SPECIFICATION FOR APPROVAL

Product Name	Metallized polypropylene film capacitor (Box-type)
Product Type	C32(MKP21 Series)
Product Code	C323A331K31****
Customer	
Customer Code	
Issue Date	2015-5

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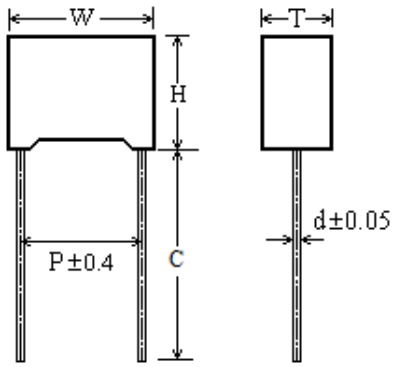
Metallized polypropylene film capacitor (Box-type)

■Outline Drawing



W±0.4, H±0.4, T±0.4

■ Features

- Metallized polypropylene structure
- Low loss at high frequency
- Small inherent temperature rise
- Plastic case（UL94 V-0），Epoxy resin sealing

■ Typical application

- Widely used in high frequency, DC,AC and pulse circuits
- S-correction circuits for TV sets and monitors

■ Specifications

Reference Standard	GB/T 10190 (IEC 60384-16)
Climatic Category	40/105/21
Rated temperature	85℃
Operating temperature	-40℃~105℃ (+85℃ to +105℃: decreasing factor 1.25% per ℃ for VR(DC))
Rated Voltage	160Vdc(90Vac); 250Vdc(160Vac); 400Vdc(220Vac); 630Vdc(250Vac); 1 000Vdc(400Vac); 1 600Vdc(500Vac); 2 000Vdc(700Vac)
Capacitance Range	0.00056~15.0μF
Capacitance Tolerance	±2% (G), ±3% (H), ±5%(J), ±10% (K), ±20% (M)
Voltage Proof	$1.6U_R$ (5s)
Dissipation Factor	$\leq 10\times10^{-4}$(20℃, 1kHz)
Insulation Resistance	≥50 000MΩ, $C_R \leq 0.33\mu F$; ≥15 000s, $C_R > 0.33\mu F$ (20℃, 100V, 1min)

Part number system

The 18 digits part number is formed as follow:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
C	3	2															

Digit 1 to 3 Series code of film capacitor

C32=MKP21

Digit 4 to 5 D.C. rated voltage

2C=160V 2E=250V 2G=400V

2J=630V 3A=1000V 3C=1600V

3D=2000V

Digit 6 to 8 Rated capacitance value

For example : 103=10×10^3 pF= 0.01μF

Digit 9 Capacitance tolerance

G=±2%, H=±3%, J=±5%

K=±10%, M=±20%

Digit 10 Pitch

2=5.0mm 3=7.5mm 4=10mm

6=15mm 9=22.5mm B=27.5mm

Digit 11 Internal use

Digit 12 to 15 Lead form and packaging code

Digit 16 to 18 Internal use

■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	2 3 4 6	F=5.0mm 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 pitch=5.0/7.5mm) 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
		00	standard lead length (18mm~26mm)				
		45	lead length 4.5mm				
		32	lead length 3.2mm				
		35	lead length 3.5mm				

■ Dimensions (mm)

1000Vdc (400Vac)						
C (μF)	W	H	T	P	d	Part number
0.00033	10.5	9.0	4.0	7.5	0.6	C323A331K31****

Note: 1. "-"=capacitance tolerance code, M=±20%,K=±10%,J=±5%, H=±3%,G=±2%

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

■ Maximum permissible voltage change per unit of time

Rated Voltage (V)	dV/dt(V/us)					
	P=5.0mm	P=7.5mm	P=10mm	P=15mm	P=22.5mm	P=27.5mm
1000	/	2000	2200	2000	800	/

Note:

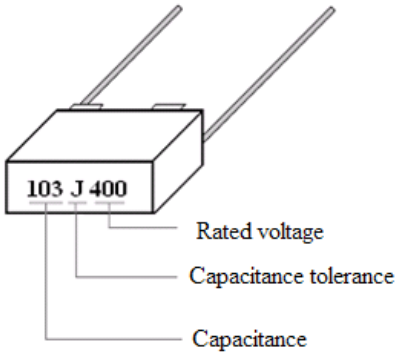
1. Rated voltage pulse slope $(dV/dt)_R$ at rated voltage.
2. If the working voltage(U) is lower than the rated voltage(U_R),the capacitor can be worked at a higher dV/dt. In this case, the maximum allowed dV/dt is obtain by multiplying the right value with U_R/U.

2 Test Method And Performance：

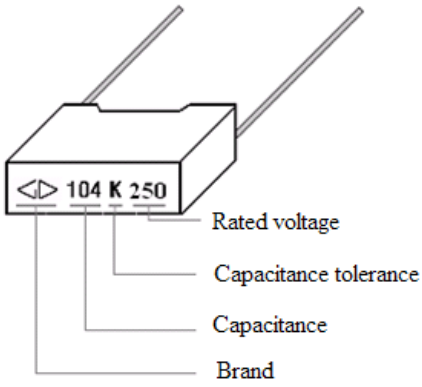
No.	Item		Performance	Test method(IEC 60384-17)
1	Solderability		Good quality of tinning	Solder temperature:245˚C±5˚C Immersion time: 2.0s±0.5s
2	Initial measurement		Capacitance Tgδ:1kHz，C>1.0μF 10kHz，C≤1.0μF	
	Terminal strength		There shall be no visible damage	Tension: 0.6≤ϕd≤0.8mm，10N ϕd=1.0mm，20N Bend: 0.6≤ϕd≤0.8mm，5N ϕd=1.0mm，10N The terminals shall be bent 2 times in each direction.
	Resistance to solder heat		There shall be no visible damage	Solder temperature:260˚C±5˚C Immersion time: 10s±1s
	Final measurement		ΔC/C ≤±3%(relative to the initial value) Increase of tgδ: ≤0.004 (10kHz,C≤1.0μF) ≤0.004 (1kHz,C>1.0μF)	
3	Initial measurement		Capacitance Tgδ:1kHz，C>1.0μF 10kHz，C≤1.0μF	
	Rapid change of tempe rature		There shall be no evidence of deterioration.	θ_A=-40˚C, θ_B =+85˚C 5 cycles, Duration: t=30min
3	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.
	Bump		There shall be no evidence of deterioration.	4 000 times, Acceleration: 390m/s^2,Pulse duration, 6ms
	Final measurement		ΔC/C ≤±3%(relative to the initial value) Increase of tgδ: ≤0.004 (10kHz, C≤1.0μF) ≤0.004 (1kHz, C>1.0μF) IR: ≥ 50% of the rated value	
4	climate sequence	Initial measurement	Capacitance Tgδ:1kHz，C>1.0μF 10kHz，C≤1.0μF	
		Dry heat		+85℃，16h
		Damp heat, Cyclic		Test Db, Severity: b, the first cycle
		Cold		-40℃，2h
		Low air pressure	There shall be no permanent breakd own, flashover or other harmful def ormation when applying U_R at the l ast 1 minute.	15℃～35℃，8.5kPa，1h,

No.	Item		Performance	Test method(IEC 60384-17)
4	climate sequence (continue)	Damp heat, cyclic other		Test Db, Severity b, the other cycles, Applying U_R for 1 minute after the test finished.
		Final measurement	There shall be no evidence of deterioration and the marking shall be legible. ΔC/C ≤±5%(relative to the initial value) Increase of tgδ: ≤0.005 (10kHz, C≤1.0μF) ≤0.005 (1kHz, C>1.0μF) IR: ≥ 50% of the rated value	
5	Damp heat steady state		There shall be no evidence of deterioration and the marking shall be legible. ΔC/C ≤ ±5%(relative to the initial value) Increase of tgδ ≤0.002 IR: ≥50% of the rated value	Temperature:40˚C ±2˚C Humidity: 93^{+2}_{-3} %RH Duration: 21days
6	Endurance		ΔC/C ≤±5%(relative to the initial value) Increase of tgδ: ≤0.004 (10kHz, C≤1.0μF) ≤0.004 (1kHz, C>1.0μF) IR: ≥ 50% of the rated value	Temperature: +85℃ Voltage: 1.25×U_R(50Hz) Duration: 1 000h
7	Temperature characteristic		Measuring capacitance at test point b, d, f: Characteristic at lower category temperature -40˚C: $0 \le (C_b-C_d)/C_d \le +3\%$ Characteristic at upper category temperature +85˚C: $-3.25\% \le (C_f-C_d)/C_d \le 0$	Static method: The capacitors should be kept at the following temperature in turn: a.(+20±2) ˚C， b.(–40±2) ˚C，d.(20±2) ˚C，f.(+85±2) ˚C，g.(+20±2) ˚C
8	Charging and discharging		ΔC/C ≤±5%(relative to the initial value) Increase of tgδ: ≤0.005 (10kHz, C≤1.0μF) ≤0.005 (1kHz, C>1.0μF) IR: ≥ 50% of the rated value	Times: 10 000 Duration of charging: 0.5s Duration of discharging: 0.5s Charging voltage: rated voltage Charging resistance: 220/C_R(Ω) Discharging resistance: R=10/C_R(Ω) or 20Ω(whichever is the greater) C_R: rated capacitance (μF)

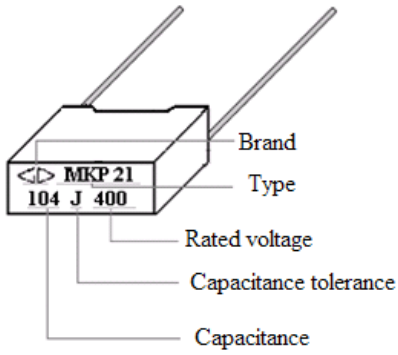
3 Marking:



P=5mm



P=7.5mm & P=10mm



P≥15mm

4 Packing for tinned-wire capacitors

■Outline Drawing

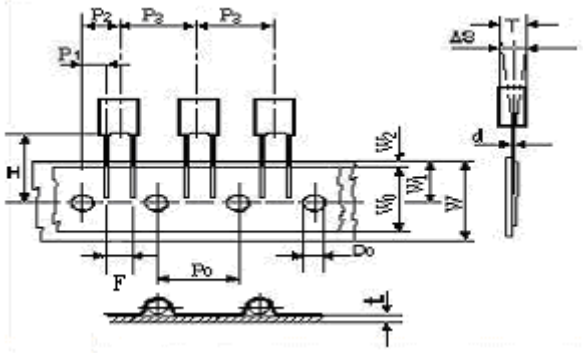


Fig.1 P=5.0、7.5mm

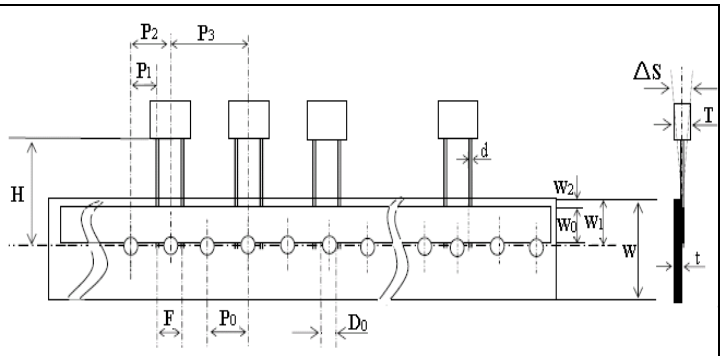


Fig.2 P=10.0、15.0mm

■ 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	±0.2
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	12min	12min	12min	——
Hole position	W_1	9.0	9.0	9.0	9.0	±0.5
Hold down tape sition	W_2	1.5max	1.5max	1.5max	1.5max	——
Feed hole dia.	D_0	4.0	4.0	4.0	4.0	±0.2
Tape thickness	t	0.7	0.7	0.7	0.9	±0.2

■ Packing Quantity

Pitch (mm)	Box thinkness T(mm)	Ammo-pack (pcs/box)	
		Domestic	Export
5.0	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	1 300
	5.0	1 200	1 000
	6.0	1 000	800
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	200

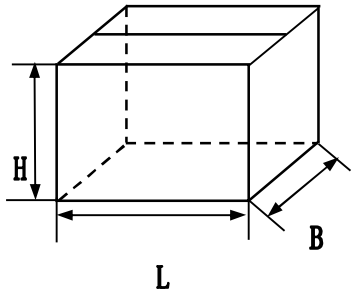
Note: * P_0=15mm is also available;

**F can be other lead spacing;

***H=16.5mm is available;

5 Packing in bulk

5. 1Out packing box for bulk



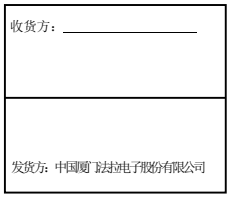
L:375mm

B:375mm

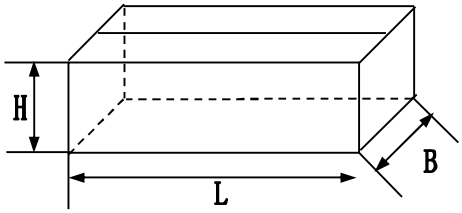
H:265mm

Plane drawing

Overlooking Drawing



5. 2 Inner packing box for bulk

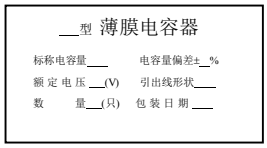


L:355mm

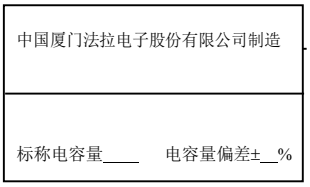
B:175mm

H:118mm

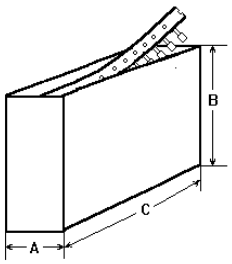
Plane drawing



Overlooking Drawing



5.3 Box size for Ammo-pack



A=48±3; B=260±3; C=330±3