



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



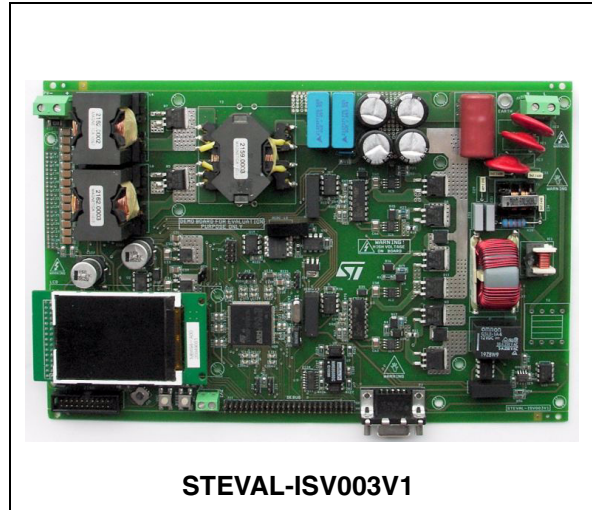
Features

- Input voltage range from 20 V to 40 V
- Output voltage 230 V AC, 50 Hz
- Grid connection algorithm and MPPT capability
- Digital control section managed by the STM32
- Reactive power management
- RS-232 for communication
- RoHS compliant

Description

The STEVAL-ISV003V1 is a demonstration board which implements the microinverter concept and is designed to optimize the power production of each single solar panel by means of DC-AC conversion. The conversion system is capable of both grid synchronization and maximum power point tracking (MPPT) thanks to the use of an advanced control algorithm implemented in the 32-bit STM32 microcontroller. The MPPT function is based on the perturb and observe (P & O) concept which seeks the best operating point of the panel, thus maximizing the energy produced under any environmental condition. The grid synchronization algorithm has the advantage over standard solutions of a decoupled control of active and reactive power. The STEVAL-ISV003V1 demonstration board uses a high-frequency (HF) isolated DC-DC converter with interleaved current and an optimized full-bridge DC-AC inverter. The typical solar panel voltage is first stepped up to about 400 V and then converted into AC to create a sinusoidal output.

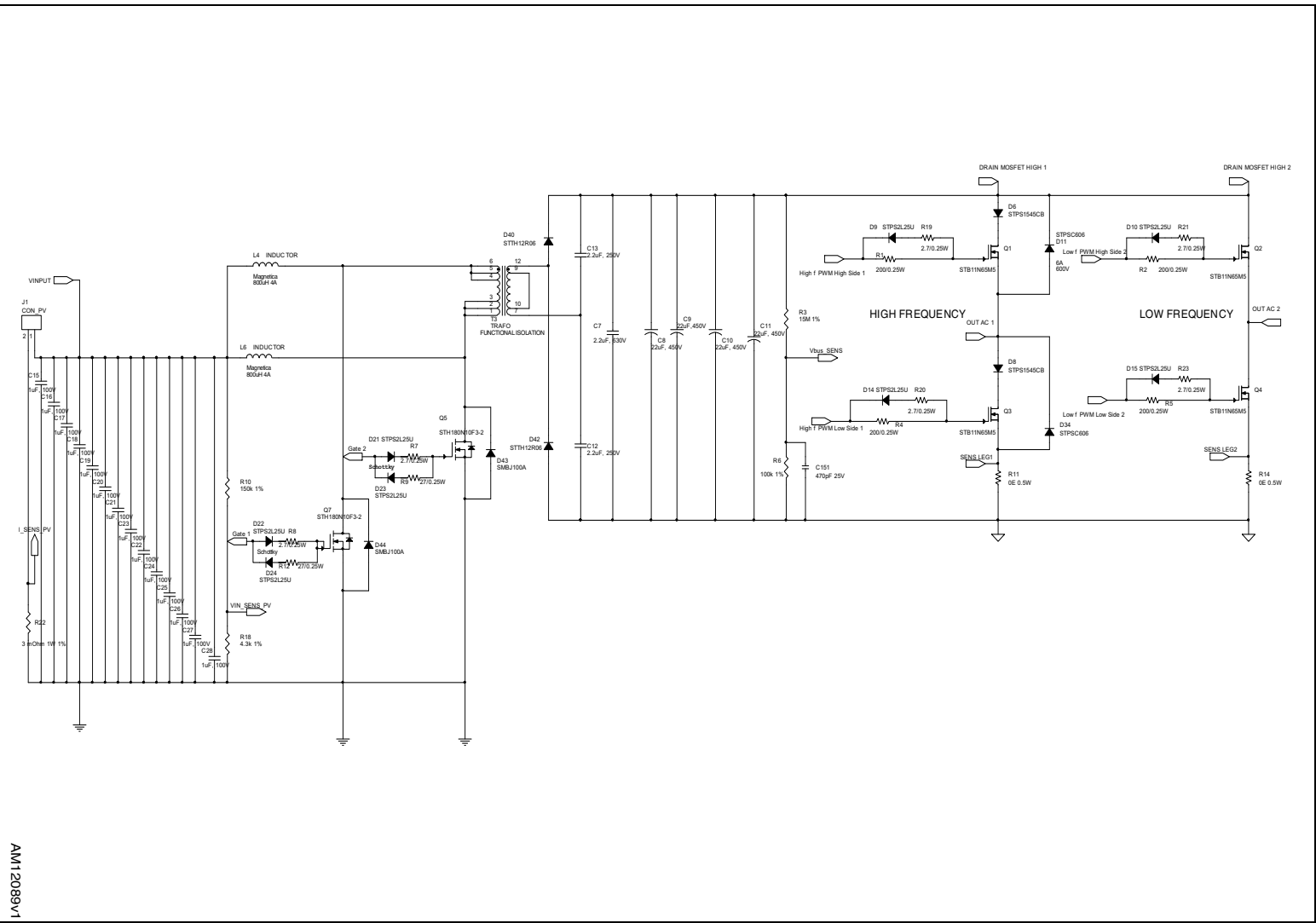
An LED display provides a user-friendly interface for the end user which allows the monitoring and/or modifying of some of the main operating parameters. Two modes of operation are available and can be selected to allow either open-loop operation or closed-loop operation in synchronization with the grid.



In open-loop mode the sinusoidal reference is created internally by means of a standard lookup table, while in closed-loop mode, a sinusoidal voltage feedback which is proportional to the grid voltage is used. This system can be connected to a 50 Hz network (STEVAL-ISV003V1) and to a 60 Hz network (STEVAL-ISV003V2), based on local requirements. The RS-232 interface can be used for serial data transfer of specified voltage, current and current signals.

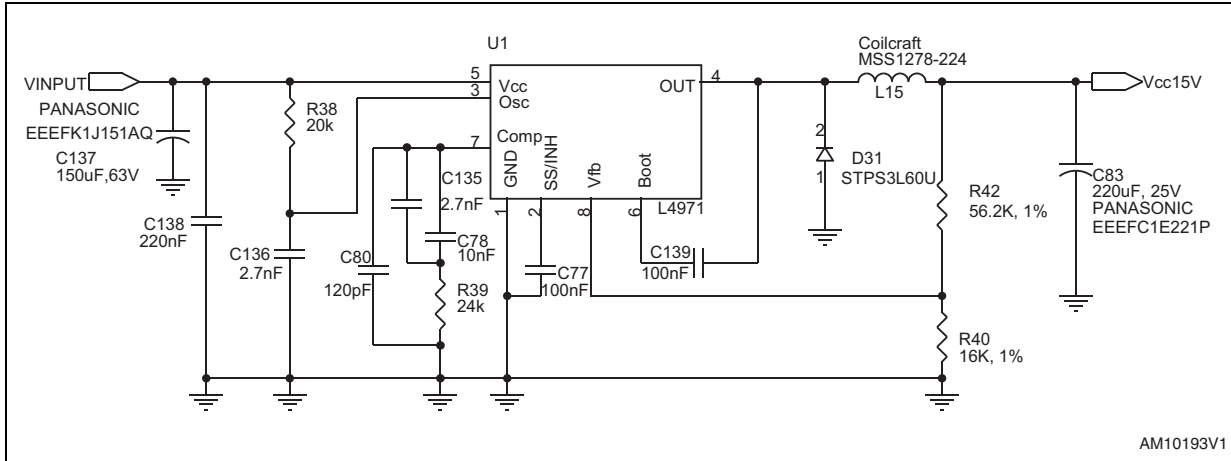
1 Schematic diagrams

Figure 1. Isolated interleaved boost converter



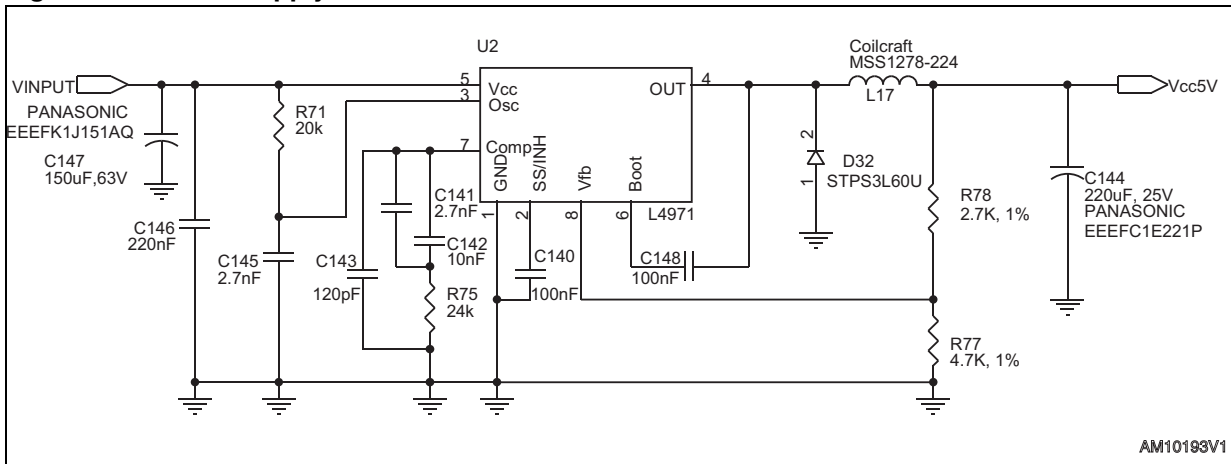
AM12089v1

Figure 2. Power supply section - 15 V



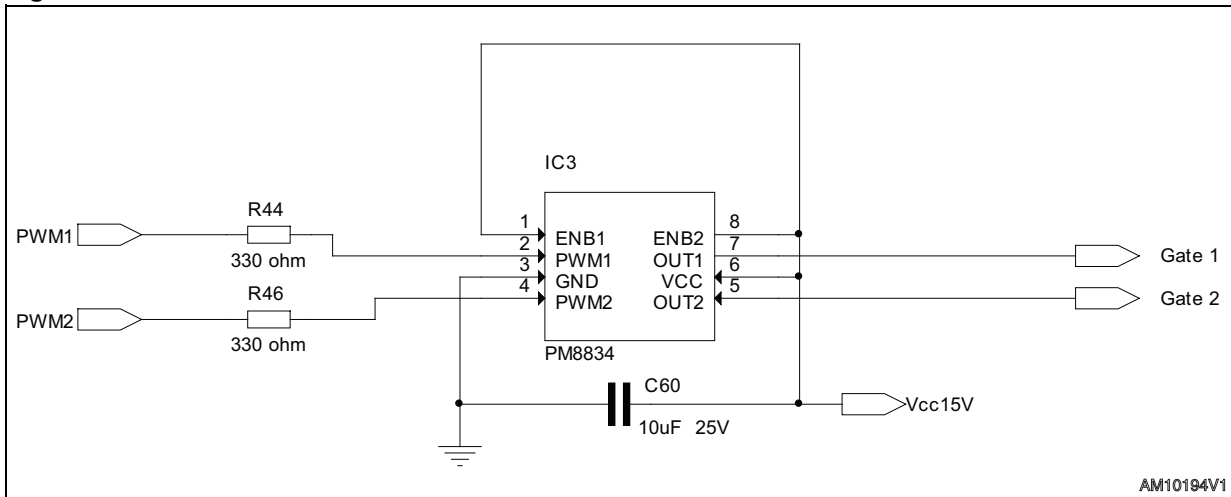
AM10193V1

Figure 3. Power supply section - 5 V



AM10193V1

Figure 4. DC-DC drive section



AM10194V1

Figure 5. 5 V isolated

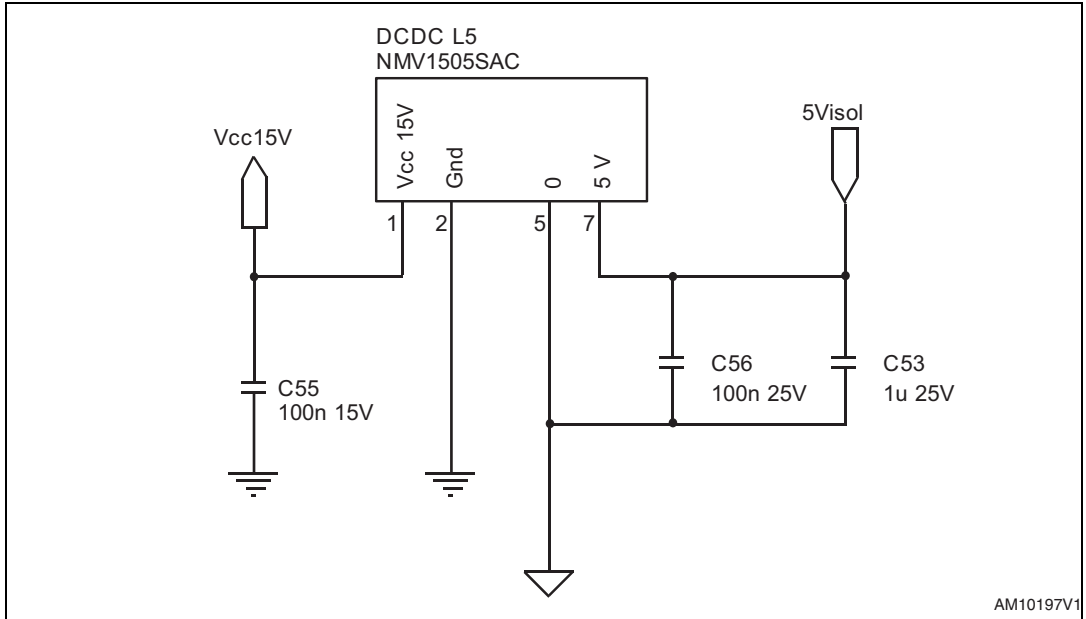


Figure 6. PV voltage sensing section

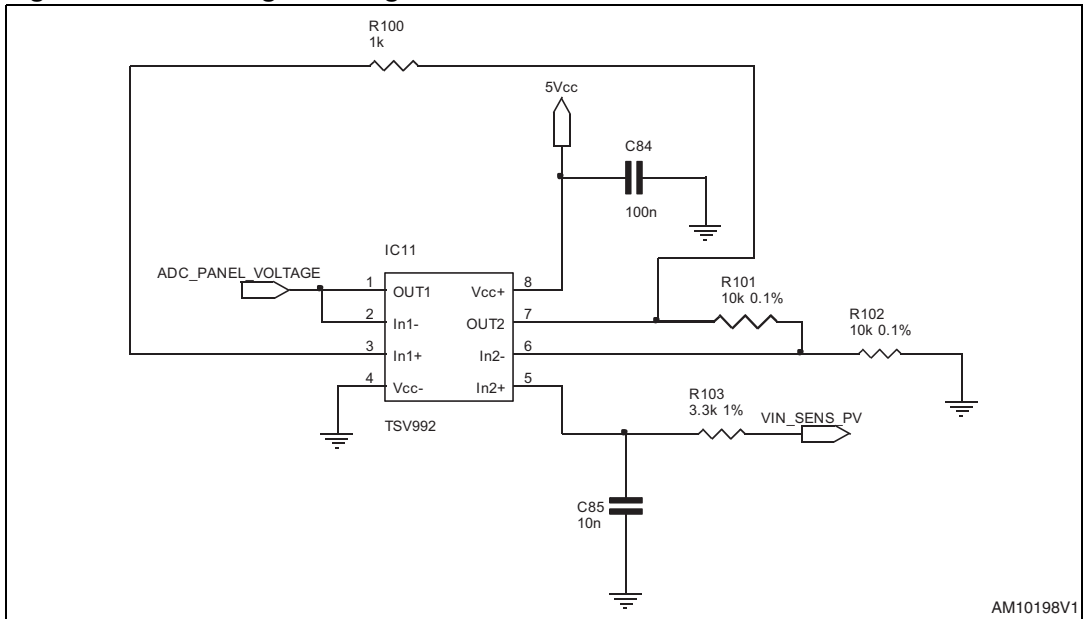


Figure 7. Output AC line filter

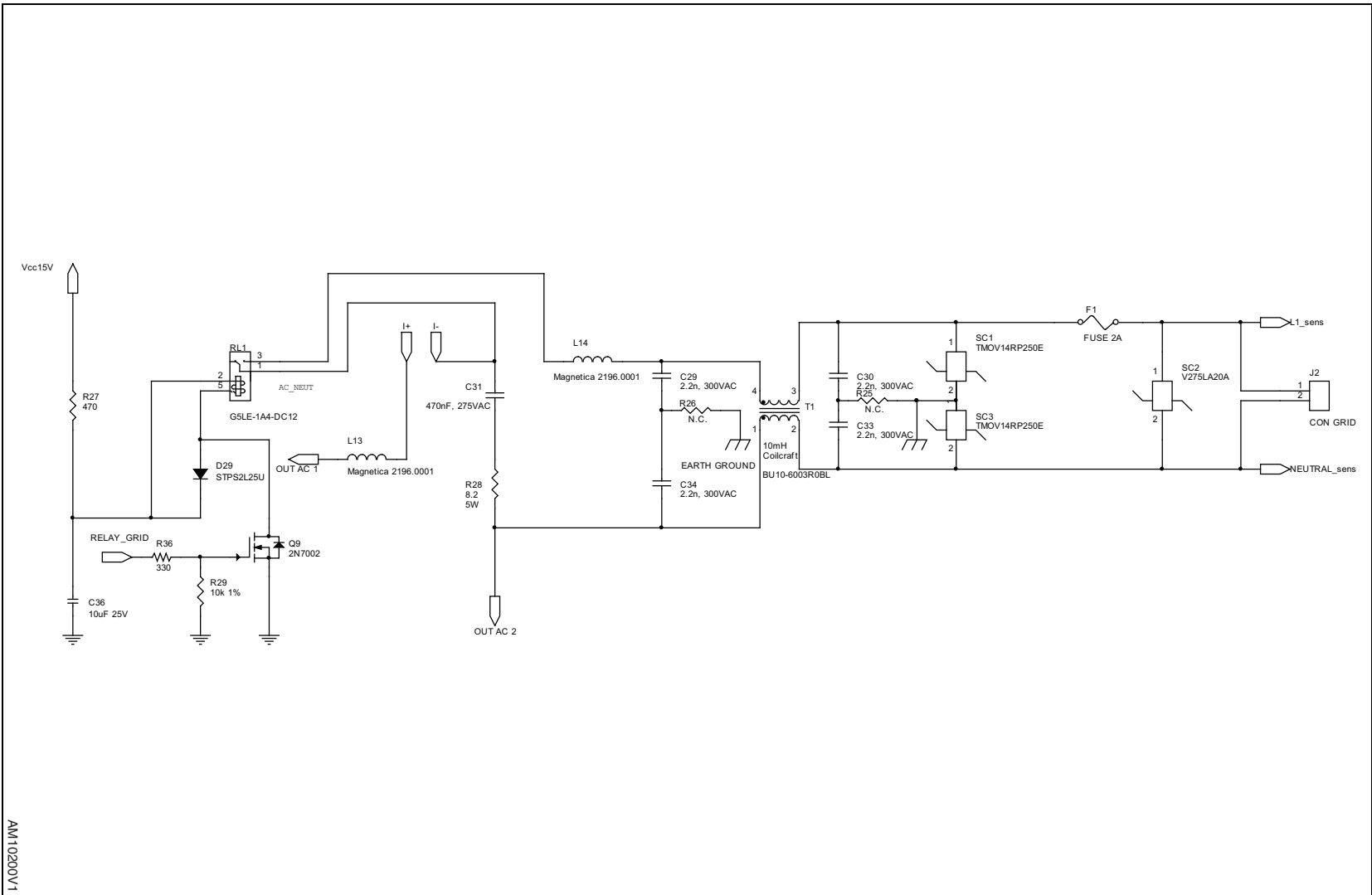


Figure 8. Output current sensor

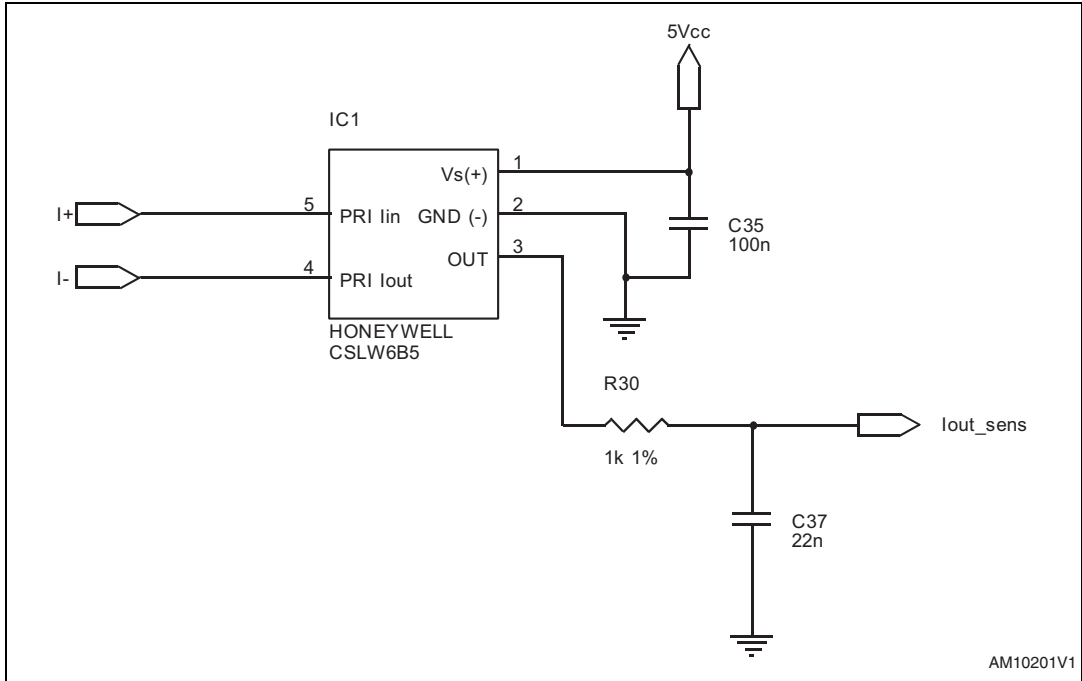


Figure 9. AC line current sensing

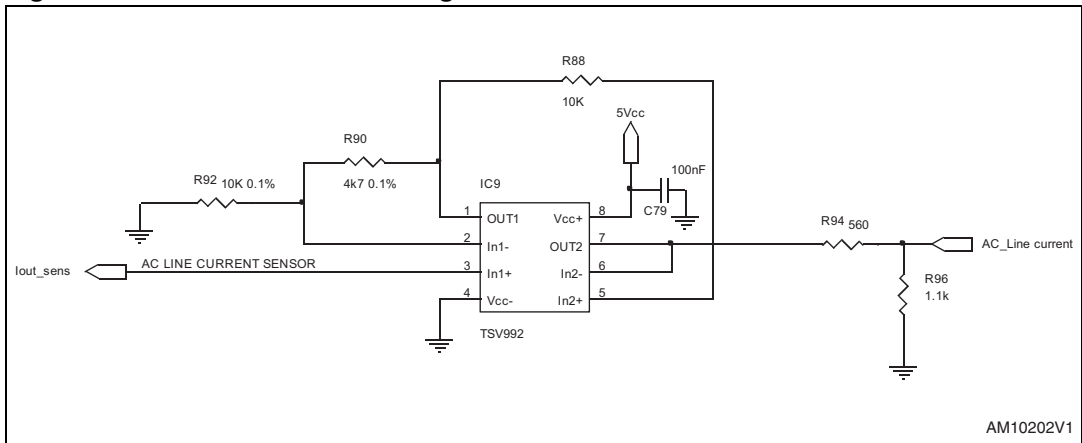
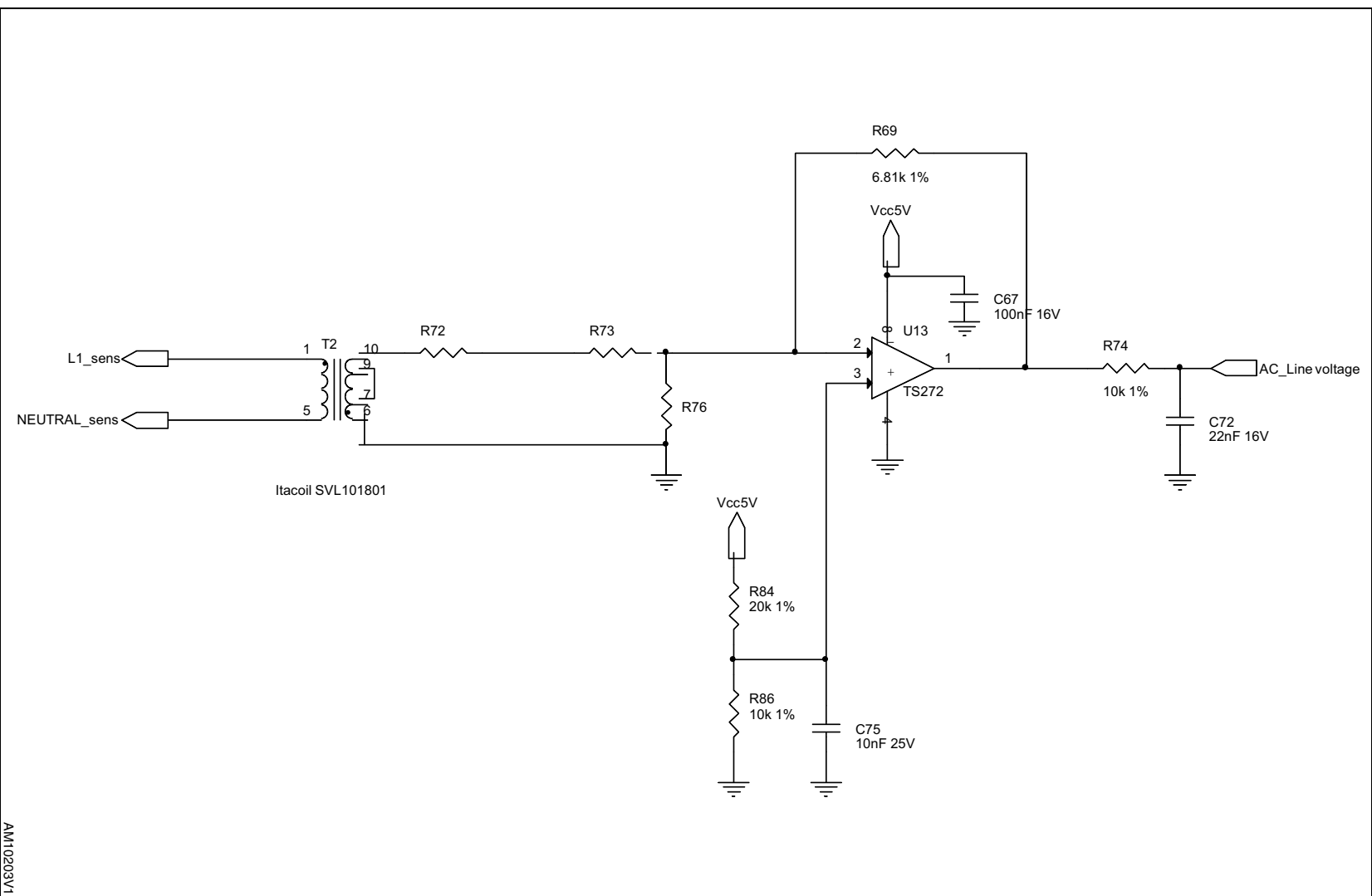


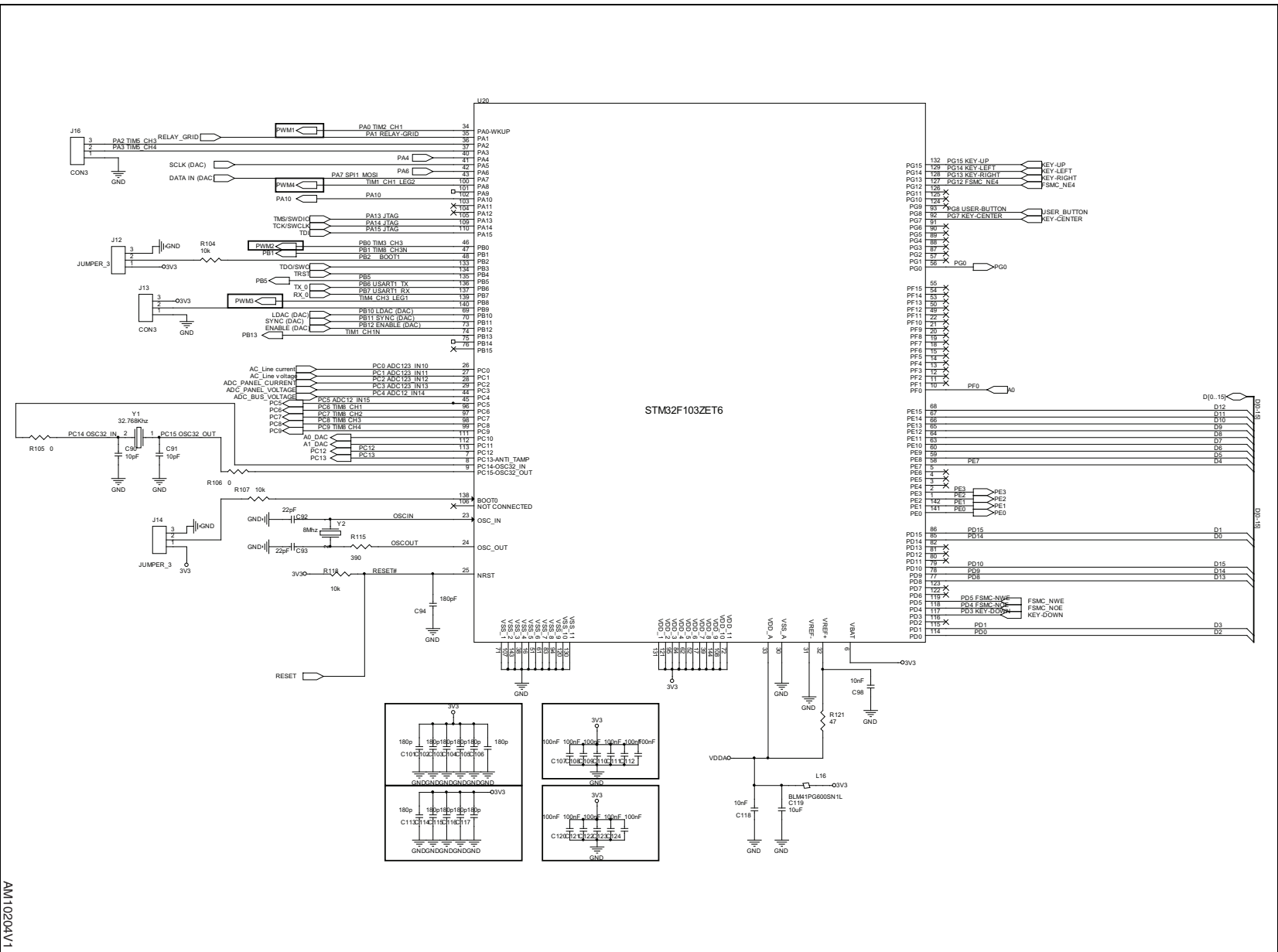
Figure 10. Vout sensing section

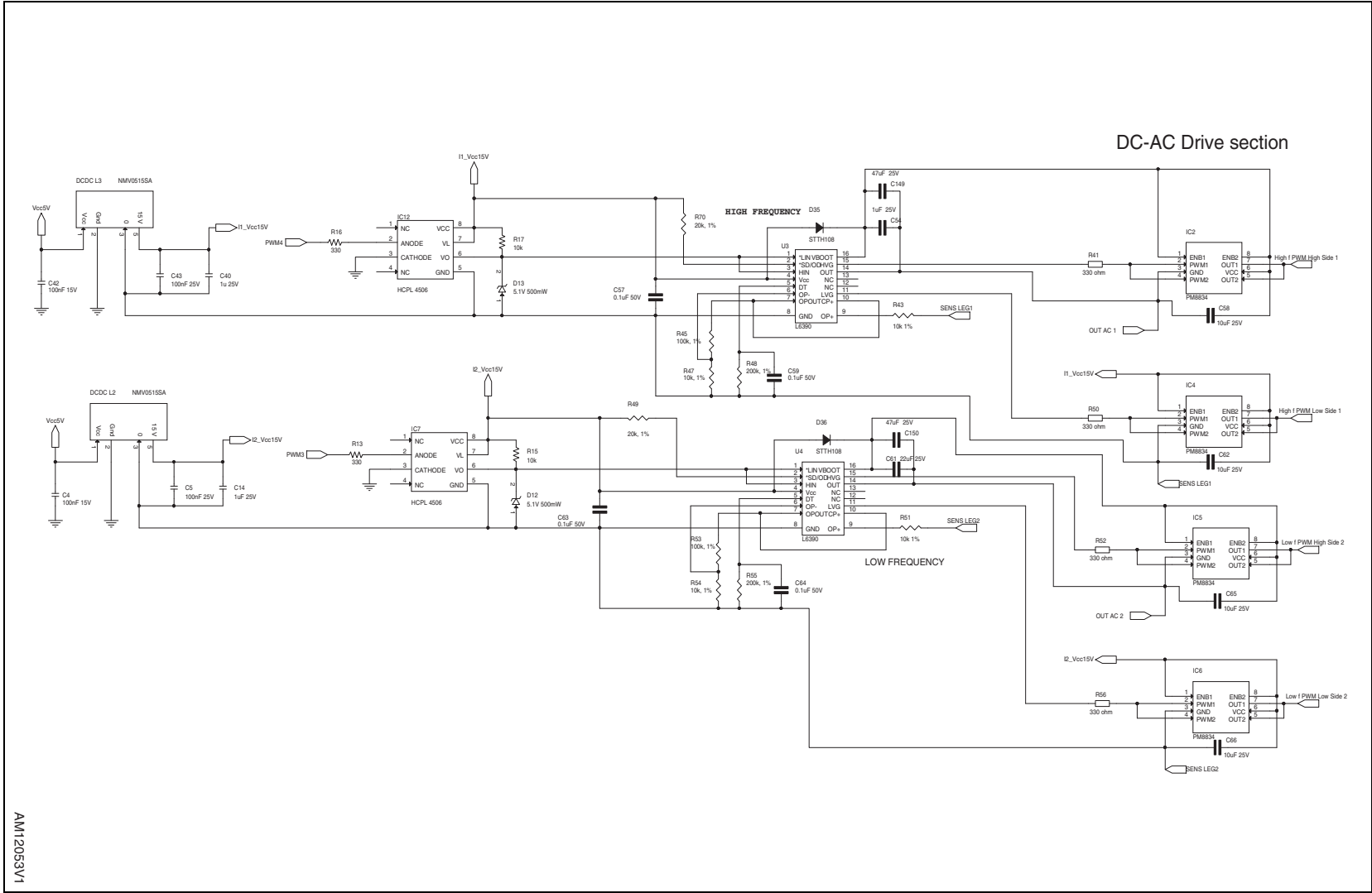


AM10203V1



Figure 11. 32 bit MCU-STM32F electrical schematic

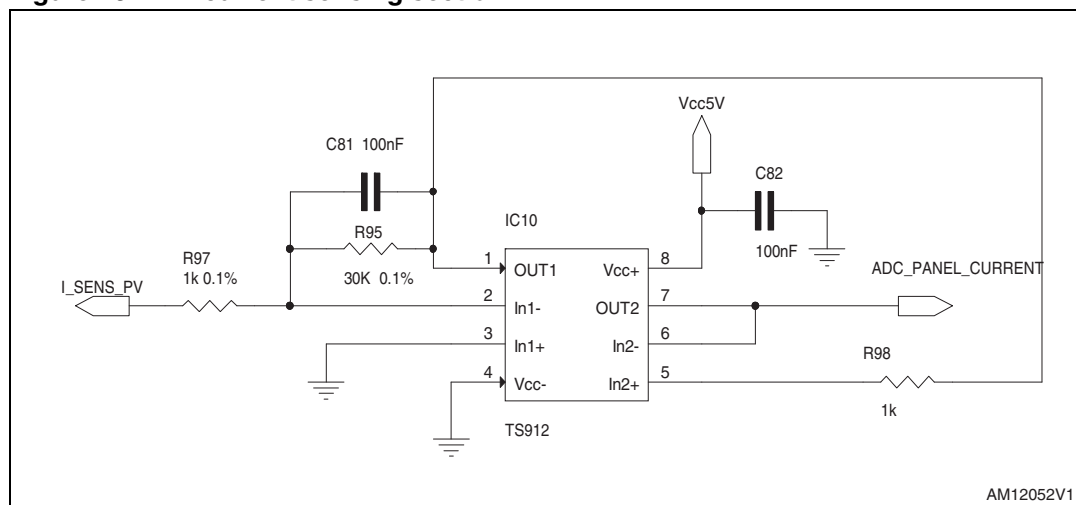




AM12053V1

Figure 12. DC-AC section driver

Figure 13. PV current sensing section



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
07-Oct-2011	1	Initial release.
11-Oct-2011	2	Minor text changes on cover page.
12-Nov-2012	3	– Added: Figure 12 and 13 – Minor text changes throughout 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