

High-efficiency 250 W compressor solution based on STSPIN32F0601Q and STD8N60DM2



Features

- Complete system solution made by ready-to-use hardware and firmware
- Fitting wide range of applications supplied from the mains, rated up to 250 W:
 - refrigerator compressors
 - pumps and fans
 - industrial appliances
- Market highest efficiency values:
 - Inverter efficiency > 96.5% at 3000 rpm
 - COP efficiency > 1.94 at 3000 rpm
- Based on the [STSPIN32F0601Q](#) intelligent three-phase motor controller with embedded STM32
- Power supply based on [VIPER122](#) in fly-back configuration to generate on-board DC voltages
- Inverter power stage based on [STD8N60DM2](#) MOSFETs rated 600 V and 8 A
- Equipped with proven sensorless field-oriented control (FOC) firmware in one-shunt or two- plus one-shunt topology
- Compact solution of only 7.5 x 11.2 cm
- RoHS compliant

Description

The [STEVAL-CTM012V1](#) evaluation board is a three-phase inverter based on the [STSPIN32F0601Q](#) controller, which embeds a 3-phase 600 V gate driver and an Arm[®] Cortex[®]-M0 STM32 MCU.

The power stage features [STD8N60DM2](#) MOSFETs.

The board supports both one-shunt and two- plus one-shunt sensing topology. You can set the shunt topology by opportunely populating a set of jumpers.

Moreover, you can implement a sensorless field-oriented control (FOC). This allows driving permanent magnet synchronous motors (PMSMs) and brushless DC (BLDC) motors to cover a wide range of applications, such as refrigerator compressors, pumps, fans, and industrial appliances.

The [STEVAL-CTM012V1](#) evaluation board is compatible with a wide range of input voltages. It includes a power supply stage with the [VIPER122](#) in fly-back configuration that generates +15 V and +3.3 V supply voltages required by the application.

The companion firmware is [X-CUBE-MCSDK](#), available for download on www.st.com, to be used with the [STSW-CTM011](#) firmware example for compressor motors.

You can compile, debug, and configure the firmware through the [STM32CubeIDE](#) and [B-STLINK-ISOL](#) plus [STLINK-V3SET](#).

SWD and UART TX-RX connectors are also available.

Product summary	
High-efficiency 250 W compressor solution based on STSPIN32F0601Q and STD8N60DM2	STEVAL-CTM012V1
Firmware example for compressor motors	STSW-CTM011
STM32 motor control software development kit	X-CUBE-MCSDK
600 V three-phase controller with MCU	STSPIN32F0601Q
N-channel 600 V, 550 mOhm typ., 8 A MDmesh DM2 Power MOSFET in a DPAK package	STD8N60DM2
Applications	Motor Control

1 Schematic diagrams

Figure 1. STEVAL-CTM012V1 circuit schematic (1 of 2)

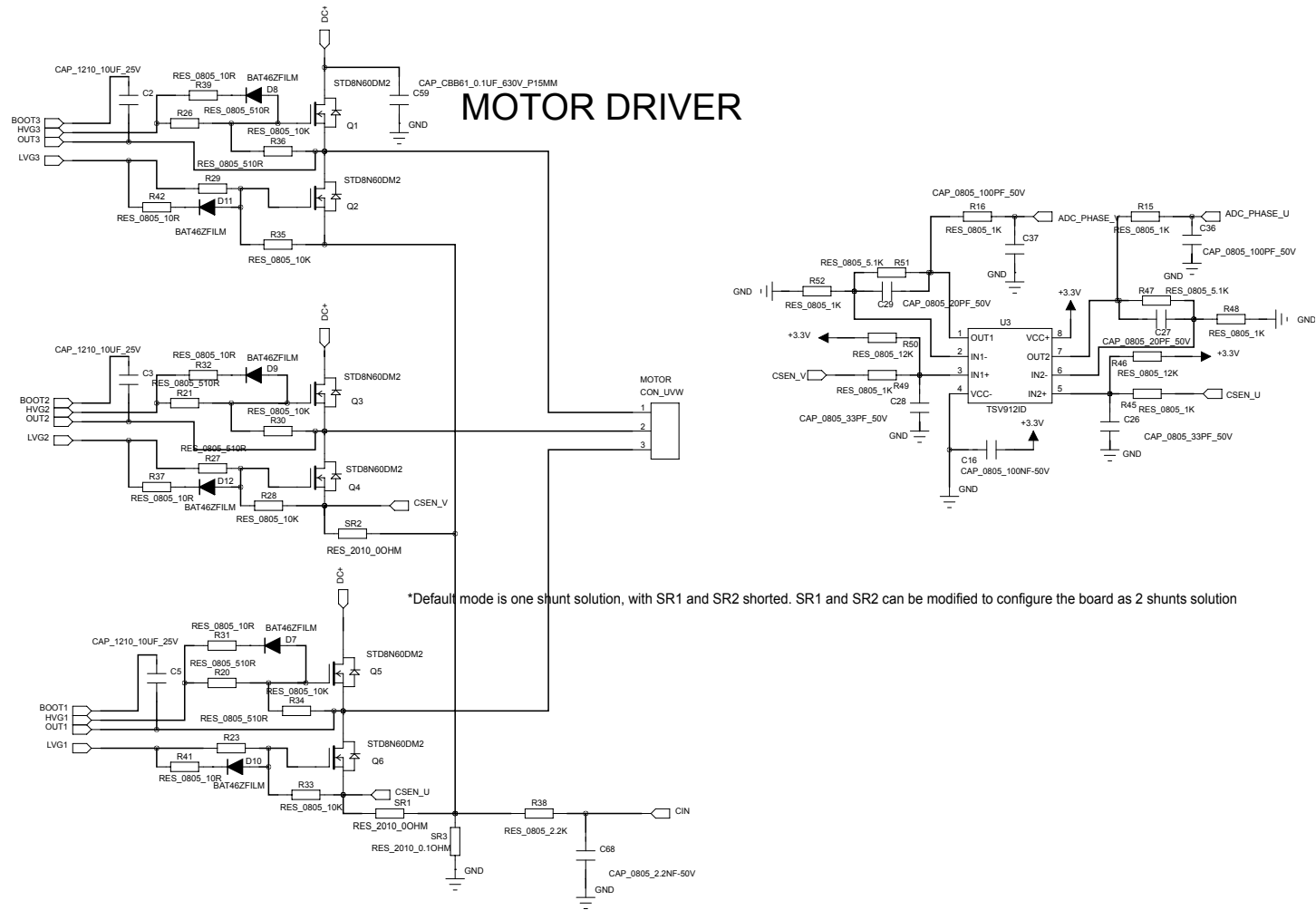
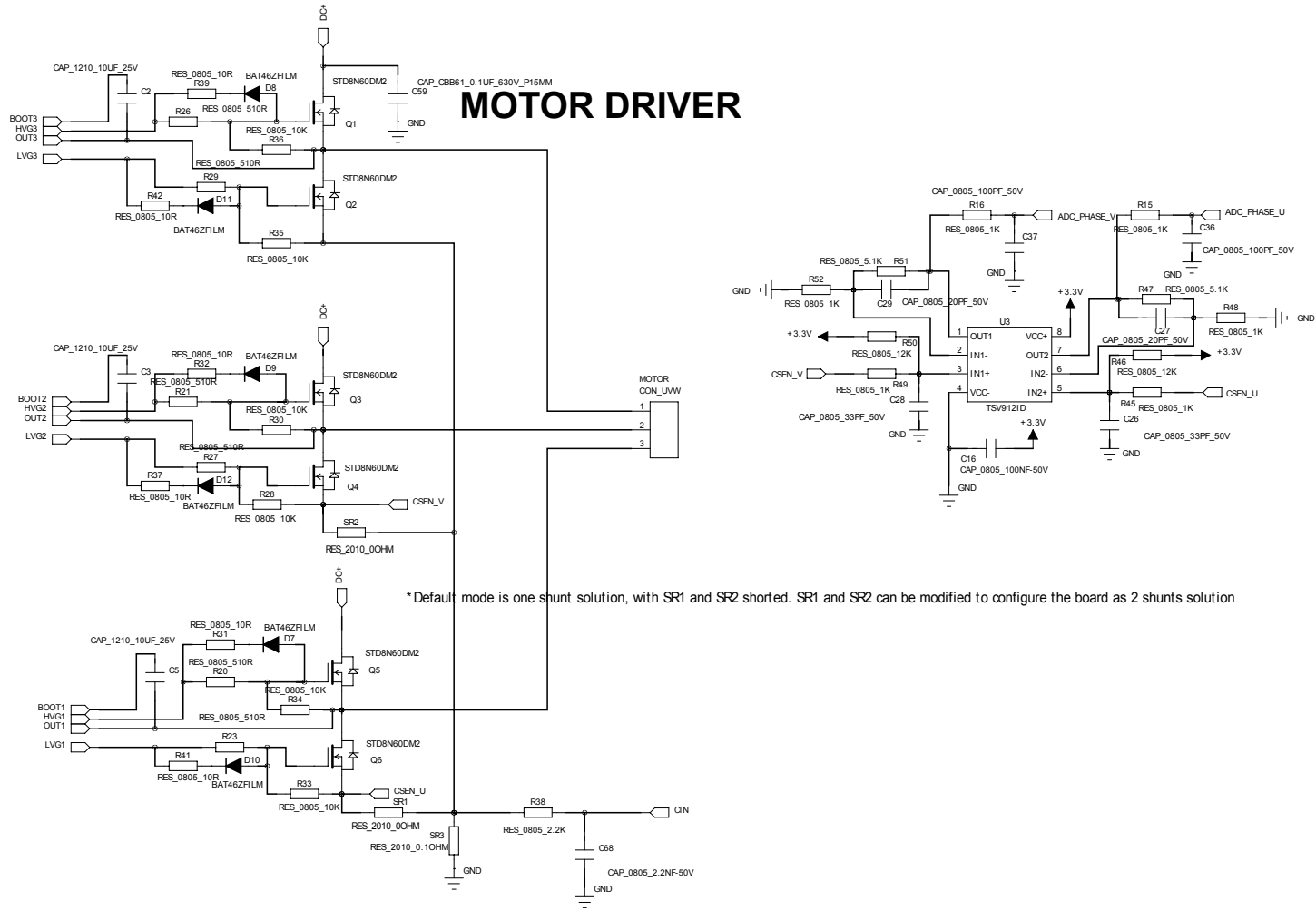


Figure 2. STEVAL-CTM012V1 circuit schematic (2 of 2)



2 Board versions

Table 1. STEVAL-CTM012V1 versions

Finished good	Schematic diagrams	Bill of materials
STEVAL\$CTM012V1A ⁽¹⁾	STEVAL\$CTM012V1A schematic diagrams	STEVAL\$CTM012V1A bill of materials

1. This code identifies the STEVAL-CTM012V1 evaluation board first version.

Revision history

Table 2. Document revision history

Date	Revision	Changes
18-Nov-2021	1	Initial release.