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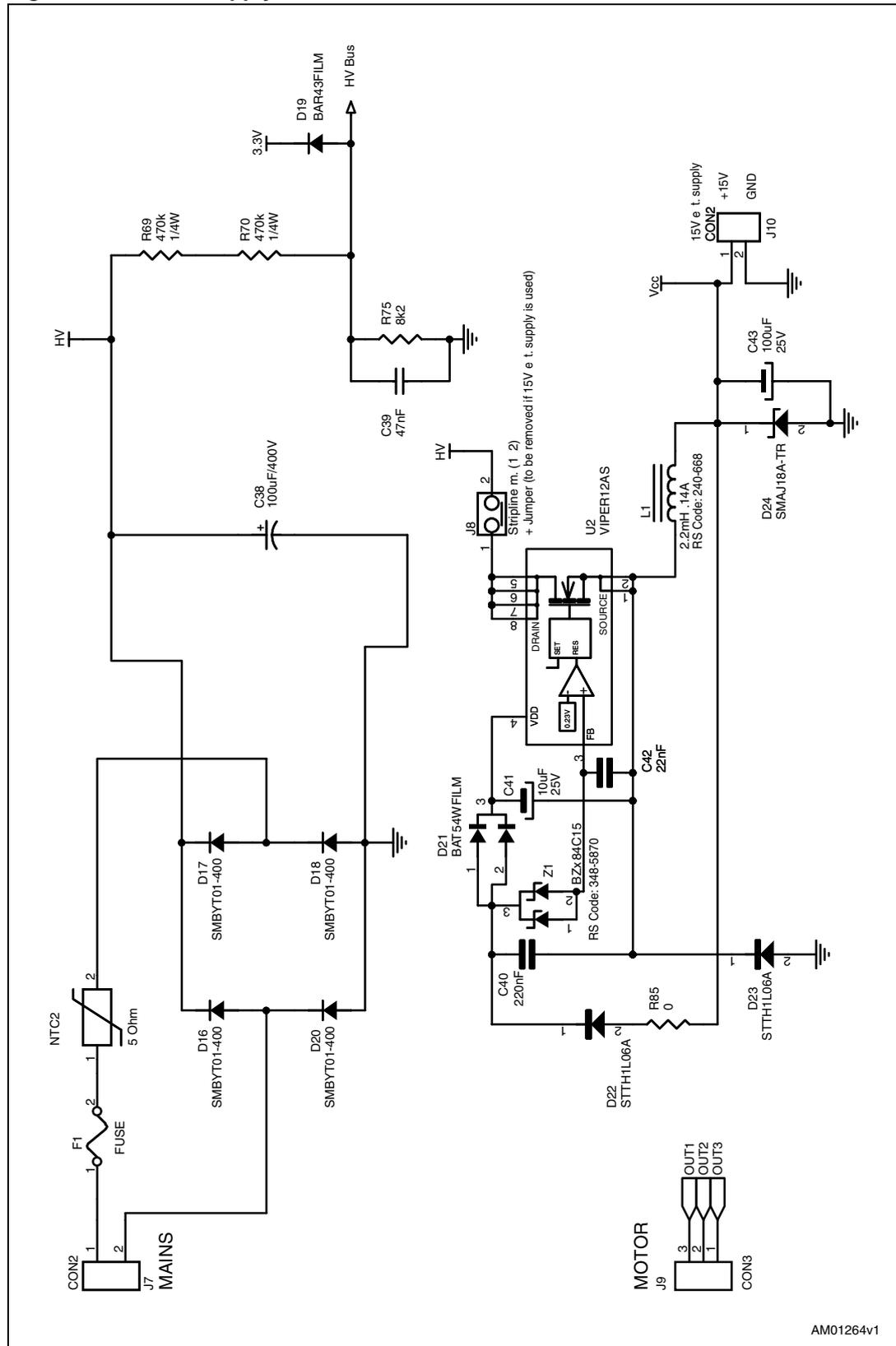
As an alternative to the STD5N52U, the STGD6NC60HD or STGDL6NC60DI IGBT devices may also be used on the board for

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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.

1 Schematic diagrams

Figure 1.   Inverter schematic

AM051126v1

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	– Added part number STGDL6NC60DI to the *Features* and *Description* sections of the coverpage. – Replaced part number STD5NK52ZD with STD5N52U in the *Description* section of the coverpage. – Modified *Figure 1: Inverter schematic* – Textual modifications in the *Description on page 1*.

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