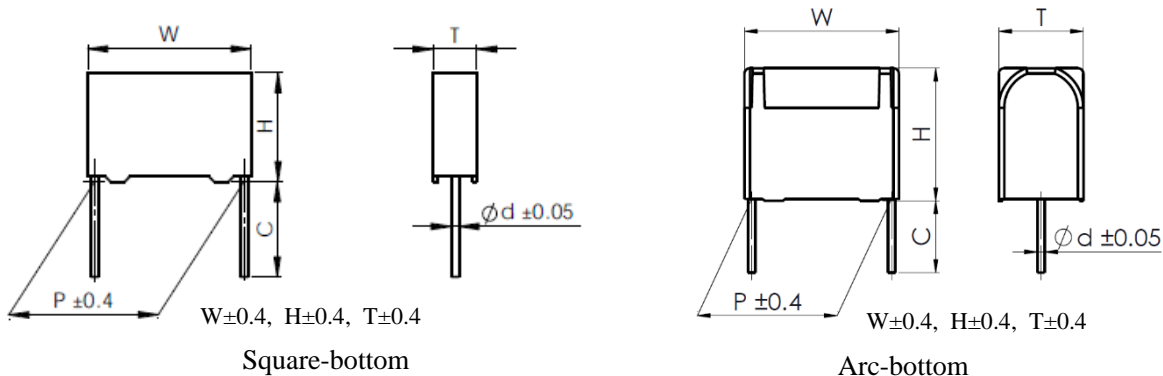


**Version history**

Current version	Date	Author	Change description

## Metallized polypropylene film interference suppression capacitor (Class X2, THB Miniature Version) (Temperature Humidity Bias series)

### ■ Outline Drawing



### ■ Features

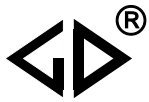
- AEC-Q200 qualified
- High stability of capacitance under severe ambient condition, such as high temperature and high humidity
- Good self-healing properties, withstanding surge voltage stressing
- Excellent active and passive flame resistant abilities

### ■ Applications

- For connection in series with the mains
- For capacitive divider power supply
- Such as power meter, LED driver, and other severe ambient condition applications.

### ■ Specifications

Reference Standard	GB/T 6346.14 (IEC60384-14)		
Safety Approvals	CQC03001002875; ENEC-VDE:40000358; UL-CUL: E186600, CCN: FOWX2/8		
Class	Class X2		
Climatic Category / Passive Flammability Category	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	0.15μF ~ 8.2μF		
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 <sub>≥</sub> 15 000MΩ , C <sub>N</sub> ≤0.33μF (20°C, 100V, 1min) R <sub>CN</sub> ≥5 000s, C <sub>N</sub> >0.33μF		
Dissipation Factor	CN≤1.0μF	≤10×10 <sup>-4</sup> (1kHz,20°C)	≤20×10 <sup>-4</sup> (10kHz,20°C)
	CN>1.0μF	≤20×10 <sup>-4</sup> (1kHz,20°C)	≤40×10 <sup>-4</sup> (10kHz,20°C)
THB test (Damp heat test with loading)	Temperature: 85°C±2°C; Humidity: 85%RH±2% RH Voltage: 240Vac 50Hz; Duration: 1 000 hours  Capacitance change (ΔC/C): ≤10% Dissipation factor change (Δtan δ): ≤0.5% (1kHz) Insulation resistance: ≥50% of the rated value		
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.			



■ 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
D	4	2								Z				

Digit 1 to 3 Series code

D42=MKP62 for automotive

Digit 4 to 5 A.C. rated voltage

Q2=305V P2=275V

Digit 6 to 8 Rated capacitance value

For example : 474=47×10<sup>4</sup> pF=0.47uF

Digit 9 Capacitance tolerance

K=±10% M=±20%

Digit 10 Pitch

6=15.0mm 9=22.5mm B=27.5mm

Digit 11 Internal use

Digit 12 to 15 Lead form and packaging code

**Table 1 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=10/15mm)
C	straight lead "C" in the figure above	Code	explanation			0	Length tolerance ±0.5mm Or standard length Length tolerance ±0.3mm
		00	standard lead length (18mm~26mm)			2	
		45	lead length 4.5mm				
		35	lead length 3.5mm				
		32	lead length 3.2mm				
Note: Recommend short lead due to long lead could deform easily.							



■ Dimensions(mm)

305Vac/275Vac #						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.15	17.5	13.5	6.0	15.0	0.6	D42Q2154-6Z***
0.22	17.5	13.5	7.5	15.0	0.6	D42Q2224-6Z***
0.33M	17.5	14.5	8.5	15.0	0.6	D42Q2334M6Z***
0.33K	17.5	15.0	9.0	15.0	0.6	D42Q2334K6Z***
0.39	17.5	16.0	10.0	15.0	0.6	D42Q2394-6Z***
0.47	17.5	16.5	11.0	15.0	0.8	D42Q2474-6Z***
0.56	17.5	19.0	11.0	15.0	0.8	D42Q2564-6Z***
0.68	17.5	22.0	11.0	15.0	0.8	D42Q2684-6Z***
0.33	26.5	16.0	7.0	22.5	0.6	D42Q2334-9Z***
0.39	26.5	16.0	7.0	22.5	0.6	D42Q2394-9Z***
0.47	26.5	17.0	7.5	22.5	0.8	D42Q2474-9Z***
0.56	26.5	17.0	8.5	22.5	0.8	D42Q2564-9Z***
0.68	26.5	18.5	9.0	22.5	0.8	D42Q2684-9Z***
0.82	26.5	18.5	10.0	22.5	0.8	D42Q2824-9Z***
1.0	26.5	20.0	11.0	22.5	0.8	D42Q2105-9Z***
1.2	26.5	22.0	12.0	22.5	0.8	D42Q2125-9Z***
1.5	26.5	22.0	13.0	22.5	0.8	D42Q2155-9Z***
1.8	26.5	24.5	14.5	22.5	0.8	D42Q2185-9Z***
2.2	26.5	24.5	15.5	22.5	0.8	D42Q2225-9Z***

305Vac/275Vac #						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
1.0	32.0	20.0	11.0	27.5	0.8	D42Q2105-BZ***
1.2	32.0	22.0	11.0	27.5	0.8	D42Q2125-BZ***
1.5	32.0	22.0	12.0	27.5	0.8	D42Q2155-BZ***
1.8	32.0	25.0	13.0	27.5	0.8	D42Q2185-BZ***
2.2	32.0	26.0	14.0	27.5	0.8	D42Q2225-BZ***
★2.7	32.0	27.0	16.0	27.5	0.8	D42Q2275-BZ***
3.3	32.0	30.0	16.0	27.5	0.8	D42Q2335-BZ***
3.9	32.0	33.0	18.0	27.5	0.8	D42Q2395-BZ***
★4.7	32.0	34.0	20.0	27.5	0.8	D42Q2475-BZ***
★5.6	32.0	37.0	22.0	27.5	0.8	D42Q2565-BZ***
★6.8	32.0	38.0	24.0	27.5	0.8	D42Q2685-BZ***
★8.2M	32.0	38.0	24.0	27.5	0.8	D42Q2825MBZ***

- Note:
1. “-”=capacitance tolerance code, K=± 10%, M=± 20%
  2. “\*\*\*”=lead form and packing code (refer to table 1)
  3. “#”when the rated voltage is 275Vac,the digit 4~5 is P2.
  4. If used in the 380Vac, Pls refer to MKP65. Pls contact our technical engineer for more details.
  5. “★” = Arc-bottom of the outer shell.



■ Test Method And Performance

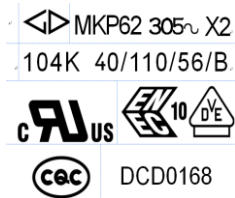
No.	Item	Performance	Test Method (IEC 60384-14)
1	4.5 Solderability	Good quality of tinning	Solder temperature: 245°C ±5°C Immersion time: 2.0s±0.5s
2	4.3 Terminal strength (straight lead)	There shall be no visible damage	Tense: 0.50<d≤0.80, 10N 0.80<d≤1.25, 20N Bend: 0.50<d≤0.80, 5N 0.80<d≤1.25, 10N 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	4.14 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	$+110^\circ\text{C}$ , $1.25U_R \text{Va.c.}$ , 1 000h The voltage shall be subjected to $1000\text{Vrms}$ for 0.1s every one hour during test.
9	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: $\sqrt{2} U_R \text{Vd.c.}$ 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 ( $\mu\text{F}$ ) $dU/dt(\text{V}/\mu\text{s})$ : $100\text{V}/\mu\text{s}$
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.	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

**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%

**Marking(example)**

**Marking Introduction:**

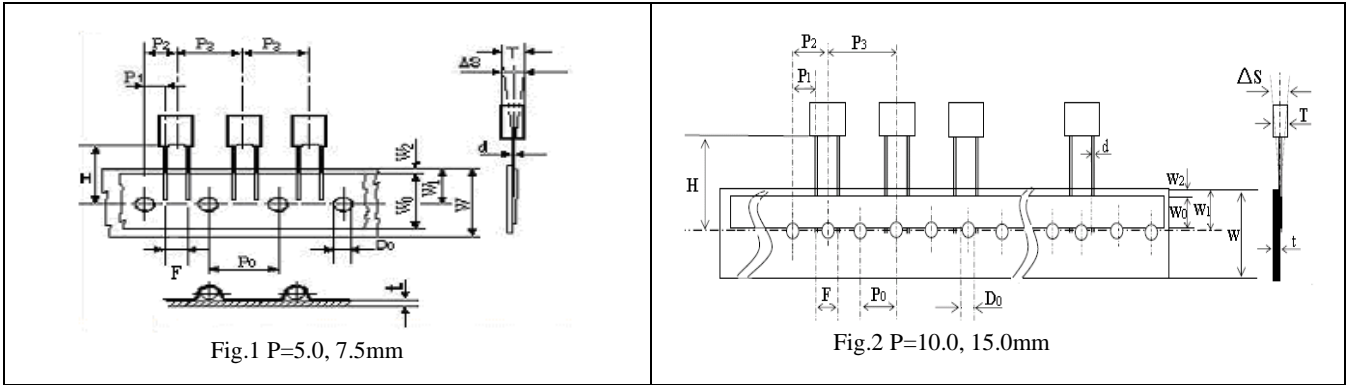
Sign	explain	Sign	explain
	Brand		ENEC-VDE Approval
MKP62	Type		CQC Approval
305~	Rated voltage		UL, CUL Approval
X2	Class	40/110/56/B	Climate category / Passive Flammability Class
104K	Rated capacitance and tolerance	DCD0168	Lot number information





■ Taping specification for box-type capacitors

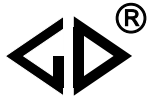
▲ Outline Drawing



▲ Taping Dimensions(mm)

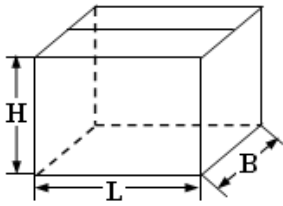
Technology index title	Code	Dimensions				Tolerance
		P=5.0	P=7.5	P=10.0	P=15.0	
Taping type	—	Fig 1	Fig 1	Fig2	Fig 2	—
Part number Digit12-15	Ammo-pack	A201	A301	A405	A605	
Taping pitch	P <sub>3</sub>	12.7	12.7	25.4	25.4	±1.0
Feed hole pitch	P <sub>0</sub>	12.7	12.7	12.7	12.7	±0.3
Center of wire	P <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	ΔS	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;



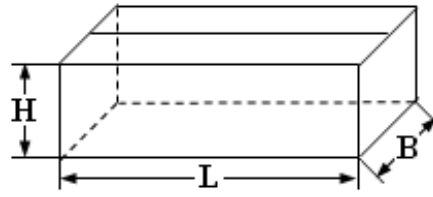
■ Packing box sizes(mm)(example)

1. Out packing box for bulk



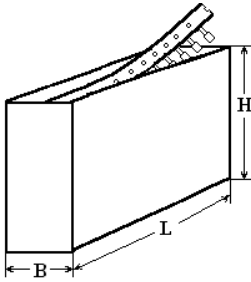
L:375±5  
B:375±5  
H:265±5

2. Inner packing box for bulk



L:355±3  
B:175±3  
H:118±3

3. Box sizes for Ammo-pack



L:350±3  
B:50±3  
H:260±3