



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

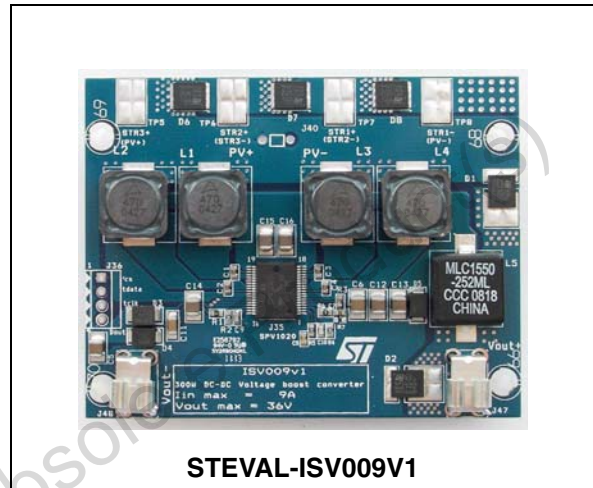
Description

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



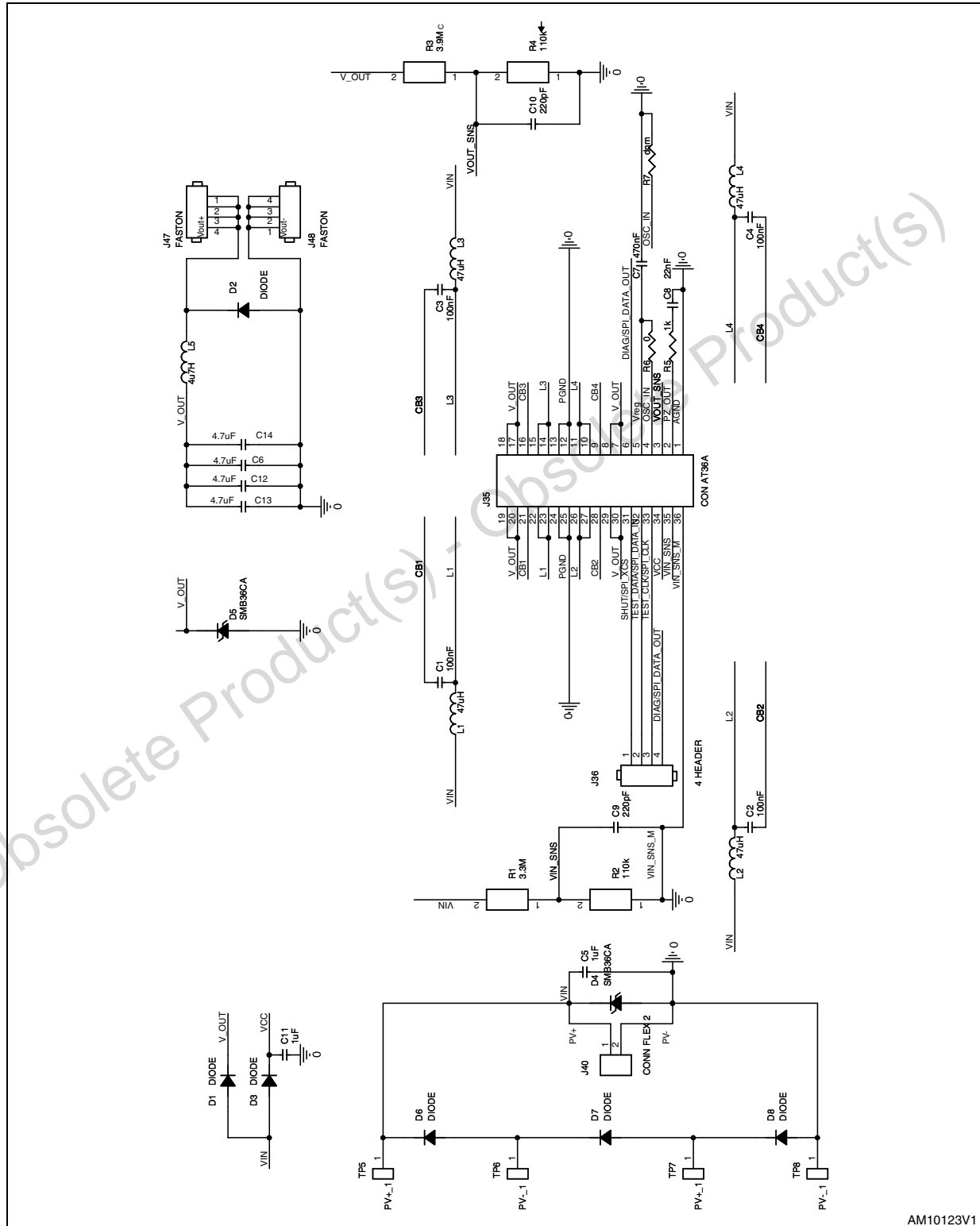
converter eliminates the need for electrolytic capacitors, which would severely limit lifetime.

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



AM10123V1

2 Revision history

Table 1. Document revision history

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

Obsolete Product(s) - Obsolete Product(s)

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2011 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com