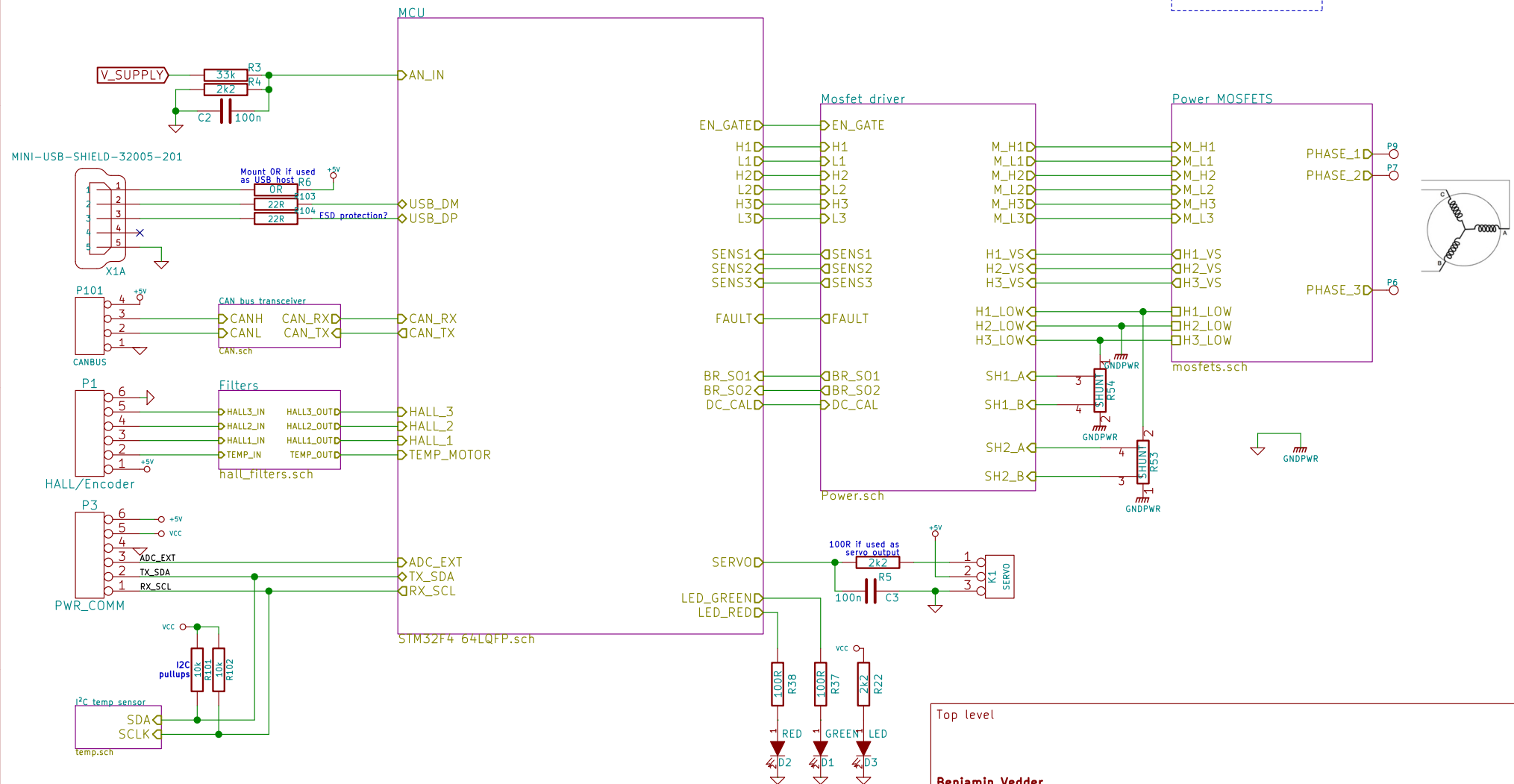
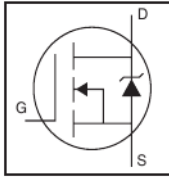


BLDC motor controller

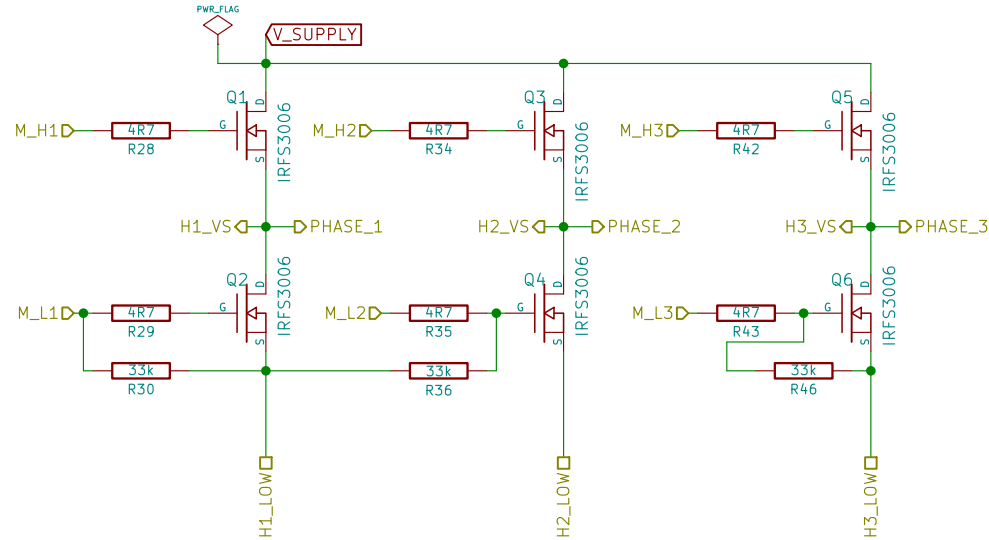
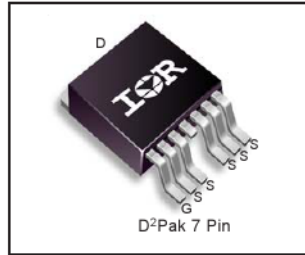


Top level	
Benjamin Vedder	
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File: BLDC_4.sch	
Title: BLDC Driver 4.5	
Size: A4	Date: 25 Aug 2014
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HEXFET® Power MOSFET



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_{S10}	Soldering Temperature, for 10 seconds (1.6mm from case)	300	°C
	Mounting torque, 6-32 or M3 screw	10lb-in (1.1N-m)	

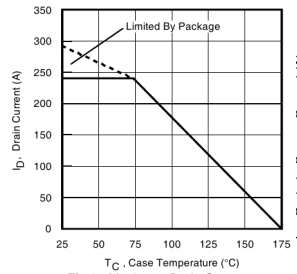


Fig 9. Maximum Drain Current vs. Case Temperature

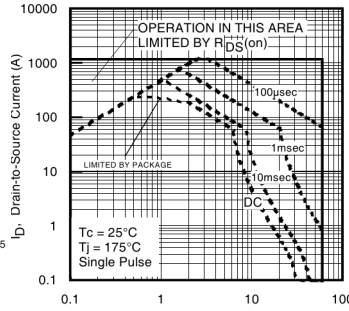
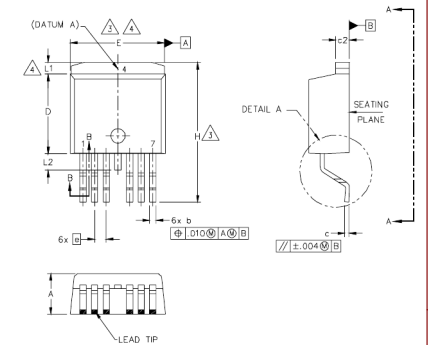


Fig 8. Maximum Safe Operating Area



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Sheet: /Power MOSFETS/
File: mosfets.sch

Title: BLDC Driver 4.5

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LM73 2.7V, SOT, 11-to-14 Bit Digital Temperature Sensor with 2-Wire Interface

FEATURES

- Single Address Pin Offers Choice of Three Selectable Addresses per Version for a Total of Six Possible Addresses.
- SMBus and I²C-Compatible Two-Wire Interface
- Supports 400 kHz Operation
- Shutdown Mode with One-Shot Feature Available for Very Low Average Power Consumption
- Programmable Digital Temperature Resolution from 11 Bits to 14 Bits.
- Fast Conversion Rate Ideal for Quick Power Up and Measuring Rapidly Changing Temperature
- Open-Drain ALERT Output Pin Goes Active When Temperature is Above a Programmed Temperature Limit
- Very Stable, Low-Noise Digital Output.
- UL Recognized Component

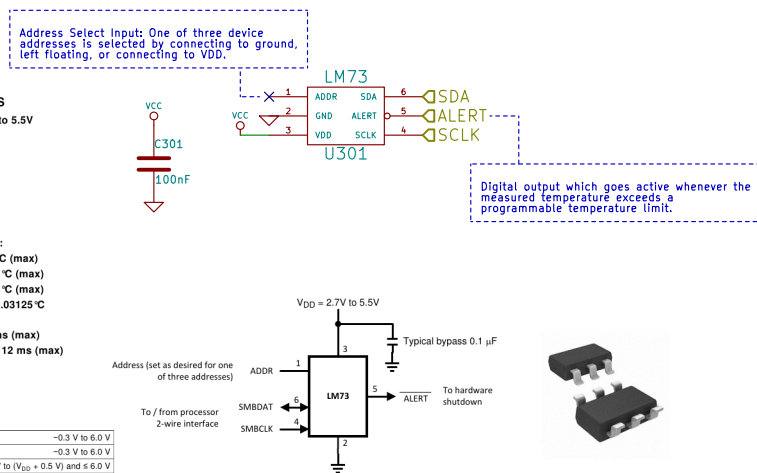
KEY SPECIFICATIONS

- Supply Voltage: 2.7V to 5.5V
- Supply Current:
 - Operating:
 - 320 μ A (typ)
 - 495 μ A (max)
 - Shutdown:
 - 8 μ A (max)
 - 1.9 μ A (typ)
- Temperature Accuracy:
 - -10°C to 80°C: $\pm 1.0^\circ\text{C}$ (max)
 - -25°C to 115°C: $\pm 1.5^\circ\text{C}$ (max)
 - -40°C to 150°C: $\pm 2.0^\circ\text{C}$ (max)
- Resolution: 0.25°C to 0.03125°C
- Conversion Time:
 - 11-bit (0.25°C): 14 ms (max)
 - 14-bit (0.03125°C): 112 ms (max)

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Supply Voltage	-0.3 V to 6.0 V
Voltage at SMBCLK and SMBDAT pins	-0.3 V to 6.0 V
Voltage at All Other Pins	-0.3 V to (V _{DD} + 0.5 V) and ≤ 6.0 V
Input Current at Any Pin ⁽²⁾	± 5 mA
Storage Temperature	-65°C to +150°C
ESD Susceptibility ⁽³⁾	Human Body Model Machine Model
	2000 V 200 V

Soldering process must comply with Texas Instruments' Reflow Temperature Profile specifications. Refer to www.ti.com/packaging.⁽⁴⁾



Mrk Industries

Sheet: /I²C temp sensor/

File: temp.sch

Title: I²C digital temperature sensor

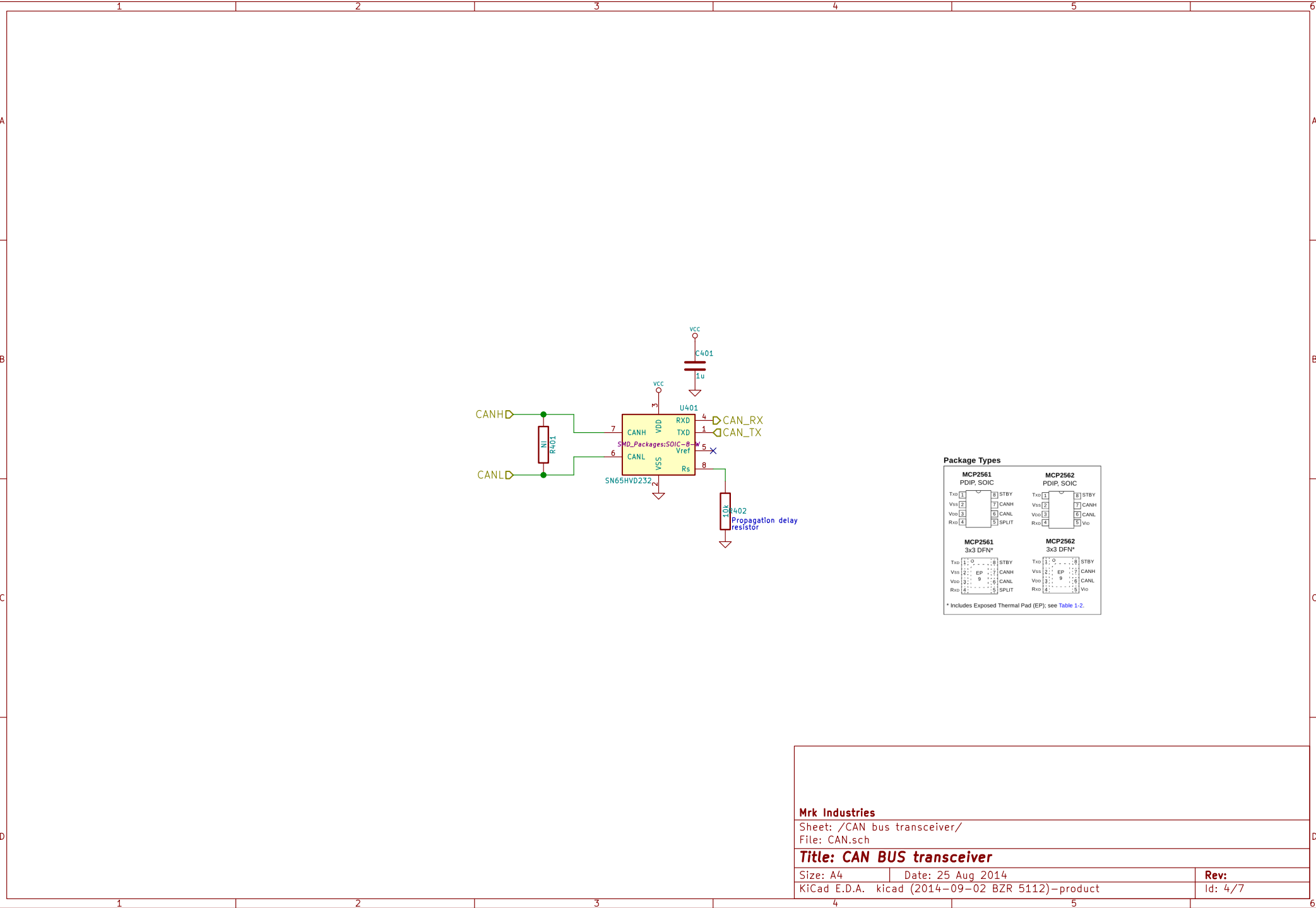
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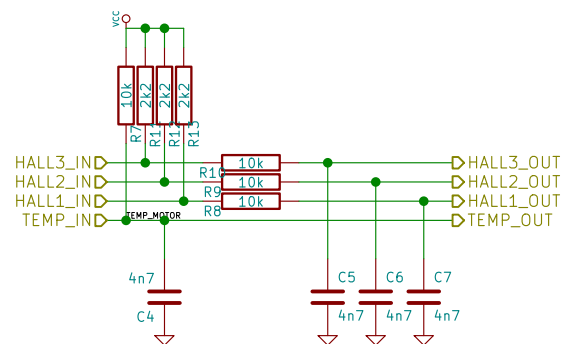
Date: 25 Aug 2014

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Sheet: /Filters/
File: hall_filters.sch

Title:

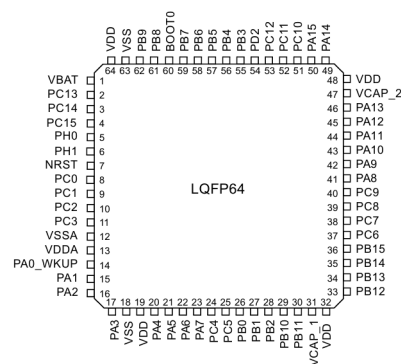
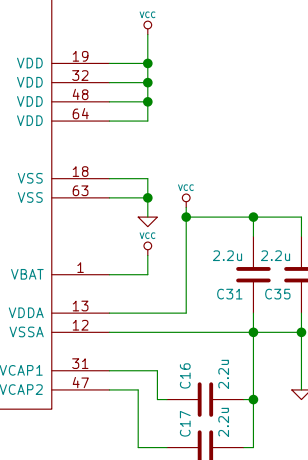
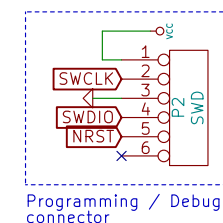
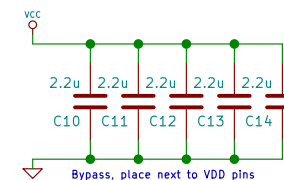
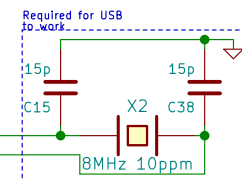
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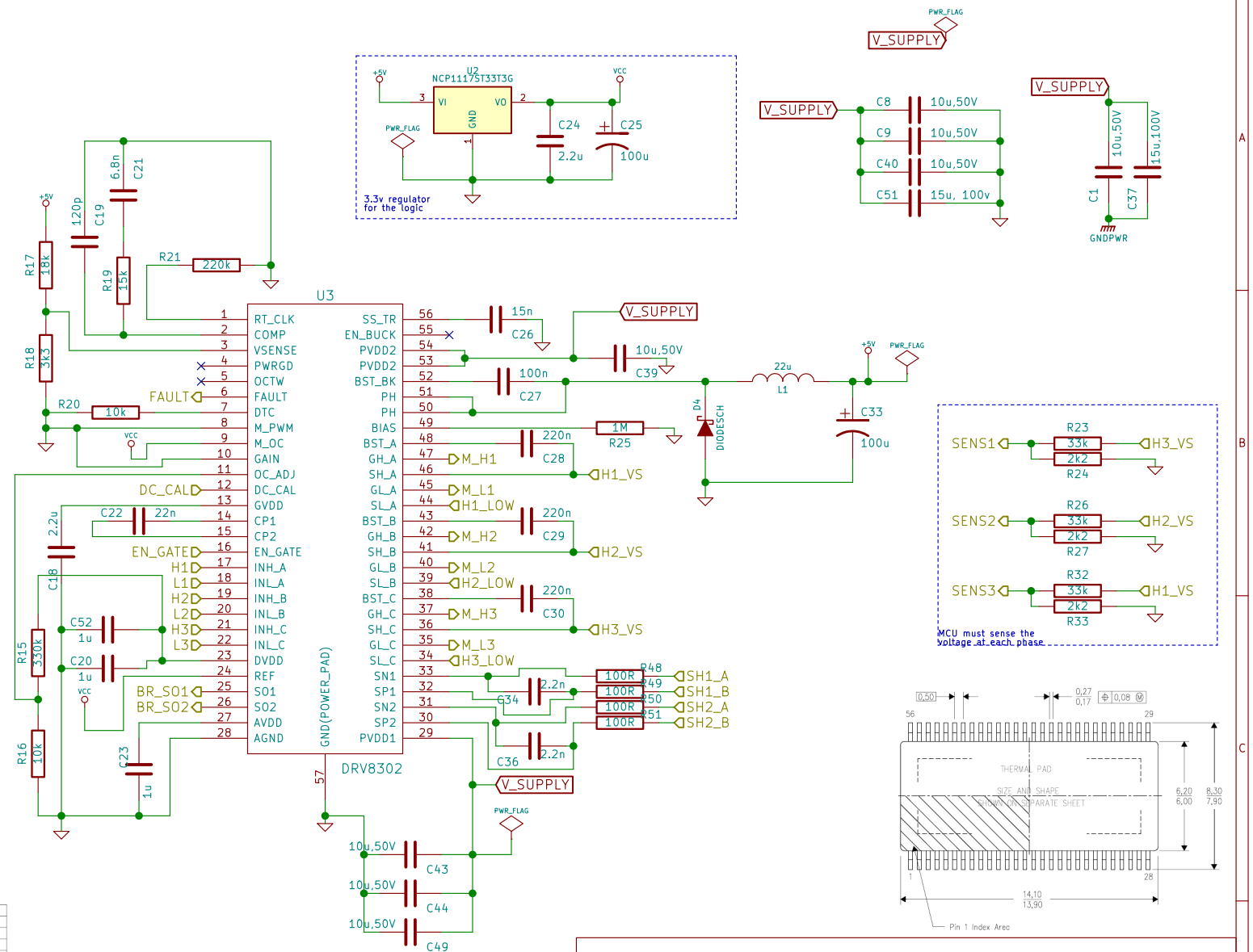
		U1
SENS3	14	PA0(ADC123_IN0/WKUP)
SENS2	15	PA1(ADC123_IN1)
SENS1	16	PA2(ADC123_IN2)
	17	PA3(ADC123_IN3)
	20	PA4(ADC12_IN4/DAC1_0U)
BR_S02	21	PA5(ADC12_IN5/DAC2_0U)
BR_S01	22	PA6(ADC12_IN6)
LED_RED	23	PA7(ADC12_IN7)
H3	41	PA8
H2	42	PA9(OTG_FS_VBUS)
H1	43	PA10
USB_DM	44	PA11
USB_DP	45	PA12
	26	PB0(ADC12_IN8)
	27	PB1(ADC12_IN9)
SERVO	57	PB5
HALL_1	58	PB6
HALL_2	59	PB7
CAN_RXD	61	PB8
CAN_TXD	62	PB9
RX_SCL	29	PB10
TX_SDA	30	PB11
DC_CALD	33	PB12
L3	34	PB13(OTG_HS_VBUS)
L2	35	PB14
L1	36	PB15
TEMP_MOTOR	8	PC0(ADC123_IN10)
	9	PC1(ADC123_IN11)
AN_IND	10	PC2(ADC123_IN12)
	11	PC3(ADC123_IN13)
LED_GREEN	24	PC4(ADC12_IN14)
ADC_EXTD	25	PC5(ADC12_IN15)
TX_SDA	37	PC6
RX_SCL	38	PC7
	39	PC8
	40	PC9
EN_GATE	51	PC10
HALL_3D	52	PC11
FAULT	53	PC12
	2	PC13_(RTC_AF1)
	54	PD2



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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



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 _{BST}	Bootstrap cap (ceramic cap)		100		nF
I _{DD1}	Input current of digital pins when EN_GATE is high		100		µA
I _{DD2}	Input current of digital pins when EN_GATE is low		1		µA
C _{INL}	Maximum capacitance on digital input pin		10		pF
C _{OUT}	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		2		mA
I _{OCTW}	OCTW pin sink current. Open-drain		2		mA
V _{REF}	External voltage reference voltage for current shunt amplifiers	2	6		V
f _{SW}	Operating switching frequency of gate driver		200		kHz
T _A	Ambient temperature	-40	125		°C

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