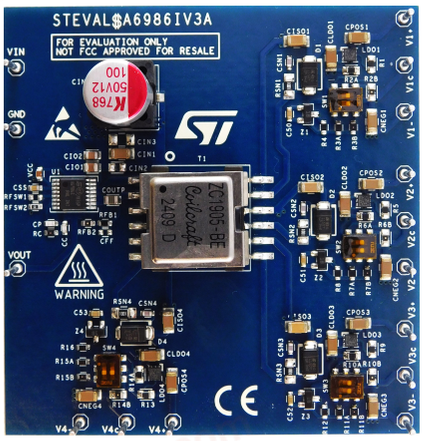
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STEVAL-A6986IV3

Data brief

Isobuck-boost converter with four selectable dual voltages



Features

- Designed for isobuck-boost topology
- 4 V to 28 V operating input voltage
- Four isolated outputs with regulated dual voltage
- 60 mA typ. for the outputs dedicated to high-side drivers
- 180 mA typ. for the output dedicated to the low side drivers
- Selectable isolated voltage pairs: 18 V/ - 5 V or 15 V/ - 8 V
- Primary output voltage regulation
- Secondary post regulation dedicated to each output with accuracy <±1%
- No optocoupler required
- 250 kHz operating switching frequency
- Peak and reverse current protections
- Protection against overcurrent and short circuit events at the isolated outputs
- Thermal protection

Product summary	
Isobuck-boost converter with four selectable dual voltages	STEVAL-A6986IV3
Automotive 38V, 5W synchronous iso-buck converter	A6986I
Automotive 150 V, 1 A Power Schottky Rectifier	STSP1150AY
200 mA low dropout LDO	LDH40PURY
Adjustable micropower shunt voltage reference	TL431BL3T
Applications	EV Charging - DC Fast charging station Three phase inverters On board charger (OBC)

Description

The STEVAL-A6986IV3 is an evaluation board based on ST A6986I.

The A6986I is designed for isolated applications and normally implements an iso-buck architecture.

The STEVAL-A6986IV3 board adopts an inverting buck-boost topology at the primary side (instead of a standard buck), hence building an isobuck-boost (so called from now on).

The advantages in using the isobuck-boost instead of a buck are mainly: higher deliverable power at the secondary side, optimization of the transformer design.

The input voltage is up to 28 V. Since the primary side performs an inverting buck-boost conversion, the primary output voltage is negative.

The secondary side of the board consists of four independent windings, each one intended to provide the supply for a gate driver (see block diagram on page 2) thanks to a very accurate post regulation.

The isobuck-boost architecture exploits the power capability of the A6986I, delivering up to 60 mA for three secondary channels and up to 180 mA for the fourth one.

A microswitch provides the possibility to select two regulated voltage pairs for each channel: 18 V / - 5 V or 15 V / - 8 V. The regulation of these voltages is achieved by using the LDH40 (for the positive voltage) and a shunt regulator TL431B (for the negative voltage). The expanded output voltage range (up to 22 V) of the LDH40 makes it ideal for this kind of application.

Thanks to the LDH40 and the TL431B, the described post regulation allows a voltage accuracy well below ±1%.

The availability of four well-regulated dual voltages makes this solution ideal for gate driving in three-phase inverters.

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1 Schematic diagrams

Figure 1. **STEVAL-A6986IV3 circuit schematic (1 of 2)**

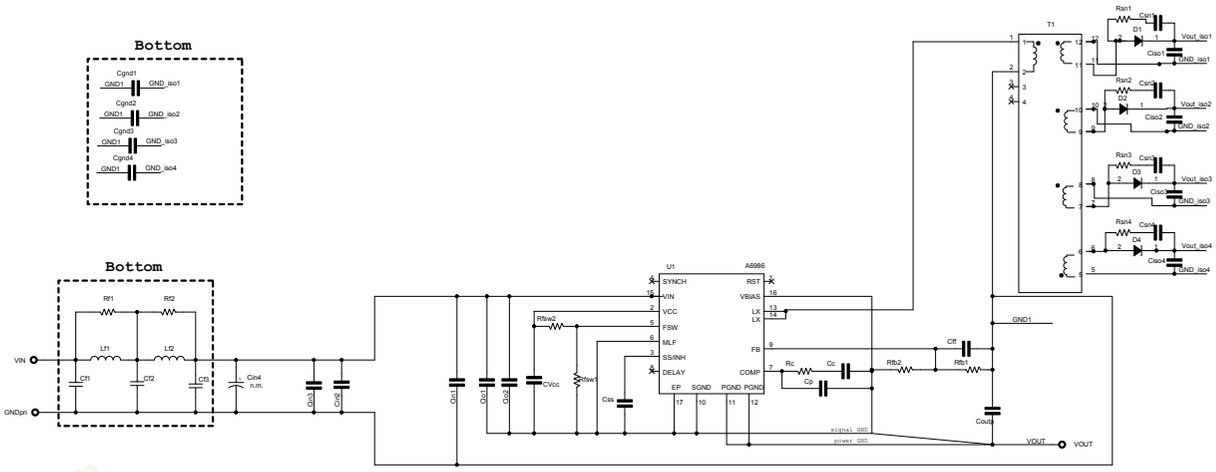
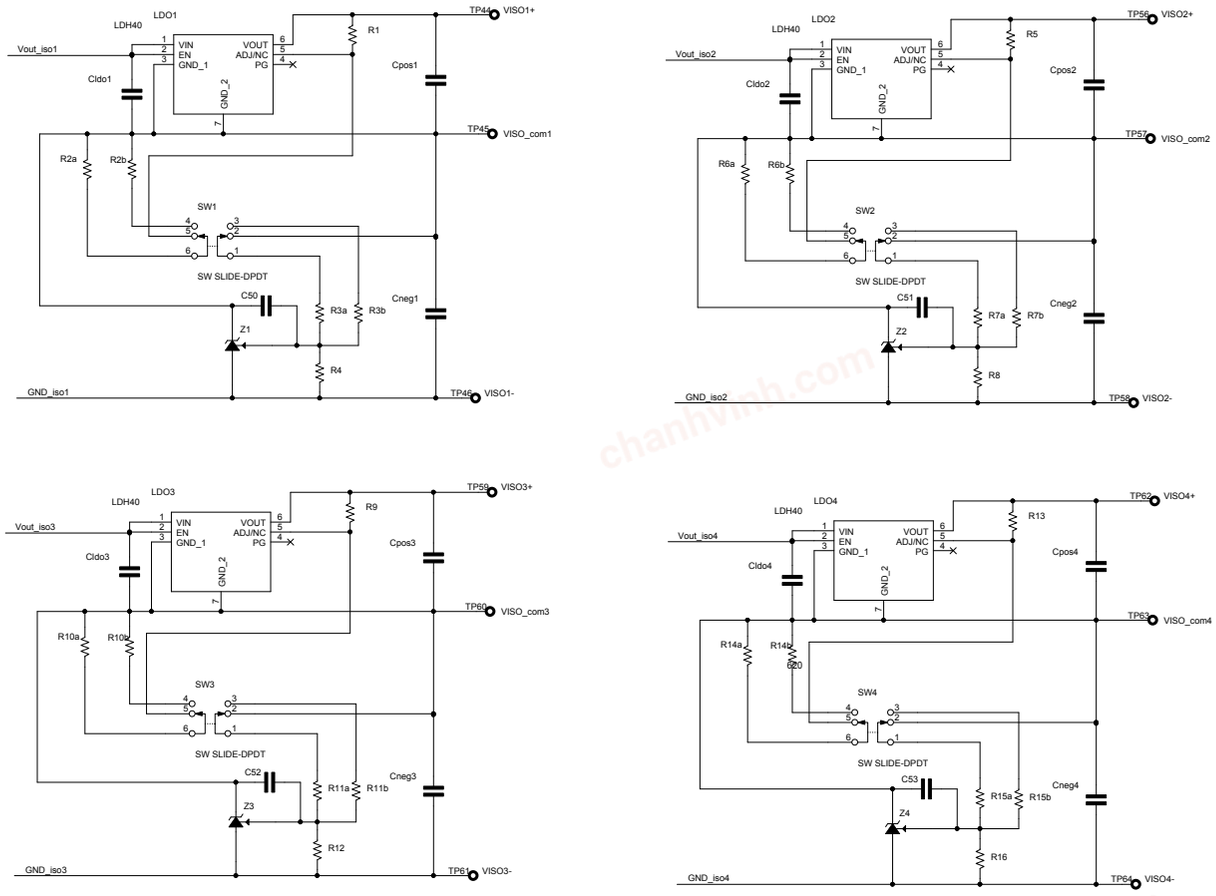


Figure 2. **STEVAL-A6986IV3 circuit schematic (2 of 2)**



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2 Board versions

Table 1. **STEVAL-A6986IV3 versions**

Finished good	Schematic diagrams	Bill of materials
STEVAL$A6986IV3A (1)	STEVAL$A6986IV3A schematic diagrams	STEVAL$A6986IV3A bill of materials

1. *This code identifies the STEVAL-A6986IV3 evaluation board first version.*

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Revision history

Table 2. **Document revision history**

Date	Revision	Changes
06-May-2024	1	Initial release.

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