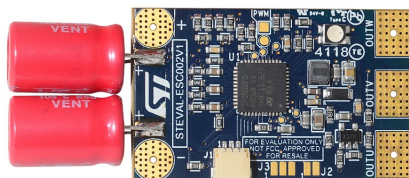


## Electronic Speed Controller reference design based on STSPIN32F0A



### Features

- Very compact and light design
- Designed for sensorless six-step driving
- 2S to 6S LiPo battery pack
- Output current up to 20 A<sub>RMS</sub>
- Pre-configured firmware package (STSW-ESC002V1)
- BEMF sensing through OpAmps embedded in STSPIN32F0A
- Embedded bootloader through UART interface
- Overcurrent protection
- Battery voltage sensing
- RGB LED
- RoHS compliant
- WEEE compliant
- Compliant with Directive 2006/66/EC

### Description

The STEVAL-ESC002V1 board is a very compact and ready to use Electronic Speed Controller (ESC) reference design. The board can easily fit any small and light drone for racing or surveying purposes, and is also highly suitable for any three-phase BLDC application requiring a small form factor, minimal BoM, and high speed rotation performance.

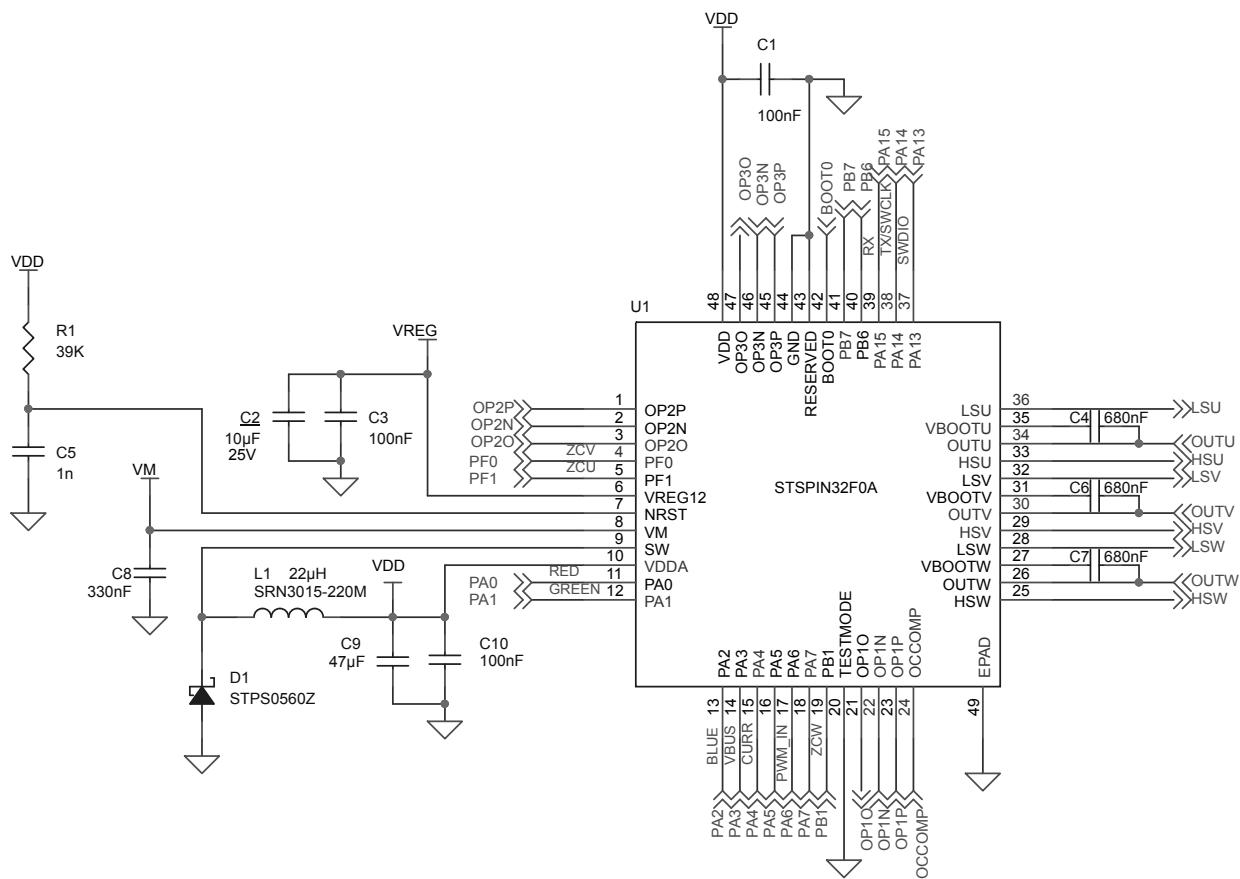
Together with the companion firmware package (STSW-ESC002V1), it represents a solution for sensorless voltage mode six-step driving.

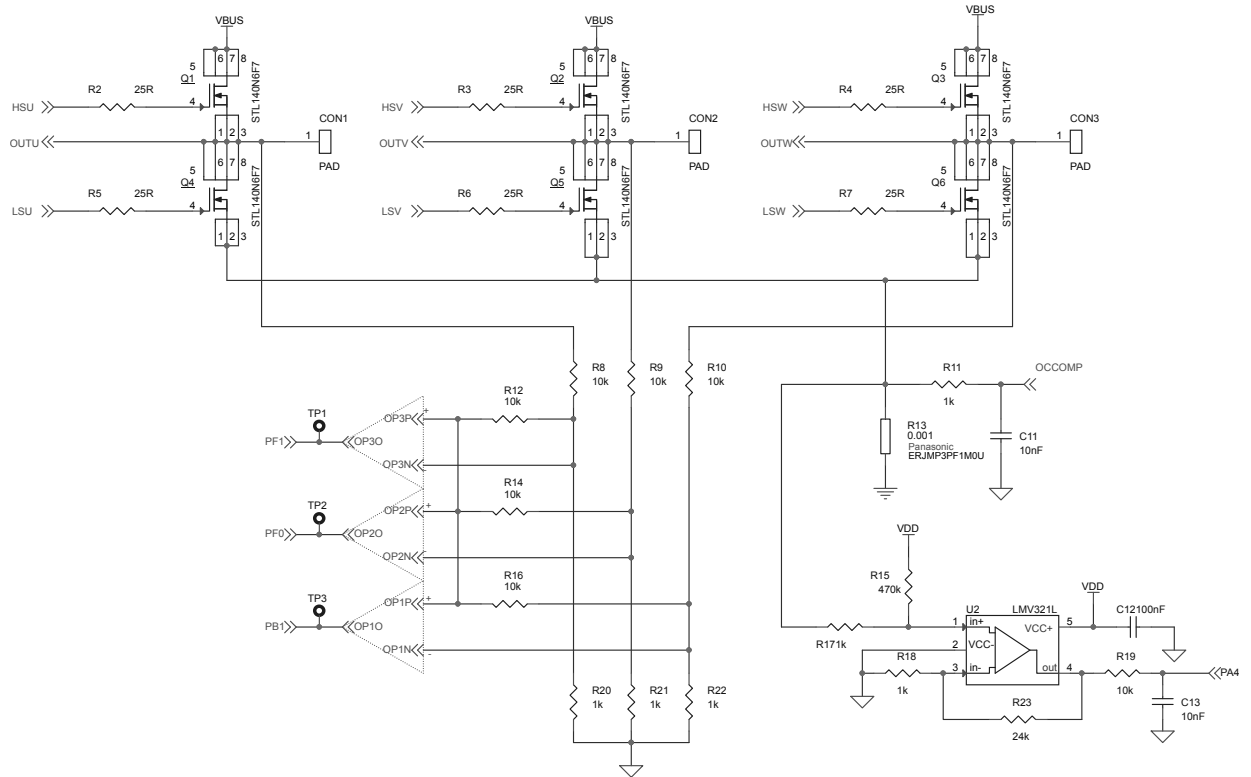
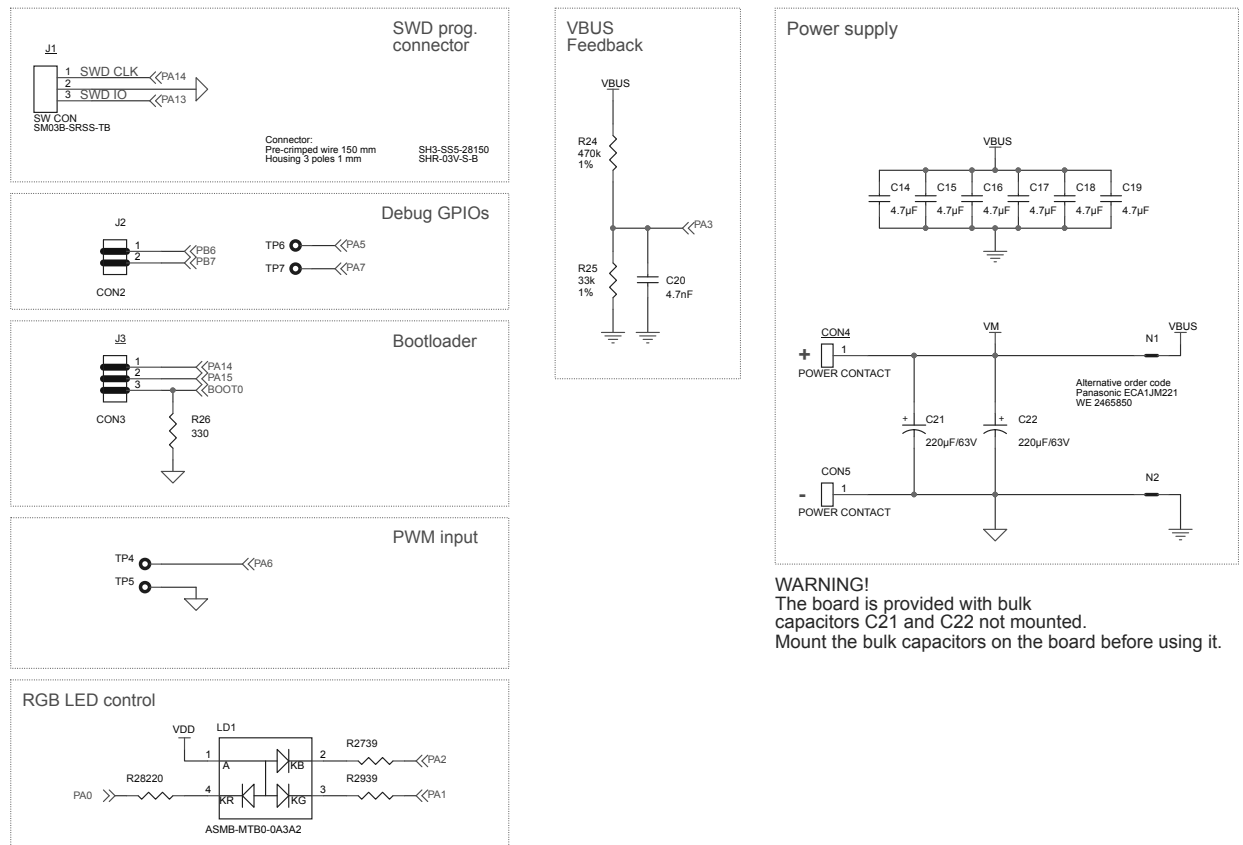
The heart of the board is the STSPIN32F0A advanced 3-phase brushless motor controller that embeds an STM32 Cortex®-M0® microcontroller, voltage regulators, signal conditioning circuitry and gate drivers in a small 7x7 mm<sup>2</sup> QFN package. The power stage is based on the 2.8 mΩ low resistance, high speed STL140N6F7 MOSFETs, designed with STripFET™ F7 technology and able to deliver up to 20 A of continuous current.

Product summary	
Electronic Speed Controller reference design based on STSPIN32F0A	<a href="#">STEVAL-ESC002V1</a>
Six-step reference design firmware for STEVAL-ESC002V1	<a href="#">STSW-ESC002V1</a>
N-channel 60 V, 0.0024 Ohm typ., 140 A STripFET F7 Power MOSFET in a PowerFLAT 5x6 package	<a href="#">STL140N6F7</a>
Advanced BLDC controller with embedded STM32 MCU	<a href="#">STSPIN32F0A</a>

# 1 Schematic diagrams

Figure 1. STEVAL-ESC002V1 board schematic (1 of 3)



**Figure 2. STEVAL-ESC002V1 board schematic (2 of 3)**

**Figure 3. STEVAL-ESC002V1 board schematic (3 of 3)**


## Revision history

**Table 1. Document revision history**

Date	Version	Changes
04-Dec-2018	1	Initial release.

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2018 STMicroelectronics – All rights reserved