



STEVAL-ISV014V1

Up to 3 W solar and USB battery charger for single-cell Li-Ion and Li-Po batteries based on the SPV1040, STBC21 and STC3100

Data brief

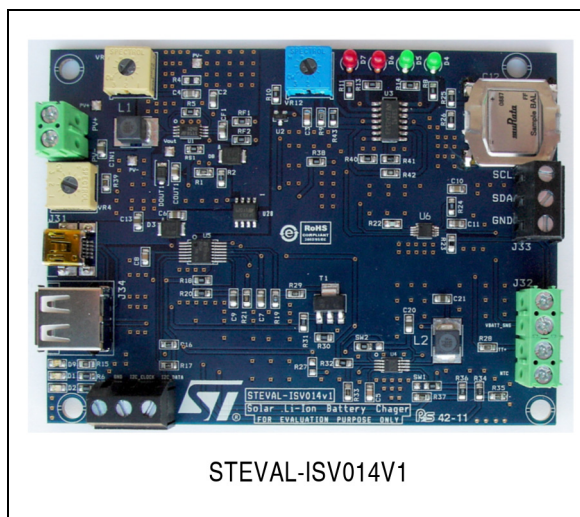
Features

- Solar section
 - Solar energy harvester with proprietary “Perturb and Observe” embedded MPPT algorithm
 - Reverse polarity protection for solar panel connection
- Battery charging section
 - Both linear and quasi-pulse operation, with programmable charge current (up to 1 A) in both fast charge and pre-charge mode
 - Selectable 4.1 V and 4.2 V output voltage ($\pm 1\%$ accuracy)
 - Programmable termination current, pre-charge mode voltage threshold and charge time setting by I²C
 - Coulomb counter available via I²C
 - Status outputs to drive LEDs or host processor interface
 - Charge status LED indicator
- Battery protection section
 - Battery absence detection
 - Battery thermal control (monitoring and protection) by NTC or PTC thermistor interface
- 5 V USB supply output from external battery
- RoHS compliant

Description

The STEVAL-ISV014V1 demonstration board provides a very high level of integration being based on the ST devices SPV1040 (solar energy harvester and power optimizer), STBC21 (single cell Li-Ion battery charger) and STC3100 (gas gauge).

The STEVAL-ISV014V1 controls the single-cell Li-Ion battery charging thanks to the STBC21, which can be supplied by a solar panel or by an



USB (type-A connector) compatible supply. The battery charging status set by STBC21 can be controlled via I²C. Safety during the battery charge process is guaranteed by the gas-gauge controller device STC3100.

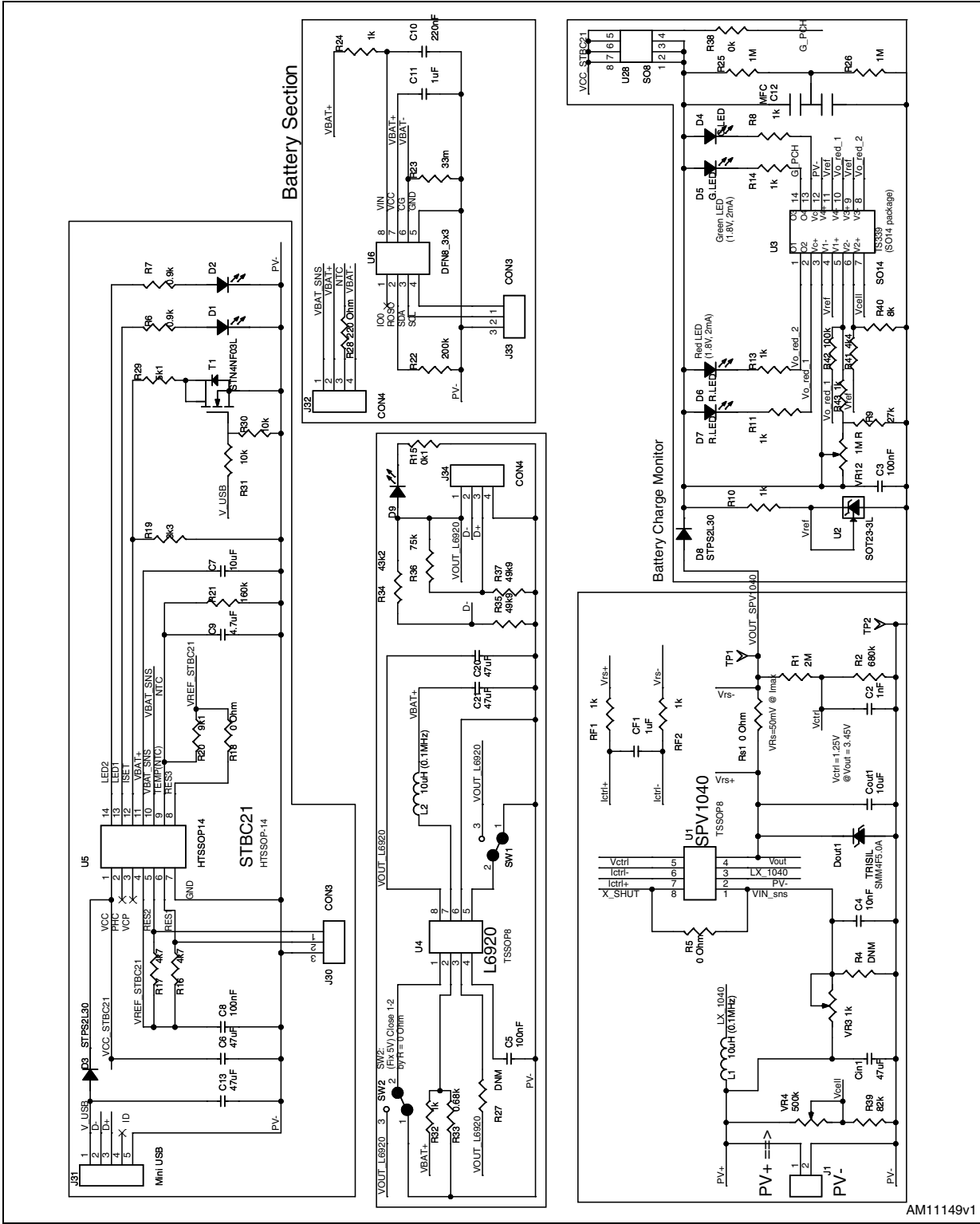
When the energy is provided by the solar panel, the SPV1040 optimizes the power extracted from the source and boosts the voltage, charging a 440mF super-capacitor, which is connected to the input stage of the STBC21 by a STS5PF30L P-channel power MOSFET.

Furthermore, the STEVAL-ISV014V1 can be used to supply a type-B USB compatible load by an external Li-Ion battery. In this case, the L6920 voltage boost controller will regulate the battery voltage up to the 5 V required by the USB standard.

Finally, the STEVAL-ISV014V1 has a dedicated charging monitor circuitry implemented by 4 LEDs and by the TS339 quad comparator.

1 Circuit schematic

Figure 1. Circuit schematic



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
19-Jul-2012	1	Initial release.
28-Aug-2012	2	Updated part number on the cover page from STPS5PF30L to STS5PF30L

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