



# SPECIFICATION FOR APPROVAL

File No.: O/FRK 0.GS.E.C42-C15

Product Name      Box-type Metallized Polypropylene Film Interference Suppression Capacitor (Class X2)

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Product Type      MKP62

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Product Code      C42Q2104K66A605

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Customer

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Customer Code

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Issue Date      2021-09

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Xiamen Faratronic Co. Ltd.			Approved by Customer
Drafted	Checked	Approved	
			



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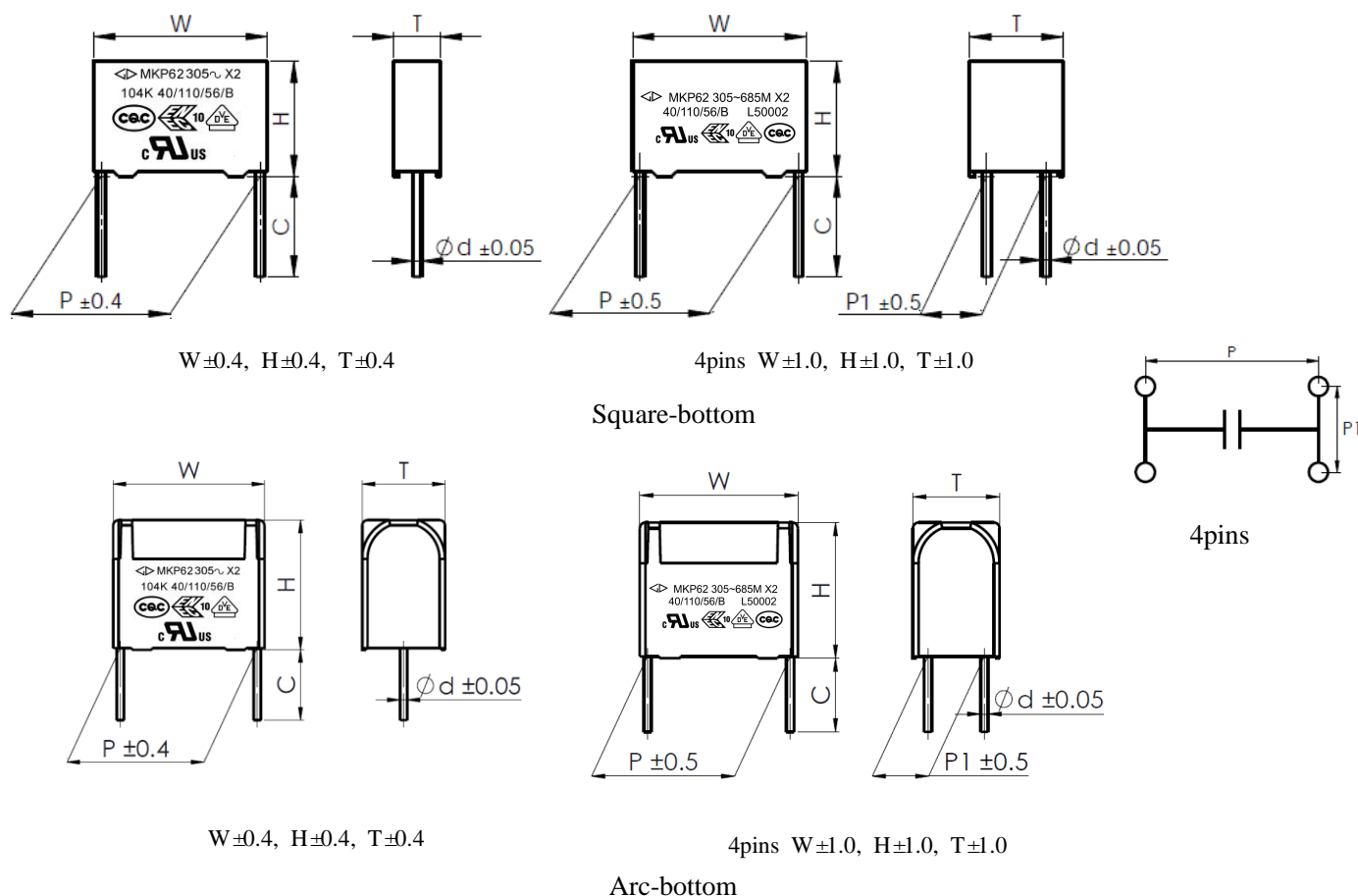
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**Version history**

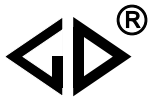
Current version	Date	Author	Change description

**Metallized polypropylene film interference suppression capacitor(Class X2, 305Vac/275Vac)**
**■ Outline Drawing**

**■ Features**

- Metallized polypropylene structure
- Withstanding overvoltage stressing
- Excellent active and passive flame resistant abilities
- Used in across-the-line, interference suppression circuit.

**■ Safety Approvals**

●		CQC	IEC 60384-14:2013, X2, 305Vac/275Vac, 0.0010μF~50.0μF, 40/110/56/B Certificate No.: CQC03001002875
●		ENEC-VDE	EN 60384-14:2013+A1: 2016, X2, 305Vac/275Vac, 0.0010μF~50.0μF, 40/110/56/B Certificate No.: 40000358
●		UL-CUL	UL 60384-14:2009, CSA E60384-14:09, X2, 305Vac/275Vac, 0.0010μF~50.0μF, 40/110/56/B File No.: E186600, CCN: FOWX2/8
●		KC	K60384-14(2006-12), X2, 305Vac/275Vac, 0.0010μF~3.0μF, 40/110/56/B Certificate No.: SU03060-12001A/12002/12003/12004



■ Specifications

Class	Class X2		
Climatic Category / Passive Flammability	40/110/56/B		
Operating Temperature Range	-40°C ~ +110°C		
Rated Voltage (U <sub>R</sub> )	305Vac/275Vac, 50/60Hz		
Maximum continuous DC voltage	630Vdc		
Capacitance Range	0.1μF		
Capacitance Tolerance	±10%(K), ±20%(M)		
Voltage Proof	Between Terminals	4.3U <sub>R</sub> (dc), 2s	
	Between Terminals To Case	2 120Vac, 1min	
Insulation Resistance	R≥15 000MΩ, C <sub>N</sub> ≤0.33μF RC <sub>N</sub> ≥5 000s, C <sub>N</sub> >0.33μF (20°C, 100V, 1min)		
Dissipation Factor	0.0010μF≤C <sub>N</sub> <0.010μF	≤20×10 <sup>-4</sup> (1kHz,20°C)	≤20×10 <sup>-4</sup> (10kHz,20°C)
	0.010μF≤C <sub>N</sub> <0.47μF	≤10×10 <sup>-4</sup> (1kHz,20°C)	≤20×10 <sup>-4</sup> (10kHz,20°C)
	0.47μF≤C <sub>N</sub> ≤1.0μF	≤20×10 <sup>-4</sup> (1kHz,20°C)	≤40×10 <sup>-4</sup> (10kHz,20°C)
	1.0μF<C <sub>N</sub> ≤10.0μF	≤30×10 <sup>-4</sup> (1kHz,20°C)	-----
	10.0μF<C <sub>N</sub> ≤50.0μF	≤40×10 <sup>-4</sup> (1kHz,20°C)	-----
<p>Note:</p> <ol style="list-style-type: none"> <li>1.Recommend for max rated supply mains voltage 250Vac application ;</li> <li>2.If used in application which has ripple current applied, recommend to use AC filter series: C6A etc; If have any questions please contact our technical engineer for more detail;</li> <li>3. For outdoor or severe humidity condition application, recommend to use THB series.</li> </ol>			



■ Part number system

The 15 digits part number is formed as follow:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	4	2												

Digit 1 to 3 Series code

C42=MKP62

Digit 4 to 5 A.C. rated voltage

Q2=305V P2=275V

Digit 6 to 8 Rated capacitance value

For example : 103=10×10<sup>3</sup> pF= 0.01μF

Digit 9 Capacitance tolerance

K=±10%, M=±20%

Digit 10 Pitch

3=7.5mm 4=10.0mm 6=15.0mm 9=22.5mm

B=27.5mm F=37.5mm M=52.5mm

Digit 11 Internal use

Digit 12 to 15 Lead form and packaging code

**Table1 Lead form and packaging code**

Digit 12		Digit 13		Digit 14		Digit 15	
code	explanation	code	explanation	code	explanation	code	explanation
A	ammo-pack	3	F=7.5mm	0	Straight	1	each cap. among two consecutive holes P3=12.7mm,H=18.5mm (For P=7.5mm)
		4	F=10.0mm				
		6	F=15.0mm				
C	straight lead "C" in the figure above	code	explanation	0		0	Length tolerance ±0.5mm or standard length
		00	standard lead length (18mm~26mm)				
		45	lead length 4.5mm				

Note: Recommend short lead due to long lead could deform easily.

**■ Dimensions(mm)**

305Vac						
$C_N$ ( $\mu F$ )	W	H	T	P	d	Part number
0.1	17.5	10.5	5.0	15.0	0.8	C42Q2104K66A605

**■ Maximum permissible voltage change per unit of time**

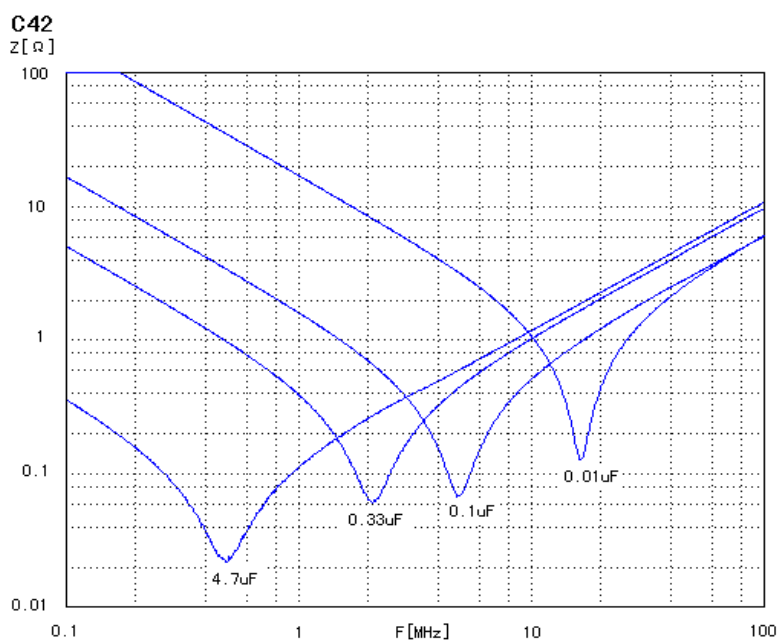
Rated Voltage (Vac)	dV/dt(V/us) at 440 Vdc						
	P=7.5mm	P=10mm	P=15mm	P=22.5mm	P=27.5mm	P=37.5mm	P=52.5mm
305	500	500	400	200	150	100	50

Note:

1. Rated voltage pulse slope  $(dV/dt)_R$  at rated voltage.
2. If the working voltage(U) is lower than the rated voltage( $U_R$ ),the capacitor can be worked at a higher dV/dt. In this case, the maximum allowed dV/dt is obtain by multiplying the right value with  $U_R/U$ .

**■ Impedance Vs. Frequency**

TYPICAL GRAPHS

 $Z=f(f)$  Typical values


**■ Test Method And Performance**

No.	Item	Performance	Test Method (IEC 60384-14)
1	4.5 Solderability	Good quality of tinning	Solder temperature: 245°C ±5°C Immersion time: 2.0s±0.5s
2	4.3 Terminal strength (straight lead)	There shall be no visible damage	Tense: 0.50<d≤0.80, 10N 0.80<d≤1.25, 20N Bend: 0.50<d≤0.80, 5N 0.80<d≤1.25, 10N The terminals shall be bent 2 times in each direction
3	4.4 Resistance to solder heat	There shall be no visible damage $\Delta C/C \leq \pm 5\%$ (relative to the initial value)	Solder temperature: 260°C ±5°C Immersion time: 10s ± 1s
4	4.20 Solvent resistance of the marking	The marking shall be legible	Solvent: Industrial isopropanol. Solvent temperature: 23°C ±5°C Dipping time: 5min ± 0.5min Condition: scrub Scrub material: absorbent cotton Reverting time: No
5	4.2 Initial measurement	Capacitance, Tgδ	
	4.6 Rapid change of temperature	There shall be no evidence of deterioration.	T <sub>A</sub> = -40°C, T <sub>B</sub> = +110°C 5 cycles Duration: t = 30min
	4.7 Vibration (straight lead)	There shall be no evidence of deterioration.	Amplitude 0.75mm or acceleration 100m/s <sup>2</sup> (whichever is the smaller severity), f: 10Hz to 500Hz. Three directions, 2h for each direction, total 6h.
	4.8 Bump (straight lead)	There shall be no evidence of deterioration.	4 000 times, Acceleration: 400m/s <sup>2</sup> , Pulse duration, 6ms
	Final measurement	There shall be no visible damage $\Delta C/C \leq \pm 5\%$ (relative to the initial value)	
6	4.11 Climate sequence	Initial measurement	
		Dry heat	+110°C, 16h
		Damp heat, Cyclic	Test Db, Severity: b, the first cycle
		Cold	-40°C, 2h
		Damp heat, cyclic other	Test Db, Severity b, the other cycles
		Final measurement	There shall be no visible damage, legible marking $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of tgδ: C <sub>N</sub> ≤ 1μF: ≤ 0.008 (10kHz) C <sub>N</sub> > 1μF: ≤ 0.005 (1kHz) Dielectric strength : there shall be no permanent breakdown or flashover I.R.: ≥ 50% of the rated value

No.	Item	Performance	Test Method (IEC 60384-14)
7	4.12 Damp heat steady state	There shall be no visible damage, legible marking $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $C_N \leq 1\mu\text{F}$ : $\leq 0.008$ (10kHz) $C_N > 1\mu\text{F}$ : $\leq 0.005$ (1kHz) Dielectric strength : there shall be no permanent breakdown or flashover I.R.: $\geq 50\%$ of the rated value	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93 \pm 3\% \text{RH}$ Duration: 56 days
8	4.13 Impulse voltage	There are three or more waveforms which indicate that no self-heating breakdown have occurred when it is monitored by the monitor	Each individual capacitor shall be subjected to 24 impulses of the same polarity (when any three successive impulses are shown by the monitor to have a wave form indicating that no self-heating breakdown have taken place the impulses can be stopped), the time between impulses shall not be less than 10S, and the peak value of the voltage impulse: 2.5kV (suitable for $C_N \leq 1\mu\text{F}$ ; When $C_N > 1\mu\text{F}$ , the capacitor can endure pulse voltage value is $2.5/\sqrt{C_N}$ kV)
9	4.14 Endurance	There shall be no visible damage, legible marking $\Delta C/C \leq \pm 10\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $C_N \leq 1\mu\text{F}$ : $\leq 0.008$ (10kHz) $C_N > 1\mu\text{F}$ : $\leq 0.005$ (1kHz) Dielectric strength : There shall be no breakdown or flashover I.R. : $\geq 50\%$ of the rated value	$+110^\circ\text{C}$ , $1.25U_R$ Va.c., 1 000h The voltage shall be subjected to 1000Vrms for 0.1s every one hour during test.
10	4.15 Charging and discharging	$\Delta C/C \leq \pm 10\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $C_N \leq 1\mu\text{F}$ : $\leq 0.008$ (10kHz) $C_N > 1\mu\text{F}$ : $\leq 0.005$ (1kHz) I.R.: $\geq 50\%$ of the rated value	Times: 10 000 Duration of charging: 0.5s Duration of discharging: 0.5s Charging voltage: $\sqrt{2} U_R$ Vd.c. Charging resistance: $220/C_N(\Omega)$ or the current $\leq 1.0\text{A}$ (whichever is the minor) Discharging resistance: $R = \frac{\sqrt{2}U_R}{C_N \times \frac{dU}{dt}} (\Omega)$ $C_N$ : Capacitance ( $\mu\text{F}$ ) $dU/dt$ (V/us) : 100V/ $\mu\text{s}$
11	4.17 Passive flammability	The flaming time of each capacitor shall not go beyond 10s after it is taken apart from the flame. Drop of each capacitor caused by flame shall not fire the tissue below.	Ref.item 4.17 Needle flame test The category of flammability: B Expose time: 1 time Capacitor Volume Exposing time $250 < V(\text{mm}^3) \leq 500$ 20s $500 < V(\text{mm}^3) \leq 1750$ 30s $V(\text{mm}^3) > 1750$ 60s



No.	Item	Performance	Test Method (IEC 60384-14)
12	4.18 Active flammability	The cheese cloth around the capacitor shall not burn with a flame.	The specimens shall be individually wrapped in at least 1, but not more than 2, complete layers of cheesecloth, the cheesecloth shall be untreated pure cotton cloth. Each sample shall be subjected to 20 discharges, the interval between successive discharges shall be 5s. $U_i = 2.5kV_0^{+7\%}$ $U_R$ be applied and be maintained for $120_0^{+10}$ s after the last discharge.

**■ Marking (example)**

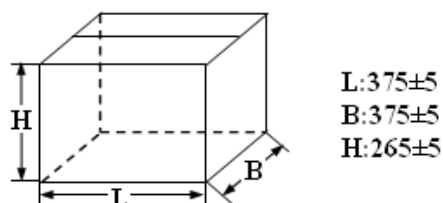
MKP62 305~ X2 474 M 40/110/56/B   Fig.1 P ≤ 27.5mm	MKP62 305~685M X2 40/110/56/B L50002  Fig.2 P > 27.5mm
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**Marking Introduction**

Sign	explain	Sign	explain
	Brand	40/110/56/B	Climate category / Passive Flammability Class
MKP62	Type		ENEC-VDE Approval
305~	Rated voltage		CQC Approval
X2	Class		UL,CUL Approval
104K	Rated capacitance and tolerance	L50002	

**■ Packing box sizes(mm)(example)**

1. Out packing box for bulk



2. Inner packing box for bulk

