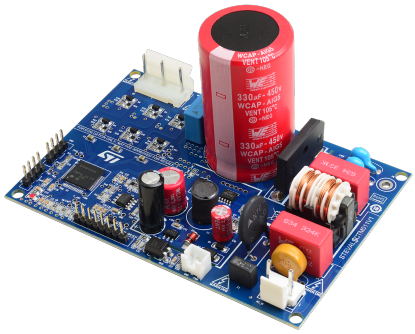
STEVAL-CTM011V1

Data brief

250 W mainstream compressor solution based on STSPIN32F0601Q and STGD5H60DF



Product summary	
250 W mainstream compressor solution based on STSPIN32F0601Q and STGD5H60DF	STEVAL-CTM011V1
Firmware example for compressor motors	STSW-CTM011
STM32 motor control software development kit	X-CUBE-MCSDK
600 V three-phase controller with MCU	STSPIN32F0601Q
H-series, 600 V, 5 A high-speed trench gate field-stop IGBT	STGD5H60DF
Applications	Motor Control

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
- High efficiency value:
  - Inverter efficiency > 96.5% at 3000 rpm
- Very low stand-by power consumption and overcurrent/undervoltage protections
- Based on STSPIN32F0601Q intelligent 3-phase motor controller with embedded STM32
- Power supply based on VIPER122 in buck configuration to generate on-board DC voltages
- Inverter power stage based on STGD5H60DF IGBT rated 600 V and 5 A
- Compact size: 7.5 x 11.2 cm
- Equipped with proven sensorless field-oriented control (FOC) firmware in one-shunt or 2+1 shunt topology
- RoHS compliant

Description

The STEVAL-CTM011V1 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 STGD5H60DF IGBTs.

The board supports one-shunt and two- plus one-shunt sensing topology. You can properly set the shunt topology by populating the related shunt resistors (RS1, RS2, and RS3).

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-CTM011V1 evaluation board is compatible with a wide range of input voltages. It includes a power supply stage with the VIPER122 in buck 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.

1 Schematic diagrams

Figure 1. **STEVAL-CTM011V1 circuit schematic (1 of 2)**

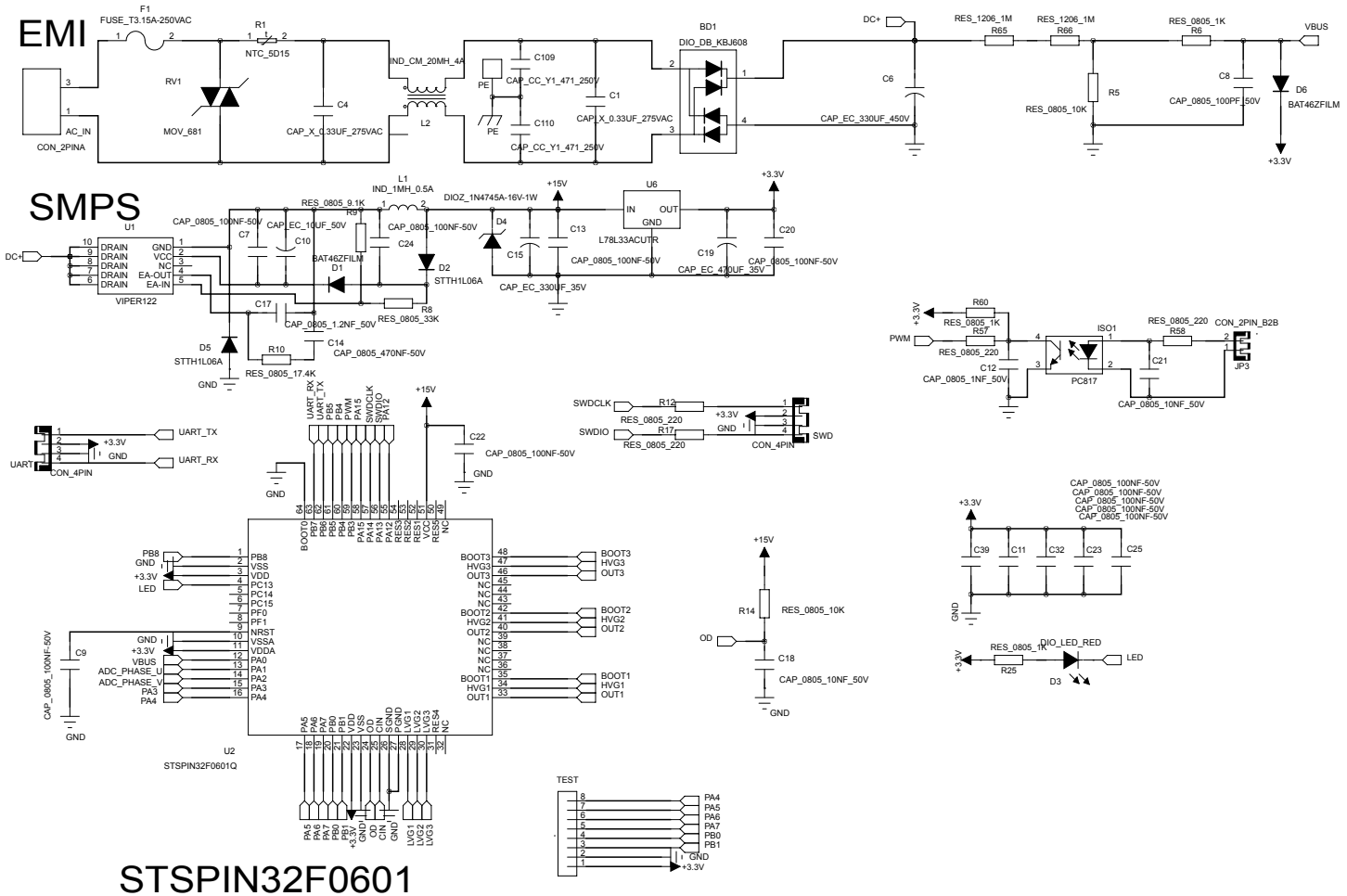
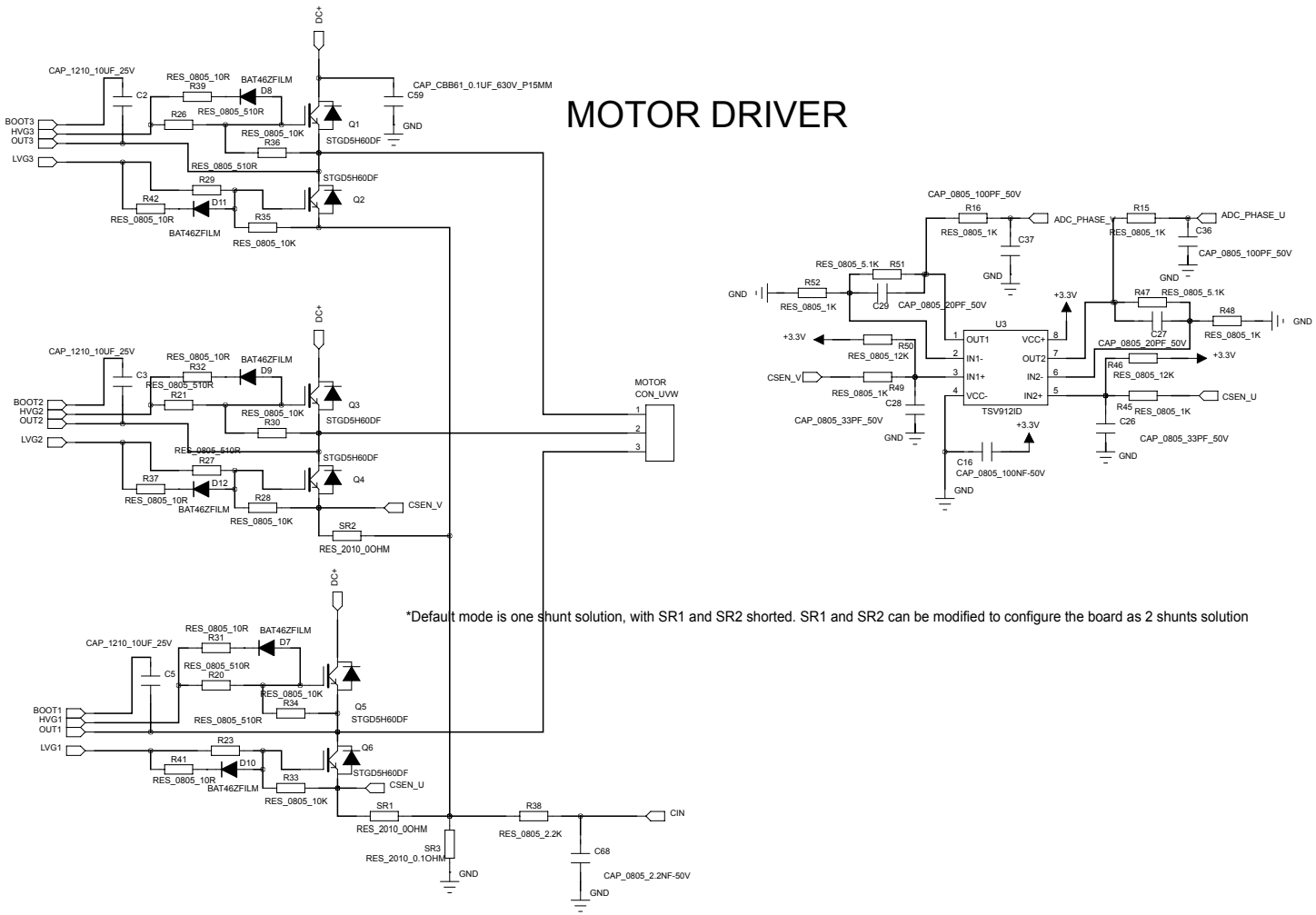


Figure 2. STEVAL-CTM011V1 circuit schematic (2 of 2)



*Default mode is one shunt solution, with SR1 and SR2 shorted. SR1 and SR2 can be modified to configure the board as 2 shunts solution

2 Board versions

Table 1. STEVAL-CTM011V1 versions

Finished good	Schematic diagrams	Bill of materials
STEVAL$CTM011V1A (1)	STEVAL$CTM011V1A schematic diagrams	STEVAL$CTM011V1A bill of materials

1. *This code identifies the STEVAL-CTM011V1 evaluation board first version.*

Revision history

Table 2. **Document revision history**

Date	Revision	Changes
18-Jan-2021	1	Initial release.
10-Mar-2022	2	Updated cover page features.
04-May-2022	3	Updated cover page features and description.
05-Jul-2022	4	Updated cover page features.

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