

SOLUTION BRIEF

High voltage power electronics solution for automotive

Revolutionary approach eliminates need for auxiliary low voltage (LV) batteries, lowering vehicle weight and total cost of ownership

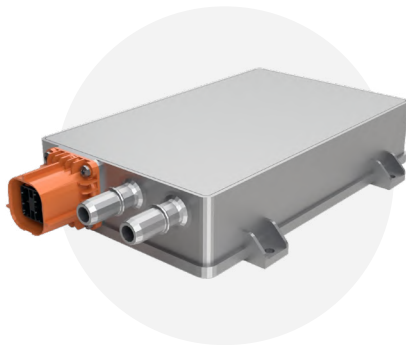
KEY BENEFITS

- Eliminates need for auxiliary LV batteries
- Ultra-fast and bidirectional operation
- High power density and ASIL D ready
- Dual active bridge architecture
- Significant cost and weight reduction
- Validated at the component level across use cases

LV batteries power an array of essential vehicle accessories and electronics in traditional and electric vehicles, including lights, infotainment systems, safety systems such as steering and braking, domain and zonal controllers, advanced driver assistance systems (ADAS), and more. When reliable operation across the electrical architecture requires more power than a single LV battery can deliver, or safety-critical components require a backup, automakers incorporate auxiliary batteries. But that performance comes with a tradeoff: additional cost and weight. To eliminate the need for additional LV batteries, Flex improved the performance and functionality of main and backup DC/DC converters to enable an intelligent high voltage (HV) power electronics solution, a strong improvement in automotive power management.

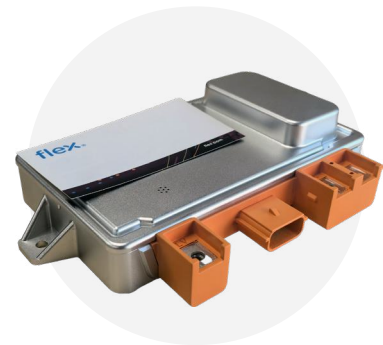
A first-of-its-kind solution that decreases the need for auxiliary LV batteries

Flex backup DC/DC converters connect HV and LV power architectures, taking over the functionality of auxiliary LV batteries and working alongside a main DC/DC converter. Engineered to meet key safety and performance requirements, the converters have been tested for power flow and functionality in critical use cases. They are proven to efficiently and rapidly convert voltages while ensuring key safety backups remain ready for use.



MAIN DC/DC CONVERTER

Ultra-fast and bidirectional, the main DC/DC converter connects the HV propulsion system to the primary LV system.



BACKUP DC/DC CONVERTER

Small, light, and cost-effective, the backup DC/DC converter covers safety-critical events by providing near-instantaneous power to a backup LV system.

ABOUT FLEX

Flex is at the forefront of automotive innovation, offering agile manufacturing services for individual projects as well as joint and full product development for tailored, next-generation mobility solutions.

Real-world benefits, not edge-case scenarios

With proven performance in demanding, real-world scenarios, the HV power electronics solution from Flex stands to transform automotive architectures.

HEAVY STEERING AND BRAKING	ASIL D SYSTEM FAILURE	SYSTEM INITIALIZATION	OVER-THE-AIR (OTA) UPDATES
The main DC/DC converter's ultra-fast bidirectional conversion ensures vehicle performance in situations with highly dynamic system and component loads.	The backup DC/DC converter takes over in under 100 milliseconds in the case of ADAS or safety system failures, supporting critical functions until vehicle safe state.	The main and backup DC/DC converters work in tandem to pre-charge and initialize HV systems and LV systems.	The backup DC/DC converter efficiently powers LV systems during vehicle sleep mode as needed. Power is supplied directly from HV battery cells to avoid turning on safety monitoring functions.

Improve affordability in hybrid and electric vehicles

With affordability a key driver of hybrid and electric vehicle adoption, eliminating the need for auxiliary LV batteries reduces the overall cost of the electrical system even as highly connected, feature-rich models are introduced to the market. The Flex HV power electronics solution gives automakers a low-maintenance path toward high-impact features and performance.

The Flex advantage

The Flex HV power electronics solution offers a robust, scalable, and production-ready solution that empowers automakers to incorporate cost-effective automotive electrical architectures with confidence.

- **Innovation** – First-to-market DC/DC converters replace the need for auxiliary LV batteries
- **Performance** – Ultra-fast, bidirectional conversion with high power density and ASIL D ready
- **Impact** – Significant cost and weight savings at the vehicle and system levels



Accelerate next-generation safety and reliability with the Flex HV power electronics solution.

Learn more

[Flex Automotive](#) | [Backup DC/DC Converter White Paper](#)

For more information, visit flex.com/connect

Flex (Reg. No. 199002645H) is the manufacturing partner of choice that helps a diverse customer base design and build products that improve the world. Through the collective strength of a global workforce across 30 countries and responsible, sustainable operations, Flex delivers technology innovation, supply chain, and manufacturing solutions to various industries and end markets.

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