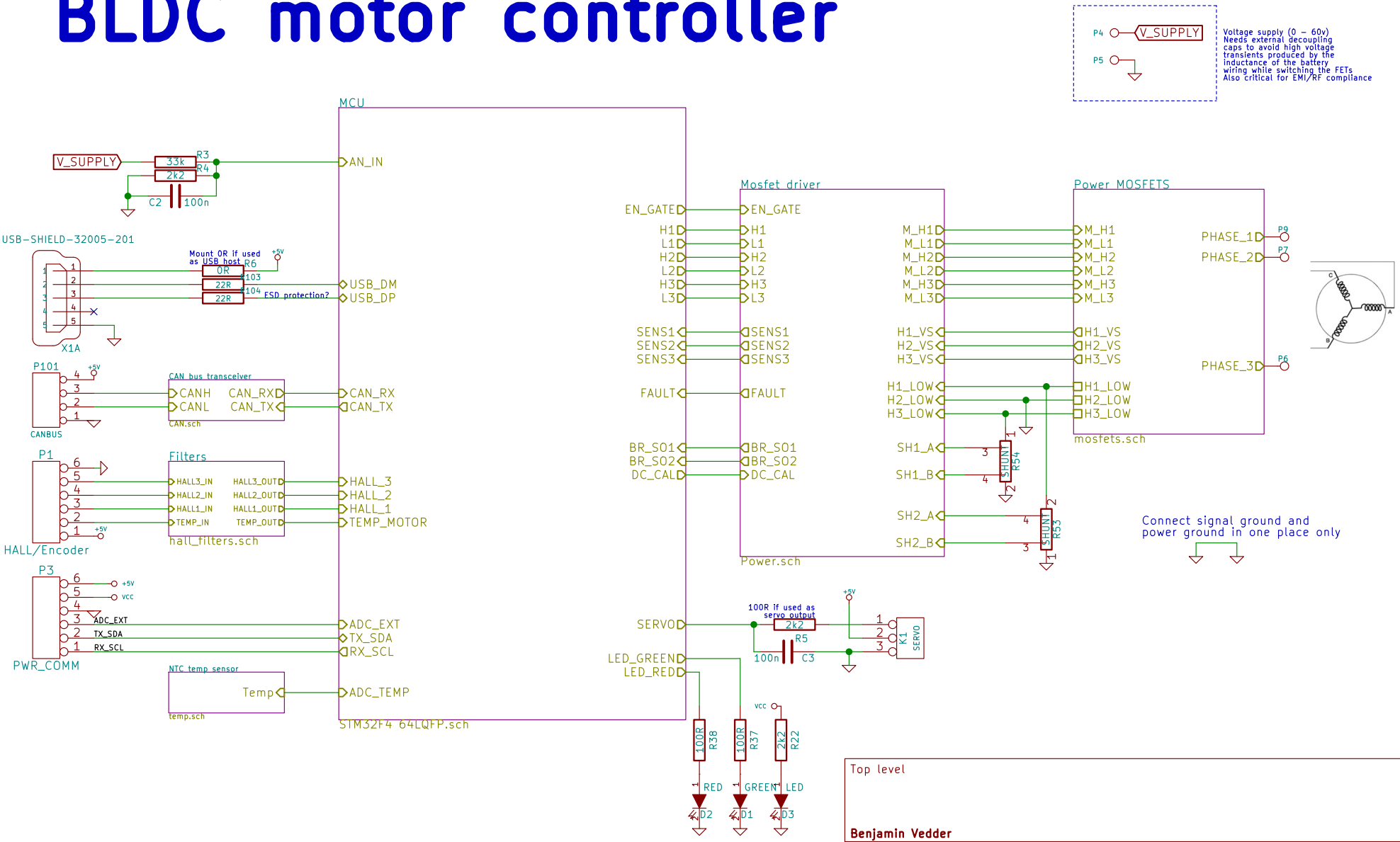
BLDC motor controller



Top level

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Sheet: /
File: BLDC_4.sch

Title: BLDC Driver 4.6

Size: A4	Date: 25 Aug 2014	**Rev: 4.6**
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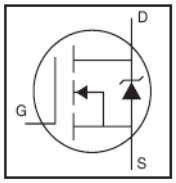
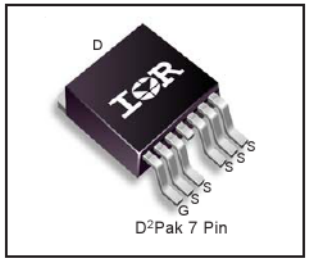
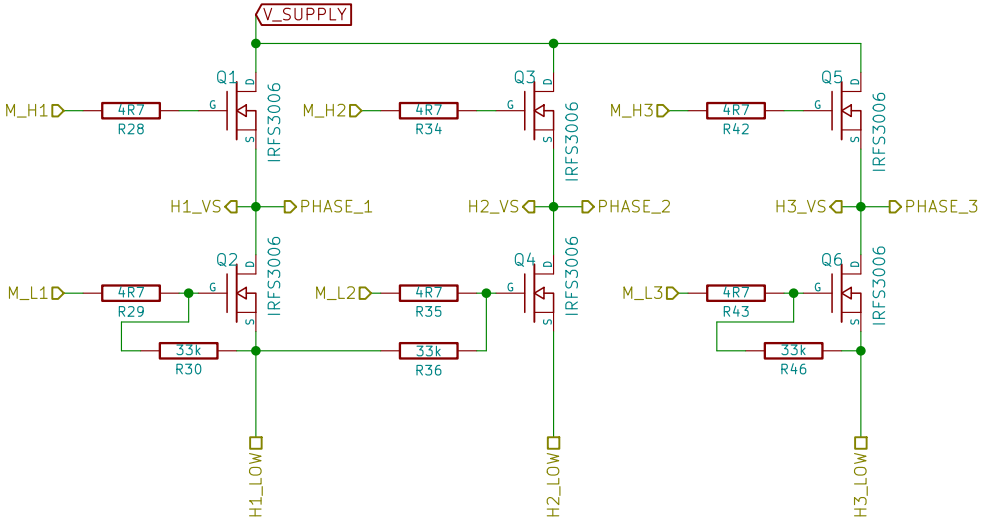
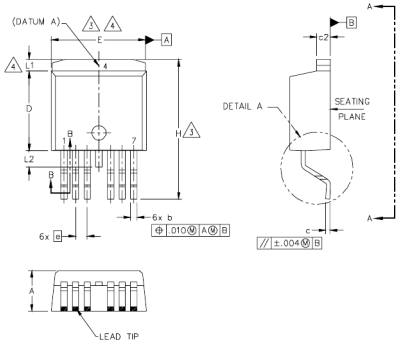
HEXFET® Power MOSFET



V_{DSS}	60V
$R_{DS(on)}$ typ.	1.5mΩ
max.	2.1mΩ
I_D (Silicon Limited)	293A①
I_D (Package Limited)	240A







Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	293①	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	207 ①	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V (Package Limited)	240	
I_{DM}	Pulsed Drain Current ②	1172	
P_D @T_C = 25°C	Maximum Power Dissipation	375	W
	Linear Derating Factor	2.5	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery ⑥	11	V/ns
T_J	Operating Junction and	-55 to + 175	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10lb·in (1.1N·m)	

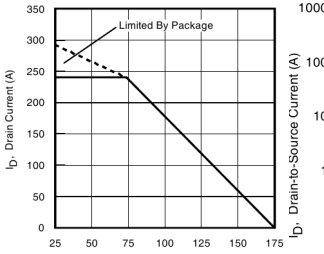


Fig 9. Maximum Drain Current vs. Case Temperature

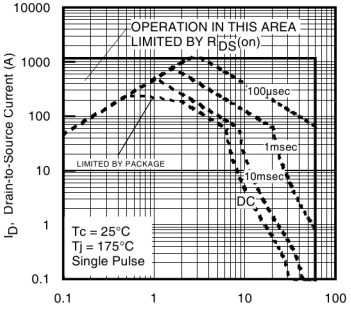


Fig 8. Maximum Safe Operating Area

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Sheet: /Power MOSFETS/
File: mosfets.sch

Title: BLDC Driver 4.6

Size: A4	Date: 25 Aug 2014	**Rev: 4.6**
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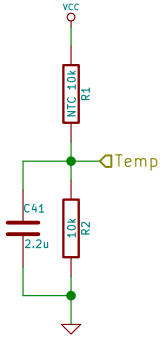

Mrk Industries

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

Title: NTC resistor temperature sensor

Size: A4	Date: 27 sep 2014	**Rev:**
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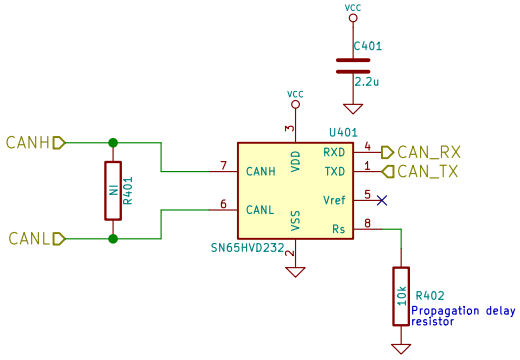
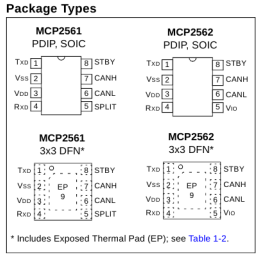


Package Types

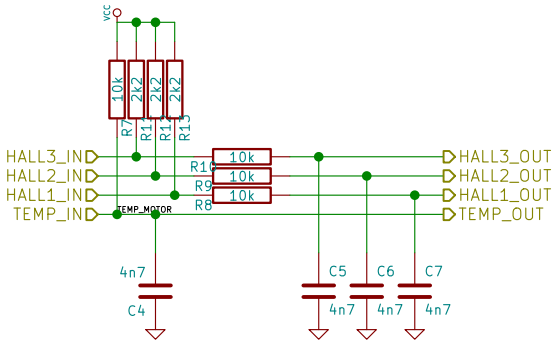


Mrk Industries

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

Title: CAN BUS transceiver

Size: A4	Date: 25 Aug 2014	**Rev:**
KiCad E.D.A. kicad (2014-10-11 BZR 5175)-product		Id: 4/7



Sheet: /Filters/		
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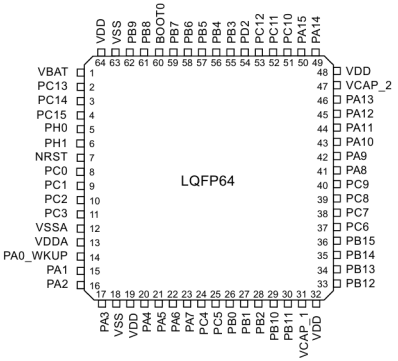
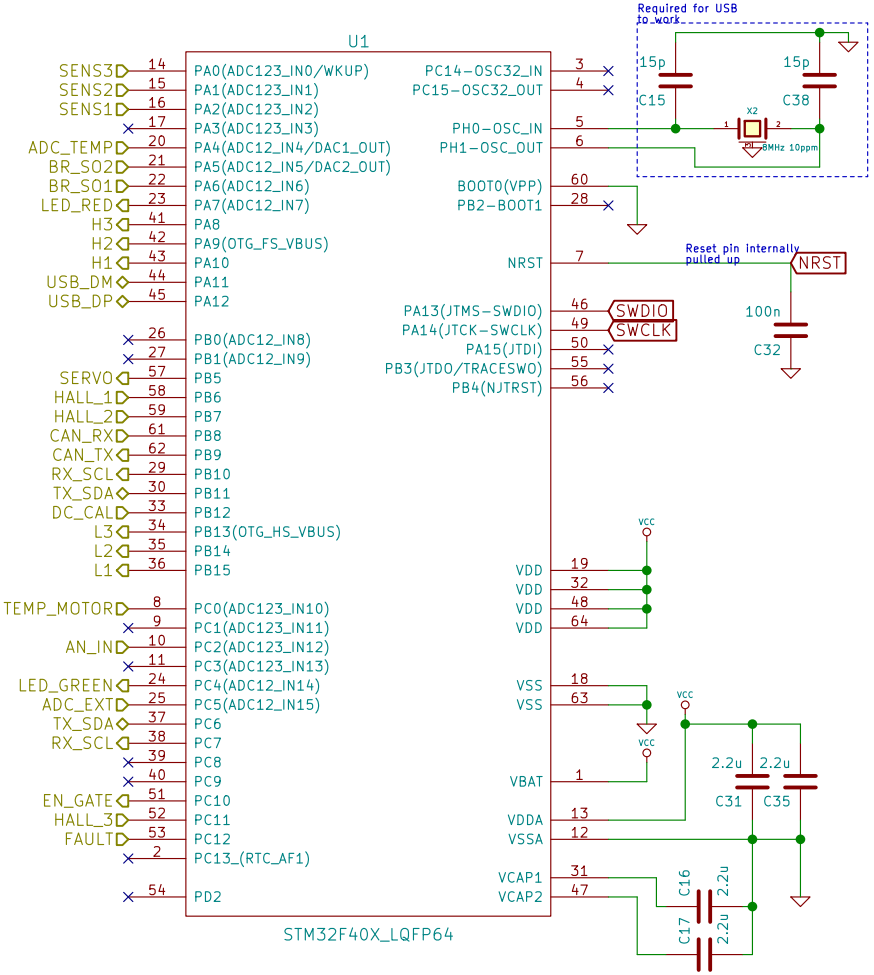
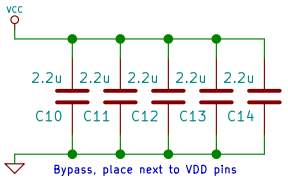
Title:		
Size: A4	Date: 25 Aug 2014	**Rev:**
KiCad E.D.A. kicad (2014-10-11 BZR 5175)-product		Id: 5/7

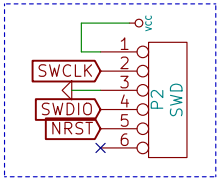
STM32F405xx
STM32F407xx

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









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

Title: BLDC Driver 4.6

Size: A4	Date: 25 Aug 2014	**Rev: 4.6**
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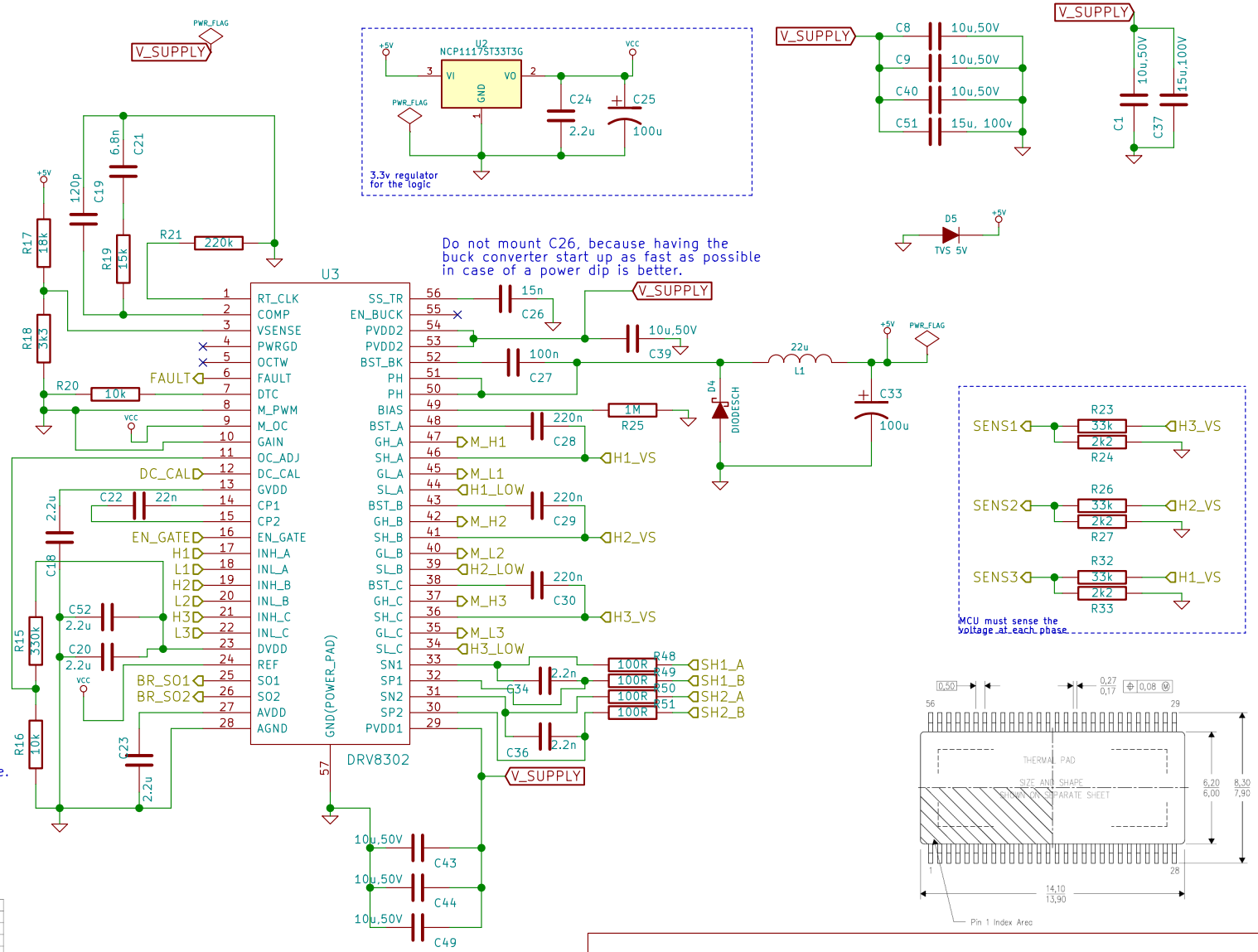
FEATURES

- 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



Do not mount the resistor R16, because the internal current limit in the DRV8302 does not work with this configuration for some reason. If this resistor is mounted, the DRV8203 will generate faults all the time.

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

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Sheet: /Mosfet driver/
File: Power.sch

Title: BLDC Driver 4.5

Size: A4	Date: 25 Aug 2014	**Rev: 4.5**
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