

LS ULTRACAPACITOR

New-generation Energy Storage Devices with
Great Power and Reliability



- | Company introduction

- | Ultracapacitor is...

 - | Comparison to the other energy storage

 - | Characteristics & Structure

 - | Good application with ultracapacitor

- | Product & Production

 - | Production line up of LS Materials

 - | Production Site of LS Materials

- | Ultracapacitor application (Actual cases)



Company profile








Spun off from LG Group in 2003

A leading company in the areas of industrial electricity and electronics, materials, machinery, components, and energy



Management Status

	No. of employees	13,000
	No. of affiliates	49
	Sales	USD 23 Billion
	Operating profit	USD 750 Million
	Total assets	USD 22 Billion

(As of 2020, excluding overseas subsidiaries)



Established to enhance global competitiveness and expertise in the ultracapacitor business

LS Ultracapacitor

Global Top Ultracapacitor Manufacturer

- Rated Voltage: up to 3.0V
- High power performance
- High energy performance
- Environmentally friendly
- Maintenance-free
- Wide operating temperature range (-40°C~+65°C)





Ultracapacitor is...



Ultracapacitor is

Ultracapacitor is 100M runner

Ultracapacitor is 100M runner



LIB is Marathon runner

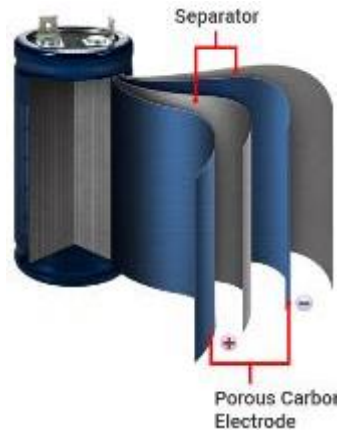


Ultracapacitor is

Structure

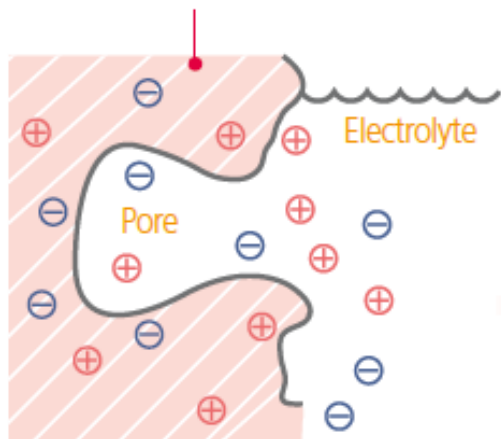
Capacitor with maximized capacity is called Ultracapacitor

Structure (ultracapacitor cell)



How UC works

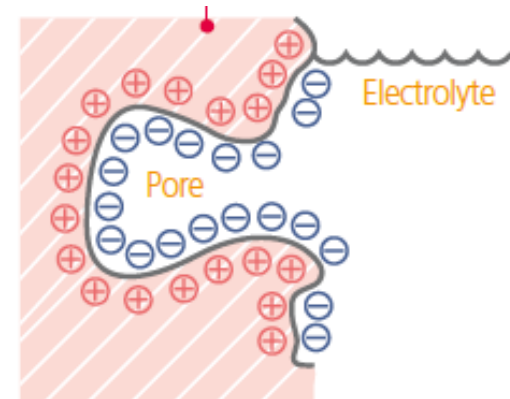
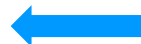
Activated Carbon Electrode



Charging



Discharging



Ultracapacitor can be used as... with it's characteristics

Advantages



Long life time
More than 10years
More than 1million cycles



High power density
10times higher power
density comparing to LIB



Fast charge & Discharge
Charge & discharge within
few Seconds



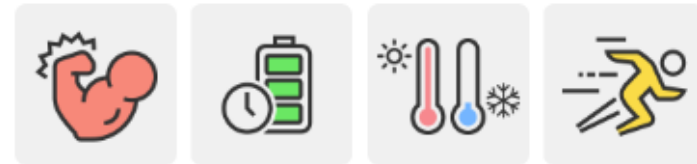
Wide operating temp.
range
-40°C~+65 °C

Good application with UC

VDP (UPS) / Peak shaving (Electric power industry)



Wind power (Pitch Control)



AGV/Bus/Tram



Automotive (passenger car & Truck)



Ultracapacitor is

So Ultracapacitor is good to use...





Product & Production



Ultracapacitor Cell

Most various cell line up in the market

LSUC has more than 25 types of cells in mass production

22Φ/33Φ/35Φ Series - Lug or Snap-in Type



Voltage	2.8V	3.0V
Capacitance	100F~720F	380F, 430F, 480F
Type	PCB mounting	

60Φ Series - Screw or Weldable Type



Voltage	2.7V	2.85V, 3V
Capacitance	650F~3000F	3000F, 3400F
Type	Bus-bar connection	

Ultracapacitor Module

Most various module line up in the market

LSUC has more than 15 types of modules in mass production

PCB Type Series



16.8V 58F



168V 5.8F



403.2V 4.1F

Busbar Type Series



16.2V 500F



32.4V 250F



48.6V 166F



51.3V 166F

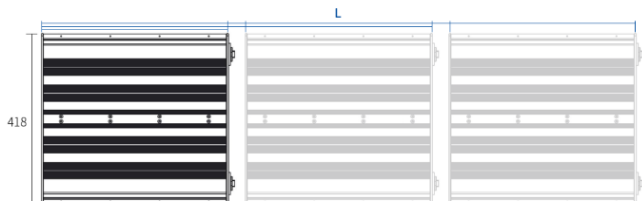
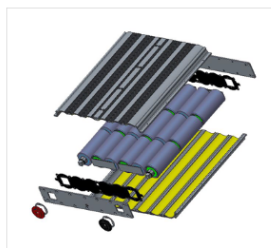


86.4V 93F



129.6V 62F

Cell to Cell (C to C) connection module



16.2V 500F



54V 166F

Production Site

LS materials is continuously investing in capa. up and R&D

LSUC will increase it's production capacity continuously to satisfy market growth

Production site



LS TOWER, Hi-Tech Center



Head office, Ultracapacitor plant





Applications



UPS / VDP (Sag protector)

SAG Protection for electric power load

- ◆ Installation : Korea, Europe, Japan, China (2008~)
- ◆ Provide protection against short outages and very deep sags (~60sec)
- ◆ End customers: Samsung, LG, Japan Display
- ◆ Purpose: High power/High Current output
Reducing maintenance fee (Long life time)



Recommended module



LSUM 051R3C 0166F EA



LSUM 032R4C 0250F EA

- ※ UPS: uninterruptible power supply
- ※ VDP: Voltage drop protector, Voltage Sag protector

Cutting down construction cost, line noise, maintenance cost by not using power from production line

- ◆ Installation : Korea, Europe, Japan, China, USA
- ◆ Moves fast and moves in the certain area
Can charge often and periodically
- ◆ End customers: Samsung, LG, CSOT, AMAZON, Walmart
- ◆ Purpose: Reducing maintenance fee (Long life time)
Move fast with excellent power
Charge fast



Recommended module



LSUM 048R6C 0166F EA DC



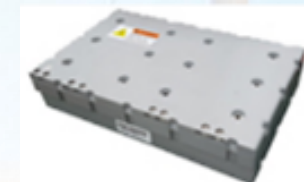
LSUM 403R2L 0004F EA

Cutting down maintenance cost by guaranteeing longevity under unfavorable condition

- ◆ Installation : Europe, China, USA
- ◆ Peak power for blade pitch control
- ◆ Purpose: Reducing maintenance fee (Long life time)
Fast recovery after discharging
Outstanding operating temperature range



Recommended module



LSUM 168R0L 0005F EA

Peak Shaving

Cutting down grid construction cost and maintenance cost by reducing power consumption

- ◆ Installation : Europe, China, USA
- ◆ Electric machines such needs high power like motors servo presses or test equipment need high power for short periods
- ◆ Ultracapacitor can output this high power, so no need to install additional Power source in the grid
- ◆ Purpose:
 - Reduce peak load of grid connection point
 - Eliminate costs for grid connection expansion
 - Reducing electric charge by covering peak power



Recommended module



LSUM 048R6C
0166F EA DC



LSUM 048R6C
0166F EA YJ



LSUM 129R6C
0062F EA

Transportation (Tram / Substation / Hybrid bus)

Improving fuel consumption by using regenerative braking

- ◆ Installation : Europe, China
- ◆ Peak power assist
 - Charging & Discharging Regeneration energy
 - Moves one station and charge and move
 - Outstanding operating temperature range
- ◆ Purpose: Improving fuel consumption
 - Replacing Batteries for reducing replacement cost
 - Using ultracapacitor + battery to use longer



Recommended module



LSUM 048R6C 0166F EA DC



LSUM 129R6C 0062F EA

Automotive (Passenger car / Bus / Truck)

Various purpose for automotive

- ◆ Emergency power when main power got off (Electric car)
- ◆ Improving fuel consumption (ISG)
- ◆ Back up power for steering
- ◆ Voltage stabilization



Cranking

Easy cranking by using high density power from ultracapacitor

- ◆ Installation : Europe, Korea, China
- ◆ For
 - Locomotive Diesel engine cranking
 - Emergency generator cranking
 - Passenger car emergency cranking (Jump starter)
- ◆ Smaller size & lighter weight
 - To output the same power, LIB or Lid-acid battery needs to be bigger and heavier
- ◆ Purpose: Replacing batteries for reducing replacement cost
 - Using ultracapacitor + battery to use longer
 - High power for cranking
 - Can starts engine in a tough environment (Outstanding operating temperature range)



Recommended module



LSUM 048R6C 0166F EA DC



LSUM 032R4C 0250F EA

Ultracapacitor can be the most effective energy storage to supply emergency power supply

Elevator

- ◆ Customers : Europe
- ◆ Emergency lift up, Emergency light, Energy regeneration
- ◆ Advantages
 - Maintenance fee reduction
 - Capture braking energy and compensate peak power load



Cable Car – In-Car Power Supply

- ◆ Installation : Europe / North America
- ◆ In-Car Power Supply & Emergency Power
- ◆ High Reliability & Maintenance Free



Exit Sign (Fire fighting equipment)

- ◆ Emergency light
- ◆ Advantages
 - Maintenance fee reduction
 - (Longer longevity comparing to conventional battery)



Medical equipment

- ◆ High power & current from ultracapacitor



Thank you

Contact

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