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STEVAL-ISV009V1

300 W photovoltaic converter demonstration board based on the SPV1020

Data brief

Features

- PWM mode DC-DC boost converter
- Duty cycle controlled by MPPT algorithm with 0.2% accuracy
- Operating voltage range: 0-40 V
- Overvoltage, overcurrent and overtemperature protection
- Built-in soft-start
- Up to 98% efficiency
- Automatic transition to burst mode for improved efficiency during low solar radiation
- SPI interface
- RoHS compliant

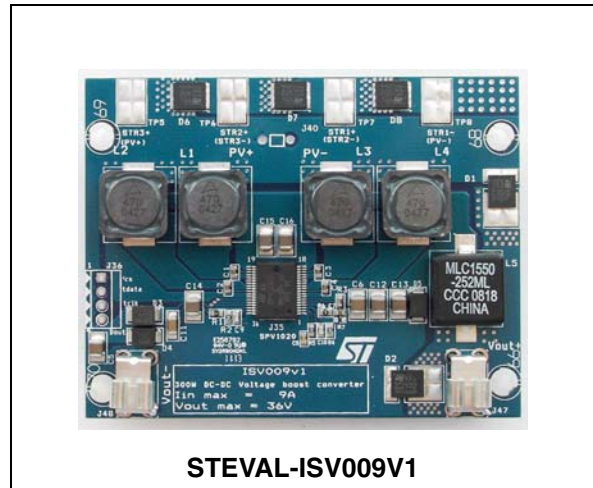
Description

The STEVAL-ISV009V1 demonstration board is based on the SPV1020, which is a monolithic DC-DC boost converter designed to maximize the power generated by photovoltaic panels independent of temperature and amount of solar radiation.

The optimization of the power conversion is obtained with embedded logic which performs the MPPT (max power point tracking) algorithm on the PV cells connected to the converter.

One or more converters can be housed in the connection box of the PV panels, replacing the bypass diodes and, thanks to the fact that the maximum power point is locally computed, the efficiency at system level is higher than that of conventional topologies, where the MPP is computed in the main centralized inverter.

For a cost effective application solution and miniaturization needs, the SPV1020 embeds the power MOSFETs for active switches and synchronous rectification, minimizing the number of external devices necessary. Furthermore, the 4-phase interleaved topology of the DC-DC



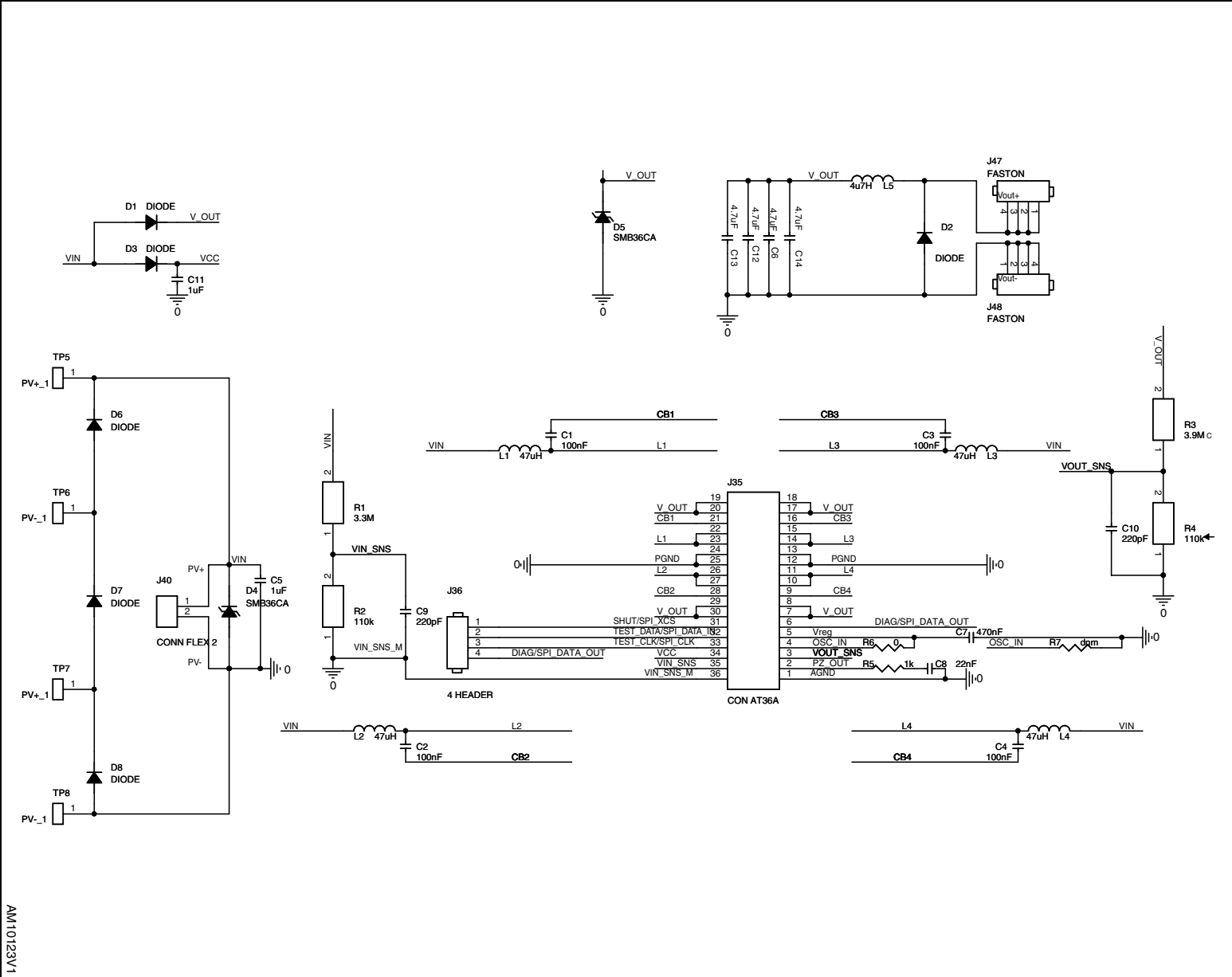
converter eliminates the need for electrolytic capacitors, which would severely limit lifetime.

It works at a fixed frequency in PWM mode, where the duty cycle is controlled by the embedded logic running a “perturb & observe” MPPT algorithm. The switching frequency, internally generated and set by default at 100 kHz, is externally tunable, while the duty cycle can range from 5% to 90% with a step of 0.2%.

Safety of the application is guaranteed by stopping the drivers in case of output overvoltage or overtemperature.

1 Schematic diagram

Figure 1. STEVAL-ISV009V1 circuit schematic



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
08-Aug-2011	1	Initial release.

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