SPECIFICATION FOR APPROVAL

Customer:	
Type:	**Box-type MKP61 Metallized Polypropylene Film Interference Suppression Capacitor (X2 Class)**
Customer code:	
Co. code:	
Date:	

	"√"	Signed by customer	Specification
Approved			
Approved conditionally			
Rejected			

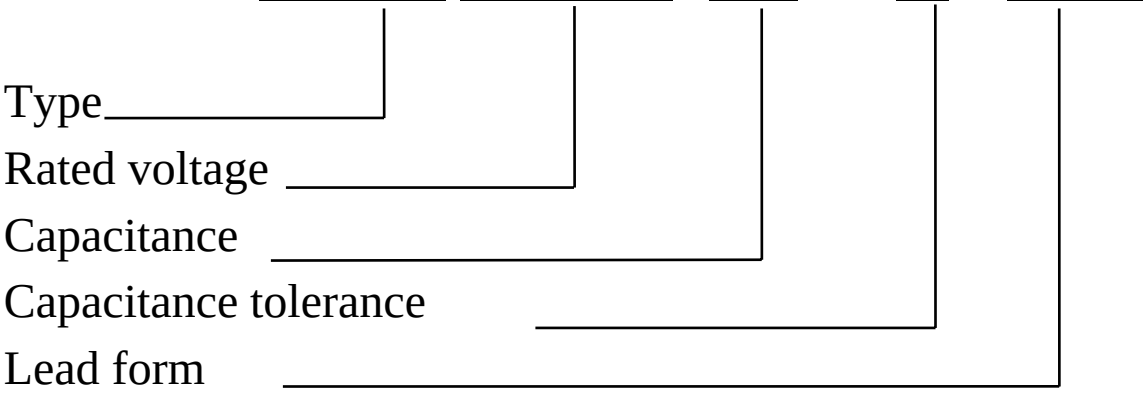
厦门法拉电子股份有限公司

XIAMEN FARATRONIC Co.，Ltd.

Box-type Metallized Polypropylene Film Interference Suppression Capacitor (X2 Class) (Type MKP61)

Purchase Specification

MKP61 275Va.c. 104 M P15.0



Capacitance tolerance:

Capacitance tolerance	±10%	±20%
Code	K	M

Lead form:

Code	P	P7.5	P10.0	P15.0	P22.5	P27.5
Lead form	straight lead	Lead pitch 7.5mm	Lead pitch 10.0mm	Lead pitch 15.0mm	Lead pitch 22.5mm	Lead pitch 27.5mm
Note	Pitch in common use					

Box-type Metallized Polypropylene Film Interference Suppression Capacitor (X2 Class) (Type MKP61)

1 Feature:

The capacitor is wound with polypropylene film as dielectric and the zinc、aluminum on the film which is evaporated on the vacuum as electrode. Radial lead, the capacitor is enveloped in a plastic box with insulation material filled. It can withstand overvoltage stressing and has excellent active and passive flame resistant abilities. As a X2 class capacitor, It is suitable for use in situation where failure of the capacitor could not lead to danger or electric shock such as across-the-line and interference suppression circuits of electronic equipment. It can endure impulse voltage of 2.5kV(suitable for $C_R \leq 1\mu F$; When $C_R > 1\mu F$, the capacitor can endure pulse voltage of $2.5/\sqrt{C_R}$ **kV**).

2 Reference standards

GB 2693 IEC 384-1	Fixed capacitor for use in electronic equipment Part 1: General specification
GB/T 14472 IEC 384-14	Fixed capacitor for use in electronic equipment Part 14：Sectional specification：Fixed capacitors for electromagnetic interference suppression and connection to the supply mains
GB/T 14473 IEC 60384-14-1	Fixed capacitor for use in electronic equipment Part 14 Blank detail specification：Fixed capacitors for electromagnetic interference suppression and connection to the supply mains Assessment level D
Q/FRK0.463.029	Detail specification for electronic component Fixed plastic box-type metallized polypropylene film dielectric capacitors for electromagnetic interference suppression and connection to the supply mains type MKP 61 Assessment level D
GB 2828	Sampling procedures and tables for lot-by-lot inspection by attributes

3 Approved with the following countries:

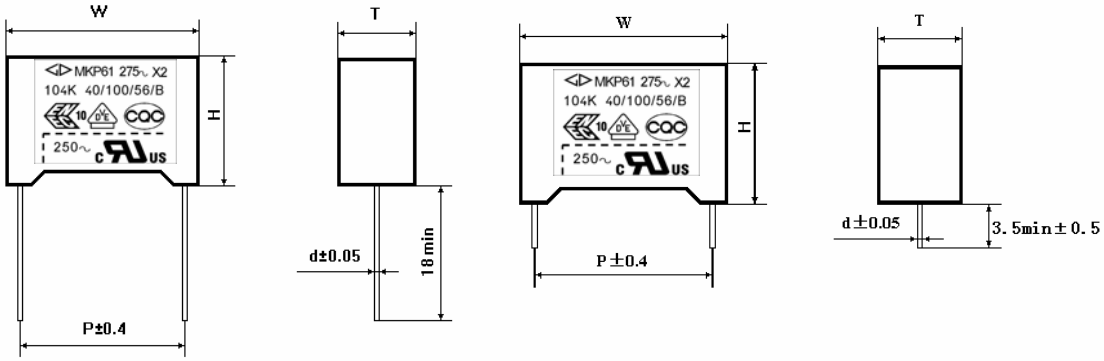
CQC	CQC (china)	GB/T 14472-1998, 275VAC, 0.0047μF~2.2μF Certificate No.: CQC03001002877
ENEC 10 DVE	ENEC-VDE (Germany)	EN 132400,IEC 60384-14, 275VAC, 0.0047μF~2.2μF Certificate No.: 40007424
RU	UL (America)	UL1414, 250VAC , 0.0047μF~1.0μF Certificate No.: E186600
c RU	CUL (Canada)	CSA C22.2-1, 250VAC, 0.0047μF~1.0μF Certificate No.: E186600

4 Quality Ensuring test (before shipment):

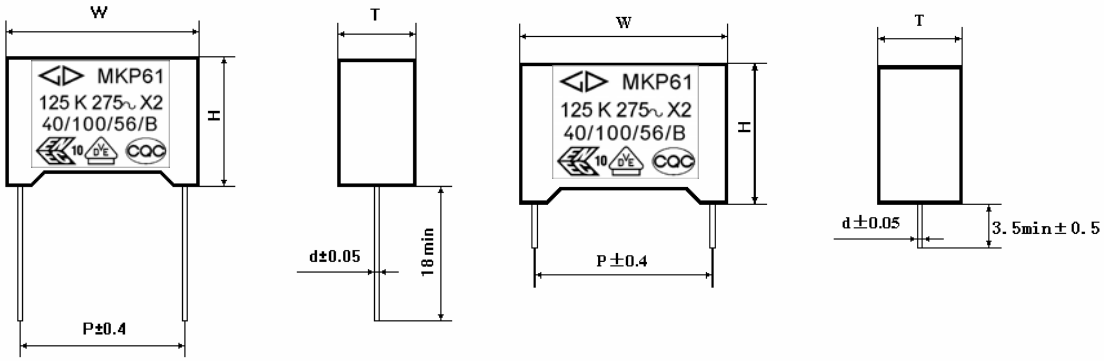
Inspection item	Inspection level （GB 2828）	
（each batch）	IL	AQL
1.Appearance inspection	II	1.5%
2.Dimensions		
1.Capacitance	II	0.25%
2.Tangent of the loss angle		
3.Dielectric strength		
4.Insulation resistance		
1.Solderability	S-3	2.5%

5 Dimensions and marking:

Ⅰ（$C_R \leqslant 105$）



Ⅱ（$C_R > 105$）



Box-type Metallized Polypropylene Film Interference Suppression Capacitor (X2 Class) (Type MKP61)

Dimensions:

unit: mm

脚距 (Pitch) P	≤10	>10
Lead Wire Dia.d±0.05	0.6	0.8
Dimension Tolerance (W, H, T)	W+0.4/-0.7, H±0.4, T±0.4	

电容量 (μF)	250/275VAC											
	P=10.0			P=15.0			P=22.5			P=27.5		
0.0047	13.0	9.0	4.0									
0.0056	13.0	9.0	4.0									
0.0068	13.0	9.0	4.0									
0.0082	13.0	9.0	4.0									
0.01	13.0	9.0	4.0	18.0	11.0	5.0						
0.012	13.0	9.0	4.0	18.0	11.0	5.0						
0.015	13.0	9.0	4.0	18.0	11.0	5.0						
0.018	13.0	11.0	5.0	18.0	11.0	5.0						
0.022	13.0	11.0	5.0	18.0	11.0	5.0						
0.027	13.0	11.0	5.0	18.0	11.0	5.0						
0.033 M	13.0	11.0	5.0	18.0	11.0	5.0						
0.033 K	13.0	12.0	6.0	18.0	11.0	5.0						
0.039	13.0	12.0	6.0	18.0	11.0	5.0						
0.047	13.0	12.0	6.0	18.0	11.0	5.0						
0.056				18.0	12.0	6.0						
0.068				18.0	12.0	6.0						
0.082				18.0	12.0	6.0						
0.1 M				18.0	12.0	6.0						
0.1 K				18.0	13.5	7.5						
0.12				18.0	13.5	7.5	26.5	15.0	6.0			
0.15				18.0	14.5	8.5	26.5	15.0	6.0			
0.18 M				18.0	16.0	10.0	26.5	15.0	6.0			
0.18 K				18.0	16.0	10.0	26.5	16.0	7.0			
0.22				18.0	16.0	10.0	26.5	16.0	7.0			
0.27							26.5	17.0	8.5			
0.33							26.5	17.0	8.5			
0.39							26.5	18.5	10.0	32.0	18.0	9.0
0.47							26.5	18.5	10.0	32.0	18.0	9.0
0.56										32.0	20.0	11.0
0.68										32.0	20.0	11.0
0.82										32.0	22.0	13.0
1.0										32.0	22.0	13.0
1.2										32.0	28.0	14.0
1.5										32.0	28.0	14.0
1.8										32.0	33.0	18.0
2.2										32.0	33.0	18.0

6 Specification：

（一） Rated Characteristic (Testing temperature: 20℃)

(1) Rated voltage:250/275Vrms 50/60Hz

(2) Capacitance: 4 700pF～2.2μF E12 series

(3) Capacitance tolerance: K(±10%),M(±20%)

(4) Tangent of the loss angle

Capacitance	tgδ(max)	
	test frequency	
	1kHz	10kHz
4 700pF<C_R≤0.47μF	10×10^{-4}	20×10^{-4}
0.47μF <C_R≤1.0μF	20×10^{-4}	70×10^{-4}
C_R>1.0μF	30×10^{-4}	-

(5) Dielectric strength:

①Between terminals:1183(Vd.c.),2～5s

there shall be no permanent breakdown or harmful deformation.

②Between terminal and enclosure:2050(Va.c.), 2～5s

there Shall be no permanent breakdown or harmful deformation.

(6) Insurance resistance:

①Between terminals**:** Measurement shall be carried out after applying 100V for 1min.

CR≤0.33μF I.R.≥15000MΩ,

CR>0.33μF RC≥5 000s

②Between terminal and enclosure: I.R.≥30000MΩ, Measurement shall be carried out after applying 100V for 1min.

(7) Climatic category: -40℃～+100℃

（二）、Characteristics testing

NO.	Item	Specification	Testing Method (IEC 384-14)
1	Dielectric strength		Ref.item 4.2.1
	Between terminals	There shall be no permanent breakdown or flashover	1 183Vd.c.，2～5s
	Between terminal and enclosure	There shall be no permanent breakdown or flashover	2 050Va.c.，50/60Hz，2～5s
2	I.R. Between terminals	C_R≤0.33μF I.R.≥15000MΩ C_R>0.33μF RC≥5 000s	Ref.item 4.2.5 Charging voltage: 100Vd.c. Measuring after charging for 1min
	I.R. Between terminal and enclosure	I.R.≥30 000MΩ	
3	Capacitance	K(±10%)，M(±20%)	Ref. item 4.2.2 1kHz, 5Vrms max.
4	Tangent of the loss angle (Tgδ)	Capacitance / tgδ(max) 1kHz / 10kHz 4 700pF<C_R≤0.47μF: 10×10^{-4} / 20×10^{-4} 0.47μF<C_R≤1.0μF: 20×10^{-4} / 70×10^{-4} C_R>1.0μF: 30×10^{-4} / –	Ref. item 4.2.3 1kHz or 10kHz，5Vrms max
5	Solderability	Terminals shall be examined by 8× to 12× linear magnifier in oblique light. Solder shall cover the tested terminals. Beyond 95% of the dipped terminals shall be covered with new solder. Pin holes and voids not wetted or falled off shall not be collected in one area.	Ref. item 4.5 Solder bath method Ta, method 1 Soldering temperature:235±5℃ Dipping time:2.0±0.5S
6	Terminal strength	There shall be no visible damage	Ref. item 4.3 Tense: 10N Bend: 5N, The terminals shall be bent 2 times in each direction
7	Resistance to soldering heat	There shall be no visible damage ΔC/C ≤±5%(relative to the initial value)	Ref. item 4.4 Solder bath method Tb, method 1A 260±5℃,10±1S
8	Solvent resistance of the marking	The marking shall be legible	Ref. item.4.20 Method 1
9	Rapid change of temperature	There shall be no visible damage	Ref. item 4.6, θ_A=-40℃，θ_B=+100℃ Duration：t=30min, 5 cycles
	Vibration	There shall be no visible damage	Ref. item 4.7 Amplitude:0.75mm or acceleration:98m/s^2 (whichever is the smaller severity) Frequency:10～500Hz, Three directions, altogether 6h
	Bump		Ref. item 4.8 4 000 times, Acceleration:390m/s^2 Duration:6ms
	Final measurement	There shall be no visible damage ΔC/C ≤±5%(relative to the initial value)	Ref. item 4.8.2

(continued)

NO.	Item	Specification	Testing Method (IEC 384-14)
10 climatic sequence	Initial measurement		Ref. item 4.11
	Dry heat		+100℃,16h
	Damp heat, cyclic		Test Db, Severity:b, the first cycle
	Cold		-40℃,2h
	Damp heat, cyclic		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_R≤1μF；≤0.008（10kHz） C_R>1μF；≤0.005（1kHz） Dielectric strength(No.1):there shall be no permanent breakdown or flashover I.R.：≥ 50% of the rated value (No.2)	
11	Damp heat, steady state	There shall be no visible damage and the marking shall be legible ΔC/C ≤±5%(relative to the initial value) Increase of tgδ:C_R≤1μF；≤0.008（10kHz） C_R>1μF；≤0.005（1kHz） Dielectric strength(No.1):there shall be no permanent breakdown or flashover I.R.：≥ 50% of the rated value (No.2)	Ref.item.4.12 Temperature：40±2℃ Humidity：93^{+2}_{-3}%RH Duration：56days
12	Impulse voltage	There are three or more waveforms which indicate that no self-heating breakdown have occurred when it is monitored by the monitor	Ref. item 4.13 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 CR≤1μF；When CR>1μF，the capacitor can endure pulse voltage value is $2.5/\sqrt{C_R}$ kV)
	Endurance	There shall be no visible damage, legible marking ΔC/C≤±10%(relative to the initial value) Increase of tgδ: C_R≤1μF；≤0.008（10kHz） C_R>1μF；≤0.005（1kHz） Dielectric strength(No.1) : There shall be no breakdown or flashover I.R.：≥ 50% of the rated value (No.2)	Ref. item 4.14 +100℃, 344Va.c., 1 000h The voltage shall be subjected to 1000Vrms for 0.1s every one hour during test.

(continued)

NO.	Item	Specification	Testing Method (IEC 384-14)
13	Charging and discharging	ΔC/C ≤±10%(relative to the initial value) Increase of tgδ: C_R≤1μF；≤0.008（10kHz） C_R>1μF；≤0.005（1kHz） I.R.：≥ 50% of the rated value (No.2)	Ref. item 4.15 Times：10 000 Duration of charging：0.5s Duration of discharging：0.5s Charging voltage: 550Vd.c. Charging resistance: 220/C_R(Ω) or the current ≤1.0A (whichever is the minor) Discharging resistance： $R=\frac{550}{C_R\times dU/dt}=\frac{5.50}{C_R}(\Omega)$ C_R: Capacitance (μF) dU/dt(V/us) : 100V/μs
14	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

7、Packing and shipment:

7.1 Bulk packing

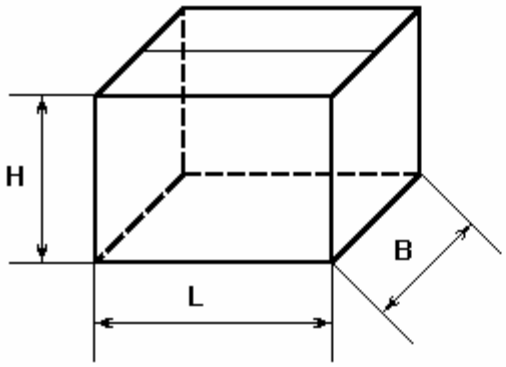
7.1.1 The capacitors shall be packed with plastic bag, which contains a qualified bill in the plastic bag(min. package). Then several plastic bags are put into a small packing box sealed with adhesive paper. A big packing box comprises four small packing boxes. Packing with small or big box depends on the customer's purchase quantity.

7.1.2 The dimensions of packing boxes refer to the drawing in the following page.

7.2 For the packing box with capacitors, all kinds of shipments are permitted. but the sprinkle of rain or snow and mechanical damage must be avoided.

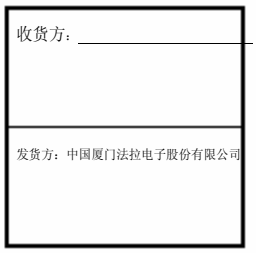
Big packing box dimension drawing

L: 377mm B: 377mm H: 267mm



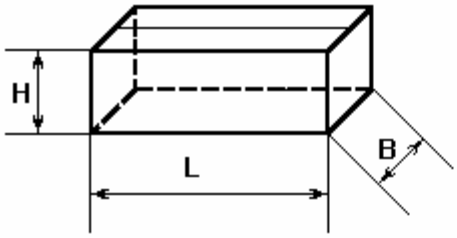
Plane Drawing

Overlook Drawing

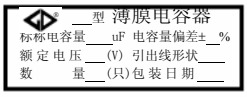


Small packing box dimension drawing:

L: 353mm B: 175mm H: 118mm



Plane Drawing



Overlook Drawing