

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.
- Excellent electric property.
- Flame retardant epoxy resin powder coating (UL94 V-0)

■ Typical application

- 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	0.027μF ~ 18.0μF								
Capacitance Tolerance	J(±5%), K(±10%), M(±20%)								
Voltage Proof	1.6U _R (5s)								
Dissipation Factor	≤ 10 × 10 ⁻⁴ (20°C, 1kHz)								
Insulation Resistance	≥ 100 000MΩ, C _N ≤ 0.33μF ≥ 30 000s, C _N > 0.33μF (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 obtain by multiplying the right value with U _R /U.	U _R (V)	dV/dt(V/μs) —— Miniature version				dV/dt(V/μs)			
		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	7															

Digit 1 to 3 Series code

C37

Digit 4 to 5 D.C. rated voltage:

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

Digit 6 to 8 Rated capacitance value

For example: 103=10×10³pF=0.01uF

Digit 9 Capacitance tolerance

J=±5%, K=±10%, M=±20%

Digit 10 Pitch

4=10mm 6=15mm 9=22.5mm B=27.5mm

Digit 11 Internal use

Digit 12 to 15 Lead form and packaging code

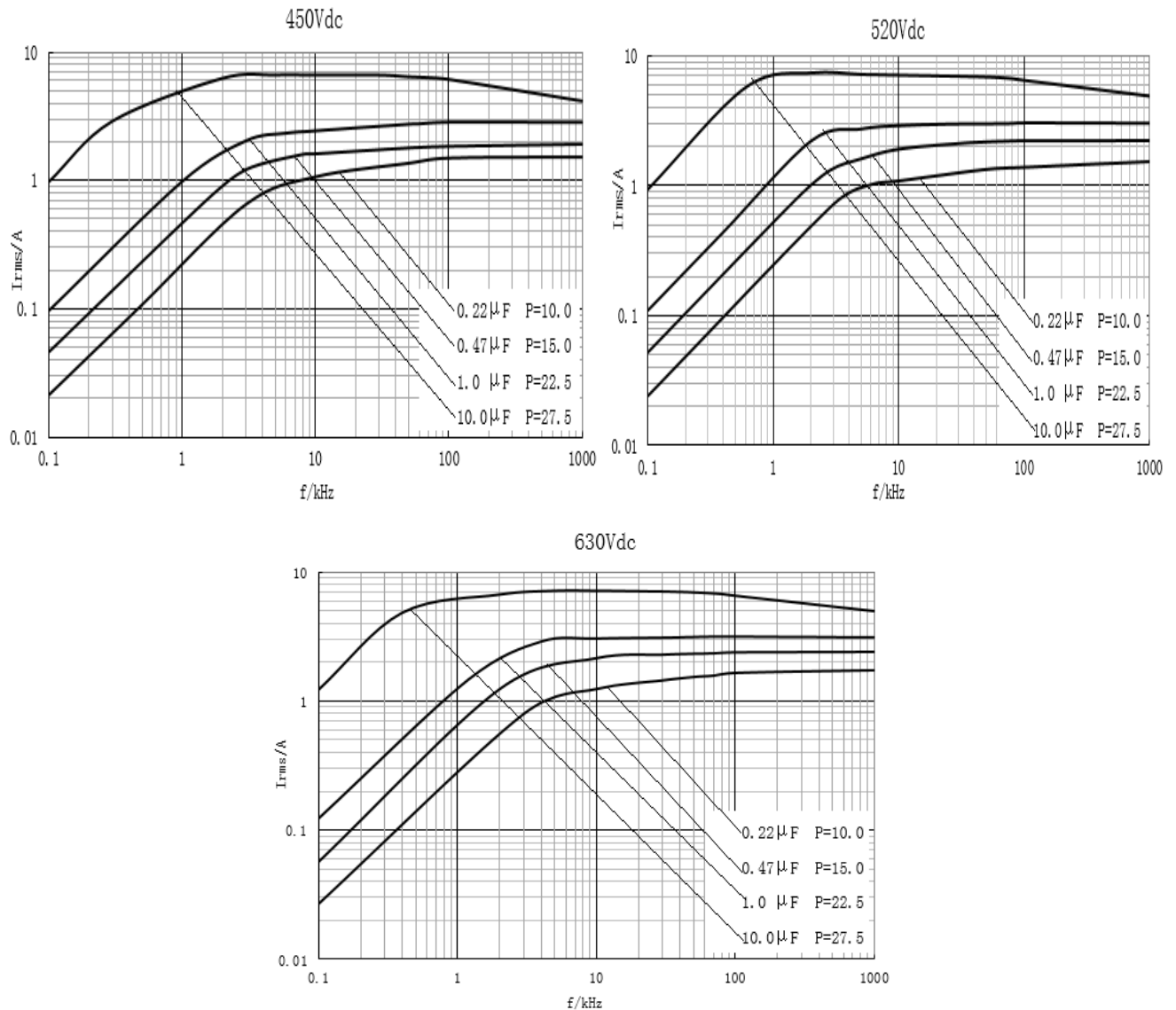
Digit 16 to 18 Internal use

Table 1 Lead form and packing code

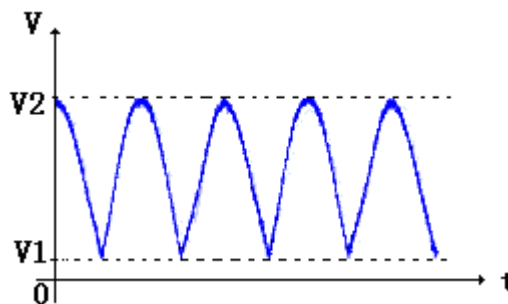
Digit 12		Digit 13		Digit 14		Digit 15	
code	explanation	code	explanation	code	explanation	code	explanation
A	ammo-pack	2	F=5.0mm	1	kinked	A	each cap. between two consecutive holes P3=12.7mm,H=20.0mm (For pitch=7.5mm)
		3	F=7.5mm			E	P3=25.4mm;H=20.0mm (For pitch=10.0/15mm)
F	lead kinked	4	F=10.0mm	0	B=4.5mm (the length of B)	0	B Length tolerance ±0.5mm
		6	F=15.0mm				
		2	F=5.0mm				
		3	F=7.5mm				
Y	straight lead “Y” in the figure above	4	F=10.0mm	0		0	Length tolerance ±0.5mm
		35	lead length 4.5mm				
		32	lead length 3.5mm				
		32	lead length 3.2mm				

Digit 12-15 code “C000” means standard lead length (20mm ~ 30mm)

■ Max Current (I_{r.m.s.}) versus frequency (Miniature version)

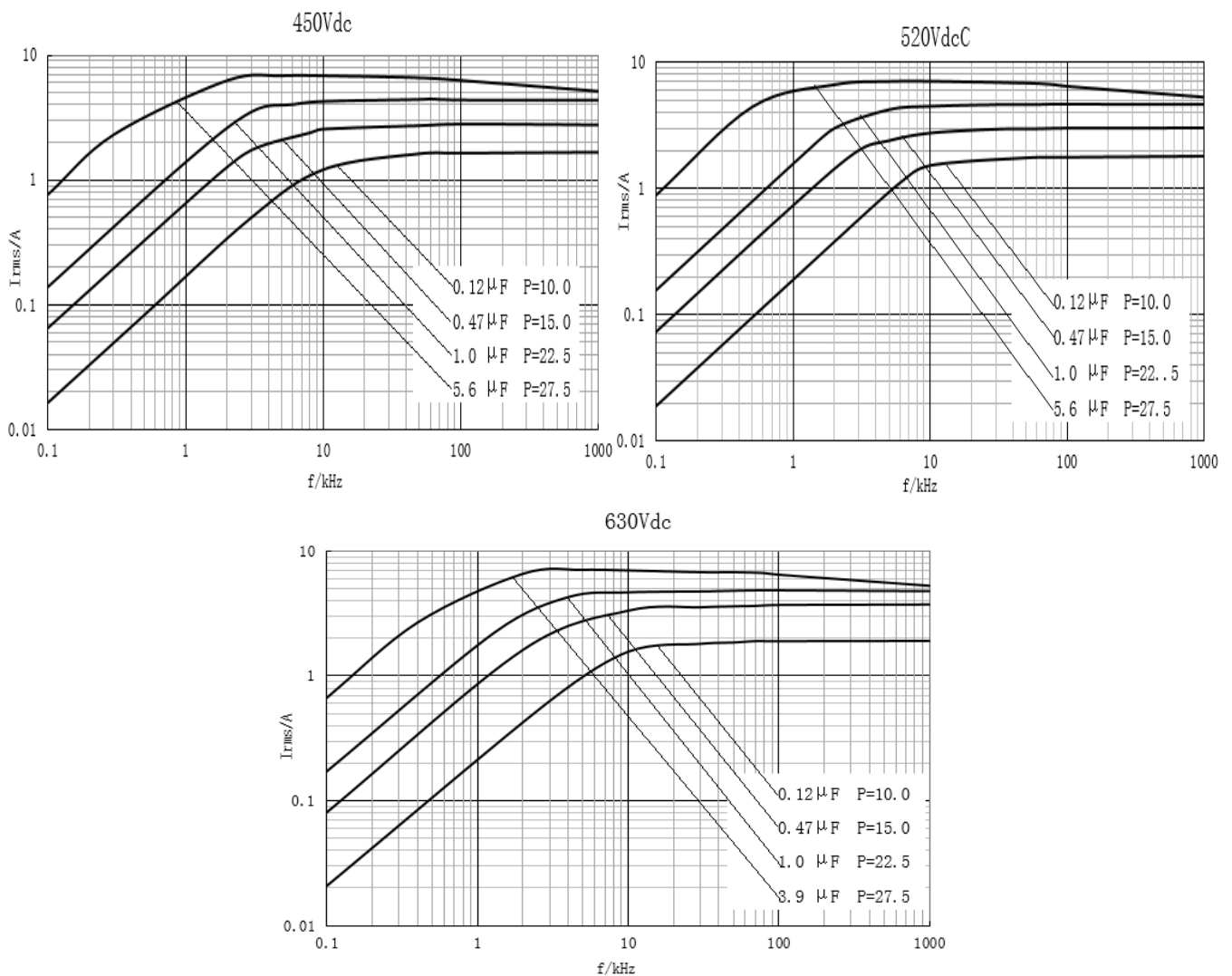


- NOTE: 1. sinusoidal wave-form, environment temperature $\leq 85^{\circ}\text{C}$, internal temperature rise $\Delta T = 10^{\circ}\text{C}$, p (pitch) in mm.
 2. The series product is only recommended to use in DC-filter or DC-blocking circuits. It means the voltage applied to the capacitors must be 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.

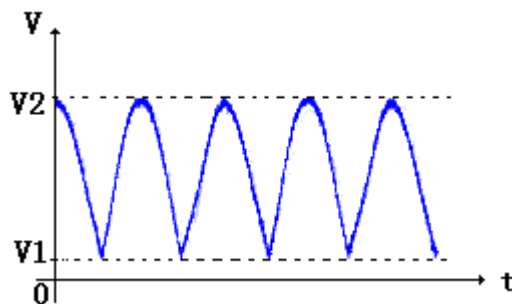


Here: $V_1 \geq 0$, $V_2 \leq U_R$, $I_{r.m.s.} = 2 \pi f \times C \times (V_2 - V_1) / \sqrt{2}$
 U_R is the rated voltage of the capacitor

■ Max Current (I_{r.m.s.}) versus frequency



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■ Test Method And Performance

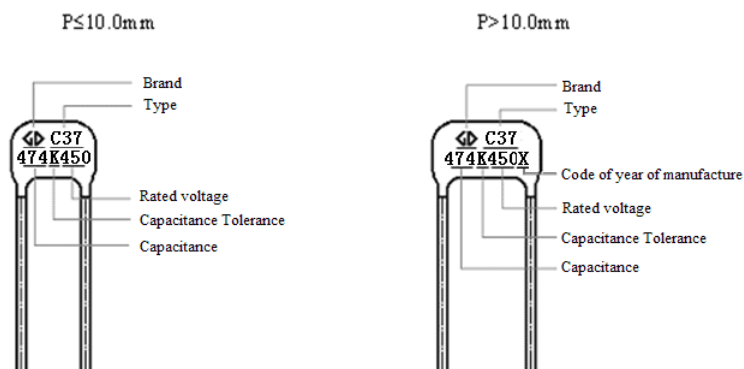
No.	Item	Performance	Test method(IEC 60384-16)
1	Solderability	Good quality of tinning	Solder temperature: 245°C ±5°C Immersion time: 2.0s±0.5s
2	Initial measurement	Capacitance Tanδ: 1kHz, C>1.0μF, 10kHz, C≤1.0μF	
	Terminal strength	There shall be no visible damage	Tension: 10N(0.6≤φd≤0.8) 20N(φd=1.0) 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 evidence of deterioration.	Solder temperature: 260°C ±5°C Immersion time: 10s ±1s
	Final measurement	ΔC/C ≤±3%(relative to the initial value) Increase of tanδ: ≤0.004 (10kHz, C≤1.0μF) ≤0.004 (1kHz, C>1.0μF)	
3	Initial measurement	Capacitance Tanδ: 1kHz, C>1.0μF, 10kHz, C≤1.0μF	
	Rapid change of temperature	There shall be no evidence of deterioration.	θ _A =-40°C, θ _B =+105°C 5 cycles Duration: t=30min
	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 000times, Acceleration: 390m/s ² , Pulse duration, 6ms
	Final measurement	ΔC/C ≤±3%(relative to the initial value) Increase of tanδ: ≤0.004 (10kHz, C≤1.0μF) ≤0.004 (1kHz, C>1.0μF) IR: ≥ 50% of the rated value	
4	climate sequence	Initial measurement	Capacitance Tanδ: 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 _R at the last 1 minute. 15°C~35°C, 8.5kPa, 1h
		Damp heat, Cyclic other	Applying U _R 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 tanδ: ≤0.005 (C≤1.0μF, 10kHz) ≤0.005 (C>1.0μF, 1kHz) IR: ≥ 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 $\tan\delta: \leq 0.002$ (1kHz) IR: $\geq 50\%$ of the rated value	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93 \pm \frac{2}{3} \% \text{RH}$ 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 $\tan\delta$: ≤ 0.004 (10kHz, $C \leq 1.0\mu\text{F}$) ≤ 0.004 (1kHz, $C > 1.0\mu\text{F}$) IR: $\geq 50\%$ 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 $\tan\delta$: ≤ 0.005 ($C \leq 1.0\mu\text{F}$, 10kHz) ≤ 0.005 ($C > 1.0\mu\text{F}$, 1kHz) IR: $\geq 50\%$ 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 (μF) dv/dt value: see P2

Quality ensuring test (before shipment):

Inspection item (each batch)	Inspection level (GB/T 2828.1)	
	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 for dipped-type capacitor

▲ Outline Drawing

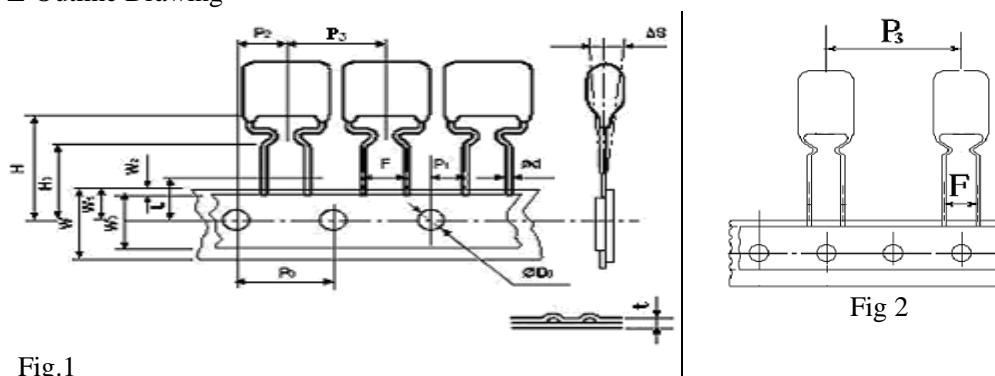


Fig.1

▲ Taping Dimensions(mm)

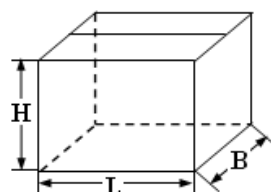
Technology index title	Code	Dimensions (mm)				Tolerance
		P=5.0	P=7.5	P=10.0	P=15.0	
Taping type	—	Fig 1	Fig 1	Fig 2	Fig 2	—
Part number Digit12-15	Ammo-pack	A21A	A31A	A41E	A61E	
Taping pitch	P ₃	12.7	12.7	25.4	25.4	±1.0
Feed hole pitch	P ₀	12.7	12.7	12.7	12.7	±0.3
Center of wire	P ₁	3.85	2.60	7.7	5.2	±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	+0.8 -0.2
Component alignment	△S	0	0	0	0	±2.0
Height of crangle from tape center	H	20.0	20.0	20.0	20.0	±1.0
Height of component from tape center	H ₀	16.0	16.0	16.0	16.0	±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 position	W ₂	3max	3max	3max	3max	—
Feed hole dia.	D ₀	4.0	4.0	4.0	4.0	±0.3
Tape thickness	t	0.7	0.7	0.7	0.7	±0.2

Note: * P₀=15mm is also available;

** F can be other lead spacing;

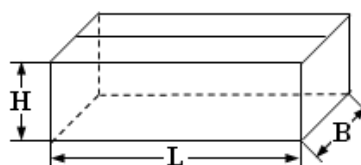
■ Packing box sizes(mm)

1. Out packing box for bulk



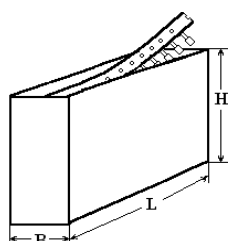
L:375±5
B:375±5
H:265±5

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

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