



# ELECTRIC DOUBLE LAYER CAPACITOR HYBRID ULTRA CAPACITOR



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◆ Company profile


GMCC ELECTRONIC TECHNOLOGY WUXI LTD(abbreviation GMCC) was established in July 2010. The team was formed by senior talents in the fields of materials, electrochemistry, engineering technology, etc. In 2013, it was recognized as the leading returnee entrepreneurial enterprise of Wuxi. In 2023 the company was 70% controlled by Sieyuan Electric (002028).

GMCC is mainly engaged in the development and manufacturing of electrochemistry, active powder materials for energy storage devices, dry electrodes, supercapacitors and energy storage batteries. With the technology R&D and manufacturing capability of the whole value chain from active material - dry electrode - supercapacitor cell & module - application solution , GMCC is at the forefront of the global supercapacity industry.

GMCC has around 300 employees at present, with R&D and technical management personnel accounting more than 40%. The production plant covers an area of 16,000 square meters, with annual production capacity exceeding 6 million supercapacitors. The planned new plant is around 192,000 square meters, with annual production capacity exceeding 30 million supercapacitors and 200,000 modules.

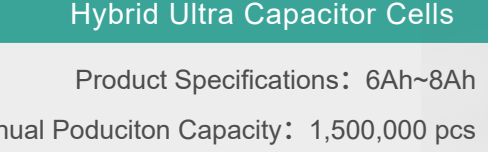


◆ BUSINESS SCOPE




**Electric Double Layer Capacitor Cells**

Product Specifications: 3.0V 220F-5000F  
Annual Poduciton Capacity: 4,500,000 pcs




**Hybrid Ultra Capacitor Cells**

Product Specifications: 6Ah~8Ah  
Annual Poduciton Capacity: 1,500,000 pcs



**Supercapacitor Module**

Product Specifications: 12V-48V;54V-522V  
Annual Poduciton Capacity: 200,000 units



**Supercapacitor System**

Product Specifications: kW~MW level  
Annual Poduciton Capacity: On demand

- ▶ EDLC supercapacitor, also known as Electrical Double-Layer Capacitor, uses electrostatic polarisation of an electrolytic solution to store energy. Although it is an electrochemical device, its energy storage mechanism does not involve a chemical reaction. This mechanism is highly reversible, so supercapacitors can be charged/discharged up to one million times.
- ▶ HUC hybrid supercapacitor combines the science of EDLC supercapacitors and lithium-ion batteries, combining both energy density and power density with excellent low-temperature performance, long life and safety.
- ▶ Supercapacitor module consists of EDLC or HUC supercapacitor monoblocks connected in series and parallel by wave soldering/laser welding/nut fastening, etc. It is equipped with self-developed CMS supercapacitor management system, which has the characteristics of high power charging and discharging capability, low internal resistance, short charging and discharging time, and long service life.



2024

- ◎ State grid tibet jiamu station SSC project
- ◎ Hebei guyuan lightning river reservoir SSC project.
- ◎ Shandong hybrid energy storage project.
- ◎ Spanish grid energy storage project.
- ◎ Multiple projects nominated by domestic and international OEMs.
- ◎ Yimin thermal power plant energy storage frequency regulation project

2023

- ◎ Sieyuan Electric Co.,Ltd holdings 70%
- ◎ Received multiple RFI& RFQ for vehicle projects.

2022

- ◎ Wuxi gaogang primary frequency control project.
- ◎ Dutch power grid 50mw primary frequency regulation project.
- ◎ Developed 35/46/60 series vehicle grade EDLC products and formed a large product matrix, with 5 million units delivery in total.

2021

- ◎ Nominated active stabilizer bars, electrical voltage stabilization and micro-hybrid EDLC projects for multiple vehicle applications.

2020

- ◎ Nanjing huqiao substation 500kw primary frequency control project.
- ◎ UK national grid inertia monitoring project 10mw.
- ◎ 12V HUC backup power project fixed-point.
- ◎ Nominated EMB electric braking project for commercial vehicle.

2019

- ◎ Mass production of 12V start-up power project for PHEV.
- ◎ Mass production of 12V start-up power project for fuel vehicle.
- ◎ Nominated 48V active stabilizer bar project.

2017

- ◎ Nominated by OEM for a vehicle model - entering the automotive industry

2016

- ◎ Zhangbei Distributed Photovoltaic Virtual Synchronous Machine Project

2012

- ◎ Successful development of dry electrode
- ◎ Preliminary completion of IP layout

2010

- ◎ GMCC Establishment



## ◆ PATENT



Invention Patent **48**      Utility Model Patent **57**      Design Patent **15**

## ◆ TESTING REPORT



## ◆ CERTIFICATE



IATF 16949      ISO 9001      ISO 14001      ISO 45001      Intellectual Property      D-U-N-S Certified

## ◆ R&D CAPABILITY

► GMCC is the leading enterprise in China to realize the industrialization of dry electrode, first in the world to release 3.0V series supercapacitor, and has applied for more than 100 patents for invention and utility model.

► **Electrochemical R&D center:** Material R&D and electrochemical laboratories are equipped with experimental capabilities such as material synthesis, physical and chemical characterization, high-current testing, while the Reliability Test Center is equipped with experimental capabilities of cell and module such as electrical performance testing, mechanical environment testing, climatic environment testing, and safety testing.

► **Supercomputing center:** The Supercomputing Center of Siyuan Electric Co., Ltd. is equipped with mechanical simulation, thermal design simulation, electromagnetic and insulation simulation, electromagnetic compatibility simulation, power system simulation, power artificial intelligence and other simulation capabilities, and is equipped with a CNAS-certified electromagnetic compatibility laboratory, a dark room for electric waves, an electrical performance laboratory and an environmental reliability laboratory, which can meet the testing needs related to automotive electronics and power equipment.



## ◆ HONOR



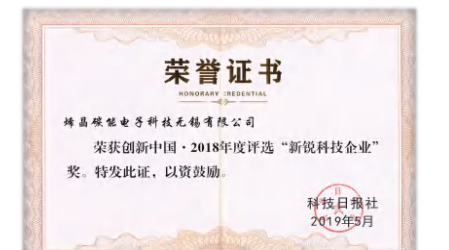
High tech enterprises



National level specialized and innovative "little giant" enterprise.



Enterprises that have won the "Lingxuan Award" (China's authoritative automotive parts award)



Honorary certificate





# EDLC SUPERCAPACITOR

## φ33-60mm 3.0V 310-5000F



### EDLC CHARACTERISTIC

- High purity dry electrode:** Intellectual property rights, good electrochemical stability, high energy density, eco-friendly and sustainabl;
- Maximum voltage 3.0V for cell:** Self-developed advanced electrochemical system;
- Long life:**
  - High temperature load life:** More than 1500h measured @ 3.0V/65°C. more than 14000h measured @ 2.7V/65°C;
  - Cycle life:** One million cycles measured @ 3.0V/25°C;
- Low internal resistance, strong vibration resistance:** Full tab hard connection and laser welding.  
The product has low DC internal resistance and passes the vehicle-grade vibration resistance verification;
- High safety:** There is no fire explosion and other hazards, eco-friendly, maintenance-free;
- Wide temperature range:** Operating temperature up to -40 °C ~ 65 °C, passed the harsh environmental and extreme working conditions verification test (summer standard, winter standard);
- Automotive-grade quality:** Meet the AEC-Q200 requirements, mass-produced and installed over 5 million 3.0V cells,already operating safely around the world;
- Multi-standard certification:** The products have passed GB/T34870, DL/T2080, QC/T 741 third-party type tests, and are available for domestic and international automotive and energy storage safety certificates, including UL, UN, etc.

### EDLC SUPERCAPACITOR CELL PARAMETER

TYPE	C33S-3R0-0310	C35S-3R0-0330	C35S-3R0-0360	C35S-3R0-0600
Rated Voltage (V)	3.0	3.0	3.0	3.0
Rated Capacitance (F)	310	330	360	600
ESR²(mΩ)	1.6	1.2	1.5	1.5
Max Current(A)	311	355	351	474
Charge And Discharge Rate	1204	1291	1170	948
Storage Energy(Wh)	0.39	0.41	0.45	0.75
Energy Density(Wh/kg)	6.2	5.8	6.3	7.2
Matched Impedance Power (KW/kg)	22.3	26.4	21.1	14.4
Weigth(g)	63	71	71	104
External Terminal	Solderable	Solderable	Solderable	Solderable
Diameter×Height (mm)	φ33×63	φ35×62.7	φ35×62.7	φ35×87.7

TYPE	C46W-3R0-0600	C46W-3R0-1200	C60W-3R0-1200	C60W-3R0-1500
Rated Voltage (V)	3.0	3.0	3.0	3.0
Rated Capacitance (F)	600	1200	1200	1500
ESR²(mΩ)	0.7	0.6	0.4	0.3
Max Current(A)	634	1047	1216	1550
Charge And Discharge Rate	1268	1047	1216	1240
Storage Energy(Wh)	0.75	1.5	1.5	1.88
Energy Density(Wh/kg)	5.4	7.5	5.6	6.9
Matched Impedance Power (KW/kg)	23	18.8	20.8	27.8
Weigth(g)	140	200	270	270
External Terminal	Weldable	Weldable	Weldable	Weldable
Diameter×Height (mm)	φ46×67.4	φ46×98.7	φ60×74.4	φ60×74.4

TYPE	C60W-3R0-3000	C60W-3P0-3000	C60W-3R0-3400	C60W-2R7-5000
Rated Voltage (V)	3.0	3.0	3.0	2.7
Rated Capacitance (F)	3000	3000	3400	5000
ESR²(mΩ)	0.23	0.15	0.24	0.25
Max Current(A)	2663	3103	2808	3000
Charge And Discharge Rate	1065	1241	991	800
Storage Energy(Wh)	3.75	3.75	4.25	5.1
Energy Density(Wh/kg)	7.4	7.5	8.3	9.9
Matched Impedance Power (KW/kg)	19.4	30	18.2	14.2
Weigth(g)	505	500	514	515
External Terminal	Weldable	Weldable	Weldable	Weldable
Diameter×Height (mm)	φ60×138	φ60×138	φ60×138	φ60×138



# HYBRID ULTRA CAPACITOR

φ46mm 4.2V 6-8Ah



## HUC CHARACTERISTIC

- Unique structure design: Full tab to hard connection, laser welding;
- Low temperature endurance -40℃: Capacitance enhanced low-temperature design;
- Discharge Rate >100C: Efficient carrier transport capacity;
- Life cycle >30000: Design of long-life chemical systems;
- Multi-standard certification: The products have passed DL/T2080, GB31485-2015 third-party type tests, and are availbale for domestic and international automotive and energy storage safety certification standards, including UL, UN, etc.

HYBRID ULTRA CAPACITOR CELL PARAMETER		
ITEM	C46W-4R2-0008	NOTE
Capacity(Ah)	8	1.0C discharge
Median Voltage(V)	3.7	
Internal Resistance(mΩ)	≤0.8	@25°C, 50%SOC, 1KHz AC
Charge Cut-off Voltage(V)	4.2	
Discharge Cut-off Voltage(V)	2.8	@25°C
Max Continuous Charge Current(A)	190	@25°C, 50%SOC, 30s
Max 10s Charge Current(A)	280	@25°C, 50%SOC
Max Continuous Discharge Current(A)	320	@25°C, 50%SOC, 30s
Max 10s Discharge Current(A)	460	@25°C, 50%SOC
Max 10s Discharge Power(W)	1350	@25°C, 50%SOC, 10s
Weight(g)	315	
Operating Temperature(°C)	Charge	-35~+55
	Discharge	-40~+60
Storage Temperature(°C)		-40~+60 50%SOC, Charge every 3 months
External Terminal	Weldable	
Height (mm)	95	
Diameter(mm)	φ46	

ITEM	C46W-4R2-0006	NOTE
Capacity(Ah)	6	1.0C discharge
Median Voltage(V)	3.7	
Internal Resistance(mΩ)	≤0.55	@25°C, 50%SOC, 1KHz AC
Energy Density(Wh/kg)	91.28	
Charge Cut-off Voltage(V)	4.2	
Discharge Cut-off Voltage(V)	2.8	@25°C
Max Continuous Charge Current(A)	170	@25°C, 50%SOC, 30s
Max 10s Charge Current(A)	240	@25°C, 50%SOC
Max Continuous Discharge Current(A)	250	@25°C, 50%SOC, 30s
Max 10s Discharge Current(A)	400	@25°C, 50%SOC
Max 10s Discharge Power(W)	1100	@25°C, 50%SOC, 10s
Weight(g)	290	
Operating Temperature(°C)	Charge	-35~+55
	Discharge	-40~+60
Storage Temperature(°C)		-40~+60 50%SOC, Charge every 3 months
External Terminal	Weldable	
Height (mm)	95	
Diameter(mm)	φ46	



# EDLC/HUC SUPERCAPACITOR MODULE



## ■ SUPERCAPACITOR MODULE CHARACTERISTIC

- GMCC module product series cover different voltages and capacities such as 12V/48V/96V/144V/174V/348V/522V, and are applied in passenger cars, commercial vehicles, grid energy storage and frequency regulation, energy recovery for rail transportation and heavy machinery, data centres, and power quality management for petrochemicals and other industrial industries;
- Modular design, drawer mounting, high maintainability;
- High product consistency, low capacity deviation;
- High safety: Utilizes UL94 V-0 flame-retardant grade materials;
- CMS precise control: completely self-developed CMS supercapacitor management system, which can be applied in high-voltage scenarios with self-diagnosis function to achieve product health status detection and alarm;
- Products can meet up to 5000 metres altitude requirements;
- Multi-standard certification: the products have passed third-party type test according to GB/T 34870, DL/T 2080, QC/T 741 standard;
- Module products have been operating safely for years.

### EDLC SUPERCAPACITOR MODULE PARAMETER

TYPE	CELL	TYPE	STRUCTURE	ESR (mΩ)	VOLTAGE (V)	CAPACITANCE (F)	SIZE (mm) L*W*H
18V 500F	60 3000F	EDLC	1P6S	≤2.1	18	500	418*68*179
48V 562F	60 3000F	EDLC	3P16S	≤1.8	48	562	446*597*157.2
54V 166~188F	60 3000~3400F	EDLC	1P18S	≤3-6	54	166~188	416.2*190*179.2
96V 46F	60 1500F	EDLC	1P32S	≤11.5	96	46	556*280*104
96V 93F	60 3000F	EDLC	1P32S	≤10.75	96	93	520*259*187.86
144V 25F	60 1200F	EDLC	1P48S	≤23	144	25	434*606*92
144V 62~70F	60 3000~3400F	EDLC	1P48S	≤10~16	144	62~70	446*610*156.8
174V 6F	35 360F	EDLC	1P58S	≤105	174	46	391*234*77
240V 7F	46 600F	EDLC	1P80S	≤67	240	7	435*581.5*82.5



### HYBRID ULTRA CAPACITOR MODULE PARAMETER

TYPE	CELL	TYPE	STRUCTURE	SIZE (mm) L*W*H
168V 16Ah	46 8Ah	HUC	2P40S	606*490*106
84V 32Ah	46 8Ah	HUC	4P20S	606*490*106
28V 8Ah	46 8Ah	HUC	1P7S	258*133*135.7
12V 4Ah	46 6Ah	HUC	1P4S	201*147*151






◆ APPLICATION FIELD OF SUPERCAPACITORS IN AUTOMOBILES


GMCC produces supercapacitors and hybrid supercapacitors with excellent and stable performance, which have outstanding performance in automotive, new power systems, and industrial fields.

GMCC has been nominated/mass produced more than 10 automobile brands (Audi, Volvo, Porsche, Lamborghini,Hong Qi, etc.), and a number of OEMs (Volkswagen AG, Stellantis, Geely, FAW, Tata), Nearly 7 million supercapacitor cells installed in vehicles for use.



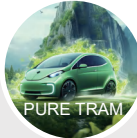
**TYPICAL APPLICATIONS**

- Parallel connection with batteries to improve vehicle's starting performance;
- Low temperature cold start;
- Auxiliary power reduces fuel consumption and reduces exhaust emissions;
- Reduce self starting noise;
- Reduce maintenance workload.



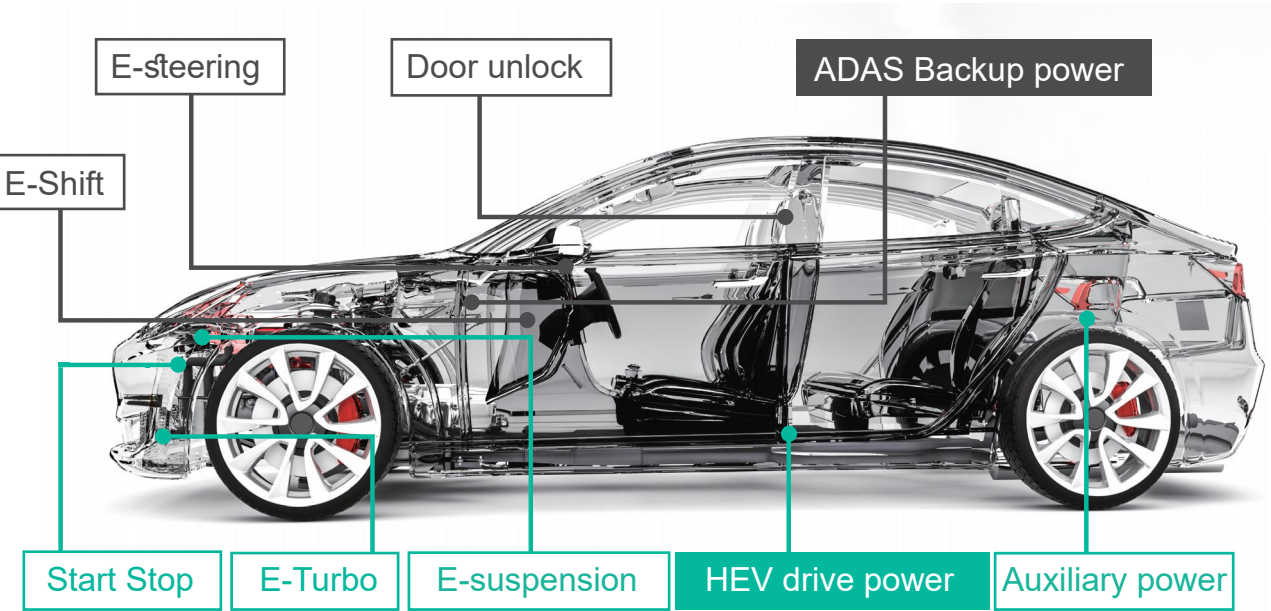
**TYPICAL APPLICATIONS**

- Improve the power efficiency of hybrid electricity and fuel cells;
- Suitable for frequent parking of vehicles;
- Improve vehicle acceleration performance;
- Drive power supply power support, and increase range;
- Provide high current discharge and braking energy recovery.



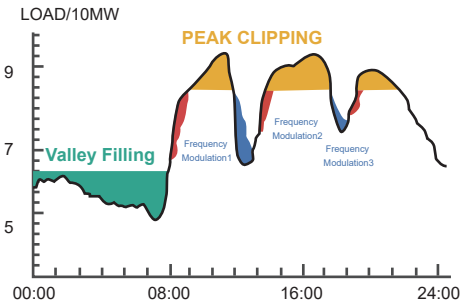
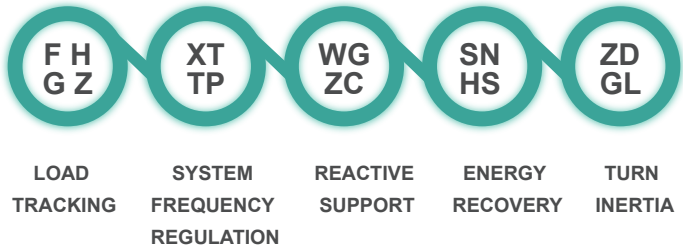
**TYPICAL APPLICATIONS**

- Provide assistance for motor startup;
- Absorb motor braking energy;
- Protect the battery from over discharge;
- Extend battery life.



◆ APPLICATION FIELDS OF NEW POWER SYSTEMS

Since 2016, the company's multiple energy storage modules have been applied in European commercial energy storage projects such as UK National Grid inertia detection, Netherlands National Grid Tennet primary frequency regulation, Nanjing Huqiao primary frequency regulation, Zhangbei distributed photovoltaic virtual synchronous device, Anhui Jinzhai DC microgrid, Datang Guyuan Shandian River windpower static synchronous condenser, Shandong Laizhou Tushan hybrid energy storage and other projects, with excellent product performance. In 2021, we successfully led the "Energy Storage and Smart Grid" National Key R&D Program of China: "key materials and technologies for low-cost hybrid supercapacitor and megawatt-level demonstrations."



NEW ENERGY GENERATION SIDE: Virtual synchronous power generation and energy storage system	POWER TRANSMISSION AND TRANSFORMATION SIDE: Super capacity energy storage system	USER SIDE: New generation supercapacitor voltage recovery device
It can smoothly connect solar and wind energy to the power grid, reducing the impact of their randomness, intermittency, and volatility on the power grid.	It can quickly and efficiently adjust the frequency changes caused by sudden imbalances between power generation and loads in transmission, distribution, and isolated power grids, millisecond level response, stability of frequency regions within seconds, reduction of harmonics, suppression of voltage flicker, and other impacts on the power grid	It can compensate the load side with an appropriate drop voltage within milliseconds, and effectively solve various transient power quality problems, transient voltage drop and rise, and interruption problems due to its characteristics of low static power consumption, long service life, high power, and strong impact resistance.

◆ APPLICATION CASES OF NEW POWER SYSTEMS



State Grid Xizang Jiamu Static Synchronous Condenser Project 96V 46.875F Supercapacitor Module (1120 sets)



◆ INDUSTRIAL APPLICATIONS

Supercapacitors have a wide range of applications in the industrial industry, including pulse power supply, energy recovery for special equipment at ports and docks, cold start power supply for special vehicles, energy storage modern trams, UAV backup power supply, etc. They can also be used to improve the power quality of high-end manufacturing equipment such as data centers, semiconductors, microchips, pharmaceuticals, and new energy sectors.



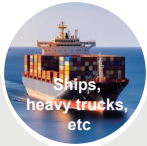
TYPICAL APPLICATIONS

- Regenerative braking energy return , oil saving.
- Compensating the output power of the generator set.
- Improving generator exhaust emissions.
- Extend the service life of generators and auxiliary systems.
- Emergency power supply.



TYPICAL APPLICATIONS

- Improving power quality.
- FM auxiliary services.
- Backup power supply, emergency support.
- Collaborate with energy storage to optimize system performance and cost.



TYPICAL APPLICATIONS

- Regenerative braking energy recovery, energy-saving.
- Reduce diesel generator configuration.
- Reduce device temperature.
- Extend the service life of equipment.
- Save operation and maintenance costs.

◆ APPLICATION CASES



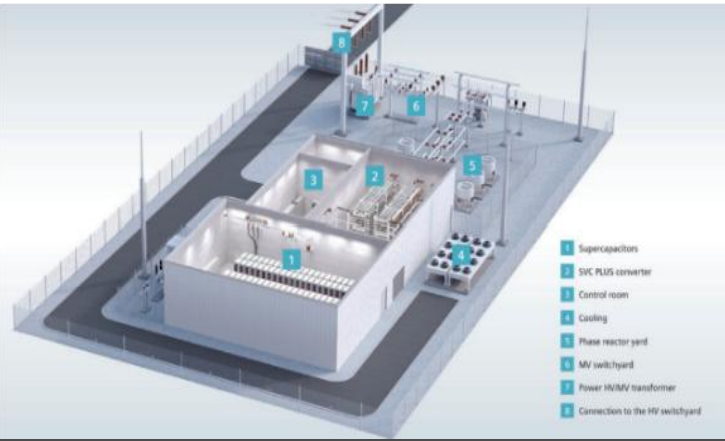
54V 178F EDLC Supercapacitor Module for Oilfield Workover Machine



Guyuan Shandian River windpower static synchronous condenser project was put into operation in April 2024



Nanjing Huqiao substation primary frequency regulation



Primary frequency regulation of the German-Dutch power grid



UK National Grid Inertia Detection



Anhui Jinzhai DC Microgrid Project