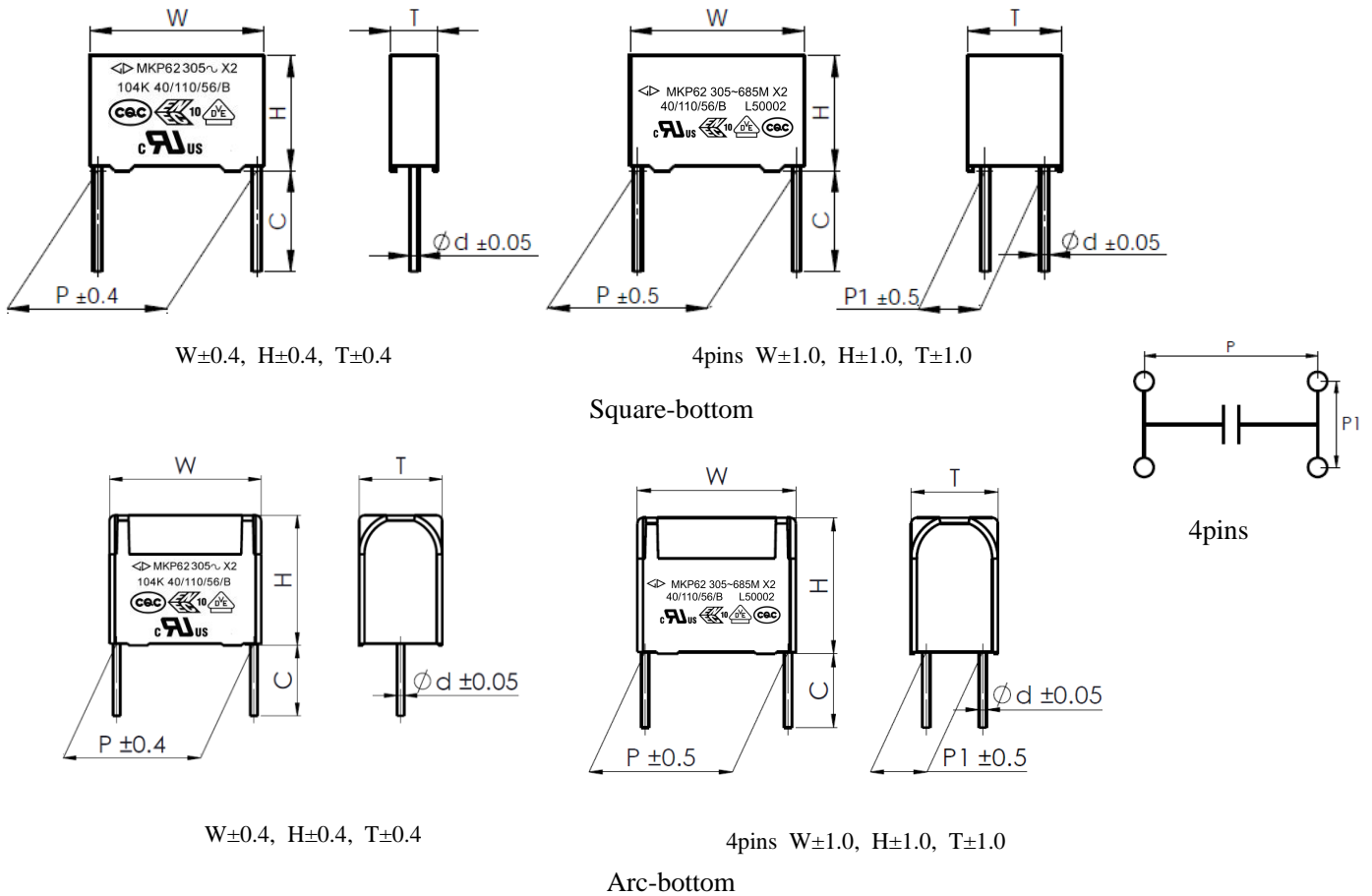


**Metallized polypropylene film interference suppression capacitor(Class X2, 305Vac/275Vac)**
**■ Outline Drawing**

**■ 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	0.0010μF~25.0μF		
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 (20°C, 100V, 1min) RC <sub>N</sub> ≥5 000s, C <sub>N</sub> >0.33μF		
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)	-----
Note: 1.Recommend for max rated supply mains voltage 250Vac application; 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; 3. 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<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) P3=25.4mm;H=18.5mm (For pitch=10/15mm) (Detail parameter refer to page 11) P3=38.1mm, H=18.5mm(For pitch=22.5/27.5mm)
		4	F=10.0mm			5	
		6	F=15.0mm			7	
		9	F=22.5mm				
C	straight lead “C” in the figure above	code	explanation			0 2	Length tolerance ±0.5mm or standard length Length tolerance ±0.3mm
		00	standard lead length (18mm~26mm)				
		45	lead length 4.5mm				
		35	lead length 3.5mm				
D	Insulated stranded leads	C5	35mm	K0	100mm	1	Length tolerance -5 mm~0 mm
		K0	100mm				
		K2	120mm				
		L0	200mm				
E	Insulated solid leads	L0	Note 1: This length includes the stripping parts. Note 2: Normally, for P≥27.5 Caps can choice Insulated leads.	K2	120mm	2	Length tolerance 0 mm~+5 mm
M	Insulated stranded leads Box with mounting foot	L0	Note 1: This length includes the stripping parts. Note 2: Normally, for P≥27.5 Caps can choice Insulated leads.	K2	120mm	3	Length tolerance 0 mm~+10mm
T	P1=20.3mm±0.5mm	45	lead length 4.5mm	K0	100mm	0	Length tolerance ±0.5mm or standard length
3	P1=20mm±0.5mm	55	lead length 5.5mm				

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



■ Dimensions(mm)

Standard version

Table with 3 main columns for different capacitor configurations, each with sub-columns for dimensions (W, H, T, P, d) and part numbers. It lists various capacitor models like C42Q2102-30\*\*\*\* and their physical specifications.

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

2.“\*\*\*\*”=lead form and packing 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.

5.“★” = Arc bottom of the outer shell.



■ Dimensions(mm)

High performance version

305Vac/275Vac #							305Vac/275Vac #						
C <sub>N</sub> (μF)	W	H	T	P	d	Part number	C <sub>N</sub> (μF)	W	H	T	P	d	Part number
0.022	10.5	9.0	4.0	7.5	0.6	C42Q2223-30****	0.22	26.5	15.0	6.0	22.5	0.8	C42Q2224-90****
0.027	10.5	11.0	5.0	7.5	0.6	C42Q2273-30****	0.27	26.5	16.0	7.0	22.5	0.8	C42Q2274-90****
0.033	10.5	11.0	5.0	7.5	0.6	C42Q2333-30****	0.33	26.5	16.0	7.0	22.5	0.8	C42Q2334-90****
0.039	10.5	12.0	6.0	7.5	0.6	C42Q2393-30****	0.39	26.5	17.0	8.5	22.5	0.8	C42Q2394-90****
0.047	10.5	12.0	6.0	7.5	0.6	C42Q2473-30****	0.47	26.5	17.0	8.5	22.5	0.8	C42Q2474-90****
0.033	13.0	11.0	5.0	10.0	0.6	C42Q2333-40****	0.56	26.5	18.5	10.0	22.5	0.8	C42Q2564-90****
0.039	13.0	11.0	5.0	10.0	0.6	C42Q2393-40****	0.68	26.5	18.5	10.0	22.5	0.8	C42Q2684-90****
0.047	13.0	11.0	5.0	10.0	0.6	C42Q2473-40****	0.82	26.5	22.0	12.0	22.5	0.8	C42Q2824-90****
0.056	13.0	11.0	5.0	10.0	0.6	C42Q2563-40****	1.0	26.5	22.0	12.0	22.5	0.8	C42Q2105-90****
0.068	13.0	12.0	6.0	10.0	0.6	C42Q2683-40****	1.2	26.5	24.5	15.5	22.5	0.8	C42Q2125-90****
0.082	13.0	12.0	6.0	10.0	0.6	C42Q2823-40****	1.5	26.5	24.5	15.5	22.5	0.8	C42Q2155-90****
0.10	13.0	12.0	6.0	10.0	0.6	C42Q2104-40****	0.82	32.0	20.0	11.0	27.5	0.8	C42Q2824-B0****
0.12	13.0	14.0	8.0	10.0	0.6	C42Q2124-40****	1.0	32.0	20.0	11.0	27.5	0.8	C42Q2105-B0****
0.15	13.0	14.0	8.0	10.0	0.6	C42Q2154-40****	1.2	32.0	22.0	13.0	27.5	0.8	C42Q2125-B0****
0.010	17.5	11.0	5.0	15.0	0.8	C42Q2103-60****	1.5	32.0	22.0	13.0	27.5	0.8	C42Q2155-B0****
0.012	17.5	11.0	5.0	15.0	0.8	C42Q2123-60****	1.8	32.0	24.5	15.0	27.5	0.8	C42Q2185-B0****
0.015	17.5	11.0	5.0	15.0	0.8	C42Q2153-60****	2.2	32.0	28.0	14.0	27.5	0.8	C42Q2225-B0****
0.018	17.5	11.0	5.0	15.0	0.8	C42Q2183-60****	2.7	32.0	33.0	18.0	27.5	0.8	C42Q2275-B0****
0.022	17.5	11.0	5.0	15.0	0.8	C42Q2223-60****	3.3	32.0	33.0	18.0	27.5	0.8	C42Q2335-B0****
0.027	17.5	11.0	5.0	15.0	0.8	C42Q2273-60****	3.9	32.0	37.0	22.0	27.5	0.8	C42Q2395-B0****
0.033	17.5	11.0	5.0	15.0	0.8	C42Q2333-60****	4.7	32.0	37.0	22.0	27.5	0.8	C42Q2475-B0****
0.039	17.5	11.0	5.0	15.0	0.8	C42Q2393-60****	1.5	41.0	22.0	11.0	37.5	1.0	C42Q2155-F0****
0.047	17.5	11.0	5.0	15.0	0.8	C42Q2473-60****	★1.8	41.0	26.0	12.0	37.5	1.0	C42Q2185-F0****
0.056	17.5	11.0	5.0	15.0	0.8	C42Q2563-60****	★2.2	41.0	26.0	12.0	37.5	1.0	C42Q2225MF0****
0.068	17.5	11.0	5.0	15.0	0.8	C42Q2683-60****	2.2K	42.0	28.0	14.0	37.5	1.0	C42Q2225KF0****
0.082	17.5	11.0	5.0	15.0	0.8	C42Q2823-60****	2.7	42.0	28.0	14.0	37.5	1.0	C42Q2275-F0****
0.10	17.5	11.0	5.0	15.0	0.8	C42Q2104-60****	3.3	41.0	30.0	16.0	37.5	1.0	C42Q2335-F0****
0.12	17.5	12.0	6.0	15.0	0.8	C42Q2124-60****	3.9	41.0	32.0	17.0	37.5	1.0	C42Q2395-F0****
0.15	17.5	12.0	6.0	15.0	0.8	C42Q2154-60****	4.7	41.0	33.5	18.5	37.5	1.0	C42Q2475-F0****
0.18	17.5	13.5	7.5	15.0	0.8	C42Q2184-60****	5.6	41.0	37.0	22.0	37.5	1.0	C42Q2565-F0****
0.22	17.5	13.5	7.5	15.0	0.8	C42Q2224-60****	6.8	41.0	37.0	22.0	37.5	1.0	C42Q2685-F0****
0.27	17.5	14.5	8.5	15.0	0.8	C42Q2274-60****	8.2	41.0	41.0	26.0	37.5	1.0	C42Q2825-F0****
0.33	17.5	16.0	10.0	15.0	0.8	C42Q2334-60****	10.0	41.0	43.0	28.0	37.5	1.0	C42Q2106-F0****
0.39	17.5	19.0	11.0	15.0	0.8	C42Q2394-60****							
0.47	17.5	19.0	11.0	15.0	0.8	C42Q2474-60****							

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

2. “\*\*\*\*”=lead form and packing 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

5.“★” = Arc bottom of the outer shell.

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

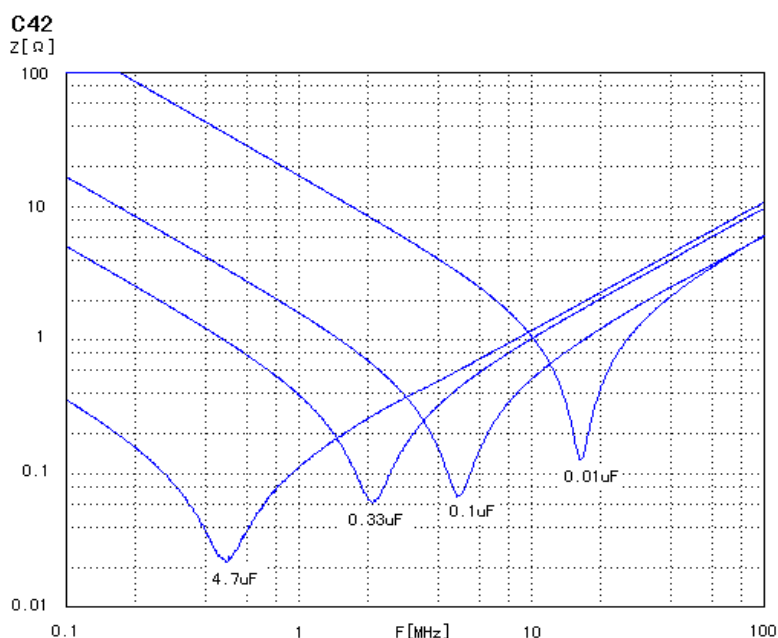
Rated Voltage (Vac)	dV/dt(V/us) at 440 Vdc						
	P=7.5mm	P=10mm	P=15mm	P=22.5mm	P=27.5mm	P=37.5mm	P=52.5mm
305	500	500	400	200	150	100	50

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

**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 $\Delta C/C \leq \pm 5\%$ (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-healing 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 474M 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	

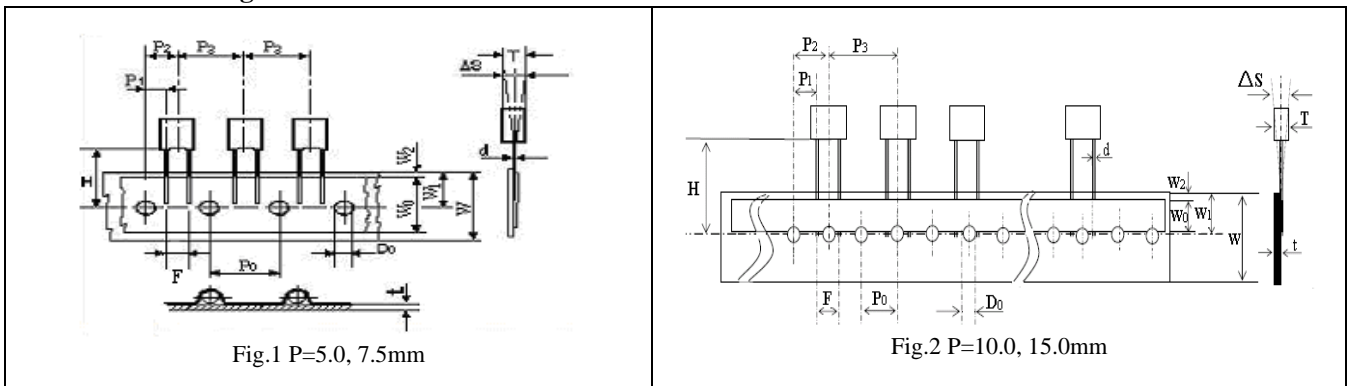
**■ Taping specification for box-type capacitors**
**▲ Outline Drawing**


Fig.1 P=5.0, 7.5mm

Fig.2 P=10.0, 15.0mm

**▲ Taping Dimensions(mm)**

Technology index title	Code	Dimensions				Tolerance
		P=5.0	P=7.5	P=10.0	P=15.0	
Taping type	—	Fig 1	Fig 1	Fig2	Fig 2	—
Part number Digit12-15	Ammo- pack	A201	A301	A405	A605	
Taping pitch	P <sub>3</sub>	12.7	12.7	25.4	25.4	±1.0
Feed hole pitch	P <sub>0</sub>	12.7	12.7	12.7	12.7	±0.3
Center of wire	P <sub>1</sub>	3.85	2.6	7.7	5.2	±0.7
Center of body	P <sub>2</sub>	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 <sub>0</sub>	6min	10min	10min	10min	—
Hole position	W <sub>1</sub>	9.0	9.0	9.0	9.0	±0.5
Hold down tape sition	W <sub>2</sub>	3max	3max	3max	3max	—
Feed hole dia.	D <sub>0</sub>	4.0	4.0	4.0	4.0	±0.2
Tape thickness	t	0.7	0.7	0.7	0.7	±0.2

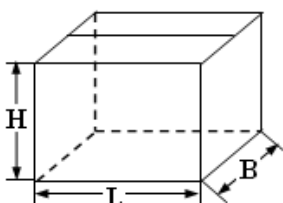
**Note:** \* P<sub>0</sub>=15mm is also available;

\*\*F can be other lead spacing;

\*\*\*H=16.5mm is available;

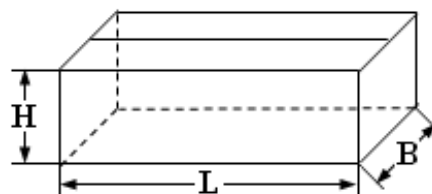
**■ Packing box sizes(mm)(example)**

1. Out packing box for bulk



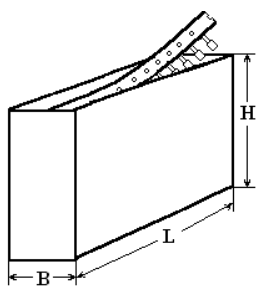
L:375±5  
B:375±5  
H:265±5

2. Inner packing box for bulk



L:355±3  
B:175±3  
H:118±3

3. Box sizes for Ammo-pack



L:  $350 \pm 3$

B:  $50 \pm 3$

H:  $260 \pm 3$

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[B32022B3223K026](#) [B32912A3104K026](#) [46KI3470DQM1K](#) [B32913A3154K](#) [B81123C1102M003](#) [MKPY2-.02230020P15](#)  
[46KN333000M1M](#) [46KN422000P0M](#) [DE1E3KX222MJ4BN01F](#) [46KR422000M1K](#) [HUB2200-S](#) [46KF268000M1M](#) [46KI3150NDM2M](#)  
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