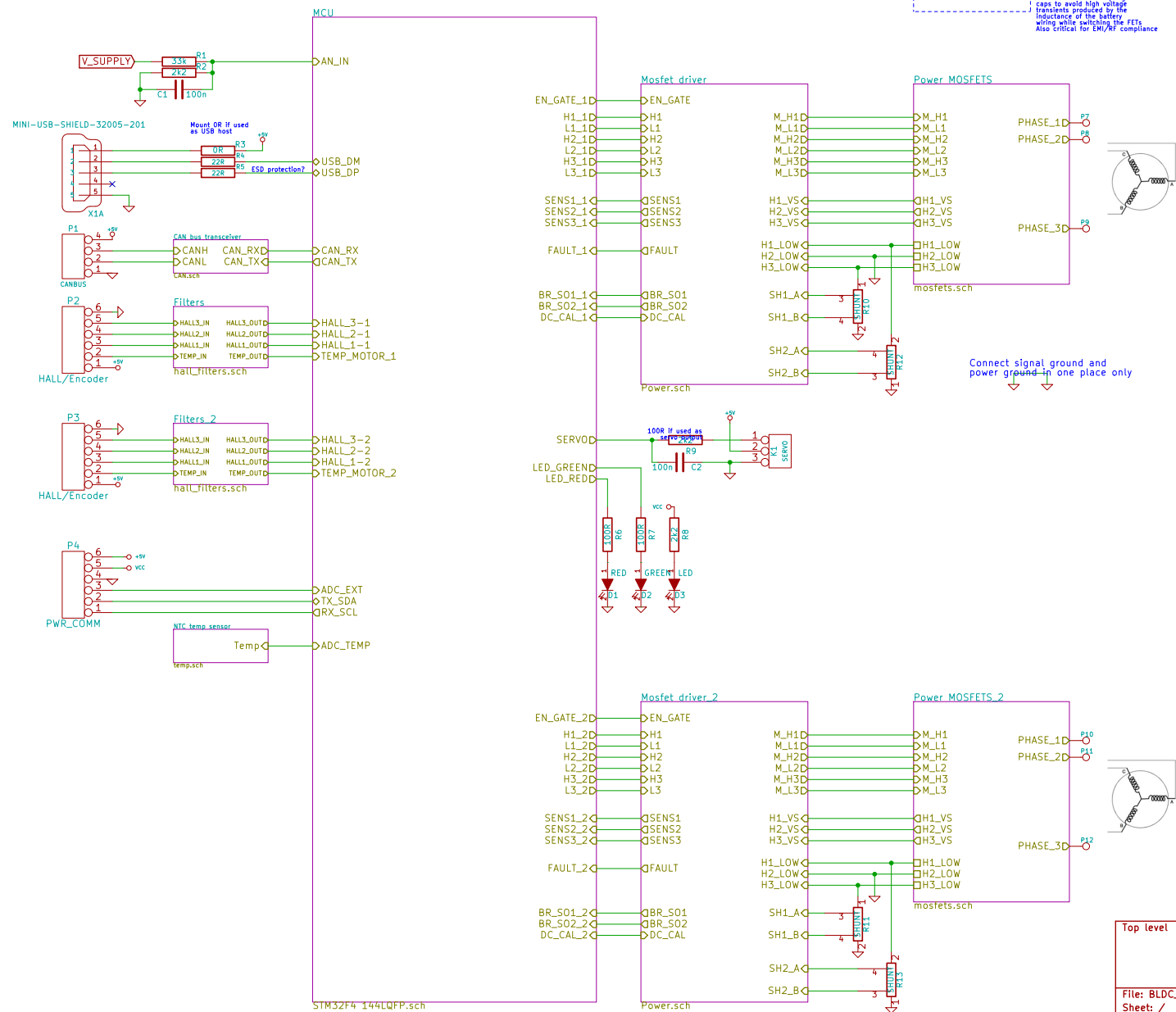


BLDC motor controller



Top level

File: BLDC_4.sch

Sheet: /

Title: BLDC Driver 4.6

Size: A3

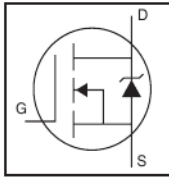
Date: 16 jan 2015

Rev: 1.0

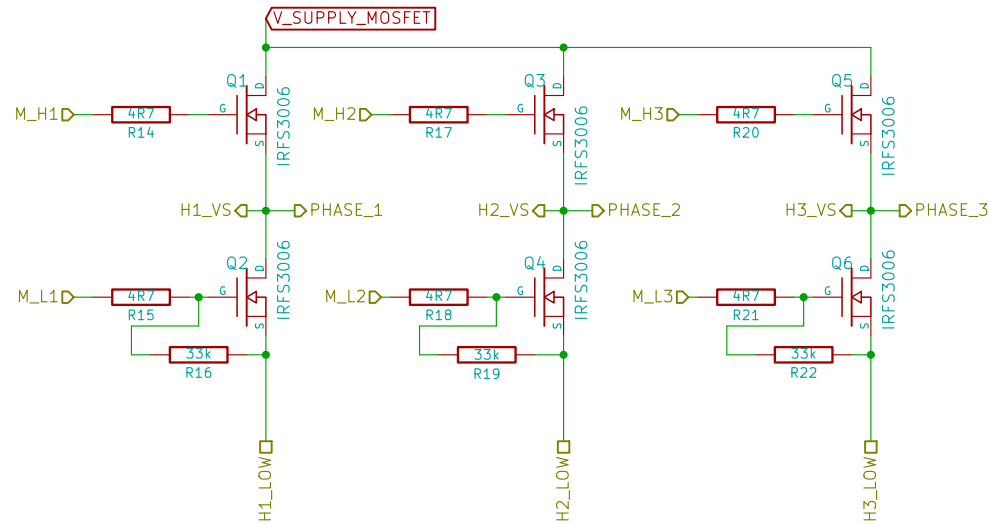
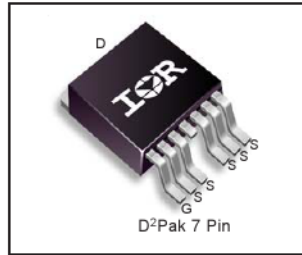
KiCad E.D.A.

Id: 1/10

HEXFET® Power MOSFET



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



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
I_D @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{DS} = 10\text{V}$ (Silicon Limited)	293①	A
I_D @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{DS} = 10\text{V}$ (Silicon Limited)	207 ②	A
I_D @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{DS} = 10\text{V}$ (Package Limited)	240	A
I_{DS}	Pulsed Drain Current ③	1172	A
P_D @ $T_C = 25^\circ\text{C}$	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 ④	11	V/ns
T_J	Operating Junction and Storage Temperature Range	-55 to $+175$	°C
T_{SOL}	Soldering Temperature, for 10 seconds (1.6mm from case)	300	°C
	Mounting torque, 6-32 or M3 screw	10lb-in (1.1N-m)	

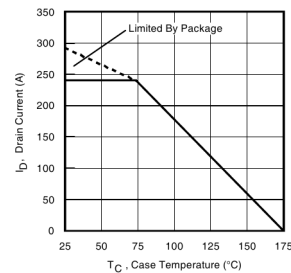


Fig 9. Maximum Drain Current vs. Case Temperature

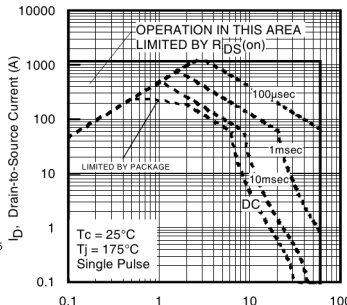
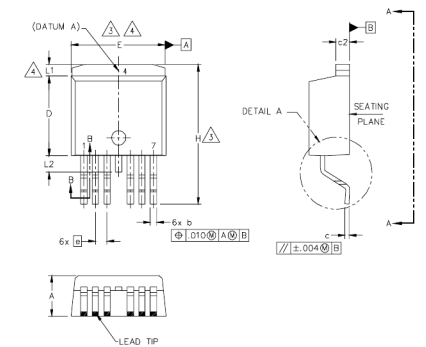


Fig 8. Maximum Safe Operating Area



File: mosfets.sch

Sheet: /Power MOSFETS/

Title: BLDC Driver 4.6

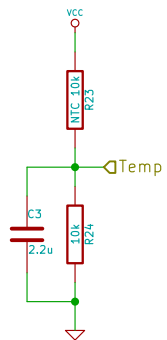
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Date: 16 jan 2015

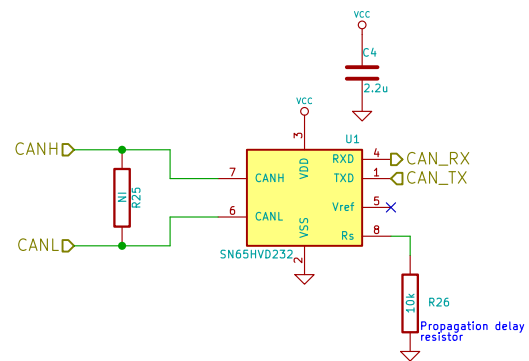
Rev: 1.0

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Id: 2/10



File: temp.sch		
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Size: A4	Date: 16 jan 2015	Rev: 1.0
KiCad E.D.A.		Id: 3/10

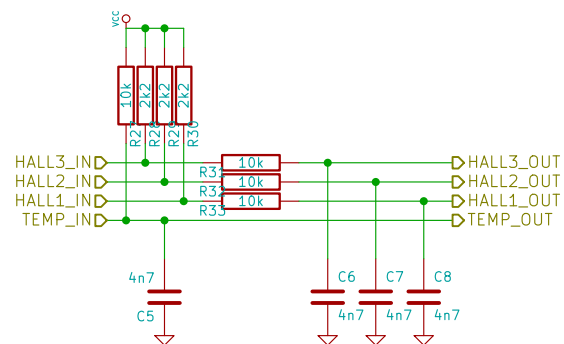


Package Types

MCP2561 PDIP, SOIC	MCP2562 PDIP, SOIC
MCP2561 3x3 DFN*	MCP2562 3x3 DFN*

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

File: CAN.sch	
Sheet: /CAN bus transceiver/	
Title: CAN BUS transceiver	
Size: A4	Date: 16 jan 2015
KiCad E.D.A.	Rev: 1.0
	Id: 4/10



File: hall_filters.sch		
Sheet: /Filters/		
Title:		
Size: A4	Date: 16 jan 2015	Rev: 1.0
KiCad E.D.A.		Id: 5/10

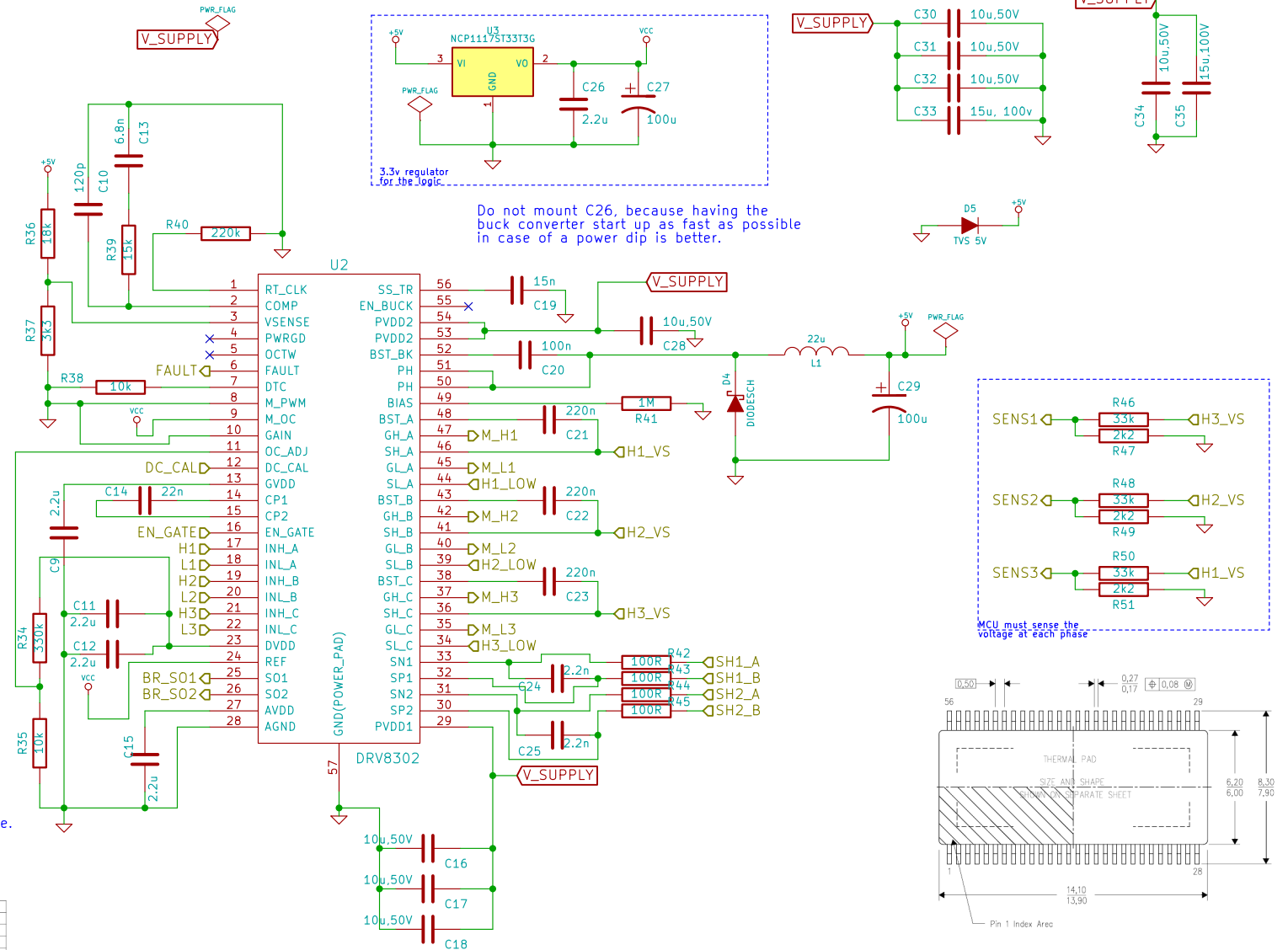
FEATURES

- 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	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 _{BS1}	Bootstrap cap (ceramic cap)	100		nF
I _{DD1,EN}	Input current of digital pins when EN_GATE is high	100		µA
I _{DD1,DIS}	Input current of digital pins when EN_GATE is low	1		µA
C _{DI}	Maximum capacitance on digital input pin	10		pF
C _{O,OPA}	Maximum output capacitance on outputs of shunt amplifier	20		pF
R _{DT}	Dead time control resistor range. Time range is 50ns (GND) to 500ns (150kΩ) with a linear approximation.	0	150	kΩ
I _{FAULT}	FAULT pin sink current. Open-drain	V = 0.4 V	2	mA
I _{OCTW}	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 _{SW}	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



File: Power.sch

Sheet: /Mosfet driver/

Title: BLDC Driver 4.5

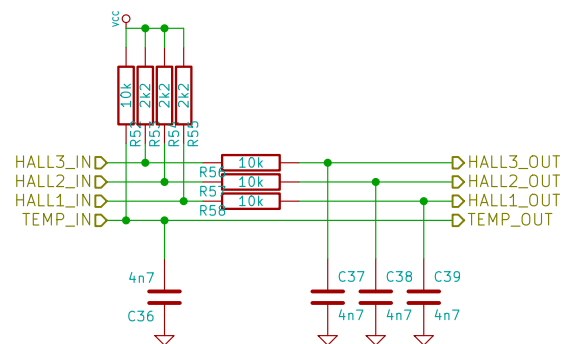
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Date: 16 jan 2015

Rev: 1.0

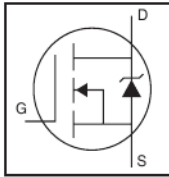
KiCad E.D.A.

Id: 6/10

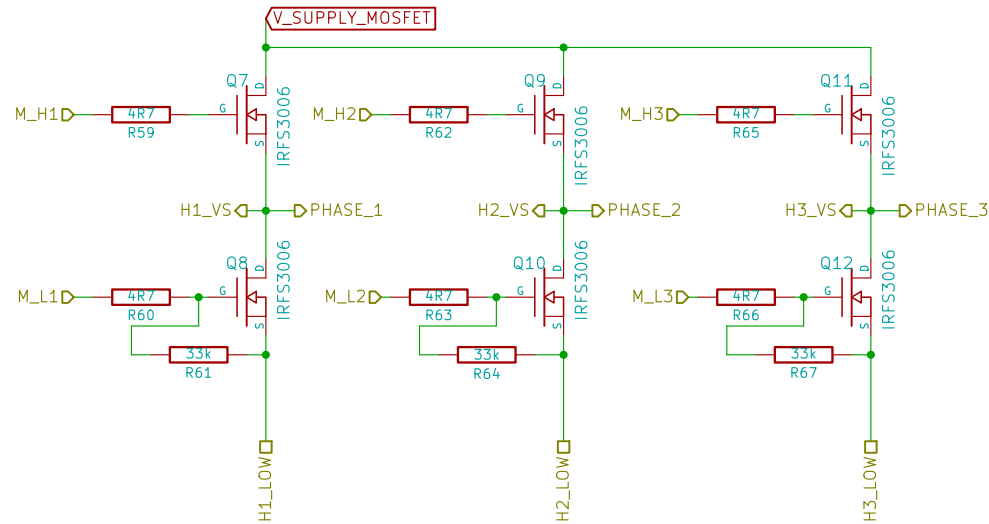
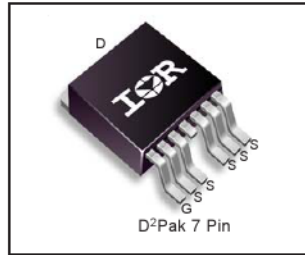


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Sheet: /Filters_2/		
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Size: A4	Date: 16 jan 2015	Rev: 1.0
KiCad E.D.A.		Id: 7/10

HEXFET® Power MOSFET

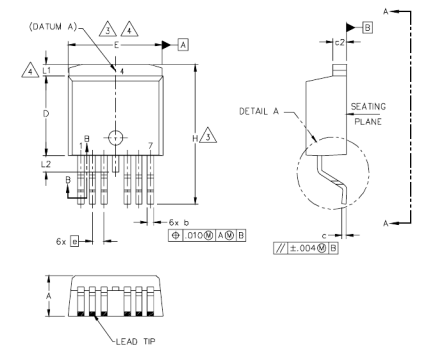
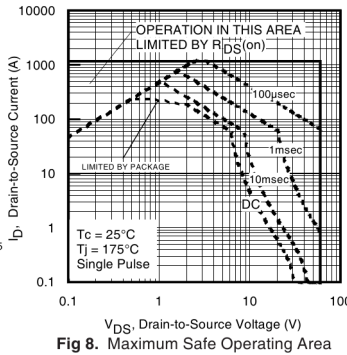
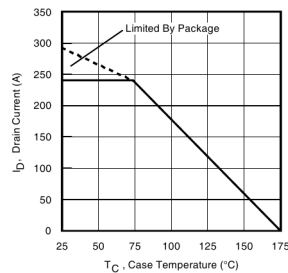


V_{DSS}		60V
$R_{DS(on)}$	typ.	1.5mΩ
	max.	2.1mΩ
I_D (Silicon Limited)		293A①
I_D (Package Limited)		240A

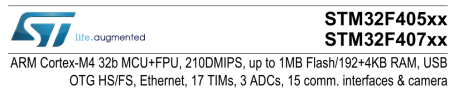


Absolute Maximum Ratings

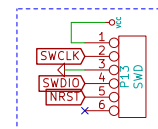
Symbol	Parameter	Max.	Units
I_D @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{DS} = 10\text{V}$ (Silicon Limited)	293①	A
I_D @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{DS} = 10\text{V}$ (Silicon Limited)	207 ②	A
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T_{SOL}	Soldering Temperature, for 10 seconds (1.6mm from case)	300	°C
	Mounting torque, 6-32 or M3 screw	10lb-in (1.1N-m)	



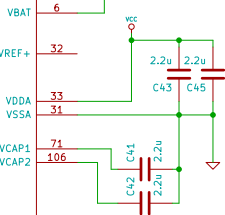
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Title: BLDC Driver 4.6	Size: A4	Date: 16 jan 2015
KiCad E.D.A.		Id: 8/10



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



Programming / Debug
connector



Id: 9/10

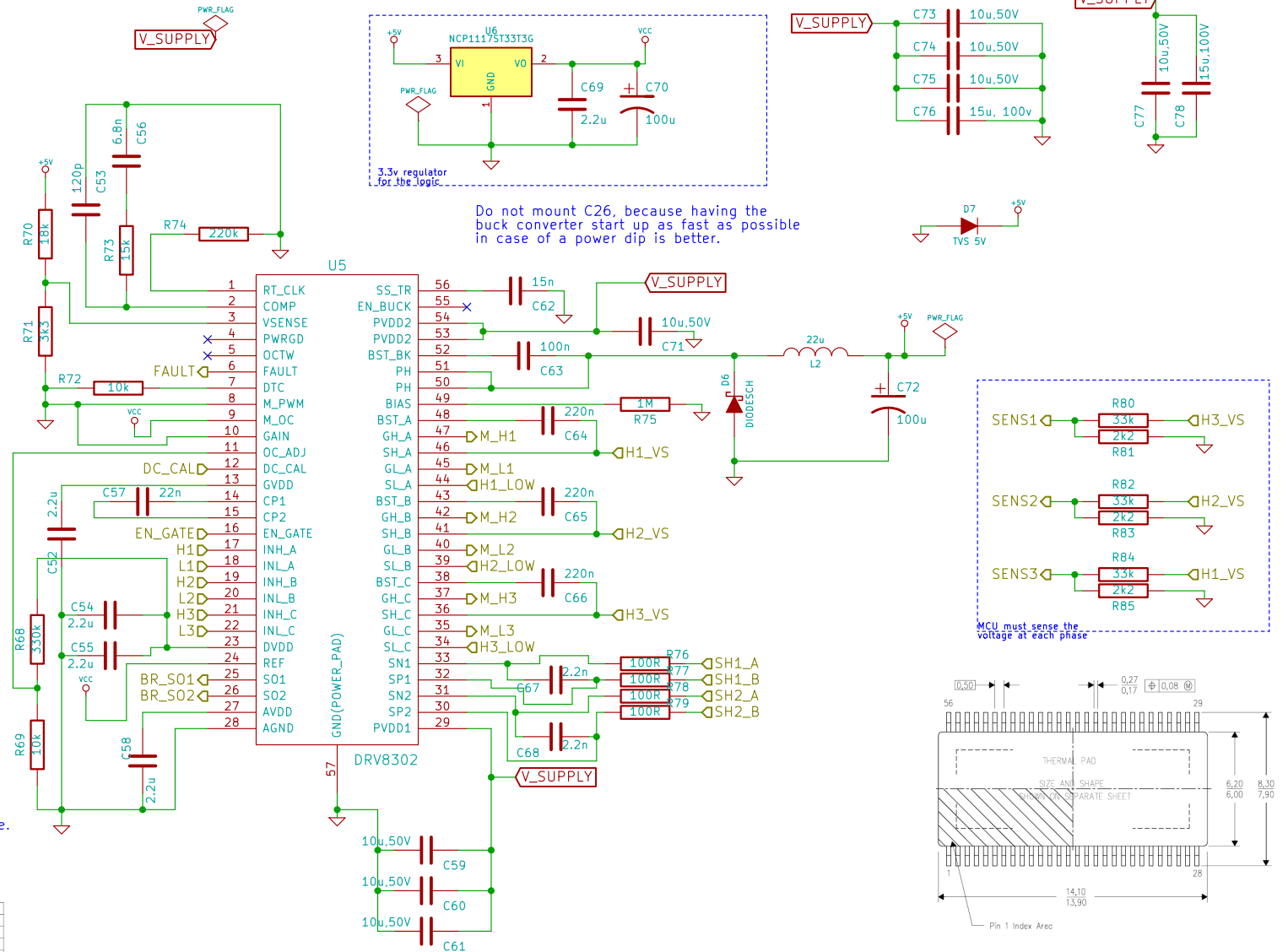
FEATURES

- 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
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C _{GVDD}	External capacitance on GVDD pin (ceramic cap) 20% tolerance	2.2		µF
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C _{BOOT}	Bootstrap cap (ceramic cap)	100		nF
I _{DD1,EN}	Input current of digital pins when EN_GATE is high	100		µA
I _{DD1,DIS}	Input current of digital pins when EN_GATE is low	1		µA
C _{DI}	Maximum capacitance on digital input pin	10		pF
C _{O,OPA}	Maximum output capacitance on outputs of shunt amplifier	20		pF
R _{DT}	Dead time control resistor range. Time range is 50ns (-GND) to 500ns (150kΩ) with a linear approximation.	0	150	kΩ
I _{FAULT}	FAULT pin sink current. Open-drain	V = 0.4 V	2	mA
I _{OCTW}	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 _{SW}	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



File: Power.sch

Sheet: /Mosfet driver_2/

Title: BLDC Driver 4.5

Size: A4

Date: 16 jan 2015

Rev: 1.0

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Id: 10/10