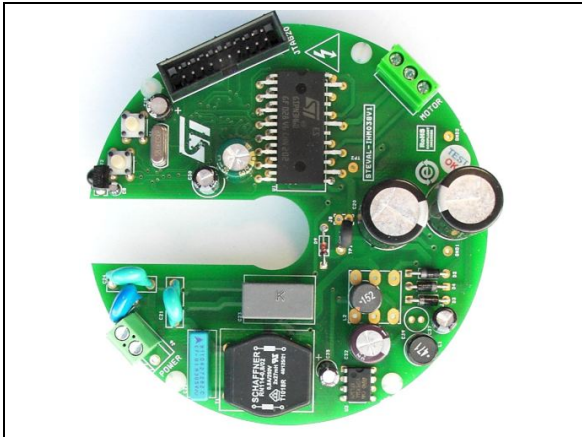


BLDC ceiling fan controller based on the STM32 and SLLIMM-nano

Data brief



Features

- Maximum input voltage: 265 V AC or 375 V DC
- Minimum input voltage: 90 V AC or 128 V DC
- Output power for applied motor: up to 50 W
- +15 V auxiliary power supply based on the VIPER16 in a non-isolated buck configuration
- Compact design using the SLLIMM™-nano STGIPN3H60 consisting of 600 V IGBTs with gate drivers, op amp for current sensing and comparator
- Passive PFC circuit for power factor correction
- On-board infrared (IR) receiver/demodulator for speed and on/off control using IR remote
- External EEPROM M24C01 for recovery of last speed setting
- Hardware overcurrent protection
- Overtemperature protection with NTC thermistor
- Overvoltage and undervoltage detection
- Based on 32-bit ARM® Cortex™-M3 core-based microcontroller STM32F100C6T6B
- Firmware based on STM32 PMSM FOC SDK 3.0 motor control firmware library and fully customized for the ceiling fan application

- FOC (field oriented control) sensorless algorithm
- PCB size customized for ceiling fan design
- PCB diameter: 105 mm
- Double-sided layout
- RoHS compliant

Description

The STEVAL-IHM038V1 system evaluation board implements a BLDC/PMSM fan controller board which is based on the SLLIMM™-nano (small low-loss intelligent molded module) STGIPN3H60 and STM32F100C6T6B microcontroller. The STEVAL-IHM038V1 incorporates a complete inverter stage and a control stage to drive a 3-phase BLDC fan motor with a power range of 30-35 W with FOC (field oriented control) sensorless mode for the ceiling fan applications. For power factor correction, a passive PFC stage is implemented to achieve a power factor up to 0.90, which is the minimum recommended for ceiling fan applications, particularly for the Indian market. To set the speed by remote control, an on-board IR demodulator is available.

The inverter stage is implemented using the intelligent power module SLLIMM™-nano STGIPN3H60 which embeds 600 V IGBTs with gate drivers, op amp for current sensing and a comparator in a single NDIP-26L package, resulting in a reliable and compact system design.

The control part includes field oriented control with sensorless control algorithm, fault detection and speed setting via remote control (IR receiver), all handled by the STM32F100C6T6B microcontroller from ST's ARM® Cortex™-M3 core-based low density STM32™ MCU family.

Figure 2. JTAG connector

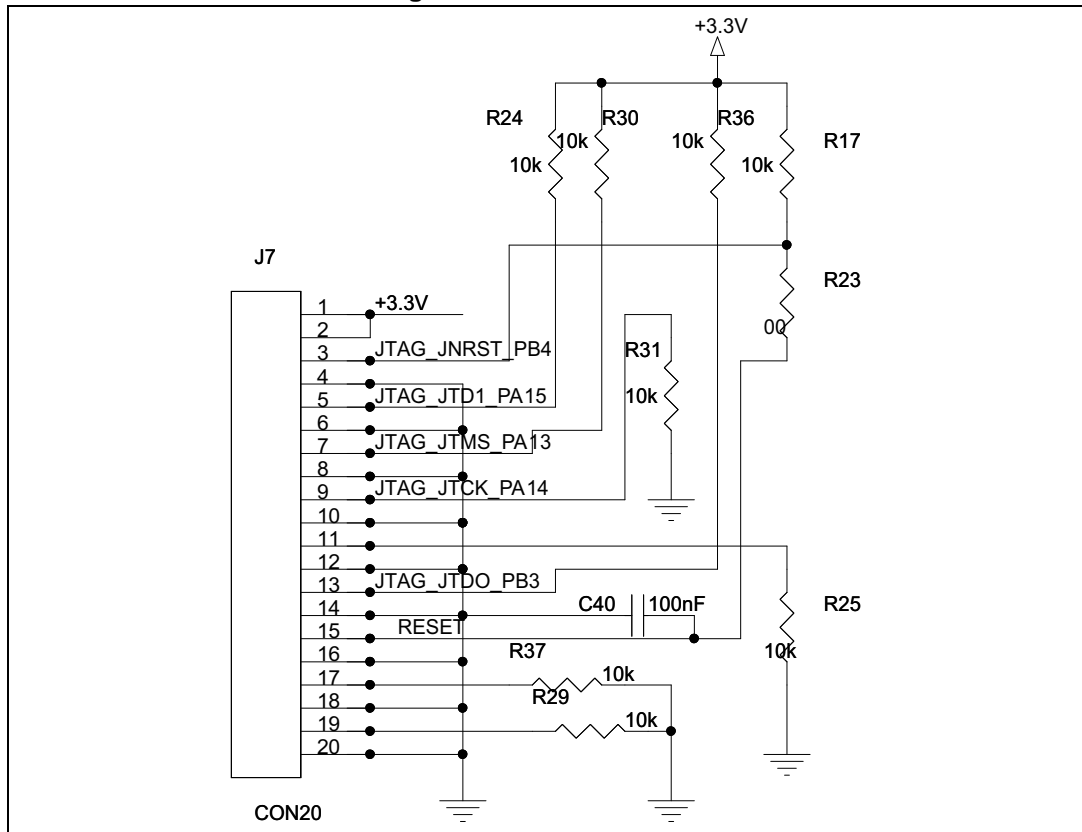


Figure 3. EEPROM section

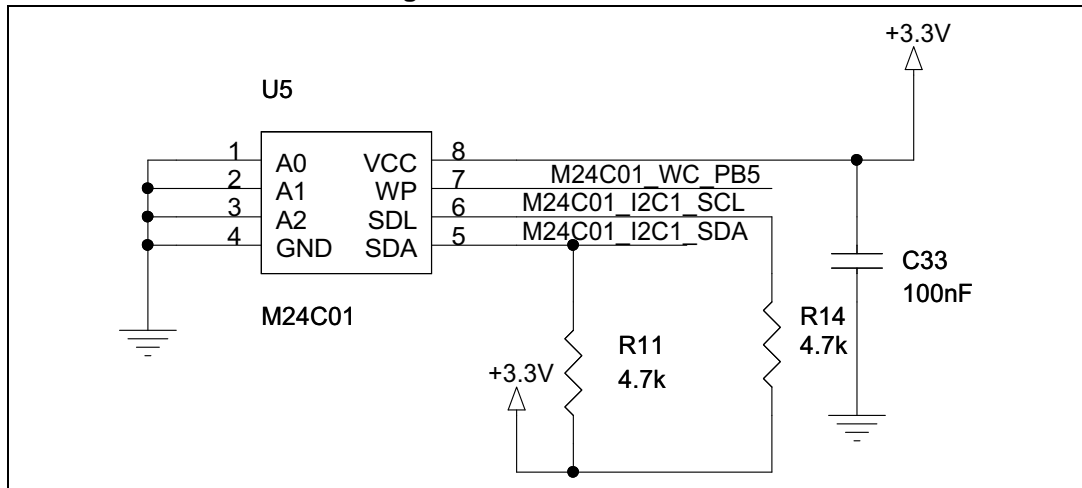


Figure 4. Power section

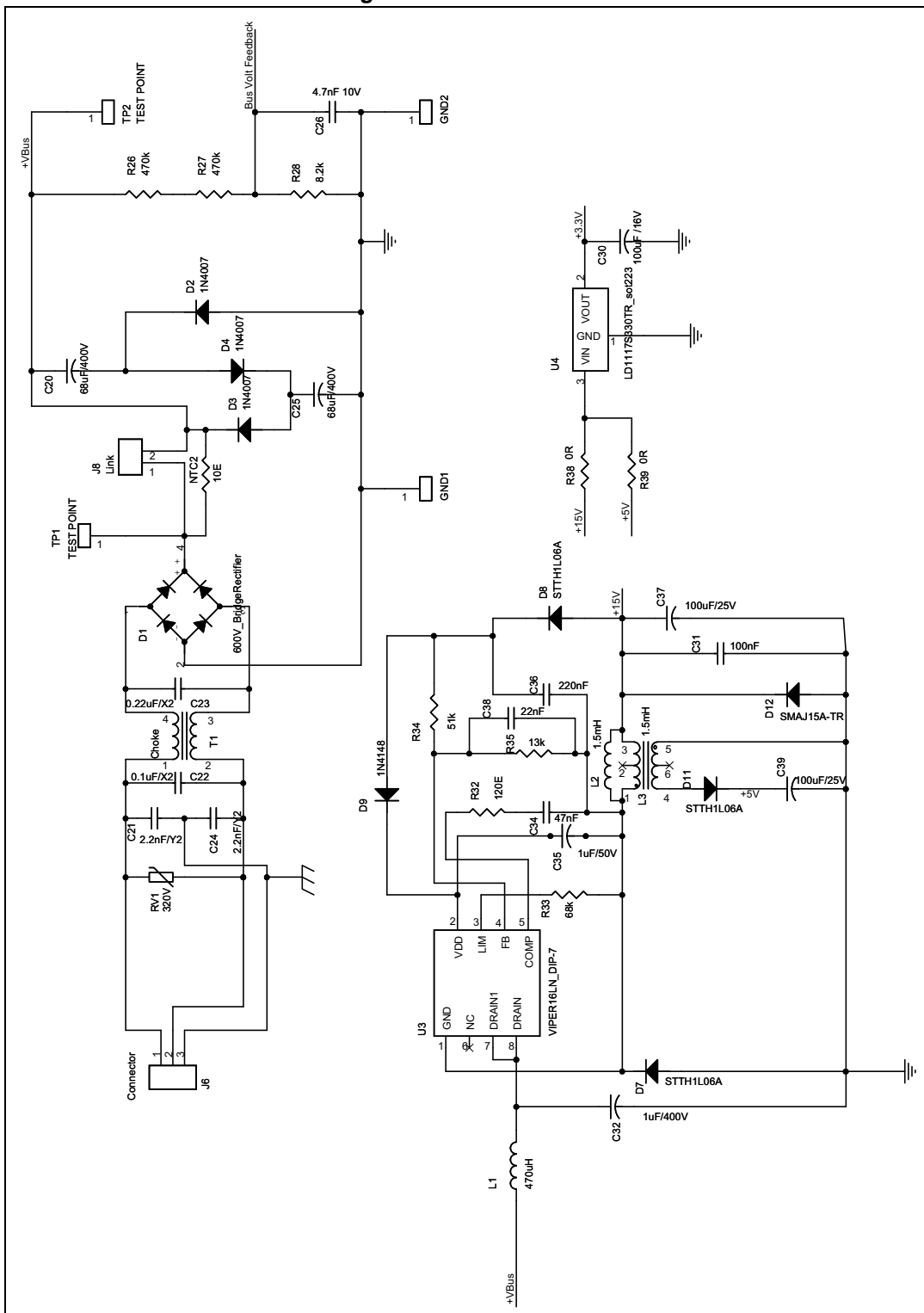
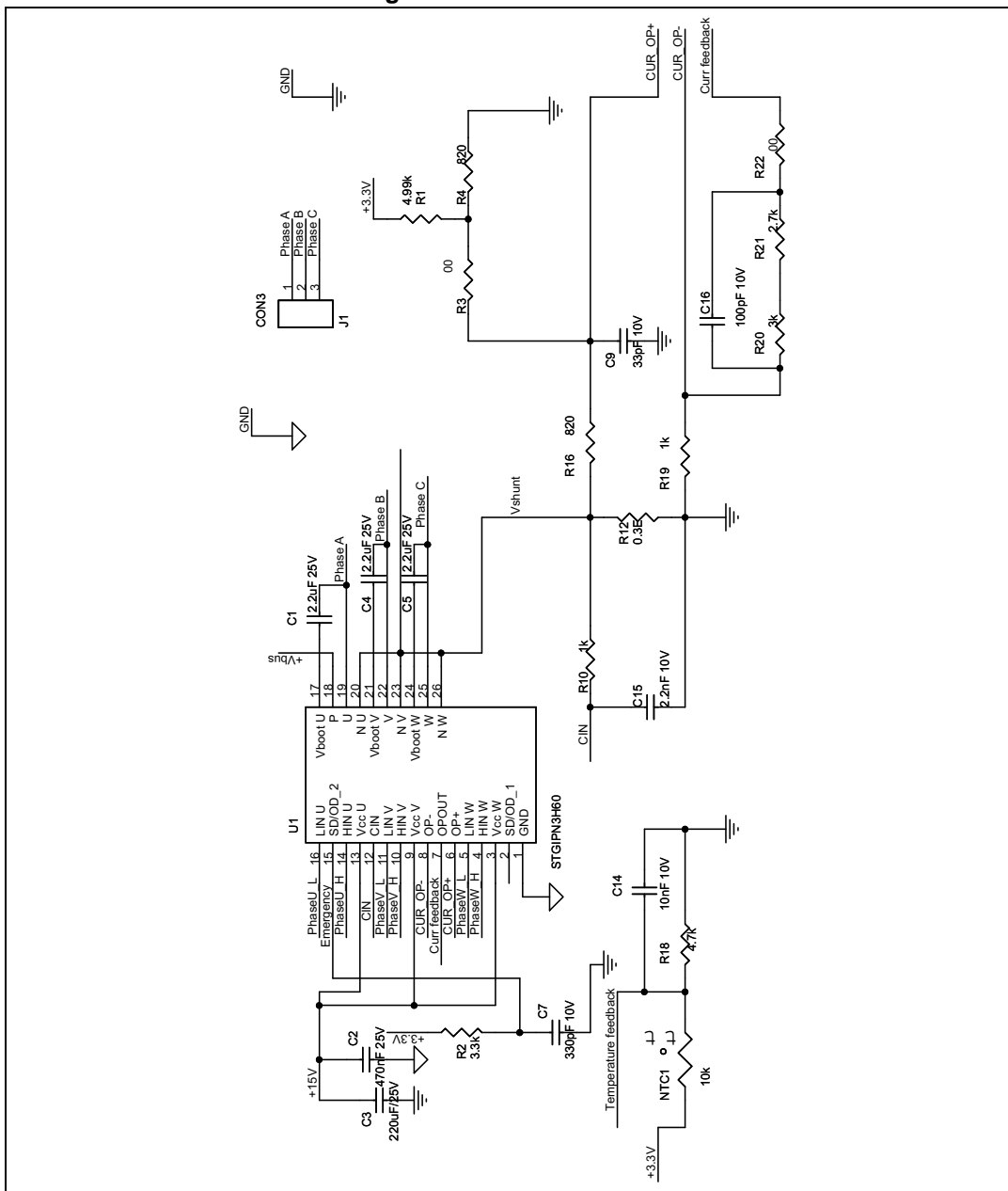


Figure 5. Inverter section



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
12-Feb-2013	1	Initial release.
19-Nov-2013	2	Document status promoted from confidential to public.

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.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

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.

© 2013 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



X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Power Management IC Development Tools](#) *category:*

Click to view products by [STMicroelectronics](#) *manufacturer:*

Other Similar products are found below :

[EVAL-ADM1168LQEBZ](#) [EVB-EP5348UI](#) [MIC23451-AAAYFL EV](#) [MIC5281YMME EV](#) [DA9063-EVAL](#) [ADP122-3.3-EVALZ](#) [ADP130-0.8-EVALZ](#) [ADP130-1.2-EVALZ](#) [ADP130-1.5-EVALZ](#) [ADP130-1.8-EVALZ](#) [ADP1712-3.3-EVALZ](#) [ADP1714-3.3-EVALZ](#) [ADP1715-3.3-EVALZ](#) [ADP1716-2.5-EVALZ](#) [ADP1740-1.5-EVALZ](#) [ADP1752-1.5-EVALZ](#) [ADP1828LC-EVALZ](#) [ADP1870-0.3-EVALZ](#) [ADP1871-0.6-EVALZ](#) [ADP1873-0.6-EVALZ](#) [ADP1874-0.3-EVALZ](#) [ADP1882-1.0-EVALZ](#) [ADP199CB-EVALZ](#) [ADP2102-1.25-EVALZ](#) [ADP2102-1.875EVALZ](#) [ADP2102-1.8-EVALZ](#) [ADP2102-2-EVALZ](#) [ADP2102-3-EVALZ](#) [ADP2102-4-EVALZ](#) [ADP2106-1.8-EVALZ](#) [ADP2147CB-110EVALZ](#) [AS3606-DB](#) [BQ24010EVM](#) [BQ24075TEVM](#) [BQ24155EVM](#) [BQ24157EVM-697](#) [BQ24160EVM-742](#) [BQ24296MEVM-655](#) [BQ25010EVM](#) [BQ3055EVM](#) [NCV891330PD50GEVB](#) [ISLUSBI2CKIT1Z](#) [LM2744EVAL](#) [LM2854EVAL](#) [LM3658SD-AEV/NOPB](#) [LM3658SDEV/NOPB](#) [LM3691TL-1.8EV/NOPB](#) [LM4510SDEV/NOPB](#) [LM5033SD-EVAL](#) [LP38512TS-1.8EV](#)