



STEVAL-IHM021V2

100 W, 3-phase inverter based on the L6390 and UltraFASTmesh™ MOSFET for speed FOC of 3-phase PMSM motor drives

Data brief

Features

- Wide range input voltage
- Maximum power: up to 100 W at 230 Vac input
- STD5N52U power MOSFET (4.4 A, 520 V)
- Compatible with other power switches in DPAK packages (i.e. the STGD6NC60HD or STGDL6NC60DI)
- 15 V auxiliary power supply connector
- Motor control connector for interfacing with STM32-based control stages
- Three shunt resistor-based motor current sensing network
- Target applications: refrigerator compressors and dishwasher pumps
- RoHS compliant

Description

The STEVAL-IHM021V2 demonstration board implements a 100 W, 3-phase inverter for field-oriented control (FOC) of permanent magnet synchronous motors (PMSM).

The 3-phase inverter bridge is based on the STD5N52U power MOSFET with enhanced fast body-drain recovery diode in a DPAK package, and the L6390. The L6390 represents the latest in high-voltage half-bridge gate drivers featuring an integrated comparator for hardware protection against overcurrent, overtemperature, etc. The device also features an embedded operational amplifier suitable for advanced current sensing.

The STEVAL-IHM021V2 has been specifically designed to achieve fast and accurate conditioning of the three shunt resistor-based motor current feedback network, matching the requirements typical for high-end applications such as field-oriented motor control.

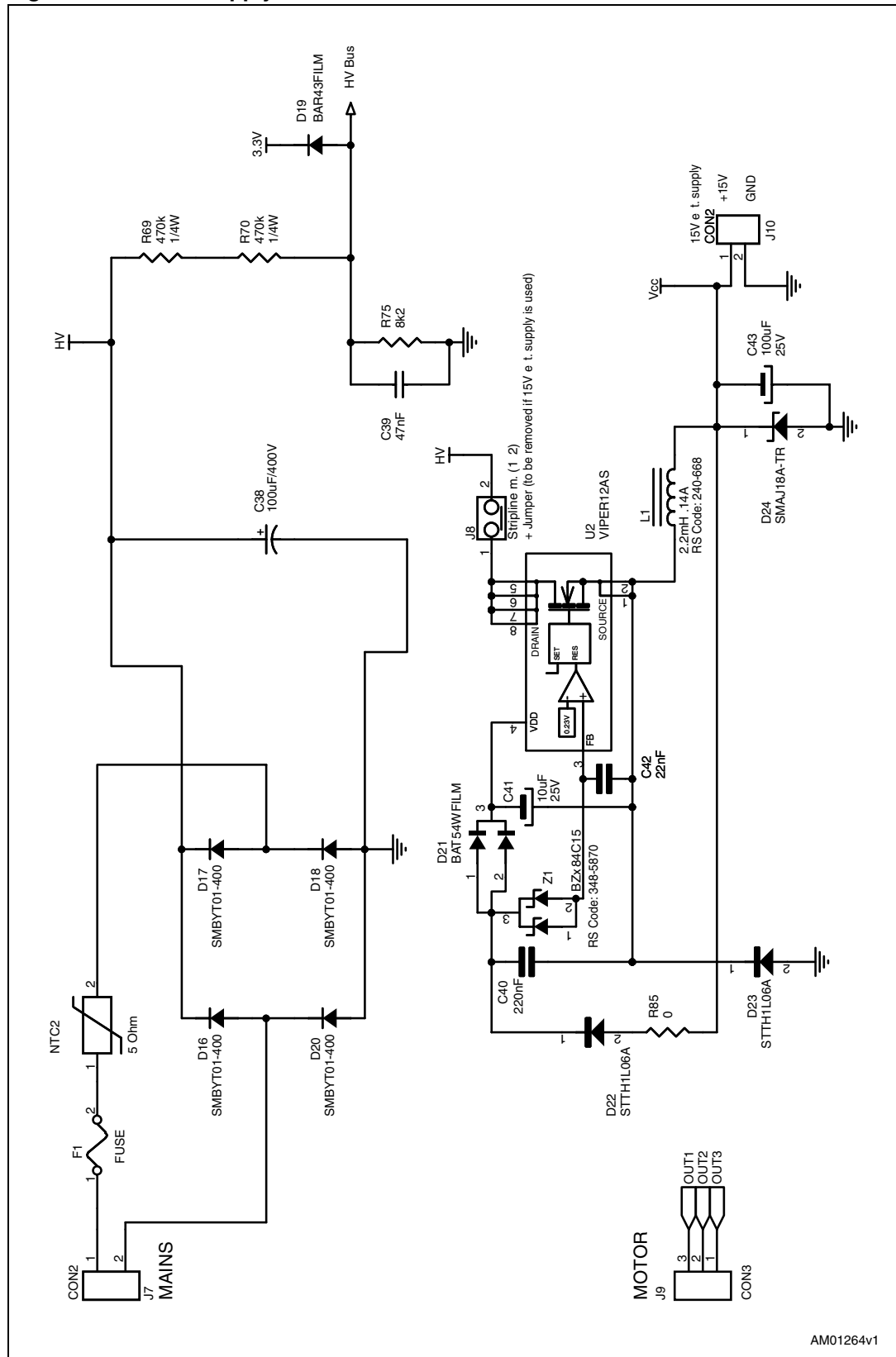
As an alternative to the STD5N52U, the STGD6NC60HD or STGDL6NC60DI IGBT devices may also be used on the board for



frequencies lower and higher than 10 kHz, respectively. In either case, no replacement of the switches driving the network is required.

The board is compatible with 110 and 230 Vac mains, and includes a power supply stage using the VIPer12A-E (in buck configuration) to generate the +15 V and +3.3 V supply voltage required by the application. The board can be interfaced with the STM3210B-EVAL (STM32 microcontroller demonstration board) through the dedicated motor control connector.

Figure 2. Power supply schematic



AM01264v1

2 Revision history

Table 1. Document revision history

Date	Revision	Changes
25-Feb-2010	1	Initial release.
10-Nov-2011	2	<ul style="list-style-type: none">– Added part number STGDL6NC60DI to the <i>Features</i> and <i>Description</i> sections of the coverpage.– Replaced part number STD5NK52ZD with STD5N52U in the <i>Description</i> section of the coverpage.– Modified <i>Figure 1: Inverter schematic</i>– Textual modifications in the <i>Description on page 1</i>.

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.

© 2011 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