



# SPECIFICATION FOR APPROVAL

File No.: Q/FRK 0.GS.E.C23-D08

Product Name	Box-type metallized polyester film capacitor
Product Type	C23(CL23 Series)
Product Code	
Customer	
Customer Code	
Issue Date	2013-10



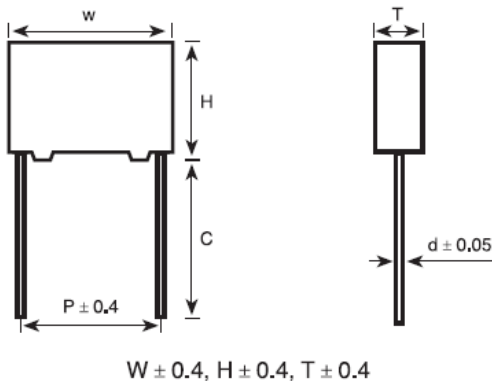
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## Metallized polyester film capacitor (Box-type)

### ■ Outline Drawing



### ■ Features

- High reliability
- Metallized polyester film, non-inductive wound construction
- Plastic case (UL94 V-0), Epoxy resin sealing
- Pattern II is new design and reduce size

### ■ Typical application

- by-passing, blocking, coupling, decoupling,
- pulse, logic, timing, oscillator circuits.
- interference suppression in low voltage application (i.e. automotive)

### ■ Specifications

Reference Standard	GB 7332 (IEC 60384-2)					
Climatic Category	55/105/56					
Rated temperature	85°C					
Operating temperature	-55°C~105°C (+85°C to +105°C: decreasing factor 1.25% per °C for $U_R$ )					
Rated Voltage	63V, 100V, 250V, 400V, 630V, 1 000V					
Capacitance Range	0.0010μF~47.0μF					
Capacitance Tolerance	±5%(J), ±10%(K), ±20%(M)					
Voltage Proof	1.6 $U_R$ (5s)					
Dissipation Factor	Frequency	$C_N \leq 0.1\mu F$		$C_N > 0.1\mu F$		
	1kHz	≤1.0%		≤1.0%		
	10kHz	≤1.5%		≤1.5%		
	100kHz	≤3.0%		-		
Insulation Resistance	$U_R > 100V$	≥30 000MΩ, $C_R \leq 0.33\mu F$ ≥10 000 s, $C_R > 0.33\mu F$		(20°C, 100V, 1min)		
	$U_R \leq 100V$	≥3 750MΩ, $C_N \leq 0.33\mu F$ ≥1 250s, $C_N > 0.33\mu F$		(20°C, 10V, 1min)		
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 $U_R/U$ .	$U_R(V)$	dV/dt (V/μs)				
		P=7.5	P=10.0	P=15.0	P=22.5	P=27.5
	63	7.5	6	3	2	1
	100	15	9	5	3	2
	250	30	20	12	8	5
	400	40	30	20	10	7
	630	50	40	25	12	10
1 000	70	60	30	15	12	

■ 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	2	3															

Digit 1 to 3 Series code

C23=CL23

Digit 4 to 5 DC rated voltage

1J=63V 2A=100V 2C=160V 2E=250V 2G=400V 2J=630V 3A=1 000V

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 Lead pitch

3=7.5mm 4=10.0mm 6=15.0mm 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	3	F=7.5mm	0	straight	1	each cap. among two consecutive holes P3=12.7mm,H=18.5mm (For pitch=7.5mm)
		4	F=10.0mm			5	P3=25.4mm;H=18.5mm (For pitch=10/15mm)
		6	F=15.0mm				
C	straight lead "C" in the figure above	code	explanation	0		0	Length tolerance ±0.5mm Or standard length
		00	standard lead length (18mm~26mm)				
		45	lead length 4.5mm				

■ **Dimensions (mm)**

Pattern II (Reduced sizes)

63Vdc (40Vac)						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.47	10.5	8.5	3.5	7.5	0.5	C231J474-3S*****
0.68	10.5	9.0	4.0	7.5	0.6	C231J684-3S*****
1.0	10.5	11.0	5.0	7.5	0.6	C231J105-3S*****
1.5	10.5	12.0	6.0	7.5	0.6	C231J155-3S*****
1.8	10.5	12.0	6.0	7.5	0.6	C231J185-3S*****
0.10	13.0	9.0	4.0	10.0	0.6	C231J104-4S*****
0.15	13.0	9.0	4.0	10.0	0.6	C231J154-4S*****
0.22	13.0	9.0	4.0	10.0	0.6	C231J224-4S*****
0.33	13.0	9.0	4.0	10.0	0.6	C231J334-4S*****
0.47	13.0	9.0	4.0	10.0	0.6	C231J474-4S*****
0.68	13.0	9.0	4.0	10.0	0.6	C231J684-4S*****
1.0	13.0	9.0	4.0	10.0	0.6	C231J105-4S*****
1.5	13.0	11.0	5.0	10.0	0.6	C231J155-4S*****
1.8	13.0	12.0	6.0	10.0	0.6	C231J185-4S*****
2.2	13.0	12.0	6.0	10.0	0.6	C231J225-4S*****
0.68	17.5	11.0	5.0	15.0	0.8	C231J684-6S*****
1.0	17.5	11.0	5.0	15.0	0.8	C231J105-6S*****
1.5	17.5	11.0	5.0	15.0	0.8	C231J155-6S*****
1.8	17.5	11.0	5.0	15.0	0.8	C231J185-6S*****
2.2	17.5	11.0	5.0	15.0	0.8	C231J225-6S*****
3.3	17.5	12.0	6.0	15.0	0.8	C231J335-6S*****
4.7	17.5	13.5	7.5	15.0	0.8	C231J475-6S*****
6.8	17.5	14.5	8.5	15.0	0.8	C231J685-6S*****
10.0	17.5	19.0	11.0	15.0	0.8	C231J106-6S*****
3.3	26.5	16.0	7.0	22.5	0.8	C231J335-9S*****
4.7	26.5	16.0	7.0	22.5	0.8	C231J475-9S*****
6.8	26.5	16.0	7.0	22.5	0.8	C231J685-9S*****
10.0	26.5	17.0	8.5	22.5	0.8	C231J106-9S*****
15.0	26.5	20.0	11.0	22.5	0.8	C231J156-9S*****
4.7	32.0	18.0	9.0	27.5	0.8	C231J475-BS*****
6.8	32.0	18.0	9.0	27.5	0.8	C231J685-BS*****
10.0	32.0	18.0	9.0	27.5	0.8	C231J106-BS*****
15.0	32.0	18.0	9.0	27.5	0.8	C231J156-BS*****
22.0	32.0	22.0	13.0	27.5	0.8	C231J226-BS*****
33.0	32.0	24.5	15.0	27.5	0.8	C231J336-BS*****
47.0	32.0	30.0	16.0	27.5	0.8	C231J476-BS*****

100Vdc (63Vac)						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.22	10.5	8.5	3.5	7.5	0.5	C232A224-3S*****
0.33	10.5	9.0	4.0	7.5	0.6	C232A334-3S*****
0.39	10.5	9.0	4.0	7.5	0.6	C232A394-3S*****
0.47	10.5	9.0	4.0	7.5	0.6	C232A474-3S*****
0.68	10.5	11.0	5.0	7.5	0.6	C232A684-3S*****
1.0	10.5	12.0	6.0	7.5	0.6	C232A105-3S*****
0.10	13.0	9.0	4.0	10.0	0.6	C232A104-4S*****
0.15	13.0	9.0	4.0	10.0	0.6	C232A154-4S*****
0.22	13.0	9.0	4.0	10.0	0.6	C232A224-4S*****
0.33	13.0	9.0	4.0	10.0	0.6	C232A334-4S*****
0.47	13.0	9.0	4.0	10.0	0.6	C232A474-4S*****
0.68	13.0	9.0	4.0	10.0	0.6	C232A684-4S*****
1.0	13.0	11.0	5.0	10.0	0.6	C232A105-4S*****
1.5	13.0	12.0	6.0	10.0	0.6	C232A155-4S*****
0.33	17.5	11.0	5.0	15.0	0.8	C232A334-6S*****
0.47	17.5	11.0	5.0	15.0	0.8	C232A474-6S*****
0.68	17.5	11.0	5.0	15.0	0.8	C232A684-6S*****
1.0	17.5	11.0	5.0	15.0	0.8	C232A105-6S*****
1.5	17.5	12.0	6.0	15.0	0.8	C232A155-6S*****
1.8	17.5	12.0	6.0	15.0	0.8	C232A185-6S*****
2.2	17.5	12.0	6.0	15.0	0.8	C232A225-6S*****
3.3	17.5	13.5	7.5	15.0	0.8	C232A335-6S*****
4.7	17.5	14.5	8.5	15.0	0.8	C232A475-6S*****
1.5	26.5	15.0	6.0	22.5	0.8	C232A155-9S*****
1.8	26.5	15.0	6.0	22.5	0.8	C232A185-9S*****
2.2	26.5	15.0	6.0	22.5	0.8	C232A225-9S*****
3.3	26.5	15.0	6.0	22.5	0.8	C232A335-9S*****
4.7	26.5	16.0	7.0	22.5	0.8	C232A475-9S*****
6.8	26.5	18.5	10.0	22.5	0.8	C232A685-9S*****
10.0	26.5	22.0	12.0	22.5	0.8	C232A106-9S*****
4.7	32.0	18.0	9.0	27.5	0.8	C232A475-BS*****
6.8	32.0	18.0	9.0	27.5	0.8	C232A685-BS*****
10.0	32.0	20.0	11.0	27.5	0.8	C232A106-BS*****
15.0	32.0	20.0	11.0	27.5	0.8	C232A156-BS*****
22.0	32.0	25.0	13.0	27.5	0.8	C232A226-BS*****
33.0	32.0	30.0	16.0	27.5	0.8	C232A336-BS*****

Note: 1. “-”=capacitance tolerance code, M=±20%,K=±10%,J=±5%  
 2. “\*\*\*\*\*”=lead form and packing code (refer to table 1).

■ **Dimensions (mm)**

Pattern II (Reduced sizes)

250Vdc (160Vac)						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.068	10.5	8.5	3.5	7.5	0.5	C232E683-3S*****+
0.10	10.5	8.5	3.5	7.5	0.5	C232E104-3S*****+
0.15	10.5	9.0	4.0	7.5	0.6	C232E154-3S*****+
0.18	10.5	11.0	5.0	7.5	0.6	C232E184-3S*****+
0.22	10.5	11.0	5.0	7.5	0.6	C232E224-3S*****+
0.27	10.5	12.0	6.0	7.5	0.6	C232E274-3S*****+
0.33	10.5	12.0	6.0	7.5	0.6	C232E334-3S*****+
0.033	13.0	9.0	4.0	10.0	0.6	C232E333-4S*****+
0.047	13.0	9.0	4.0	10.0	0.6	C232E473-4S*****+
0.068	13.0	9.0	4.0	10.0	0.6	C232E683-4S*****+
0.10	13.0	9.0	4.0	10.0	0.6	C232E104-4S*****+
0.15	13.0	9.0	4.0	10.0	0.6	C232E154-4S*****+
0.22	13.0	11.0	5.0	10.0	0.6	C232E224-4S*****+
0.33	13.0	11.0	5.0	10.0	0.6	C232E334-4S*****+
0.39	13.0	12.0	6.0	10.0	0.6	C232E394-4S*****+
0.47	13.0	12.0	6.0	10.0	0.6	C232E474-4S*****+
0.10	17.5	11.0	5.0	15.0	0.8	C232E104-6S*****+
0.15	17.5	11.0	5.0	15.0	0.8	C232E154-6S*****+
0.22	17.5	11.0	5.0	15.0	0.8	C232E224-6S*****+
0.33	17.5	11.0	5.0	15.0	0.8	C232E334-6S*****+
0.47	17.5	11.0	5.0	15.0	0.8	C232E474-6S*****+
0.68	17.5	12.0	6.0	15.0	0.8	C232E684-6S*****+
1.0	17.5	13.5	7.5	15.0	0.8	C232E105-6S*****+
1.5	17.5	14.5	8.5	15.0	0.8	C232E155-6S*****+
0.22	26.5	15.0	6.0	22.5	0.8	C232E224-9S*****+
0.47	26.5	15.0	6.0	22.5	0.8	C232E474-9S*****+
0.68	26.5	15.0	6.0	22.5	0.8	C232E684-9S*****+
1.0	26.5	15.0	6.0	22.5	0.8	C232E105-9S*****+
1.5	26.5	16.0	7.0	22.5	0.8	C232E155-9S*****+
1.8	26.5	16.0	7.0	22.5	0.8	C232E185-9S*****+
2.2	26.5	17.0	8.5	22.5	0.8	C232E225-9S*****+
3.3	26.5	20.0	11.0	22.5	0.8	C232E335-9S*****+
1.5	32.0	18.0	9.0	27.5	0.8	C232E155-BS*****+
1.8	32.0	18.0	9.0	27.5	0.8	C232E185-BS*****+
2.2	32.0	18.0	9.0	27.5	0.8	C232E225-BS*****+
3.3	32.0	18.0	9.0	27.5	0.8	C232E335-BS*****+
4.7	32.0	20.0	11.0	27.5	0.8	C232E475-BS*****+
6.8	32.0	22.0	13.0	27.5	0.8	C232E685-BS*****+
10.0	32.0	24.5	15.0	27.5	0.8	C232E106-BS*****+

400Vdc (200Vac)						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.022	10.5	8.5	3.5	7.5	0.5	C232G223-3S*****+
0.033	10.5	8.5	3.5	7.5	0.5	C232G333-3S*****+
0.047	10.5	9.0	4.0	7.5	0.6	C232G473-3S*****+
0.068	10.5	11.0	5.0	7.5	0.6	C232G683-3S*****+
0.082	10.5	12.0	6.0	7.5	0.6	C232G823-3S*****+
0.10	10.5	12.0	6.0	7.5	0.6	C232G104-3S*****+
0.010	13.0	9.0	4.0	10.0	0.6	C232G103-4S*****+
0.015	13.0	9.0	4.0	10.0	0.6	C232G153-4S*****+
0.022	13.0	9.0	4.0	10.0	0.6	C232G223-4S*****+
0.033	13.0	9.0	4.0	10.0	0.6	C232G333-4S*****+
0.047	13.0	9.0	4.0	10.0	0.6	C232G473-4S*****+
0.056	13.0	9.0	4.0	10.0	0.6	C232G563-4S*****+
0.068	13.0	11.0	5.0	10.0	0.6	C232G683-4S*****+
0.10	13.0	11.0	5.0	10.0	0.6	C232G104-4S*****+
0.15	13.0	12.0	6.0	10.0	0.6	C232G154-4S*****+
0.047	17.5	11.0	5.0	15.0	0.8	C232G473-6S*****+
0.068	17.5	11.0	5.0	15.0	0.8	C232G683-6S*****+
0.10	17.5	11.0	5.0	15.0	0.8	C232G104-6S*****+
0.15	17.5	11.0	5.0	15.0	0.8	C232G154-6S*****+
0.22	17.5	12.0	6.0	15.0	0.8	C232G224-6S*****+
0.33	17.5	13.5	7.5	15.0	0.8	C232G334-6S*****+
0.47	17.5	14.5	8.5	15.0	0.8	C232G474-6S*****+
0.56	17.5	16.0	10.0	15.0	0.8	C232G564-6S*****+
0.68	17.5	16.0	10.0	15.0	0.8	C232G684-6S*****+
0.22	26.5	15.0	6.0	22.5	0.8	C232G224-9S*****+
0.33	26.5	15.0	6.0	22.5	0.8	C232G334-9S*****+
0.47	26.5	15.0	6.0	22.5	0.8	C232G474-9S*****+
0.68	26.5	16.0	7.0	22.5	0.8	C232G684-9S*****+
1.0	26.5	18.50	10.0	22.5	0.8	C232G105-9S*****+
1.5	26.5	22.0	12.0	22.5	0.8	C232G155-9S*****+
0.68	32.0	18.0	9.0	27.5	0.8	C232G684-BS*****+
1.0	32.0	18.0	9.0	27.5	0.8	C232G105-BS*****+
1.5	32.0	20.0	11.0	27.5	0.8	C232G155-BS*****+
1.8	32.0	20.0	11.0	27.5	0.8	C232G185-BS*****+
2.2	32.0	22.0	13.0	27.5	0.8	C232G225-BS*****+
3.3	32.0	24.5	15.0	27.5	0.8	C232G335-BS*****+
4.7	32.0	30.0	16.0	27.5	0.8	C232G475-BS*****+
6.8	32.0	33.0	18.0	27.5	0.8	C232G685-BS*****+

Note: 1. “-”=capacitance tolerance code, M=±20%,K=±10%,J=±5%  
 2. “\*\*\*\*”=lead form and packing code (refer to table 1).

■ **Dimensions (mm)**

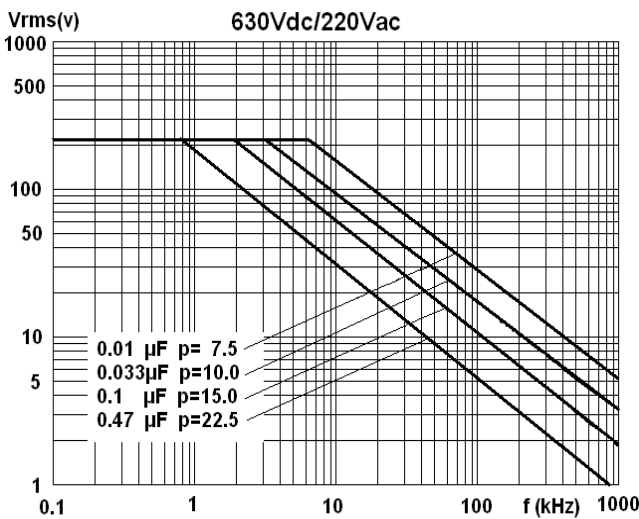
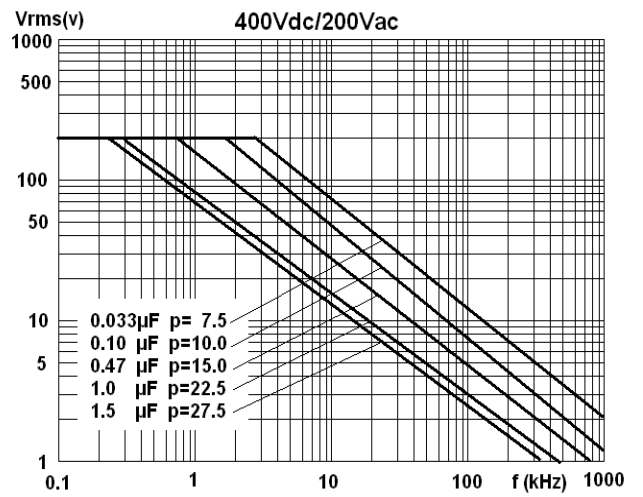
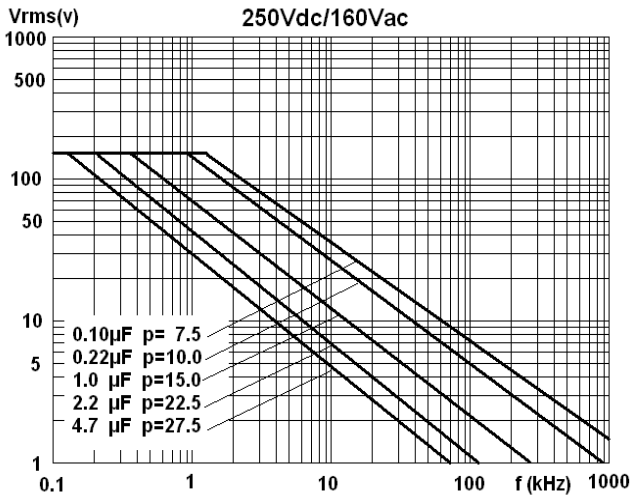
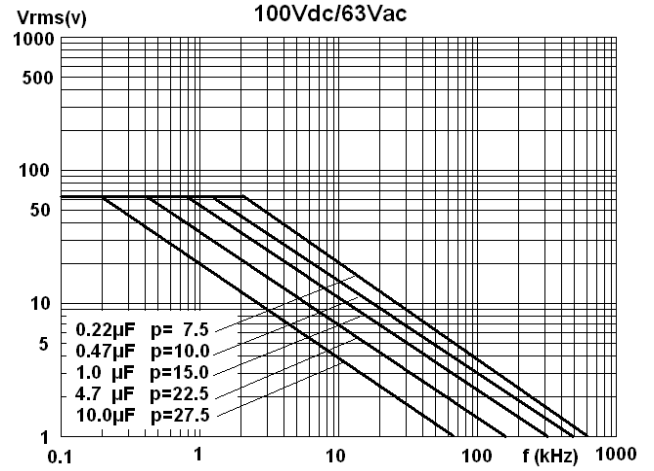
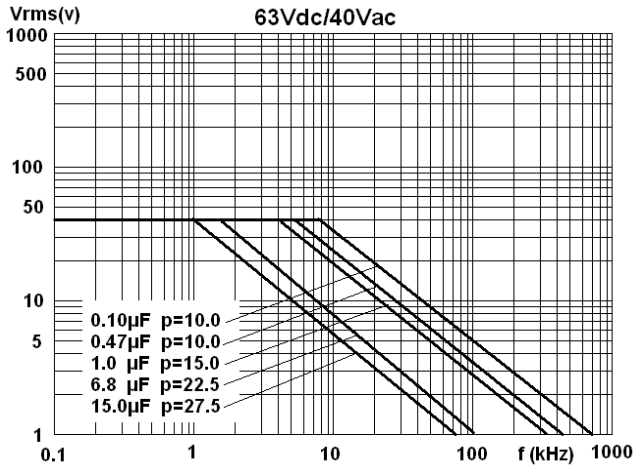
Pattern II (Reduced sizes)

630Vdc (220Vac) <sup>@</sup>						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.0022	10.5	8.5	3.5	7.5	0.5	C232J222-3S*****
0.0047	10.5	8.5	3.5	7.5	0.5	C232J472-3S*****
0.0068	10.5	8.5	3.5	7.5	0.5	C232J682-3S*****
0.010	10.5	8.5	3.5	7.5	0.5	C232J103-3S*****
0.015	10.5	9.0	4.0	7.5	0.6	C232J153-3S*****
0.022	10.5	11.0	5.0	7.5	0.6	C232J223-3S*****
0.033	10.5	12.0	6.0	7.5	0.6	C232J333-3S*****
0.047	10.5	12.0	6.0	7.5	0.6	C232J473-3S*****
0.0047	13.0	9.0	4.0	10.0	0.6	C232J472-4S*****
0.0068	13.0	9.0	4.0	10.0	0.6	C232J682-4S*****
0.010	13.0	9.0	4.0	10.0	0.6	C232J103-4S*****
0.015	13.0	9.0	4.0	10.0	0.6	C232J153-4S*****
0.022	13.0	9.0	4.0	10.0	0.6	C232J223-4S*****
0.033	13.0	11.0	5.0	10.0	0.6	C232J333-4S*****
0.047	13.0	11.0	5.0	10.0	0.6	C232J473-4S*****
0.068	13.0	12.0	6.0	10.0	0.6	C232J683-4S*****
0.033	17.5	11.0	5.0	15.0	0.8	C232J333-6S*****
0.047	17.5	11.0	5.0	15.0	0.8	C232J473-6S*****
0.068	17.5	11.0	5.0	15.0	0.8	C232J683-6S*****
0.10	17.5	12.0	6.0	15.0	0.8	C232J104-6S*****
0.15	17.5	13.5	7.5	15.0	0.8	C232J154-6S*****
0.22	17.5	16.0	10.0	15.0	0.8	C232J224-6S*****
0.33	17.5	19.0	11.0	15.0	0.8	C232J334-6S*****
0.10	26.5	15.0	6.0	22.5	0.8	C232J104-9S*****
0.15	26.5	15.0	6.0	22.5	0.8	C232J154-9S*****
0.22	26.5	16.0	7.0	22.5	0.8	C232J224-9S*****
0.33	26.5	16.0	7.0	22.5	0.8	C232J334-9S*****
0.47	26.5	17.0	8.5	22.5	0.8	C232J474-9S*****
0.68	26.5	22.0	12.0	22.5	0.8	C232J684-9S*****
0.33	32.0	18.0	9.0	27.5	0.8	C232J334-BS*****
0.47	32.0	18.0	9.0	27.5	0.8	C232J474-BS*****
0.68	32.0	20.0	11.0	27.5	0.8	C232J684-BS*****
1.0	32.0	20.0	11.0	27.5	0.8	C232J105-BS*****

1 000Vdc (300Vac)						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.0010	10.5	8.5	3.5	7.5	0.5	C233A102-3S*****
0.0015	10.5	8.5	3.5	7.5	0.5	C233A152-3S*****
0.0022	10.5	8.5	3.5	7.5	0.5	C233A222-3S*****
0.0033	10.5	8.5	3.5	7.5	0.5	C233A332-3S*****
0.0047	10.5	8.5	3.5	7.5	0.5	C233A472-3S*****
0.0068	10.5	9.0	4.0	7.5	0.6	C233A682-3S*****
0.010	10.5	11.0	5.0	7.5	0.6	C233A103-3S*****
0.015	10.5	12.0	6.0	7.5	0.6	C233A153-3S*****
0.0010	13.0	9.0	4.0	10.0	0.6	C233A102-4S*****
0.0015	13.0	9.0	4.0	10.0	0.6	C233A152-4S*****
0.0022	13.0	9.0	4.0	10.0	0.6	C233A222-4S*****
0.0033	13.0	9.0	4.0	10.0	0.6	C233A332-4S*****
0.0047	13.0	9.0	4.0	10.0	0.6	C233A472-4S*****
0.0056	13.0	9.0	4.0	10.0	0.6	C233A562-4S*****
0.0068	13.0	9.0	4.0	10.0	0.6	C233A682-4S*****
0.010	13.0	9.0	4.0	10.0	0.6	C233A103-4S*****
0.015	13.0	11.0	5.0	10.0	0.6	C233A153-4S*****
0.022	13.0	11.0	5.0	10.0	0.6	C233A223-4S*****
0.010	17.5	11.0	5.0	15.0	0.8	C233A103-6S*****
0.015	17.5	11.0	5.0	15.0	0.8	C233A153-6S*****
0.022	17.5	11.0	5.0	15.0	0.8	C233A223-6S*****
0.033	17.5	12.0	6.0	15.0	0.8	C233A333-6S*****
0.047	17.5	12.0	6.0	15.0	0.8	C233A473-6S*****
0.068	17.5	13.5	7.5	15.0	0.8	C233A683-6S*****
0.10	17.5	14.5	8.5	15.0	0.8	C233A104-6S*****
0.033	26.5	15.0	6.0	22.5	0.8	C233A333-9S*****
0.047	26.5	15.0	6.0	22.5	0.8	C233A473-9S*****
0.068	26.5	15.0	6.0	22.5	0.8	C233A683-9S*****
0.10	26.5	15.0	6.0	22.5	0.8	C233A104-9S*****
0.15	26.5	16.0	7.0	22.5	0.8	C233A154-9S*****
0.22	26.5	17.0	8.5	22.5	0.8	C233A224-9S*****
0.33	26.5	20.0	11.0	22.5	0.8	C233A334-9S*****
0.15	32.0	18.0	9.0	27.5	0.8	C233A154-BS*****
0.22	32.0	18.0	9.0	27.5	0.8	C233A224-BS*****
0.33	32.0	20.0	11.0	27.5	0.8	C233A334-BS*****
0.47	32.0	20.0	11.0	27.5	0.8	C233A474-BS*****
0.68	32.0	28.0	14.0	27.5	0.8	C233A684-BS*****
1.0	32.0	30.0	16.0	27.5	0.8	C233A105-BS*****
1.5	32.0	37.0	22.0	27.5	0.8	C233A155-BS*****

- Note: 1. “-”=capacitance tolerance code, M=±20%,K=±10%,J=±5%  
 2. “\*\*\*\*\*”=lead form and packing code (refer to table 1).  
 3. “@” Not suitable for across-the-line applications. Pls refer to the Interference Suppression Capacitors.

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



Note: sinusoidal wave-form, environment temperature  $\leq 85^{\circ}\text{C}$ , internal temperature rise  $\Delta T = 15^{\circ}\text{C}$ , p (pitch) in mm..

### ■ Test Method And Performance

No.	Item	Performance	Test method (GB 7332(IEC 60384-2))
1	Solderability	Good quality of tinning	Solder temperature: 245°C±5°C Immersion time: 2.0s±0.5s
2	Initial measurement	Capacitance, Tgδ	
	Terminal strength	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, legible marking	Solder temperature: 260°C±5°C Immersion time: 10s±1s
	Final measurement	ΔC/C ≤±2%(relative to the initial value) Increase of tgδ: ≤0.003 (C≤1.0μF) ≤0.002 (C>1.0μF)	
3	Initial measurement	Capacitance, Tgδ	
	Rapid change of temperature	There shall be no evidence of deterioration.	θ <sub>A</sub> =-55°C, θ <sub>B</sub> =+105°C 5 cycles Duration: t=30min
	Vibration	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	There shall be no evidence of deterioration.	4 000 times, Acceleration: 390m/s <sup>2</sup> , Pulse duration, 6ms
	Final measurement	ΔC/C ≤±5%(relative to the initial value) Increase of tgδ: ≤0.003 (C≤1.0μF) ≤0.002 (C>1.0μF) IR: ≥ 50% of the rated value	
4	climate sequence	Initial measurement	Capacitance, Tgδ
		Dry heat	+105°C, 16h
		Damp heat, Cyclic	Test Db, Severity: b, the first cycle
		Cold	-55°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,
		Damp heat, cyclic other	Test Db, Severity b, the other cycles, Applying U <sub>R</sub> for 1 minute after the test finished.

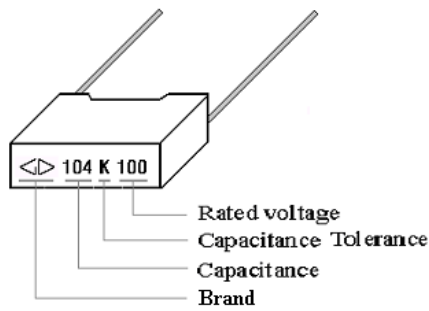


No.	Item		Performance	Test method (GB 7332(IEC 60384-2))
4	climate sequence (continue)	Final measurement	There shall be no evidence of deterioration and the marking shall be legible. $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $\leq 0.005$ ( $C \leq 1.0\mu\text{F}$ ) $\leq 0.003$ ( $C > 1.0\mu\text{F}$ ) 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 $\text{tg}\delta \leq 0.005$ IR: $\geq 50\%$ of the rated value	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93 \pm 2\%$ RH Duration: 56 days
6	Endurance		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 $\text{tg}\delta$ : $\leq 0.003$ ( $C \leq 1.0\mu\text{F}$ ) $\leq 0.002$ ( $C > 1.0\mu\text{F}$ ) IR: $\geq 50\%$ of the rated value	Temperature: $+85^\circ\text{C}/+100^\circ\text{C}$ Voltage: $1.25 \times U_R / 1.25 \times U_c$ ( $U_c = 0.8U_R$ ) Duration: 2 000h
7	Temperature characteristic		Measuring capacitance at test point b, d, f: Characteristic at lower category temperature $-55^\circ\text{C}$ : $-10\% \leq (C_b - C_d)/C_d \leq 0\%$ Characteristic at upper category temperature $+100^\circ\text{C}$ : $0\% \leq (C_f - C_d)/C_d \leq +10\%$ I.R. (test at point f): $U_R \leq 100\text{V}$ : $\geq 75 \text{ M}\Omega$ ( $C \leq 0.33\mu\text{F}$ ) $\geq 25\text{s}$ ( $C > 0.33\mu\text{F}$ ) $U_R > 100\text{V}$ : $\geq 150 \text{ M}\Omega$ ( $C \leq 0.33\mu\text{F}$ ) $\geq 50\text{s}$ ( $C > 0.33\mu\text{F}$ )	Static method: The Capacitors should be kept at the following temperature in turn: a( $20 \pm 2$ ) $^\circ\text{C}$ , b( $-55 \pm 3$ ) $^\circ\text{C}$ , d( $20 \pm 2$ ) $^\circ\text{C}$ , f( $100 \pm 2$ ) $^\circ\text{C}$ , g( $20 \pm 2$ ) $^\circ\text{C}$
8	Charging and discharging		$\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $\leq 0.003$ ( $C \leq 1.0\mu\text{F}$ ) $\leq 0.002$ ( $C > 1.0\mu\text{F}$ ) 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: $220/C_N$ ( $\Omega$ ) Discharging resistance: $R = 10/C_N$ ( $\Omega$ ) or $20\Omega$ (whichever is the greater) $C_N$ : rated capacitance ( $\mu\text{F}$ )

■ **Quality ensuring test (before shipment):**

Inspection item (each batch)	Inspection level (GB 2828)	
	IL	AQL
Appearance inspection	S-4	1.5%
Dimensions		
Capacitance	II	0.65%
Tangent of the loss angle		
Dielectric strength		
Insulation resistance		
Solderability	S-3	2.5%

■ **Marking:**



## ■ Taping specification for box-type capacitors

### ▲ Outline Drawing

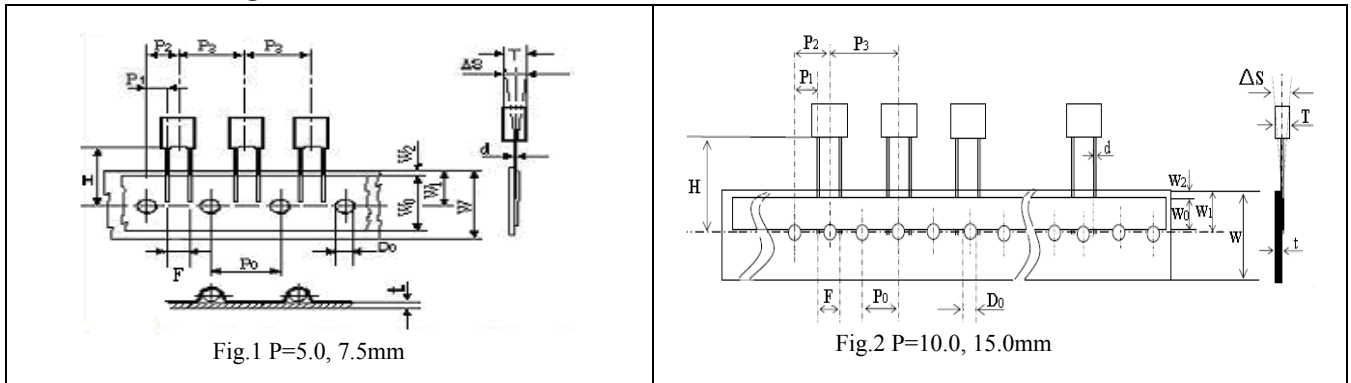


Fig.1 P=5.0, 7.5mm

Fig.2 P=10.0, 15.0mm

### ▲ Taping Dimensions(mm)

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 <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	△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 <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

### ▲ Packing Quantity

Pitch (mm)	Box thickness 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
7.5	6.0	1 000	800
	3.5	1 700	1 500
	4.0	1 500	1 350
	5.0	1 200	1 050
10.0/ 15.0	6.0	1 000	850
	4.0	750	650
	5.0	600	500
15.0	6.0	500	450
	7.5	400	350
	8.5	350	300
	10.0	300	250
	11.0	250	220

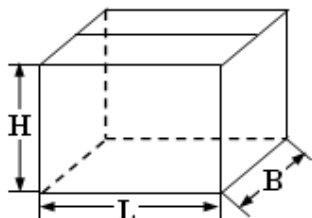
**Note:** \* P<sub>0</sub>=15mm is also available;

\*\*F can be other lead spacing;

\*\*\*H=16.5mm is available;

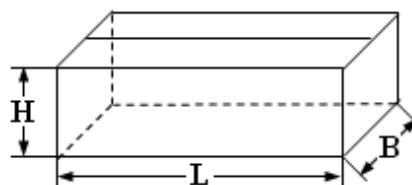
## ■ Packing box sizes(mm)

1. Out packing box for bulk



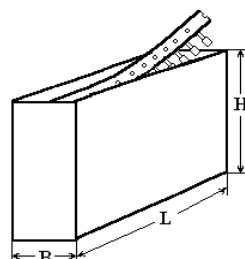
L: 375±5  
 B: 375±5  
 H: 265±5

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