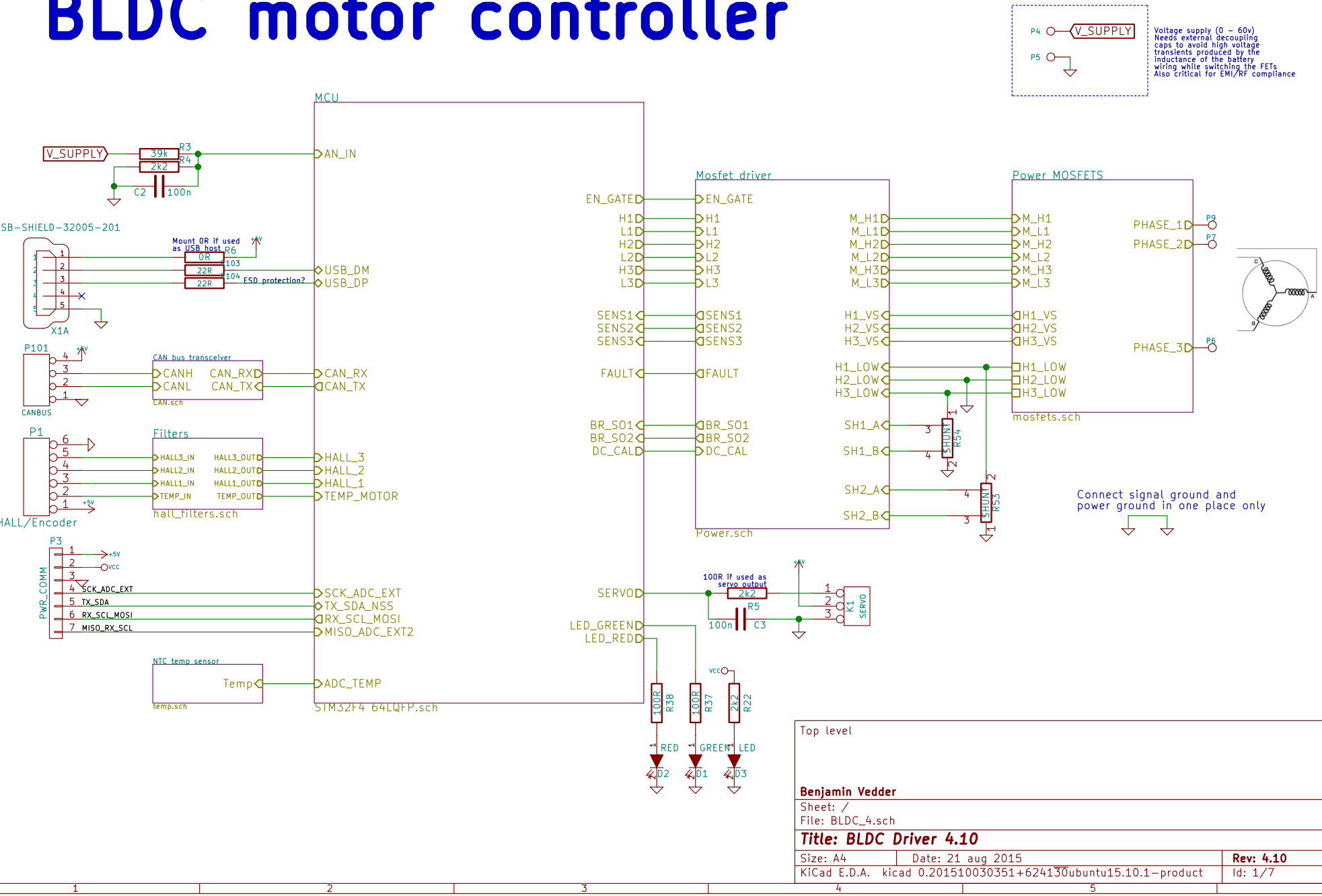
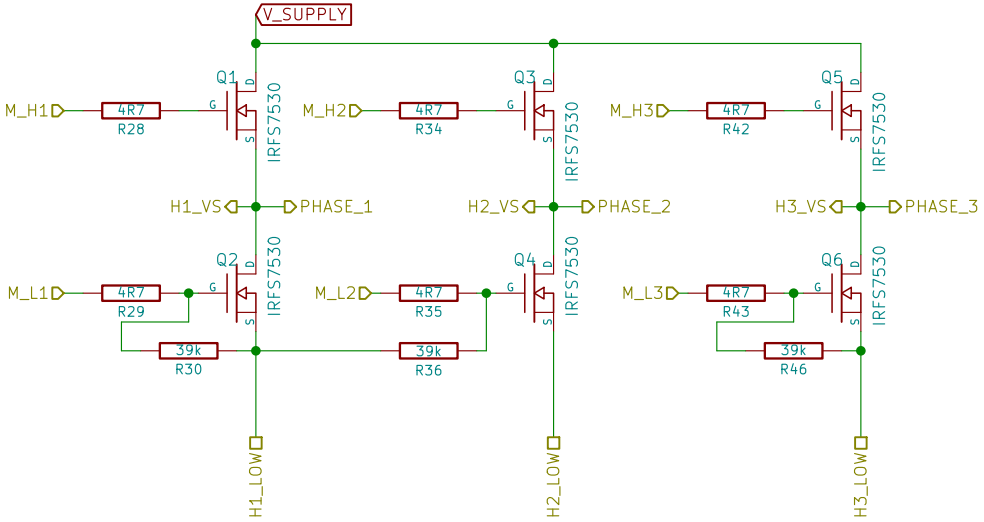
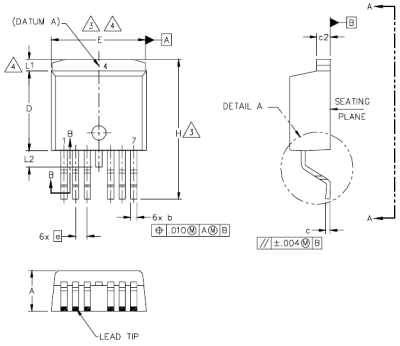
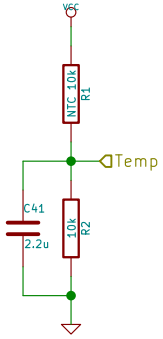
# BLDC motor controller






| | | |
|---|---|---|
| **Benjamin Vedder** | | |
| Sheet: /Power MOSFETS/ | | |
| File: mosfets.sch | | |
| ***Title: BLDC Driver 4.10*** | | |
| Size: A4 | Date: 21 aug 2015 | **Rev: 4.10** |
| KiCad E.D.A. kicad 0.201510030351+624130ubuntu15.10.1-product | | Id: 2/7 |

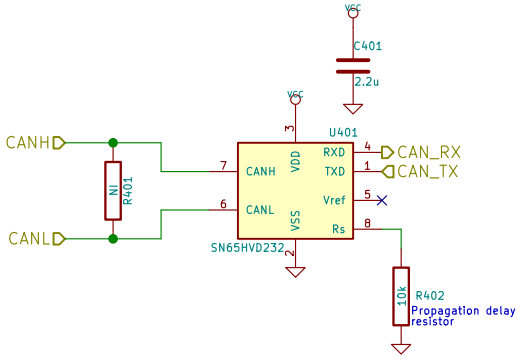



**Benjamin Vedder**

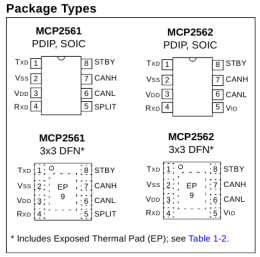
Sheet: /NTC temp sensor/
File: temp.sch

***Title: BLDC Driver 4.10***

| Size: A4 | Date: 21 aug 2015 | **Rev: 4.10** |
|---|---|---|
| KiCad E.D.A. | kicad 0.201510030351+624130ubuntu15.10.1-product | Id: 3/7 |




**Package Types**




* Includes Exposed Thermal Pad (EP); see Table 1-2.

**Benjamin Vedder**

Sheet: /CAN bus transceiver/
File: CAN.sch

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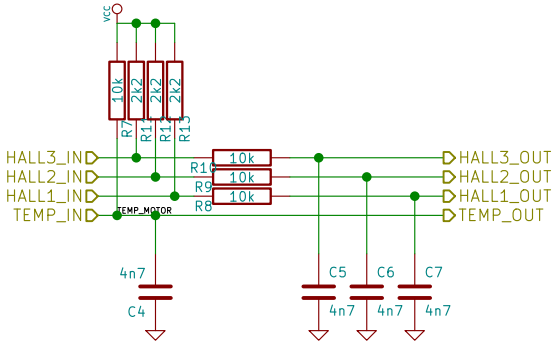
|---|---|---|
| KiCad E.D.A. | kicad 0.201510030351+624130ubuntu15.10.1-product | Id: 4/7 |




| | | |
|---|---|---|
| **Benjamin Vedder** | | |
| Sheet: /Filters/<br>File: hall_filters.sch | | |
| ***Title: BLDC Driver 4.10*** | | |
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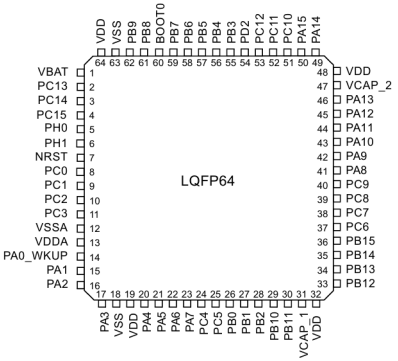
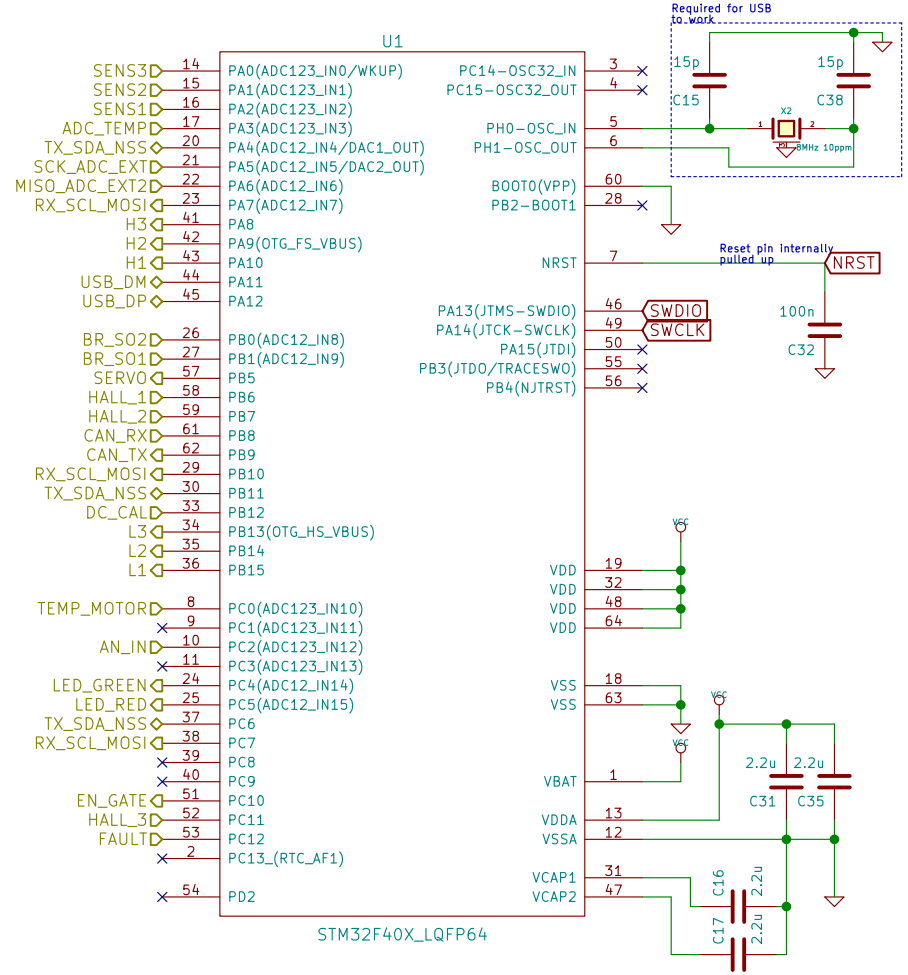
| KiCad E.D.A. kicad 0.201510030351+624130ubuntu15.10.1-product | | Id: 5/7 |

**STM32F405xx**
**STM32F407xx**

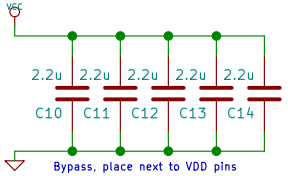
ARM Cortex-M4 32b MCU+FPU, 210DMIPS, up to 1MB Flash/192+4KB RAM, USB OTG HS/FS, Ethernet, 17 TIMs, 3 ADCs, 15 comm. interfaces & camera

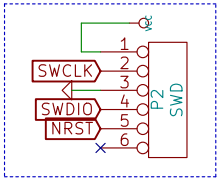












**Benjamin Vedder**

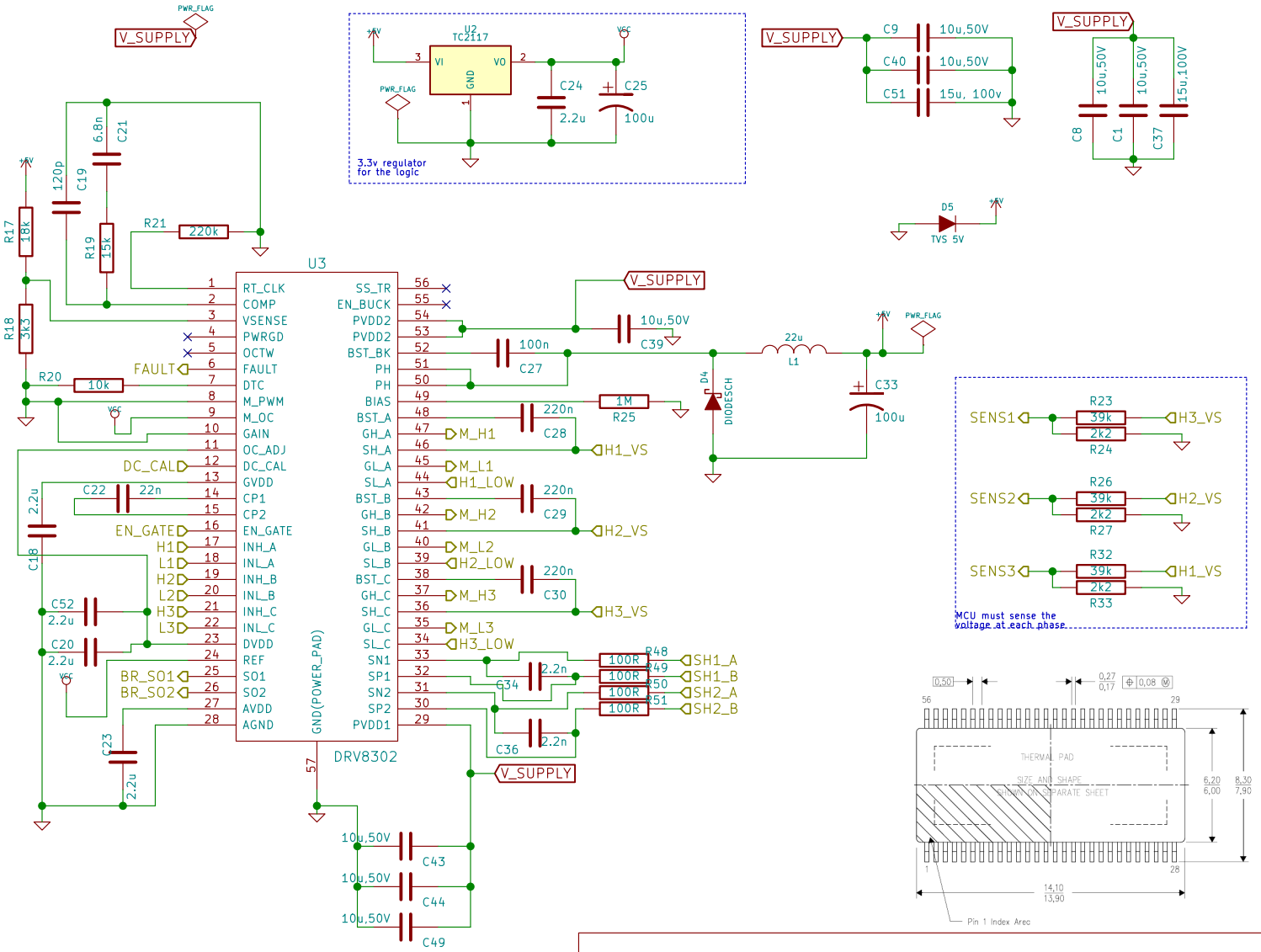
Sheet: /MCU/
File: STM32F4 64LQFP.sch

***Title: BLDC Driver 4.10***

| Size: A4 | Date: 21 aug 2015 | **Rev: 4.10** |
|---|---|---|
| KiCad E.D.A. | kicad 0.201510030351+624130ubuntu15.10.1-product | Id: 6/7 |

## FEATURES

- Operating Supply Voltage 8V–60V
- 2.3A Sink and 1.7A Source Gate Drive Current Capability
- Integrated Dual Shunt Current Amplifiers With Adjustable Gain and Offset
- Integrated Buck Converter to Support up to 1.5A External Load
- Independent Control of 3 or 6 PWM Inputs
- Bootstrap Gate Driver With 100% Duty Cycle Support
- Programmable Dead Time to Protect External FETs from Shoot Through
- Programmable Overcurrent Protection of External MOSFETs
- Thermally Enhanced 56-Pin TSSOP Pad Down DCA Package




**RECOMMENDED OPERATING CONDITIONS**

| | | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| PVDD1 | DC supply voltage PVDD1 for normal operation | Relative to PGND | 8 | | 60 | V |
| PVDD2 | DC supply voltage PVDD2 for buck converter | | 3.5 | | 60 | V |
| $C_{AVDD}$ | External capacitance on AVDD pin (ceramic cap) 20% tolerance | | | 1 | | µF |
| $C_{DVDD}$ | External capacitance on DVDD pin (ceramic cap) 20% tolerance | | | 1 | | µF |
| $C_{GVDD}$ | External capacitance on GVDD pin (ceramic cap) 20% tolerance | | | 2.2 | | µF |
| $C_{CP}$ | Flying cap on charge pump pins (between CP1 and CP2) (ceramic cap) 20% tolerance | | | 22 | | nF |
| $C_{BST}$ | Bootstrap cap (ceramic cap) | | | 100 | | nF |
| $I_{DIN\_EN}$ | Input current of digital pins when EN_GATE is high | | | | 100 | µA |
| $I_{DIN\_DIS}$ | Input current of digital pins when EN_GATE is low | | | | 1 | µA |
| $C_{DIN}$ | Maximum capacitance on digital input pin | | | | 10 | pF |
| $C_{O\_OPA}$ | Maximum output capacitance on outputs of shunt amplifier | | | | 20 | pF |
| $R_{DTC}$ | Dead time control resistor range. Time range is 50ns (-GND) to 500ns (150kΩ) with a linear approximation. | | 0 | | 150 | kΩ |
| $I_{FAULT}$ | $\overline{FAULT}$ pin sink current. Open-drain | V = 0.4 V | | | 2 | mA |
| $I_{OCTW}$ | $\overline{OCTW}$ pin sink current. Open-drain | V = 0.4 V | | | 2 | mA |
| $V_{REF}$ | External voltage reference voltage for current shunt amplifiers | | 2 | | 6 | V |
| $f_{gate}$ | Operating switching frequency of gate driver | Qg(TOT) = 25 nC or total 30 mA gate drive average current | | | 200 | kHz |
| $T_A$ | Ambient temperature | | –40 | | 125 | °C |


**Benjamin Vedder**


Sheet: /Mosfet driver/
File: Power.sch

***Title: BLDC Driver 4.10***

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|---|---|---|
| KiCad E.D.A. kicad 0.201510030351+624130ubuntu15.10.1–product | | Id: 7/7 |