SPECIFICATION FOR APPROVAL

File No.: Q/FRK 0.GS.E.C42.1-C05

Product Name	Box-type Metallized Polypropylene Film Interference Suppression Capacitor (Class X2, Miniature version)
Product Type	MKP62
Product Code	C42
Customer	
Customer Code	
Issue Date	2020-4

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

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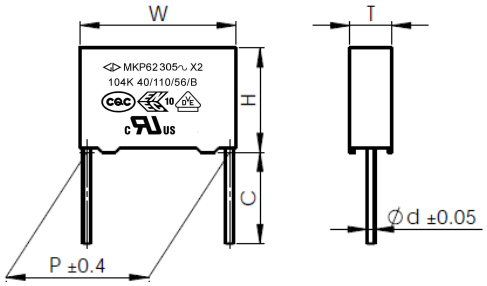
Version history

Current version	Date	Author	Change description

Metallized polypropylene film interference suppression capacitor
(Class X2, 305Vac/275Vac，Miniature version)

■ Outline Drawing



W±0.4, H±0.4, T±0.4

■ Features

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

■ 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	K 60384-14(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℃ ~ +110℃		
Rated Voltage (U_R)	305Vac/275Vac，50/60Hz		
Max rated supply mains voltage	250Vac，50/60Hz		
Maximum continuous DC voltage	560Vdc		
Capacitance Range	0.033μF～0.47μF		
Capacitance Tolerance	±10%(K), ±20%(M)		
Voltage Proof	Between Terminals	4.3U_R(dc), 2s	
	Between Terminals To Case	2 120Vac, 1min	
Insulation Resistance	R≥15 000MΩ， C_N≤0.33μF RC_N≥5 000s， C_N>0.33μF	(20℃, 100V ,1min)	
Dissipation Factor	0.033μF≤C_N<0.47μF	≤10×10^{-4}(1kHz,20℃)	≤20×10^{-4}(10kHz,20℃)
	C_N=0.47μF	≤20×10^{-4}(1kHz,20℃)	≤40×10^{-4}(10kHz,20℃)

Note:1. 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；
2.For outdoor or severe humidity condition application, recommend to use THB series.

■ 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=10×10^3 pF= 0.01μF

Digit 9 Capacitance tolerance

K= ±10%, M= ±20%

Digit 10 Pitch

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

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 4 6	F=7.5mm F=10.0mm F=15.0mm	0	Straight	1 5	each cap. among two consecutive holes P3=12.7mm,H=18.5mm (For P=7.5mm) P3=25.4mm;H=18.5mm (For pitch=10/15mm) (Detail parameter refer to page 11)
C	straight lead "C" in the figure above	code	explanation			0 2	Length tolerance ±0.5mm or standard length Length tolerance ±0.3mm
		00 45 35 32	standard lead length (18mm~26mm) lead length 4.5mm lead length 3.5mm lead length 3.2mm				
Note: Recommend short lead due to long lead could deform easily.							

■ Dimensions(mm)

305Vac/275Vac #							305Vac/275Vac #						
C_N (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number	C_N (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.033M	10.5	9.0	4.0	7.5	0.6	C42Q2333M3F****	0.10	17.5	9.5	5.0	15.0	0.6	C42Q2104-6F****
0.033K	10.5	11.0	5.0	7.5	0.6	C42Q2333K3F****	0.12	17.5	9.5	5.0	15.0	0.6	C42Q2124-6F****
0.039	10.5	11.0	5.0	7.5	0.6	C42Q2393-3F****	0.15	17.5	11.0	5.0	15.0	0.6	C42Q2154-6F****
0.047	10.5	11.0	5.0	7.5	0.6	C42Q2473-3F****	0.18M	17.5	11.0	5.0	15.0	0.6	C42Q2184M6F****
0.056	10.5	11.0	5.0	7.5	0.6	C42Q2563-3F****	0.18K	17.5	12.0	6.0	15.0	0.6	C42Q2184K6F****
0.068	10.5	12.0	6.0	7.5	0.6	C42Q2683-3F****	0.22M	17.5	11.5	5.5	15.0	0.6	C42Q2224M6G****
0.082	10.5	12.0	6.0	7.5	0.6	C42Q2823-3F****	0.22	17.5	12.0	6.0	15.0	0.6	C42Q2224-6F****
0.033	13.0	9.0	4.0	10.0	0.6	C42Q2333-4F****	0.27	17.5	13.5	7.5	15.0	0.6	C42Q2274-6F****
0.039	13.0	9.0	4.0	10.0	0.6	C42Q2393-4F****	0.27	17.5	12.5	9.0	15.0	0.6	C42Q2274-6G****
0.047	13.0	9.0	4.0	10.0	0.6	C42Q2473-4F****	0.27	17.5	17.5	6.0	15.0	0.6	C42Q2274-6H****
0.056	13.0	9.0	4.0	10.0	0.6	C42Q2563-4F****	0.33K	17.5	13.5	7.5	15.0	0.6	C42Q2334K6F****
0.068	13.0	11.0	5.0	10.0	0.6	C42Q2683-4F****	0.33M	17.5	12.0	7.0	15.0	0.6	C42Q2334M6G****
0.082	13.0	11.0	5.0	10.0	0.6	C42Q2823-4F****	0.33K	17.5	12.5	9.0	15.0	0.6	C42Q2334K6G****
0.10M	13.0	10.0	5.0	10.0	0.6	C42Q2104M4G****	0.33K	17.5	17.5	6.0	15.0	0.6	C42Q2334K6H****
0.10	13.0	11.0	5.0	10.0	0.6	C42Q2104-4F****	0.39	17.5	13.5	7.5	15.0	0.6	C42Q2394-6F****
0.12	13.0	12.0	6.0	10.0	0.6	C42Q2124-4F****	0.39	17.5	12.5	9.0	15.0	0.6	C42Q2394-6G****
0.15M	13.0	12.0	6.0	10.0	0.6	C42Q2154M4F****	0.39	17.5	17.5	6.0	15.0	0.6	C42Q2394-6H****
0.15K	13.0	13.0	7.0	10.0	0.6	C42Q2154K4F****	0.47M	17.5	14.0	8.0	15.0	0.6	C42Q2474M6F****
0.18	13.0	13.0	7.0	10.0	0.6	C42Q2184-4F****	0.47K	17.5	14.5	8.5	15.0	0.6	C42Q2474K6F****
0.22	13.0	14.0	8.0	10.0	0.6	C42Q2224-4F****	0.47M	17.5	12.5	9.0	15.0	0.6	C42Q2474M6G****
							0.47M	17.5	17.5	6.0	15.0	0.6	C42Q2474M6H****
							0.47K	17.5	18.5	7.5	15.0	0.8	C42Q2474K6H****

Note: 1. "-"=capacitance tolerance code, M=±20%,K=±10%

2. "****"=lead form and packaging mode code (refer to table 1)

3. "#"when the rated voltage is 275Vac,the digit 4~5 is P2.

4. Not for use in series with the mains, the capacitors for series with the mains, please refer to A.C. Capacitors for Capacitive Divider.

■ 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
305/275	500	500	400	200	150	100	50

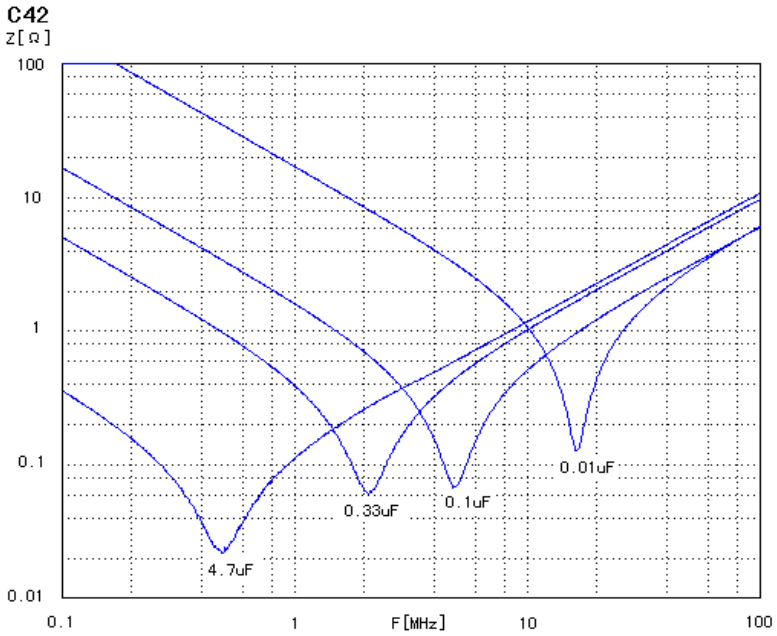
Note:

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



■ Quality ensuring test (before shipment):

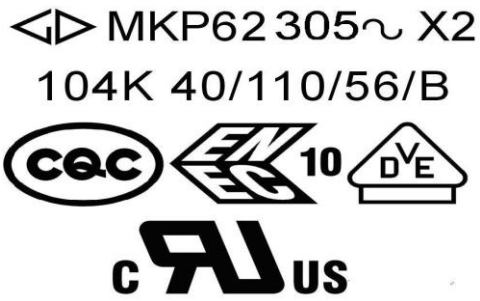
Inspection item（each batch）	Inspection level （GB/T 2828.1, ISO2859-1）	
	IL	AQL
Appearance inspection	II	1.5%
Dimensions		
Capacitance	II	0.25%
Tangent of the loss angle		
Dielectric strength		
Insulation resistance		
Solderability	S-3	2.5%

■ 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 ΔC/C ≤±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_A=-40˚C, T_B =+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^2 (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^2, Pulse duration, 6ms
	Final measurement		There shall be no visible damage ΔC/C≤±5%(relative to the initial value)	
6	4.11 Climate sequence	Initial measurement		
		Dry heat		+110℃, 16h
		Damp heat, Cyclic		Test Db, Severity: b, the first cycle
		Cold		-40℃, 2h
		Damp heat, cyclic other		Test Db, Severity b, the other cycles
		Final measurement	There shall be no visible damage, legible marking ΔC/C≤±5%(relative to the initial value) Increase of tgδ: C_N≤1μF: ≤0.008 (10kHz) C_N>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 ΔC/C ≤±5%(relative to the initial value) Increase of tgδ: C_N≤1μF: ≤0.008 (10kHz) C_N>1μF: ≤0.005 (1kHz) Dielectric strength : there shall be no permanent breakdown or flashover I.R.: ≥ 50% of the rated value	Temperature: 40˚C ±2˚C Humidity: 93±3%RH Duration: 56 days
8	4.14 Endurance	There shall be no visible damage, legible marking ΔC/C≤±10%(relative to the initial value) Increase of tgδ: C_N≤1μF: ≤0.008 (10kHz) C_N>1μF: ≤0.005 (1kHz) Dielectric strength : There shall be no breakdown or flashover I.R. : ≥ 50% of the rated value	+110˚C, 1.25U_RVa.c., 1 000h
9	4.15 Charging and discharging	ΔC/C ≤±10%(relative to the initial value) Increase of tgδ: C_N≤1μF: ≤0.008 (10kHz) C_N>1μF: ≤0.005 (1kHz) I.R.: ≥ 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(Ω) or the current ≤1.0A (whichever is the minor) Discharging resistance: $R=\frac{\sqrt{2}U_R}{C_N\times\frac{dU}{dt}}(\Omega)$ C_N: Capacitance (μF) dU/dt(V/us) : 100V/μs
10	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(mm^3)≤500 20s 500<V(mm^3)≤1750 30s V(mm^3)>1750 60s

■ Marking



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		

■ Taping specification for box-type capacitors

▲ Outline Drawing

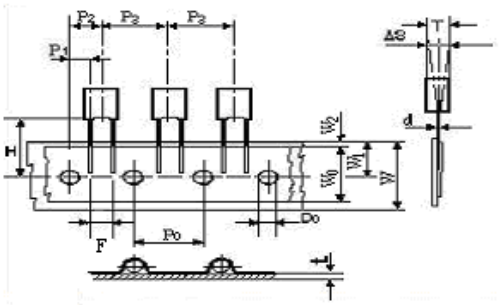


Fig.1 P=5.0, 7.5mm

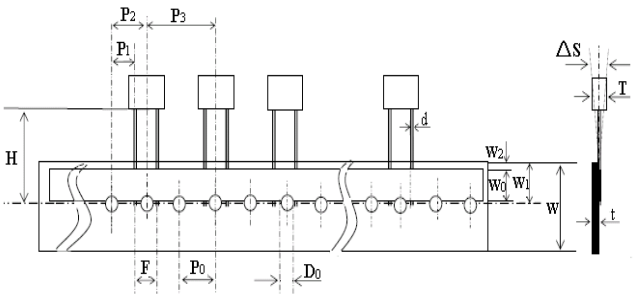


Fig.2 P=10.0, 15.0mm

▲ **Taping Dimensions(mm)**

Technology index title	Code	Dimensions				
		P=5.0	P=7.5	P=10.0	P=15.0	Tolerance
Taping type	—	Fig 1	Fig 1	Fig2	Fig 2	——
Part number Digit12-15	Ammo-pack	A201	A301	A405	A605	
Taping pitch	P_3	12.7	12.7	25.4	25.4	±1.0
Feed hole pitch	P_0	12.7	12.7	12.7	12.7	±0.3
Center of wire	P_1	3.85	2.6	7.7	5.2	±0.7
Center of body	P_2	6.35	6.35	12.7	12.7	±1.3
Pitch of taping wire	F**	5.0	7.5	10.0	15.0	+0.6 -0.1
Component alignment	△S	0	0	0	0	±2.0
Height of component from tape center	H***	18.5	18.5	18.5	18.5	±0.5
Carrier tape width	W	18.0	18.0	18.0	18.0	+1.0 -0.5
Hold down tape width	W_0	6min	10min	10min	10min	——
Hole position	W_1	9.0	9.0	9.0	9.0	±0.5
Hold down tape sition	W_2	3max	3max	3max	3max	——
Feed hole dia.	D_0	4.0	4.0	4.0	4.0	±0.2
Tape thickness	t	0.7	0.7	0.7	0.7	±0.2

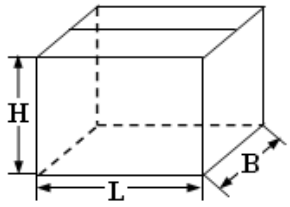
Note: * P_0=15mm is also available;

**F can be other lead spacing;

***H=16.5mm is available;

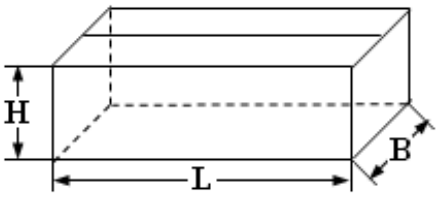
■ Packing box sizes(mm)(example)

1. Out packing box for bulk



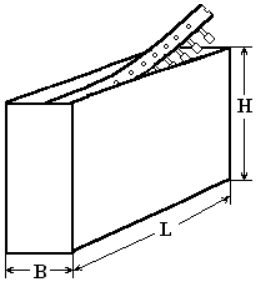
L:375±5
B:375±5
H:265±5

2. Inner packing box for bulk



L:355±3
B:175±3
H:118±3

3. Box sizes for Ammo-pack



L:350±3
B:50±3
H:260±3