



# SPECIFICATION FOR APPROVAL

File No.: Q/FRK 0.GS.E.C31-C12

Product Name Metallized polypropylene film capacitor(dipped)

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Product Type: CBB21

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Product Code C312E104J37Y400

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Customer \_\_\_\_\_

Customer Code \_\_\_\_\_

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**Version history**

Current version	Date	Author	Change description

## Metallized polypropylene film capacitor(dipped)

### ■ Outline Drawing

	Forming Lead Shapes			
	I	II	III	IV
	P ≥ F		P < F	
	0mm ≤ P-F ≤ 3mm	3mm < P-F ≤ 8mm	3mm < F-P ≤ 5mm	0mm < F-P ≤ 3mm
F±0.8mm; A≤5.0mm; B=4.5±0.5mm				

### ■ Features

- Metallized polypropylene structure
- Low loss at high frequency
- Small inherent temperature rise
- Flame retardant epoxy resin powder coating (UL94/V-0)

### ■ Typical application

- Widely used in high frequency, DC, AC and pulse circuits
- Suitable for S-correction circuits of large screen monitor
- Suitable for the situation where applies high frequency and high current pulse

### ■ Specifications

Reference Standard	GB/T 10190(IEC 60384-16)				
Climatic Category	40/105/21				
Rated temperature	85°C				
Operating temperature	-40°C~105°C (+85°C to +105°C: decreasing factor 1.25% per °C for U <sub>R</sub> )				
Rated Voltage	250V				
Capacitance Range	0.10μF				
Capacitance Tolerance	±5%(J)				
Voltage Proof	1.6U <sub>R</sub> (5s)				
Dissipation Factor	≤10×10 <sup>-4</sup> (20°C, 1kHz)				
Insulation Resistance	R <sub>N</sub> ≥100 000MΩ, C <sub>N</sub> ≤0.33μF RC <sub>N</sub> ≥30 000s, C <sub>N</sub> >0.33μF (20°C, 100V, 1min)				
Maximum Pulse Rise Time(dV/dt) If the working voltage(U) is lower than the rated voltage(U <sub>R</sub> ),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 <sub>R</sub> /U.	Pattern II				
	U <sub>R</sub> (V)	dV/dt(V/us)			
		P=7.5	P=10.0	P=15.0	P=22.5
	100/250	660	560	310	130
	400	900	780	600	300
630	1 500	1 200	900	400	
1 000/1 250	2 500	2 200	--	--	

**■ 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	3	1												

Digit 1 to 3 Series code

C31= CBB21

Digit 4 to 5 D.C. rated voltage

2A=100V 2E=250V 2G=400V

2J=630V 3A=1000V 3B=1250V

Digit 6 to 8 Rated capacitance value

 For example: 103=10×10<sup>3</sup>pF=0.01μF

Digit 9 Capacitance tolerance

J=±5%, K=±10%, M=±20%

Digit 10 Pitch

3=7.5mm 4=10mm 5=12.5mm 6=15mm

8=20mm 9=22.5mm A=25mm C=30mm

Digit 11 Internal use

S= PatternII

Digit 12 to 15 Lead form and packaging code

**Table 1 lead form and packing code**

Digit 12		Digit 13		Digit 14		Digit 15	
code	explanation	code	explanation	code	explanation	code	explanation
A	ammo-pack	3	F=7.5mm	1	kinked	A	each cap. between two consecutive holes P3=12.7mm,H=20.0mm (For pitch=7.5mm)
		4	F=10.0mm			E	P3=25.4mm;H=20.0mm (For pitch=10.0/15.0mm)
F	lead kinked	6	F=15.0mm	0	B=4.5mm The length of B	0	B Length tolerance ±0.5mm
		7	F=17.5mm				
		8	F=20.0mm				
		9	F=22.5mm				
Y	straight lead "Y" in the figure above		code	explanation		0	Length tolerance ±0.5mm
		40	lead length 4.0mm				

Digit 12-15 code "C000" means standard lead length (18mm ~ 30mm)

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

**■ Dimensions(mm)**
**Pattern II (Reduced sizes)**

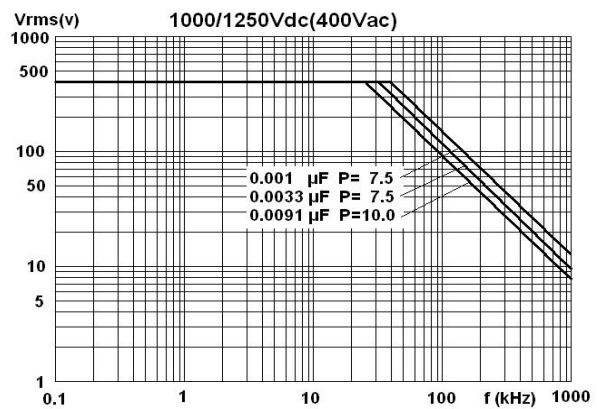
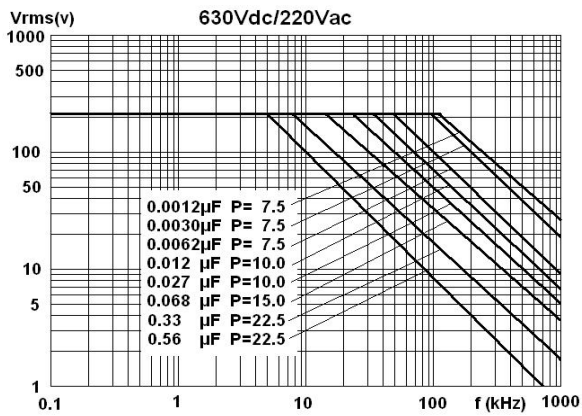
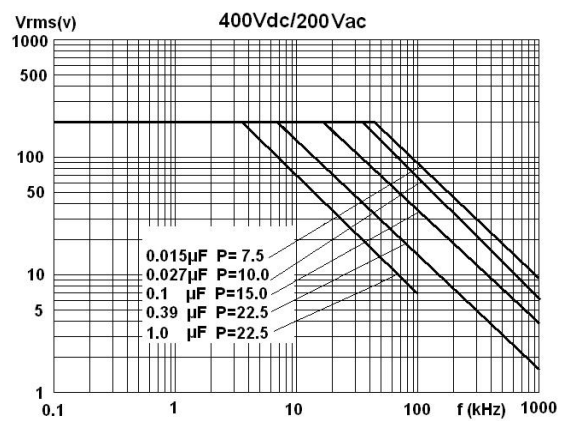
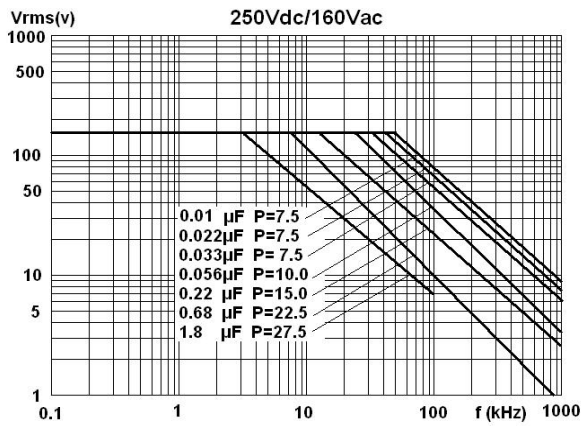
250Vdc(160Vac) <sup>#</sup>						
C <sub>N</sub> (μF)	W max	H max	T max	P	d	Part number
0.10	9.8	9.2	5.5	7.5	0.6	C312E104J37Y400

Note: 1. “-”=capacitance tolerance code, M=±20%,K=±10%,J=±5%

2. “\*\*\*\*”=lead form and packing code (refer to table 1)

3. “#”when the rated voltage is 250Vdc,the digit 4~5 is 2E.

■ MAX. VOLTAGE(Vr.m.s) VERSUS FREQUENCY

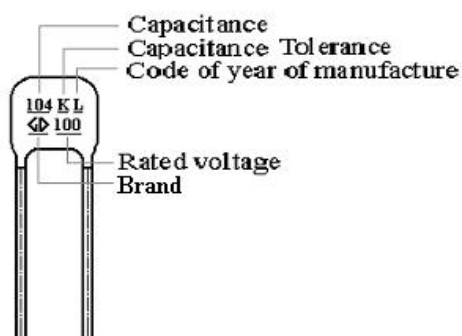
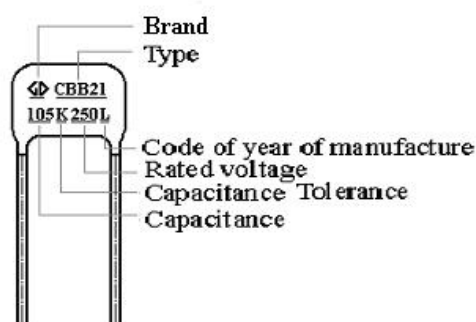


Note: sinusoidal wave-form, environment temperature  $\leq 85^{\circ}\text{C}$ , internal temperature rise  $\Delta T = 10^{\circ}\text{C}$ , p (pitch) in mm.

**■ Test Method And Performance**

No.	Item	Performance	Test method(IEC 60384-16)
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 (straight lead)	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	Δ C/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 temperature	There shall be no evidence of deterioration.	θ <sub>A</sub> =-40°C, θ <sub>B</sub> =+105°C 5 cycles, Duration: t=30min
3	Vibration(straight lead)	There shall be no evidence of deterioration.	Amplitude 0.75mm or acceleration 98m/s <sup>2</sup> (whichever is the smaller severity), f: 10Hz to 500Hz.Three directions, 2h for each direction, total 6h.
	Bump(straight lead)	There shall be no evidence of deterioration.	4 000 times, Acceleration: 390m/s <sup>2</sup> ,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	+105°C, 16h
		Damp heat, Cyclic	Test Db, Severity: b, the first cycle
		Cold	-40°C, 2h
		Low air pressure	There shall be no permanent breakdown, flashover or other harmful deformation when applying U <sub>R</sub> at the last 1 minute.
			15°C~ 35°C, 8.5kPa, 1h,

No.	Item		Performance	Test method(IEC 60384-16)
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. $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $\leq 0.005$ (10kHz, $C \leq 1.0\mu\text{F}$ ) $\leq 0.005$ (1kHz, $C > 1.0\mu\text{F}$ ) $\text{IR} \geq 50\%$ of the rated value	
5	Damp heat steady state		There shall be no evidence of deterioration and the marking shall be legible. $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta \leq 0.002$ $\text{IR} \geq 50\%$ of the rated value	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93 \pm 2\%$ RH Duration: 21days
6	Endurance		$\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $\leq 0.004$ (10kHz, $C \leq 1.0\mu\text{F}$ ) $\leq 0.004$ (1kHz, $C > 1.0\mu\text{F}$ ) $\text{IR} \geq 50\%$ of the rated value	Temperature: $+85^\circ\text{C}$ Voltage: $1.25 \times U_R$ (50Hz) Duration: 1 000h
7	Temperature characteristic		Measuring capacitance at test point b, d, f: Characteristic at lower category temperature $-40^\circ\text{C}$ : $0 \leq (C_b - C_d)/C_d \leq +3\%$ Characteristic at upper category temperature $+85^\circ\text{C}$ : $-3.25\% \leq (C_f - C_d)/C_d \leq 0$	Static method: The capacitors should be kept at the following temperature in turn: a. $(+20 \pm 2)^\circ\text{C}$ b. $(-40 \pm 2)^\circ\text{C}$ d. $(20 \pm 2)^\circ\text{C}$ f. $(+85 \pm 2)^\circ\text{C}$ g. $(+20 \pm 2)^\circ\text{C}$
8	Charging and discharging		$\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $\leq 0.005$ (10kHz, $C \leq 1.0\mu\text{F}$ ) $\leq 0.005$ (1kHz, $C > 1.0\mu\text{F}$ ) $\text{IR} \geq 50\%$ of the rated value	Times: 10 000 Duration of charging: 0.5s Duration of discharging: 0.5s Charging voltage: rated voltage Charging resistance: $220/C_R (\Omega)$ Discharging resistance: $R = 10/C_R (\Omega)$ or $20 \Omega$ (whichever is the greater) $C_R$ : rated capacitance ( $\mu\text{F}$ )

**Marking (example)**
 $P \leq 10.0\text{mm}$ 

 $P > 10.0\text{mm}$ 




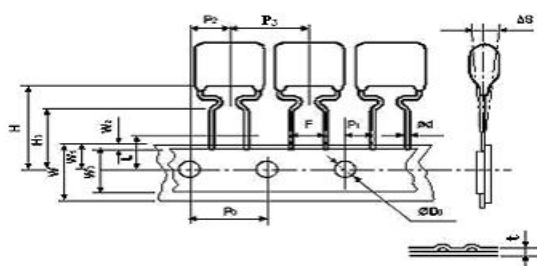
**■ Taping for dipped-type capacitor**
**▲ Outline Drawing**


Fig. 1

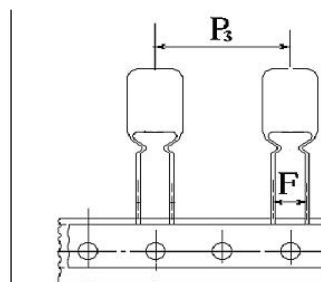


Fig 2

**▲ Taping Dimensions(mm)**

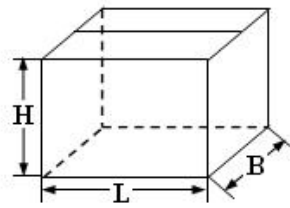
Technology index title	Code	Dimensions (mm)				Tolerance
		P=5.0	P=7.5	P=10.0	P=15.0	
Taping type	—	Fig 1	Fig 1	Fig 2	Fig 2	—
Part number Digit12-15	Ammo-pack	A21A	A31A	A41E	A61E	
Taping pitch	$P_3$	12.7	12.7	25.4	25.4	$\pm 1.0$
Feed hole pitch	$P_0$	12.7	12.7	12.7	12.7	$\pm 0.3$
Center of wire	$P_1$	3.85	2.60	7.7	5.2	$\pm 0.7$
Center of body	$P_2$	6.35	6.35	12.7	12.7	$\pm 1.3$
Pitch of taping wire	$F^{**}$	5.0	7.5	10.0	15.0	+0.8 -0.2
Component alignment	$\Delta S$	0	0	0	0	$\pm 2.0$
Height of crangle from tape center	H	20.0	20.0	20.0	20.0	$\pm 1.0$
Height of component from tape center	$H_0$	16.0	16.0	16.0	16.0	$\pm 0.5$
Carrier tape width	W	18.0	18.0	18.0	18.0	+1.0 -0.5
Hold down tape width	$W_0$	10min	10min	10min	10min	—
Hole position	$W_1$	9.0	9.0	9.0	9.0	+0.75 -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	$\pm 0.3$
Tape thickness	t	0.7	0.7	0.7	0.7	$\pm 0.2$

**Note:** \*  $P_0=15\text{mm}$  is also available;

\*\* F can be other lead spacing;

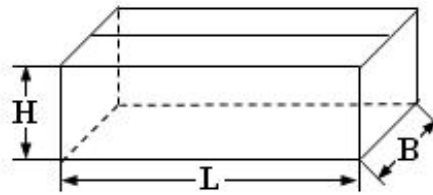
■ Packing box sizes(mm)(example)

1. Out packing box for bulk



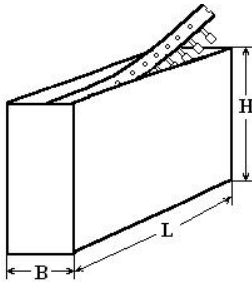
L:375±5  
B:375±5  
H:265±5

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