Shanghai YMIN Electronics Co., Ltd.

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APPLICATION MANUAL FOR DEDICATED CAPACITORS FOR UAVS

UAV SPECIAL CAPACITOR APPLICATION MANUAL

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Drone power management module

■ Development Trends and Technical Requirements

The development of drone power modules is moving towards higher energy density, higher reliability, greater intelligence, and faster charging. In the future, power modules will not only need to meet the basic power requirements of drones, but also provide greater technical support in areas such as system integration, intelligent management, and security.

1) High energy density, lightweight	To extend flight time and increase payload capacity, power modules require higher energy density and lighter weight.
2) High reliability, stability	
3) Intelligent management	Power modules must operate stably in various harsh environments, possessing characteristics such as shock resistance, interference resistance, and high-temperature resistance.
4) Fast charging, high energy efficiency conversion	
5) Integrated functions	Battery management systems (BMS) monitor battery status and charge/discharge processes to ensure safety and long lifespan.

■ Recommended Products

Liquid aluminum electrolytic capacitors

Lead-type double-layer supercapacitor

■ Liquid aluminum electrolytic capacitor

LKX series

- 105℃, 12000H lifespan / Voltage range: 35~450V
- / Long lifespan / High ripple current withstand / Slim design suitable for flat applications

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
420 (470)	150	16*40	0.15	350	1800	1270	LKXI4002T151MF	176

LKM series

- 105℃, 10000H rating / Voltage range: 10~500V
- Small size / Low impedance / High frequency, high ripple current withstand

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
100 (150)	100	8*20	0.09	140	1040	100	LKMD2002A101MF	500

LKE series

- 105℃, 10000H rating / Voltage range: 10~250V
- / Long lifespan / High frequency, low impedance

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
120 (170)	330	14.5*25	0.09	60	2040	396	LKEU2502K331MF	80

LLK series

- 105℃, 20000H lifespan / Voltage range: 160~450V Ultra-long
- lifespan / High frequency, low impedance

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
450 (500)	22	10*20	0.24	4500	250	496	LLKE2002W220MF	250

KCM series

- 105℃ 3000H rating / Voltage range: 400~500V
- Ultra-compact size / High ripple current withstand / Slim design suitable for flat applications

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
450 (500)	120	12.5*50	0.18	300	1000	820	KCML5002W121MF	100
450 (500)	100	14.5*25	0.18	160	1120	685	KCMU2502W101MF	80

■ Lead-type double-layer supercapacitor

SDB series

- 70℃ 1000H rating / Voltage range: 0~3V
- High energy / High power / High voltage / Long cycle life

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (F)	Product dimensions ΦD*L (mm)	ESR (mΩ)	LC (μA)	Product Part Number	Minimum Packaging Quantity
3.0 (3.15)	30	16*25	25	60	SDB3R0L3061625	60

Unmanned Aerial Vehicle Motor Drive System

■ Development Trends and Technical Requirements

The development trends of UAV motor drive systems mainly focus on high-efficiency energy conversion, integrated design, intelligent control, lightweight design, and high power density. With the continuous advancement of UAV technology, motor drive systems will be continuously optimized to meet increasingly complex application requirements. To improve flight performance, extend flight time, and reduce energy loss, motor drive systems will evolve towards greater efficiency, intelligence, and reliability.

1) High-efficiency energy conversion, low energy consumption	Improve system efficiency, reduce power loss, and extend flight time.
2) Integrated design	Motor control, speed monitoring, and thermal management are integrated into a single system, reducing weight and improving reliability.
3) Intelligent control	The system can automatically adjust motor output based on flight conditions, optimizing efficiency and performance.
4) High power density, lightweight	Increased power density reduces size and weight, providing greater thrust.
5) Anti-interference, stable	Improved electromagnetic interference (EMI) immunity and vibration resistance ensure stable operation in complex environments.

■ Recommended Products

Lead-type double-layer supercapacitor

Polymer solid aluminum electrolytic capacitor

Polymer Hybrid Power Aluminum Electrolytic Capacitor

■ Lead-type double-layer supercapacitor

SDL series

- 85℃ 1000H rating / Voltage range: 0~2.7V
- Low internal resistance / Wide temperature range / High energy density

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (F)	Product dimensions ΦD*L (mm)	ESR (mΩ)	LC (μA)	Product Part Number	Minimum Packaging Quantity
2.7 (2.85)	50	18*40	15	100	SDL2R7L5061840	45
2.7 (2.85)	100	18*55	14	120	SDL2R7L1071855	35

■ Polymer solid aluminum electrolytic capacitor

VPX series

- 105℃ 2000H rating / Voltage range: 6.3~100V
- Miniaturized / Low impedance / High capacitance / Large ripple current

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Mipimum Packaging Quantity
25 (28.8)	68	6.3*5.8	0.08	40	1900	500	VPXC0581E680MVTM	1200
25 (28.8)	82	6.3*7.7	0.08	30	2350	500	VPXC0771E820MVTM	900
25 (28.8)	100	6.3*7.7	0.08	30	2350	500	VPXC0771E101MVTM	900
35 (41)	100	6.3*5.8	0.12	60	1550	700	VPXC0581V101MVTM	1200
35 (41)	220	8*10.5	0.12	40	2800	1540	VPXD1051V221MVTM	500

■ Polymer hybrid aluminum electrolytic capacitor

VHM series

- 135℃, 4000H rating / Voltage range: 16~100V
- Miniaturized / Low impedance / High capacitance / Large ripple current

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
35 (41)	270	10*10.5	0.12	20	2800	94.5	VHME1051V271MVCG	500
50 (58)	100	10*10.5	0.10	25	2200	50	VHME1051H101MVCG	500
63 (73)	150	10*13	0.10	20	2400	94.5	VHME1301J151MVCG	400

Unmanned Aerial Vehicle Controller System

■ Development Trends and Technical Requirements

The drone controller, often referred to as the "brain" of a drone, plays a crucial role. It processes data from various sensors and the remote controller, making decisions based on this information to control the drone's flight behavior and mission execution.

1) Integration and miniaturization	Integrating flight control, navigation, and communication functions, it reduces weight and improves performance.
2) High reliability and high precision	It maintains stable operation in harsh environments, ensuring flight accuracy and safety. High-precision attitude control and stable flight performance are particularly crucial in complex flight missions.
3) High efficiency and low power consumption	As drones become increasingly reliant on battery life, the power consumption of the controller system has become a critical issue. The controller needs to be highly efficient while ensuring low power consumption to extend the drone's flight time.
4) Anti-interference and shock resistance	The controller needs strong anti-interference capabilities to effectively cope with various electromagnetic interferences and noises in the environment, maintaining flight stability. Simultaneously, the controller should be shock-resistant to prevent vibrations from affecting flight control accuracy.

■ Recommended Products

Polymer solid aluminum electrolytic capacitor

Surface mount double-layer supercapacitor

Multilayer polymer solid aluminum electrolytic capacitor

■ Polymer solid aluminum electrolytic capacitor

VPX series

- 105℃ 2000H rating / Voltage range: 6.3~100V
- Miniaturized / Low impedance / High capacitance / Large ripple current

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
6.3 (7.2)	330	6.3*5.8	0.08	18	2800	500	VPXC0580J331MVTM	1200
7.5 (8.6)	220	6.3*5.8	0.08	18	2800	500	VPXC0580L221MVTM	1200

■ Surface mount double-layer supercapacitor

SDV series

- 70℃ 1000H rating / Voltage range: 0~3V Wide temperature range
- / Meets 260° C reflow soldering requirements

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (F)	Product dimensions ΦD*L (mm)	ESR (mΩ)	LC (μA)	Product Part Number	Minimum Packaging Quantity
3.0 (3.15)	0.1	5*5.8	8000	2	SDV3R0V1040506	1200

■ Multilayer polymer solid aluminum electrolytic capacitor

MPD28 series

- 105℃ 2000H rating / Voltage range: 2~100V
- Low impedance / Ultra-thin miniaturization / High capacitance density / High ripple current withstand

■ Recommended Selection

Rated Voltage (Surge Voltage) (V)	Nominal capacity (μF)	Product dimensions ΦD*L (mm)	Tan (120HZ)	ESR (mΩ)	Rated ripple current (mA/100kHz)	LC (μA)	Product Part Number	Minimum Packaging Quantity
16 (18.4)	150	7.3*4.3*2.8	0.06	15	5600	240	MPD151M1CD28015R	3000
25 (28.8)	100	7.3*4.3*2.8	0.06	20	5100	250	MPD101M1ED28020R	3000
35 (40.3)	47	7.3*4.3*2.8	0.06	30	4300	165	MPD470M1VD28030R	3000