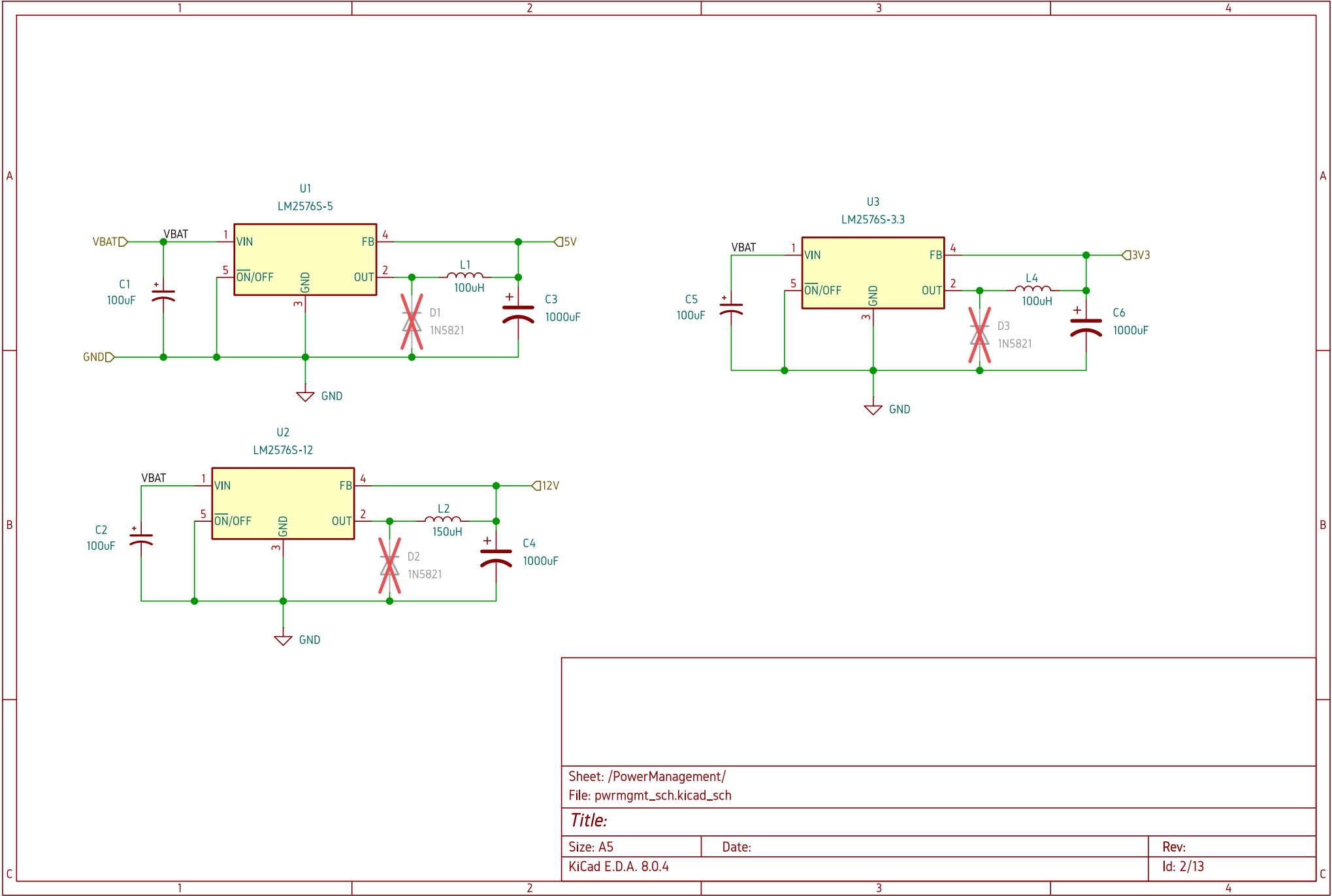
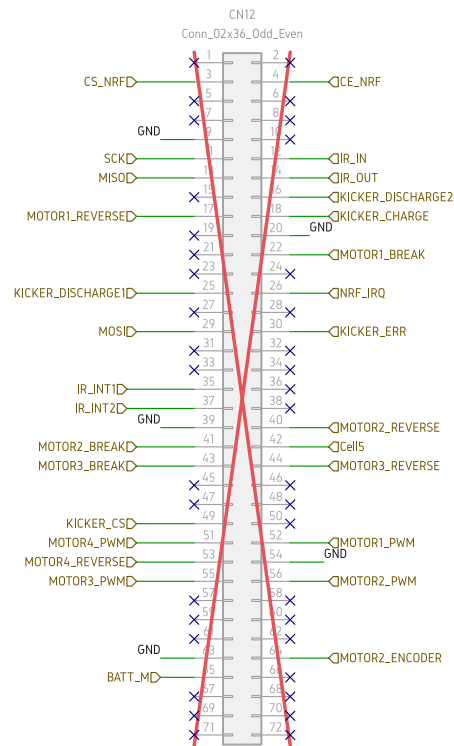
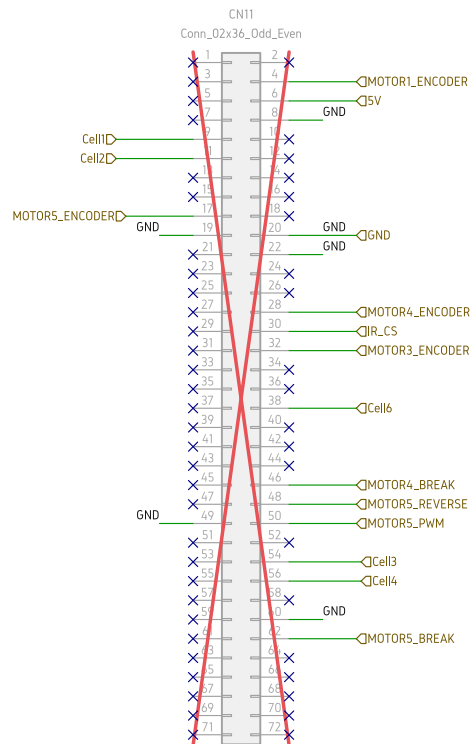


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Size: A3	Date: 2024-07-06	Rev: V1
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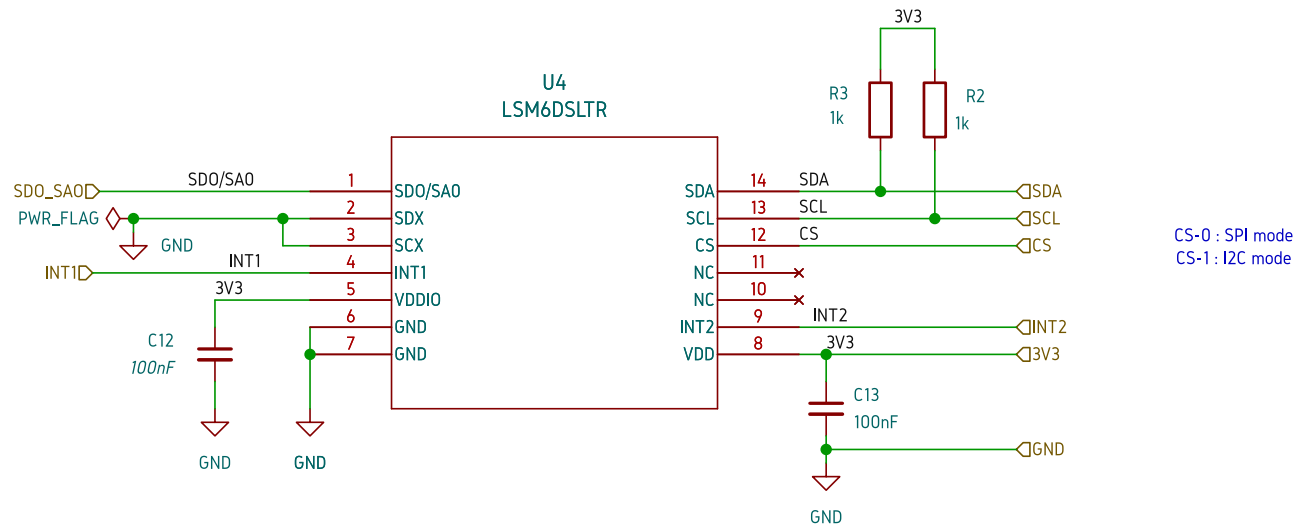
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Date:

Rev:
Id: 3/13



IMU unit used to measure various motion parameters and send data to STM32
Reference schematic: imu_LSM6DSL by Li Ang Hu

Sheet: /IMU/
File: imu_sch.kicad_sch

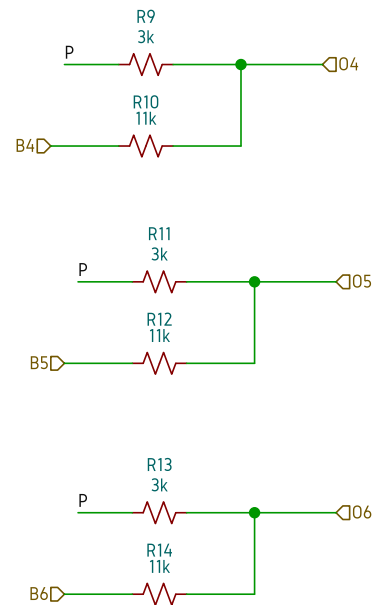
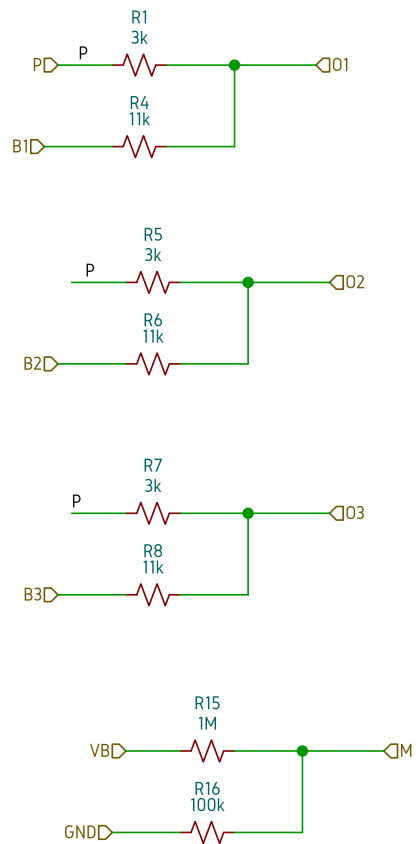
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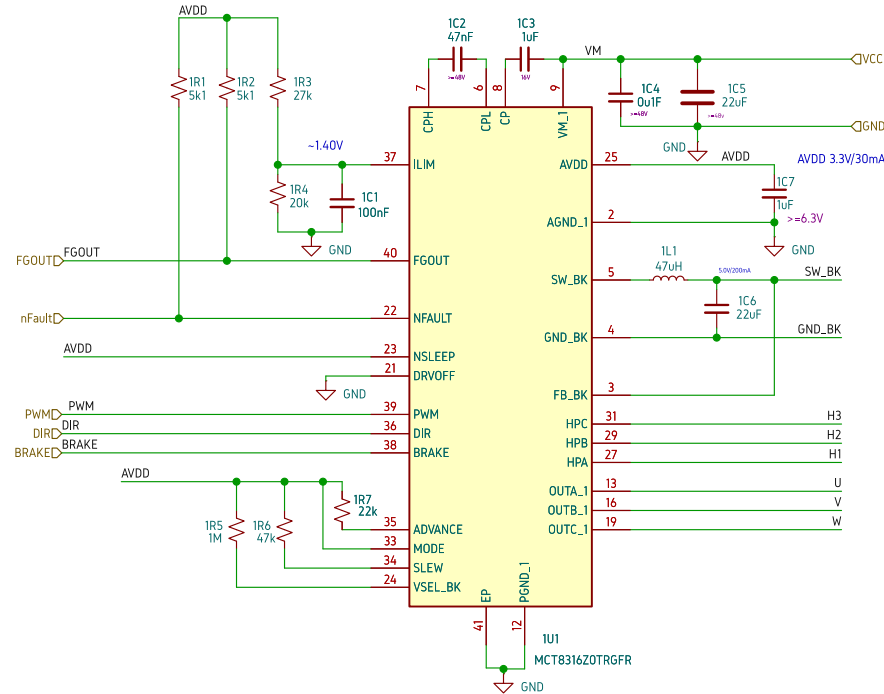
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Id: 5/13

Motor Driver and Connectors



SW_BK can be used to power external devices up to 5V max 200mA

Motor hall sensor takes 3.3..18V input.

U	1
V	2
W	3
GND_BK	4
H2	5
H1	6
H3	7
SW_BK	8

Cable UL1430 AWG24

The peak current of the motor is 9.5A and the peak phase current of the driver is 8A. The motor have 3 phases and at least two of them active at once. This means that the approximate minimum peak phase current needed for efficient control is:

$$I_{outx} = 9.5A / \sqrt{3} \sim 5.48A$$

Therefore if cycle-by-cycle threshold is set to $5.48A \cdot 0.9 > I_{lim}$ it will be sufficient for the driver to handle the motor load.

$$I_{lim} = 5.48 \cdot 0.9 \sim 4.94A$$
$$\rightarrow V_{lim} = AVDD / 2 - 0.4 \cdot I_{lim} / 8 \sim 1.40V \text{ (Calc. according datasheet)}$$

ADVANCE is tied to 22k Ohms to AVDD which gives 4 degree setting.

MODE is tied to AVDD which gives PWM Mode; synchronous digital hall input.

SLEW is tied to 47k Ohms resistor to AVDD which gives SLEW=10b.

VSEL_BK is set to HI-z which gives SW_BK 5.0V.

Motor driver used to power and monitor the motor parameters.
Reference schematic: driver_separate by Anton

Sheet: /MotorDriver1/
File: md1.kicad_sch

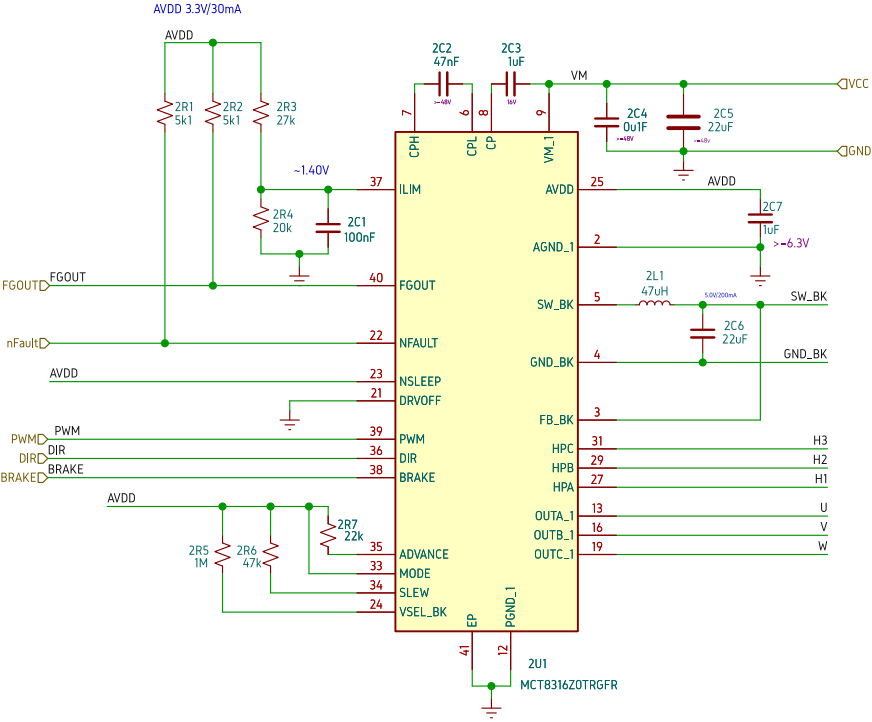
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Date:

Rev:
Id: 6/13

Motor Driver and Connectors



SW_BK can be used to power external devices up to 5V max 200mA

Motor hall sensor takes 3.3.. 18V input.

U	1	C
V	2	C
W	3	C
GND_BK	4	M2
H2	5	C
H1	6	C
H3	7	C
SW_BK	8	C

Cable UL1430 AWG24

The peak current of the motor is 9.5A and the peak phase current of the driver is 8A. The motor have 3 phases and at least two of them active at once. This means that the approximate minimum peak phase current needed for efficient control is:

$$I_{outx} = 9.5A / \sqrt{3} \sim 5.48A$$

Therefore if cycle-by-cycle threshold is set to $5.48A \cdot 0.9 > I_{lim}$ it will be sufficient for the driver to handle the motor load.

$$I_{lim} = 5.48 \cdot 0.9 \sim 4.94A$$

$$\Rightarrow V_{lim} = AVDD/2 \sim 0.4 \cdot I_{lim}/8 \sim 1.40V$$
 (Calc. according datasheet)

ADVANCE is tied to 22k Ohms to AVDD which gives 4 degree setting.

MODE is tied to AVDD which gives PWM Mode; synchronous digital hall input.

SLEW is tied to 47k Ohms resistor to AVDD which gives SLEW=10b.

VSEL_BK is set to HI-z which gives SW_BK 5.0V.

Motor driver used to power and monitor the motor parameters.
Reference schematic: driver_separate by Anton

Sheet: /MotorDriver2/
File: md2.kicad_sch

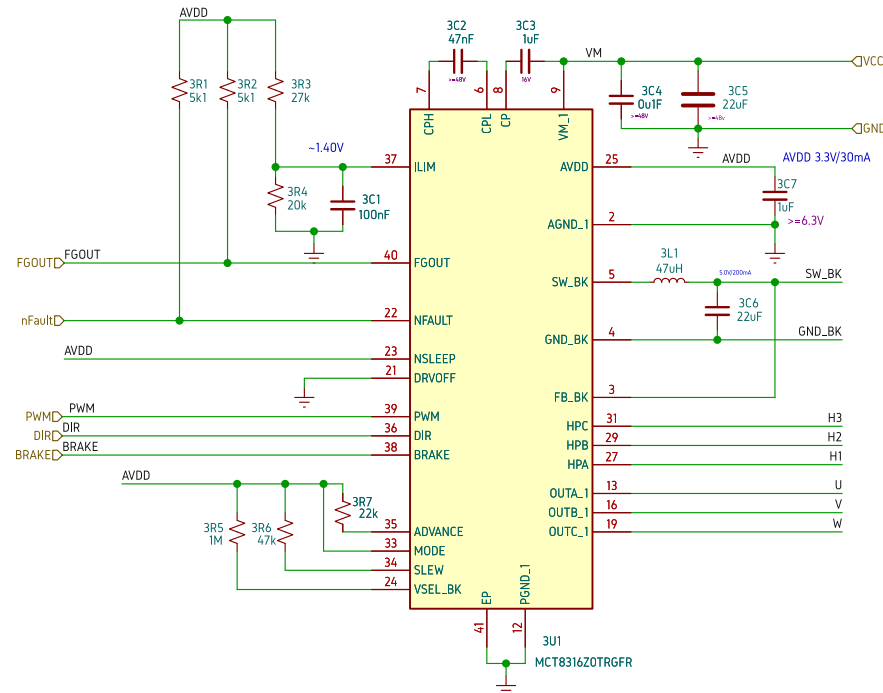
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KiCad E.D.A. 8.0.4

Date:

Rev:
Id: 7/13

Motor Driver and Connectors



SW_BK can be used to power external devices up to 5V max 200mA

Motor hall sensor takes 3.3., 18V input.



Cable UL1430 AWG24

The peak current of the motor is 9.5A and the peak phase current of the driver is 8A. The motor have 3 phases and at least two of them active at once. This means that the approximate minimum peak phase current needed for efficient control is:

$$I_{outx} = 9.5A / \sqrt{3} \sim 5.48A.$$

Therefore if cycle-by-cycle threshold is set to $5.48A \cdot 0.9 > I_{lim}$ it will be sufficient for the driver to handle the motor load.

$$\rightarrow V_{lim} = AVDD/2 - 0.4 \cdot I_{lim}/8 \sim 1.40V \text{ (Calc. according datasheet)}$$

ADVANCE is tied to 22k Ohms to AVDD which gives 4 degree setting.

MODE is tied to AVDD which gives PWM Mode;
synchronous digital hall input.

SLEW is tied to 47k Ohms resistor to AVDD which gives SLEW=10b.

VSEL_BK is set to HI-z which gives SW_BK 5.0V.

Motor driver used to power and monitor the motor parameters.
Reference schematic: driver_separate by Anton

Sheet: /MotorDriver3/
File: md3.kicad_sch

Title:

Size: A4

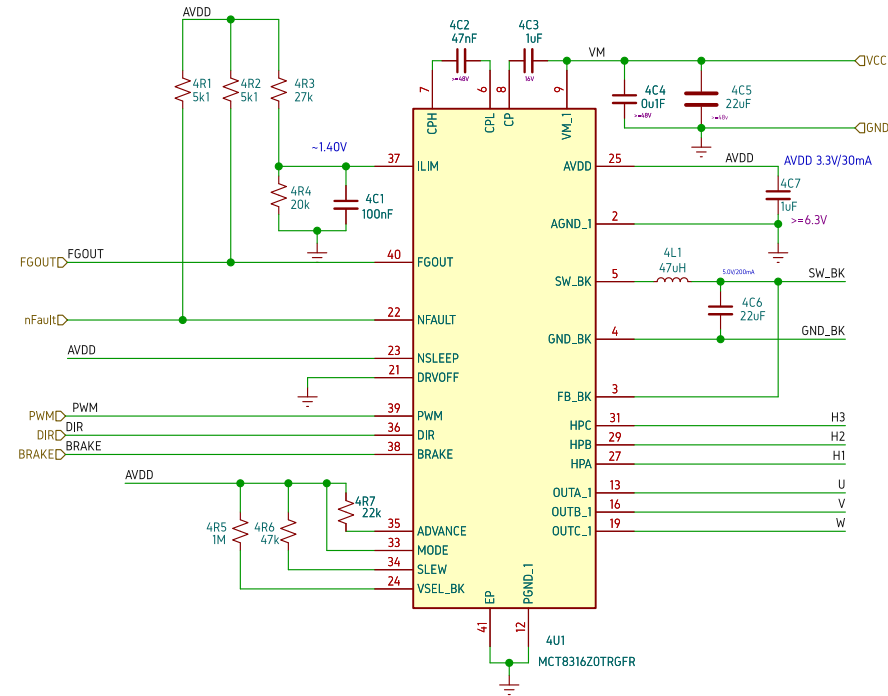
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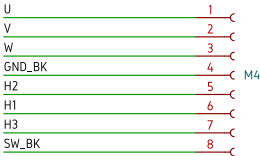
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Motor Driver and Connectors



SW_BK can be used to power external devices up to 5V max 200mA

Motor hall sensor takes 3.3.. 18V input.



Cable UL1430 AWG24

The peak current of the motor is 9.5A and the peak phase current of the driver is 8A. The motor have 3 phases and at least two of them active at once. This means that the approximate minimum peak phase current needed for efficient control is:

$$I_{outx} = 9.5A / \sqrt{3} \approx 5.48A.$$

Therefore if cycle-by-cycle threshold is set to $5.48A * 0.9 > I_{lim}$ it will be sufficient for the driver to handle the motor load.

$$I_{lim} = 5.48 * 0.9 \approx 4.94A \\ \Rightarrow V_{lim} = AVDD / 2 - 0.4 * I_{lim} / 8 \approx 1.40V \text{ (Calc. according datasheet)}$$

ADVANCE is tied to 22k Ohms to AVDD which gives 4 degree setting.

MODE is tied to AVDD which gives PWM Mode; synchronous digital hall input.

SLEW is tied to 47k Ohms resistor to AVDD which gives SLEW=10b.

VSEL_BK is set to H1-z which gives SW_BK 5.0V.

Motor driver used to power and monitor the motor parameters.
Reference schematic: driver_separate by Anton

Sheet: /MotorDriver4/
File: md4.kicad_sch

Title:

Size: A4

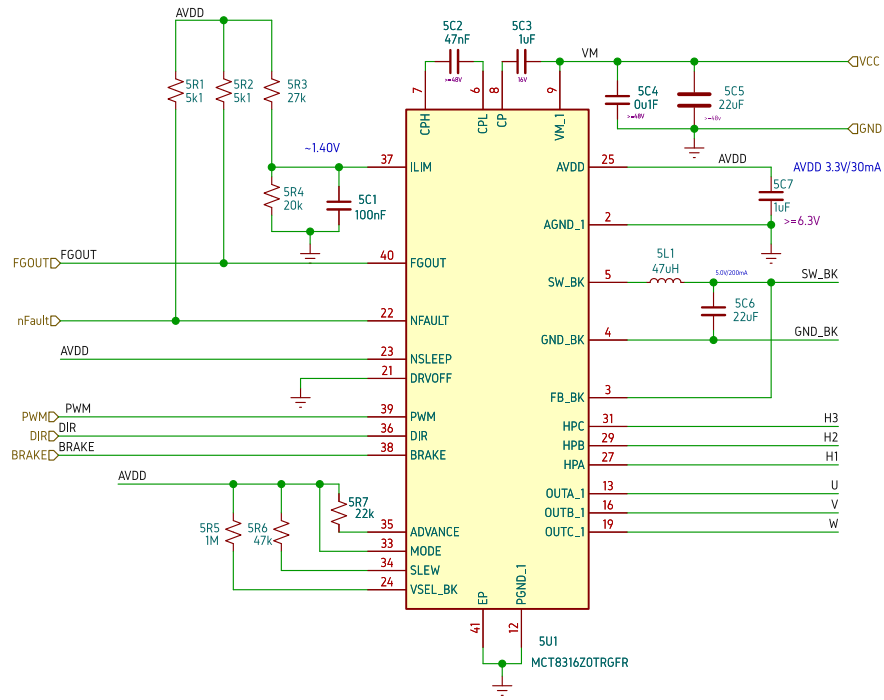
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Id: 9/13

Motor Driver and Connectors



SW_BK can be used to power external devices up to 5V max 200mA

Motor hall sensor takes 3.3.. 18V input.

U	1
V	2
W	3
GND_BK	4
H2	5
H1	6
H3	7
SW_BK	8

Cable UL1430 AWG24

The peak current of the motor is 9.5A and the peak phase current of the driver is 8A. The motor have 3 phases and at least two of them active at once. This means that the approximate minimum peak phase current needed for efficient control is:

$$I_{outx} = 9.5A / \sqrt{3} \approx 5.48A.$$

Therefore if cycle-by-cycle threshold is set to $5.48A \cdot 0.9 > I_{lim}$ it will be sufficient for the driver to handle the motor load.

$$I_{lim} = 5.48 \cdot 0.9 \approx 4.94A \\ \Rightarrow V_{lim} = AVDD/2 - 0.4 \cdot I_{lim}/8 \approx 1.40V \text{ (Calc. according datasheet)}$$

ADVANCE is tied to 22k Ohms to AVDD which gives 4 degree setting.

MODE is tied to AVDD which gives PWM Mode; synchronous digital hall input.

SLEW is tied to 47k Ohms resistor to AVDD which gives SLEW=10b.

VSEL_BK is set to HI-z which gives SW_BK 5.0V.

Motor driver used to power and monitor the motor parameters.
Reference schematic: driver_separate by Anton

Sheet: /MotorDriver5/
File: md5.kicad_sch

Title:

Size: A4

Date:

Rev:

KiCad E.D.A. 8.0.4

Id: 10/13

