STEVAL-ISV008V1

300 W PV converter demonstration board to be integrated into a photovoltaic panel 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, overtemperature protections
- Built in soft-start
- Up to 98% efficiency
- Automatic transition to burst mode for improved efficiency at low solar radiation
- SPI interface
- RoHS compliant

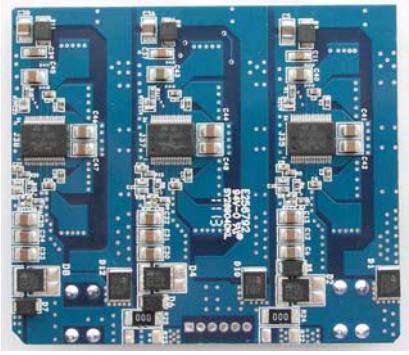
Description

The STEVAL-ISV008V1 demonstration board contains 3 SPV1020s in the same PCB and is suitable for distributed PV panels with 3 isolated strings. The outputs of the SPV1020s can be connected in parallel (STEVAL-ISV008v1 default setting) or in series, despite the pairs of independent inputs. For the STEVAL-ISV008v1 only the output parallel connection is allowed.

The SPV1020 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 (maximum 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, because 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.



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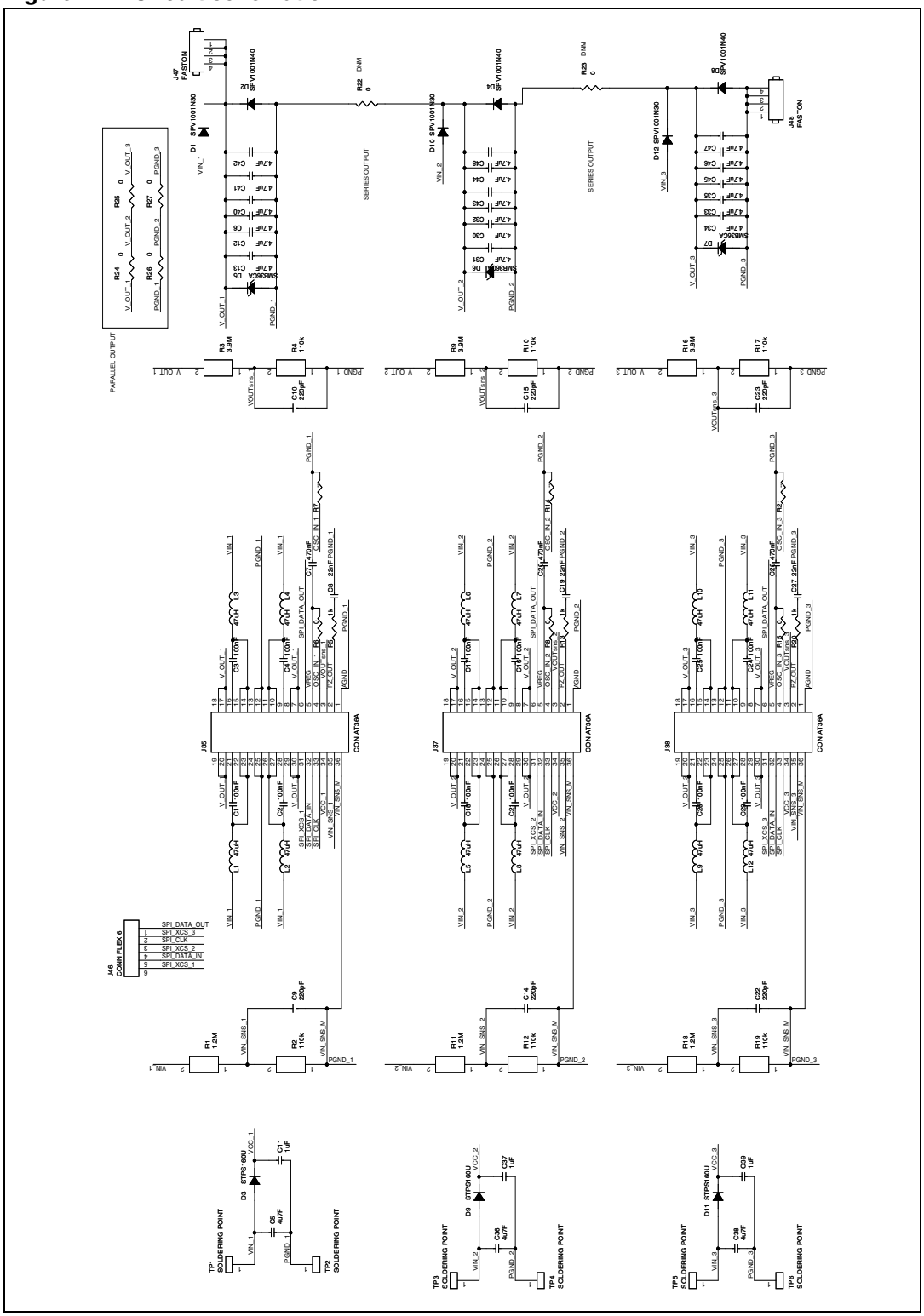
For a cost effective application solution and miniaturized system, the SPV1020 embeds the Power MOSFETs for active switches and synchronous rectification, minimizing the number of external devices. Furthermore, the 4-phase interleaved topology of the DC-DC converter avoids the use of electrolytic capacitors, which would severely limit the lifetime.

The SPV1020 operates at 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 adjustable. The duty cycle can range from 5% to 90% with a resolution of 0.2%.

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

1 Circuit schematic

Figure 1. Circuit schematic



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
11-May-2011	1	Initial release.
30-Nov-2011	2	Updated description on cover page.