SIGMA CELLS

ALL-IN-ONE INVERTER, CHARGER AND ADVANCED BATTERY MANAGEMENT SYSTEM FOR ENHANCED E-MOBILITYS

WHAT IS SIGMA CELLS?

Sigma Cells, Leti's switched cell technology, is revolutionizing the world of batteries for e-transportation revisiting the traditional architectures and taking the multi-cells power source as a key advantage to bring a disruptive solution featuring:

- Improved power conversion efficiency
- Fast charging at no additional cost
- Less bulky and lighter batteries
- Reduced pollution: currently, if only one cell fails, the entire battery is down
- Contraintless electrical vehicle architecture
- Simplified diagnostic & maintenance

Sigma Cells allows smart use of battery cells—the battery brains, by:

- Ensuring continuity of service in the event of sudden cell failure by finding an alternative "safe route"
- Leveraging the "best" cells at a time to ensure longer autonomy and a power reserve

APPLICATIONS

Sigma Cells is designed for e-mobility applications regardless of the power size: for example e-cars, e-bicycles, e-buses, etc.

Sigma Cells can also be leveraged for storage applications, among others:

- Network regulation
- Server supply
- Nomadik power banks
- Power tools supplies
- Autonomous building…

WHAT'S NEW?

With e-mobility coming down the road, Sigma Cells addresses tomorrow's massive demand for power conversion and efficiency. Here is what's new:

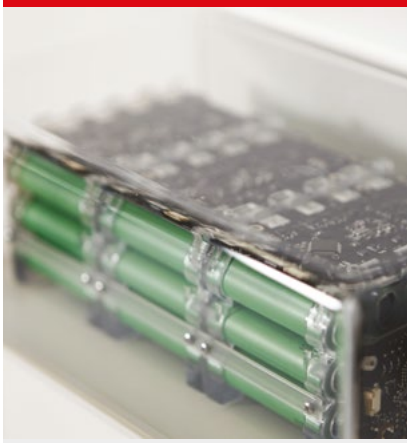
- **Inverter function:** provides a direct motor drive from the battery pack providing a waveform in line with the motor speed, torque and power
- **Integrated fast charger:** bidirectional system (current and voltage) enabling a direct recharge on the electrical network
- **Advanced BMS** with individual and continuous access to any cell unit:
  - reducing SoC and SoH error estimation by a factor 2
  - improving autonomy of 20%
  - improving life time of 15%
- **Enhanced performances** thanks to native low voltage switching (~3.6V) compared to a classical inverter switching the full battery pack voltage (~400V):
  - reducing drastically the switching losses by 100
  - reducing the need for cooling
  - reducing drastically the CEM emission by 100

WHAT'S NEXT?

Leti is working hand-in-hand with industrials to prepare the upcoming e-mobility boom. Researchers are currently working towards enhanced systems and dedicated hardware and software for the automotive industry.

KEY FACTS:

- *"Battery Having a Brick Architecture Including Cells Arranged in Series or in Parallel"*, 2012, G. Despesse, Patent US 2014287278, CN103782413
- *"Battery with Individual Cell Management"*, 2011, G. Despesse, Patent US 20140015488, JP2014512636
- *"Battery Monitoring System Using Switching Battery Cells - Paper"*, G. Despesse, S. Lechat Sanjuan, S. Gery, Conf. ASTech-RITF, Paris, 2012



INTERESTED IN THIS TECHNOLOGY?

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