ESR$ <sup>(5)</sup> (typ.) (mΩ)	$ESL$ <sup>(6)</sup> (typ.) (nH)	$R_{th}$ <sup>(7)</sup> (KW)	Part number <sup>(8)</sup>
	T (mm)	H (mm)	L (mm)	P1 (mm)	P2 (mm)	Ød (mm)							
70	45.0	57.0	57.5	52.5	20.3	1.2	20	1400	22.0	3.0	21	7.5	MKCP4-800V706KJLL
70	35.0	65.0	57.5	52.5	20.3	1.2	20	1400	22.0	3.0	22	8.0	MKCP4-800V706KHNL

(2) Nominal capacitance at 1kHz, Capacitance tolerance ±10%

(3) Maximum permitted repetitive current amplitude during continuous operation

(4) Maximum ripple current (rms) at 1k -10 kHz, ambient 85° C

(5) Equivalent series resistance typical values at 10 kHz

(6) Equivalent series inductance typical values at 1 MHz

(7) Thermal resistance

(8) "Long-Life" respective "High-Humidity" THB-type (85° C/85% RH) available on request. Part number suffix: "T".

# POWER ELECTRONICS USE PLASTIC FILM CAPACITORS

Rated Voltage $U_N$ : 900Vdc (70° C: 1100Vdc, 85° C: 900Vdc, 105° C: 650Vdc)									Voltage test between terminals $U_{TT}$ : 1350 Vdc /10s				
Nominal capacitance $C_N$ <sup>(2)</sup> (μF)	Dimensions						$dv/dt$ (V/μs)	Maximum peak current $\hat{i}$ <sup>(3)</sup> (A)	Irms [Arms] <sup>(4)</sup>	ESR <sup>(5)</sup> (typ.) (mΩ)	ESL <sup>(6)</sup> (typ.) (nH)	Rth <sup>(7)</sup> (KW)	Part number <sup>(8)</sup>
	21.5	38.5	43.0	37.5	10.2	1.0							
10	21.5	38.5	43.0	37.5	10.2	1.0	40	400	9.0	11.0	18	13.0	MKCP4-900V106KEHI
12	21.5	38.5	43.0	37.5	10.2	1.0	40	480	10.0	9.0	18	13.0	MKCP4-900V126KEHI
15	24.0	44.0	42.0	37.5	10.2	1.0	40	600	12.0	7.0	19	12.0	MKCP4-900V126KEII
15	25.0	45.0	57.5	52.5	10.2	1.2	20	300	9.5	12.0	19	11.0	MKCP4-900V156KFJL
17	43.0	22.0	57.5	52.5	20.3	1.2	20	340	8.6	12.0	19	8.0	MKCP4-900V176KIELS
20	30.0	45.0	42.0	37.5	20.3	1.0	40	800	15.5	5.0	19	9.5	MKCP4-900V206KGJI
20	25.0	45.0	57.5	52.5	10.2	1.2	20	400	10.0	11.0	19	11.0	MKCP4-900V206KFJL
25	30.0	45.0	57.5	52.5	20.3	1.2	20	500	11.5	9.0	19	9.5	MKCP4-900V256KGJL
35	35.0	50.0	57.5	52.5	20.3	1.2	20	700	15.5	6.0	20	8.0	MKCP4-900V356KHKL
40	35.0	50.0	57.5	52.5	20.3	1.2	20	800	17.0	5.0	20	8.0	MKCP4-900V406KHKL
45	35.0	60.0	57.5	52.5	20.3	1.2	20	900	16.5	5.0	21	8.0	MKCP4-900V456KHML
50	35.0	60.0	57.5	52.5	20.3	1.2	20	1000	18.5	4.0	21	8.0	MKCP4-900V506KHML
55	35.0	65.0	57.5	52.5	20.3	1.2	20	1100	19.0	4.0	22	8.0	MKCP4-900V556KHNL
55	45.0	57.0	57.5	52.5	20.3	1.2	20	1100	19.6	4.0	21	7.5	MKCP4-900V556KJLL
60	60.0	45.0	57.5	52.5	20.3	1.2	20	1200	22.0	3.5	19	6.0	MKCP4-900V606KMJL
60	35.0	80.0	57.5	52.5	20.3	1.2	20	1200	20.5	3.5	28	8.0	MKCP4-900V606KHQL
65	45.0	65.0	57.5	52.5	20.3	1.2	20	1300	22.0	3.0	22	7.5	MKCP4-900V656KJNL

Rated Voltage $U_N$ : 1100Vdc (70° C: 1300Vdc, 85° C: 1100Vdc, 105° C: 800Vdc)									Voltage test between terminals $U_{TT}$ : 1650 Vdc /10s				
Nominal capacitance $C_N$ <sup>(2)</sup> (μF)	Dimensions						$dv/dt$ (V/μs)	Maximum peak current $\hat{i}$ <sup>(3)</sup> (A)	Irms [Arms] <sup>(4)</sup>	ESR <sup>(5)</sup> (typ.) (mΩ)	ESL <sup>(6)</sup> (typ.) (nH)	Rth <sup>(7)</sup> (KW)	Part number <sup>(8)</sup>
	21.5	38.5	43.0	37.5	10.2	1.0							
7	21.5	38.5	43.0	37.5	10.2	1.0	45	310	8.5	11.5	18	13.0	MKCP4-1100V705KEHI
8	21.5	38.5	43.0	37.5	10.2	1.0	45	360	9.5	10.0	18	13.0	MKCP4-1100V805KEHI
10	24.0	44.0	42.0	37.5	10.2	1.0	45	459	11.0	8.0	19	12.0	MKCP4-1100V106KEII
10	25.0	45.0	57.5	52.5	10.2	1.2	23	230	8.5	16.0	19	11.0	MKCP4-1100V106KFJL
12	30.0	45.0	42.0	37.5	20.3	1.0	45	540	13.5	6.5	19	9.5	MKCP4-1100V126KGJL
15	25.0	45.0	57.5	52.5	10.2	1.2	23	340	10.5	10.5	19	11.0	MKCP4-1100V156KFJL
15	30.0	55.0	42.0	37.5	20.3	1.0	45	670	15.0	5.5	21	9.5	MKCP4-1100V156KGLI
20	30.0	45.0	57.5	52.5	20.3	1.2	23	460	12.5	8.0	19	9.5	MKCP4-1100V206KGJL
22	35.0	50.0	57.5	52.5	20.3	1.2	23	500	14.5	7.0	20	8.0	MKCP4-1100V226KHKL
25	35.0	50.0	57.5	52.5	20.3	1.2	23	550	15.0	6.5	20	8.0	MKCP4-1100V256KHKL
30	35.0	60.0	57.5	52.5	20.3	1.2	23	690	16.5	5.0	21	8.0	MKCP4-1100V306KHML
35	35.0	65.0	57.5	52.5	20.3	1.2	23	800	18.0	4.5	22	8.0	MKCP4-1100V356KHNL
35	45.0	57.0	57.5	52.5	20.3	1.2	23	800	18.0	4.5	21	7.5	MKCP4-1100V356KJLL
40	60.0	45.0	57.5	52.5	20.3	1.2	23	920	22.0	4.0	19	6.0	MKCP4-1100V406KMJL
40	35.0	80.0	57.5	52.5	20.3	1.2	23	920	19.0	4.0	29	8.0	MKCP4-1100V406KHQL
45	45.0	65.0	57.5	52.5	20.3	1.2	23	1000	19.5	4.0	22	7.5	MKCP4-1100V456KJNL

(2) Nominal capacitance at 1kHz, Capacitance tolerance ±10%

(3) Maximum permitted repetitive current amplitude during continuous operation

(4) Maximum ripple current (rms) at 1k -10 kHz, ambient 85° C

(5) Equivalent series resistance typical values at 10 kHz

(6) Equivalent series inductance typical values at 1 MHz

(7) Thermal resistance

(8) "Long-Life" respective "High-Humidity" THB-type (85° C/85% RH) available on request. Part number suffix: "T".

## Type test

No.	Item	Performance	Test method
1	Robustness of Terminal	Tensile strength	No abnormality such as breaking or loosening of terminal Force: 20N Duration: 10 ±1s
		Bending strength	No abnormality such as breaking or loosening of terminal Force: 20N Duration: 2s-3s /bend Bending: 90° x 4 times
2	Resistance to soldering heat	Capacitance: within ±0.5% of the initial value measured Tanδ (at 10kHz): initial value measured + 0.5% or less Appearance: no remarkable abnormality	No pre drying, method 1A Solder bath: 260 ± 5° C Duration: 10 ± 1s
3	Vibration	Capacitance: within ±0.5% of the initial value measured Tanδ (at 10kHz): initial value measured + 0.5% or less Appearance: no remarkable abnormality	Frequency range: from 10 to 55 Hz Sweep time: 1 octave/min. Amplitude: ± 0.35mm Test duration: 10 frequency cycle per axis Direction: 3 axes offset from each other by 90°
4	Shock of impact	Capacitance: within ± 0.5% of the initial value measured Tanδ (at 10kHz): initial value measured + 0.5% or less Appearance: no remarkable abnormality	Pulse shape: Half-sine Acceleration: 490 m/s <sup>2</sup> Duration of pulse: 11ms
5	Voltage test between terminal	Capacitance: within ± 0.5% of the initial value measured Tanδ (at 10kHz): initial value measured + 0.5% or less	$U_N \times 1.5$ for 60s
6	Self-healing test	Capacitance: within ± 0.5% of the initial value measured Tanδ (at 10kHz): initial value measured x 1.2 + 0.01% or less Appearance: no remarkable abnormality	Applied $U_N \times 1.5$ for 10s. If fewer than 5 clearings occur during 10s, Applied voltage is increased at 100 V/s until 5 clearings have occurred or until the voltage has reached $U_N \times 2.5$ . Clearing = voltage drop of 5%
7	Change of temperature	Capacitance: within ± 2% of the initial value measured Tanδ (at 10kHz): initial value measured x 1.5 or less Dielectric strength: no puncturing of flashover Self-healing punctures are permitted Appearance: no remarkable abnormality	$T_{MAX}$ : 105° C $T_{MIN}$ : - 40° C Transition time: 1h Number of cycle: 5
8	Damp heat steady state	Capacitance: within ± 2% of the initial value measured Tanδ (at 10kHz): initial value measured x 1.5 or less Dielectric strength: no puncturing of flashover Self-healing punctures are permitted Appearance: no remarkable abnormality	Ambient temperature: 40+ 2° C Humidity: RH 93 ± 3% Duration: 56 days
9	Endurance	Capacitance: within ± 3% of the initial value measured Tanδ (at 10kHz): initial value measured x 1.5 or less	Step1: Applied voltage : $U_N \times 1.4$ Ambient temperature : 85° C Duration : 250h Step2: Discharge 1000 times at $1.4 \times I_{peak}$ Ambient temperature: room temp. Step3: Applied voltage : $U_N \times 1.4$ Ambient temperature : 85° C Duration : 250h

## Voltage and current derating curves

