

# A6983I AND A6986I: ISOLATED DC-DC CONVERTERS ICs



## Saving costs and space in automotive isolated applications



### Versatile isolated buck converters with wide output power capabilities

Specifically designed for isolated buck topology, the **A6983I** and **A6986I** are **automotive-grade synchronous buck converters** ICs capable of managing up to 10 W and 5 W output power, respectively. The primary output voltage can be accurately adjusted, while the isolated secondary output is derived using a given transformer ratio, eliminating the need for an optocoupler. The control loop is based on a peak current mode architecture, and the device operates in forced PWM. A blanking time of over 300 ns filters oscillations generated by the transformer leakage inductance, enhancing the robustness of the solution. The compact QFN-16 (3x3 mm) package and the internal compensation of the A6983I contribute to minimizing design complexity and size.

Discover isolated DC-DC converters



#### MAIN FEATURES

- AEC-Q100 qualified
- Isolated buck and isobuck-boost topology supported
- Primary output voltage regulation, no optocoupler required
- Peak current mode architecture in forced PWM operation
- 4 V to 38 V operating input voltage
- Programmable fsw up to 1 MHz
- 1.9 A (A6986I) / 4.5 A (A6983I) typical sink peak primary current capability

- Optional spread spectrum for improved EMC (A6983I)

#### MAIN APPLICATIONS

Automotive isolated gate drive supply for

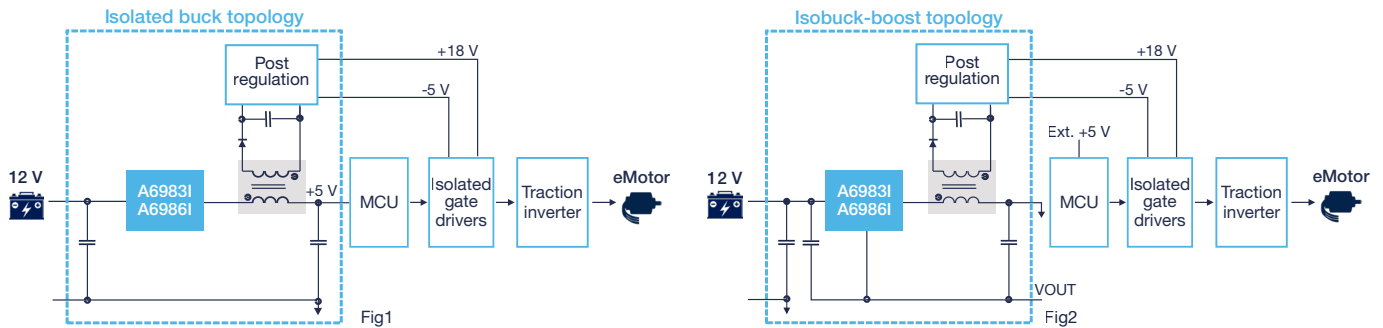
- OBC (on-board charger)
- Traction inverter



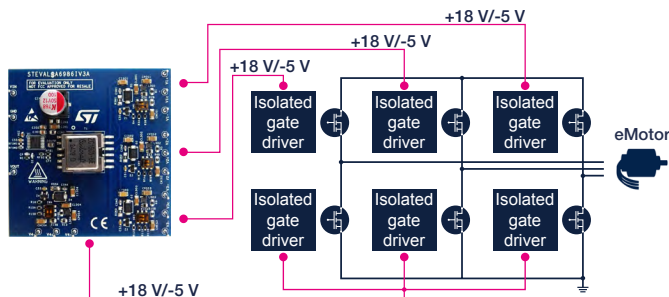
## APPLICATIONS

The main application for both devices is the isolated gate driver supply in the OBC and traction inverter. Two topologies can be adopted for this purpose:

- Isolated buck topology:** the A6983I/A6986I devices, starting from the 12 V battery and with the appropriate transformer selection, generate secondary side voltages which, through a post-regulation stage, split into positive (e.g. +18 V) and negative (e.g. -5 V) voltages required for the isolated gate drivers in OBC or traction inverter (figure 1). A significant advantage of this topology is that it provides the isolated voltage without the need for an optocoupler with an additional auxiliary non-isolated voltage, which can be used by other devices in the system, such as the MCU.



- Isobuck-boost topology:** for each A6983I/A6986I device, this topology allows higher output power than buck topology to be delivered to the secondary side, and optimizes the transformer (figure 2). This topology can be evaluated through the STEVAL-A6983IV3, which is designed to supply 6 isolated gate drivers for a full three-phase inverter using a single A6986I device together with a 4-output transformer.



### STEVAL-A6986IV3

- Isobuck-boost topology based on a single **A6986I**
- Post regulation for longer life solution based on the **LDH40**
- No optocoupler need
- $V_{in}$  up to 28 V,  $P_{out}$  up to 8 W
- Four-output transformer with regulated dual voltage each: 18 V/-5 V or 15 V/-8 V
- 60 mA for each of the outputs dedicated to high-side drivers
- 180 mA for the single output dedicated to low-side driver

## DISCOVER OUR EVALUATION BOARDS AND SOFTWARE TOOLS

To support the development of your automotive power solutions, ST provides a range of evaluation boards along with design and simulation tools.

### Evaluation boards

- **STEVAL-A6986IV1**
- **STEVAL-A6986IV2**
- **STEVAL-A6986IV3**
- **STEVAL-L6983IV1**



Scan the QR code to learn more about our evaluation boards and how they can accelerate your design process.

### Software tools

- **eDesignSuite**
- **eDSim**



Scan the QR code to access our software tools for seamless integration and simulation.

