

EV BLDC Driver

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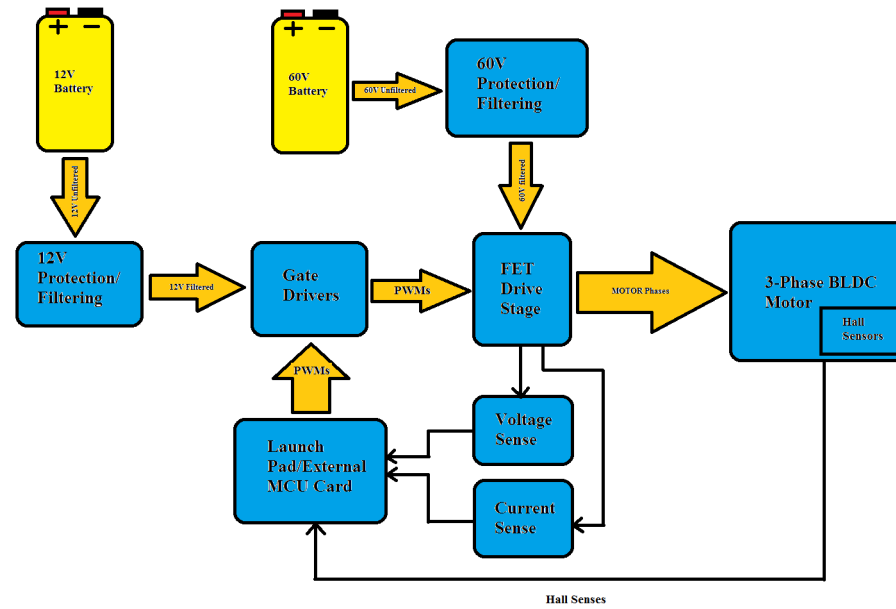
Release Date:	
Designed By: APC	Date: 27-06-2019
Drawn By: APC	Date: 27-06-2019
Verified By: APC,ISHAN,H.Sheth	Date: 28-06-2019
Customer:	



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Block Diagram



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Sheet Name: /s_01_Block Diagram/

Title: EV BLDC Driver

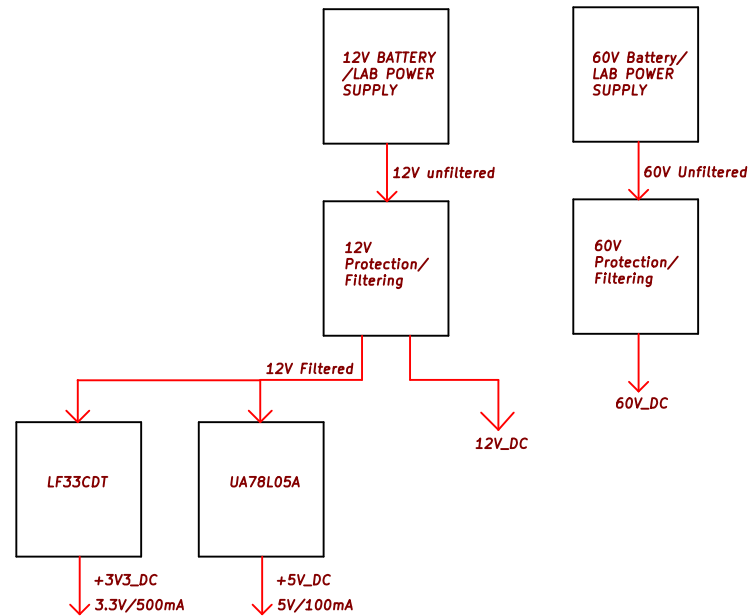
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Power Tree



Note:

- (1)+60V_DC will be used to Supply FET Drive stages.
- (2)+12V_DC will be used to Supply Gate Driver ICs.
- (3)+5V_DC will be used to Supply Hall Sensors of the motors.
- (4)+3.3V_DC will be used for signaling purpose and Current sensing.

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Sheet Name: /s_02_Power Tree/

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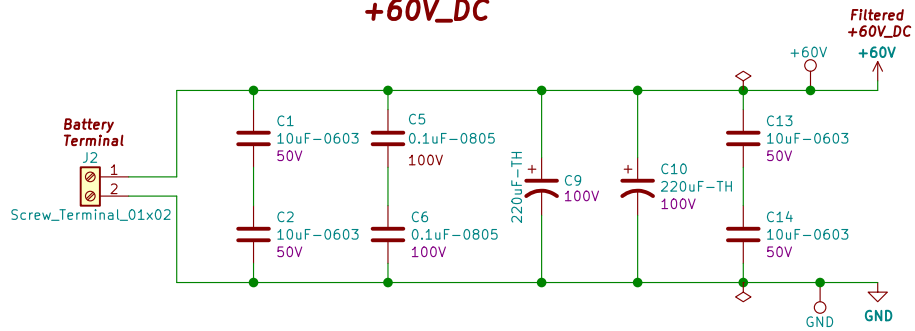
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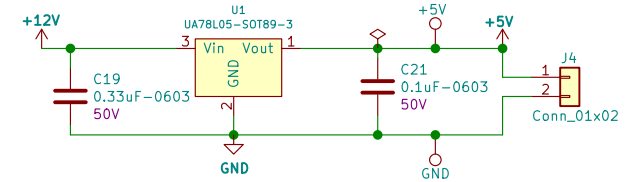
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Power

+60V_DC



+5V_DC



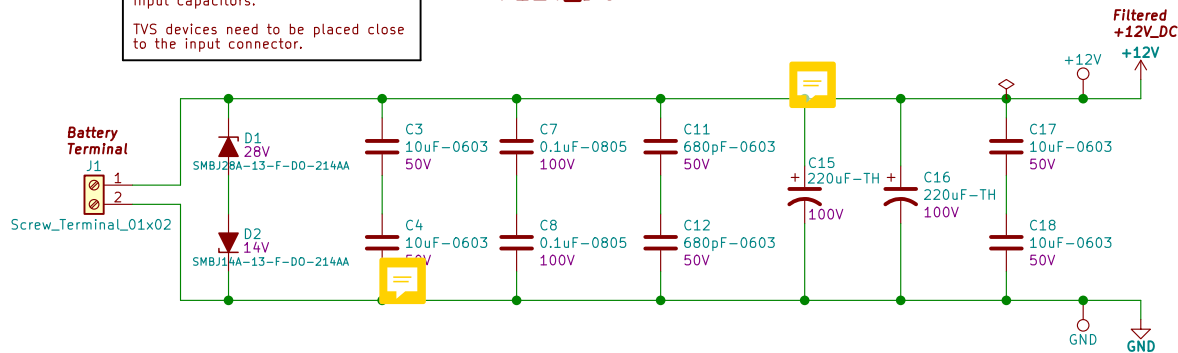
Note:
Ceramic input caps in series shall be placed in an "L" configuration. If the board bends, the ceramic caps may crack and cause a short. If one of the input caps shorts then the other cap in series (rotated 90 degrees on the board) will prevent a short on the power supply.

SMBJ28A-13-F will clamp the positive terminal to 40V typically.

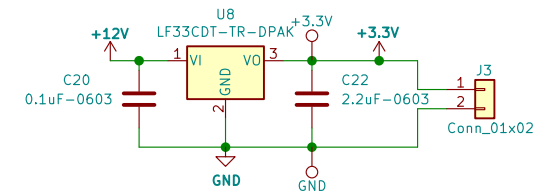
SMBJ14A-13-F needs the lower clamp voltage. This is due to the 40V reverse voltage possibility, in addition to, dealing with a stored voltage on input capacitors.

TVS devices need to be placed close to the input connector.

+12V_DC



+3V3_DC



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Sheet Name: /s_03_Power/

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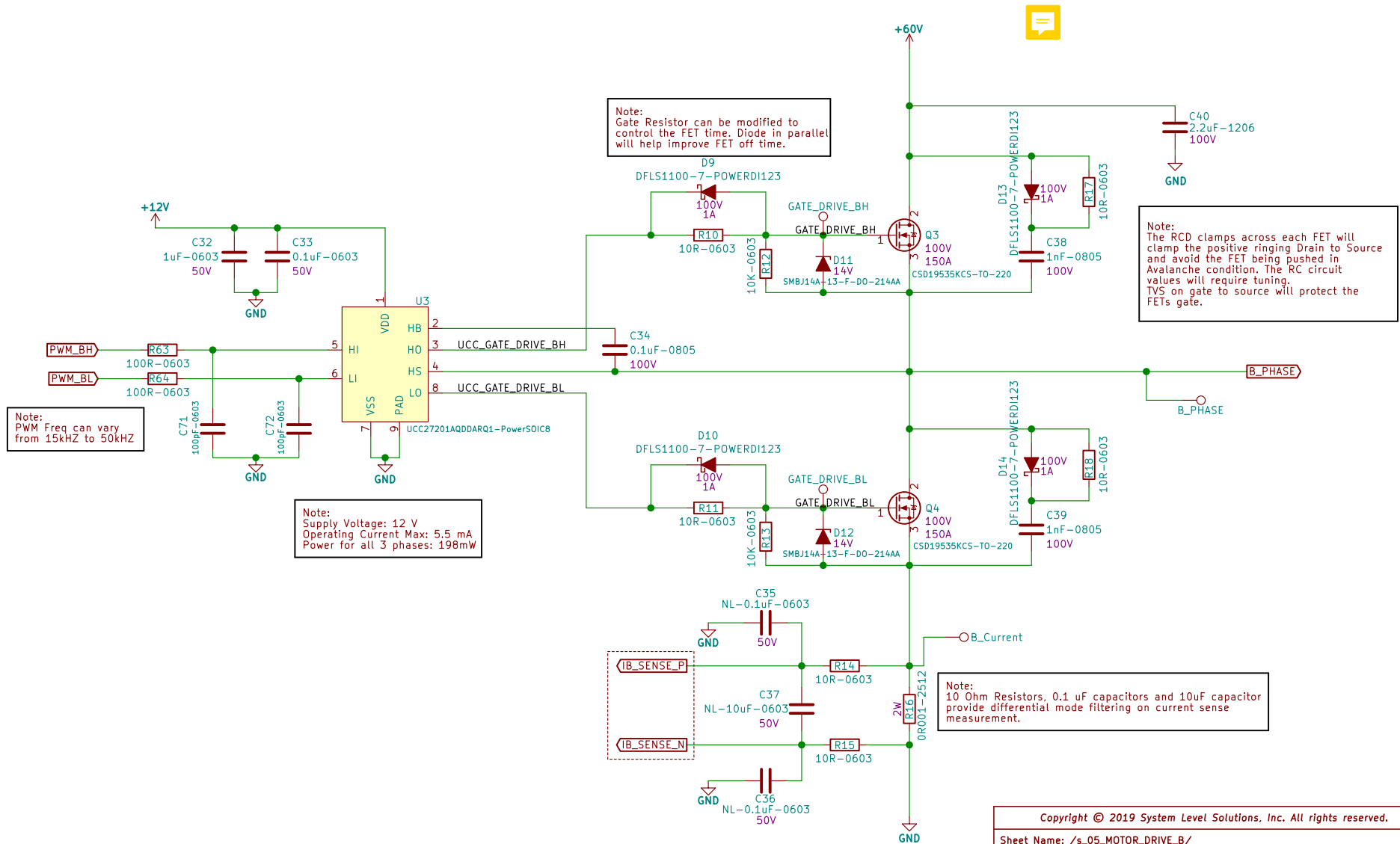
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Date: 2019-06-29

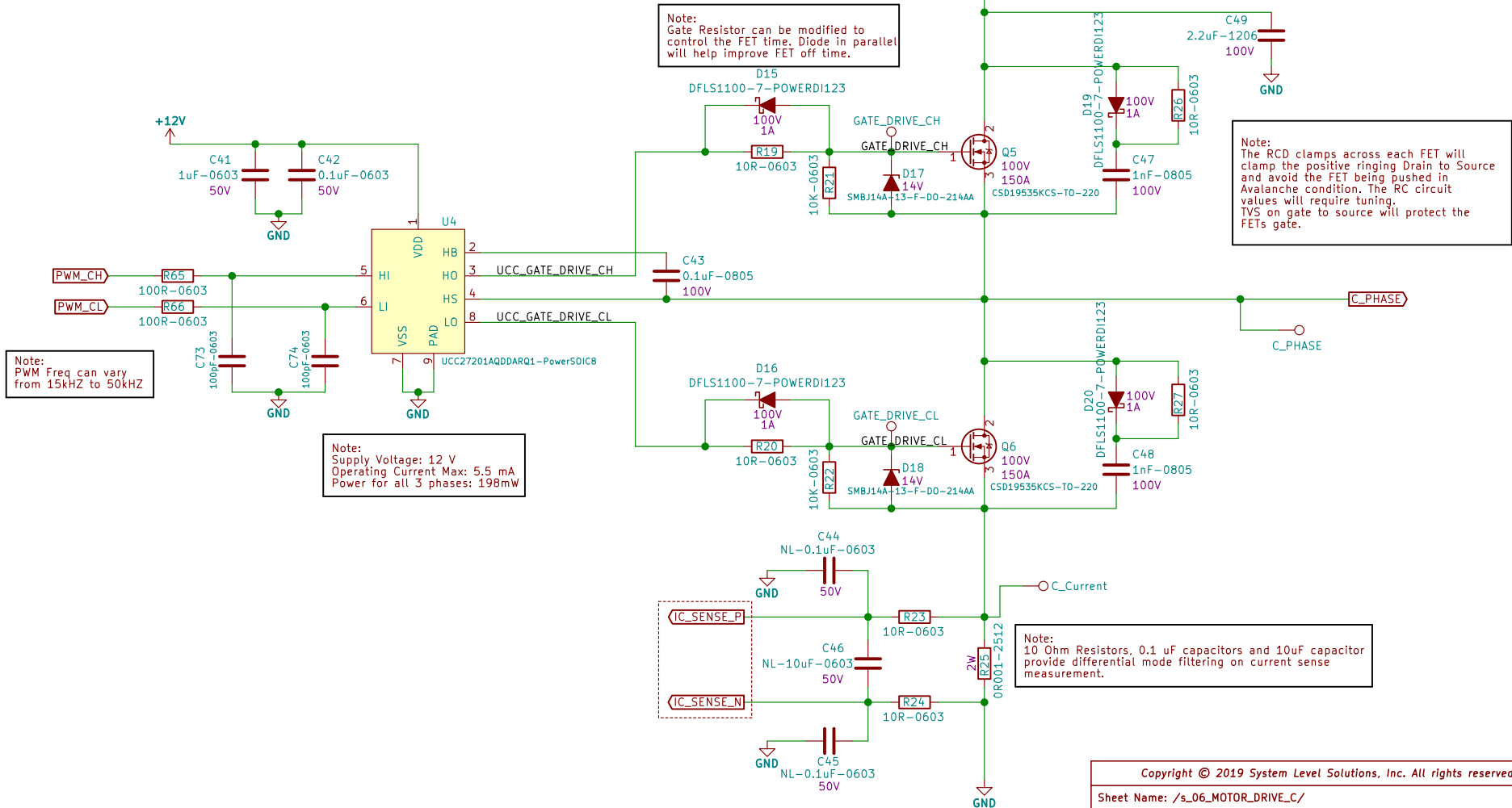
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MOTOR DRIVE B



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MOTOR DRIVE C



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Sheet Name: /s_06_MOTOR_DRIVE_C/

Title: EV BLDC Driver

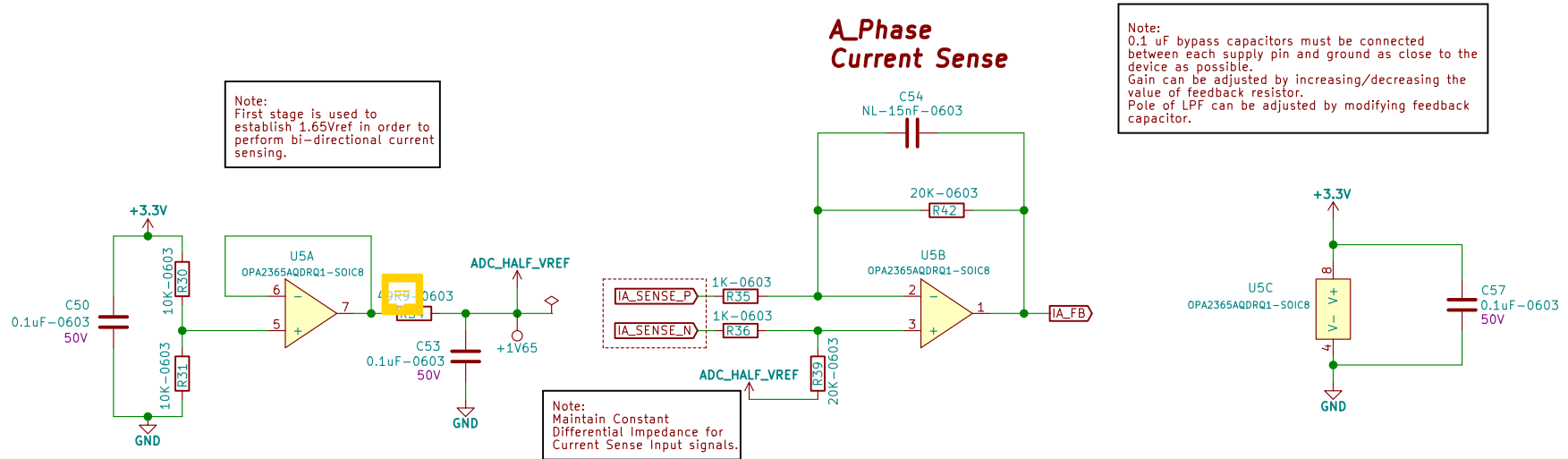
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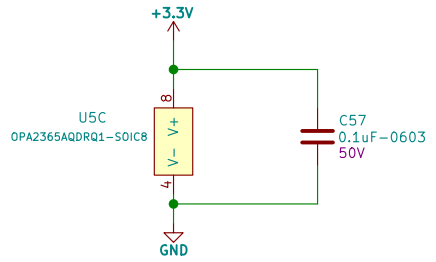
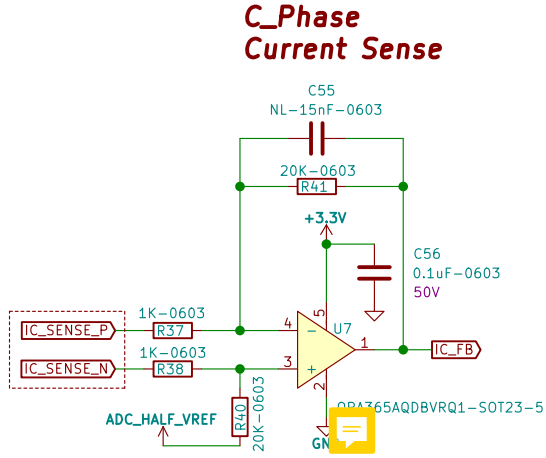
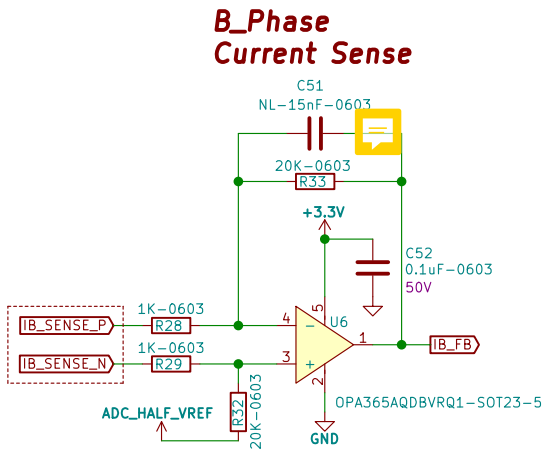
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Current Sense



Note:
0.1 uF bypass capacitors must be connected between each supply pin and ground as close to the device as possible.
Gain can be adjusted by increasing/decreasing the value of feedback resistor.
Pole of LPF can be adjusted by modifying feedback capacitor.

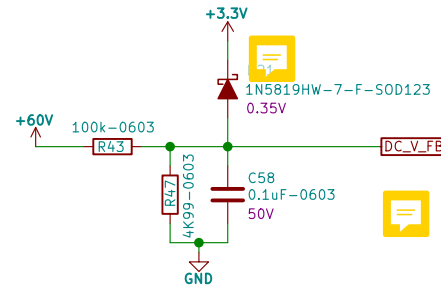


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Sheet Name: /s_07_Current Sense/		
Title: EV BLDC Driver		
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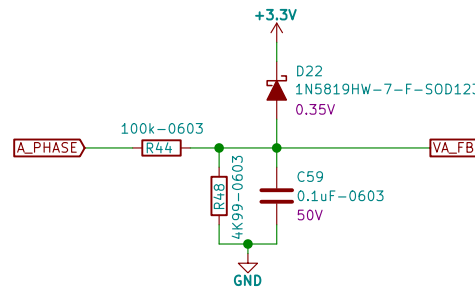
Voltage Sense

Note:
Voltage Divider to scale the maximum input of 70V
to ADC range of 0V - 3.3V
LPF with -3dB at approximately 333 Hz

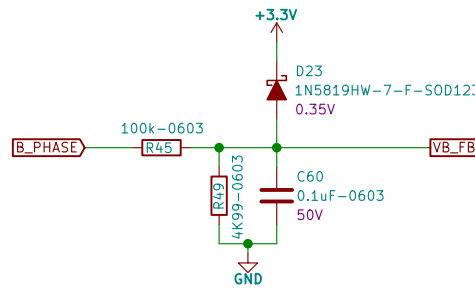
DC Battery Voltage Sense



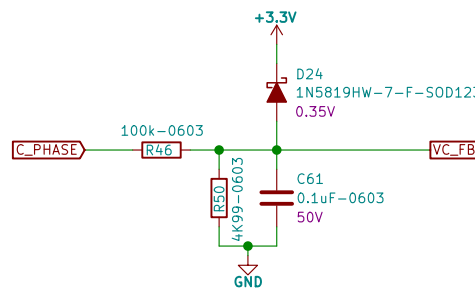
A_Phase Voltage Sense



B_Phase Voltage Sense



C_Phase Voltage Sense



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Sheet Name: /s_08_Voltage Sense/

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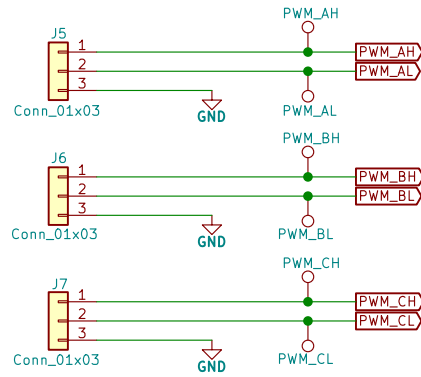
Rev: 1C

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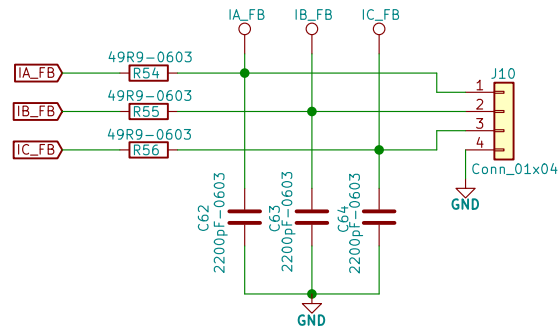
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Connectors

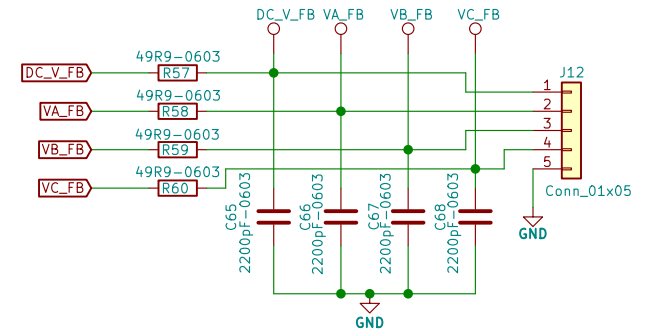
PWM Signals From Launch Pad



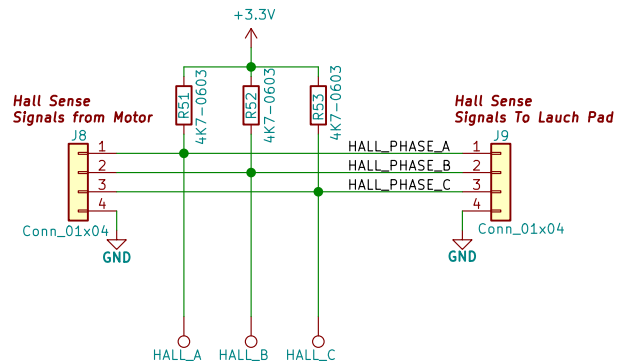
Current Sense Feedback Signals



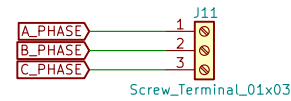
Voltage Sense Feedback Signals



Hall Sense Signals



Motor Phase Terminal



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Sheet Name: /s_09_Connectors/

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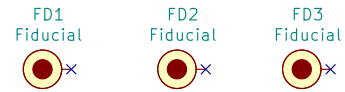
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Date: 2019-06-29

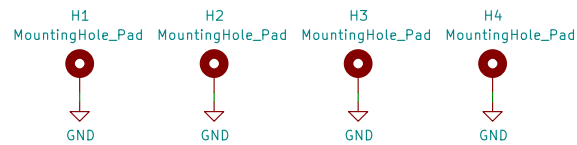
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Miscellaneous

Fiducials



Mounting Holes



SLS LOGO



PRI Number



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Revision History

Sr. No.	Revision	Date	Description
1	REV1A	11th Feb,2019	Changes done as per the ECR documents.
2	REV1B	1st MAY,2019	(1)Changed MOSFETs from SMD/LOW Power to PTH(TO-220)/HIGH Power. (2)Added TVS diode across drain and source of Mosfets to protect against Back emf and voltage spikes. (3)Changed HALL Sensor Pull ups from 10k to 1K.
3	REV1C		Made REV1C board with help of TI reference design(TIDA-00281).

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