

SIRIUS SUPER CAPACITOR



KEY ATTRIBUTES

- Actively balanced and stable operation at all commercial voltages
- Flat discharge curve (module discharge rate is determined by the load)
- 2% per month self-discharge when idle and in sleep mode
- Cell level energy density of 70-80Wh/kg
- Supercap cell cycle life and capacity unaffected by high rate of charge or discharge
- Supercap cell projected calendar life of 45 years and cycle life of 1,000,000 cycles
- High charge / discharge capability
- Wide operating temperature range of supercap cells
- No degradation of capacity and efficiency over cycle life
- Works with standard inverters/rectifiers/regulators used with Lead Acid or Li Ion batteries
- Non-toxic, with no risk of thermal runaway
- Form factor similar to chemical batteries

SIRIUS ADVANTAGE OVER CHEMICAL BATTERIES

FEATURE	SIRIUS	CHEMICAL BATTERIES ⁶
Supercap Cell Cycle Life (Projected) ¹	1,000,000	200 TO 10,000
DC to DC efficiency (@25°C) ¹	99% (constant over life)	70% to 95% (degrades over life)
Useable Capacity (% of rated capacity)	100% (constant over life)	50% to 80% (degrades over life)
Temperature Range ¹	-30°C to 85°C	-20°C to 65°C
Operation outside Temperature Range	Yes	No
Max. Rate of Charge ²	1.7C (120C ³)	0.1C to 0.5C (NA ⁴)
Max. Rate of Discharge ²	1.7C (120C ³)	0.1C to 0.5C (NA ⁴)
Thermal Runaway	No Risk	Medium to High Risk
Energy Density (Wh/kg)	70 to 80 ⁷	70 to 100 ⁵
Disposal costs	Deferred	Significant
Environmental impact of disposal	None	Significant
Short/Medium/Long Duration	Single module	Different batteries for different deployment
Warehousing	No maintenance	Periodic charging

¹ Performance may vary at different temperatures and at different C-rates.

² Max. rate of charge and discharge is provided for a standard Sirius module. This rate may vary at different temperatures and for different Sirius modules.

³ Rapid charge of storage for EV's.

⁴ Rapid charge at 120C is not possible with chemical batteries.

⁵ On useable capacity basis.

⁶ Publicly available information. Manufacturer data may vary.

⁷ Supercap cell level.