Shanghai Yongming Electronics Co., Ltd.

Capacitor Solutions, Ask YMIN for your Applications

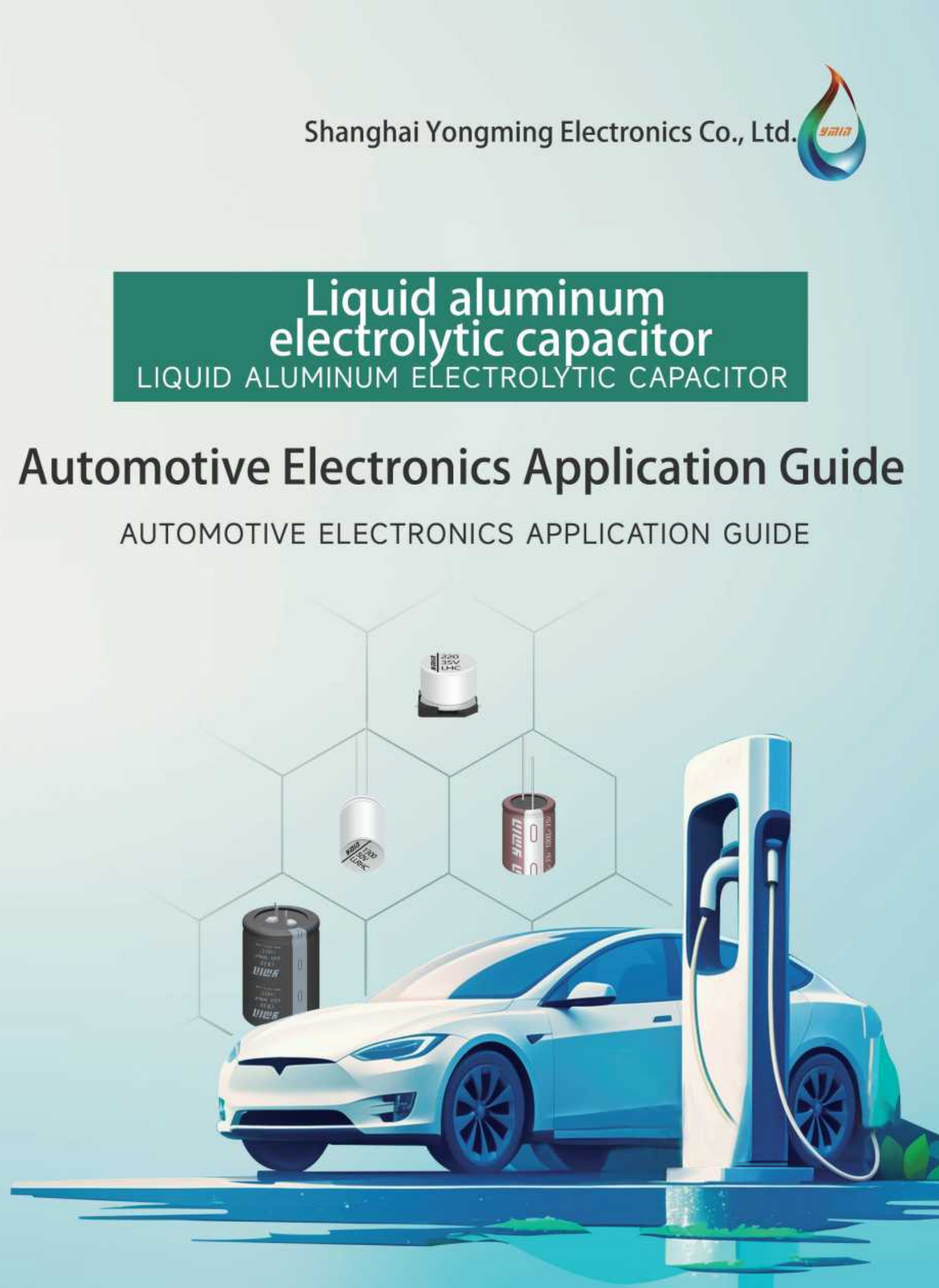
Respond quickly and accurately to customer needs

Liquid aluminum electrolytic capacitor

LIQUID ALUMINUM ELECTROLYTIC CAPACITOR

Automotive Electronics Application Guide

AUTOMOTIVE ELECTRONICS APPLICATION GUIDE



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质量管理体系认证证书

上海永铭电子股份有限公司

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IATF16949


CNAS

中国合格评定国家认可委员会

实验室认可证书

CNAS

AEC-Q200

Safety components

SAFETY COMPONENTS

ELECTRONIC POWER STEERING (EPS)

AIRBAGS/WINDOW CONTROLS

SEAT VENTILATION

VEHICLE STABILITY CONTROL (ESC)

Electronic Power Steering (EPS)

Application Requirements

Rapid response; seismic performance; high-temperature durability; safety and reliability;

YMIN Liquid Chip Capacitor Product Advantages

Wide temperature stability design

Adaptable to extreme temperatures from -55℃ to 125℃, meeting automotive-grade requirements. Low impedance, high capacity, and miniaturized design reduce module size and contribute to system weight reduction. Ensures smooth low-temperature start-up and reliable high-temperature operation.

Overload resistance

The capacitor can withstand the instantaneous high current surge during motor start-up/stop/rotation/lock conditions, making the whole machine more reliable and stable;

YMIN's advantages in liquid lead large-diameter capacitors

High reliability and long life design

Products with a temperature resistance of 135℃ can achieve an actual lifespan of 6000 hours at 135℃, and ultra-low ESR ensures low temperature rise of the capacitor, guaranteeing the normal operation of EPS power steering for extended periods and providing strong protection.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VKL	125℃ 2000H	35 (44)	100	6.3*7.7	0.16	0.48	240	35	UUB/ULT ULH	MVH	TC	27
	VMM	105℃ 2000H	50 (58)	47	6.3*7.7	0.16	0.68	200	23	UWT/UWX UWJ	MVE	FT	22
Lead type	LKL(R)	135℃ 3000H	50 (63)	1300	16*25	0.10	0.055	2500	650	UBW/UBY	GPD/GVD	/	35
			50 (63)	2400	18*35.5	0.12	0.029	3210	1200				
			50 (63)	3000	18*35.5	0.14	0.034	3390	1500				
			50 (79)	3600	18*40	0.14	0.030	3700	1800				
			63 (79)	2700	18*40	0.11	0.028	4100	1701				

airbags

Application Requirements

Long lifespan and durability; low-temperature resistance; seismic performance; impact resistance;

Yongming's advantages in liquid lead large-diameter capacitors

High temperature resistance and long life design

It can withstand temperatures up to 105℃, and its actual lifespan can reach 12,000 hours at 105℃. It can also meet the requirement of 50,000 charge-discharge cycles at 105℃.

High capacity density design

High-density and compact designs can meet customers' PCB layout needs;

Low temperature stability

ESR is stable at -40℃;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Rubycon	
Lead type	LK	105℃ 8000H	25 (31)	4400	16*20	0.18	0.030	2000	1100	UPW/UPM	LBV/LBG	/	31
			35 (44)	3300	18*25	0.12	0.045	3600	155				
			35 (44)	5600	18*25	0.22	0.035	2000	1960				
			35 (44)	7600	18*31.5	0.24	0.032	2600	2660				
			35 (44)	10000	18*40	0.30	0.020	3800	3500				

Window controller

Application Requirements

Long lifespan and durability; low-temperature resistance; seismic performance; impact resistance;

Yongming's advantages in liquid lead small diameter capacitors

Wide temperature stability design

Stable electrical performance over a wide temperature range at 135℃ for 3000 hours;

Long life design

The designed lifespan is 3000 hours, but the actual lifespan can reach more than 5000 hours, which greatly improves

Low ESR, impact resistant

Low ESR, high ripple, and resistant to switching shocks;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Rubycon	
Lead type	LKL(R)	135℃ 3000H	35 (44)	470	10*20	0.20	0.65	780	164.5	UBW/UBY	/	HGX	35
			35 (44)	1200	12.5*20	0.20	0.57	2215	420				
			35 (44)	2200	14.5*25	0.20	0.35	2550	770				

Seat ventilation

Application Requirements

Rapid response; safety and reliability;

Yongming's advantages in liquid lead small diameter capacitors

High temperature resistance and long life design

Stable electrical performance over a wide temperature range at 135℃ for 3000 hours;

High capacity density

The designed lifespan is 3000 hours, but the actual lifespan can reach more than 5000 hours, which greatly improves

Low temperature stability design

Low ESR, high ripple, and resistant to switching shocks;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Rubycon	
Lead type	LKL(R)	135℃ 3000H	16 (20)	2200	10*25	0.26	0.154	1450	352	UBW/UBY	/	HGX	35

Vehicle Stability Control (ESC)

Application Requirements

High temperature resistance; rapid response; lifespan and durability;

Yongming Liquid Chip Capacitor Product Advantages

High temperature resistance and long life design

Withstands high temperatures of 125℃ for 3000 hours, adapts to extreme temperatures ranging from -55℃ to 125℃, and meets automotive-grade requirements. Low-impedance, high-capacity capacitors meet the energy storage and filtering needs of high-power modules, ensuring smooth low-temperature startup and long lifespan.

Wide temperature stability design

Adaptable to extreme temperatures from -55℃ to 125℃, meeting automotive-grade requirements. Low impedance, high capacity, and miniaturized design reduce module size and contribute to system weight reduction. Ensures smooth low-temperature start-up and reliable high-temperature operation.

Low impedance, high ripple resistance design

Small size, high capacity, can meet automotive-grade requirements in both extremely low and high temperatures of -55℃ to 105℃, low impedance and high ripple current resistance, making the whole machine more reliable and stable.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VKL	125℃ 2000H	35 (44)	100	6.3*7.7	0.16	0.48	240	35	UUB/ULT ULH	MVH	TC	27
		125℃ 3000H	35 (44)	330	10*10	0.16	0.22	750	115				
	V3M(T)	105℃ 2000H	35 (40)	100	6.3*5.8	0.12	0.72	300	35	UCM	MZR	FK	/

Thermal management components

THERMAL MANAGEMENT COMPONENTS

IMAGE FOR REFERENCE ONLY.

COOLING FAN CONTROLLER

AIR CONDITIONER COMPRESSOR CONTROLLER

PTC HEATER

ELECTRIC WATER PUMP

Cooling fan controller

Application Requirements

Rapid response; seismic performance; high-temperature durability; safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

High temperature resistant design

The capacitor is adapted to the extreme temperature environment of the engine compartment and operates stably under high temperature conditions (such as continuous heat dissipation requirements in summer).

Low ESR

To cope with instantaneous current surges during fan start-up and shutdown and sudden load changes, and reduce the risk of capacitor overheating.

Seismic performance

Ensure the capacitor can withstand vehicle bumps and mechanical vibrations, and prevent internal structural breakage or lead desoldering.

Long life design

The capacitor has stable long-term durability, with capacitance decay not exceeding 20% throughout its entire lifespan, ensuring stable and new-like performance of the entire device.

Yongming's advantages in liquid lead large-diameter capacitors

High temperature resistance and long service life

Products that can withstand temperatures up to 135℃ can actually last for 6000 hours at 135℃.

Ultra-low ESR

Ultra-low ESR ensures low capacitor temperature rise, allowing the cooling fan to operate at high temperatures for extended periods.

Yongming's advantages in liquid lead small diameter capacitors

Wide temperature stability design

Stable electrical performance over a wide temperature range at 135℃ for 3000 hours;

Long life design

The designed lifespan is 3000 hours, but the actual lifespan can reach more than 5000 hours, which greatly improves the overall lifespan of the machine.

High ripple resistance

Low leakage current, high ripple, and resistant to switching shocks;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Rubycon	
surface mount type	VKL	125℃ 3000H	35 (44)	330	10*10	0.16	0.22	750	115	UUB/ULT ULH	MVH	/	27
			35 (44)	470	10*16.5	0.16	0.20	1100	164				
Lead type	LKL(R)	135℃ 3000H	25 (31)	3300	16*25	0.18	0.041	3100	825	UBW/UBY	GPD/GVD	HGX	35
			25 (31)	3300	18*25	0.18	0.035	3600	825				
			50 (63)	470	12.5*20	0.2	0.5	1050	235				
			50 (63)	1000	16*20	0.10	0.055	1800	500				
			50 (63)	1200	12.5*25	0.20	0.08	2205	600				
			50 (63)	1300	16*25	0.10	0.055	2500	650				
			50 (63)	1500	14.5*27	0.20	0.065	2420	750				

Air Conditioner Compressor Controller

Application Requirements

Compact and integrated; low power consumption; long lifespan and durability;

Yongming Liquid Chip Capacitor Product Advantages

☑ High capacity

It can meet the requirements of small overall size, adapt to the PCB layout of air conditioner controller, and save space;

☑ Low ESR design

Ensure fast overall machine response, improve touch button sensitivity, and reduce power filtering losses;

Yongming's advantages in liquid lead large-diameter capacitors

☑ High reliability, long lifespan

The capacitors exhibit good consistency in characteristics, meeting the needs of customers for series and parallel applications. Their long lifespan, low ESR, and low temperature rise ensure stable operation of the entire unit over extended periods.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Rubycon	
surface mount type	V3M	105℃ 5000H	50 (63)	220	10*10	0.12	0.25	670	110	UCM	MZR	FK	20
Lead type	LKG	105℃ 12000H	275 (325)	51	16*20	0.08	0.60	1356	346	UCY	KXJ/KXQ	BXW/BHW	33
			450 (500)	56	12.5*35	0.12	1.82	1200	514				
			450 (500)	68	16*35.5	0.12	1.25	1400	622				

PTC heater

Application Requirements

Compact and integrated design; high temperature and corrosion resistance; seismic performance; high energy efficiency and interference resistance;

Yongming Liquid Chip Capacitor Product Advantages

High temperature resistance and long life design

Withstands high temperatures up to 125℃ for 5000 hours, and meets automotive-grade requirements at both low and high temperatures (-40℃ to 125℃). Low leakage current (<20μA) reduces standby power consumption. The large-capacity, miniaturized design reduces module size, contributing to a lighter overall system. Ensures smooth low-temperature startup and reliable operation at ultra-high temperatures.

High capacity density design

Small size, large capacity, withstands high voltage of 450V, instantaneous surge voltage of 1200V, low leakage current <60μA to reduce standby power consumption, while ensuring smooth low-temperature start-up and reliable high-temperature operation life;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VKL	125℃ 5000H	400 (450)	5.6	10*10	0.16	8	130	20	UUB/ULT ULH	MVH	TC	27
	VMM	105℃ 8000H	450 (500)	15	12.5*13.5	0.16	7	225	60	UWT/UWX UWJ	MVE	FT	22

electric water pump

Application Requirements

Compactness and integration; long lifespan and durability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density

Miniaturized packaging, compatible with water valve ECU module design, saving PCB space;

Long life design

The capacitor has stable long-term durability, with capacitance decay not exceeding 20% throughout its entire lifespan, matching the full lifespan requirements of automotive thermal management systems and preventing reduced flow regulation performance due to capacitor aging.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VKL	125℃ 3000H	50 (63)	100	10*10	0.16	0.50	550	50	UUB/ULT ULH	MVH	TC	27
		125℃ 5000H	80 (92)	220	12.5*21	0.16	0.24	890	176				

New energy vehicle headlights

NEW ENERGY VEHICLE LIGHTS

CAR LIGHTS

Headlight controller

Application Requirements

Compact and integrated design; high and low temperature resistance; long lifespan and durability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density

Ultra-small size, high capacity.

Wide temperature stability design

Adaptable to extreme temperatures from -55℃ to 105℃, meeting automotive-grade requirements. Low impedance withstands high ripple current, meeting the energy storage and filtering needs of high-power modules.

Low temperature stability and long life design

Ensures smooth low-temperature start-up and long service life.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	V3M(T)	105℃ 2000H	35 (40)	100	6.3*5.8	0.12	0.72	300	35	UCM	MZR	FK	/
	V3MC	105℃ 2000H	35 (40)	220	6.3*7.7	0.12	0.24	610	77				/
	V3M	105℃ 2000H	50 (63)	220	8*10	0.12	0.36	670	110				20

Intelligent driving

INTELLIGENT DRIVING

CHASSIS DOMAIN CONTROLLER

RADAR CAMERA

SMART COCKPIT, DOOR AND WINDOW CONTROLLER

AUTOMATIC SHIFTER

REMOTE COMMUNICATION MODULE T-BOX

Domain Controller - DCU

Application Requirements

Low power consumption; safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density design

Small size, high capacity.

Wide temperature stability design

Adaptable to extreme temperatures from -55℃ to 125℃, meeting automotive-grade requirements. Low impedance withstands high ripple current, meeting the energy storage and filtering needs of high-power modules.

Low temperature stability and long life design

Ensures smooth low-temperature start-up and long service life.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VMM	105℃ 4000H	35 (44)	68	6.3*7.7	0.18	0.52	300	23	UWT/UWX UWJ	MVE	FT	22
	VKL	125℃ 3000H	35 (44)	220	10*10	0.16	0.30	670	77	UUB/ULT ULH	MVH	TC	27
	V3M	105℃ 5000H	50 (63)	220	10*10	0.12	0.25	670	110	UCM	MZR	FK	20

radar camera

Application Requirements

Compactness and integration; Electromagnetic interference (EMC) immunity;
Safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density design

Small size, high capacity;

Wide temperature stability design

It can withstand extreme temperatures of -55℃ to 125℃ and meets automotive-grade requirements.

Low impedance, high ripple resistance design

Low impedance withstands high ripple current, meeting the energy storage and filtering requirements of

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (mΩ 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VMM	105℃ 4000H	35 (44)	68	6.3*7.7	0.18	0.52	300	23	UWT/UWX UWJ	MVE	FT	22
	VKL	125℃ 2000H	35 (44)	100	6.3*7.7	0.16	0.48	240	35	UUB/ULT ULH	MVH	TC	27

Smart Cockpit

Application Requirements

Compactness and integration; Electromagnetic interference (EMC) immunity;
Safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

Small size, high capacity;

Wide temperature stability design

It can withstand extreme temperatures of -55℃ to 105℃ and meets automotive-grade requirements.

Low impedance, high ripple resistance design

Low impedance withstands high ripple current, meeting the energy storage and filtering requirements of high-power modules, ensuring smooth low-temperature start-up and reliable high-temperature operation;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Nominal capacity (μF)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VMM	105℃ 6000H	25 (31)	330	8*10	0.20	0.17	600	82	UWT/UWX UWJ	MVE	FT	22
			35 (44)	220	8*10	0.18	0.21	600	77				
	V3M	105℃ 5000H	50 (63)	220	10*10	0.12	0.25	670	110	UCM	MZR	FK	20

Car door and window controller

Application Requirements

Low power consumption; safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density design

Small size, large capacity;

Wide temperature stability design

It can withstand extreme temperatures of -55℃ to 105℃ and meets automotive-grade requirements.

Low impedance, high ripple resistance design

Low impedance withstands high ripple current, meeting the energy storage and filtering requirements of high-power modules, ensuring smooth low-temperature start-up and reliable high-temperature operation;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VMM	105℃ 6000H	25 (31)	330	8*10	0.20	0.17	600	82	UWT/UWX UWJ	MVE	FT	22
			35 (44)	330	10*10	0.18	0.2	855	115				
		105℃ 4000H	50 (63)	100	8*7.9	0.16	0.42	360	50				

Automatic shifter

Application Requirements

Compactness and integration; low power consumption; security and reliability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density design

Small size, high capacity;

Wide temperature stability design

It can withstand extreme temperatures from -55℃ to 105℃ and meets automotive-grade requirements.

Low temperature stability and long life design

Low impedance withstands high ripple current, meeting the energy storage and filtering requirements of

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	V3M	105℃ 2000H	50 (63)	100	6.3*7.7	0.12	0.68	350	50	UCM	MZR	FK	20

Remote communication module/T-BOX

Application Requirements

Compactness and integration; Electromagnetic interference (EMC) immunity;
Safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density design

Small size, high capacity;

Wide temperature stability design

It can withstand extreme temperatures of -55℃ to 105℃ and meets automotive-grade requirements.

Low impedance, high ripple resistance design

Low impedance withstands high ripple current, meeting the energy storage and filtering requirements of

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	V3M	105℃ 2000H	10 (11.5)	470	6.3*7.7	0.19	0.32	600	47	UCM	MZR	FK	20
			50 (63)	100	6.3*7.7	0.12	0.68	350	50				
	V3M(T)	105℃ 2000H	35 (44)	100	6.3*5.8	0.12	0.72	300	35	UCM	MZR	FK	/

multimedia

MULTIMEDIA

COMBINATION INSTRUMENTS

IN-VEHICLE SCREEN/NAVIGATION

HUD

AUDIO

Instrument cluster, in-vehicle screen, navigation

Application Requirements

Compactness and integration; Electromagnetic interference (EMC) immunity; Safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

Low ESR design

It can effectively suppress high-frequency ripple in the power supply circuit (10kHz~1MHz), reduce MCU power supply noise, and improve the accuracy of instrument signal processing and the stability of the display screen.

High capacity density, wide temperature stability design

Compact size, high capacity, adaptable to extreme temperatures from -55℃ to 105℃, meeting automotive-grade requirements. Low impedance withstands high ripple current, meeting the energy storage and filtering needs of high-power modules, ensuring smooth low-temperature startup and long lifespan.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦDxL (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	V3M	105℃ 2000H	10 (12.5)	470	6.3*7.7	0.19	0.32	600	47	UCM	MZR	FK	20
			16 (20)	100	6.3*5.8	0.16	0.56	255	16				
			50 (63)	220	8*10	0.12	0.36	670	110				
			50 (63)	220	10*10	0.12	0.25	670	110				
			50 (63)	330	10*10	0.12	0.24	900	165				

Head-up Display (HUD)

Application Requirements

High and low temperature resistance; safety and reliability; long lifespan and durability;

Yongming Liquid Chip Capacitor Product Advantages

Wide temperature stability design

To ensure stable operation of the HUD in high-temperature (such as direct sunlight on the center console) or low-temperature (winter start-up) environments inside the vehicle, and to prevent sudden drop in capacitor capacity and failure.

Overload capacity

To address transient current surges in the HUD backlight driver and power conversion circuits (such as LED backlight startup) and reduce voltage fluctuations caused by capacitor temperature rise;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	V3M(T)	105℃ 2000H	35 (40)	100	6.3*5.8	0.12	0.72	300	35	UCM	MZR	FK	/
	V3M	105℃ 2000H	50 (63)	100	6.3*7.7	0.12	0.68	350	50				20

Audio

Application Requirements

Low power consumption; electromagnetic interference (EMC) immunity; safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density

Small size, large capacity, long lifespan;

Wide temperature stability design

It meets automotive-grade requirements for both extremely low and high temperatures of -55℃ to 105℃;

Low impedance, high ripple resistance design

Low impedance withstands high ripple current;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VKM	105℃ 10000H	25 (31)	2200	16*17	0.20	0.068	3250	550	/	/	HD/FK	/

Support

AUXILIARY

REFRIGERATOR CONTROLLER

USB/WPT

Refrigerator controller

Application Requirements

High and low temperature resistance; safety and reliability; long lifespan and durability;

Yongming Liquid Chip Capacitor Product Advantages

High capacity density design

Compact size, large capacity, long lifespan, and automotive-grade performance in both extremely low and high temperatures (-55℃ to

Wide temperature stability design

Adaptable to extreme temperatures from -55℃ to 125℃, meeting automotive-grade requirements. Low impedance withstands high ripple

Low temperature stability and long life design

Ensures smooth low-temperature start-up and long service life.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	VKM	105℃ 10000H	35 (44)	2200	16*21	0.16	0.056	3630	770	/	/	HD/FK	/

USB、WPT

Application Requirements

High energy efficiency and interference resistance; high temperature and durability; compact design and integration; safety and reliability;

Yongming Liquid Chip Capacitor Product Advantages

Wide temperature stability

Adaptable to extreme temperatures from -55℃ to 125℃, meeting automotive-grade requirements; ensuring smooth low-temperature starts and reliable high-temperature operation;

High capacity density design

Low impedance, high capacity, and miniaturized design reduce module size and contribute to system lightweighting;

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦDxL (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Panasonic	
surface mount type	V3M	105℃ 2000H	10 (11.5)	330	6.3*7.7	0.19	0.32	600	33	UCM	MZR	FK	20
	VKL	125℃ 2000H	35 (44)	100	6.3*7.7	0.16	0.48	240	35	UUB/ULT ULH	MVH	TC	27

In-vehicle OBC

VEHICLE OBC

OBC-DCDC

OBC-DCDC

Application Requirements

High energy efficiency and interference resistance; high temperature and durability; compact design and integration; safety and reliability;

Advantages of Yung-Ming Liquid Substrate Self-standing Capacitors

Operating temperature range

It meets the requirements of low capacitance decay and stable ESR (equivalent series resistance) at

Low leakage

The leakage current is stable at high temperatures, preventing capacitor failure due to

Ripple current

In OBC, high-frequency switches (such as LLC topologies) generate large ripple currents, and capacitors can

Low ESR

A lower ESR can provide greater current and smoother ripple output for the vehicle OBC;

High capacitance stability

The capacitance value changes little with temperature/voltage, ensuring effective filtering.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Rubycon	
substrate self-reliant	CW3H	105℃ 3000H	450 (500)	330	25*50	0.20	0.39	1940	940	LGN/LGM	KHS/KMS KMR/KMQ	MXG/MXK	37
			450 (500)	560	30*50	0.20	0.45	2100	940				

charging pile

CHARGING PILE

CHARGING PILE

AC-DC、DC-DC

Application Requirements

High energy efficiency, anti-interference; wide temperature range stability; low power consumption;

Advantages of YMIN Liquid Substrate Self-standing Capacitors

Low ESR

Ensure effective filtering to guarantee a clean power supply; reduce heat generation and improve overall energy efficiency.

Wide temperature stability design

If the capacitance and ESR change little over a wide temperature range and the parameters remain stable over a wide temperature range, the whole machine can easily cope with extreme temperatures.

Low leakage current

The capacitor's low leakage current design effectively reduces standby power consumption, ensuring extended battery life and improving system security.

Recommended selection (the following are sample specifications for reference only)

shape	series	Temperature life	Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (Ω 100kHz)	Rated ripple current (mA/100kHz)	LC (μA)	Replace international counterparts			page number
										Nichicon	NIPPON CHEMI-CON	Rubycon	
substrate self-reliant	CW3H	105℃ 3000H	450 (500)	330	30*30	0.20	0.39	1100	940	LGN/LGM	KHS/KMS KMR/KMQ	MXG/MXK	37
			550 (600)	120	30*30	0.20	0.87	1200	940				
			550 (600)	270	35*40	0.20	0.731	1420	940				

Liquid aluminum electrolytic capacitor

LIQUID ALUMINUM ELECTROLYTIC CAPACITOR

surface mount type

P20 V3M
105℃
2000H~5000H
Low impedance, thin profile
High capacity chemicals

→ **P22 VMM**
105℃
3000H~8000H
5mm high, thin product

→ **P27 VKL**
125℃
2000H~5000H
High ripple current
High temperature resistance
Long lifespan

Lead type

P31 LK
105℃
6000H~8000H
High ripple current
Low impedance
Miniaturization

→ **P33 LKG**
105℃
8000H~12000H
High ripple current
Low impedance
Long life

→ **P35 LKL(R)**
135℃
3000H
High temperature resistance
Low impedance

snap-in type

P37 CW3H
105℃ 3000H
350~600V

V3M

◆Low impedance, thin, high capacity V-CHIP products

◆2000~5000 hours at 105℃

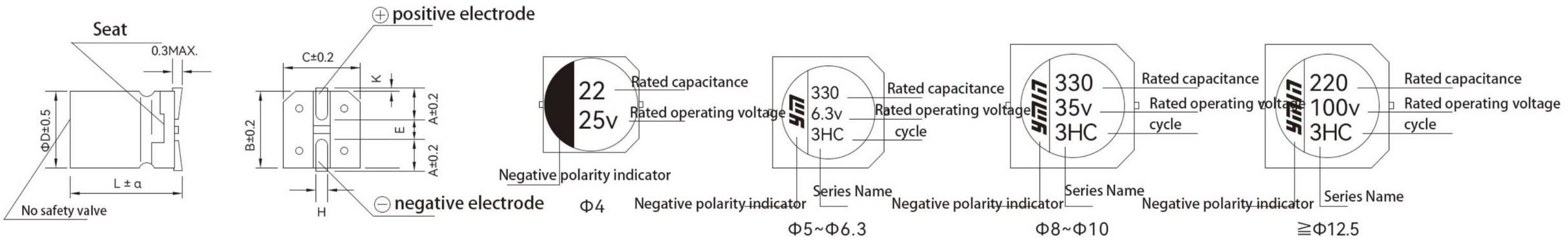
◆Compliant with AEC-Q200 RoHS directive

◆Suitable for high-density, fully automated surface mount technology and high-temperature reflow soldering

■ Main technical parameters

project	characteristic
Operating Temperature Range	≦100V －55~+105℃ ; 160V －40~+105℃
Nominal Voltage Range	6.3~160V
Capacity Tolerance	±20% (25±2℃ 120Hz)
Leakage Current (μA)	6.3~100WV I≦0.01CV or 3μA (whichever is greater) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken after 2 minutes
	160WV I≦0.02CV+10(μA) C: Nominal Capacity (μF) V: Rated Voltage (V) Reading after 2 minutes
Loss Tangent (25 ± 2° C 120Hz)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 / 160 tg δ: 0.26 / 0.19 / 0.16 / 0.14 / 0.12 / 0.12 / 0.12 / 0.12 / 0.12 / 0.14 For nominal capacities exceeding 1000μF, the loss tangent increases by 0.02 for every additional 1000μF.
Temperature Characteristics (120Hz)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 / 160 Impedance ratio Z(－40℃)/Z(20℃): 3 / 3 / 3 / 3 / 3 / 3 / 5 / 5 / 5 / 5
Durability	After applying the rated voltage for a specified time in a 105℃ oven, and then placing it at room temperature for 16 hours, the capacitor is tested at a test temperature of 25±2℃. The capacitor's performance should meet the following requirements. Capacity change rate: Within ±30% of the initial value Loss tangent: Below 300% of the specified value Leakage current: Below the specified value Load life: ≦Φ10 2000小时 ; >Φ10 5000小时
High Temperature Storage	After being stored at 105℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements. Capacity change rate: Within ±30% of the initial value Loss tangent: Below 300% of the specified value Leakage current: Below 200% of the specified value

■ Product dimension drawing (unit: mm)



ΦD	L	B	C	A	H	E	K	α
4	5.8	4.3	4.3	1.8	0.75±0.20	1.0	0.5MAX	±0.3
5	5.8	5.3	5.3	2.1	0.75±0.20	1.5	0.7MAX	±0.3
6.3	5.8	6.6	6.6	2.6	0.75±0.20	1.8	0.7MAX	±0.3
6.3	7.7	6.6	6.6	2.6	0.75±0.20	1.8	0.7MAX	±0.4
8	10	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
10	10	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.5
12.5	13.5	13	13	4.7	0.90±0.30	4.4	0.7MAX	±1.0
12.5	14.5	13	13	4.7	0.90±0.30	4.4	0.7MAX	±1.0
12.5	16.5	13	13	4.7	0.90±0.30	4.4	0.7MAX	±1.0
12.5	21	13	13	4.7	0.90±0.30	4.4	0.7MAX	±1.0
16	16.5	17	17	5.5	1.20±0.30	6.7	0.70±0.30	±1.0
16	21	17	17	5.5	1.20±0.30	6.7	0.70±0.30	±1.0
18	16.5	19	19	6.7	1.20±0.30	6.7	0.70±0.30	±1.0
18	21	19	19	6.7	1.20±0.30	6.7	0.70±0.30	±1.0

■ Frequency correction factor

Frequency (Hz)	50	120	1K	≧10K
coefficient	0.35	0.50	0.83	1.00

V3M

■ List of Standard Products

Voltage (V)	6.3			10			16			25		
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)
22										4×5.8	2.00	160
33										4×5.8	2.00	160
47							4×5.8	2.00	160	5×5.8	0.720	240
68				4×5.8	2.00	160	5×5.8	0.72	240	5×5.8	0.720	240
100	4×5.8	2.00	160				5×5.8	0.72	240	6.3×5.8	0.520	300
150				5×5.8	0.72	240	6.3×5.8	0.52	300	6.3×7.7	0.320	600
220	5×5.8	0.72	240	6.3×5.8	0.52	300	6.3×5.8	0.52	300	6.3×7.7	0.320	600
330	6.3×5.8	0.52	300	6.3×7.7	0.32	600	6.3×7.7	0.32	600			
470	6.3×7.7	0.32	600	6.3×7.7	0.32	600				8×10	0.16	850
680	6.3×7.7	0.32	600				8×10	0.16	850			
820										10×10	0.120	1190
1000				8×10	0.16	850	10×10	0.12	1190			
1500	8×10	0.16	850	10×10	0.12	1190				12.5×13.5	0.116	1420
2200	10×10	0.12	1190									

Voltage (V)	35			50			63			80		
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)
10				4×5.8	4.60	85						
10				5×5.8	1.76	165						
22	4×5.8	2.00	160	5×5.8	1.76	165						
33	5×5.8	0.72	240									
47	5×5.8	0.72	240	6.3×5.8	1.36	195						
68	6.3×5.8	0.52	300									
100	6.3×5.8	0.52	300	6.3×7.7	0.68	350						
150	6.3×7.7	0.32	600									
220				8×10	0.36	670				12.5×13.5	0.36	1050
330	8×10	0.16	850	10×10	0.24	900						
470				12.5×13.5	0.24	1340	12.5×16.5	0.28	1250	16×16.5	0.20	1500
560	10×10	0.12	1190									
680							16×16.5	0.164	1740	16×21	0.132	2040
820							18×16.5	0.16	1880	18×21	0.126	2140
1000	12.5×14.5	0.116	1420	16×16.5	0.160	1820						
1200							16×21	0.108	2430			
1500				16×21	0.100	2440						

V3M

■ List of Standard Products

Voltage (V)	100			160		
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)
100				12.5×16.5	4.60	1040
150	12.5×13.5	0.36	1050	16×21	3.28	1520
220	12.5×16.5	0.22	1250	18×21	2.58	2140
330	16×16.5	0.20	1500			
470	16×21	0.132	2040			
560	18×21	0.126	2140			

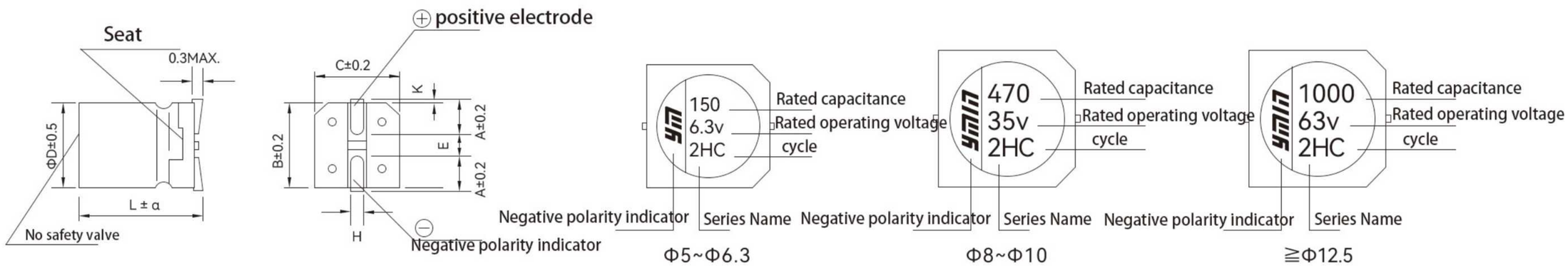
VMM

- ◆ All-voltage, miniature, flat V-chip products
- ◆ 3000~8000 hours at 105℃
- ◆ Compliant with AEC-Q200 RoHS directive
- ◆ Suitable for high-density, fully automated surface mount technology and high-temperature reflow soldering

■ Main technical parameters

project	characteristic
Operating Temperature Range	≦100V －55~+105℃；160~500V －40~+105℃
Nominal Voltage Range	6.3~500V
Capacity Tolerance	±20% (25±2℃ 120Hz)
Leakage Current (μA)	6.3~100WV I≦0.01CV or 3μA (whichever is greater) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken after 2 minutes 160~500WV I≦0.02CV+10(μA) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken over 2 minutes
Loss Tangent (25 ± 2° C 120Hz)	Rated voltage (V) 6.3 10 16 25 35 50 63 80 tg δ 0.32 0.28 0.24 0.20 0.18 0.16 0.16 0.14 Rated voltage (V) 100 160 200 250 350 400 450 500 tg δ 0.14 0.15 0.15 0.15 0.20 0.20 0.20 0.25 For nominal capacities exceeding 1000μF, the loss tangent increases by 0.02 for every additional 1000μF.
Temperature Characteristics (120Hz)	Rated voltage (V) 6.3 10 16 25 35 50 63 80 Impedance ratio Z(－40℃)/Z(20℃) 14 12 10 10 10 7 7 7 Rated voltage (V) 100 160 200 250 350 400 450 500 Impedance ratio Z(－40℃)/Z(20℃) 7 10 10 10 10 10 10 12
Durability	After applying the rated voltage for a specified time in a 105℃ oven, and then placing it at room temperature for 16 hours, the capacitor is tested at a test temperature of 25±2℃. The capacitor's performance should meet the following requirements. Capacity change rate: Within ±30% of the initial value Loss tangent: Below 300% of the specified value Leakage current: Below the specified value Load life: 6.3~100WV — External Dimensions / Load life: ΦD*5.7 (6.2, 6.9) 3000; ΦD*7.7 (7.9, 8.4) 4000; Others Φ5~Φ6.3 5000; Others Φ8 6000; Others Φ10 and above 8000 Load life: 160~500WV — External Dimensions / Load life: ΦD*5.7 (6.2, 6.9) 3000; ΦD*7.7 (7.9, 8.4) 5000; Others Φ5~Φ6.3 6000; Others Φ8 7000; Others Φ10 and above 8000
High Temperature Storage	After applying the rated voltage for a specified time in a 105℃ oven, and then placing it at room temperature for 16 hours, the capacitor is tested at a test temperature of 25±2℃. The capacitor's performance should meet the following requirements. Capacity change rate: Within ±20% of the initial value Loss tangent: Below 200% of the specified value Leakage current: Below 200% of the specified value

■ Product dimension drawing (unit: mm)



ΦD	L	B	C	A	H	E	K	α
5	5.7	5.3	5.3	2.1	0.75±0.20	1.5	0.7MAX	±0.3
5	7.9	5.3	5.3	2.1	0.75±0.20	1.5	0.7MAX	±0.3
5	10	5.3	5.3	2.1	0.75±0.20	1.5	0.7MAX	±0.5
6.3	5.7	6.6	6.6	2.6	0.75±0.20	1.8	0.7MAX	±0.3
6.3	7.7	6.6	6.6	2.6	0.75±0.20	1.8	0.7MAX	±0.3
6.3	10	6.6	6.6	2.6	0.75±0.20	1.8	0.7MAX	±0.5
8	6.2	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.3
8	7.9	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.3
8	10	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
8	12.5	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
8	14.5	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
8	16.5	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
10	6.9	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.3
10	8.4	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.3
10	10	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.5
10	12.5	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.5
10	13	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.5
10	14.5	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.5
10	16.5	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.5
10	21	10.3	10.3	3.5	0.90±0.20	4.4	0.7MAX	±0.5
12.5	13.5	13	13	4.7	0.90±0.20	4.4	0.7MAX	±1.0
12.5	14.5	13	13	4.7	0.90±0.20	4.4	0.7MAX	±1.0
12.5	16.5	13	13	4.7	0.90±0.20	4.4	0.7MAX	±1.0
16	16.5	17	17	5.5	1.2±0.30	6.7	0.7±0.30	±1.0
16	21	17	17	5.5	1.2±0.30	6.7	0.7±0.30	±1.0
18	17	19	19	6.7	1.2±0.30	6.7	0.7±0.30	±1.0
18	21	19	19	6.7	1.2±0.30	6.7	0.7±0.30	±1.0

■ Frequency correction factor

Frequency (Hz)	50	120	1K	≧10K
coefficient	0.65	1.00	1.37	1.50

Product List

category	series	Features	Standard products	Miniaturized products	Long-life products	High temperature resistant products	low impedance products	AEC — Q200	Customized products	Rated Voltage Range (V)	Rated capacitance range (μF)	Operating temperature range (°C)	Lifespan (Hrs)	page number
Surface mount type	V4M	3.95mm LMAX Ultra-compact Product		●				●		6.3~100	1~220	-55~+105	1000	21
	V3MC	Ultra-high capacitance, low impedance, small size products					●	●		6.3~35	220~2700	-55~+105	2000	23
	V3M	Low impedance, thin, high capacitance products		●			●	●		6.3~100	10~2200	-55~+105	2000~5000	25
										160		-40~+105		
	VMM	5mm high thin product		●	●			●		6.3~100	0.47~4700	-55~+105	3000~8000	28
										160~500		-40~+105		
	VK7	7mm high small products		●	●			●		6.3~100	1.0~680	-55~+105	4000~6000	35
										160~400		-40~+105		
	VKO	Small size	●					●		10~100	0.47~10000	-55~+105	6000~8000	38
										160~500		-40~+105		
	VKM	Long lifespan miniaturized products		●	●			●		10~100	0.47~4700	-55~+105	7000~10000	45
										160~500		-40~+105		
	VKG	Long lifespan		●	●			●		10~100	0.47~4700	-55~+105	8000~12000	52
										160~500		-40~+105		
	VKL	High temperature resistant, long lifespan products		●	●	●		●		10~100	0.47~4700	-40~+125	2000~5000	59
										160~450		-25~+125		
	VKL(R)	High temperature resistance, low impedance, and high reliability products		●	●	●	●	●		10~50	47~3300	-55~+135	2000	63
	VKD	Customized products							●	Voltage requirements	Capacity requirements	Temperature requirements	Lifespan requirements	/
Radial lead type	L3M	Low impedance, thin, high capacitance products		●			●	●		6.3~100	10~2200	-55~+105	2000~5000	65
										160		-40~+105		
	LMM	thin products		●	●			●		6.3~100	0.47~4700	-55~+105	3000~8000	67
										160~500		-40~+105		
	LK7	7mm high ultra-compact product		●	●			●		6.3~400	1.0~680	-40~+105	5000~6000	72
	LK	Small size, high frequency, low impedance	●		●		●	●		10~120	0.47~10000	-55~+105	6000~8000	75
										160~500		-40~+105		
	KCX	Ultra-compact size, lightning-resistant, suitable for fast charging power supplies		●	●		●			400~500	4.7~270	-40~+105	2000~3000	83
	KCG NEW	High temperature resistance, long lifespan, high voltage, large capacity, and lightning protection.		●		●	●			400	10~120	-40~+105	115℃ 2000 105℃ 4000	86
	KCM NEW	Ultra-small size, high pressure resistance		●	●					400~450	8.2~180	-40~+105	3000	88
	LKF	Standard products, high frequency, low impedance	●		●		●	●		10~120	0.47~4700	-55~+105	7000~10000	91
										160~500		-40~+105		
	LKM	Long lifespan, miniaturized, high frequency, low impedance		●	●		●	●		10~120	0.47~4700	-55~+105	7000~10000	99
										160~500		-40~+105		
	LKG	Long lifespan, high frequency, low impedance		●	●		●	●		10~120	0.47~10000	-55~+105	8000~12000	107
										160~500		-40~+105		
	LKZ	Long lifespan, high frequency, low impedance		●	●		●	●		10~120	2.2~6800	-55~+105	12000~15000	115
										160~600		-40~+105		
	LLK	Ultra-long lifespan products	●		●		●	●		160~400	1.0~68	-40~+105	12000~20000	122
										450		-25~+105		
	LKX	Long-life pen type	●		●			●		35~100	12~1800	-55~+105	7000~12000	124
										160~450		-40~+105		
	LKL	High temperature resistant, long lifespan products		●	●	●	●	●		10~120	0.47~8200	-55~+130	2000~5000	128
										160~500		-25~+130		
	LKL(R)	High temperature resistant and high reliability products		●	●	●	●	●		10~100	10~12000	-55~+135	3000	133
	LKJ	Long lifespan, miniaturized products		●	●		●	●		6.3~100	0.47~15000	-55~+105	5000~10000	136
	LKD NEW	Small size, large capacity, long lifespan		●	●					400~600	100~560	-40~+105	8000	138
	LED NEW	High temperature resistant, long life LED-specific products			●	●		●		400~450	2.2~100	-25~+130	130℃ 2000 105℃ 10000	140
	LKE NEW	Long life, high frequency, low impedance, dedicated to motor frequency conversion			●		●	●		10~120	22~10000	-55~+105	10000	142
										160~250		-40~+105		

VMM

■ List of Standard Products

Voltage (V)	6.3		10		16		25		35		50	
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)
0.47											5×5.7	4
1.0											5×5.7	8
1.2											5×5.7	9
1.5											5×5.7	10
1.8											5×5.7	11
2.2											5×5.7	12
2.7											5×5.7	14
3.3											5×5.7	16
3.9											5×5.7	18
4.7											5×5.7	20
5.6											5×5.7	22
6.8											5×5.7	24
8.2											5×5.7	26
10	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	29
12											5×5.7	32
15	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	35
18											5×7.7	40
18											6.3×5.7	55
22	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	26	5×5.7	26	5×7.7	57
22											6.3×5.7	57
27											6.3×5.7	60
33	5×5.7	30	5×5.7	30	5×5.7	30	5×5.7	30	6.3×5.7	55	6.3×7.7	72
33											8×6.2	72
39	5×5.7	33	5×5.7	33	5×5.7	33	5×7.7	49	6.3×5.7	61	6.3×7.7	80
39											8×6.2	80
47	5×5.7	37	5×5.7	37	5×5.7	37	5×7.7	54	6.3×5.7	67	6.3×7.7	88
47											8×6.2	88
56	5×5.7	40	5×5.7	40	5×7.7	53	5×7.7	60	6.3×7.7	74	8×6.2	100
56					6.3×5.7	53			8×6.2	74		
68	5×5.7	45	5×5.7	45	5×7.7	58	6.3×5.7	100	6.3×7.7	105	8×7.9	120
68					6.3×5.7	58		100	8×6.2	105	10×6.9	120
82	5×5.7	50	6.3×5.7	71	5×7.7	64	6.3×7.7	115	6.3×7.7	116	8×7.9	140
82					6.3×5.7	64	8×6.2	115	8×6.2	116	10×6.9	140
100	5×5.7	55	6.3×5.7	78	6.3×5.7	70	8×6.2	160	8×7.9	160	8×7.9	150
100											10×6.9	150
120	5×5.7	61	6.3×5.7	85	6.3×5.7	77	6.3×7.7	180	8×7.9	180	10×8.4	180
120							8×6.2	180				
150	6.3×5.7	85	6.3×5.7	85	6.3×7.7	109	8×6.2	200	8×7.9	180	10×8.4	220
150					8×6.2	109			10×6.9	210		

VMM

■ List of Standard Products

Voltage (V)	6.3		10		16		25		35		50	
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)
180	6.3×5.7	94	6.3×7.7	94	8×6.2	120	8×7.9	170	10×8.4	225	10×10	310
180							10×6.9	225			8×12.5	310
220	6.3×5.7	103	6.3×7.7	103	8×6.2	132	10×6.9	250	10×8.4	315	10×12.5	340
270	6.3×7.7	123	6.3×7.7	163				250	10×8.4	350	10×12.5	375
270	8×6.2	123	8×6.2	163	8×7.9	180	10×8.4	310				
330	8×6.2	135	8×6.2	175					10×10	420	12.5×13.5	415
330	6.3×7.7	135			8×7.9	200	10×8.4	345			10×14.5	415
390	8×6.2	166	8×7.9	196	10×6.9	220			10×12.5	525	12.5×13.5	455
390			10×6.9	196			10×8.4	380				
470	8×7.9	200	8×7.9	210	10×8.4	295	10×10	490	10×13	570	12.5×13.5	500
470	10×6.9	200	10×6.9	210								
560	8×7.9	231	10×8.4	253	10×8.4	325	10×12.5	580	12.5×13.5	586	12.5×14.5	550
560	10×6.9	231										
680	8×7.9	254	10×8.4	275	10×10	420	10×12.5	640	12.5×13.5	640	12.5×16.5	610
680	10×6.9	254										
820	10×8.4	304	10×8.4	345	10×10	465	12.5×13.5	710	12.5×14.5	710	16×16.5	680
820	8×10	304										
1000	10×8.4	362	10×10	450	10×12.5	580	12.5×13.5	780	12.5×16.5	780	16×16.5	680
1000	8×10	362										
1200	8×12.5	430	10×12.5	540	10×13	600	12.5×13.5	860	12.5×16.5	850	18×17	750
1200	10×10	430										
1500	10×12.5	520	10×13	600	12.5×13.5	665	12.5×16.5	925	16×16.5	925	16×21	830
1800	10×12.5	520	12.5×13.5	730	12.5×13.5	730	12.5×16.5	1010	16×16.5	1010	18×21	910
2200	10×13	570	12.5×13.5	800	12.5×14.5	860	16×16.5	1100	18×17	1100		
2700	10×16.5	686	12.5×13.5	810	12.5×16.5	980	16×16.5	1230	18×21	1230		
2700	12.5×13.5	686										
3300	10×16.5	760	12.5×16.5	970	16×16.5	1130	18×17	1350				
3300	12.5×13.5	760										
3900	12.5×14.5	830	12.5×16.5	1060	16×16.5	1250	18×21	1480				
4700	12.5×16.5	910	16×16.5	1360	18×17	1580	18×21	1650				

VMM

■ List of Standard Products

Voltage (V)	63		80		100		160		200		250	
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)
0.47	5×5.7	4	5×5.7	4	5×5.7	4						
1.0	5×5.7	8	5×5.7	8	5×5.7	8	5×5.7	15	5×5.7	15	5×5.7	15
1.2	5×5.7	9	5×5.7	9	5×5.7	9	5×5.7	18	5×5.7	18	5×5.7	18
1.5	5×5.7	10	5×5.7	10	5×5.7	10	5×5.7	18	5×5.7	18	5×7.7	22
1.8	5×5.7	11	5×5.7	11	5×5.7	11	5×5.7	18	5×7.7	22	5×7.7	22
2.2	5×5.7	12	5×5.7	12	5×5.7	12	5×7.7	20	5×7.7	22	6.3×5.7	22
2.7	5×5.7	14	5×5.7	14	5×5.7	14	5×7.7	22	6.3×5.7	31	6.3×7.7	35
3.3	5×5.7	16	5×5.7	16	5×5.7	16	6.3×5.7	22	6.3×5.7	35	6.3×7.7	35
3.3											8×6.2	35
3.9	5×5.7	18	5×5.7	18	5×5.7	18	6.3×5.7	22	6.3×7.7	40	6.3×7.7	40
3.9									8×6.2	40	8×6.2	40
4.7	5×5.7	20	5×5.7	20	5×5.7	20	6.3×7.7	28	6.3×7.7	45	8×6.2	50
4.7							8×6.2	28	8×6.2	45		
5.6	5×5.7	22	5×5.7	22	5×7.7	22	6.3×7.7	40	8×6.2	50	8×7.9	55
5.6							8×6.2	40			10×6.9	55
6.8	5×5.7	24	5×5.7	24	5×7.7	24	8×6.2	45	8×7.9	65	8×7.9	65
6.8											10×6.9	65
8.2	5×5.7	26	5×7.7	26	6.3×5.7	26	8×6.2	51	8×7.9	65		
8.2									10×6.9	65	10×8.4	80
10	5×5.7	29	5×7.7	28	6.3×5.7	28	8×7.9	56	8×7.9	72		
10							10×6.9	56	10×6.9	72	10×8.4	95
12	5×7.7	45	6.3×5.7	31	6.3×7.7	31	8×7.9	62	8×10	90	10×8.4	105
12	6.3×5.7	45			8×6.2	31	10×6.9	62	10×8.4	90		
15	5×7.7	50	6.3×7.7	38	6.3×7.7	34	8×10	87	10×8.4	105	10×10	125
15	6.3×5.7	50	8×6.2	38	8×6.2	34	10×8.4	87				
18	6.3×5.7	55	6.3×7.7	44	8×6.2	44	10×8.4	95	10×10	125	10×12.5	140
18			8×6.2	44								
22	6.3×5.7	60	6.3×7.7	49	8×7.9	60	10×10	110	10×12.5	180	10×12.5	180
22			8×6.2	60	10×6.9	60						
27	6.3×7.7	65	8×6.2	65	8×7.9	78	10×12.5	150	10×13	225	10×14.5	225
27	8×6.2	65			10×6.9	78						
33	6.3×7.7	72	8×7.9	78	10×8.4	86	10×12.5	165	10×14.5	250	12.5×13.5	270
33	8×6.2	72	10×6.9	78								
39	8×6.2	80	8×7.9	86	10×8.4	110	10×13	185	12.5×13.5	300	12.5×14.5	300
39			10×6.9	86								
47	8×7.9	88	10×8.4	110	10×8.4	140	12.5×13.5	300	12.5×13.5	330	12.5×16.5	375
47	10×6.9	88										
56	8×7.9	98	10×8.4	140	10×10	170	12.5×13.5	330	12.5×14.5	340	12.5×16.5	375
56	10×6.9	98										

VMM

■ List of Standard Products

Voltage (V)	63		80		100		160		200		250	
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kH 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)
68	8×7.9	110	10×8.4	155	10×12.5	200	12.5×14.5	365	12.5×16.5	375	16×16.5	450
68	10×6.9	110										
82	10×8.4	155	10×10	180	10×13	250	12.5×16.5	440	16×16.5	450	16×16.5	450
100	10×8.4	180	10×10	200	12.5×13.5	310	12.5×16.5	440	16×16.5	480	18×17	500
120	10×10	200	10×12.5	250	12.5×13.5	320	16×16.5	525	18×17	575	16×21	540
150	10×12.5	250	12.5×13.5	310	12.5×13.5	320	18×17	630	16×21	575	18×21	670
180	10×12.5	275	12.5×13.5	320	12.5×16.5	390	18×17	630	18×21	690		
220	12.5×13.5	320	12.5×13.5	320	12.5×16.5	480	18×21	835				
270	12.5×13.5	350	12.5×14.5	390	16×16.5	530						
330	12.5×13.5	390	12.5×16.5	480	16×16.5	590						
390	12.5×16.5	440	16×16.5	530	18×17	700						
470	12.5×16.5	480	16×16.5	590	16×21	700						
560	16×16.5	550	18×17	700	18×21	850						
680	16×16.5	610	16×21	700								
820	18×17	730	18×21	850								
1000	18×17	750										
1200	16×21	830										
1500	18×21	910										

VKL

◆High temperature resistance, long lifespan, high frequency and high ripple current resistance, designed for high

◆2000~5000 hours at 125℃

◆Compliant with AEC-Q200 RoHS directive

◆Suitable for high-density, fully automated surface mount technology and high-temperature reflow soldering

■ Main technical parameters

project	characteristic
Operating Temperature Range	≦100V －40~+125℃；160~450V －25~+125℃
Nominal Voltage Range	10~450V
Capacity Tolerance	±20% (25±2℃ 120Hz)
Leakage Current (μA)	10~100WV I≦0.01CV or 3μA (whichever is greater) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken after 2 minutes
	160~450WV I≦0.02CV+10(μA) C: Nominal Capacity (μF) V: Rated Voltage (V) Readings taken over 2 minutes

Loss Tangent (25 ± 2° C 120Hz)

Rated voltage (V)	10	16	25	35	50	63	80
tg δ	0.28	0.24	0.20	0.16	0.14	0.14	0.12
Rated voltage (V)	100	160	200	250	400	450	
tg δ	0.12	0.15	0.15	0.15	0.20	0.20	

For nominal capacities exceeding 1000μF, the loss tangent increases by 0.02 for every additional 1000μF.

Temperature Characteristics (120Hz)

Rated voltage (V)	10	16	25	35	50	63	80
Impedance ratio Z(－40℃)/Z(20℃)	6	4	3	3	3	3	3
Rated voltage (V)	100	160	200	250	400	450	
Impedance ratio Z(－40℃)/Z(20℃)	3	5	5	5	7	7	

Durability

After applying the rated voltage for a specified time in a 125℃ oven, and then placing it at room temperature for 16 hours, the capacitor is tested at a test temperature of 25±2℃. The capacitor's performance should meet the following requirements.

Capacity change rate	10~100WV Within ±30% of the initial value			
	160~450WV Within ±20% of the initial value			
Loss tangent	10~100WV Within ±300% of the initial value			
	160~450WV Within ±200% of the initial value			
Leakage current	Within the specified value			
Load life	10~100WV		160~450WV	
	External dimensions	Load life	External dimensions	Load life
	ΦD=5、6.3	2000h	ΦD=5、6.3	2000h
	ΦD=8、10	3000h	ΦD=8	3000h
	ΦD≧12.5	5000h	ΦD≧10	5000h

High Temperature Storage

After being stored at 105℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements.

Capacity change rate	Within ±20% of the initial value
Loss tangent	Below 200% of the specified value
Leakage current	Below 200% of the specified value

Encoding rules

1	2	3

series	code
L3M	L3M
LMM	LMM
LK7	LK7
LK	OLK
KCX	KCX
KCG	KCG
KCM	KCM
LKF	LKF
LKM	LKM
LKG	LKG
LKZ	LKZ
LLK	LLK
LKX	LKX
LKL	LKL
LKL(R)	LKL(R)
LKJ	LKJ
LKD	LKD
LED	LED
LKE	LKE
V4M	V4M
V3MC	V3MC
V3M	V3M
VMM	VMM
VK7	VK7
VKO	VKO
VKM	VKM
VKG	VKG
VKL	VKL
VKL(R)	VKL(R)

4	5	6	7

Product diameter	code	Product Height	code
3.5	F	3.95	039
3.55	W	4.5	045
4	A	5	050
4.5	G	5.4	054
5	B	5.7	057
5.5	H	5.8	058
6.3	C	6.5	065
7	T	7	070
8	D	7.7	077
10	E	8	080
12.5	L	8.5	085
13	S	9	090
14.5	U	9.5	095
16	I	10	100
18	J	10.5	105
20	N	11	110
22	K	11.5	115
25	M	12	120
		12.5	125
		13	130
		13.5	135
		14	140
		14.5	145
		15	150
		16	160
		16.5	165
		17	170
		18	180
		19	190
		20	200
		21	210
		22	220
		23	230
		25	250
		28	280
		30	300
		31.5	315
		32	320
		35.5	355
		36	360
		40	400
		41.5	415
		45	450
		50	500

8	9

Rated voltage (V)	code
6.3	0J
10	1A
16	1C
20	1D
25	1E
27	1N
35	1V
40	1G
50	1H
63	1J
70	1L
80	1K
90	1F
100	2A
110	2R
120	2K
125	2B
130	1Q
140	2Q
160	2C
180	2M
200	2D
250	2E
270	2N
300	2S
315	2F
320	1U
330	2U
350	2V
375	2P
400	2G
420	2T
450	2W
480	2L
500	2H
550	2I
600	2J
630	2Y
650	2X

10	11	12

Capacitance (μF)	code
0.1	R10
0.22	R22
0.33	R33
0.47	R47
0.56	R56
0.68	R68
0.82	R82
1.0	1R0
2.2	2R2
3.3	3R3
3.9	3R9
4.7	4R7
5.6	5R6
6.8	6R8
8.2	8R2
10	100
12	120
15	150
22	220
33	330
47	470
56	560
68	680
82	820
100	101
120	121
150	151
180	181
220	221
330	331
470	471
560	561
680	681
820	821
1000	102
1500	152
2200	222
3300	332
4700	472
6800	682
10000	103
22000	223
33000	333

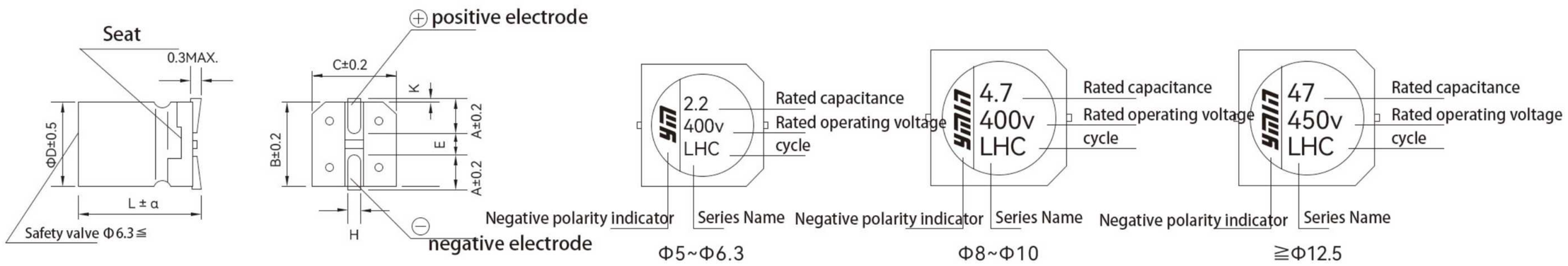
13

Capacity range	code
±20%	M
±10%	K
0%~+10%	R
0%~-10%	T
-10%~+20%	V
-20%~+5%	L
-10%~+5%	G
-10%~+15%	H
0%~+40%	I
±15%	J
-20%~+50%	A
-5%~-20%	B
-5%~+20%	E
-15%~+5%	C
-15%~-5%	D
0%~+20%	F
0%~+15%	N
-5%~+15%	W
-20%~+0%	S
-20%~+10%	P
0%~+5%	Q
-15%~+20%	u

14

Subsidiary code (domestic)	
O	Lead Wire 30F/35F
H	Lead Wire 33F/38F
F	Lead Wire 22F/27F
A	Straight Cut Lead Type A
B	Cut & Formed Lead Type B
C	Cut & Formed Lead Type C
D	Cut & Formed Lead Type D
E	Cut & Formed Lead Type E
Q	Cut & 90° Bent Lead Type F-A (Right)
P	Cut & 90° Bent Lead Type F-B (Left)
X	Cut & Formed Lead Type G
g	Cut & Double 90° Bent Lead Type H-A (Right)
f	Cut & Double 90° Bent Lead Type H-B (Left)
K	Taped Type A
J	Taped Type B
V	SMD
TM	Coated
CG	AEC-Q200 / Automotive Grade
TJ	Transparent
SLYP	Plastic Reel
Indicator Code (IND)	
2	Lead Wire 30F/35F
3	Lead Wire 33F/38F
4	Straight Cut Lead Type A
5	Cut & Formed Lead Type B
6	Cut & Formed Lead Type C
7	Cut & Formed Lead Type D
8	Cut & Formed Lead Type E
9	Lead Wire 22F/27F
M	Taped Type A
N	Taped Type B

■ Product dimension drawing (unit: mm)



ΦD	L	B	C	A	H	E	K	α
5	10	5.3	5.3	2.1	0.75±0.20	1.3	0.7MAX	±0.5
5	12	5.3	5.3	2.1	0.75±0.20	1.3	0.7MAX	±0.5
6.3	10	6.6	6.6	2.6	0.75±0.20	1.8	0.7MAX	±0.5
6.3	12	6.6	6.6	2.6	0.75±0.20	1.8	0.7MAX	±0.5
8	10	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
8	12.5	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
8	14.5	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
8	16.5	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
8	20.5	8.3	8.3	3.0	0.90±0.20	3.1	0.7MAX	±0.5
10	10	10.3	10.3	3.5	0.90±0.20	4.6	0.7MAX	±0.5
10	13	10.3	10.3	3.5	0.90±0.20	4.6	0.7MAX	±0.5
10	14.5	10.3	10.3	3.5	0.90±0.20	4.6	0.7MAX	±0.5
10	16.5	10.3	10.3	3.5	0.90±0.20	4.6	0.7MAX	±0.5
10	21	10.3	10.3	3.5	0.90±0.20	4.6	0.7MAX	±0.5
12.5	13.5	13.0	13.0	4.7	0.90±0.30	4.4	0.7MAX	±1.0
12.5	14.5	13.0	13.0	4.7	0.90±0.30	4.4	0.7MAX	±1.0
12.5	16.5	13.0	13.0	4.7	0.90±0.30	4.4	0.7MAX	±1.0
12.5	21	13.0	13.0	4.7	0.90±0.30	4.4	0.7MAX	±1.0
16	16.5	17.0	17.0	5.5	1.20±0.30	6.7	0.7±0.30	±1.0
16	21	17.0	17.0	5.5	1.20±0.30	6.7	0.7±0.30	±1.0
18	16.5	19.0	19.0	6.7	1.20±0.30	6.7	0.7±0.30	±1.0
18	21	19.0	19.0	6.7	1.20±0.30	6.7	0.7±0.30	±1.0

■ Frequency correction factor

Frequency (Hz)		120	1K	10K	100K≦
coefficient	0.47~8.2	0.42	0.60	0.80	1.00
	10~39	0.45	0.75	0.90	1.00
	47~180	0.50	0.80	0.95	1.00
	220以上	0.60	0.85	0.95	1.00

VKL

■ List of Standard Products

Voltage (V)	80		100		160		200		250		400	
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)
0.47					6.3×10	48	6.3×10	68	6.3×10	68	6.3×10	54
1.0	5×10	32	5×10	32	6.3×10	48	6.3×10	68	6.3×10	68	6.3×10	54
1.5	5×10	32	5×10	32	6.3×10	48	6.3×10	68	6.3×10	68	6.3×10	68
1.8	5×10	32	5×10	32	6.3×10	68	6.3×10	72	6.3×10	81	6.3×10	68
2.2	5×10	45	5×10	45	6.3×10	68	6.3×10	81	6.3×10	81	6.3×10	80
2.7	5×10	45	5×10	45	6.3×10	68	6.3×10	81	6.3×10	81	8×10	100
3.3	5×10	63	5×10	63	6.3×10	72	6.3×10	85	6.3×10	90	8×10	110
3.9	5×10	63	5×10	63	6.3×10	72	6.3×10	90	6.3×12	110	8×12.5	125
4.7	5×10	90	5×10	90	6.3×10	81	6.3×12	110	6.3×12	110	8×12.5	125
4.7									8×10	90	10×10	125
5.6	5×10	90	6.3×10	90	6.3×10	85	8×10	117	8×10	117	8×14.5	130
6.8	5×10	90	6.3×10	90	6.3×12	90	8×10	117	8×10	162	10×13	208
8.2	5×10	90	6.3×10	90	8×10	107	8×12.5	165	8×12.5	165	8×20.5	250
8.2							10×10	160	10×10	160	10×14.5	260
10	6.3×10	108	6.3×10	180	8×10	107	8×14.5	210	8×14.5	210	10×16.5	330
10							10×10	160			12.5×14.5	360
15	6.3×10	180	6.3×12	210	8×12.5	117	8×16.5	210	8×16.5	210	12.5×16.5	410
15			8×10	180								
22	6.3×12	210	8×12.5	230	8×14.5	160	8×20.5	250	8×20.5	250	12.5×21	500
22	8×10	180	10×10	198	10×13	178	10×14.5	250	10×14.5	250		
33	6.3×12	230	8×12.5	280	10×14.5	255	10×21	340	10×21	340	16×21	730
33	8×10	198	10×10	280								
47	8×12.5	280	10×13	350	10×21	400	12.5×21	400	12.5×21	400	18×21	850
47	10×10	280										
56	10×10	280	10×13	350	12.5×16.5	608	12.5×21	500	12.5×21	500		
100	10×16.5	550	12.5×16.5	700	16×21	825	16×21	800	18×21	800		
220	12.5×21	890	16×21	1155								
330	12.5×21	1050	18×21	1400								
470	18×21	1400										

Voltage (V)	450		Voltage (V)	450		Voltage (V)	450		Voltage (V)	450	
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	project / Capacity (μF)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	project / Capacity (μF)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	project / Capacity (μF)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)
0.47	6.3×10	60	**2.7**	8×10	120	**6.8**	10×14.5	260	**15**	12.5×16.5	410
1.0	6.3×10	60	**3.3**	8×12.5	120	**8.2**	8×20.5	260	**22**	12.5×21	500
1.5	6.3×10	60	**3.9**	8×12.5	130	**8.2**	10×14.5	260	**33**	16×21	820
1.8	8×10	84	**4.7**	8×14.5	130	**10**	10×16.5	320	**47**	18×21	980
2.2	8×10	90	**5.6**	10×13	140	**10**	12.5×14.5	360			

VKL

■ List of Standard Products

Voltage (V)	10		16		25		35		50		63	
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Ripple current (mA r.m.s / 105℃ 120Hz)
1.0									5×10	32	5×10	32
1.5									5×10	32	5×10	32
1.8									5×10	32	5×10	32
2.2									5×10	45	5×10	45
2.7									5×10	45	5×10	45
3.3									5×10	63	5×10	63
3.9									5×10	63	5×10	63
4.7									5×10	90	5×10	90
5.6									5×10	90	5×10	90
6.8									5×10	94	5×10	94
8.2									5×10	98	5×10	98
10	5×10	72	5×10	72	5×10	72	5×10	81	5×10	98	5×10	108
15									5×10	108	5×10	118
22	5×10	72	5×10	72	5×10	72	5×10	81	6.3×10	170	6.3×10	180
33									6.3×10	245	6.3×12	265
33											8×10	280
47	5×10	114	5×10	114	5×10	114	6.3×10	240	6.3×12	320	8×10	420
47									8×10	330		
56									8×10	330	8×10	420
100	5×10	114	6.3×10	200	6.3×10	240	8×10	324	8×12.5	500	8×16.5	590
100									10×10	550	10×13	590
150	6.3×10	162	6.3×10	240	8×10	324	8×12.5	380				
150	6.3×10	200					10×10	324				
220	6.3×10	324	8×10	324	8×12.5	380	8×12.5	650	10×16.5	940	10×21	860
330	6.3×12	380	8×10	380	8×14.5	650	10×13	850	12.5×16.5	980	12.5×21	1050
330	8×10	324			10×13	650						
470	8×10	620	8×12.5	650	10×13	850	10×16.5	1000	12.5×21	1050	16×21	1570
1000	10×13	1000	10×16.5	1000	10×21	1155	12.5×21	1500	18×21	2290		
2200	12.5×16.5	1500	12.5×21	1500	18×21	2400						
3300	12.5×21	1780	18×21	2400								
4700	18×21	2400										

LK

◆ Compact size, withstands high frequency and high ripple current, high frequency and low impedance, designed for high-end power supplies

◆ 6000~8000 hours at 105℃

◆ Compliant with AEC-Q200 RoHS directive

■ Main technical parameters

project	characteristic
Operating Temperature Range	≦120V －55~+105℃；160~500V －40~+105℃
Nominal Voltage Range	10~500V
Capacity Tolerance	±20% (25±2℃ 120Hz)
Leakage Current (μA)	10~120WV I≦0.01CV or 3μA (whichever is greater) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken after 2 minutes
	160~500WV I≦0.02CV+10(μA) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken over 2 minutes

Loss Tangent (25 ± 2° C 120Hz)

Rated voltage (V)	10	16	25	35	50	63	80	100
tg δ	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.09
Rated voltage (V)	120	160	200	250	350	400	450	500
tg δ	0.09	0.09	0.08	0.08	0.10	0.10	0.12	0.20

For nominal capacities exceeding 1000μF, the loss tangent increases by 0.02 for every additional 1000μF.

Temperature Characteristics (120Hz)

Rated voltage (V)	10	16	25	35	50	63	80	100
Impedance ratio Z(－40℃)/Z(20℃)	6	4	3	3	3	3	3	3
Rated voltage (V)	120	160	200	250	350	400	450	500
Impedance ratio Z(－40℃)/Z(20℃)	5	5	5	5	7	7	7	8

Durability

After being stored at 105℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements.

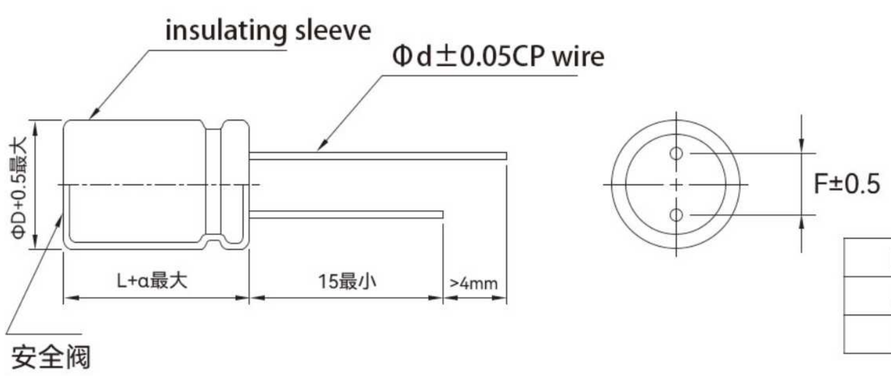
Capacity change rate	Within ±20% of the initial value	
Loss tangent	Below 200% of the specified value	
Leakage current	Below the specified value	
Load life	≦Φ5~Φ6.3	6000h
	≧Φ8	8000h

High Temperature Storage

After being stored at 105℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements.

Capacity change rate	Within ±20% of the initial value
Loss tangent	Below 200% of the specified value
Leakage current	Below 200% of the specified value

■ Product dimension drawing (unit: mm)



L=9	α=1.0
L≦16	α=1.5
L > 16	α=2.0

D	5	6.3	8	10	12.5~13	12.5~13(高度≥30)	14.5	16	18
d	0.5	0.5	0.6	0.6	0.7	0.6	0.8	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	5.0	7.5	7.5	7.5

备注：≧Φ6.3 产品有安全阀

■ Ripple current compensation coefficient

① Frequency correction factor

Frequency (Hz)	50	120	1K	10K~50K	100K
Correction Factor	0.40	0.50	0.80	0.90	1.00

② Temperature correction factor

Ambient temperature (° C)	50℃	70℃	85℃	105℃
Correction factor	2.1	1.8	1.4	1.0

LK

■ List of Standard Products

Voltage (V)	10			16			25			35		
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)
10	5×9	1.10	55	5×9	1.10	70	5×9	1.10	90	5×9	1.60	100
15	5×9	1.10	75	5×9	1.10	90	5×9	1.10	110	5×9	1.10	120
22	5×9	0.42	90	5×9	0.42	110	5×9	1.10	120	5×9	1.10	160
33	5×9	0.42	105	5×9	0.42	120	5×9	0.42	150	5×9	0.42	215
39	5×9	0.42	135	5×9	0.42	150	5×9	0.42	180	5×9	0.42	215
47	5×9	0.28	142	5×9	0.28	160	5×9	0.28	210	5×11	0.38	310
56	5×9	0.28	150	5×9	0.28	170	5×9	0.28	290	5×11	0.38	310
68	5×9	0.28	160	5×9	0.28	180	5×11	0.25	310	6.3×9	0.36	390
82	5×9	0.28	170	5×9	0.28	210	5×11	0.25	310	6.3×9	0.36	390
100	5×9	0.28	180	5×9	0.28	290	5×11	0.25	310	6.3×11	0.17	404
100										8×9	0.17	441
120	5×9	0.28	210	5×11	0.25	310	6.3×9	0.25	390	8×9	0.17	441
150	5×9	0.28	290	6.3×9	0.25	390	6.3×11	0.17	404	8×11.5	0.13	830
150							8×9	0.17	441	10×9	0.13	765
180	5×11	0.28	290	6.3×9	0.25	390	6.3×11	0.17	404	8×11.5	0.13	830
180							8×9	0.17	441	10×9	0.13	765
220	5×11	0.25	310	6.3×11	0.17	404	6.3×11	0.17	404	8×11.5	0.13	830
220				8×9	0.17	441	8×9	0.17	441	10×9	0.13	765
270	6.3×9	0.25	390	6.3×11	0.17	404	8×11.5	0.10	830	8×16	0.10	1150
270				8×9	0.17	441	10×9	0.10	765	10×12.5	0.10	1150
330	6.3×11	0.17	404	6.3×11	0.17	650	8×11.5	0.10	830	8×16	0.10	1170
330	8×9	0.17	441	8×9	0.17	765	10×9	0.10	765	10×12.5	0.10	1150
390	6.3×11	0.17	650	8×11.5	0.10	830	8×14	0.12	1150	8×20	0.0505	1350
390	8×9	0.17	765	10×9	0.10	765	10×12.5	0.10	1150	10×16	0.0505	1550
470	6.3×11	0.17	650	8×11.5	0.10	830	8×16	0.10	1170	8×20	0.0505	1350
470	8×9	0.17	765	10×9	0.10	765	10×12.5	0.10	1150	10×16	0.0505	1550
560	8×11.5	0.10	830	8×11.5	0.10	830	8×20	0.0505	1350	10×16	0.0420	1550
560	10×9	0.10	765	10×9	0.10	765	10×12.5	0.10	1150	12.5×14	0.0500	1808
680	8×11.5	0.10	830	8×16	0.10	1125	8×20	0.0505	1350	10×20	0.0420	1590
680	10×9	0.10	765	10×12.5	0.13	1150	10×16	0.0505	1550	12.5×16	0.0500	1910
820	8×11.5	0.10	830	8×20	0.0505	1350	10×16	0.0505	1550	10×20	0.0420	1590
820				10×14	0.0805	1350	12.5×14	0.0600	1808	12.5×16	0.0500	1910
1000	8×16	0.10	1125	8×20	0.0505	1350	10×20	0.0505	1808	12.5×20	0.0300	2250
1000	10×12.5	0.10	1150	10×14	0.0805	1350	12.5×14	0.0600	1808			
1200	8×16	0.10	1125	10×16	0.0505	1550	10×23	0.0500	2050	10×27	0.0300	2220
1200	10×14	0.0805	1350	12.5×14	0.0600	1808	12.5×16	0.0500	1910	12.5×20	0.0300	2250
1500	8×20	0.0805	1350	10×20	0.0420	1590	12.5×20	0.0300	2250	12.5×25	0.0270	2620
1500	10×14	0.0805	1350	12.5×14	0.0600	1808				16×20	0.0270	2925
1800	10×20	0.0620	1590	10×20	0.0420	1590	12.5×20	0.0300	2250	12.5×35	0.0210	3215

LKG

◆Long lifespan, high frequency and high ripple current resistant, high frequency and low impedance, dedicated power supply product

◆8000~12000 hours at 105℃

◆Compliant with AEC-Q200 RoHS directive

■ Main technical parameters

project	characteristic
Operating Temperature Range	≦120V －55~+105℃；160~500V －40~+105℃
Nominal Voltage Range	10~500V
Capacity Tolerance	±20% (25±2℃ 120Hz)
Leakage Current (μA)	10~120WV I≦0.01CV or 3μA (whichever is greater) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken after 2 minutes
	160~500WV I≦0.02CV+10(μA) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken over 2 minutes

Loss Tangent (25 ± 2° C 120Hz)

Rated voltage (V)	10	16	25	35	50	63	80	100
tg δ	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.09
Rated voltage (V)	120	160	200	250	350	400	450	500
tg δ	0.09	0.09	0.08	0.08	0.10	0.10	0.12	0.20

For nominal capacities exceeding 1000μF, the loss tangent increases by 0.02 for every additional 1000μF.

Temperature Characteristics (120Hz)

Rated voltage (V)	10	16	25	35	50	63	80	100
Impedance ratio Z(－40℃)/Z(20℃)	6	4	3	3	3	3	3	3
Rated voltage (V)	120	160	200	250	350	400	450	500
Impedance ratio Z(－40℃)/Z(20℃)	5	5	5	5	7	7	7	8

Durability

After being stored at 105℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements.

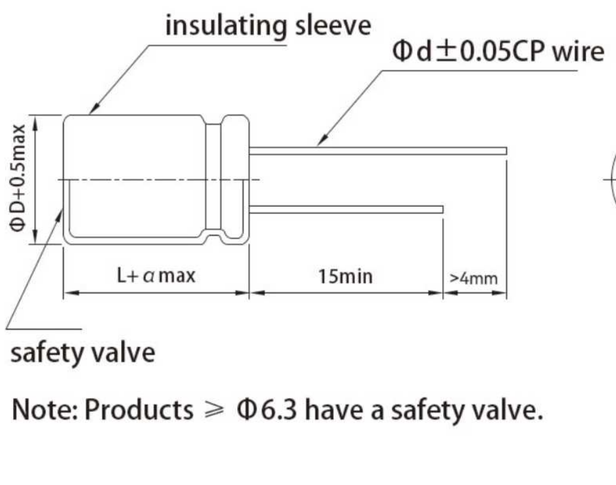
Capacity change rate	Within ±20% of the initial value	
Loss tangent	Below 200% of the specified value	
Leakage current	Below the specified value	
Load life	10~120WV	Φ5 8000h
		Φ6.3 10000h
		≧Φ8 12000h
	160~500WV	Φ5~Φ6.3 10000h ≧Φ8 12000h

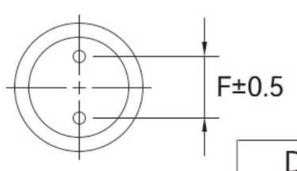
High Temperature Storage

After being stored at 105℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements.

Capacity change rate	Within ±20% of the initial value
Loss tangent	Below 200% of the specified value
Leakage current	Below 200% of the specified value

■ Product dimension drawing (unit: mm)





L=9	α=1.0
L≦16	α=1.5
L＞16	α=2.0

D	5	6.3	8	10	12.5~13	12.5~13(h≧30)	14.5	16	18
d	0.5	0.5	0.6	0.6	0.7	0.6	0.8	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	5.0	7.5	7.5	7.5

Note: Products ≧ Φ6.3 have a safety valve.

■ Ripple current compensation coefficient

① Frequency correction factor

Frequency (Hz)	50	120	1K	10K~50K	100K
Correction Factor	0.40	0.50	0.80	0.90	1.00

② Temperature correction factor

Ambient temperature (° C)	50℃	70℃	85℃	105℃
Correction factor	2.1	1.8	1.4	1.0

LKG

■ List of Standard Products

Voltage (V)	10			16			25			35		
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)
10	5×9	1.05	57	5×9	1.05	72	5×9	1.05	92	5×9	1.50	102
15	5×9	1.05	77	5×9	1.05	92	5×9	1.05	112	5×9	1.50	122
22	5×9	0.40	92	5×9	0.4	112	5×9	0.40	122	5×9	1.50	170
33	5×9	0.40	107	5×9	0.4	122	5×9	0.40	152	5×9	0.40	220
39	5×9	0.40	137	5×9	0.4	152	5×9	0.40	182	5×11	0.36	240
47	5×9	0.25	144	5×9	0.25	162	5×9	0.25	212	5×11	0.32	350
56	5×9	0.25	152	5×9	0.25	172	5×9	0.25	320	6.3×9	0.32	495
68	5×9	0.25	162	5×9	0.25	182	5×11	0.23	350	6.3×11	0.260	550
68										8×9	0.260	580
82	5×9	0.25	172	5×9	0.25	212	6.3×9	0.20	550	6.3×11	0.250	550
82										8×9	0.250	580
100	5×9	0.25	182	5×11	0.23	350	6.3×9	0.20	550	6.3×11	0.250	550
100										8×9	0.250	580
120	5×9	0.25	320	5×11	0.23	550	6.3×11	0.0980	550	8×9	0.250	864
120							8×9	0.0980	580			
150	5×11	0.23	350	6.3×9	0.20	550	6.3×11	0.0980	550	8×11.5	0.0980	960
150							8×9	0.0980	580	10×9	0.0980	980
180	5×11	0.23	350	6.3×9	0.1600	550	8×9	0.0980	864	8×11.5	0.0980	960
180										10×9	0.0980	980
220	6.3×9	0.20	550	6.3×11	0.0980	550	8×11.5	0.0608	960	8×11.5	0.0980	1270
220				8×9	0.0980	580	10×9	0.0608	980			
270	6.3×9	0.1600	550	8×9	0.0980	580	8×11.5	0.0608	960	8×16	0.0700	1270
270							10×9	0.0608	980	10×12.5	0.0629	1330
330	6.3×11	0.0980	550	8×9	0.0980	864	8×14	0.0532	960	10×12.5	0.0629	1330
330	8×9	0.0980	580									
390	8×9	0.0980	580	8×11.5	0.0608	960	8×16	0.0485	1270	8×20	0.0550	1720
390				10×9	0.0608	980	10×12.5	0.0485	1270	10×16	0.0550	1850
470	8×9	0.0980	864	8×11.5	0.0608	960	10×12.5	0.0429	1330	10×16	0.0550	1850
470				10×9	0.0608	980				12.5×14	0.0550	1890
560	8×11.5	0.0608	960	8×16	0.0485	1270	8×20	0.0313	1530	10×20	0.0480	2250
560	10×9	0.0608	980	10×9	0.0485	1330	10×14	0.0313	1850	12.5×16	0.0480	2330
680	8×11.5	0.0608	960	8×16	0.0485	1270	10×16	0.0308	1850	10×23	0.0398	2330
680	10×9	0.0608	980	10×12.5	0.0429	1330				12.5×20	0.0350	2330
820	8×14	0.0585	1170	8×20	0.0313	1530	10×20	0.0280	2250	12.5×20	0.0280	2480
820	10×12.5	0.0608	1270	10×14	0.0313	1850	12.5×16	0.0350	2330			
1000	8×16	0.0485	1270	8×20	0.0313	1530	10×20	0.0280	2330	12.5×20	0.0280	2480
1000	10×12.5	0.0429	1330	10×16	0.0308	1850	12.5×16	0.0350	2330			
1200	8×20	0.0313	1530	10×16	0.0308	1960	12.5×20	0.0280	2480	12.5×25	0.0265	2900
1200	10×14	0.0308	1760							14.5×16	0.0580	1467

LKL(R)

■ List of Standard Products

Voltage (V)	10			16			25			35		
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)	Dimensions: ΦD×L (mm)	Impedance (Ωmax/100kHz 25±2℃)	Ripple current (mA r.m.s / 105℃ 120Hz)
100				6.3*9	4.95	240	6.3×9	4.95	240	8×9	4.95	324
150							8×9	4.95	324	8×11.5	3.96	380
150										10×9	3.85	324
220				8×9	4.95	324	8*11.5	3.96	380	8×11.5	2.75	650
330	8×9	3.85	324	8×9	3.96	380	8×14	0.31	650	10×12.5	0.28	850
330							10×12.5	0.31	650			
470	8×9	0.165	620	8×11.5	0.308	650	10×12.5	0.28	850	10×16	0.1265	1000
560												
680												
750												
820										16×16	0.060	1200
910												
910												
1000	10×12.5	0.1078	1000	10×16	0.187	1000	10×20	0.154	1150	12.5×20	0.044	1500
1000										16×16	0.057	1200
1100												
1200							16×16	0.045	1200	18×16	0.053	1400
1300												
1300												
1300												
1500							16×16	0.043	1200	16×20	0.045	1500
1500										18×16	0.040	1400
1600												
1600												
1800							16×16	0.040	1200	18×20	0.038	1580
2000										16×20	0.038	1500
2200	12.5×16	0.084	1500	12.5×20	0.114	1500	18×16	0.041	1400	12.5×30	0.036	2760
2200										18×20	0.038	1600
2300												
2400												
2700							16×20	0.040	1700	18×20	0.038	1700
2700										12.5×35	0.031	2890
3000										16×25	0.032	2740
3300	12.5×20	0.079	1780	12.5×25	0.0891	2400	16×20	0.038	1800	12.5×40	0.029	3160
3600							12.5×30	0.034	2760	16×30	0.028	3020
3900										18×25	0.031	2760
4300							18×20	0.041	1750	16×35	0.025	3150
4700							12.5×35	0.032	2850	18×30	0.028	3200
4700							16×25	0.034	2650			
5100							12.5×40	0.030	3200			
5600							16×30	0.031	2900	16×40	0.024	3540
6200							18×25	0.033	2720	18×35	0.024	3400
7500							16×35	0.030	3450	18×40	0.023	3750
7500							18×30	0.034	3280			
9100							16×40	0.023	3630			
10000							18×35	0.023	3600			
12000							18*40	0.022	3890			

LKL(R)

◆High temperature resistant, long lifespan, power supply specific product

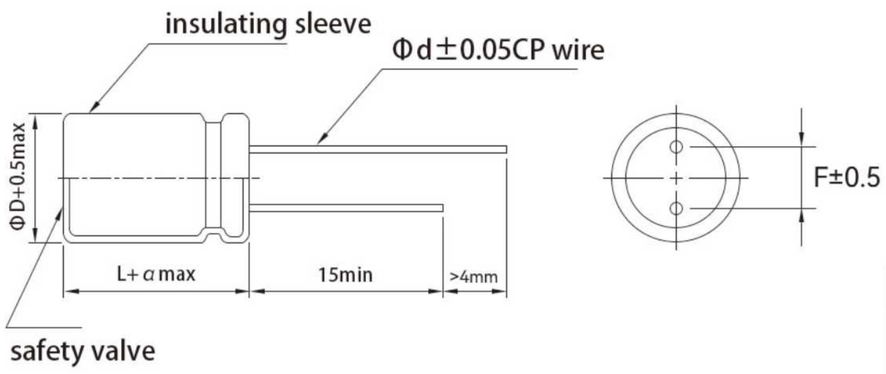
◆2000~5000 hours at 130℃

◆Compliant with AEC-Q200 RoHS directive

■ Main technical parameters

project	characteristic
Operating Temperature Range	－55~+135℃
Nominal Voltage Range	10~100V
Capacity Tolerance	±20% (25±2℃ 120Hz)
Leakage Current (μA)	10~100WV I≦0.01CV or 3μA (whichever is greater) C: Nominal capacitance (μF) V: Rated voltage (V) Readings taken after 2 minutes
Loss Tangent (25 ± 2° C 120Hz)	Rated voltage (V): 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 tg δ: 0.20 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.09 / 0.08 For nominal capacities exceeding 1000μF, the loss tangent increases by 0.02 for every additional 1000μF.
Temperature Characteristics (120Hz)	Rated voltage (V): 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 Impedance ratio Z(－40℃)/Z(20℃): 12 / 8 / 6 / 4 / 4 / 4 / 4 / 4
Durability	After being stored at 135℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements. Capacity change rate: Within ±30% of the initial value Loss tangent: Below 300% of the specified value Leakage current: Below the specified value Load life: 3000h
High temperature storage	After being stored at 105℃ for 1000 hours and then placed at room temperature for 16 hours for testing at a test temperature of 25±2℃, the capacitor performance should meet the following requirements. Capacity change rate: Within ±30% of the initial value Loss tangent: Below 300% of the specified value Leakage current: Below 200% of the specified value

■ Product dimension drawing (unit: mm)



Note: Products ⩾ Φ6.3 have a safety valve.

L=9	α=1.0
L≦16	α=1.5
L＞16	α=2.0

D	6.3	8	10	12.5~13	12.5~13(h⩾30)	14.5	16	18
d	0.5(0.45)	0.6(0.5)	0.6	0.7	0.6	0.8	0.8	0.8
F	2.5	3.5	5.0	5.0	5.0	7.5	7.5	7.5

■ Frequency correction factor

Frequency (Hz)	50	120	1K	≧10K
coefficient	0.35	0.50	0.83	1.00

CW3H

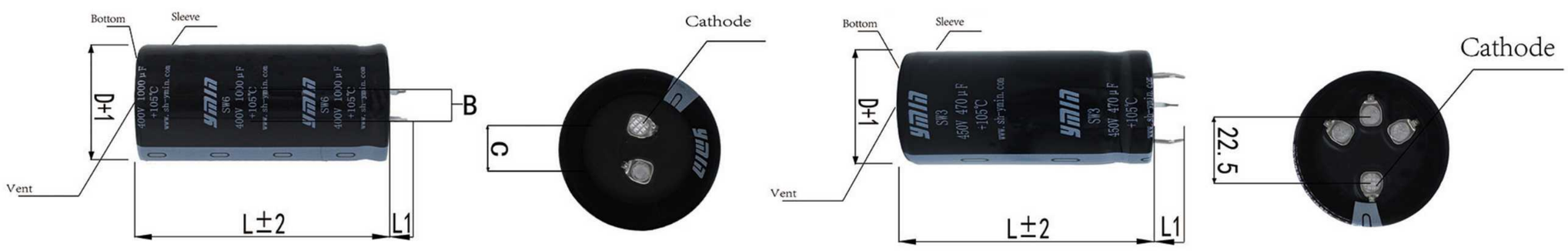
NEW

- ◆ High reliability, low ESR
- ◆ 105℃, 3000 hours
- ◆ Suitable for new energy photovoltaics and automotive electronics
- ◆ RoHS compliant

■ Main technical parameters

project	characteristic
Operating Temperature Range	−40 ~ +105℃
Rated Voltage Range	350 ~ 600V
Rated Capacitance Range	120 ~ 1000μF（20℃ 120Hz）
Rated Capacitance Tolerance	±20%
Leakage Current (mA)	≦$3\sqrt{CV}$(C: Nominal capacity; V: Rated voltage) or 0.94mA, whichever is smaller, test for 5 minutes at 20℃.
Maximum Loss (20° C)	0.20 (20℃ 120Hz)
Temperature Characteristics (120Hz)	C(-25℃)/C(+20℃)≧0.8 ; C(-40℃)/C(+20℃)≧0.65
Impedance Characteristics (120Hz)	Z(-25℃)/Z(+20℃)≦5 ; Z(-40℃)/Z(+20℃)≦8
Insulation Resistance	The insulation resistance between all terminals and the insulating sleeves and mounting straps on the container sleeve was measured with a DC 500V insulation resistance meter and was ≥100MΩ.
Insulation Voltage	An AC 2000V voltage was applied to all terminals and the insulating sleeves and mounting straps on the container sleeve for 1 minute, and no abnormalities were observed.
Durability	Under conditions of 105℃ and above the rated voltage with superimposed rated ripple current, after continuous loading of the rated voltage for 3000 hours and then returning to 20℃, the following requirements should be met. Capacity change rate (ΔC) ≦ ±20% of the initial value Loss value (tg δ) ≦ 200% of the initial specification value Leakage current (LC) ≦ Initial specification value
High Temperature No-Load Characteristics	After being stored at 105℃ for 1000 hours and then restored to 20℃, the following requirements should be met during the test. Capacity change rate (ΔC) ≦ ±15% of the initial value Loss value (tg δ) ≦ 150% of the initial specification value Leakage current (LC) ≦ Initial specification value Voltage pretreatment is required before the test: Apply the rated voltage across the capacitor through a resistor of approximately 1000Ω and maintain it for 1 hour. After pretreatment, discharge the capacitor through a resistor of approximately 1Ω/V. After complete discharge, place the capacitor at room temperature for 24 hours before starting the test.

■ Product dimension drawing (unit: mm)



ΦD	Φ22	Φ25	Φ30	Φ35	Φ40
B	11.6	11.8	11.8	11.8	12.25
C	8.4	10	10	10	10
L_1	6.5	6.5	6.5	6.5	6.5

■ Ripple current correction factor

Frequency compensation coefficient

Frequency	50Hz	120Hz	500Hz	1kHz	≧10kHz
Correction Factor	0.80	1.00	1.20	1.25	1.40

Temperature compensation coefficient

Temperature (° C)	40℃	60℃	85℃	105℃
Coefficient	2.7	2.2	1.7	1.0

CW3H

■ List of Standard Products

Operating voltage (V)	350(400)			400(450)		
project / Capacity (μF)	Dimensions: ΦD×L (mm)	Ripple current (105℃ 120Hz) Arms	ESR (Max,mΩ)	Dimensions: ΦD×L (mm)	Ripple current (105℃ 120Hz) Arms	ESR (Max,mΩ)
120	22×30	0.70	1380	22×30	0.65	1517
	25×25	0.70	1380	25×25	0.65	1517
	30×20	0.71	1380	30×20	0.68	1517
				35×20	0.68	1517
150	22×35	0.82	1104	22×35	0.76	1213
	25×30	0.82	1104	25×30	0.76	1213
	30×25	0.83	1104	30×25	0.77	1213
	35×20	0.83	1104	35×20	0.79	1213
180	22×40	0.94	919	22×40	0.87	1010
	25×30	0.94	919	25×30	0.87	1010
	30×25	0.94	919	30×25	0.87	1010
				35×25	0.87	1010
220	22×45	1.08	751	22×45	1.00	826
	25×35	1.08	751	25×40	1.00	826
	30×25	1.10	751	30×30	1.02	826
	35×25	1.10	751	35×25	1.02	826
270	22×50	1.23	617	25×45	1.17	673
	25×40	1.23	617	30×30	1.17	673
	30×30	1.23	617	35×25	1.17	673
	35×25	1.25	617			
330	25×45	1.37	504	25×50	1.34	550
	30×35	1.37	504	30×35	1.31	550
	35×30	1.37	504	35×30	1.31	550
390	25×50	1.53	426	25×55	1.51	465
	30×35	1.55	426	30×40	1.51	465
	35×30	1.55	426	35×35	1.51	465
470	25×60	1.81	353	30×45	1.66	385
	30×45	1.81	353	35×40	1.68	385
	35×35	1.81	353			
560	30×50	1.98	290	30×50	1.87	323
	35×40	1.98	290	35×45	1.87	323
680	30×60	2.37	239	35×50	2.23	265
	35×45	2.37	239			
820	35×50	2.56	198	35×55	2.49	219
1000	35×55	2.81	163	35×70	2.94	180