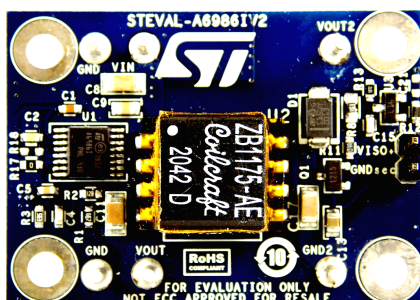


## 38 V, 5 W synchronous iso-buck converter evaluation board with single isolated output based on the A6986I



### Features

- AEC-Q100 qualified
- Operating temperature range: -40 °C to 135 °C for Tj
- 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  $\mu$ A IQ-SHTDWN
- Adjustable f<sub>SW</sub> and synchronization
- Embedded primary output voltage supervisor
- Adjustable soft-start time
- Internal primary current limiting
- Overvoltage protection
- R<sub>DS(on)</sub> HS = 180 m $\Omega$ , R<sub>DS(on)</sub> LS = 150 m $\Omega$
- Thermal shutdown

### Description

The STEVAL-A6986IV2 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 as well as 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 an isolated voltage (around 5 V, easily adjustable), especially suitable for applications requiring a single isolated supply.

| Product summary   |   |
|---|---|
| 38 V, 5 W synchronous iso-buck converter evaluation board with single isolated output based on the A6986I | STEVAL-A6986IV2   |
| 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)<br>On Board Charger (OBC) |

## 1 Isolated voltage adjustment

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If different isolated voltage values are required, simple voltage adjustment is possible by changing the resistor divider composed of R12 and R13 according to the following equation:

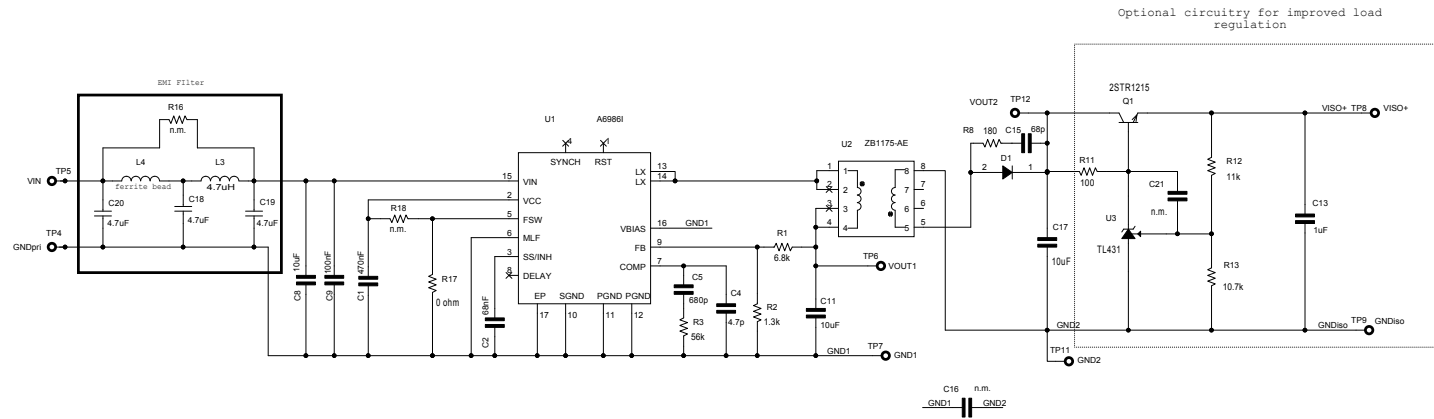
$$V_{ISO} = 2.49 \frac{R_{12} + R_{13}}{R_{13}}$$

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

## 2

## Schematic diagrams

Figure 1. STEVAL-A6986IV2 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  $\Omega$  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 product summary table. |

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