SPECIFICATION FOR APPROVAL

File No.: Q/FRK 0.GS.E.C24-C13

Product Name	Box-type Metallized Polyester Film Capacitor(Stacked version)
Product Type:	C24(CL23B Series)
Product Code	C242E223J2SC322
Customer	
Customer Code	
Issue Date	2023-11

Xiamen Faratronic Co. Ltd.			Approved by Customer
Drafted	Checked	Approved	
			

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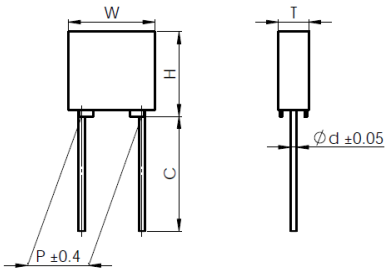
Version history

Current version	Date	Author	Change description

Box-type metallized polyester film capacitor (Stacked version)

■ Outline Drawing



■ Features

- Metallized polyester film, stacked construction
- Plastic case（UL94 V-0），Epoxy resin sealing
- High dv/dt ability

■ Typical Applications:

- By-passing, blocking, coupling, decoupling,
- Pulse logic, timing, compact fluorescent lamps.
- Inverter for LCD monitors, automotive DC motor suppression

■ Specifications

<table>
<tr><td>Reference Standard</td><td colspan="4">GB 7332(IEC 60384-2)</td></tr>
<tr><td>Climatic Category</td><td colspan="4">55/125/56</td></tr>
<tr><td>Rated temperature</td><td colspan="4">85℃</td></tr>
<tr><td>Operating temperature</td><td colspan="4">-55℃~125℃
(+85℃ to +125℃: decreasing factor 1.25% per ℃ for U_R)</td></tr>
<tr><td>Rated Voltage</td><td colspan="4">50/63V, 100V, 250V, 400V, 500V, 630V,700V</td></tr>
<tr><td>Capacitance Range</td><td colspan="4">0.0010μF ~ 2.2μF</td></tr>
<tr><td>Capacitance Tolerance</td><td colspan="4">±5%(J), ±10%(K), ±20%(M)</td></tr>
<tr><td>Voltage Proof</td><td colspan="4">1.4U_R(5s)</td></tr>
<tr><td rowspan="4">Dissipation Factor</td><td>Frequency</td><td colspan="2">$C_N \leq 0.1\mu F$</td><td>$C_N > 0.1\mu F$</td></tr>
<tr><td>1kHz</td><td colspan="2">≤1.0%</td><td>≤1.0%</td></tr>
<tr><td>10kHz</td><td colspan="2">≤1.5%</td><td>≤1.5%</td></tr>
<tr><td>100kHz</td><td colspan="2">≤3.0%</td><td>-</td></tr>
<tr><td rowspan="2">Insulation Resistance</td><td>U_R>100V</td><td colspan="2">≥3 0000MΩ, C_N≤0.33μF
≥10 000s, C_N>0.33μF</td><td>(20℃,100V,1min)</td></tr>
<tr><td>U_R≤100V</td><td colspan="2">≥15 000MΩ, C_N≤0.33μF
≥5 000s, 0.33μF<C_N≤1μF
≥1 000s, C_N >1μF</td><td>(20℃,10V,1min)</td></tr>
<tr><td rowspan="8">Maximum Pulse Rise Time(dV/dt)
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.</td><td rowspan="2">U_R (V)</td><td colspan="3">dV/dt (V/μs)</td></tr>
<tr><td>pattern I</td><td>pattern II</td></tr>
<tr><td>50/63</td><td>250</td><td>75</td></tr>
<tr><td>100</td><td>300</td><td>85</td></tr>
<tr><td>250</td><td>400</td><td>100</td></tr>
<tr><td>400</td><td>600</td><td>150</td></tr>
<tr><td>500</td><td>700</td><td rowspan="2">200</td></tr>
<tr><td>630</td><td>800</td></tr>
<tr><td>700</td><td>-</td><td>250</td></tr>
</table>

■ Part number system

The 15 digits part number is formed as follow:

C24 Pattern I (High performance)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	2	4							2	0				

C24 Pattern II (Reduced size)

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

Digit 1 to 3 Series code

C24=CL23B

Digit 4 to 5 DC rated voltage

1H=50V 1J=63V 2A=100V 2E=250V

2G=400V 2H=500V 2J=630V 1V=700V

Digit 6 to 8 Rated capacitance value

For example : 103=10×10^3pF=0.01uF

Digit 9 Capacitance tolerance

J=±5%,K=±10%, M=±20%

Digit 10 Lead pitch

2=5.0

Digit 11 Internal use

S=pattern II

Digit 12 to 15 Lead form and packaging code

Table 1 lead dimensions and packaging code

Digit 12		Digit 13		Digit 14		Digit 15	
code	explanation	code	explanation	code	explanation	code	explanation
A	ammo-pack	2	F=5.0mm	0	straight	1	each cap. among two consecutive holes P3=12.7mm,H=18.5mm (For pitch=5.0mm)
C	straight lead "C"in the figure above	code	explanation			0	Length tolerance ±0.5mm Or standard length
		00	standard lead length (14mm~22mm)				
		45	lead length 4.5mm				
Note: Recommend short lead due to long lead could deform easily.							

■ **Dimensions(mm)**

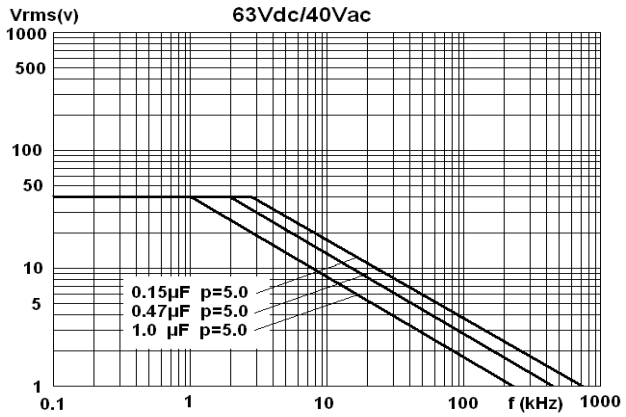
Capacitor Thickness: T	≤3.5	>3.5
Dimension Tolerance (W, H, T)	±0.2	±0.4

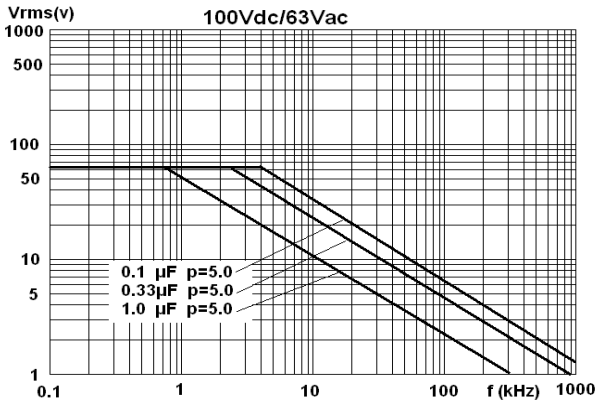
Pattern I (High performance)

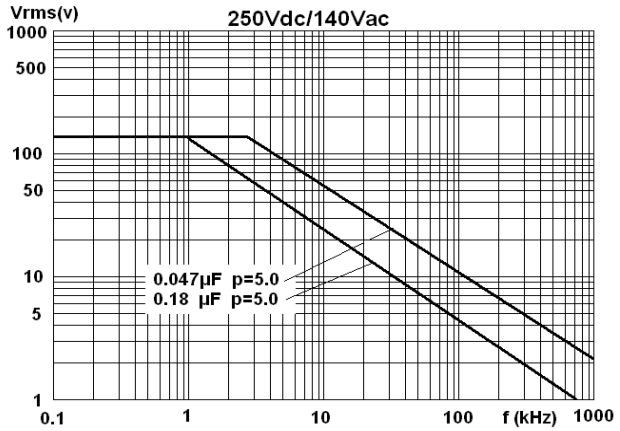
50Vdc (30Vac)/63Vdc (40Vac) #						
C_N (μF)	W	H	T	P	d	Part number
0.022	7.2	6.5	2.5	5.0	0.5	C242E223J2SC322

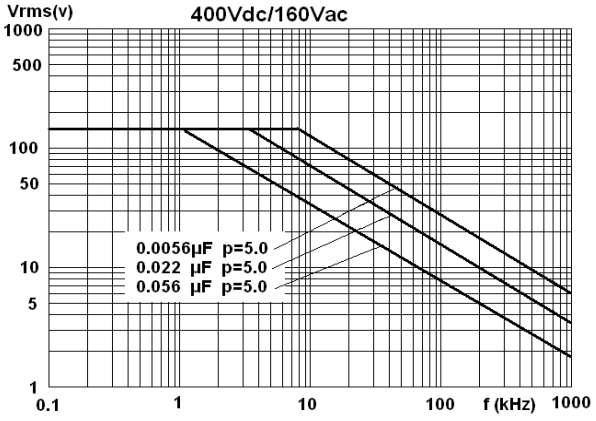
■ MAX. VOLTAGE(Vr.m.s) VERSUS FREQUENCY

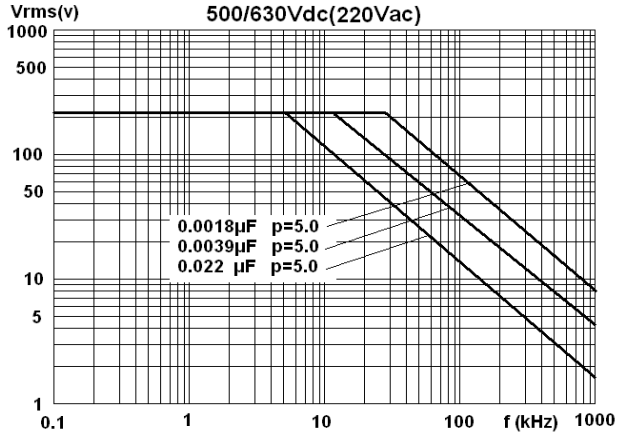
Pattern II (Reduced sized)

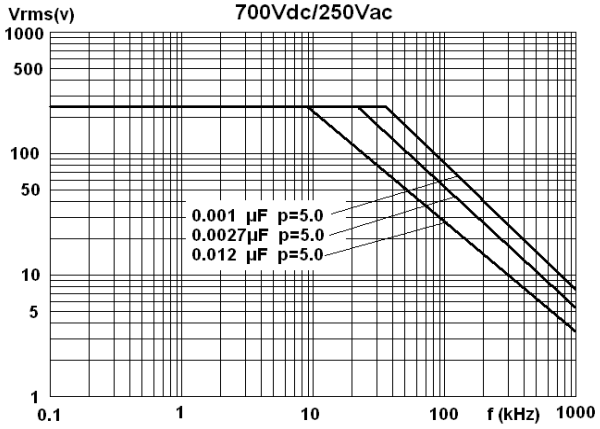








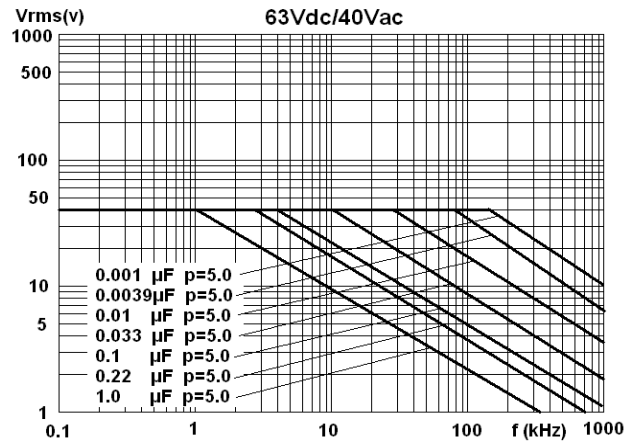


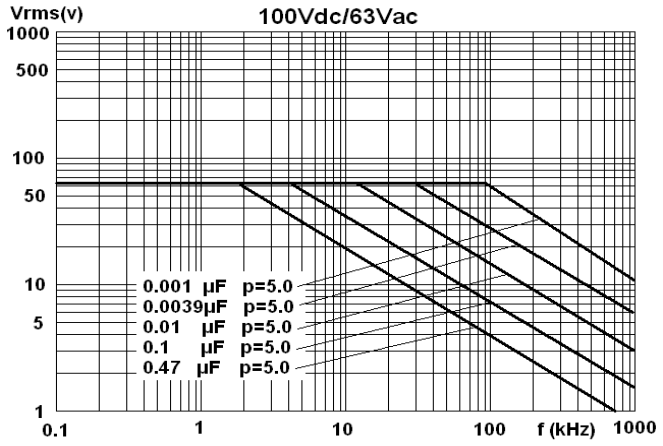


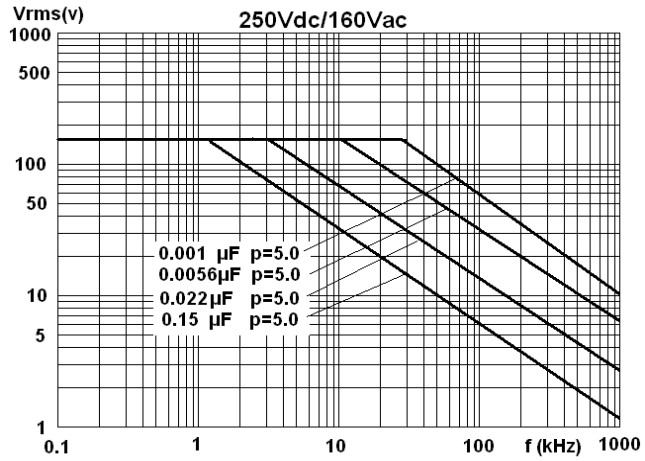
Note: sinusoidal wave-form、environment temperature≤85℃,internal temperature rise △T=15℃, p (pitch) in mm..

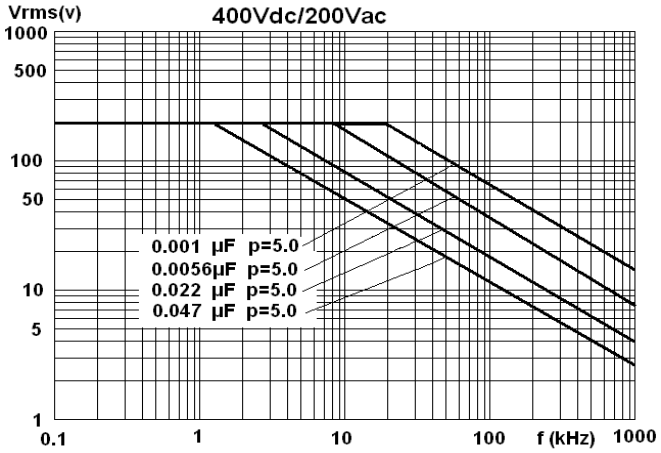
■ MAX. VOLTAGE(Vr.m.s) VERSUS FREQUENCY

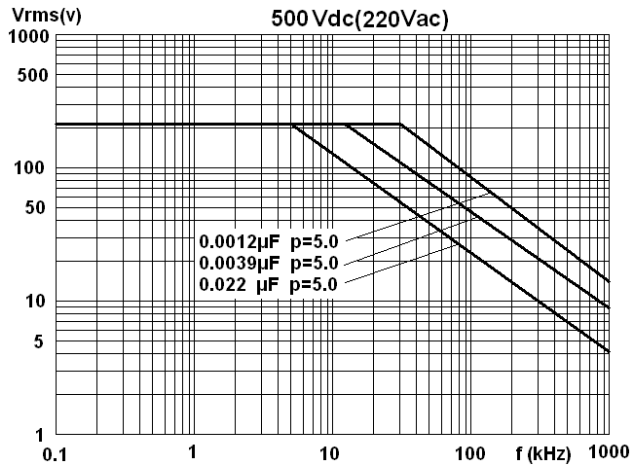
Pattern I (High performance)

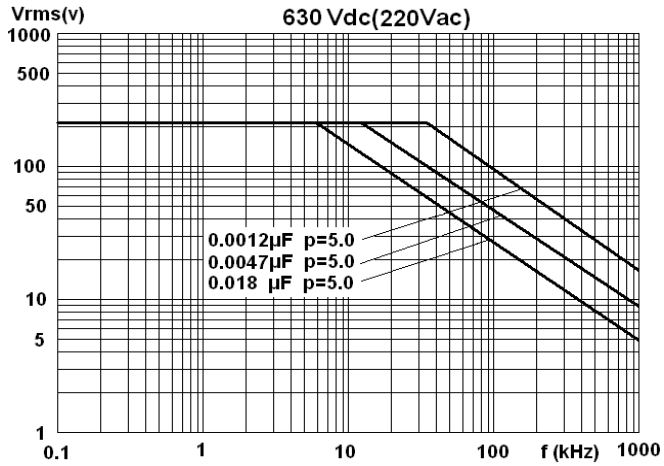












Note: sinusoidal wave-form、environment temperature≤85℃,internal temperature rise △T=15℃, p (pitch) in mm..

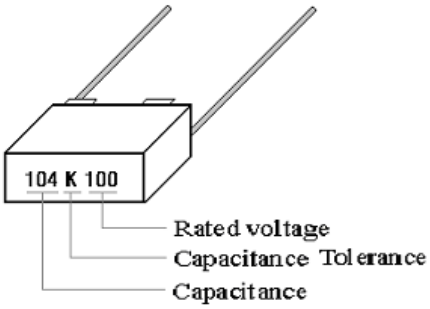
■ Test Method And Performance

No.	Item		Performance	Test method GB/T 7332 (IEC60384-2)
1	Capacitance tolerance		J(±5%), K(±10%), M(±20%)	1kHz, 3%U_R(Vrms)max.
2	Tangent of the loss angle		tanδ≤0.010(1kHz) tanδ≤0.015(10kHz) tanδ≤0.030(100kHz, C<0.1μF)	1kHz or 10 kHz or 100 kHz ≤3%U_R(Vrms) or 1 Vrms(whichever is the minor)
3	Dielectric strength		There shall be no breakdown or flashover.	1.4U_R, 5s
4	Insulation resistance		U_R≤100V ≥15 000MΩ, C_N≤0.33μF ≥5 000s, 0.33μF<C_N≤1μF ≥1 000s, C_N>1μF U_R>100V ≥3 0000MΩ, C_N≤0.33μF ≥10 000s , C_N>0.33μF,	U_R≤100V, Charging voltage 10V U_R>100V, Charging voltage 100V 20˚C, measuring after applying voltage for 1 minute
5	Solderability		Good quality of tinning	Solder temperature:245˚C±5˚C Immersion time: 2.0s±0.5s
6	Initial measurement		Capacitance, Tanδ(10kHz)	
	Terminal Strength (straight lead)		There shall be no visible damage	Tension Ua1: Pull: ϕd=0.5mm,5N; ϕd=0.6mm,10N Bend Ub: The pull of bend: ϕd=0.5mm, 2.5N ϕd=0.6mm, 5N 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 ≤±2%(relative to the initial value) Increase of tanδ:≤0.003(10kHz)	
7	Component's resistance of solvents		The dimensions shall reach the requirement of Table 1, and the change of capacitor weight shall not beyond 1%.	Solvent: Industrial isopropanol. Solvent temperature:23˚C±5˚C Immersion time:5min±0.5min Reverting time:48h
8	Initial measurement		Capacitance, Tanδ(10kHz)	
	Rapid change of temperature		There shall be no evidence of deterioration.	θ_A=-55˚C, θ_B =+125˚C 5 cycles, Duration: t=30min
	Vibration(straight lead)		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 foreach direction, total 6h.
	Bump(straight lead)		There shall be no evidence of deterioration.	4 000 times, Acceleration: 390m/s^2,Pulse duration, 6ms
	Final measurement		ΔC/C ≤±5%(relative to the initial value) Increase of tanδ: ≤0.003 (10kHz) IR: ≥ 50% of the rated value	
9	climate sequence	Initial measurement	Capacitance, Tanδ(10kHz)	
		Dry heat		+125℃,16h

No.	Item		Performance	Test method GB/T 7332 (IEC60384-2)
9	climate sequence (continue)	Damp heat, Cyclic		Test Db, Severity: b, the first cycle
		Cold		-55℃, 2h
		Low air pressure	There shall be no permanent break down, flashover or other harmful deformation when applying U_R at the last 1 minute.	15℃~35℃,8.5kPa, 1h,
		Damp heat, cyclic other		Test Db, Severity b, the other cycles, Applying U_R for 1 minute after the test finished.
		Final measu rement	There shall be no evidence of deterioration and the marking shall be legible. ΔC/C≤ ±5%(relative to the initial value) Increase of tanδ: ≤0.005(10kHz) IR: ≥50% of the rated value	
10	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 tanδ ≤0.005(10kHz) IR: ≥50% of the rated value	Temperature:40˚C ±2˚C Humidity: 93^{+2}_{-3} %RH Duration: 56 days
11	Endurance		There shall be no evidence of deterioration and the marking shall be legible. ΔC/C ≤ ±5%(relative to the initial value) Increase of tanδ: ≤0.003 (10kHz) IR: ≥50% of the rated value	Temperature: +85℃ Voltage: 1.25× U_R Duration: 2 000h or Temperature: +125℃ Voltage: 1.25×Uc (Uc=0.5U_R) Duration: 2 000h
12	Temperature characteristic		Measuring capacitance at test point b, d, f: Characteristic at lower category temperature -55˚C: -10%≤(C_b-C_d)/C_d≤0% Characteristic at upper category temperature +125˚C: 0%≤(C_f-C_d)/C_d ≤+18% I.R. (test at point f): U_R≤100V: ≥15MΩ (C≤0.33μF) ≥5s (C>0.33μF) U_R>100V: ≥30MΩ (C≤0.33μF) ≥10s (C>0.33μF)	Static method:The Capacitors should be kept at the following temperature in turn: a(20±2) ˚C, b(–55±3) ˚C, d(20±2) ˚C，f(+125±2) ˚C, g(20±2) ˚C
13	Charging and discharging		ΔC/C ≤±5%(relative to the initial value) Increase of tanδ: ≤0.003 (10kHz, C≤1.0μF) ≤0.002 (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_N(Ω) Discharging resistance: R=10/C_N(Ω) or 20Ω(whichever is the greater) C_N: rated capacitance (μF)

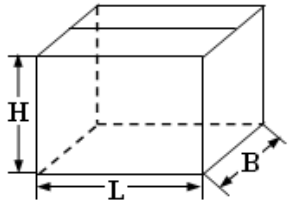
■ **Marking**

For example:



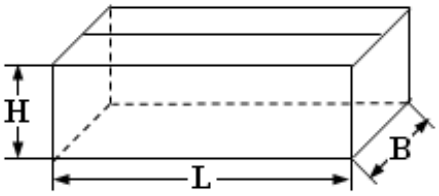
■ Packing box sizes(mm)(example)

1. Out packing box for bulk



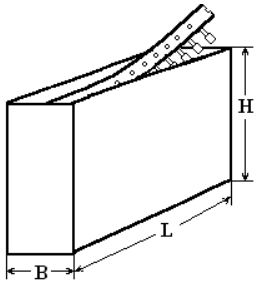
L:375±5
B:375±5
H:265±5

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