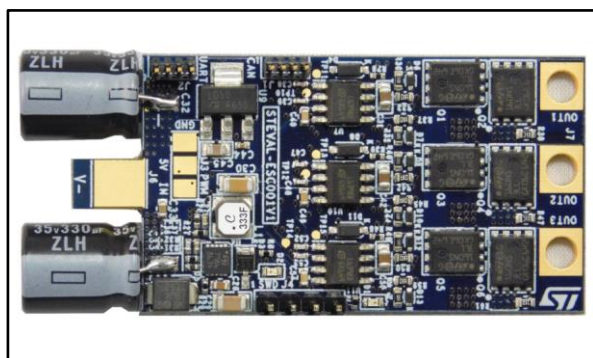


Electronic speed controller for BLDC and PMSM three phase brushless motor

Data brief



Features

- 3 phase driver board for BLDC/PMSM motors with discrete N-channel 30 V, 160 A STripFET™ H7 Power MOSFETs
- 48-pin STM32 with FPU ARM® Cortex®-M4 MCU with 128 Kbytes Flash, 72 MHz CPU, MPU, CCM, 12-bit ADC 5 MSPS, PGA, comparators
- Nominal operating voltage range: 3S-6S Li-Po battery DC voltage level (11.1 V up to 22.2 V)
- Maximum RMS output current: 20 Arms
- Output peak current: 30 A
- BEC available (5 V, 0.5 A for supplying external board; e.g., flight control board)
- Designed for field oriented control (FOC) in sensorless mode
- Supported by ST motor control software development kit (SDK)
- Ready to use with ST motor profiler
- 3-shunt mode supported for motor current sensing
- Cross conduction protection based on L6398 driver
- Overcurrent and overvoltage protection feature (OCP/OVP)
- Thermal measuring and overheating protection with on-board NTC

- Horizontal bus capacitors for low profile
- CAN, UART, I²C, SWD and PWM connectors available
- Fully populated board conception with test points for DAC, GPIOs, PWM signals, motor current feedback and CAN
- User LEDs (green and red)
- Target applications: motor driving for R/C vehicles, UAV drone, electric car etc.
- PCB type and size:
 - PCB material: FR-4
 - Multi-layer architecture
 - Dimensions: 29.1 mm x 58 mm
- RoHS compliant

Description

The STEVAL-ESC001V1 evaluation board is based on the STM32F303 microcontroller, L6398 driver and STL160NS3LLH7 power MOSFETs. It is an electronic speed controller (ESC) designed to drive a single three phase brushless motor (BLDC/PMSM), performing a sensorless FOC algorithm with speed regulation and active braking function. This unit can accept commands from an external unit for driving and monitoring a flight control board, for instance. For this purpose, several communication bus interfaces (UART, CAN, I²C) are available.

The board includes a BEC 5 V circuit and embeds an overcurrent/overvoltage and thermal protection circuit. Its form factor renders it suitable for small and light R/C vehicles and its motor current capability meets the power requirements of larger vehicles like professional drones.

1 Schematic diagrams

Figure 1: STEVAL-ESC001V1 circuit schematic (1 of 4)

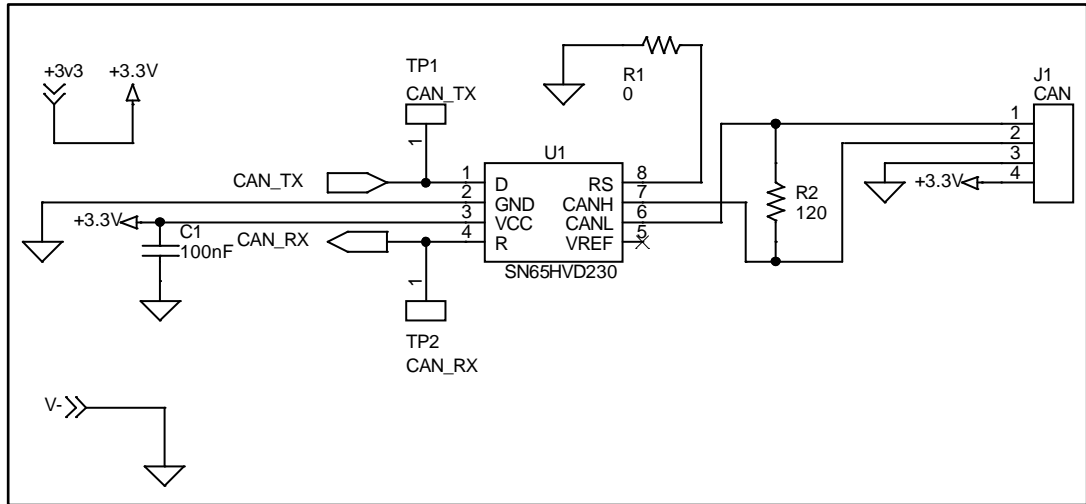


Figure 2: STEVAL-ESC001V1 circuit schematic (2 of 4)

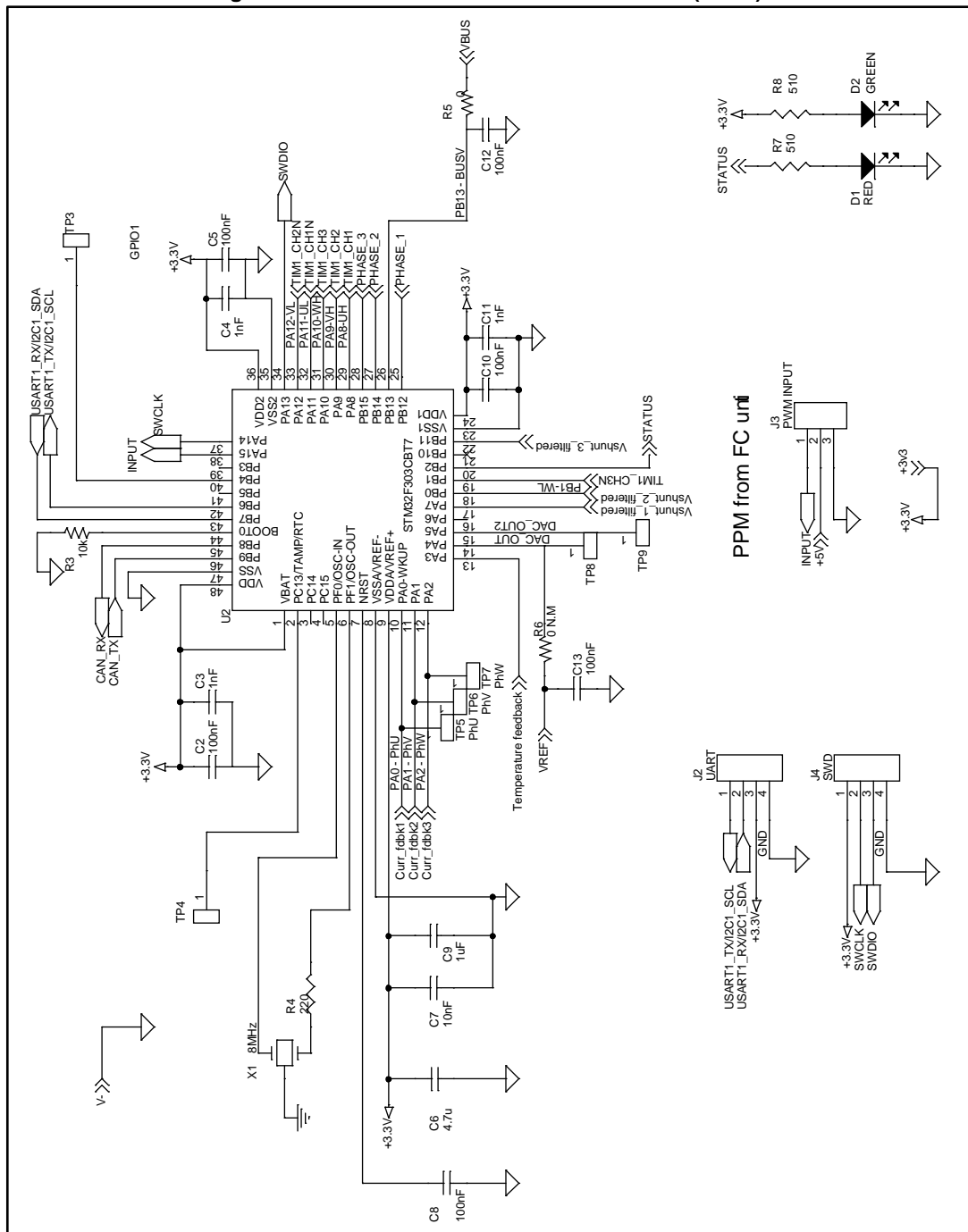


Figure 3: STEVAL-ESC001V1 circuit schematic (3 of 4)

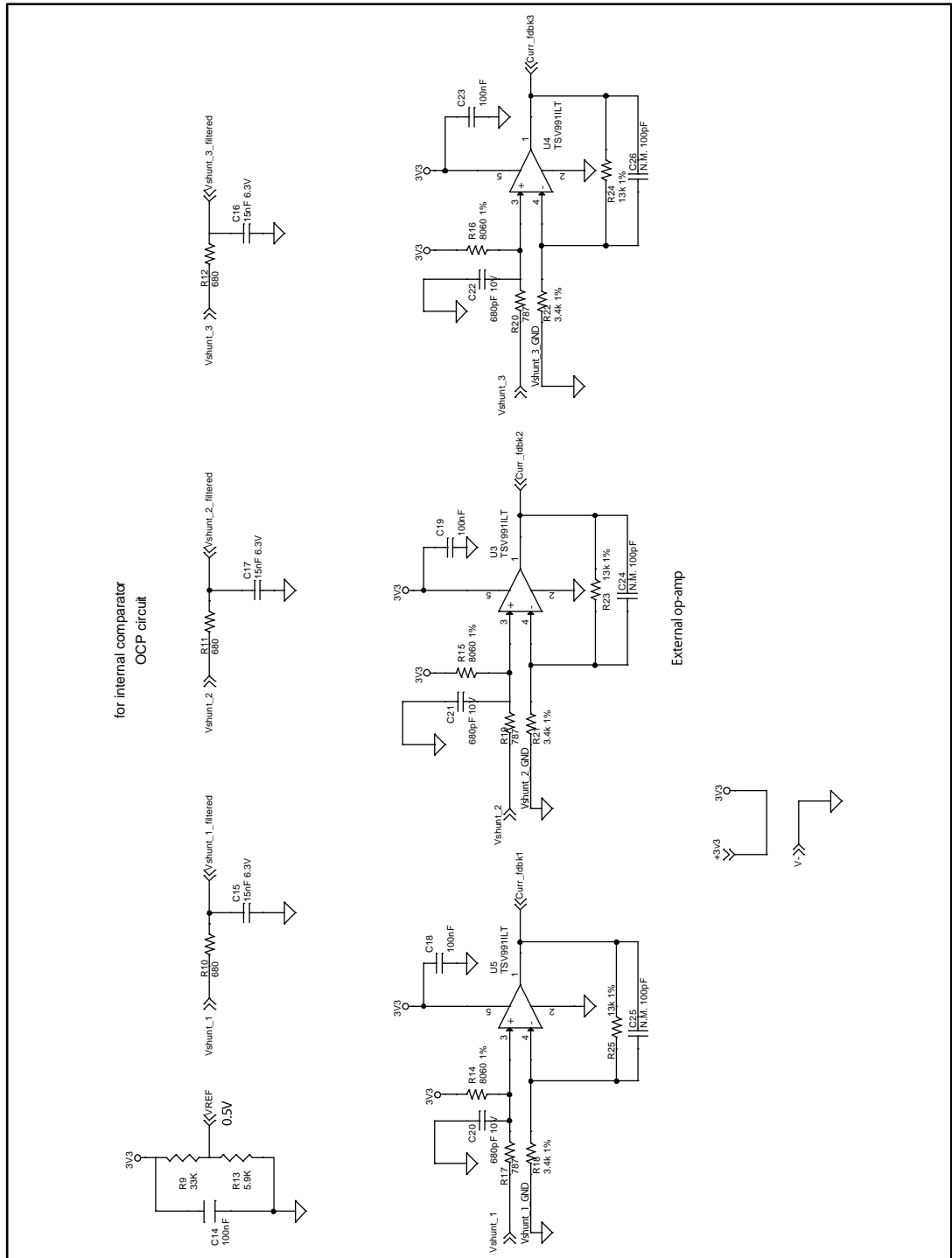
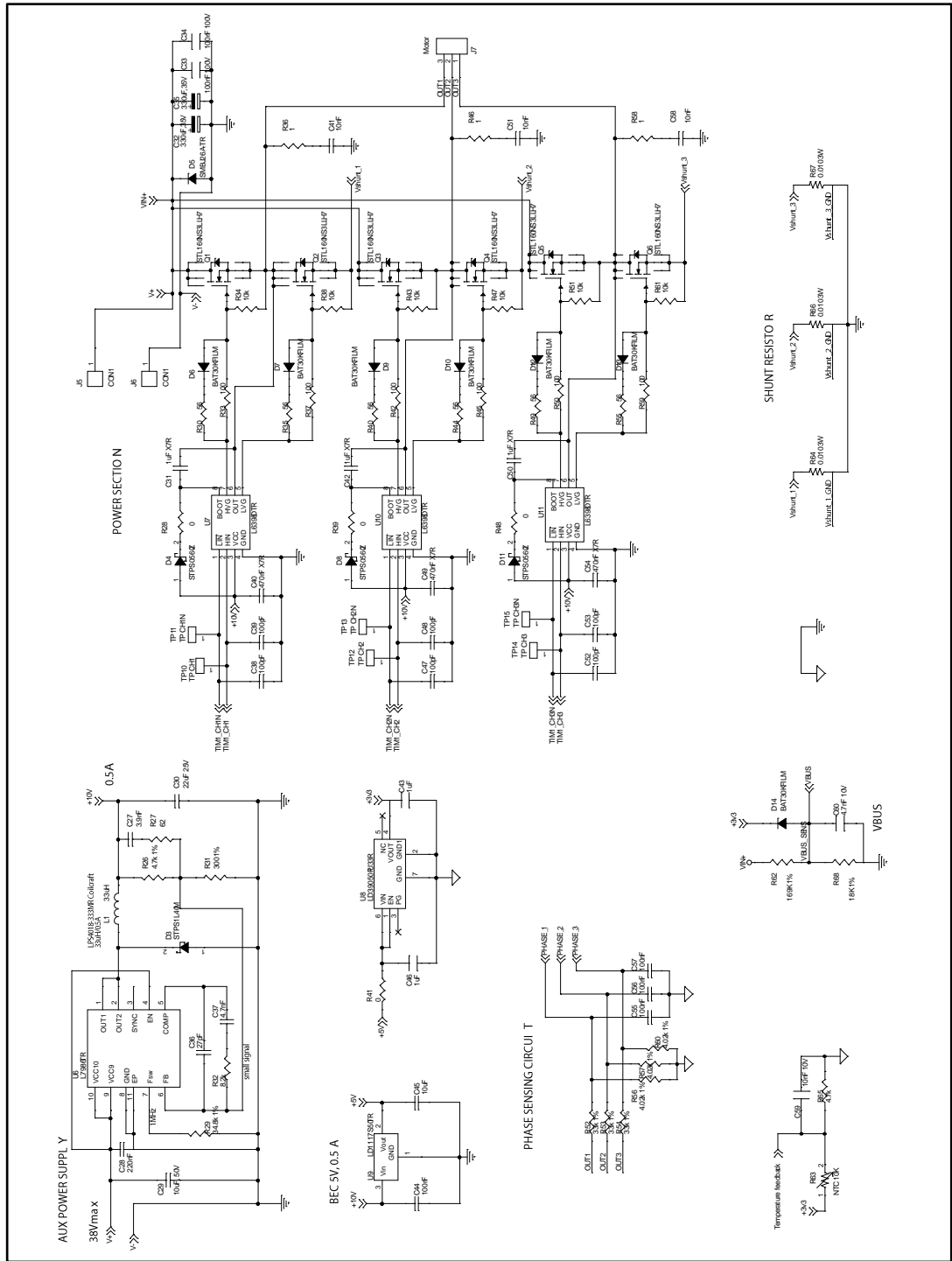


Figure 4: STEVAL-ESC001V1 circuit schematic (4 of 4)



2 Revision history

Table 1: Document revision history

Date	Version	Changes
05-Apr-2017	1	Initial release.

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