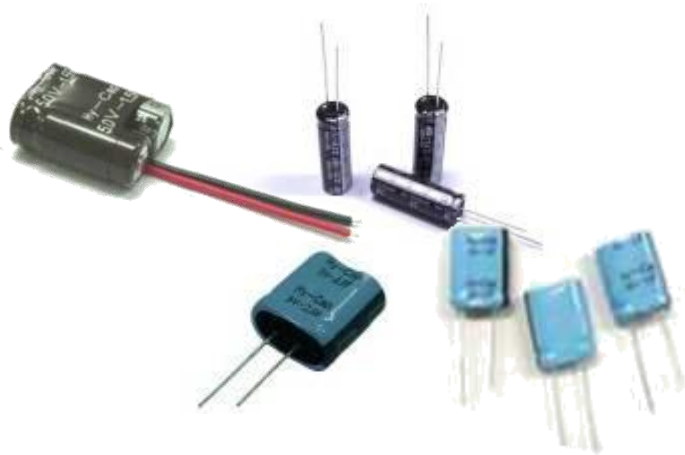




VINATech

Est since 1999

Produce Super capacitors and Activated carbon Environmental Filters and Membranes for HFCs

Largest Manufacturer of EDLC Super capacitors, focussing on 0.5 Farad to 500F

Own Factories in S.Korea and Vietnam

Highest level of Automation

TS16949 Approved

Konex Stock Market listing moving to KOSDAQ in 2020

Working with design-In partners

Super Capacitors to grow 10x in 10 years

Why?

So why VINATech Super Capacitors?

- ✓ Longer life than Batteries (over 500,000 cycles)
- ✓ Quick charge & discharge- almost instant
- ✓ High efficiency
- ✓ Ideal to support Solar energy
- ✓ Meeting EU challenges
- ✓ Environmentally Friendly (RoHS & WEEE Compliant)
- ✓ No end of life recycling costs
- ✓ Wider operating temperature down to -40c~+85c
- ✓ Short lead times, plentiful raw material supply, now worries v. battery
- ✓ Costs of ownership reduced
- ✓ No Transportation issues

Super Capacitors a growing market

Why?

- * EU Directives to reduce Carbon Foot print –SMART Meter roll out etc
- * EU committed to RoHS & WEEE Directives
- * EU Directives to reduce Battery usage (especially reducing Mercury, Lead & Cadmium (2013/56/EU)
- * Electric & Hybrid Vehicles to replace Petrol & Diesel Engines



What Market sectors?

All

Automotive, Security/ Tracking, Energy/Utilities, Medical, Communications and Military

Audio is also a growing sector

Buzz words IoT, Telematics, SMART.....

Typical Applications

- Replacing Batteries for RTC Back up
- Supporting Batteries with Pulse requirements, GPRS & ISM etc.
- Enabling down size of batteries
- Peak demands , Peak power back up
- Quick charge
- Fail safe
- Improvement of power quality
- Reduces maintenance over batteries
- No recycling costs end of life
- Reduced transportation issues

So why VINATech products?

- Longer life than Batteries (over 500,000 cycles)
- Quick charge & discharge
- High efficiency
- Ideal to support Solar energy
- Environmentally Friendly (RoHS & WEEE Compliant)
- No end of life recycling costs
- Wider operating temperature down to -40c

HyCap					
Format	Leaded Cell-EDLC +85c	Leaded Hybrid	SNAP IN Cell-EDLC	2 Series Module	Large Modules
Voltage	3v	3.8v	3v	6v	16v
Cap Range	3.3F ~100F	30, 100F~250F	100F ~500F	0.5F ~5F	60F
Applications	RTC back up, Hot Swap, pulse demands, Fail safe, USB , last gasp and battery support	term back up in high energy applications, especially LIC supporting Batteries	Energy harvesting, pulse demands, quick charge, braking energy, start/stop & battery	RTC back up, Hot Swap, pulse demands, Fail safe, USB , last gasp and battery support	Energy storage, Power droop
Markets	AMR, IoT, Automotive, EPOS, Home , Controls, Military, wearable, medical, solar lights, Asset trackers & Security	Solar, renewable, AMR, Lighting	UPS, PCs, Lighting, Actuators, Solar, Medical, Tools, Regenrative Technology & Hybrid Vehicles	AMR, Tracking, IoT, Communications, Asset trackers & Security	Renewable energy. Solar powered equipment, Vehicle electronics, Telecomms, UPS & Wind Turbines
Temp range	-40c~+85c	-25c~+60c	-40c~+65c (85c)	-40c~+65c (85c)	'-40c~+65c
Life at 25c	@2.5vdc = 57.4y @2.7vdc= 28.7y	32,000hrs	@2.5vdc = 57.4y @2.7vdc= 28.7y	@2.5vdc = 57.4y @2.7vdc= 28.7y	@2.5vdc = 57.4y @2.7vdc= 28.7y
Cycle life	500,000+	20000+	500,000+	500,000+	500,000
Approvals	RoHS, WEEE, REACH,UL	RoHS, WEEE, REACH,UL	RoHS, WEEE, REACH,UL	RoHS, WEEE, REACH,UL	RoHS, WEEE, REACH,UL
Benefits	Long life compared to Competitors 2.7v	Double density LIC has Very low LC	Long life compared to Competitors 2.7v	Higher voltage	Plug and play

The number of Applications and industry sectors are growing at a fast rate across EMEA

Communications & Industrial :

IoT:

Automotive:

Military:

Medical:

Security:

Lighting:

There are more and more coming along



Applications Communications and Industrial

Metering/ Data logging
SMART Metering

Electricity, Water & Gas Long life RTC and last gasp
GPRS & PLC concentrators Last Gasp & RTC back up

SMART Homes/ Buildings
Water Management
Emergency Lighting
Solar Studs in roads

Energy storage, Thermostats control, actuators.
Supporting Batteries with pulse management
Reduces requirement to replace Batteries
Longer life than Batteries

LED Lights
Actuators
Door Locks
Lift/ elevator Controls
Tools
UPS/SSD

Consumer products for back up (Vacuum control)
Fast Charge & discharge
Fast charge & discharge
Regenerative technology
Fast Charging
Power droop recovery



Applications IoT

Major growth market to support Communications in a wider market, idea for 3.8v VEL types for ISM bands Low Power Radio (Lora, Sigfox, Wifi, Zigbee Mbus , GPRS & NBIoT etc.)
Also for solar powered devices

Wireless sensing networks
Solar LEDs
Building Management systems (Alarms, sensors etc)
EPOS
Tracking, data logging
Wearable technology
Dairy and Farm Animal Management



Automotive Applications

Tracking of Assets and Vehicles

Navigation systems

Container Trackers

Black box recorders/ DVR

Braking system

Steering wheel

Hybrid Electric Vehicle

Idle stop start

Regenerative braking system and Pulse demands , gear shift growing applications

HUD Head up displays

Fail Safe systems (Locks)

E-call

E-locks / e-touch

Hydrogen Fuel Cells (Materials see next slide)

Pulse support last gasp & Fail safe

Last gasp & Pulse support

Pulse management & last gasp

Immediate response, no battery replacement

Back up power

Peak power assist

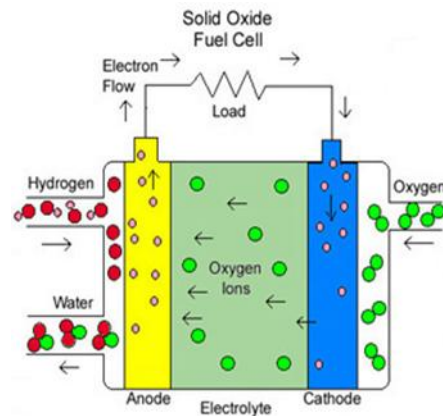
Power assist

Battery saving



Fuel Cell Material for Automotive Market

- To replace Electric Vehicles
- Also known as FCEVs
- Delivery vans
- Scooters
- Lorries
- Cars



- Most Automotive companies need to find an alternative to Battery technology
- Fuel Cells are the best option.
- It is clean energy- water is the waste
- Quick to fill
- High efficiency
- Infrastructure easy to install
- Already in use Taxis in Germany and also Asia

Applications for Medical sector

Hand held tools (Curing resin etc)
Pumps & Syringe drivers (Back up and Fail safe)
Sprays (Helps pulse power) Asthma
Diabetes body worn testing
Back up and fail safe for portable equipment
Liquid dispensers

Fail safe applications are growing along with data back up

Supporting Peak demands for Hospital Computers UPS etc



Applications Military and others

Actuators and Valves	Peak demand & long life
Switch gear	Back up
UAVs./ Drones Model Aircraft	Fast charge and also peak demand for take off
Solar and Kinetic tools	Longer life, quick charge & lighter
Hand tools	Fast charge for hand drills
Weapons	To replace Batteries for night lights/ percussion back up power
Wearable Technology	On body communications, fast charge, long life
Point of Sales	Communications management
Medical/ Dental	Hand held tools (Curing resin etc)
HVAC	Controllers in case of power failure



Applications Industrial and Others

SSD/ DRAM back up

Graceful shut down, PCs & Photocopiers

Engine Cranking for Generators

Replaces Batteries

PSU /SMPSU

Supporting Peak demands

Energy Storage Systems

Peak demand from battery

Fuel Cell systems

Peak power back up

SMART Grid

Feeder Terminal Unit / Monitoring

Tram system

Storing braking energy

Elevators

Regenerative braking energy storage

AGV

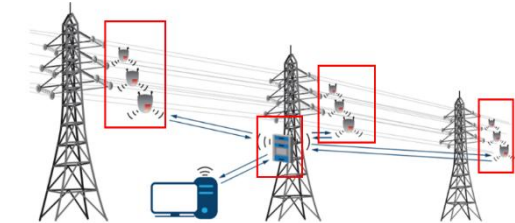
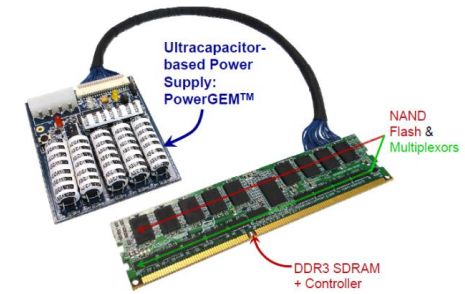
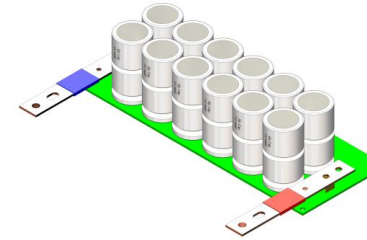
Fast charging for Automated guidance vehicles

FCI

Line fault indicators for power grid

Ethernet Controllers

Actuator controls



Super Capacitor Trends

Coin Cell Types

30year old Technology, no investment, EoL from some major producers

Suggest try VINATech 6v 0.5F improved ESR etc. ideal for RTC back up

Low Capacitance types <2Farad

3 producers now withdrawn, maybe look at WEC series

High Capacitor Companies are struggling or for sale

Wetting is growing High Temperature High voltage create the issue, VINATech seems to be the only true solution

On a positive note VINATech continue to grow

Super Capacitors are a growth industry

VINATech have advanced materials and highest Quality

3v / 6v series is a winner for extending life time

3v types can be used at 85c/ 2.4v

NEW- WET series for 85/85

NEW- VEL series 3.8v Low Leakage current High Density

VINATech are Competitive