

38 V, 5 W synchronous iso-buck converter evaluation board with dual isolated output based on the A6986I



Features

- AEC-Q100 qualified
- Operating temperature range: -40 °C to 135 °C for T_j
- Designed for iso-buck topology
- 4 to 38 V operating input voltage
- Primary output voltage regulation
- No optocoupler required
- 1.9 A typical sink peak primary current capability
- Peak current mode architecture in forced PWM operation
- 300 ns blanking time
- 8 μA IQ-SHTDWN
- Adjustable f_{SW} and synchronization
- Embedded primary output voltage supervisor
- Adjustable soft-start time
- Internal primary current limiting
- Overvoltage protection
- R_{DS(on)} HS = 180 mΩ, R_{DS(on)} LS = 150 mΩ
- Thermal shutdown

Description

The **STEVAL-A6986IV1** evaluation board is based on ST **A6986I** automotive 38 V, 5 W synchronous iso-buck converter for isolated applications.

The primary output voltage can be accurately adjusted, whereas the isolated secondary output is generated by a transformer. No optocoupler is required.

The primary sink capability (typ. 1.9 A) allows a proper energy transfer to the secondary side and enables a tracked soft-start of the secondary output.

The control loop is based on a peak current mode architecture and the device operates in forced PWM.

The 300 ns blanking time filters oscillations generated by the transformer leakage inductance and makes the solution more robust.

Pulse by pulse current sensing on both power elements implements an effective constant current protection on the primary side. Due to the primary reverse current limit, the secondary output is protected against short-circuit events. The secondary voltage is stabilized over current by using a power transistor and a shunt voltage reference (**TL431**).

The evaluation board generates two isolated voltages (positive around 18 V and negative between 4 V and 5 V), especially suitable for supplying IGBT/SiC MOSFET gate driver. A simple bypass enables the supply of a single isolated voltage.

Product summary	
38 V, 5 W synchronous iso-buck converter evaluation board with dual isolated output based on the A6986I	STEVAL-A6986IV1
Automotive 38 V, 5 W synchronous iso-buck converter for isolated applications	A6986I
Automotive 150 V, 1 A power Schottky rectifier	STPS1150AY
Adjustable micropower shunt voltage reference	TL431
Applications	Main Inverter (Electric Traction) On Board Charger (OBC)

1 Evaluation board/isolated voltage adjustment

In case different isolated voltage values are required, a simple voltage adjustment is possible.

1.1 Positive voltage adjustment

The positive voltage can be adjusted by changing the resistor divider composed of R12 and R13 according to the following equation:

$$V_{ISO} = 2.49 \frac{R_{12} + R_{13}}{R_{13}}$$

1.2 Negative voltage adjustment

The negative voltage can be changed by replacing the D3 with a Zener diode suitable to the application requirements.

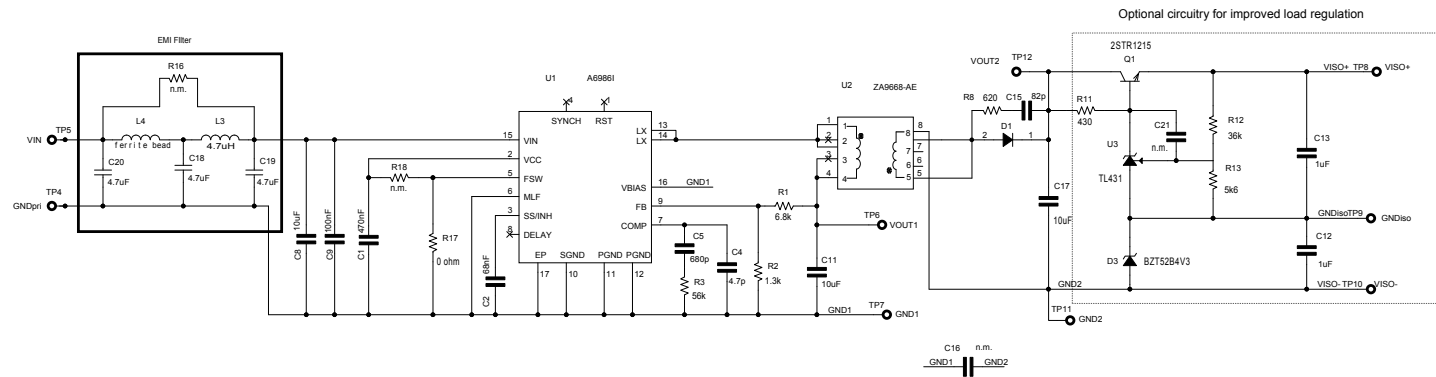
1.3 Single isolated output

A single voltage can be provided at the isolated output by removing D3 and replacing C12 with a 0 Ω resistor.

Note: A fine tuning of the R11 value might be necessary.

2 Schematic diagrams

Figure 1. STEVAL-A6986IV1 board schematic



Note: The evaluation board embeds an input EMI filter (on the bottom side). If the filter is not necessary or needs to be bypassed for any test, a 0 Ω resistor can be placed on R16 (bottom side).

Revision history

Table 1. Document revision history

Date	Version	Changes
08-Mar-2021	1	Initial release.
31-Jul-2021	2	Updated cover page summary table.

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