



# STEVAL-ISV015V1

Up to 2.5 W solar USB supply based on the SPV1040 and LD39050

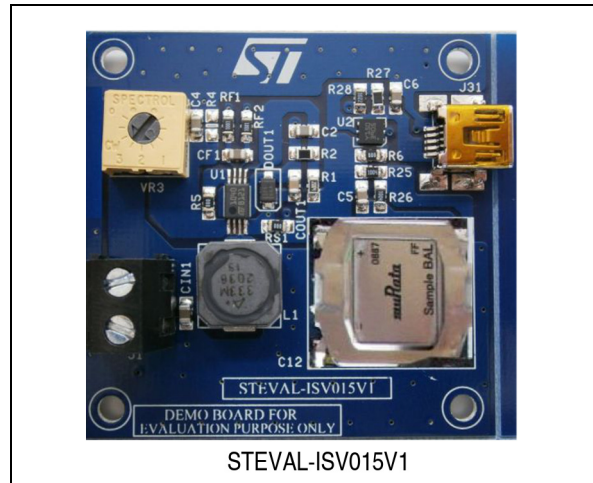
Data brief

## Features

- Proprietary “Perturb and Observe” embedded MPPT algorithm
- Very low input voltage (down to 0.3 V)
- Input reverse polarity protection
- Fully integrated solution with power MOSFET, reverse blocking, diode and output current sense resistor
- Ultra low dropout and low noise, low quiescent current LDO
- RoHS compliant

## Description

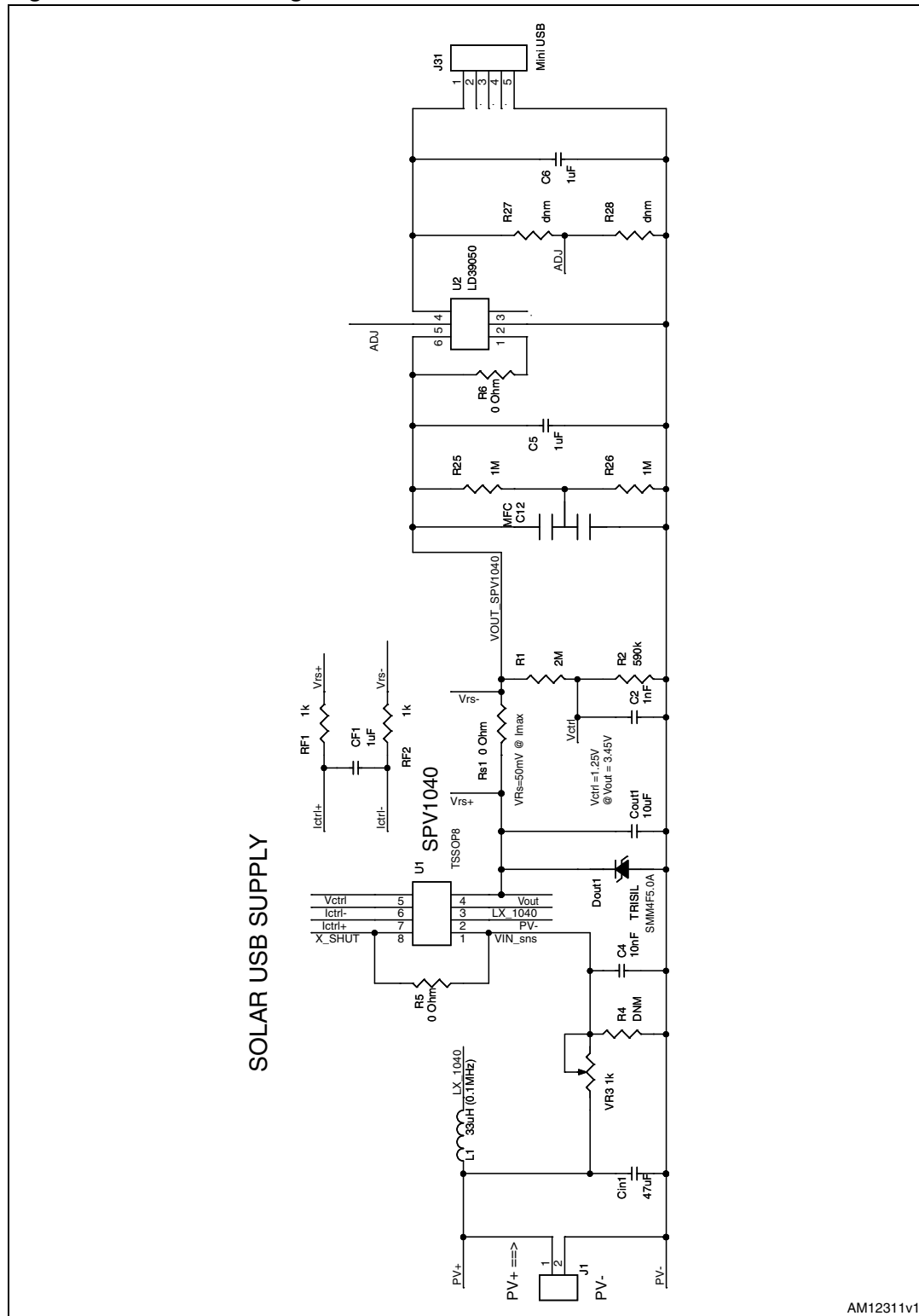
The STEVAL-ISV015V1 demonstration board is a solar harvester system designed to supply USB devices and is based on the ST devices SPV1040 (solar voltage boost converter) and LD39050 (voltage regulator with low quiescent current and low noise). The SPV1040 is a high efficiency, low power and low voltage monolithic step-up converter that operates over a 0.3 V to 5 V input voltage range, therefore allowing the use of even a few solar cells in all portable applications where the capability of handling low input voltages is of utmost importance. Despite the variation of several conditions throughout the day (such as irradiation, dirt, temperature, etc.) the SPV1040 allows the achievement of maximum efficiency (90% typ.) in terms of power harvested from the cells and transferred to the output thanks to the embedded MPPT algorithm. The SPV1040 allows the output voltage to be regulated by using an external resistive divider up to 5.2 V, limiting the current supplied to protect the battery and the measuring of input current and voltage to research the maximum power point through a dedicated input pin. Furthermore, the device can be shut off by driving an XSHUT pin to a logic level low, in order to save power when its working mode is not required. Self protection features like



overtemperature and overcurrent at the input are implemented. The LD39050 provides 500 mA maximum current from an input voltage ranging from 1.5 V to 5.5 V with a typical dropout voltage of 200 mV. It is available in a fixed output voltage version from 0.8 V up to 4.5 V (100 mV steps), or adjustable between 0.8 V and  $V_{in} - V_{drop}$ . The ultra low drop-voltage, low quiescent current and low noise features make it suitable for low power battery-powered applications. Stability is ensured using ceramic capacitors. The power supply rejection is 65 dB at low frequencies and starts to roll off at 10 kHz. An enable logic control function puts the LD39050 in shut-down mode allowing a total current consumption of lower than 1  $\mu$ A. The device also includes short-circuit constant current limiting and thermal protection.

# 1 Schematic diagram

Figure 1. Schematic diagram



## 2 Revision history

**Table 1. Document revision history**

Date	Revision	Changes
28-May-2012	1	Initial release.
11-Jun-2012	2	Changed: title of the document

**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.

© 2012 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](http://www.st.com)