



# SPECIFICATION FOR APPROVAL

File No.: Q/FRK 0.GS.E.C35-C12

Product Name	Metallized polypropylene film capacitor(Box-type)
Product Type	MKP25 Series
Product Code	C35
Customer	
Customer Code	
Issue Date	

<b>Xiamen Faratronic Co. Ltd.</b>			Approved by Customer
Drafted	Checked	Approved	



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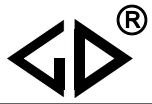
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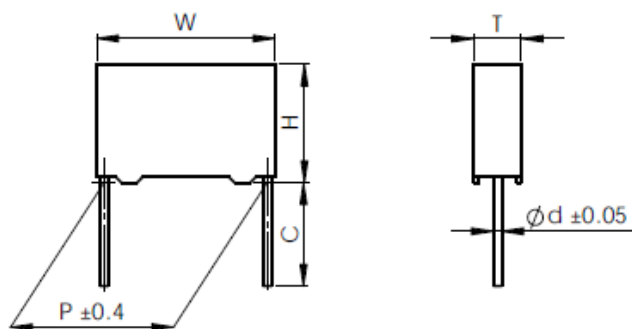


**Version history**

Current version	Date	Author	Change description

## Metallized polypropylene film capacitor (Box-type)

### ■ Outline Drawing



$$W \pm 0.4, H \pm 0.4, T \pm 0.4$$

### ■ Features

- Metallized polypropylene structure.
- Excellent electric property.
- Plastic case (UL94 V-0), Epoxy resin sealing.

### ■ Typical Applications

- As intermediate circuit capacitors for SMPS、Electronic Ballast、 inverter(i.e. DC-link, DC-filter and P.F.C)

### ■ Specifications

Reference Standard	GB/T 10190(IEC 60384-16)								
Climatic Category	40/105/56								
Rated Temperature	85°C								
Operating Temperature Range	-40°C~105°C (+85°C to +105°C: decreasing factor 1.25% per °C for $U_R$ )								
Rated Voltage	450Vdc, 520Vdc, 630Vdc								
Capacitance Range	0.022 $\mu$ F~22 $\mu$ F								
Capacitance Tolerance	$\pm 5\%$ (J), $\pm 10\%$ (K), $\pm 20\%$ (M)								
Voltage Proof	1.6 $U_R$ (5s)								
Dissipation Factor	$\leq 15 \times 10^{-4}$ (20°C, 1kHz)								
Insulation Resistance	$R \geq 100\,000\,M\Omega$ , $C_N \leq 0.33\mu F$ $RC_N \geq 30\,000s$ , $C_N > 0.33\mu F$ (20°C, 100V, 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 obtained by multiplying the right value with $U_R/U$ .	$U_R(V)$	Max dV/dt(V/us) ——Miniature version				Max dV/dt(V/us)			
		P=10.0	P=15.0	P=22.5	P=27.5	P=10.0	P=15.0	P=22.5	P=27.5
	450	100	65	35	20	300	200	100	80
	520	120	80	60	40	350	220	150	100
630	200	160	70	50	400	300	180	120	



■ 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	5															

Digit 1 to 3 Series code

C35=MKP25

Digit 4 to 5 D.C. rated voltage:

2S=450V 2T=520V 2J=630V

Digit 6 to 8 Rated capacitance value

For example: 103=10×10<sup>3</sup>pf=0.01uF

Digit 9 Capacitance tolerance

J=±5%, K=±10%, M=±20%

Digit 10 Pitch

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

**Table1 Lead form and packaging code**

Digit 12		Digit 13		Digit 14		Digit 15	
code	explanation	code	explanation	code	explanation	code	explanation
A	ammo-pack	4 6	F=10.0mm 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
		00	standard lead length (18mm~26mm)			2	
		45	lead length 4.5mm				
		35	lead length 3.5mm				
32	lead length 3.2mm				Length tolerance ±0.3mm		

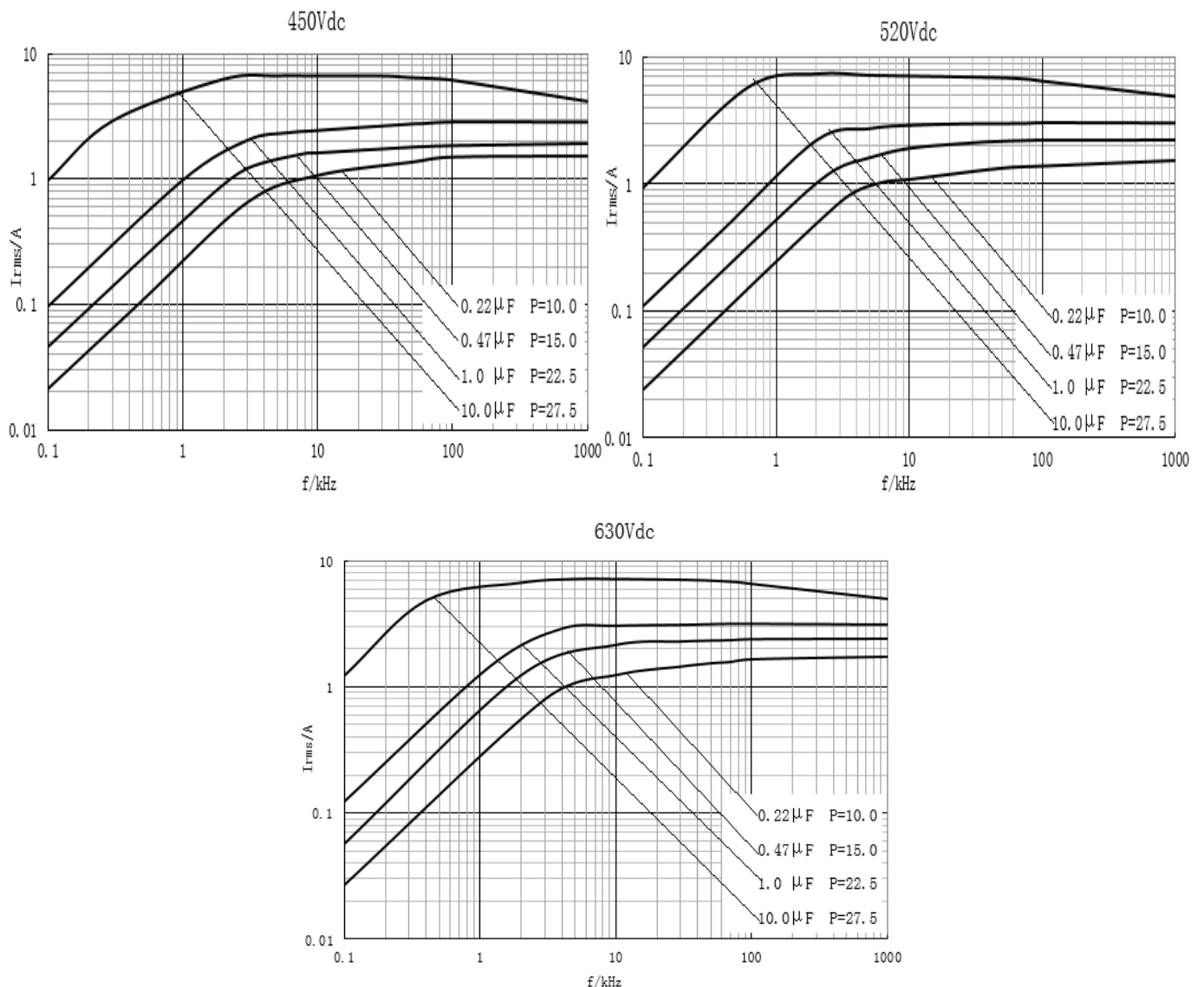


■ Dimensions (mm) ---Miniature version (Small sizes+ Segmented metallized-film design)

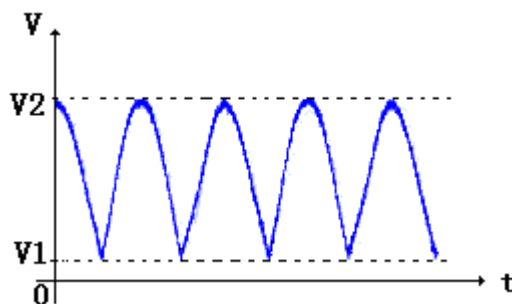
450Vdc							520Vdc							630Vdc						
C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number	C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number	C <sub>N</sub> (μF)	W ±0.4	H ±0.4	T ±0.4	P ±0.4	d	Part number
0.12	13.0	9.0	4.0	10	0.6	C352S124-4S****+++	0.082	13.0	9.0	4.0	10	0.6	C352T823-4S****+++	0.056	13.0	9.0	4.0	10	0.6	C352J563-4S****+++
0.15	13.0	9.0	4.0	10	0.6	C352S154-4S****+++	0.10	13.0	9.0	4.0	10	0.6	C352T104-4S****+++	0.068	13.0	9.0	4.0	10	0.6	C352J683-4S****+++
0.18	13.0	11.0	5.0	10	0.6	C352S184-4S****+++	0.12	13.0	11.0	5.0	10	0.6	C352T124-4S****+++	0.082	13.0	11.0	5.0	10	0.6	C352J823-4S****+++
0.22	13.0	11.0	5.0	10	0.6	C352S224-4S****+++	0.15	13.0	11.0	5.0	10	0.6	C352T154-4S****+++	0.10	13.0	11.0	5.0	10	0.6	C352J104-4S****+++
0.27	13.0	12.0	6.0	10	0.6	C352S274-4S****+++	0.18	13.0	12.0	6.0	10	0.6	C352T184-4S****+++	0.12	13.0	12.0	6.0	10	0.6	C352J124-4S****+++
0.33	13.0	12.0	6.0	10	0.6	C352S334-4S****+++	0.22	13.0	12.0	6.0	10	0.6	C352T224-4S****+++	0.15	13.0	12.0	6.0	10	0.6	C352J154-4S****+++
0.39	13.0	13.0	7.0	10	0.6	C352S394-4S****+++	0.27	13.0	13.0	7.0	10	0.6	C352T274-4S****+++	0.18	13.0	13.0	7.0	10	0.6	C352J184-4S****+++
0.47	13.0	13.0	7.0	10	0.6	C352S474-4S****+++	0.33	13.0	13.0	7.0	10	0.6	C352T334-4S****+++	0.22	13.0	13.0	7.0	10	0.6	C352J224-4S****+++
0.56	13.0	14.0	8.0	10	0.6	C352S564-4S****+++	0.39	13.0	14.0	8.0	10	0.6	C352T394-4S****+++	0.27	13.0	14.0	8.0	10	0.6	C352J274-4S****+++
0.68	13.0	14.0	8.0	10	0.6	C352S684-4S****+++	0.47	13.0	14.0	8.0	10	0.6	C352T474-4S****+++	0.33	13.0	14.0	8.0	10	0.6	C352J334-4S****+++
0.22	17.5	11.0	5.0	15	0.6	C352S224-6S****+++	0.27	17.5	11.0	5.0	15	0.6	C352T274-6S****+++	0.18	17.5	11.0	5.0	15	0.6	C352J184-6S****+++
0.33	17.5	11.0	5.0	15	0.6	C352S334-6S****+++	0.33	17.5	11.0	5.0	15	0.6	C352T334-6S****+++	0.22	17.5	11.0	5.0	15	0.6	C352J224-6S****+++
0.39	17.5	11.0	5.0	15	0.6	C352S394-6S****+++	0.39	17.5	12.0	6.0	15	0.6	C352T394-6S****+++	0.27	17.5	12.0	6.0	15	0.6	C352J274-6S****+++
0.47	17.5	11.0	5.0	15	0.6	C352S474-6S****+++	0.47	17.5	12.0	6.0	15	0.6	C352T474-6S****+++	0.33	17.5	12.0	6.0	15	0.6	C352J334-6S****+++
0.56	17.5	12.0	6.0	15	0.6	C352S564-6S****+++	0.56	17.5	12.0	7.0	15	0.6	C352T564-6S****+++	0.39	17.5	12.0	7.0	15	0.6	C352J394-6S****+++
0.68	17.5	12.0	7.0	15	0.6	C352S684-6S****+++	0.68	17.5	13.5	7.5	15	0.6	C352T684-6S****+++	0.47	17.5	13.5	7.5	15	0.6	C352J474-6S****+++
0.82	17.5	12.0	7.0	15	0.6	C352S824-6S****+++	0.82	17.5	14.0	8.0	15	0.6	C352T824-6S****+++	0.56	17.5	14.0	8.0	15	0.6	C352J564-6S****+++
1.0	17.5	13.5	7.5	15	0.6	C352S105-6S****+++	1.0	17.5	14.5	8.5	15	0.6	C352T105-6S****+++	0.68	17.5	14.5	8.5	15	0.6	C352J684-6S****+++
1.2	17.5	14.0	8.0	15	0.6	C352S125-6S****+++	1.2	17.5	16.0	10.0	15	0.8	C352T125-6S****+++	0.82	17.5	16.0	10.0	15	0.8	C352J824-6S****+++
1.5	17.5	16.0	10.0	15	0.8	C352S155-6S****+++	1.5	17.5	19.0	11.0	15	0.8	C352T155-6S****+++	1.0	17.5	16.0	10.0	15	0.8	C352J105-6S****+++
1.8	17.5	16.0	10.0	15	0.8	C352S185-6S****+++	0.68	26.5	15.0	6.0	22.5	0.8	C352T684-9S****+++	1.2	17.5	19.0	11.0	15	0.8	C352J125-6S****+++
2.2	17.5	19.0	11.0	15	0.8	C352S225-6S****+++	0.82	26.5	15.0	6.0	22.5	0.8	C352T824-9S****+++	0.47	26.5	15.0	6.0	22.5	0.8	C352J474-9S****+++
1.0	26.5	15.0	6.0	22.5	0.8	C352S105-9S****+++	1.0	26.5	16.0	7.0	22.5	0.8	C352T105-9S****+++	0.56	26.5	15.0	6.0	22.5	0.8	C352J564-9S****+++
1.2	26.5	15.0	6.0	22.5	0.8	C352S125-9S****+++	1.2	26.5	16.0	7.0	22.5	0.8	C352T125-9S****+++	0.68	26.5	16.0	7.0	22.5	0.8	C352J684-9S****+++
1.5	26.5	16.0	7.0	22.5	0.8	C352S155-9S****+++	1.5	26.5	17.0	8.5	22.5	0.8	C352T155-9S****+++	0.82	26.5	16.0	7.0	22.5	0.8	C352J824-9S****+++
1.8	26.5	16.0	7.0	22.5	0.8	C352S185-9S****+++	1.8	26.5	17.0	8.5	22.5	0.8	C352T185-9S****+++	1.0	26.5	17.0	8.5	22.5	0.8	C352J105-9S****+++
2.2	26.5	17.0	8.5	22.5	0.8	C352S225-9S****+++	2.2	26.5	18.5	10.0	22.5	0.8	C352T225-9S****+++	1.2	26.5	17.0	8.5	22.5	0.8	C352J125-9S****+++
2.7	26.5	17.0	8.5	22.5	0.8	C352S275-9S****+++	2.7	26.5	18.5	10.0	22.5	0.8	C352T275-9S****+++	1.5	26.5	18.5	10.0	22.5	0.8	C352J155-9S****+++
3.3	26.5	18.5	10.0	22.5	0.8	C352S335-9S****+++	3.3	26.5	20.0	11.0	22.5	0.8	C352T335-9S****+++	1.8	26.5	18.5	10.0	22.5	0.8	C352J185-9S****+++
3.9	26.5	18.5	10.0	22.5	0.8	C352S395-9S****+++	3.9	26.5	22.0	12.0	22.5	0.8	C352T395-9S****+++	2.2	26.5	20.0	11.0	22.5	0.8	C352J225-9S****+++
4.7	26.5	20.0	11.0	22.5	0.8	C352S475-9S****+++	4.7	26.5	24.5	15.5	22.5	0.8	C352T475-9S****+++	2.7	26.5	22.0	12.0	22.5	0.8	C352J275-9S****+++
5.6	26.5	22.0	12.0	22.5	0.8	C352S565-9S****+++	5.6	26.5	24.5	15.5	22.5	0.8	C352T565-9S****+++	3.3	26.5	24.5	15.5	22.5	0.8	C352J335-9S****+++
6.8	26.5	24.5	15.5	22.5	0.8	C352S685-9S****+++	2.2	32.0	18.0	9.0	27.5	0.8	C352T225-BS****+++	3.9	26.5	24.5	15.5	22.5	0.8	C352J395-9S****+++
8.2	26.5	24.5	15.5	22.5	0.8	C352S825-9S****+++	2.7	32.0	18.0	9.0	27.5	0.8	C352T275-BS****+++	1.8	32.0	18.0	9.0	27.5	0.8	C352J185-BS****+++
3.3	32.0	18.0	9.0	27.5	0.8	C352S335-BS****+++	3.3	32.0	20.0	11.0	27.5	0.8	C352T335-BS****+++	2.2	32.0	20.0	11.0	27.5	0.8	C352J225-BS****+++
3.9	32.0	18.0	9.0	27.5	0.8	C352S395-BS****+++	3.9	32.0	20.0	11.0	27.5	0.8	C352T395-BS****+++	2.7	32.0	20.0	11.0	27.5	0.8	C352J275-BS****+++
4.7	32.0	20.0	11.0	27.5	0.8	C352S475-BS****+++	4.7	32.0	22.0	13.0	27.5	0.8	C352T475-BS****+++	3.3	32.0	22.0	13.0	27.5	0.8	C352J335-BS****+++
5.6	32.0	20.0	11.0	27.5	0.8	C352S565-BS****+++	5.6	32.0	22.0	13.0	27.5	0.8	C352T565-BS****+++	3.9	32.0	22.0	13.0	27.5	0.8	C352J395-BS****+++
6.8	32.0	22.0	13.0	27.5	0.8	C352S685-BS****+++	6.8	32.0	24.5	15.0	27.5	0.8	C352T685-BS****+++	4.7	32.0	24.5	15.0	27.5	0.8	C352J475-BS****+++
8.2	32.0	24.5	15.0	27.5	0.8	C352S825-BS****+++	8.2	32.0	24.5	15.0	27.5	0.8	C352T825-BS****+++	5.6	32.0	28.0	17.0	27.5	0.8	C352J565-BS****+++
10.0	32.0	24.5	15.0	27.5	0.8	C352S106-BS****+++	10.0	32.0	28.0	17.0	27.5	0.8	C352T106-BS****+++	6.8	32.0	29.0	19.0	27.5	0.8	C352J685-BS****+++
12.0	32.0	28.0	17.0	27.5	0.8	C352S126-BS****+++	12.0	32.0	33.0	18.0	27.5	0.8	C352T126-BS****+++	8.2	32.0	29.0	19.0	27.5	0.8	C352J825-BS****+++
15.0	32.0	33.0	18.0	27.5	0.8	C352S156-BS****+++	15.0	32.0	37.0	22.0	27.5	0.8	C352T156-BS****+++	10.0	32.0	37.0	22.0	27.5	0.8	C352J106-BS****+++
18.0	32.0	37.0	22.0	27.5	0.8	C352S186-BS****+++	18.0	32.0	37.0	22.0	27.5	0.8	C352T186-BS****+++	12.0	32.0	37.0	22.0	27.5	0.8	C352J126-BS****+++
22.0	32.0	37.0	22.0	27.5	0.8	C352S226-BS****+++														

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

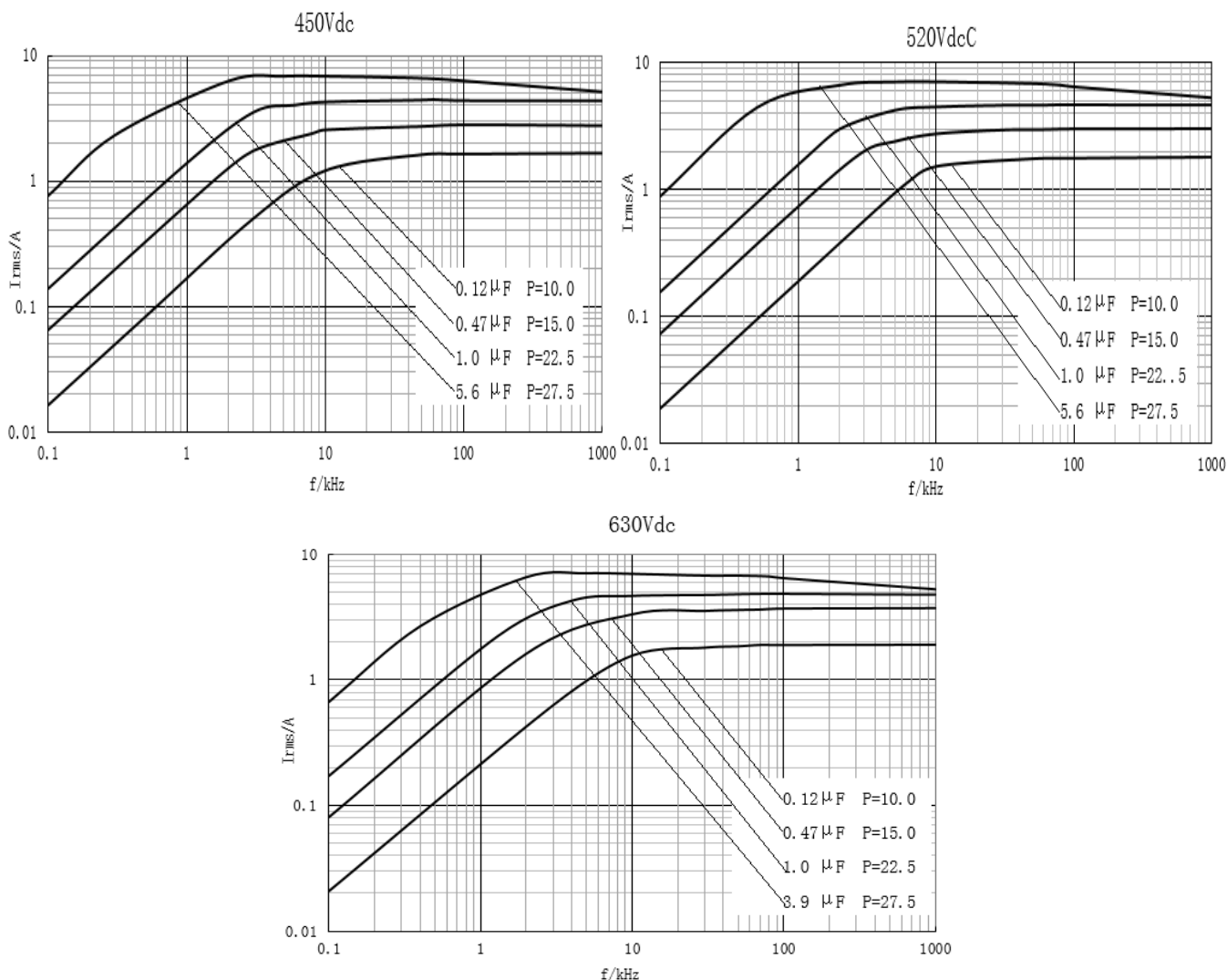


**Max. Current (I<sub>r.m.s.</sub>) versus Frequency – Miniature version**


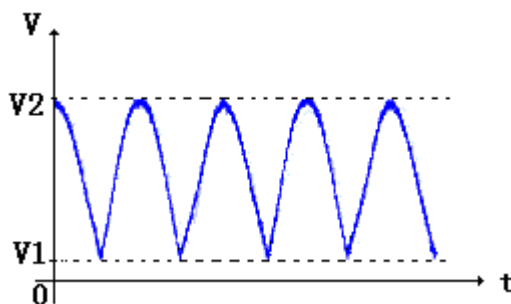
NOTE: 1. sinusoidal wave-form, environment temperature  $\leq 85^{\circ}C$ , internal temperature rise  $\Delta T=10^{\circ}C$ , p (pitch) in mm.  
 2. The series product is only recommended to use in DC-filter or DC-blocking circuits. It means the voltage applied to the capacitors must be unidirectional ripple voltage. The typical voltage curve is as follows reference.  
 If you have any questions for this note, please feel free to contact with our technical engineer.



Here:  $V_1 \geq 0$ ,  $V_2 \leq U_R$ ,  $I_{rms} = 2\pi f \times C \times (V_2 - V_1) / \sqrt{2}$   
 $U_R$  is the rated voltage of the capacitor

**Max. Current (I<sub>r.m.s.</sub>) versus Frequency**


NOTE: 1. sinusoidal wave-form, environment temperature  $\leq 85^{\circ}C$ , internal temperature rise  $\Delta T = 10^{\circ}C$ , p (pitch) in mm.  
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$$\text{Here: } V_1 \geq 0, V_2 \leq U_R, I_{rms} = 2\pi fC (V_2 - V_1) / \sqrt{2}$$

$U_R$  is the rated voltage of the capacitor



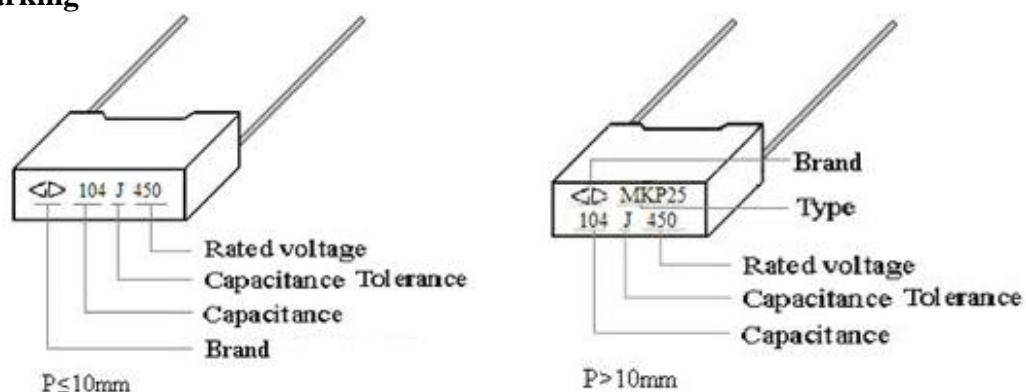
**■ Test Method And Performance**

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	There shall be no visible damage	Tension: 10N(0.6≤φd≤0.8) 20N(φd=1.0) Bend: 5N(0.6≤φd≤0.8) 10N(φd=1.0) 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 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
	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 ≤±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
		Damp heat, Cyclic other	Applying U <sub>R</sub> for 1 minute after 15 minutes the test finished. Test Db, Severity b, the other cycles,
	Final measurement	There shall be no visible damage, legible marking ΔC/C ≤±5%(relative to the initial value) Increase of tgδ: ≤0.005 (C≤1.0μF,10kHz) ≤0.005(C>1.0μF,1kHz) I.R.: ≥ 50% of the rated value	

No.	Item	Performance	Test method(IEC 60384-16)
5	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 $\text{tg}\delta: \leq 0.002$ (1kHz) I.R.: $\geq 50\%$ of the rated value	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93 \pm 3\%$ RH Duration: 56 days
6	Endurance	There shall be no visible damage, legible marking $\Delta C/C \leq \pm 5\%$ (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, $C > 1.0\mu\text{F}$ ) I.R.: $\geq 50\%$ of the rated value	Temperature: $+85^\circ\text{C}$ Voltage: $1.25 \times U_R$ Duration: 1 000h
7	Charging and discharging	$\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$ : $\leq 0.005$ ( $C \leq 1.0\mu\text{F}$ , 10kHz) $\leq 0.005$ ( $C > 1.0\mu\text{F}$ , 1kHz) I.R.: $\geq 50\%$ of the rated value	Times: 10 000 Duration of charging: 0.5s Duration of discharging: 0.5s Charging voltage: rated voltage $U_R$ Charging resistance: $220/C_N(\Omega)$ Discharging resistance: $U_R \div C_N \div dv/dt(\Omega)$ $C_N$ : rated capacitance ( $\mu\text{F}$ ) dv/dt value: see P2

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

Inspection item (each batch)	Inspection level (GB 2828)	
	IL	AQL
Appearance inspection	II	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

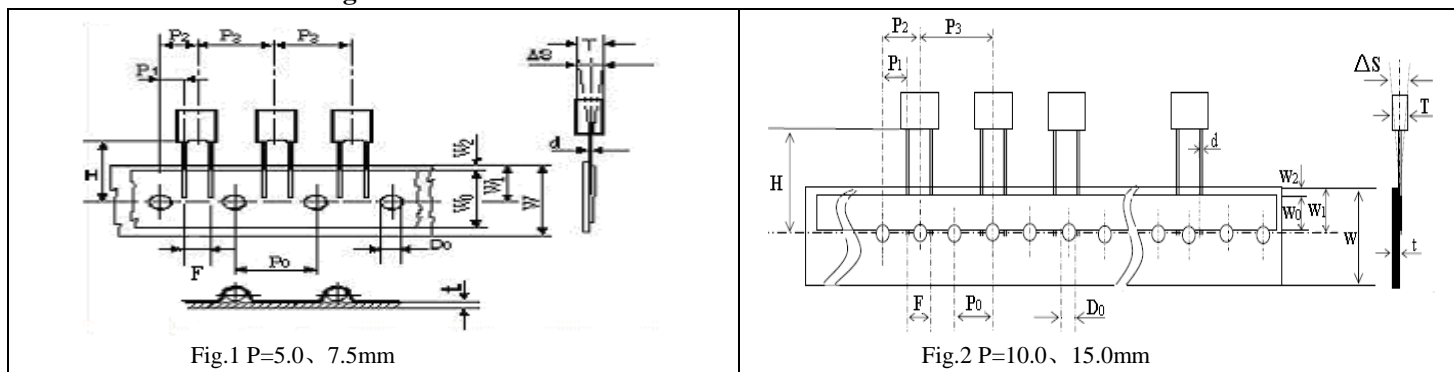


Fig.1 P=5.0、7.5mm

Fig.2 P=10.0、15.0mm

### ▲ Taping Dimensions(mm)

Technology index title	Code	Dimensions				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	△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 position	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

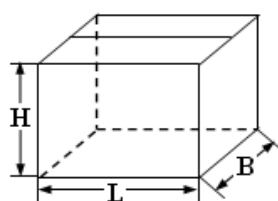
### ▲ Packing Quantity

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
	6.0	1 000	800
7.5	3.5	1 700	1 500
	4.0	1 500	1 350
	5.0	1 200	1 050
	6.0	1 000	850
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	220

**Note:** \* P<sub>0</sub>=15mm is also available;  
 \*\*F can be other lead spacing;  
 \*\*\*H=16.5mm is available;

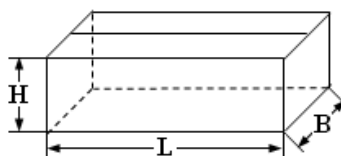
### ■ Packing box sizes(mm)

#### 1. Out packing box for bulk



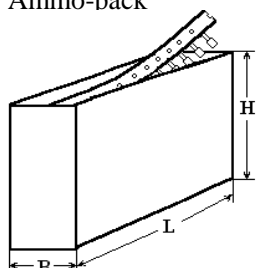
L:375±5  
 B:375±5  
 H:265±5

#### 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