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# FILM CAPACITOR





*With more than 40 years of film capacitor manufacturing experience,  
provide customer with one-stop solution of film capacitor application.*



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# ABOUT US»



HONGFA ( Hongfa Group: SH600885) is the leading relay manufacturer in China and one of the major relay suppliers in the world, with the No.1 relay output globally and being ranking as the top relay manufacturer in China in terms of overall economic index.

HONGFA produces relay, capacitor, low-voltage device, L/H voltage complete equipment, precision component, automatic equipment & etc. Products are currently being exported to over 120 countries and regions, localized sales and service network are established among multiple regions with the capability of globalized market operation and technical support. Customers involve multiple world-renowned enterprises in the fields of industry, energy, transportation, home appliance, medical care, national defense, etc.

HONGFA always focuses on developing and absorbing the leading edge technology in relay technical field, owns the state-accredited technical center, the largest and most comprehensive testing center, established the first postdoctoral research station and academician research station in relay industry. Hongfa participates in formulating relay national and industry standard, implements several national key projects, which contributes to the development of relay industry.

Founded in 1984, Zhejiang Hongfa Wufeng Capacitors Co. Ltd. is a professional film capacitor manufacturer with the integrate capability of R&D, design, production and sales, and the annual capacity of 0.38billion pcs.

The company is located in Zhuji, Zhejiang province, with strong technical force, product research and development ability. The factory integrates metal film evaporation, plastic case mold manufacturing and production of the previous parts supporting capacity, has won the national key high-tech enterprise, intelligent manufacturing demonstration base. Products are widely used in communication, home appliance, power supply, industrial control, green energy and other fields.





# STRENGTH»



## Comprehensive Testing and Analysis Capability

Hongfa owns the largest and most comprehensive testing Lab, Certified by VDE, UL and CNAS, Partner of VDE since 2007, the only enterprise in the global component industry. Chemical Analysis Lab is accredited by CNAS, capable of providing with the reliable and RoHS compliance test report.

## Leading manufacturing equipment

We have the advanced manufacturing equipments, input Germany Leybold coating machine, Germany Commscope cutting equipment, Switzerland winding machine, etc., with the automated production equipment capacity, leading the industry pee.

## Complete Quality Assurance System

Hongfa strictly insists on the operational philosophy of "Focus on the market, Winning through quality", Quality Policy of "Pursue impeccable quality to win customer's satisfaction of our products and services", Integrally fulfill the international quality and safety environment system of ISO9001 & ISO14001.





Provide customer with one-stop solution of film capacitor application such as the fields of new energy, AC filter, lighting, telecommunication, home appliance, power supply, industrial control etc.

## PRODUCTS »

### EMI (interference suppression) Capacitor

EMI (interference suppression) capacitor can withstand the impact of overvoltage, with excellent flame retardant performance which is widely used in across the line, line to ground, line-by-pass, bypass and other anti-interference occasions.

### Motor Run Capacitor

Widely used in starting and running of AC single-phase motors at 50-60HZ frequency power, such as fan motor, water pump, air-conditioner, kitchen and bathroom and other application.

### Power Electronic Capacitor

Power electronic capacitor can be applied to the fields of PV, wind electricity, frequency conversion, with the effect of DC-link, high frequency filter, braking absorption.

### Customized Metallized Film Capacitor

Customized metallized film capacitor are typical applications in DC-Link DC filtering circuits, with characteristics such as self-healing, low ESL, low ESR, strong ripple resistance, and customizable design. The products are widely used in fields such as passenger cars, commercial vehicles, and special engineering machinery vehicles.



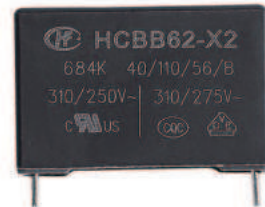
# HCBB62-X2

Class X2,275Va.c./305Va.c./310Va.c./350Va.c.

EMI (interference suppression) Capacitor

## Features

- Used in across-the line, interference suppression circuit.
- Metallized polypropylene structure, encapsulated in flame-resistant plastic case, sealed with epoxy resin.
- Withstand overvoltage impact, excellent self-healing preoperty.
- Excellent flame reistant and moisture resistance abilities.
- Compliance with AEC-Q200 standard requirements.



## Typical Applications

Widely applied to power supply crossover circuit, such as UPS, smart meter, switching power supply, and small home appliance etc.

## Specifications

Reference standard	GB/T 6346.14 (IEC 60384-14)		
Climatic category	40/110/56/B		
Operating temperature range	-40°C ~+110°C		
Rated voltage	275Va.c./305Va.c./310Va.c./350Va.c.		
Capacitance range	0.001μF~25.0μF		
Capacitance tolerance	±10%(K),±20%(M) (20°C,1kHz)		
Voltage proof	Between terminals	4.3U <sub>R</sub> (5s)	
	Between terminals and case	2120Va.c. (1min)	
Insulation resistance(IR×C <sub>N</sub> )	≥15000MΩ	C <sub>N</sub> ≤0.33μF	(20°C,100Vd.c.,1min)
	≥5000s	C <sub>N</sub> >0.33μF	
Dissipation factor	0.001μF≤C <sub>N</sub> ≤0.01μF	≤0.0020(1kHz,20°C)	≤0.0020(10kHz,20°C)
	0.01μF<C <sub>N</sub> ≤0.47μF	≤0.0010(1kHz,20°C)	≤0.0020(10kHz,20°C)
	0.47μF<C <sub>N</sub> ≤1.0μF	≤0.0020(1kHz,20°C)	≤0.0040(10kHz,20°C)
	1.0μF<C <sub>N</sub> ≤10.0μF	≤0.0030(1kHz,20°C)	--
	10.0μF<C <sub>N</sub> ≤25.0μF	≤0.0040(1kHz,20°C)	--

# HCBB62-X2

Class X2,275Va.c./305Va.c./310Va.c.(Miniature version)

EMI (interference suppression) Capacitor

## Features

- Used for interference suppression, across-the-line applications.
- Encapsulated in flame-resistant plastic case,sealed with epoxy resin.
- Widely used in anti-interference occasions such as power supply cross line (indoor).



## Typical Applications

Widely applied to power supply crossover circuit, such as UPS, smart meter, switching power supply, and small home appliance etc.

## Specifications

Reference standard	GB/T 6346.14 (IEC 60384-14)		
Climatic category	40/110/56/B		
Operating temperature range	-40°C ~+110°C		
Rated temperature	+110°C		
Rated voltage	275Va.c./305Va.c./310Va.c. (50Hz/60Hz)		
Max. continuous DC voltage	560Vd.c.		
Capacitance range	0.027μF~8.2μF		
Capacitance tolerance	±10%(K), ±20%(M) (20°C,1kHz)		
Voltage proof	Between terminals	4.3U <sub>R</sub> (Vd.c.)/2s	
	Between terminals and case	2120Va.c./2s	
Insulation resistance(IR×C <sub>N</sub> )	≥15000MΩ	C <sub>N</sub> ≤0.33μF	(20°C,100Vd.c.,1min)
	≥5000s	C <sub>N</sub> >0.33μF	
Dissipation factor	0.027μF≤C <sub>N</sub> ≤0.47μF	≤0.0010(1kHz,20°C)	≤0.0020(10kHz,20°C)
	0.47μF<C <sub>N</sub> ≤1.0μF	≤0.0020(1kHz,20°C)	≤0.0040(10kHz,20°C)
	1.0μF<C <sub>N</sub> ≤10.0μF	≤0.0030(1kHz,20°C)	--



# HCBB62-X2T

Class X2,275Va.c./305Va.c./310Va.c.(THB series)

EMI (interference suppression) Capacitor

## Features

- Used in across-the-line,interference suppression circuit.
- Metallized polypropylene film structure,plastic case,filled with resin.
- Withstanding overvoltage stressing.
- Excellent active and passive flame resistant abilities.
- High stability of capacitance under severe ambient condition,such as high temperature and high humidity.
- Compliance with AEC-Q200 standard requirements.



## Typical Applications

Widely applied to power supply crossover circuit, such as UPS, smart meter, switching power supply, and small home appliance etc.

## Specifications

Reference standard		GB/T 6346.14 (IEC 60384-14)	
Rated voltage		275Va.c./310Va.c. (50Hz/60Hz)	
Capacitance range		0.022μF ~ 25μF	
Capacitance tolerance		±10%(K),±20%(M) (20°C,1kHz)	
Climatic category		40/110/56/B	
Operating temperature range		-40°C~+110°C	
Voltage proof	Between terminals	4.3U <sub>R</sub> (Vd.c.)/2s	
	Between terminals and case	2120Va.c./2s	
Insulation resistance(IR×C <sub>N</sub> )		C <sub>N</sub> ≤0.33μF    IR≥15000 MΩ C <sub>N</sub> >0.33μF    IR×C <sub>N</sub> ≥5000s	(20°C,100Vd.c.,1min)
Dissipation factor		C <sub>N</sub> ≤1.0μF    ≤0.0010(1kHz,20°C)	≤0.0020(10kHz,20°C)
		C <sub>N</sub> >1.0μF    ≤0.0020(1kHz,20°C)	≤0.0040(10kHz,20°C)
THB test (Damp Heat Test with Loading)		Temperature: 85°C±2°C; Humidity: 85%RH±2%RH Voltage: 240Va.c. 50Hz; Duration1000h Capacitance change (ΔC/C): ≤10% Dissipation factor change(Δtanδ): ≤0.5%(1kHz) Insulation resistance: ≥50% of the rated value	

# HCBB62-X2T

Class X2,310Va.c./350Va.c.(THB series)

EMI (interference suppression) Capacitor

## Features

- Used in anti-interference occasions such as power supply cross line.
- Metallized polypropylene film ,encapsulated in flame-resistant plastic case,sealed with epoxy resin.
- Withstand overvoltage impact.
- Excellent flame resistant ability.
- High stability of capacitance under severe ambient condition,such as high temperature and high humidity.
- Compliance with AEC-Q200 standard requirements.



## Typical Applications

Widely applied to power supply crossover circuit, such as UPS, smart meter, switching power supply, and small home appliance etc.



## Specifications

Reference standard		GB/T 6346.14 (IEC 60384-14)		
Rated voltage		310Va.c.(50Hz/60Hz)	350Va.c.(50Hz/60Hz)	
Max. continuous DC voltage		560Vd.c.	630Vd.c.	
Capacitance range		0.1μF~25μF	0.1μF~20μF	
Capacitance tolerance		±10%(K),±20%(M)(20℃,1kHz)		
Climatic category		40/110/56/B		
Operating temperature range		-40℃~+110℃		
Voltage proof	Between terminals	4.3UR(Vd.c.)/2s		
	Between terminals and case	2200Va.c./1min		
Insulation resistance(IR×CN)		CN≤0.33μF CN>0.33μF	IR≥15000MΩ IR×CN≥5000s	(20℃,100Vd.c.,1min)
Dissipation factor		0.10μF≤CN≤1.0μF	≤0.0015(1kHz,20℃)	≤0.0040(10kHz,20℃)
		1.0μF<CN≤10.0μF	≤0.0030(1kHz,20℃)	--
		CN>10.0μF	≤0.0040(1kHz,20℃)	--
THB test (Damp Heat Test with Loading)t		Temperature: 85℃±2℃; Humidity: 85%RH±2%RH Voltage: 300Va.c. 50Hz; Duration1000h Capacitance change (ΔC/C): ≤10% Dissipation factor change(Δtanδ): ≤0.5%(1kHz) Insulation resistance: ≥50% of the rated value		



# HCBB62-X2R

Class X2,275Va.c./305Va.c./310Va.c.(capacitive divider)

EMI (interference suppression) Capacitor

## Features

- Specially designed for the capacitive divider circuits in series with 100Va.c.~240Va.c. power supply, such as electricity meter, LED module, etc.
- Metallized polypropylene structure, encapsulated in flame-resistant plastic case, sealed with epoxy resin.
- Withstand overvoltage impact, excellent self-healing preoperty.
- Excellent flame reistant and moisture resistance abilities.
- Excellent capacitance stability.



## Typical Applications

Widely applied to power supply series, RC voltage reduction, such as UPS, smart meter, switching power supply, and small home appliance etc.

## Specifications

Reference standard	GB/T 6346.14 (IEC 60384-14)		
Climatic category	40/110/56/B		
Operating temperature range	-40°C ~+110°C		
Rated voltage	275Va.c./305Va.c./310Va.c. (50Hz/60Hz)		
Capacitance range	0.010μF~2.2μF		
Capacitance tolerance	±5%(J),±10%(K),±20%(M) (20°C,1kHz)		
Voltage proof	Between terminals	4.3U <sub>R</sub> (Vd.c.)/2s	
	Between terminals and case	2120Va.c./2s	
Insulation resistance(IR×C <sub>N</sub> )	≥15000MΩ ≥5000s	C <sub>N</sub> ≤0.33μF C <sub>N</sub> >0.33μF	(20°C,100Vd.c.,1min)
Dissipation factor	C <sub>N</sub> ≤1.0μF	≤0.0010(1kHz,20°C)	≤0.0020(10kHz,20°C)
	C <sub>N</sub> >1.0μF	≤0.0020(1kHz,20°C)	≤0.0040(10kHz,20°C)

# HCX1

Class X1,440Va.c./480Va.c./530Va.c.

EMI (interference suppression) Capacitor

## Features

- Withstand overvoltage impact, excellent self-healing property.
- Flame-retardant plastic case and resin encapsulation.
- High voltage capability and high insulation resistance.
- RoHS-Compatible and lead free terminations.
- Automotive grade (AEC-Q200 Compliant) .



## Typical Applications

EMI suppressors as X1 safety classification , “ across-the-line” application , Not for use in “ series with mains” type application

## Specifications

Reference standard	IEC60384-14 (GB/T6346.14)		
Climatic category	40/110/56		
Operating temperature range	-40°C~+110°C		
Rated AC voltage	530Va.c./480Va.c./440Va.c.		
Capacitance range	0.001μF~5.6μF		
Capacitance tolerance	±10% (K) ±20% (M) (20°C, 1kHz)		
DC voltage test	Between terminals: 2700Vdc (2s)		
	Between terminals & case: 2500Va.c. (1min)		
Insulation resistance	R≥100000MΩ C <sub>N</sub> ≤0.33μF RC <sub>N</sub> ≥30000s C <sub>N</sub> >0.33μF (100 VDC, 60s, 25°C±5°C)		
Dissipation factor	0.01μF<C <sub>N</sub> ≤0.47μF	≤0.0015 (1kHz,20°C)	≤0.0030 (10kHz,20°C)
	0.47μF<C <sub>N</sub> ≤1.0μF	≤0.0020 (1kHz,20°C)	≤0.0040 (10kHz,20°C)
	1μF<C <sub>N</sub> ≤5.6μF	≤0.0030 (1kHz,20°C)	/



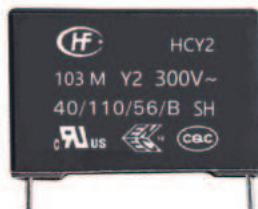
# HCY2

Class Y2,300Va.c.

EMI (interference suppression) Capacitor

## Features

- Withstand overvoltage impact, excellent self-healing property.
- Flame-retardant plastic case and resin encapsulation.
- High voltage capability and high insulation resistance.
- RoHS-Compatible and lead free terminations.
- Automotive grade (AEC-Q200 Compliant).



## Typical Applications

EMI suppressors as Y2 safety classification, "Line-to-ground" and "across-the-line" application  
Not for use in "series with mains" type application.

## Specifications

Reference standard	IEC60384-14 (GB/T6346.14)		
Climatic category	40/110/56		
Operating temperature range	-40°C~+110°C		
Rated AC voltage	300Va.c.		
Capacitance range	0.001μF~1μF		
Capacitance tolerance	±10% (K) (20°C, 1kHz)		
DC voltage test	Between terminals: 4000Vdc (2s)		
	Between terminals & case: 2500Va.c. (1min)		
Insulation resistance	R≥100000MΩ C <sub>N</sub> ≤0.33μF		
	RC <sub>N</sub> ≥30000s C <sub>N</sub> >0.33μF (100 VDC, 60s, 25°C±5°C)		
Dissipation factor	0.01μF<C <sub>N</sub> ≤0.47μF	≤0.0015 (1kHz,20°C)	≤0.0030 (10kHz,20°C)
	0.47μF<C <sub>N</sub> ≤1.0μF	≤0.0020 (1kHz,20°C)	≤0.0040 (10kHz,20°C)

# HCBB61(S0/S3)

Box-type

Motor Run Capacitor

## Features

- Widely applied to starting and running of AC single-phase motors at 50/60HZ frequency power.
- Encapsulated in flame-resistant plastic case,sealed with epoxy resin.
- Self-healing property.
- Stable performance and high reliability.



## Typical Applications

Widely applied to starting and running of AC motors at 50/60HZ frequency power, such as fan, air air-conditioner, kitchen and bathroom application, fresh air system.

## Specifications

Reference standard	GB/T 3667.1 (IEC 60252-1)	
Rated voltage	250Va.c. ~ 500Va.c.(50Hz/60Hz)	
Class of operation	Class B(10000h),Class C(3000h)	
Capacitance range	0.5μF ~ 45μF	
Climatic category	40/70/21,40/85/21	
Class of safety protection	S0 / S3	
Operation temperature range	-40°C~70°C / -40°C~85°C	
Capacitance tolerance	± 5%(J)	
Voltage proof	Between terminals	2U <sub>NAC</sub> (60s)
	Between terminals and case	2000Va.c. (60s)
Insulation resistance(IR×C <sub>N</sub> )	≥3000s(20°C,100V,60s)	
Dissipation factor	< 0.0020(100Hz,20°C)	
Max. permissible voltage	1.1U <sub>N</sub>	
Max. permissible current	1.3I <sub>N</sub>	





# HCL23

Polyester film capacitor

## Power Electronic Capacitor

### Features

- High reliability.
- Metallized polyester film, non-inductive wound construction.
- Plastic case (UL94V-0), epoxy resin sealing.



### Typical Applications

- By-passing, blocking, coupling, decoupling
- Pulse, logic, timing, oscillator circuits

### Specifications

Reference standard	GB/T 7332 (IEC 60384-2)					
Climatic category	55/105/56					
Operating temperature range	-55℃~105℃					
Rated temperature	85℃					
Rated voltage	63Vd.c., 100Vd.c., 160Vd.c., 250Vd.c., 400Vd.c., 630Vd.c., 1000Vd.c.					
Capacitance range	0.0010μF~47μF					
Capacitance tolerance	±5%(J)、 ±10%(K)、 ±20%(M) (20℃±5℃, 1kHz)					
Voltage proof	1.6U <sub>R</sub> (5s)					
Dissipation factor	≤1% (1kHz, 20℃)					
Insulation resistance (IR×C <sub>N</sub> )	U <sub>R</sub> ≤100V	≥3750MΩ ≥12500	C <sub>N</sub> ≤0.33μF C <sub>N</sub> >0.33μF	(20℃, 100Vd.c., 1min)		
	U <sub>R</sub> >100V	≥30000MΩ ≥10000s	C <sub>N</sub> ≤0.33μF C <sub>N</sub> >0.33μF	(20℃, 100Vd.c., 1min)		
Max. Pulse Rise Time: If the working voltage(U) is lower than the rate voltage (U <sub>R</sub> ), the capacitor can be worked at high dV/dt condition. In this case, the maximum allowed dV/dt is obtained by multiplying the right value with U <sub>R</sub> /U.	U <sub>R</sub> (V)	dV/dt(V/μs)				
		P=7.5(mm)	P=10.0(mm)	P=15.0(mm)	P=22.5(mm)	P=27.5(mm)
	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
	1000	70	60	30	15	12

# HMMKP82

Double sided metallized polypropylene film capacitor

## Power Electronic Capacitor

### Features

- Negative temperature coefficient of capacitance.
- Double sided metallized polypropylene film.
- Low loss and small inherent temperature rise.
- Excellent active and passive flame resistant abilities.
- Compliance with AEC-Q200 standard requirements.



### Typical Applications

Widely used in high voltage, high frequency and pulse circuit.

### Specifications

Reference standard	GB/T 10190 (IEC 60384-16)					
Climatic category	40/105/56					
Operating temperature range	<div>-40°C~-+105°C</div> <div>(+75°C~+105°C: decreasing factor 1.25% per °C for UR (dc)</div> <div>(+85°C~+105°C: decreasing factor 1.35% per °C for UR (ac)</div>					
Rated temperature	85°C for UR(Vd.c.),75°C for UR(Va.c.)					
Rated voltage	250Vd.c./180Va.c.,400Vd.c./250Va.c.,630Vd.c./400Va.c., 1000Vd.c./600Va.c.,1600Vd.c./650Va.c.,2000Vd.c./700Va.c.					
Capacitance range	0.001μF~3.9μF					
Capacitance tolerance	±5%(J)、±10%(K)、±20%(M) (20°C±5°C, 1kHz)					
Voltage proof	1.6UR(5s)					
Dissipation factor	≤0.0010 (1kHz, 20°C)					
Insulation resistance(IR×CN)	≥100000MΩ ≥30000s		CN≤0.33μF CN>0.33μF	(20°C,100Vd.c.,1min)		
Max. Pulse Rise Time: If the working voltage(U) is lower than the rate voltage (UR), the capacitor can be worked at high dV/dt condition. In this case, the maximum allowed dV/dt is obtained by multiplying the right value with UR/U.	UR(V)	dV/dt(V/μs)				
		P=7.5(mm)	P=10.0(mm)	P=15.0(mm)	P=22.5(mm)	P=27.5(mm)
	250	1200	1000	550	250	200
	400	1800	1500	900	500	300
	630	3200	3200	2500	1500	900
	1000	6000	6000	3300	2100	1000
	1600	--	8000	6000	3000	2000
	2000	--	--	10000	5000	2200



## HCBB60(S0/S3)

Cylindrical,plastic case

## Motor Run Capacitor

### Features

- Widely applied to starting and runing of AC singlephase motors at 50Hz/60Hz frequency power.
- Encapsulated in flame-resistant plastic case,sealed with epoxy resin.
- Self-healing property.
- Stable performance and high reliability.

### Typical Applications

Widely applied to starting and running of the AC motor at 50/60HZ frequency power, such as refrigerator compressor, water pump, washing machine, etc.

### Specifications

Reference standard		GB/T 3667.1(IEC 60252-1)
Rated voltage		250VAC ~ 500VAC(50Hz/60Hz)
Class of operation		Class B(10000h),Class C(3000h)
Capacitance range		1μF~100μF/1μF~60μF
Climatic category		40/70/21,40/85/21
Class of safety protection		S0 / S3
Operation temperature range		-40°C~70°C / -40°C~85°C
Capacitance tolerance		±5%(J)
Voltage proof	Between terminals	2U <sub>NAC</sub> (60s)
	Between terminals and case	2000Va.c. (60s)
Insulation resistance(IR×C <sub>N</sub> )		≥3000s(20°C,100V,60s)
Dissipation factor		< 0.0020(100Hz,20°C)
Max permissible voltage		1.1U <sub>N</sub>
Max permissible current		1.3I <sub>N</sub>



## HCBB65

Cylindrical,aluminum case,anti-explosion

## Motor Run Capacitor

### Features

- Widely applied to starting and running of AC singlephase motors at 50Hz/60Hz frequency power.
- Self-healing property.
- Excellent stable performance and reliability.
- Explosion-proof design and more safety.
- long lifetime.

### Typical Applications

Widely applied to starting and running of AC motors at 50/60HZ frequency power, such as AC, refrigerator, washing machine, water heater, etc.

### Specifications

Reference standard		GB/T 3667.1 (IEC 60252-1)
Rated voltage		250VAC ~ 450VAC(50Hz/60Hz)
Class of operation		Class B(10000h), Class C(3000h)
Capacitance range		1μF ~ 85μF, 1+0μF~85μF+15μF
Climatic category		40/70/21,40/80/21,40/85/21
Class of safety protection		S2
Operation temperature range		-40°C~85°C
Capacitance tolerance		±5%(J)
Voltage proof	Between terminals	2U <sub>NAC</sub> (2s)
	Between terminals and case	2000Va.c. (60s)
Insulation resistance(IR×C <sub>N</sub> )		≥3000s(20°C,100Vd.c.,60s)
Dissipation factor		≤0.0020(100Hz,20°C)
Max. permissible voltage		1.1U <sub>N</sub>
Max. permissible current		1.3I <sub>N</sub>





# HMKP21

Metallized polypropylene  
film capacitor for DC filter

## Power Electronic Capacitor

### Features

- Metallized polypropylene film.
- Low loss at high frequency.
- Small inherent temperature rise.
- Plastic case (UL94V-0), epoxy resin sealing.
- Compliance with AEC-Q200 standard requirements.



### Typical Applications

- Widely used in high frequency, DC, AC and pulse circuits.
- Applied to S-correction of TV sets and monitors.

### Specifications

Reference standard	GB/T 10190 (IEC 60384-16)					
Climatic category	55/105/56					
Operating temperature range	-55℃~105℃(+85℃~+105℃:decreasing factor 1.25% per℃ for U <sub>R</sub> )					
Rated temperature	85℃					
Rated voltage	160Vd.c.(90Va.c.),250Vd.c.(160Vd.c.),400Vd.c.(220Va.c.),630Vd.c.(250Va.c.), 1000Vd.c.(400Va.c.),1600Vd.c.(600Va.c.),2000Vd.c.(700Va.c.)					
Capacitance range	0.001μF~15μF					
Capacitance tolerance	±2%(G),±3%(H),±5%(J),±10%(K),±20%(M) (20℃±5℃, 1kHz)					
Voltage proof	1.6U <sub>R</sub> (5s)					
Dissipation factor	≤0.0010 (1kHz, 20℃)					
Insulation resistance(IR×C <sub>N</sub> )	≥100000MΩ ≥30000s		C <sub>N</sub> ≤0.33μF C <sub>N</sub> >0.33μF		(20℃,100Vd.c,1min)	
Max. Pulse Rise Time: If the working voltage(U) is lower than the rate voltage (U <sub>R</sub> ), the capacitor can be worked at high dV/dt condition. In this case, the maximum allowed dV/dt is obtained by multiplying the right value with U <sub>R</sub> /U.	U <sub>R</sub> (V)	dV/dt(V/μs)				
		P=7.5(mm)	P=10.0(mm)	P=15.0(mm)	P=22.5(mm)	P=27.5(mm)
	160	310	190	110	65	55
	250	660	560	310	130	110
	400	900	780	600	300	130
	630	1500	1200	900	400	200
	1000	--	2200	2000	800	--
	1600	--	--	4500	1800	--
	2000	--	--	9500	4500	--

# HMKP25

Metallized polypropylene  
film capacitor (DC-Link, PFC)

## Power Electronic Capacitor

### Features

- Metallized polypropylene film.
- Low loss at high frequency.
- Plastic case (UL94V-0), epoxy resin sealing.
- Compliance with AEC-Q200 standard requirements.



### Typical Applications

As intermediate circuit capacitors for SMPS, electronic ballast, inverter (i.e. DC-link, DC-filter and PFC).

### Specifications

Reference standard	GB/T 10190 (IEC 60384-16)								
Climatic category	40/105/56								
Operating temperature range	<b>-40℃~-+105℃</b> 40℃~-+105℃(+85℃~-+105℃: decreasing factor 1.25% per ℃ for U <sub>R</sub> )								
Rated temperature	<b>85℃</b>								
Rated voltage	450Vd.c.,520Vd.c.,630Vd.c.								
Capacitance range	0.022μF~22μF								
Capacitance tolerance	±5%(J),±10%(K),±20%(M) (20℃±5℃,1kHz)								
Voltage proof	1.6U <sub>R</sub> (5s)								
Dissipation factor	≤0.0015 (1kHz, 20℃)								
Insulation resistance (IR×C <sub>N</sub> )	≥100000MΩ ≥30000s				C <sub>N</sub> ≤0.33μF C <sub>N</sub> >0.33μF		(20℃,100Vd.c.,1min)		
Max. Pulse Rise Time: If the working voltage(U) is lower than the rate voltage (U <sub>R</sub> ), the capacitor can be worked at high dV/dt condition. In this case, the maximum allowed dV/dt is obtained by multiplying the right value with U <sub>R</sub> /U.	U <sub>R</sub> (V)	Max dv/dt(V/μs) ——Miniature version				Max dv/dt(V/μs)			
		P=10.0(mm)	P=15.0(mm)	P=22.5(mm)	P=27.5(mm)	P=10.0(mm)	P=15.0(mm)	P=22.5(mm)	P=27.5(mm)
	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



## HCDA

DC-Link-Capacitor  
(Dry-type,Aluminum Case)

## Power Electronic Capacitor

### Features

- Applied in DC-Link circuits,can replace electrolytic capacitor.
- Low ESR, high capability of ripple current.
- Low ESL.
- Self-healing property, long lifetime
- Aluminum case, resin filled.



### Typical Applications

Used in centralized PV system, wind power system for DC-link usage.

### Specifications

Reference standard		GB/T 17702 (IEC 61071)
Rated voltage		600Vd.c. ~ 4000Vd.c.
Capacitance range		20μF ~ 5500μF
Climatic category		D ≤ 116mm: 40/85/56 D = 136mm: 40/80/56
Operating temperature range (Θ <sub>hs</sub> )		D ≤ 116mm: -40°C ~ 85°C (Θ <sub>hs</sub> ≤ 85°C) D = 136mm: -40°C ~ 80°C (Θ <sub>hs</sub> ≤ 80°C)
Capacitance tolerance		±5%(J), ±10%(K)
Voltage proof	Between terminals	1.5U <sub>N</sub> (10s, 20°C ± 5°C)
	Between terminals and case	U <sub>N</sub> ≤ 1500Vd.c., 3000Va.c. (10s, 50Hz, 20°C ± 5°C) U <sub>N</sub> > 1500Vd.c., (U <sub>N</sub> + 1000V)Va.c. (10s, 50Hz, 20°C ± 5°C)
Insulation resistance (IR × C <sub>N</sub> )		≥ 5000s (20°C, 500Vd.c., 60s)
Dielectric dissipation factor (tanδ)		2 × 10 <sup>-4</sup>
Over voltage		1.1U <sub>N</sub> (30% of on-load duration/d) 1.15 U <sub>N</sub> (30min/d) 1.2 U <sub>N</sub> (5min/d) 1.3 U <sub>N</sub> (1min/d) 1.5U <sub>N</sub> (An overvoltage equal to 1.5U <sub>N</sub> for 30ms is permitted 1000 times during the life of the capacitor)
Max. altitude		2000m
Max. torque of terminals		M6: 5N·m M8: 6N·m
Installation		Any Position
Expected lifetime		100,000h @ U <sub>N</sub> , Θ <sub>hs</sub> = 70°C
Failure rate		200FIT @ U <sub>N</sub> , Θ <sub>hs</sub> = 70°C

## HCDB

DC-Link capacitor for PCB

## Power Electronic Capacitor

### Features

- DC-filter application.
- Metallized polypropylene film structure.
- Plastic case (UL94 V-0), filled with resin.
- Excellent electric property.
- Compliance with AEC-Q200 standard requirements.



### Typical Applications

Used in distributed PV system, low power frequency conversion, for DC-link usage.



### Specifications

Reference standard		GB/T 17702 (IEC 61071)
Rated voltage		500Vd.c. ~ 1500Vd.c.
Capacitance range		0.6μF ~ 140μF
Climatic category		40/85/56, 40/105/56
Operating temperature		-40°C ~ 105°C (85°C ~ 105°C: decreasing factor 1.5% per °C for U <sub>N,85°C</sub> )
Capacitance tolerance		±5%(J), ±10%(K)
Voltage proof		1.5U <sub>N</sub> (10s, 20°C ± 5°C)
(IR × C <sub>N</sub> ) Insulation resistance		≥ 10000s (20°C, 100Vd.c., 60s)
Self inductance (L <sub>s</sub> )		< 1nH/mm
Dielectric dissipation factor (tanδ)		0.0002
Maximum peak current $\hat{I}$ (A)		$\hat{I} = C \times dv/dt$
Peak Non-Repetitive Current		1.4 $\hat{I}$ (1000times during the lifetime)
Over voltage		1.1U <sub>N</sub> (30% of on-load duration/d) 1.15 U <sub>N</sub> (30min/d) 1.2 U <sub>N</sub> (5min/d) 1.3 U <sub>N</sub> (1min/d) 1.5U <sub>N</sub> (An overvoltage equal to 1.5U <sub>N</sub> for 30ms is permitted 1000 times during the life of the capacitor)
Expected lifetime		100000h @ U <sub>N,85°C</sub> , Θ <sub>hs</sub> = 85°C 8000h @ U <sub>N,105°C</sub> , Θ <sub>hs</sub> = 105°C
Failure rate		≤ 300FIT @ U <sub>N,85°C</sub> , Θ <sub>hs</sub> = 85°C



## HCDB(T)

DC-Link capacitor for PCB (THB series) **Power Electronic Capacitor**

### Features

- Metallized polypropylene film structure, excellent self-healing property.
- Strong ability to withstand ripple current.
- High stability of capacitance under severe ambient condition, such as high temperature and high humidity.
- Automotive grade (AEC-Q200 Compliant).



### Typical Applications

High performance DC filtering applications (i.e. transducers, industrial and high-end power supplies and solar inverters)

### Specifications

Reference standard	GB/T 17702 (IEC 61071)
Climatic category	40/105/56
Operating temperature range	-40°C~+105°C (85°C~105°C: decreasing factor 1.5% per °C for U <sub>N</sub> )
Rated DC voltage	500Vd.c.~1500Vd.c.
Capacitance range	0.6μF~140μF
Capacitance tolerance	±5% (J) 、 ±10% (K) (20°C, 1kHz)
DC voltage test	1.5U <sub>N</sub> (10s, 20°C±5°C)
Insulation resistance	≥10000s (100 VDC, 60s, 25°C±5°C)
Life Expectancy	100000h@U <sub>N</sub> , 85 °C, Θ <sub>hs</sub> =85°C 8000h@U <sub>N</sub> , 105 °C, Θ <sub>hs</sub> =105°C
Failure rate	≤300FIT at U <sub>N</sub> and T <sub>hs</sub> = 85°C
Biased Humidity Test	Temperature: 85±2°C, Humidity: 85±3%RH, Voltage: Rated voltage, Duration: 1000h  ΔC/C <sub>0</sub>  ≤10%, Δtanδ≤0.0200, 1kHz, IR≥50% of the rated value

## HCDB(H)

DC-Link capacitor for PCB  
(Temperature 125°C)

**Power Electronic Capacitor**

### Features

- Metallized polypropylene film structure.
- excellent self-healing property.
- High r.m.s current handling capability.
- Can be continuously worked at 125°C.
- Automotive grade (AEC-Q200 Compliant).



### Typical Applications

i.e. DC-DC convertor, OBC, WPT

### Specifications

Reference standard	GB/T 17702 (IEC 61071)
Climatic category	40/105/56
Operating temperature range	-40°C~+125°C (85°C~125°C: decreasing factor 1.0% per °C for U <sub>N</sub> )
Rated DC voltage	500Vd.c.~1500Vd.c.
Capacitance range	1μF~140μF
Capacitance tolerance	±5% (J) 、 ±10% (K) (20°C, 1kHz)
DC voltage test	1.5U <sub>N</sub> (10s, 20°C±5°C)
Insulation resistance	≥10000s (100 VDC, 60s, 25°C±5°C)
Life Expectancy	100000h@U <sub>N</sub> , 85 °C, Θ <sub>hs</sub> =85°C
Failure rate	≤5 FIT at 0.5U <sub>N</sub> and 40°C
Biased Humidity Test	60°C/95%RH at U <sub>NDC</sub> , 1000 hours,  ΔC/C ≤10%, Δtanδ≤0.0150 (at 1kHz) Rins ≥50%



# HCDB(S)

DC-Link capacitor for PCB  
(Segmented film designing)

## Power Electronic Capacitor

### Features

- Metallized polypropylene segmented film structure.
- excellent self-healing property.
- High r.m.s current handling capability.
- Automotive grade (AEC-Q200 Compliant) .



### Typical Applications

High performance DC filtering applications(i.e. transducers, industrial and high-end power supplies and solar inverters).

### Specifications

Reference standard	GB/T 17702 (IEC 61071)
Climatic category	40/105/56
Operating temperature range	-40°C~+105°C (85°C~105°C: decreasing factor 1.5% per °C for U <sub>N</sub> )
Rated DC voltage	500Vd.c.~1500Vd.c.
Capacitance range	0.6μF~140μF
Capacitance tolerance	±5% (J) 、 ±10% (K) (20°C, 1kHz)
DC voltagetest	1.5U <sub>N</sub> (10s,20°C±5°C)
Insulation resistance	≥10000s (100 VDC, 60s, 25°C±5°C)
Life Expectancy	≥50 000h U <sub>N</sub> 85°C
Failure rate	≤10 fit @ 0.5U <sub>N</sub> ,40°C
Biased Humidity Test	60°C/95%RH at U <sub>NDC</sub> , 1000 hours,  ΔC/C ≤10%, Δtanδ≤0.0150 (at 1kHz) Rins ≥50%
Safety performance test	85°C±2°C, 50VDC/ min step-up on the basis of U <sub>NDC</sub> voltage, capacity attenuation to ≥90%, product appearance without melting abnormality

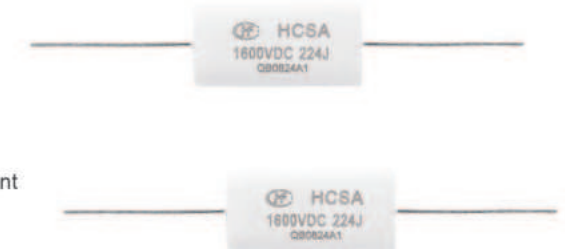
# HCSA

Snubber capacitor for IGBT  
(Axial-type)

## Power Electronic Capacitor

### Features

- Metallized polypropylene film, axial-type.
- Excellent self-healing property.
- Low Loss and small inherent temperature rise.
- Wrapped with polyester adhesive tape and ends filled with flame retardant epoxy resin (UL94 V-0).



### Typical Applications

Widely used in application as high voltage, high frequency and high current for high frequency absorption use.

### Specifications

Reference standard	GB/T 17702 (IEC 61071)
Climatic category	40/85/56
Operating temperature range	-40°C~105°C (85°C~105°C: decreasing factor 2.5% per °C for U <sub>N</sub> )
Rated voltage	630Vd.c.~2500Vd.c.
Capacitance range	0.047μF ~ 10μF
Capacitance tolerance	±5%(J),±10%(K)
Voltage proof	1.5U <sub>N</sub> (10s)
Dissipation factor	≤0.0005 (1kHz,20°C)
Insulation Resistance(IR×C <sub>N</sub> )	IR≥100000MΩ,C <sub>N</sub> ≤0.33μF IR×C <sub>N</sub> ≥30000s,C <sub>N</sub> >0.33μF
Expected lifetime	≥100,000h@U <sub>N</sub> ,Θ <sub>hs</sub> =70°C



## HCSB

Snubber capacitor for IGBT (PCB)

## Power Electronic Capacitor

### Features

- Excellent active and passive flame resistance abilities.
- Low loss and small inherent temperature rise.
- Square plastic case, sealed with epoxy resin(UL94 V-0).
- Excellent electrical performance.
- Compliance with AEC-Q200 standard requirements.



### Typical Applications

Widely used in application as high voltage, high frequency and high current for high frequency absorption use, Especially designed as snubber capacitor for IGBT.

### Specifications

Reference standard	GB/T 17702 (IEC 61071)	
Climatic category	40/85/56	
Operating temperature range	-40°C~85°C	
Rated voltage	630Vd.c.~2500Vd.c.	
Capacitance range	0.047μF~10μF	
Capacitance tolerance	±5%(J),±10%(K)	
Voltage proof	1.5U <sub>N</sub> (10s)	
Dissipation factor	≤0.0005 (1kHz,20°C)	
Insulation resistance (IR×C <sub>N</sub> )	IR≥100000MΩ,C <sub>N</sub> ≤0.33μF IR×C <sub>N</sub> ≥30000s,C <sub>N</sub> >0.33μF	(20°C,100Vd.c.,1min)
Expected lifetime	≥100,000h@U <sub>N</sub> ,Θ <sub>hs</sub> =70°C	

## HCSC

Snubber capacitor for IGBT  
(Lug terminals)

## Power Electronic Capacitor

### Features

- Excellent active and passive flame resistance abilities.
- Low loss and small inherent temperature rise.
- Square plastic case, sealed with epoxy resin(UL94 V-0).
- Excellent electrical performance.



### Typical Applications

Widely used in application as high voltage, high frequency and high current for high frequency absorption use, Especially designed as snubber capacitor for IGBT.

### Specifications

Reference standard	GB/T 17702 (IEC 61071)	
Climatic category	40/85/56	
Operating temperature range	-40°C~+85°C	
Rated voltage	630Vd.c.~2500Vd.c.	
Capacitance range	0.047μF~10μF	
Capacitance tolerance	±5%(J),±10%(K)	
Voltage proof	1.6U <sub>N</sub> (10s)	
Dissipation factor	≤0.0005(1kHz,20°C)	
Insulation resistance (IR×C <sub>N</sub> )	IR≥100000MΩ,C <sub>N</sub> ≤0.33μF IR×C <sub>N</sub> ≥30000s,C <sub>N</sub> >0.33μF	(20°C,100Vd.c.,1min)
Expected lifetime	≥100,000h@U <sub>N</sub> ,Θ <sub>hs</sub> =70°C	



# HCAA

AC filter capacitor  
(Dry-type, Aluminum Case)

## Power Electronic Capacitor

### Features

- Particularly suit for AC filter circuit in power electric equipment
- Low ESR and ESL, have ability to withstand high r.m.s current and high peak voltage
- Self-healing property
- Excellent stable performance and reliability
- Dry type design, installation is more flexible



### Typical Applications

Suitable for AC filter circuit in power electronic equipment and UPS power unit.  
Have the ability to withstand high r.m.s current and peak voltage.

### Specifications

Reference standard		GB/T 17702 (IEC 61071)
Rated RMS voltage ( $U_{rms}$ )		250Va.c.~600Va.c.
Rated frequency ( $f_N$ )		50/60Hz
Operating temperature range		-40°C ~ 85°C ( $\theta_{hs} \leq 85^\circ\text{C}$ )
Climate category		40/70/56
Capacitance tolerance		$\pm 5\%$ (J), $\pm 10\%$ (K)
Voltage proof	Between terminals	$2.15U_{rms} / 1.5U_N$ (10s, $20^\circ\text{C} \pm 5^\circ\text{C}$ )
	Between terminals and case	3000Va.c. (10s, 50Hz, $20^\circ\text{C} \pm 5^\circ\text{C}$ )
Insulation resistance ( $IR \times C_N$ )		$\geq 3000s$ ( $20^\circ\text{C}$ , 500Vd.c., 60s)
$\tan\delta_d$		0.0002
$\tan\delta$		$\leq .0045$ (1kHz, $20^\circ\text{C} \pm 5^\circ\text{C}$ )
Max. altitude		2000m
Max. torque of terminals		M6:5N.m M8:6N.m
Installation		Any Position
Expected lifetime		60,000h @ $U_{rms}$ , $\theta_{hs} \leq 70^\circ\text{C}$

# HCAB

AC filter Capacitor for PCB

## Power Electronic Capacitor

### Features

- Applied in AC filter circuits
- Metallized polypropylene film structure
- Filled with resin
- Excellent electrical performance
- Compliance with AEC-Q200 standard requirements



### Typical Applications

Suitable for small power AC output filter, i.e. UPS, Solar Photovoltaic DC/AC inverter with LCL filter

### Specifications

Reference standard	GB/T 17702 (IEC 61071)
$U_{rms}$ , @85°C Rated RMS voltage	250Va.c.~600Va.c.
Capacitance range	0.33μF~60μF
Climatic category	40/85/56, 40/105/56
Operating temperature	-40°C~105°C (85°C~105°C: decreasing factor 1.5% per 1°C for $U_N$ )
Capacitance tolerance	$\pm 5\%$ (J), $\pm 10\%$ (K)
Voltage proof	$2.15U_{rms} / 1.5U_N$ (10s, $20^\circ\text{C} \pm 5^\circ\text{C}$ )
Insulation resistance ( $IR \times C_N$ )	$\geq 3000s$ ( $20^\circ\text{C}$ , 100Vd.c., 60s)
Self inductance ( $L_s$ )	$< 1nH$ per mm of lead space
$\tan\delta_d$	0.0002
Maximum peak current $\hat{I}$ (A)	$\hat{I} = C \cdot dv/dt$
Peak non-repetitive current	1.4 $\hat{I}$ (1000 times during the lifetime)
Expected lifetime	10000h @ $U_{rms, 85^\circ\text{C}}$ , $\theta_{hs} = 85^\circ\text{C}$
	8000h @ $U_{rms, 105^\circ\text{C}}$ , $\theta_{hs} = 105^\circ\text{C}$
Failure rate	$\leq 300FIT$ @ $U_{rms, 85^\circ\text{C}}$ , $\theta_{hs} = 85^\circ\text{C}$



HCAB(T)

AC filter Capacitor for PCB  
(THB series)

Power Electronic Capacitor

Features

- Metallized polypropylene film structure.
- excellent self-healing property.
- High stability of capacitance under severe ambient condition, such as high temperature and high humidity.
- Automotive grade (AEC-Q200 Compliant).



Typical Applications

Suitable for small power AC output filter, i.e. UPS、Solar Photovoltaic DC/AC inverter with LCL filter.

Specifications

Reference standard	GB/T 17702 (IEC 61071)
Climatic category	40/105/56
Operating temperature range	-40℃~+105℃ (85℃~105℃: decreasing factor 1.5% per ℃ for U <sub>N</sub> )
Rated AC voltage	250Va.c./310Va.c./350Va.c./400Va.c./500Va.c./600Va.c.
Capacitance range	0.33μF~60μF
Capacitance tolerance	±5% (J) 、 ±10% (K) (20℃, 1kHz)
DC voltage test	Between terminals: 2.15U <sub>NAC</sub> , 60s, 25℃±5℃ ( DC Test )
	Between terminals & case: 3.2kVAC, 50Hz, 2s ( AC Test )
Insulation resistance	≥3000s (100 VDC, 60s, 25℃±5℃)
Life Expectancy	≥60000 h at U <sub>N</sub> and Ths = 85℃
Failure rate	≤300FIT at U <sub>N</sub> and Ths = 85℃
Biased Humidity Test	Temperature: 85±2℃, Humidity: 85±3%RH, Voltage: U <sub>rms</sub> ≤310Vac: 240Vac 310Vac < U <sub>rms</sub> ≤400Vac: 310Vac U <sub>rms</sub> 500Vac: 410Vac U <sub>rms</sub> 600Vac: 500Vac Duration: 1000h  ΔC/C <sub>0</sub>  ≤10%, Δtanδ≤0.0200, 1kHz, IR≥50% of the rated value

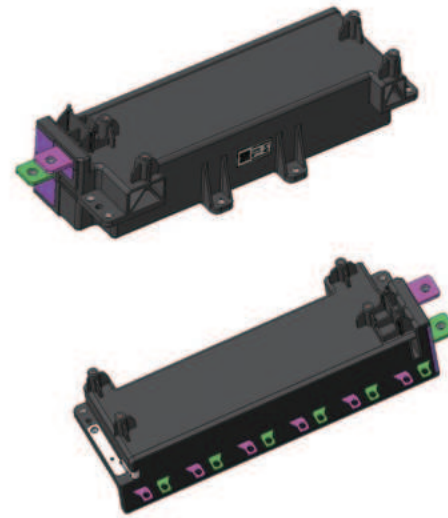
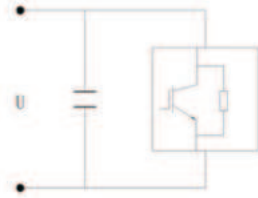


# HCPC

## Customized Metallized Film Capacitor

### Features

- Epoxy resin encapsulation
- Dry design
- Self-healing properties
- Low ESL and Low ESR
- Strong ability to withstand ripple current
- Design of segmented metallized film



### Typical Applications

DC Link DC filter circuit  
Hybrid electric vehicle and pure electric vehicle

### Specifications

Reference standard		IEC61071
Materials		
Capacitor dielectric		polypropylene
Electrode material		T2 copper.tin plated
Filling material		Epoxy resin
Installation method	leading out terminal	screwing
	Housing fixing style	screwing
Basic parameters		
Rated capacitance (C <sub>N</sub> )		1 400μF
Capacitance tolerance		±10% (K)
Dissipation factor (tgδ)		≤0.0010 @100Hz, 25±5℃
Dielectric dissipation factor		0.0002
Rated voltage (U <sub>N</sub> )		800VDC

### Specifications

Electrical parameters		
Over voltage capability	1.1×U <sub>N</sub>	880VDC (30% of on-load-dur.)
	1.15×U <sub>N</sub>	920VDC (30min./day)
	1.2×U <sub>N</sub>	960VDC (5min./day)
	1.3×U <sub>N</sub>	1040VDC (1min./day)
Voltage proof	Between terminals	1200VDC @10s, 25±5°C
		Leakage current≤5mA
	Between terminals and case	3000VAC @50Hz, 60s, 25±5°C
		Leakage current≤3mA
	Between terminals and aluminum plate	3000VDC @10s, 25±5°C
		Leakage current≤3mA
	Between terminals and ground terminals	3000VDC @2s, 25±5°C
		Leakage current≤3mA
Equivalent series resistance (ESR)		≤0.5mΩ, @10KHz
Equivalent series inductance (ESL)		≤15nH,@1MHz
Insulation resistance between terminals (R <sub>is</sub> ·C <sub>N</sub> )		≥10 000s, @500±50VDC, 25±5°C
Insulation resistance Between terminals and ground terminals		≥700MΩ, @1000±50VDC, 25±5°C
Creepage distance		≥9mm
Electrical clearance		≥10mm
Continuous ripple current		360Arms.@ Ambient temperature≤85°C.20kHz
Peak ripple current		540Arms.@ ambient temperature ≤85 °C. @ cooling ≤75°C.duration ≤ 60s.20kHz
Rated DC current		550A.@ ambient temperature ≤85 °C
Peak DC current		825A.@ ambient temperature ≤85°C. @ cooling ≤75°C. duration ≤60s
Expected lifetime		≥100,000h@U <sub>N</sub> ,Θ <sub>hs</sub> =70°C
Environmental parameters		
Operation temperature range(case)	-40 ~ 105°C	
	85 ~ 105°C: decreasing factor 1.5% per°C for voltage	
Damp Heat Steady State	40°C, 93%RH	
Storage temperature	-40 ~ 105°C	

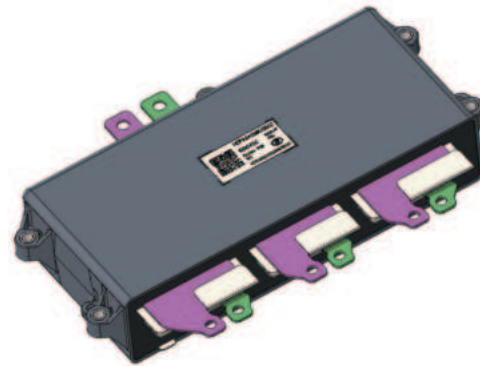
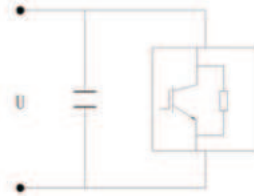


# HCPP

## Customized Metallized Film Capacitor

### Features

- Epoxy resin encapsulation
- Dry design
- Self-healing properties
- Low ESL and Low ESR
- Strong ability to withstand ripple current
- Design of segmented metallized film



### Typical Applications

DC Link DC filter circuit  
Hybrid electric vehicle and pure electric vehicle

### Specifications

Reference standard	IEC61071
Materials	
Capacitor dielectric	polypropylene
Electrode material	T2 copper coated with bright tin
Filling material	Epoxy resin
Basic parameters	
Rated capacitance (CN)	520μF
Capacitance tolerance	±5% (J)
Dissipation factor (tgδ)	≤0.0010 @100Hz, 25±5°C
Dielectric dissipation factor	0.0002
Rated voltage (UN)	750VDC

### Specifications

Electrical parameters		
Over voltage capability	1.1×UN	825VDC (30% of on-load-dur.)
	1.15×UN	862.5VDC (30min./day)
	1.2×UN	900VDC (5min./day)
	1.3×UN	975VDC (1min./day)
Voltage proof	Between terminals	1 125VDC @10s, 25±5°C
		Leakage current≤0.2mA
	Between terminals and case	3 900VDC @60s, 25±5°C
		Leakage current≤0.2mA
Equivalent series resistance (ESR)		≤0.4mΩ, @10KHz
Equivalent series inductance (ESL)		≤15nH,@1MHz
Insulation resistance between terminals (Ris-CN)		≥10 000s, @500±50VDC, 25±5°C
Creepage distance		≥7.5mm
Electrical clearance		≥3.5mm
Continuous ripple current		92Arms, @ Ambient temperature≤105°C, .@ cooling 70 °C
Peak ripple current		184Arms, @ Ambient temperature≤105°C.duration ≤ 60s.10kHz. @ cooling 70 °C
Expected lifetime		≥100,000h@UN,Θ <sub>hs</sub> =70°C
Environmental parameters		
Operation temperature range(case)		-40 ~ 105°C
		85 ~ 105°C: decreasing factor 1.5% per°C for voltage
Damp Heat Steady State		40°C, 93%RH
Storage temperature		-40 ~ 105°C



## Technical Terms and Definitions

### 1. Rated capacitance CN

Capacitance value for which the capacitor has been designed.

### 2. Tolerance on rated capacitance Ctol

The deviation of actual measured capacitance from rated capacitance, the value is following:  $Ctol = (C - CN) / CN * 100\%$

C: Actual measured capacitance of a capacitor

CN: Rated capacitance of a capacitor

Tolerance on rated capacitance determines its application its priority values are  $\pm 5\%$  (J),  $\pm 10\%$  (K).

### 3. Rated voltage UN

Rated a. c. voltage (UN):

Maximum operating peak voltage of either polarity of a reversing type waveform for which the capacitor has been designed.

Rated d. c. voltage (UN):

Maximum operating peak voltage of either polarity but of a non-reversing type waveform for which the capacitor has been designed.

### 4. Rms voltage Urms

Root mean square of maximum value of sinusoidal a.c. voltage in continuous operation.

### 5. Ripple voltage Ur

Peak-to-peak alternating component of the unidirectional voltage

### 6. Non-recurrent surge voltage Us

Peak voltage induced by a switching or any other disturbance of the system which is allowed for a limited number of times and for durations shorter than the basic period.

### 7. Insulation voltage Ui

R.M.S. value of the sine wave voltage designed for the insulation between terminals of capacitors to case or earth. If not specified, the R.M.S. value of the insulating voltage is equivalent to the rated voltage divided by  $\sqrt{2}$ .

### 8. Maximum current Imax

Maximum R.M.S. current for continuous operation.

### 9. Maximum peak current Î

Maximum peak current that can occur during continuous operation. The value is following:  $\hat{I} = CN \times (dv/dt)$

### 10. Maximum surge current Îs

Peak non-repetitive current induced by switching or any other disturbance of the system which is allowed for a limited number of times, for durations shorter than the basic period.

## Technical Terms and Definitions

### 11. Rated frequency (of a capacitor) fN

Frequency for which the capacitor has been designed.

### 12. Resonance frequency

Lowest frequency at which the impedance of the capacitor becomes minimum.

The value is following:  $f = 1 / (2\pi \sqrt{Ls C_N})$

### 13. Tangent of the loss angle of a capacitor tgδ

Ratio between the equivalent series resistance and the capacitive reactance of the capacitor at specified sinusoidal alternating voltage and frequency.

### 14. Dielectric dissipation factor tgδ0

Constant dissipation factor of dielectric material for all capacitors at the rated frequency. The typical loss factor of polypropylene Film is  $2 \times 10^{-4}$

### 15. Equivalent series resistance of a capacitor ESR

Effective resistance which, if connected in series with an ideal capacitor of capacitance value equal to that of the capacitor in question, would have a power loss equals to active power dissipated in that capacitor under specified operating conditions.

### 16. Self-inductance Ls

Effective inductance which, if connected in series with an ideal capacitor of capacitance value equal to that of the capacitor in question, would have the resonance frequency equals to the resonance frequency in that capacitor.

### 17. Thermal resistance Rth

A heat property and a measurement of a temperature difference by which a capacitor resists a heat flow. It shows the temperature difference when a unit of heat energy flows through a capacitor in unit time. It has the units  $^{\circ}\text{C/W}$  or  $\text{K/W}$ .

### 18. Capacitor losses Pj

Active power dissipated in the capacitor. The value is following:

$P_j = I_{rms}^2 \times ESR$

### 19. Operating temperature Θo

Temperature of the hottest point on the case of the capacitor when in thermal equilibrium.

### 20. Maximum operating temperature Θmax

Highest temperature at which the capacitor may be energized.

### 21. Lowest operating temperature Θmin

Lowest temperature at which the capacitor may be energized.

### 22. Cooling-air temperature Θamb

Temperature of the cooling air measured at the hottest position in bank, under steady-state conditions, midway between two units. If one unit is involved, it is the temperature measured at a point approximately 0.1m away from the capacitor container and two-thirds of the height from its base.



## Technical Terms and Definitions

### 23. Container temperature rise $\Delta\theta_{case}$

Difference between the temperature of the hottest point of the container and the temperature of the cooling air.

### 24. Hotspot temperature $\theta_{hs}$

Temperature at the hottest spot inside the capacitor. The value is following:  $\theta_{hs} = \theta_{amb} + P_j \times R_{th}$

### 25. Climatic category

The climatic category which the capacitor belongs to is expressed with minimum, maximum operating temperature and damp heat severity, For example, 40/85/56

### 26. Insulation resistance IR

The insulation resistance is the ratio between an applied DC voltage and the resulting leakage current. It is expressed in M $\Omega$ .

The insulation resistance is usually expressed with time constant( $\tau$ ), the time constant in expressed in seconds with the following formula:  $\tau = IR \times CN$

### 27. Self-healing

It is only applicable to metallized film capacitor. Self-healing means the ability that the electrical properties of the capacitor are rapidly restored after a local breakdown of the dielectric.

The electrode of metallized film capacitor is the metal coating of the metalized film, which are vacuum-deposited directly onto the plastic film, have a thickness of only several tens nm. At weak point or impurities in the dielectric, a dielectric breakdown would occur. The energy released by the arc discharge in the breakdown channel rapidly evaporate the thin metal coating in the vicinity of the channel. The insulated region thus resulting around the former faulty area will cause the capacitor to regain its full operation ability.

### 28. Failure rate

Failure rate indicates the failure probability of capacitors in unit time after a certain point, while the capacitor haven't failed before the certain point. The unit is FIT (1FIT=1/10<sup>9</sup> hours)

For example, 10000 pcs of the capacitors work at given conditions for 10000 hrs and 10 pcs of capacitors failed,

So  $\lambda = 10 / (10000 \times 10000) = 100\text{FIT}$ .

### 29. Expected lifetime of a capacitor

Expected Lifetime is a statistical value calculated on the basis of experience and on theoretical evaluations, it depends on the applied voltage and the hot spot temperature during operation. Generally speaking, for capacitors applied in different situation, the designed average service lives are different. For example, capacitors used in DC-Link circuits will have a expected lifetime of probable 100000 hrs at rated voltage and 70°C hot spot temperature.

A rough evaluation for the expected capacitor life-time can be indicated like this: 10% increase of the voltage, half long lifetime will lose. Also 10% increase of hotspot increase, half long lifetime will lose.

## Application Notes

### 1. Caution items in using plastic film capacitors

1) The plastic film capacitor varies in the maximum applicable voltage depending on the applied voltage, current, frequency and operational environment.

2) Generally speaking, although flame retardant shell or flame retardation epoxy is used in the coating or encapsulating of plastic film capacitor, continuous high temperature of firing will break the coating layer or plastic case of the capacitor, and may lead to melting and firing of the capacitor element.

### 2. Caution items in storing plastic film capacitors

1) It shouldn't be located in particular high temperature and high humidity.

2) Capacitors may not be stored in corrosive atmospheres, such as sulfides, acids, lye, salts, organic solvents or other corrosive substances.

3) When unchanging primal package, it shouldn't be stored more than 24 months (from the date marked on the capacitor's body or the label glued to the package)

## Guide For Customer Ordering

### Please provide following information as much as you can

1.Applications: such as transducer, welding machine, induction heating machine

2.Application situation: such as DC-Link, IGBT snubber, resonance, etc.

3.Rated capacitance and tolerance

4.Voltage: such as rated voltage, working voltage, ripple voltage, non-recurrent surge voltage, etc.

5.Current: such as maximum current, maximum peak current, pulse current, etc.

6.Frequency: such as working frequency, pulse frequency, etc.

7.Working environment: such as environment temperature, humidity, cooling mode, etc.

8.Dimensions: such as diameter,height or length,width etc.

9.Terminal types: such as lug, tab etc.