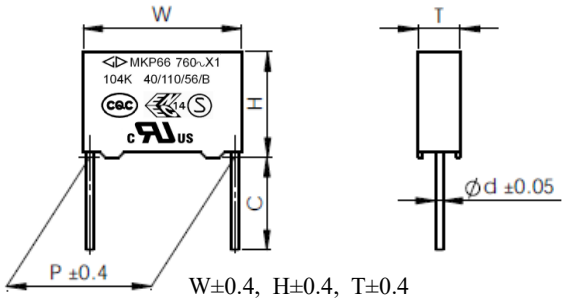
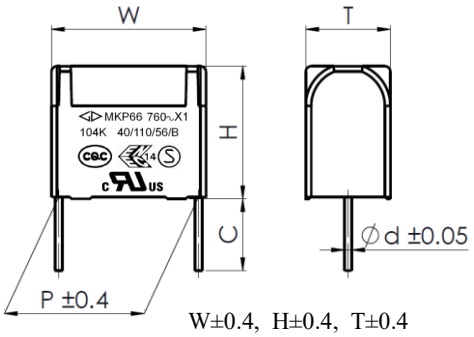
Metallized polypropylene film interference suppression capacitor (Class X1, 760Vac)

■ Outline Drawing



W±0.4, H±0.4, T±0.4

Square-bottom



W±0.4, H±0.4, T±0.4

Arc-bottom

■ Features

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

■ Safety Approvals

•	CQC	CQC	IEC 60384-14:2013, X1,760Vac, 0.0010μF~10μF, 40/110/56/B Certificate No.: CQC08001026517
•	ENEC-SEMKO	ENEC-SEMKO	EN 60384-14:2013, X1,760Vac, 0.0010μF~10μF, 40/110/56/B Certificate No.: SE/0366-3B
•	c UL us	UL/CUL	UL60384-14:2014, CSA E60384-14:09, X1, 760Vac, 0.0010μF~2.2μF, 40/110/56/B Certificate No.: E186600, CCN: FOWX2/8

■ Specifications

Class	Class X1		
Climatic Category / Passive Flammability Category	40/110/56/B		
Operating Temperature Range	-40℃ ~ +110℃		
Rated Voltage (U_R)	760Vac, 50/60Hz		
Maximum continuous DC voltage	1 500Vdc		
Capacitance Range	0.0010μF~2.2μF		
Capacitance Tolerance	±10%(K), ±20%(M)		
Voltage Proof	Between Terminals:	4.3U_R(dc), 2s	
	Between Terminals To Case:	3020 (Vac), 1min	
Insulation Resistance	R≥15 000MΩ , C_N≤0.33μF RC_N≥5 000s, C_N>0.33μF	(20℃, 500V ,1min)	
Dissipation Factor(tanδ)	0.0010μF<C_N≤0.47μF	≤10×10^{-4}(1kHz,20℃)	≤20×10^{-4}(10kHz,20℃)
	0.47μF<C_N≤1.0μF	≤20×10^{-4}(1kHz,20℃)	≤40×10^{-4}(10kHz,20℃)
	1.0μF<C_N	≤30×10^{-4}(1kHz,20℃)	----------

■ 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	6												

Digit 1 to 3 Series code

C46=MKP66

Digit 4 to 5 A.C. rated voltage

V2=760V

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

6=15.0mm 9=22.5mm

B=27.5mm F=37.5mm

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	6	F=15.0mm	0	straight	5	P3=25.4mm;H=18.5mm (For pitch=15mm) (Detail parameter refer to page 15)
C	straight lead "C" in the figure above	code	explanation			0	Length tolerance ±0.5mm Or standard length
		00	standard lead length (18mm~26mm)			2	Length tolerance ±0.3mm
		45	lead length 4.5mm				
		35	lead length 3.5mm				
		32	lead length 3.2mm				

■ Dimensions(mm)

760Vac						
C_N (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
2.2M	42.0	45.0	30.0	37.5	1.0	C46V2225MFWC450

■ Maximum permissible voltage change per unit of time

Rated Voltage （Vac）	dV/dt(V/us) at 1 075 Vdc			
	P=15mm	P=22.5mm	P=27.5mm	P=37.5mm
760	600	500	400	300

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.

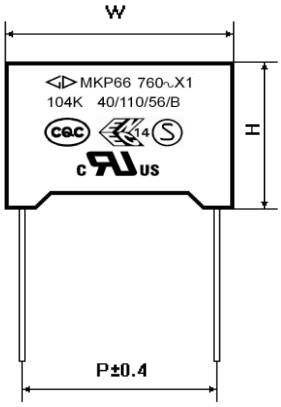
■ **Test Method And Performance**

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		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.	θ_A=-40˚C, θ_B =+110˚C 5 cycles Duration: t=30min
	4.7 Vibration		There shall be no evidence of deterioration.	Amplitude 0.75mm or acceleration 98m/s^2 (whichever is the smaller severity), f: 10Hz to 500Hz. Three directions, 2h for each direction,total 6h.
	4.8 Bump		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^{+2}_{-3} %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: 4.0kV (suitable for C_N≤1μF; When C_N>1μF, the capacitor can endure pulse voltage value is $4.0/\sqrt{C_N}$ kV)
9	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 The voltage shall be subjected to 1000Vrms for 0.1s every one hour during test.
10	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)
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(mm^3)≤500 20s 500<V(mm^3)≤1750 30s V(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 discharged, the interval between successive discharges shall be 5s. U_i=4.0kV $^{+7}_{0}$ % U_R be applied and be maintained for 120^{+10}_{0} s after the last discharge.

■ Marking



Marking Introduction:

Sign	explain	Sign	explain
◁▷	Brand	40/110/56/B	Climate category / Passive Flammability Class
MKP66	Type	CQC	CQC Approval
760~	Rated voltage	ENEC	ENEC-SEMKO Approval
X1	Class	cULus	UL&CUL Approval
104K	Rated capacitance and tolerance		

■ Taping specification for box-type capacitors

▲ Outline Drawing

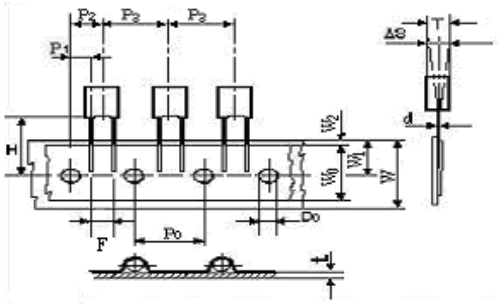


Fig.1 P=5.0, 7.5mm

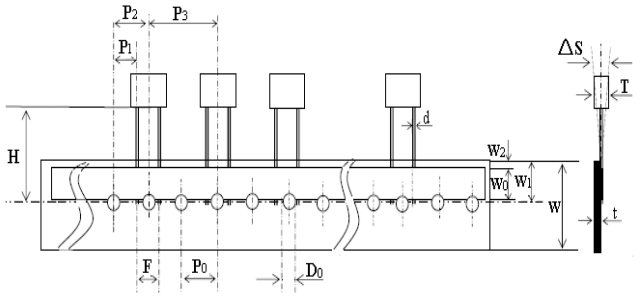


Fig.2 P=10.0, 15.0mm

▲ Taping Dimensions(mm)

▲ Packing Quantity

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

Pitch (mm)	Box thinkness T(mm)	Ammo-pack (pcs/box)	
		Domestic	Export
5.0	2.5	2500	2 000
	3.5	1 700	1 500
	4.5	1 400	1 300
	5.0	1 200	1 000
	6.0	1 000	800
7.5	3.5	1 700	1 500
	4.0	1 500	1 350
	5.0	1 200	1 050
	6.0	1 000	850
10.0/ 15.0	4.0	750	650
	5.0	600	500
	6.0	500	450
15.0	7.5	400	350
	8.5	350	300
	10.0	300	250
	11.0	250	220

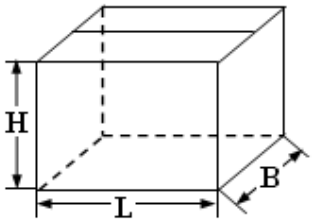
Note: * P_0=15mm is also available;

**F can be other lead spacing;

***H=16.5mm is available;

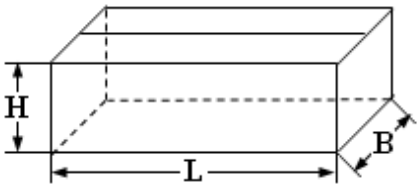
■ Packing box sizes(mm)

1. Out packing box for bulk



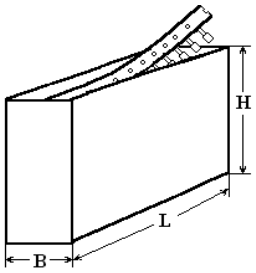
L:375±5
B:375±5
H:265±5

2. Inner packing box for bulk



L:355±3
B:175±3
H:118±3

3. Box sizes for Ammo-pack



L:330±3
B:48±3
H:260±3