

Dual motor control and PFC evaluation board featuring the STM32F103 and STGIPSS20C60

Data brief



- MC connector to drive the second motor power stage (a compatible power board, such as the STEVAL-IHM021V1, STEVAL-IHM024V1, or STEVAL-IHM032V1, can be plugged here)
- SWD programming and debugging
- JTAG programming
- Opto-isolated USART communication
- Other functions:
 - User key, reset, potentiometer, user LED, NTC relay, test points
- Power supply:
 - +15 V, +3.3 V power supply
- RoHS compliant

Features

- Nominal power 1300 W, max. power 1700 W
- Digital PFC section:
 - Single-stage boost converter based on the STGW35HF60W (or STW38N65M5) and STTH15R06D or (STPSC1206D)
 - AC mains current sensing
 - DC bus voltage sensing
 - Hardware overcurrent protection
 - Hardware overvoltage protection
 - AC mains voltage zero crossing detection
 - Rectified AC mains voltage sensing
 - External boost inductor
- Inverter section (motor 1 drive):
 - IGBT intelligent power module STGIPSS20C60 in SDIP 25L molded package
 - 3-shunt or DC link motor current sensing
 - Hardware overcurrent protection
 - Heatsink temperature measurement
 - Overcurrent protection disabling network
- Control section:
 - Centralized dual motor control and PFC drive, using the STM32F103RCT6

1 Description

The STEVAL-IHM034V2 is a complete motor control kit solution for the evaluation of STMicroelectronics® wide product portfolio tailored to applications where it is necessary to drive, simultaneously, two motors in sensorless field oriented control (FOC) and perform active power factor correction (PFC) through digital control of a single-stage boost DC-DC converter.

Typical applications include in-room air conditioners (RACs), where this ST solution can drive the compressor, outdoor fans and PFCs. The microcontroller unit consists of STMicroelectronics' ARM™ Cortex-M3 core-based STM32F103RC, which is capable of carrying out all of the previously-mentioned tasks simultaneously. The board is compatible with the STM32F2 series and with the ARM™ Cortex-M4 core-based STM32F4 series.

Motor 1 is powered by the onboard SLLIMM™ (small low-loss intelligent molded module) STGIPSS20C60. Motor 2 can be powered by an external STMicroelectronics power stage, such as those that can be evaluated using the STEVAL-IHM021V1, STEVAL-IHM024V1, STEVAL-IHM032V1 or STEVAL-IHM035V1 evaluation boards. Simultaneously, the same microcontroller unit drives the onboard boost PFC stage designed with the STGW35HF60W ultrafast IGBT or, alternatively, for high switching frequencies the STW38N65M5 MIDmesh V Power MOSFET, and STTH15R06D Turbo2 ultrafast diode or the STPSC1206D Schottky silicon carbide diode.

The STEVAL-IHM034V2 can be used together with the STM32 permanent magnet synchronous motor (PMSM) single/dual FOC software development kit (SDK) and its compatible PFC firmware plug-in.

2 Schematic diagram

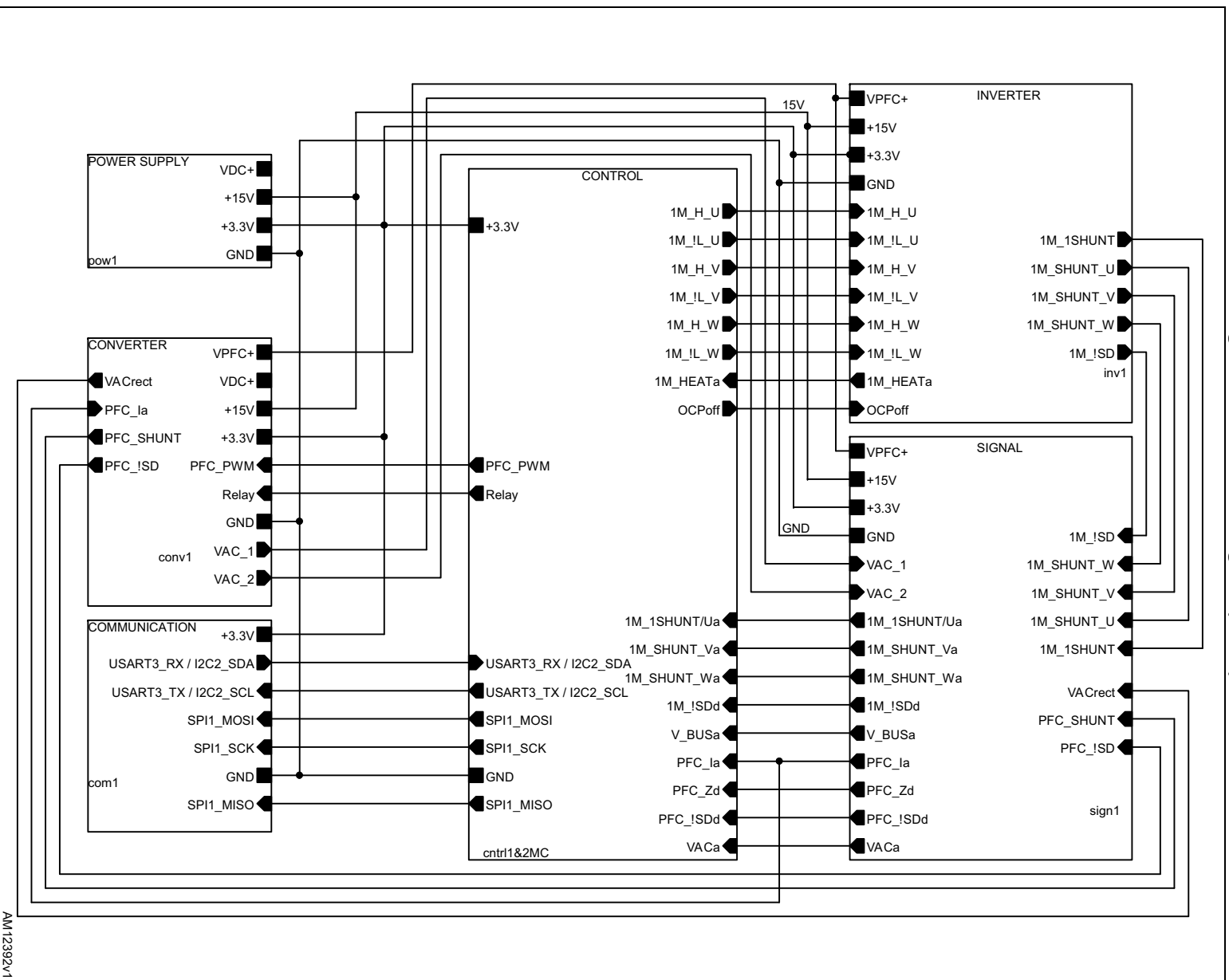


Figure 1. Schematic diagram (1 of 9)



AM12393v1

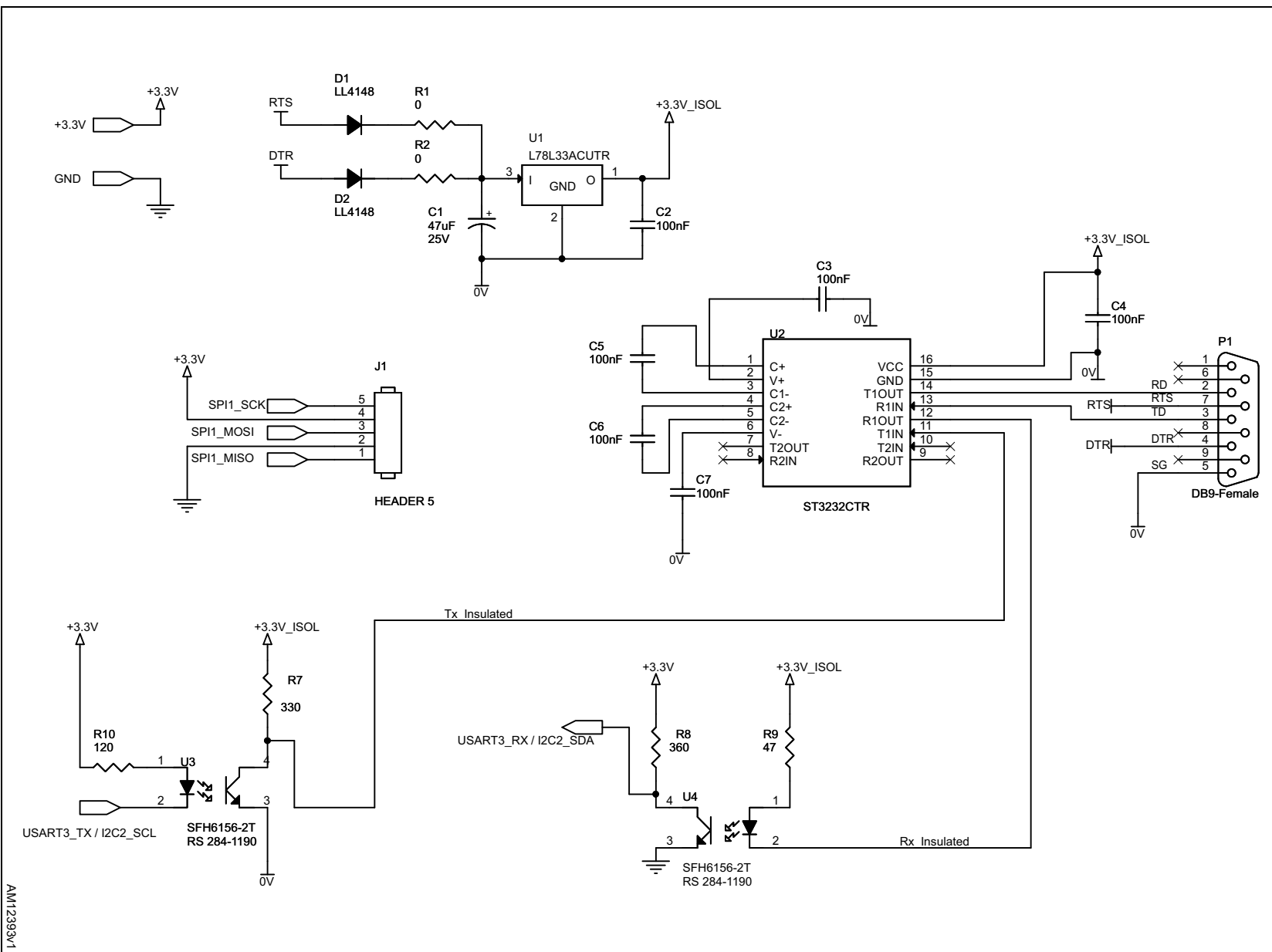


Figure 2. Schematic diagram (2 of 9)

Figure 3. Schematic diagram (3 of 9)

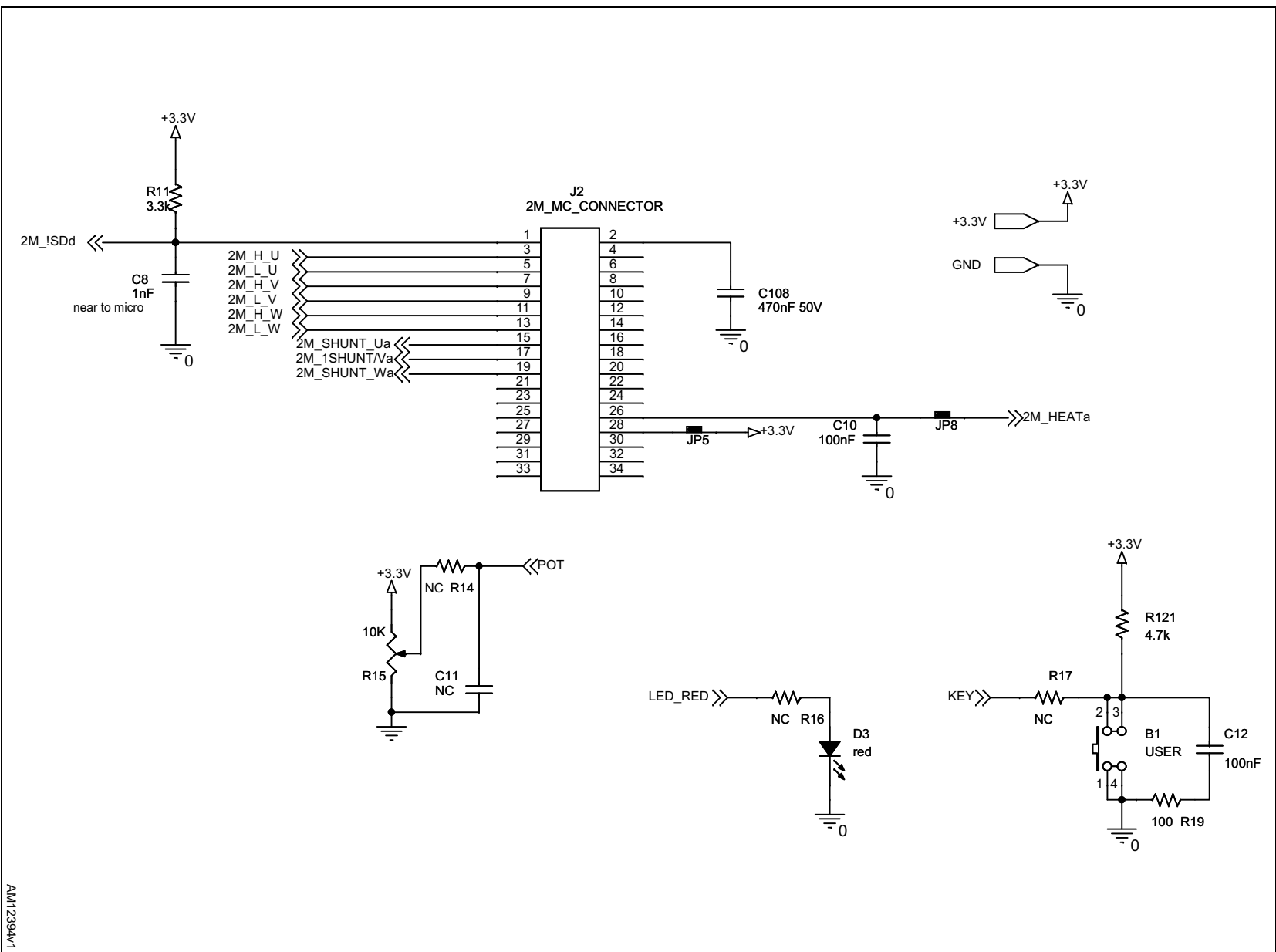
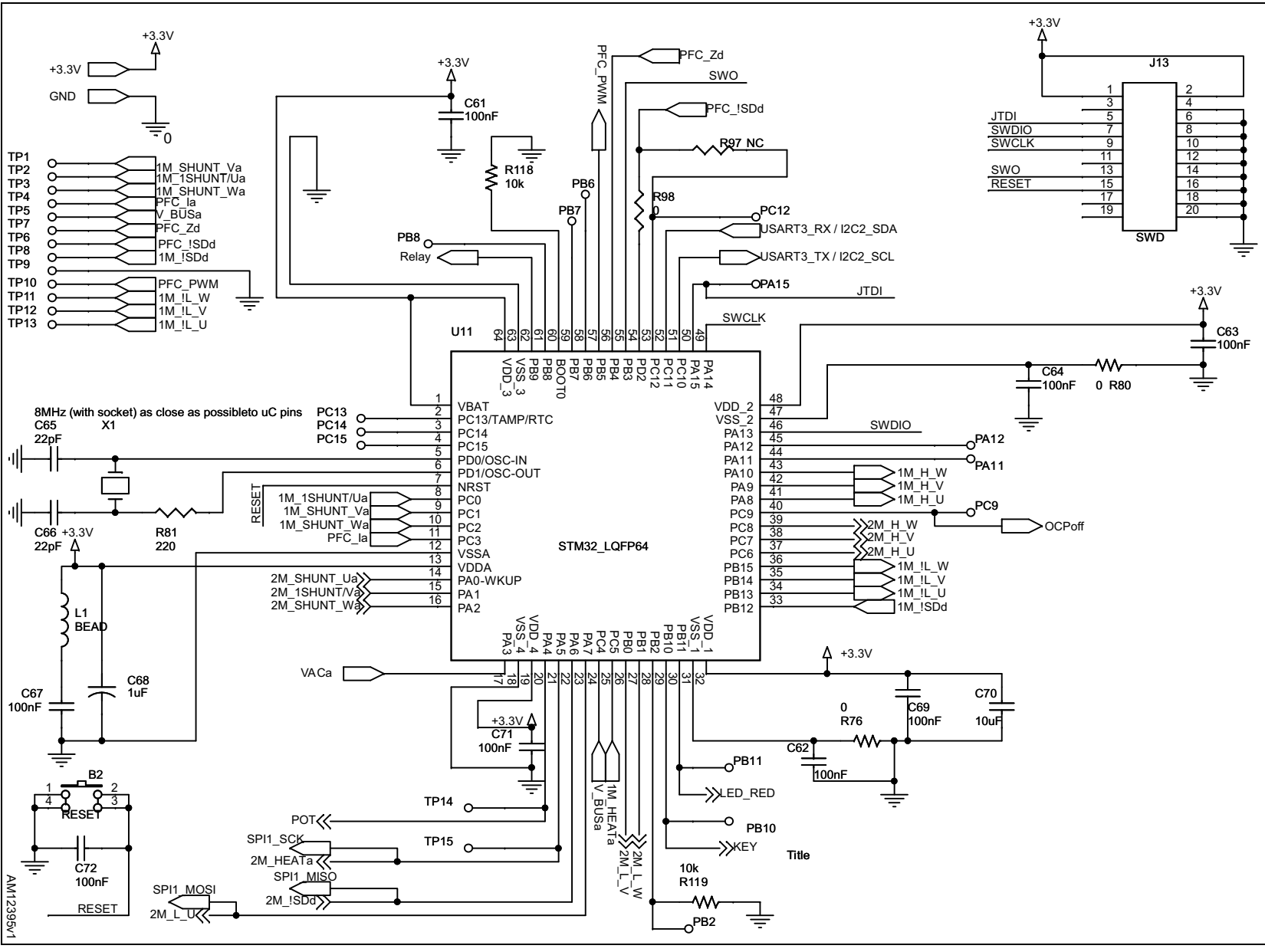


Figure 4. Schematic diagram (4 of 9)



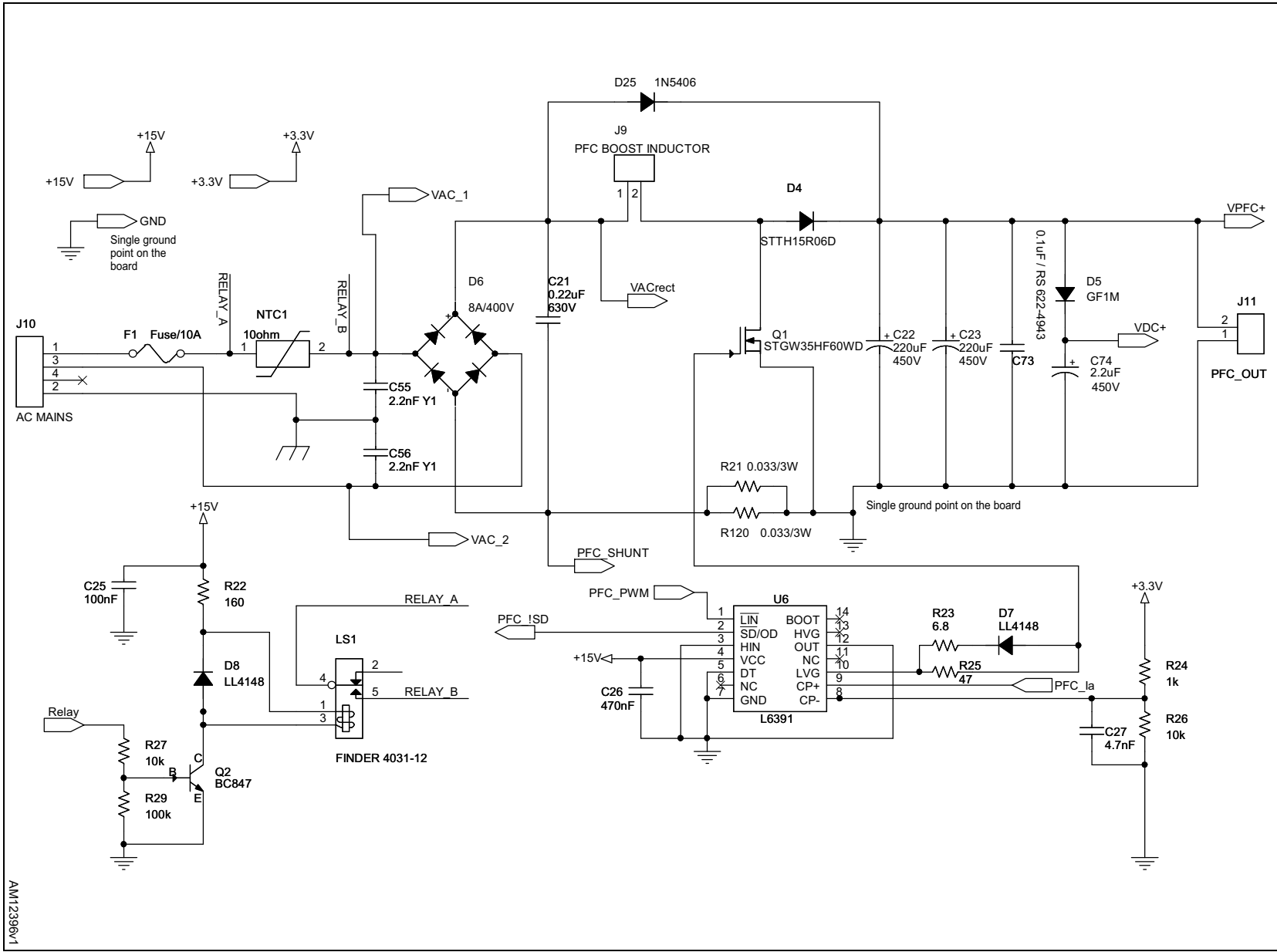
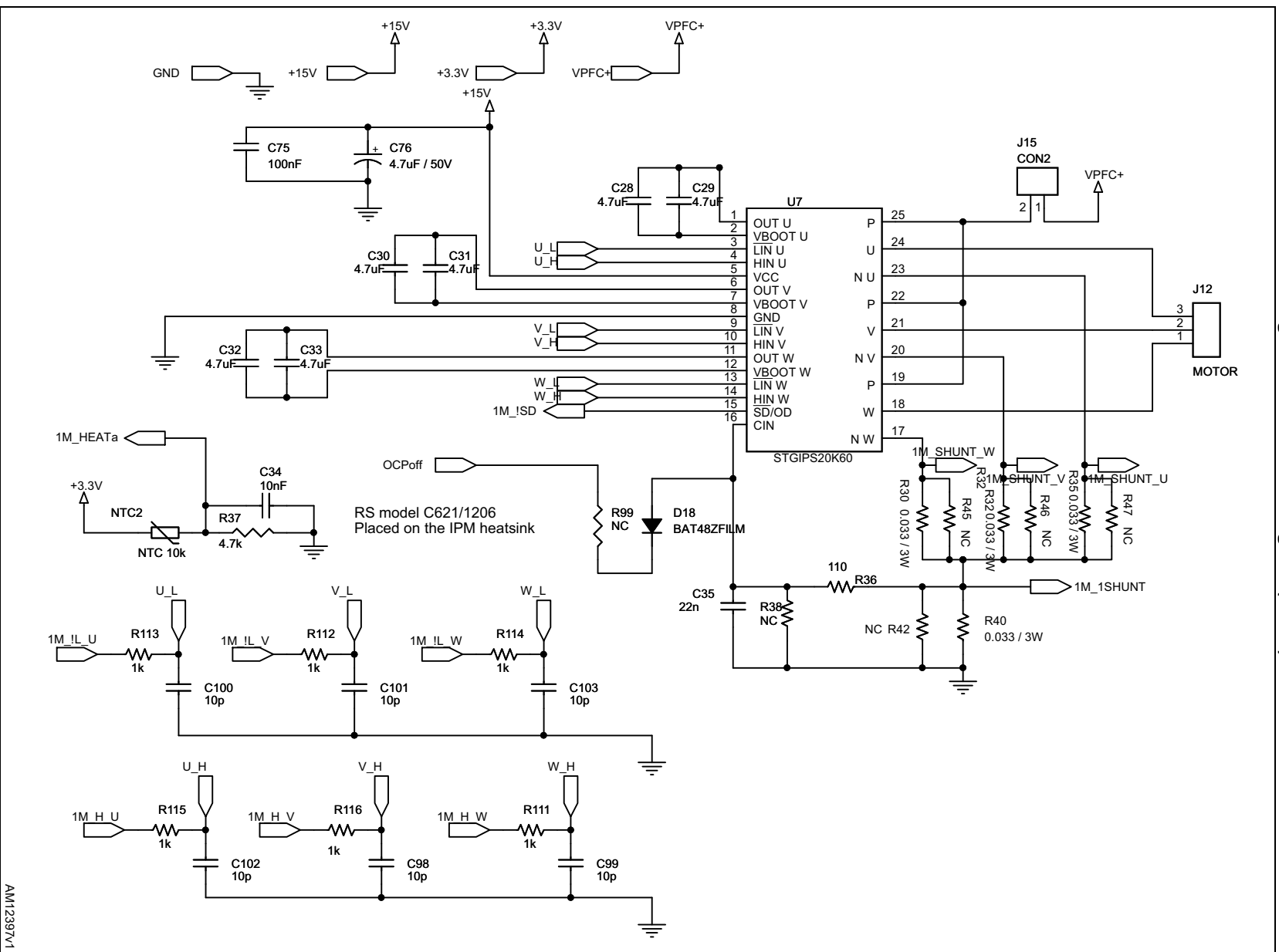


Figure 5. Schematic diagram (5 of 9)

Figure 6. Schematic diagram (6 of 9)



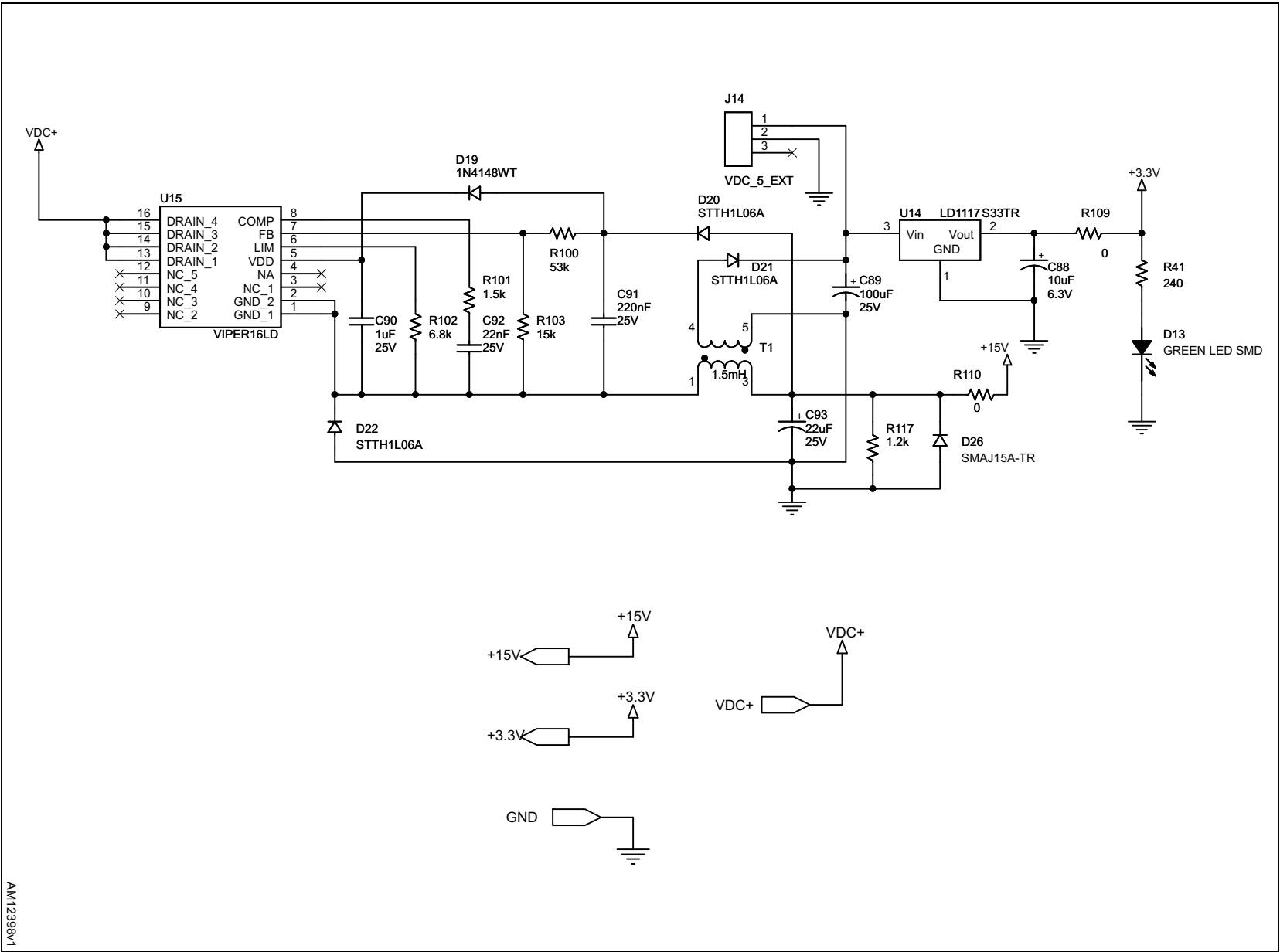
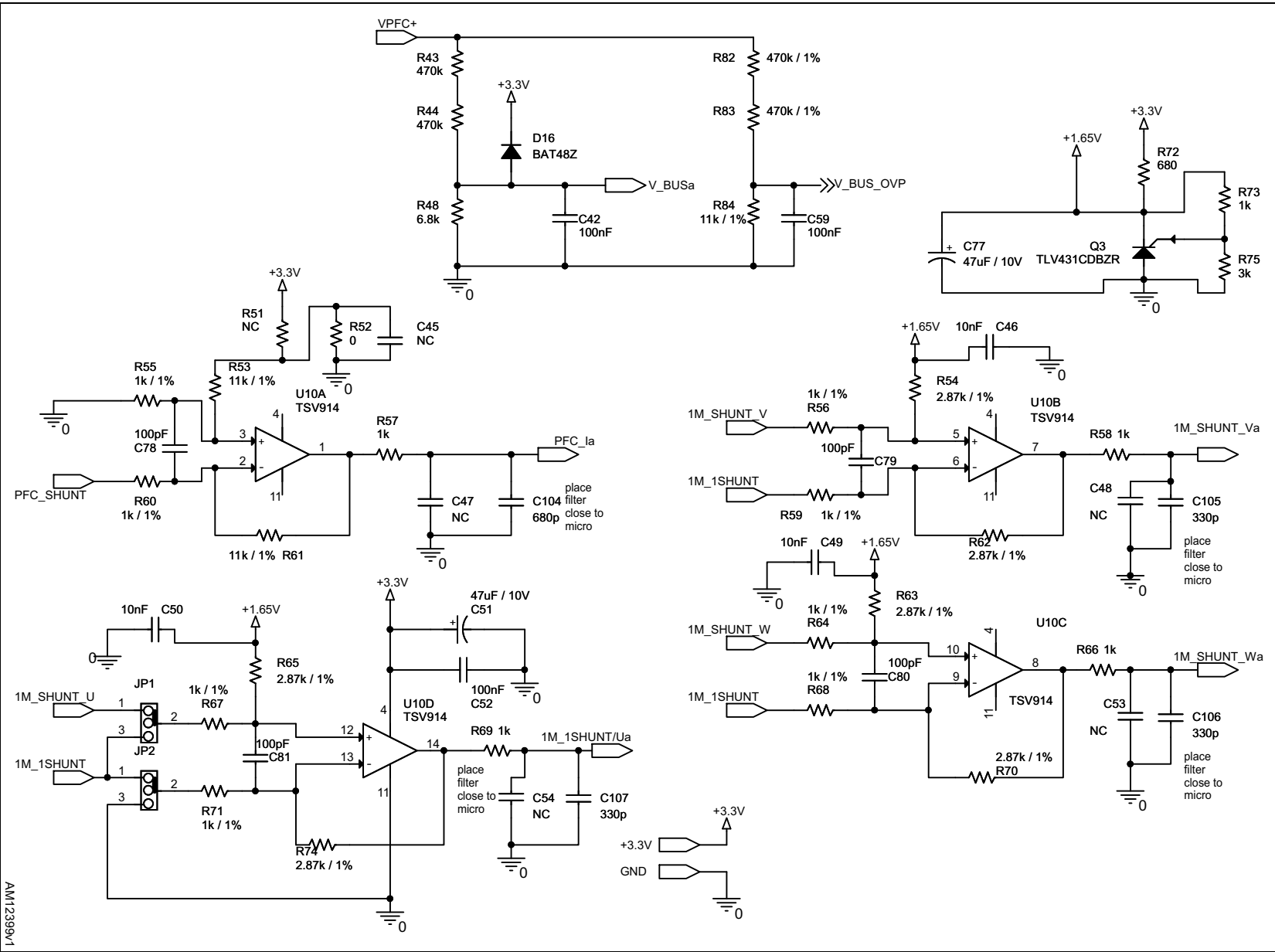
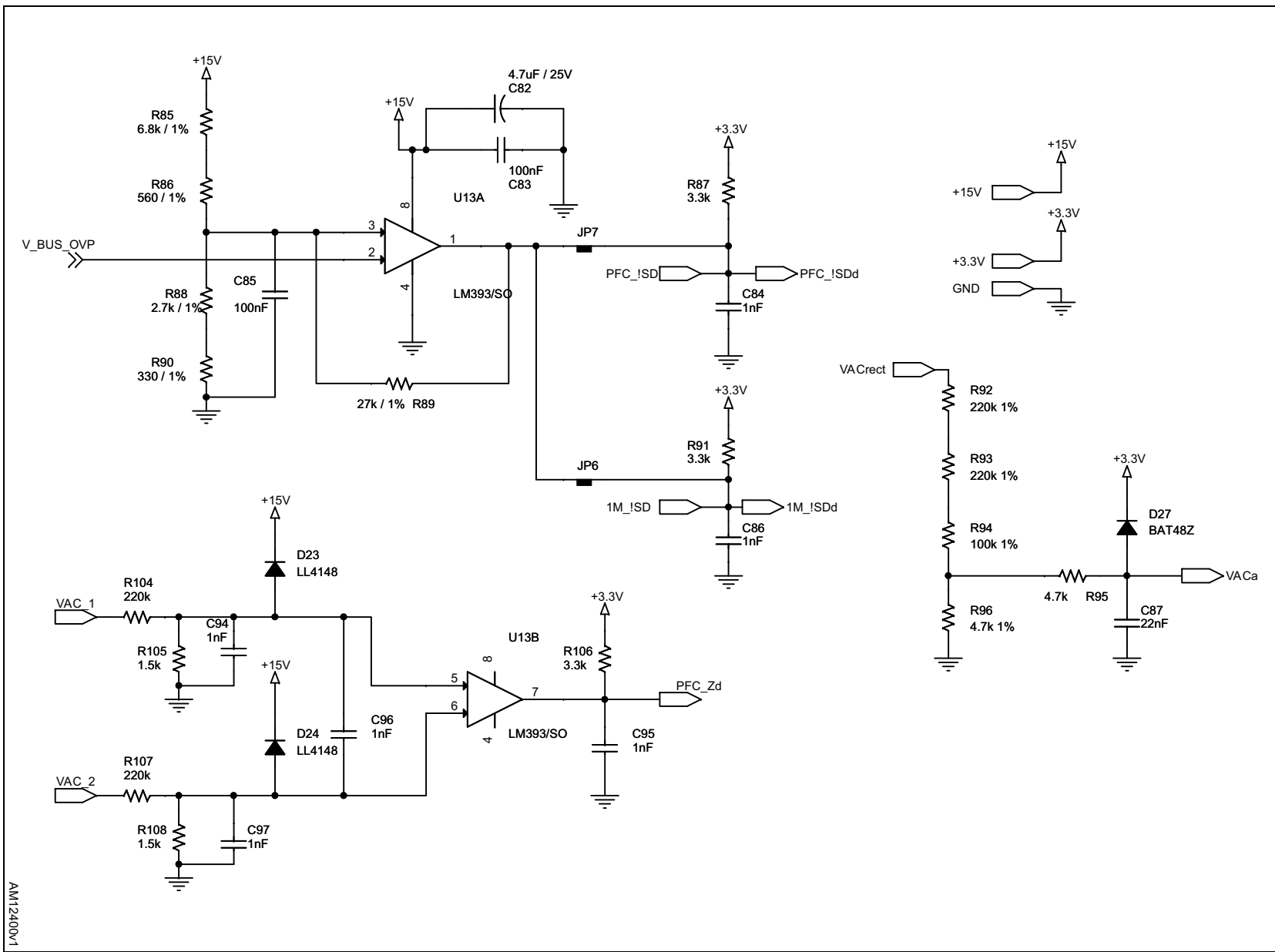


Figure 7. Schematic diagram (7 of 9)

Figure 8. Schematic diagram (8 of 9)





AM12400v1

Figure 9. Schematic diagram (9 of 9)

3 Revision history

Table 1. Document revision history

Date	Revision	Changes
10-Dec-2013	1	Initial release.
16-Jan-2014	2	Description has been corrected.

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.

© 2014 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

