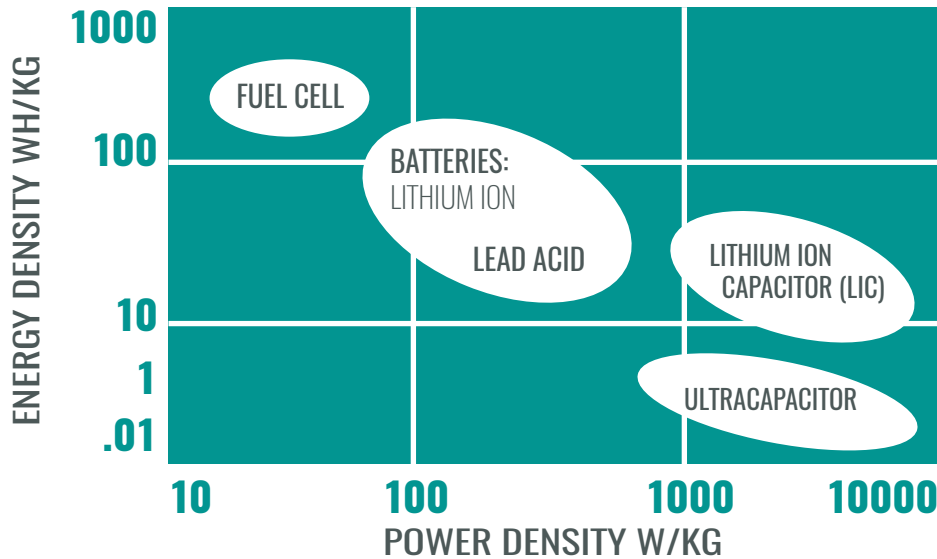


# LICAP

# Lithium Ion Capacitors

## ENERGY VS. POWER



## Introduction



**Lithium Ion Capacitors (LIC) are long life, maintenance free energy storage solutions for a variety of systems and applications.**

LIC's are ideal in situations where battery maintenance and replacement are inconvenient, costly or impossible. High current charge / discharge capability, low self-discharge rate, wide operating temperature range and a high degree of safety are a few other beneficial characteristics of the LIC. With a 10+ year calendar life and cycle life in the hundreds of thousands, an LIC can be designed in to last the entire life of a system.

## Example applications:

Reliable, long life power for remote sensors and monitoring systems commonly used in expanding IoT applications. Voltage sag support, bridge power, graceful power down, peak assist, power quality and many more.

# LICAP

## About us

LICAP, established in 2016, is a manufacturer of innovative ultracapacitor electrode material, ultracapacitor modules, and high quality ultracapacitors. and lithium ion capacitors.

The key element of our product performance is our industry leading dry electrode. LICAP's Activated Dry Electrode combines manufacturing efficiency with innovative fabrication methods that results in industry leading ESR, Capacitance, and Life Cycle performance.

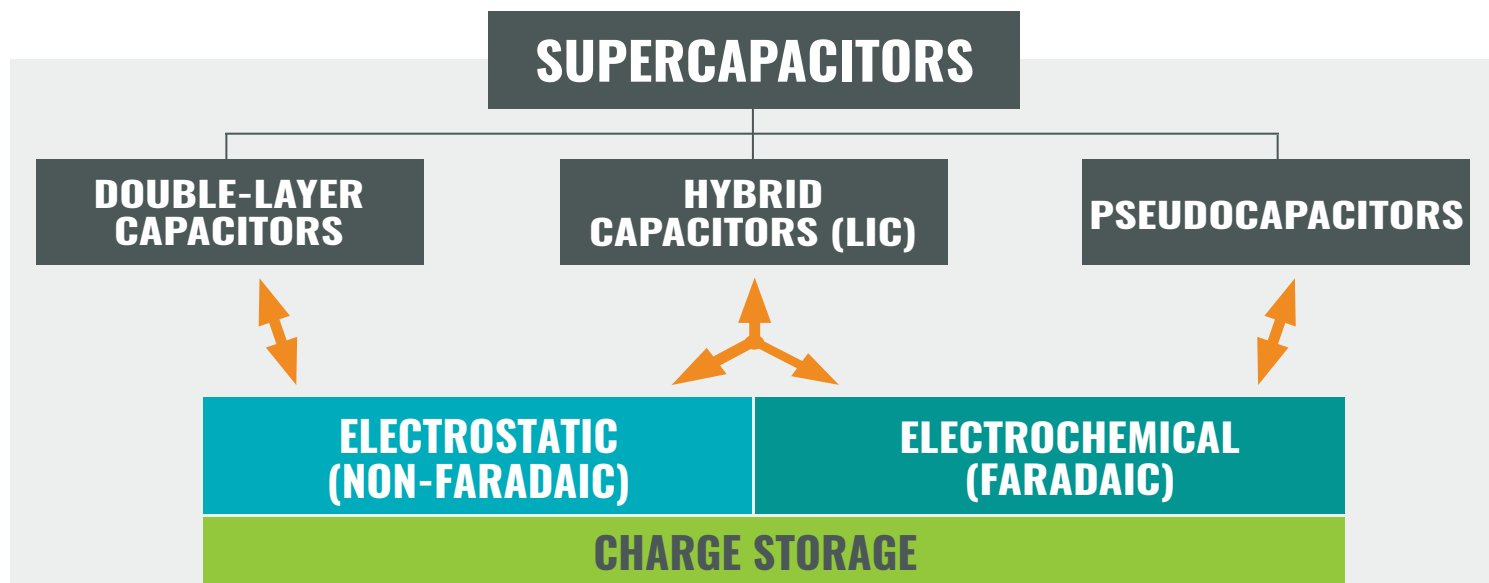


# Lithium Ion Capacitors

## The Technology:

A lithium-ion capacitor (LIC) is a hybrid capacitor that is classified as a type of supercapacitor.

The LIC cathode consists of activated carbon, and the anode is a carbon material formulation which is pre-doped with lithium ions. The pre-doping process reduces the potential of the anode and enables a higher output voltage as compared with traditional double-layer capacitors (EDLC).



The table below includes major characteristics of double-layer capacitors, LIC and lithium ion batteries.

Compared to a double-layer capacitor, the LIC has similar life and power performance with the added benefits of higher energy density, low self-discharge and higher cell voltage. Compared to a lithium ion battery, the LIC has longer life, higher power density, wider operating temperature range and is considered a safer technology.

Characteristics	EDLC	LIC	LIB
Cell Voltage	2.7 – 3.0	3.6 - 3.8	3.6 – 3.7
Power Density W/kg	1,953	1,070	100
Energy Density Wh/kg	5.1	11.9	100
Calendar Life	8-15 years	10 years	2-4 years
Cycle Life	1M cycles	500k cycles	500
Self-Discharge	50% over 2 weeks	<5% over 3 months	.35% to 2.5% per month
Thermal Runaway	No	No	Yes
Shipping Regulations	Moderate	Moderate	Strict
Temperature Range	-45C to +65C	-20C to +70C	0C to 45C

Samples available, please contact us for additional information.