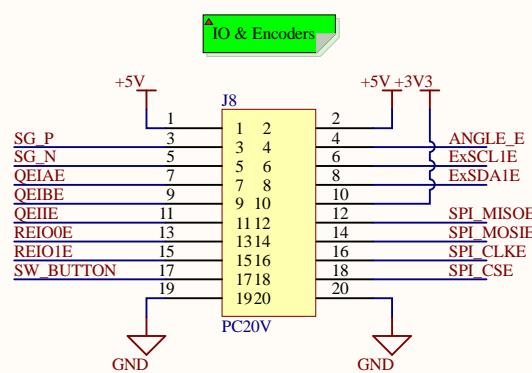
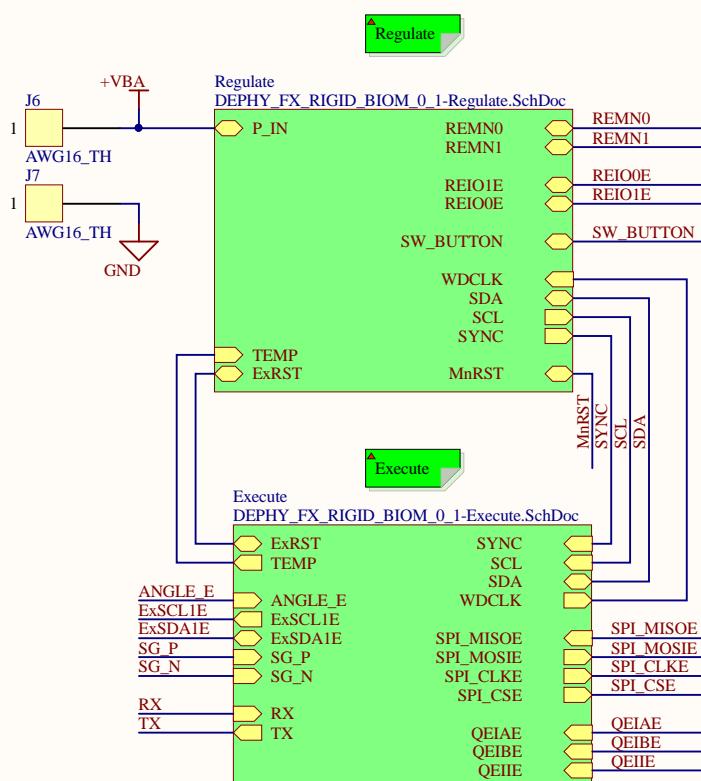


DEPHY_FX_RIGID BIOM_0_1B

Integrated Controller

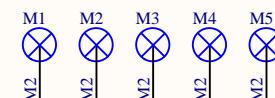
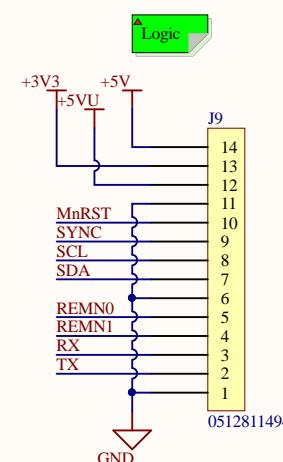
Power



Analog input: ANGLE_E; 5V
 I2C1: ExSCLIE, ExSDAIE; 5V
 SPI: SPI_MISOE, SPI_MOSIE, SPI_CLKE, SPI_CSE; 3V3
 Strain gauge: SG_N, SG_P; 5V
 External On/Off: SW_BUTTON; N/A
 Quadrature encoder: QEII(A, B, I); 5V

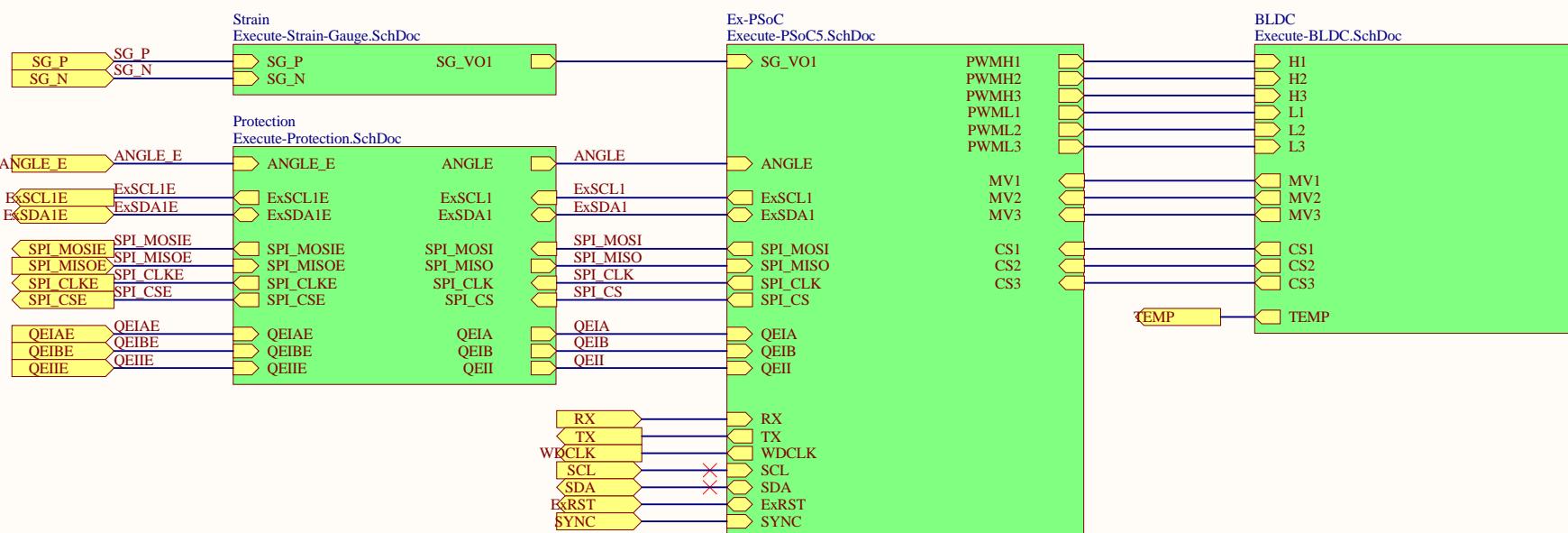
REIO[0,1]: IOs linked to Regulate. Can be used for external Shorted Leads Protection, or other. 5V

Most IOs can be used for different tasks.



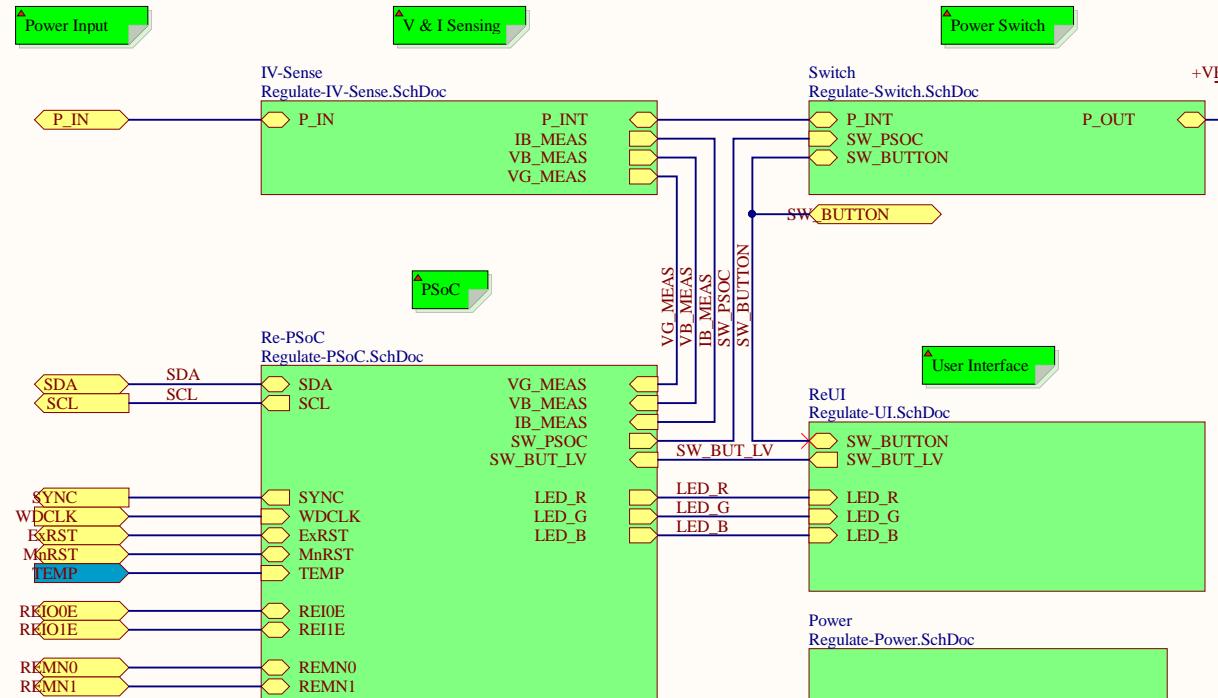
Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Number:	Revision:	
Date: 11/7/2017	Time: 11:00:02 AM	Sheet 1 of	
File: DEPHY_FX_RIGID BIOM_0_1.SchDoc			DEPHY

Execute



Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA	DEPHY
Size:	Number:	Revision:		
Date: 11/7/2017	Time: 11:00:02 AM	Sheet 3 of		
File: DEPHY_FX_RIGID_BIOM_0_1-Execute.SchDoc				

Regulate



Operation:

Turn-ON: Pressing on the pushbutton turns ON the power switch. The voltage regulator get power and the μ C boots. The μ C checks if the bus voltage is in range and latches (or not) the output switch.

Operation & Fault: At any time, if a fault condition is detected, the μ C can turn the output OFF. The P-MOSFET will always allow regen current to go to the battery. If the fuse blows while regen current is flowing the TVS will take the hit (but it can be destructive).

Turn-OFF: A press on the pushbutton will be detected by the μ C. It will stop latching the power switch and the circuit will turn OFF.

Power Path:

Input connector => Fuse =>
Current sensor => Power switch =>
Output connector

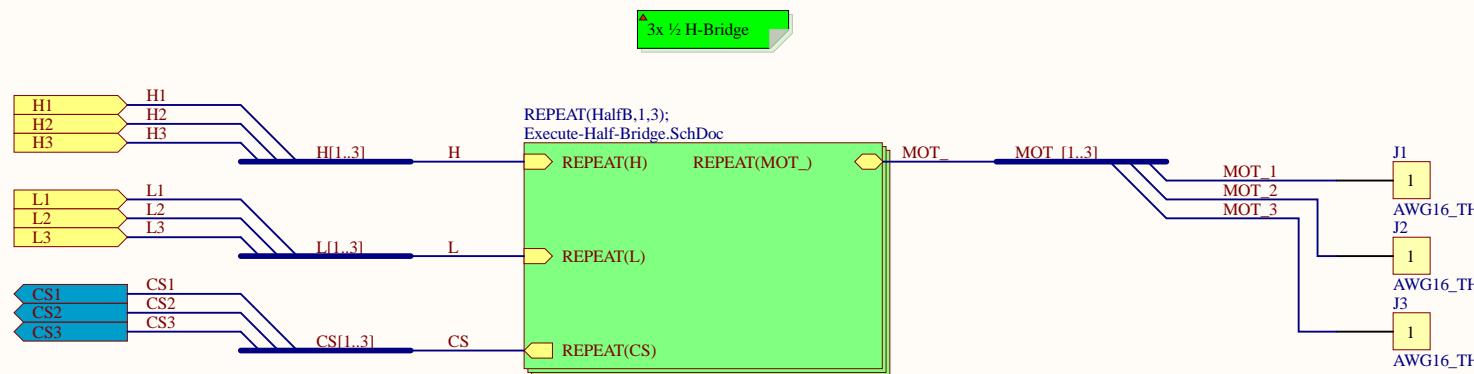
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Size:	Letter	Number:	Revision:
Date:	11/7/2017	Time:	11:00:03 AM
File:	DEPHY_FX_RIGID_BIOM_0_1-Regulate.SchDoc	Sheet	5 of

Dephy, Inc.
50 Terminal St
Building 2 Unit 520
Boston, MA 02129
USA

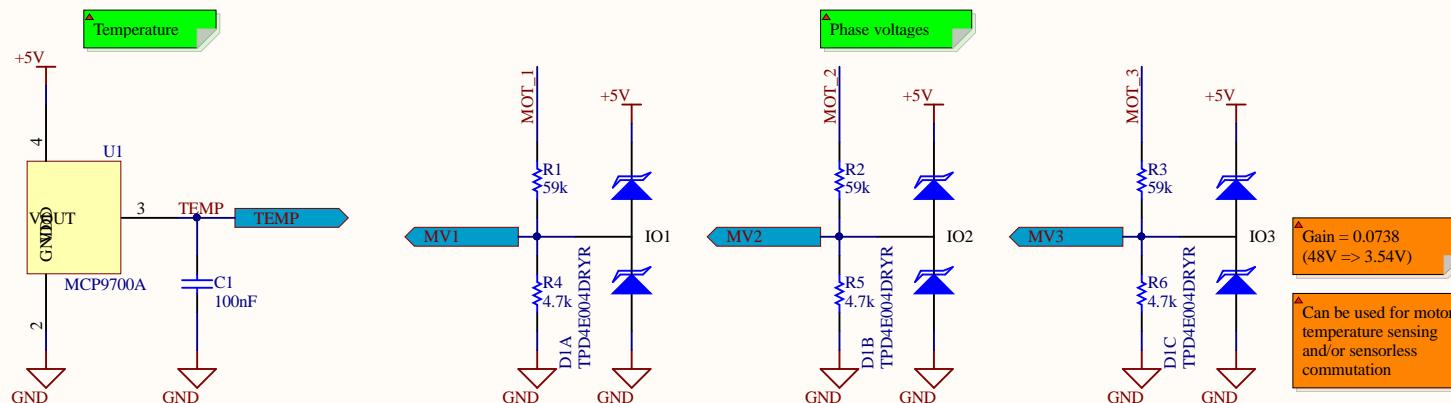
DEPHY **D**

A



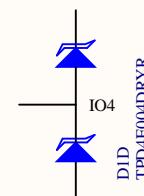
A

B



C

C

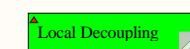
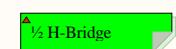


Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	11:00:03 AM
File:	Execute-BLDC.SchDoc	Sheet	6 of

DEPHY

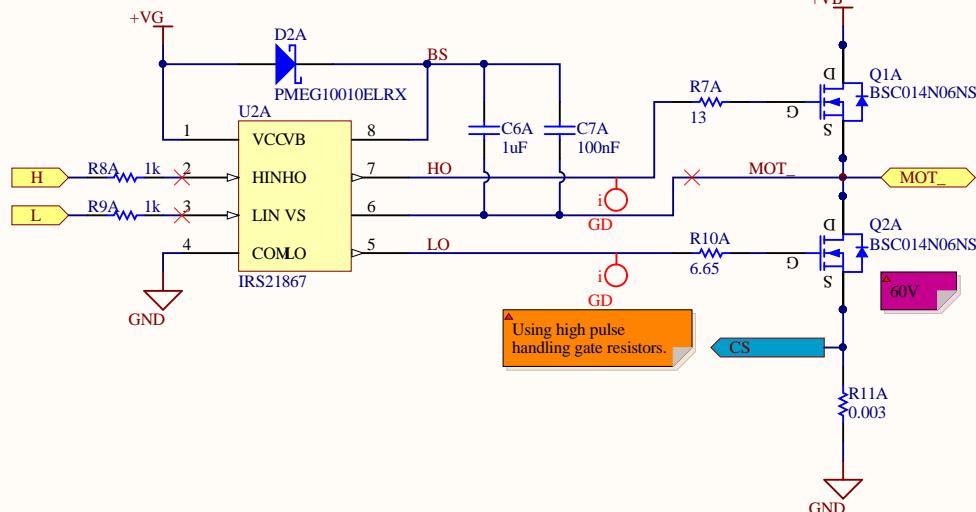
A

A



B

B



C

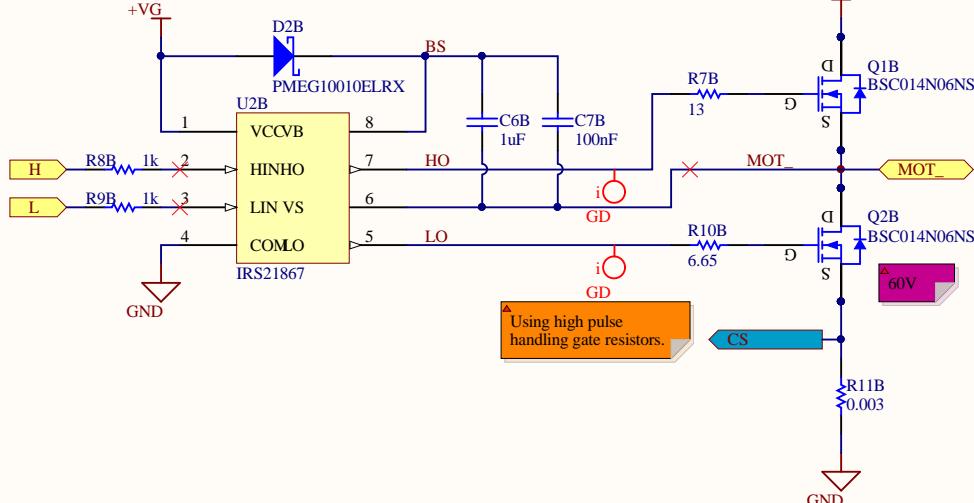
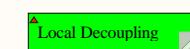
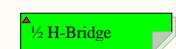
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Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	
File:	Execute-Half-Bridge.SchDoc	Sheet 7 of	



A

A



B

B

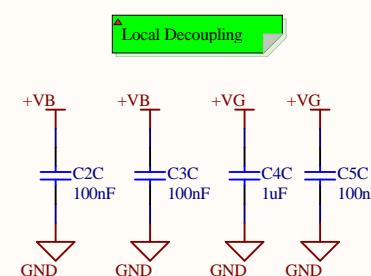
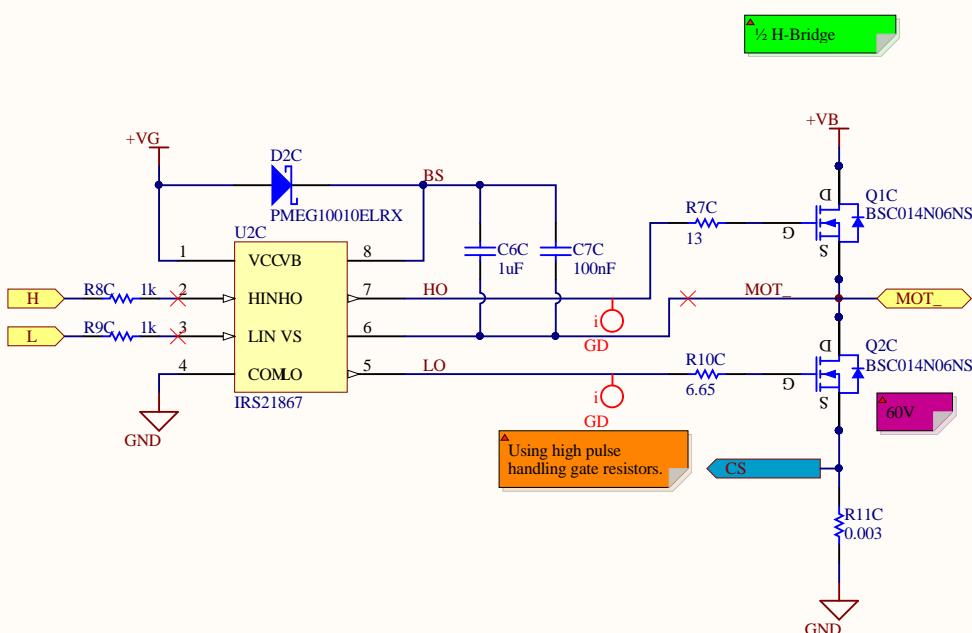
C

C

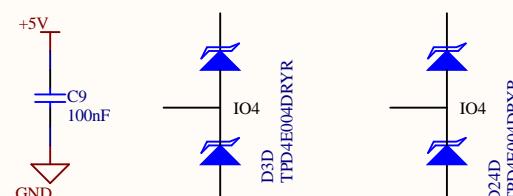
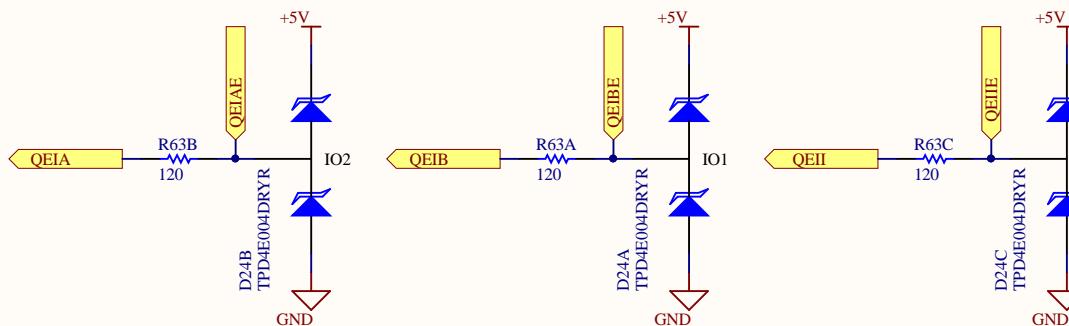
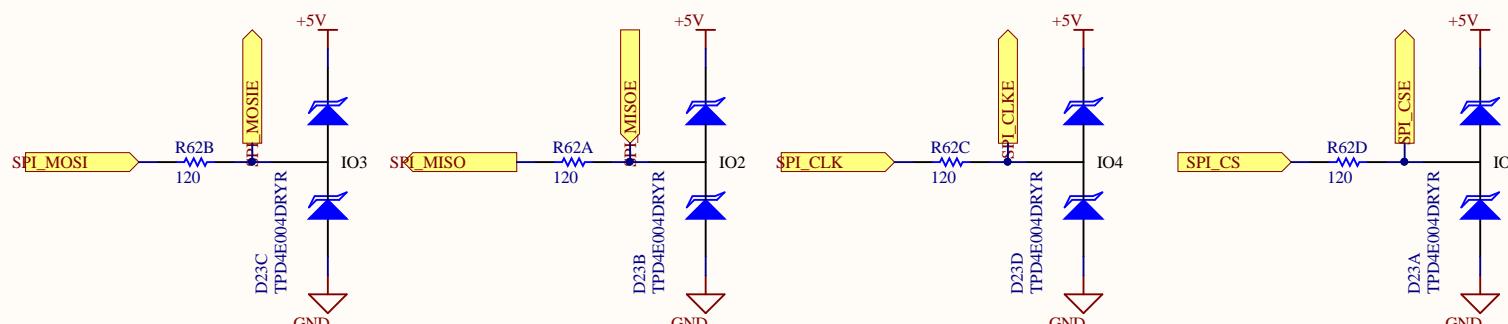
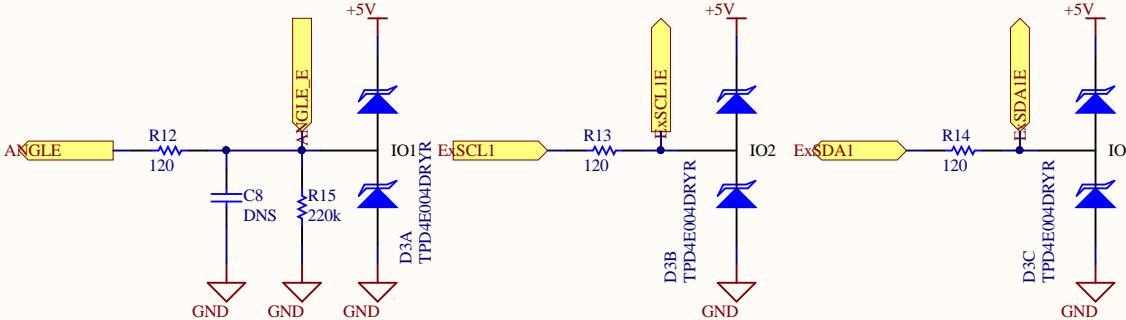
D

D

Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	
File:	Execute-Half-Bridge.SchDoc	Sheet 7 of	



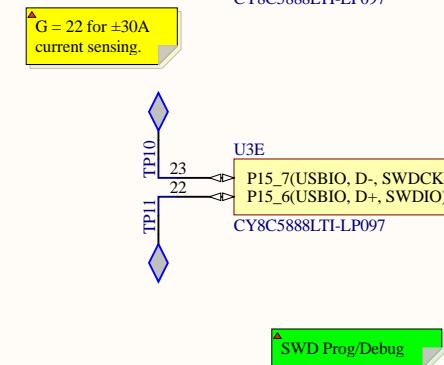
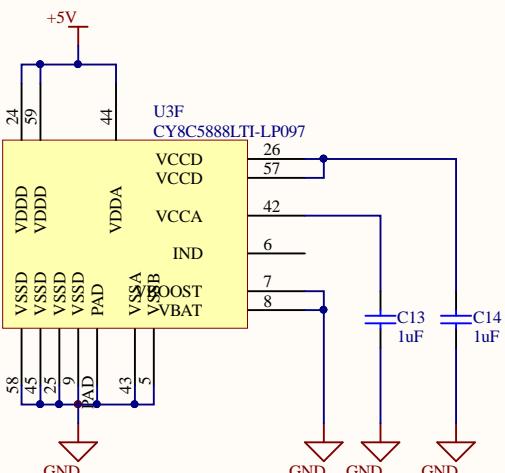
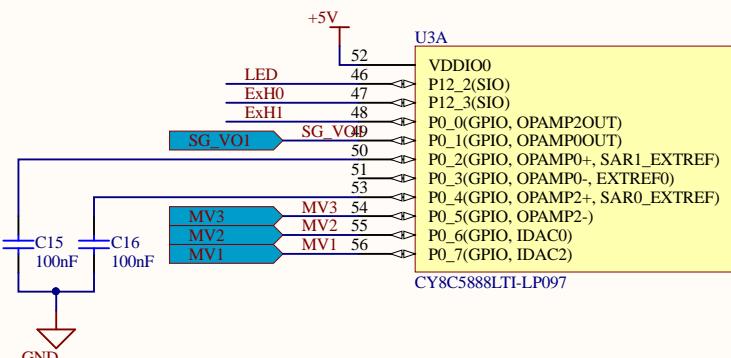
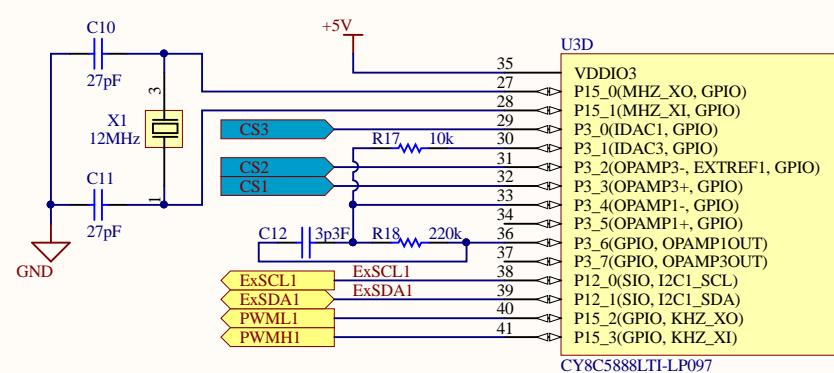
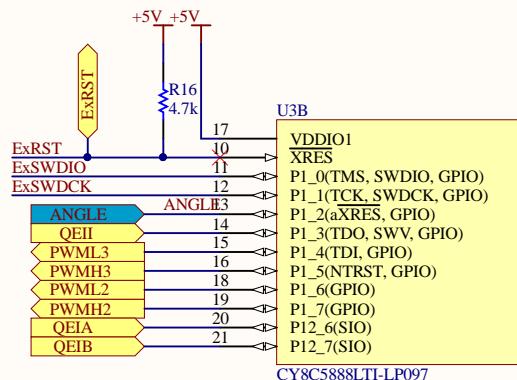
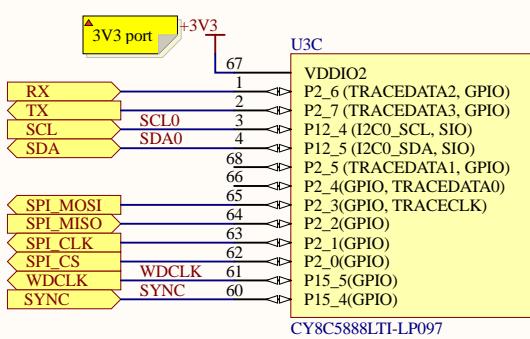
Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	
File:	Execute-Half-Bridge.SchDoc	Sheet 7 of	



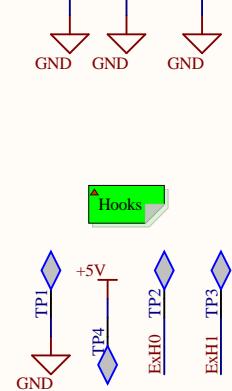
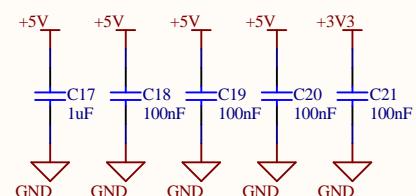
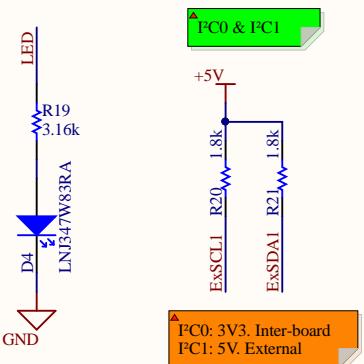
Convention: 'E' for External. 'E' pins are linked to the connector.

Title			Size: Letter	Number:	Revision:
Date: 11/7/2017	Time: 11:00:05 AM	Sheet 8 of			
File: Execute-Protection.SchDoc					
Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA					
DEPHY					

A

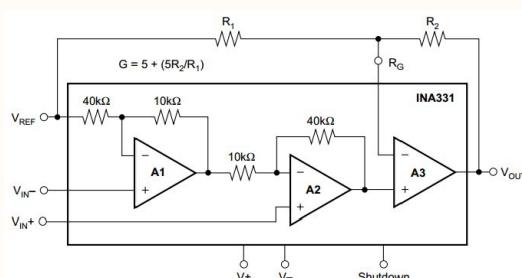
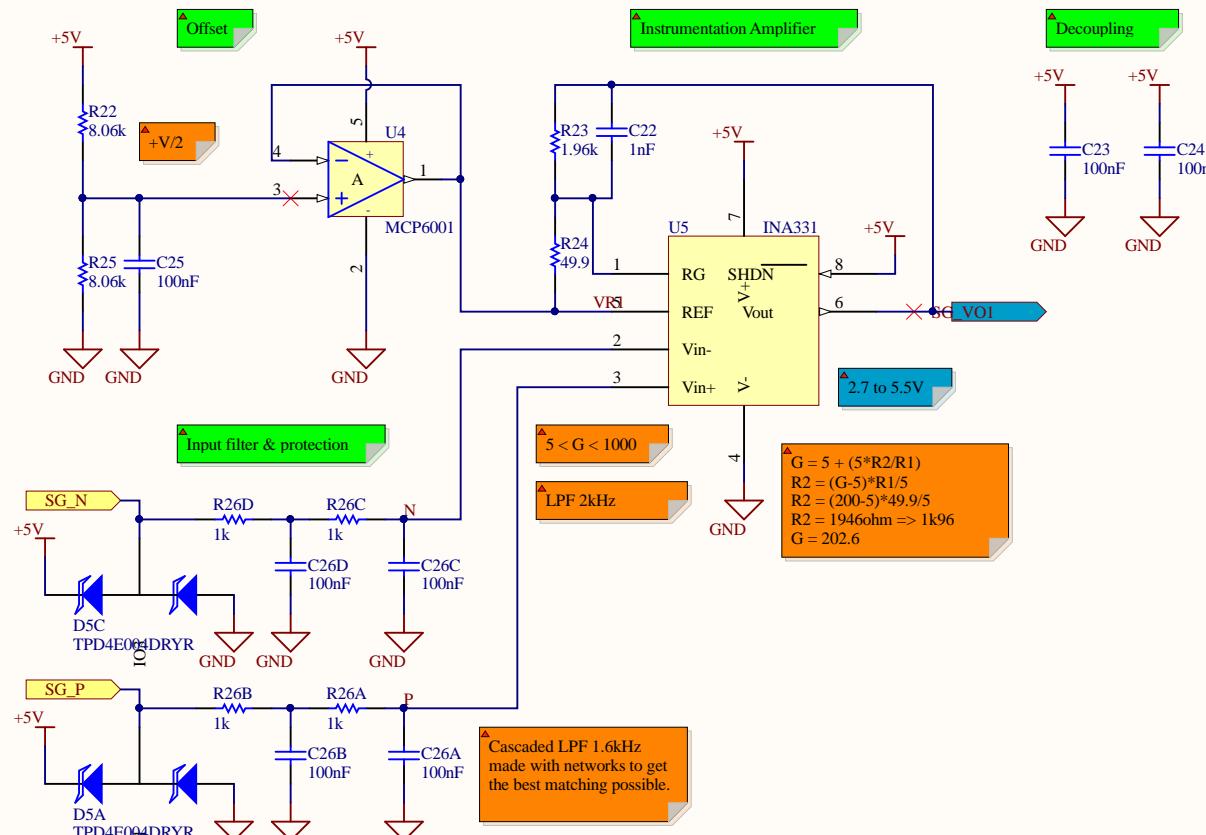


SWD Prog/Debug



Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	11:00:06 AM
Sheet	9	of	
File:	Execute-PSoC5.SchDoc		

DEPHY



Low-noise wiring:

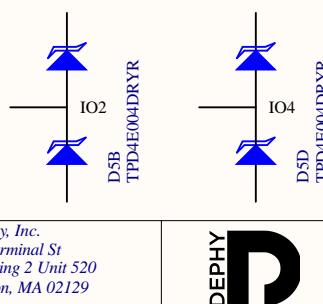
- Add a shield to the cable. Link it to GND on the Strain Amp.
- Make two twisted pair: excitation wires and signal wires

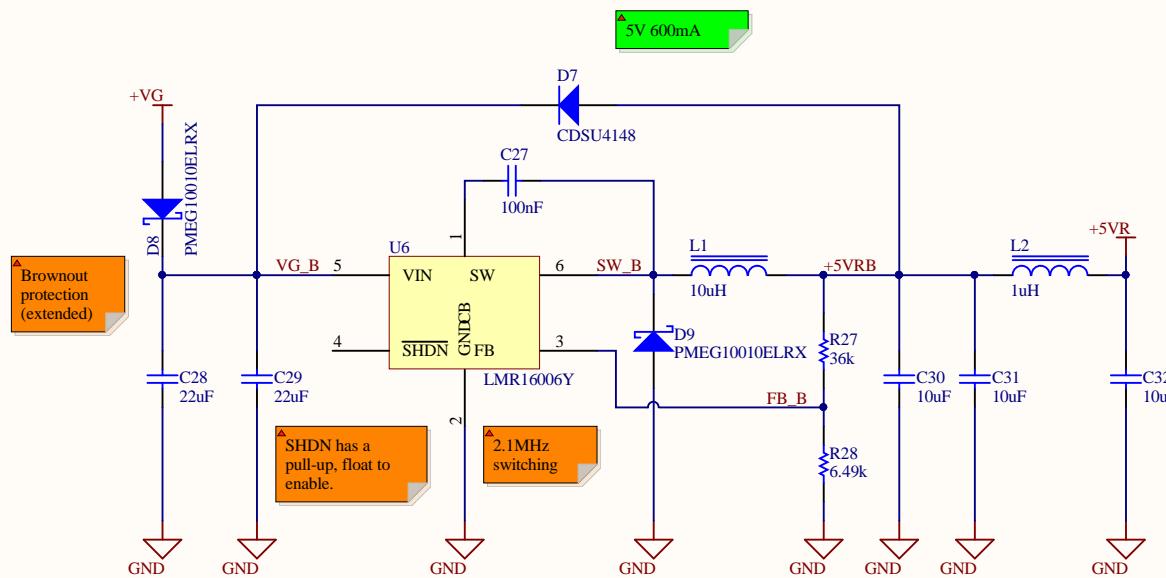
For all the details please refer to
<http://www.vishaypg.com/docs/11051/tm501.pdf>

Title		
Size: Letter	Number:	Revision:
Date: 11/7/2017	Time: 11:00:06 AM	Sheet 10 of
File: Execute-Strain-Gauge.SchDoc		

Dephy, Inc.
50 Terminal St
Building 2 Unit 520
Boston, MA 02129
USA

D





Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size: Letter	Number:	Revision:	
Date: 11/7/2017	Time: 11:00:07 AM	Sheet 11 of	
File: Regulate-5V-SMPS.SchDoc			

A

A

B

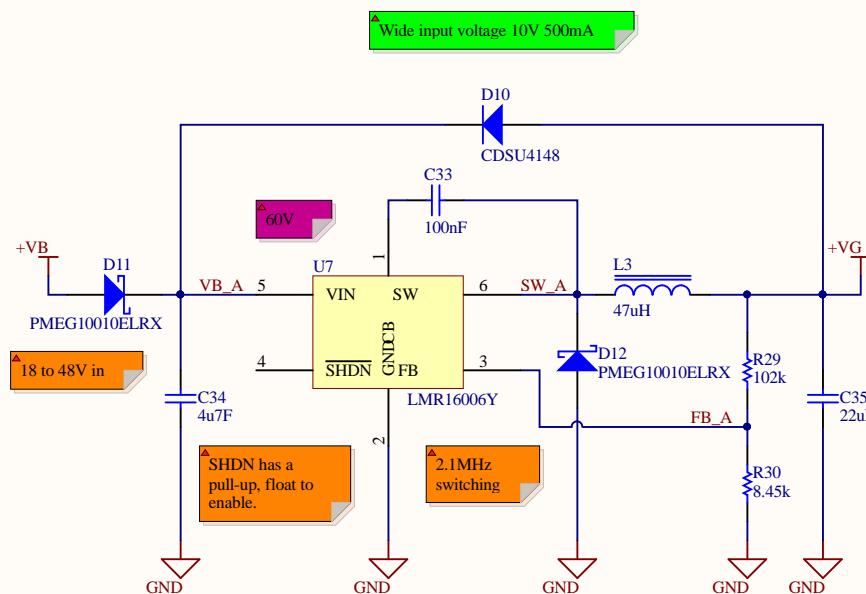
B

C

C

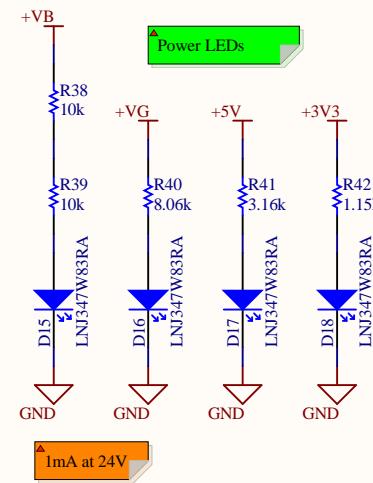
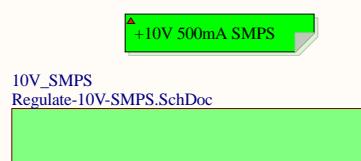
D

D

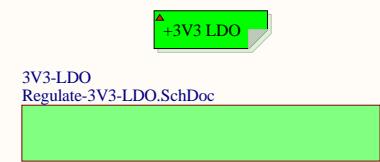
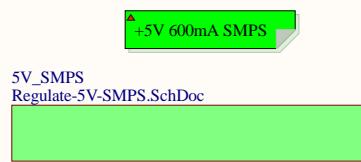


Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	
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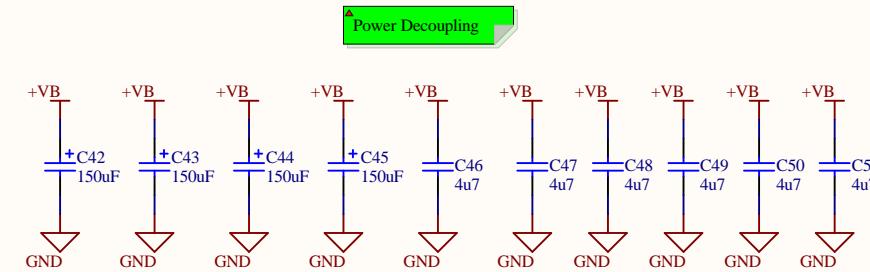
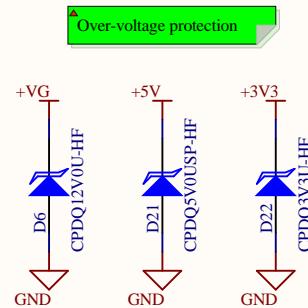
A



B



C



D

Supply naming convention:

<hr/> <hr/>		
+VB	18-48V	Battery voltage
+VG	10V	Gate driver voltage, input for low voltage regulators
+5V	5V	Logic supply (Execute & Regulate)
+3V3	3.3V	Logic supply (Manage)

Title

Size: Letter

Number:

Revision:

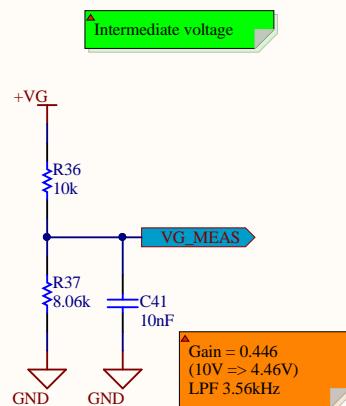
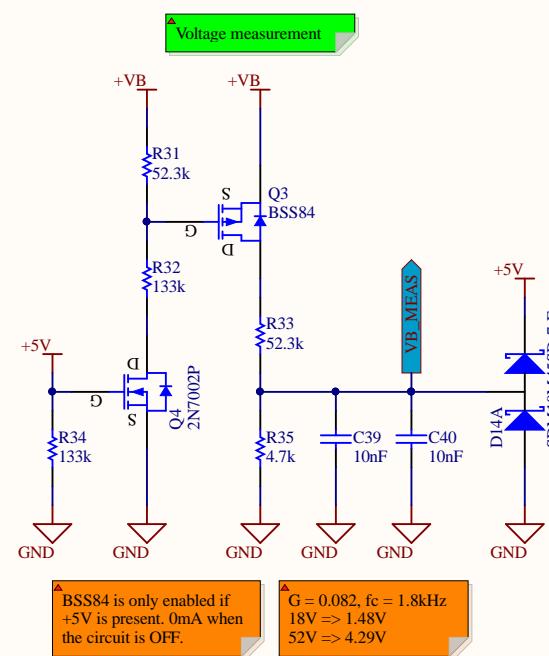
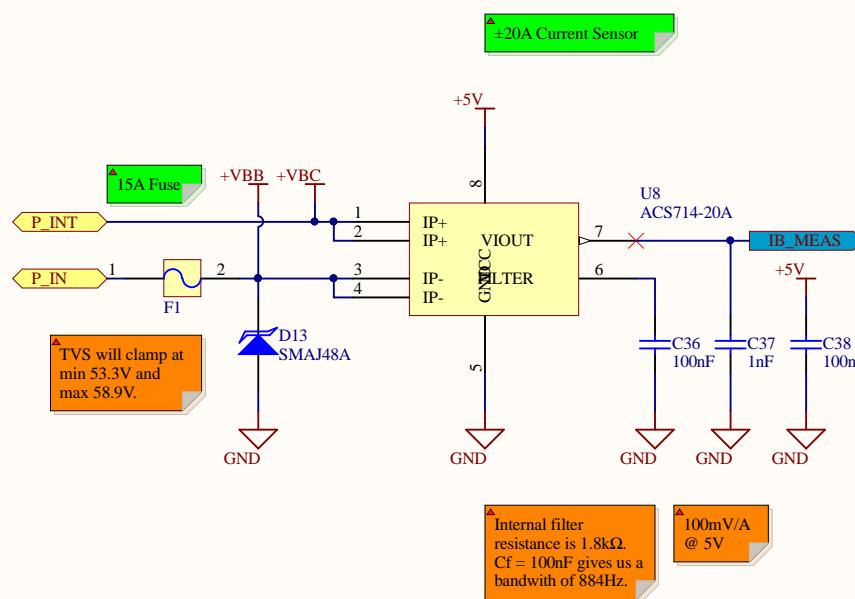
Date: 11/7/2017 Time: 11:00:08 AM

Sheet 13 of

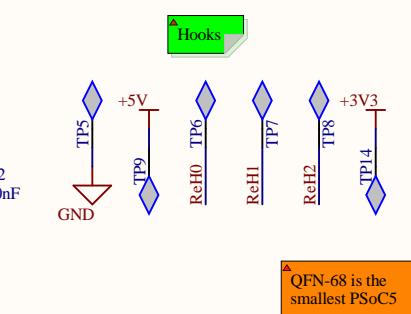
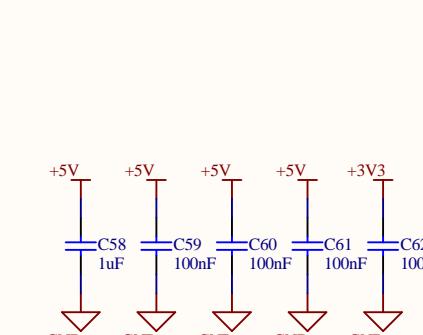
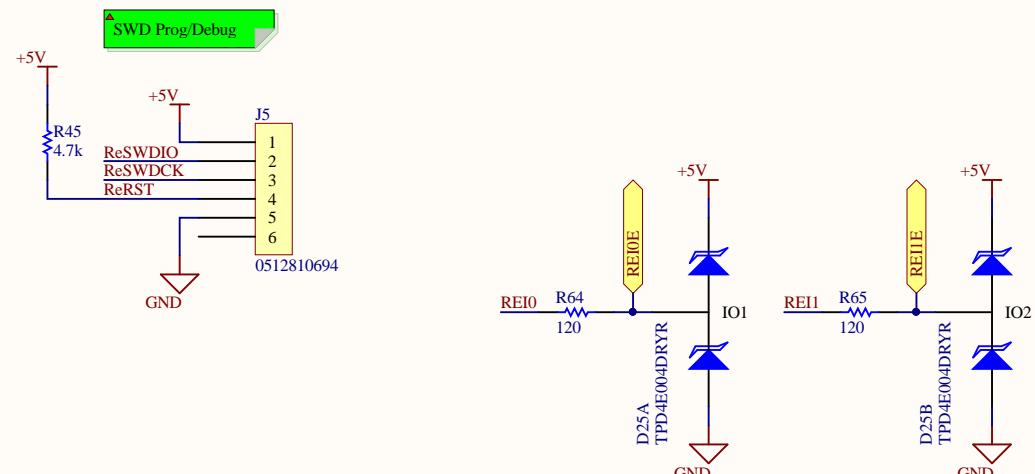
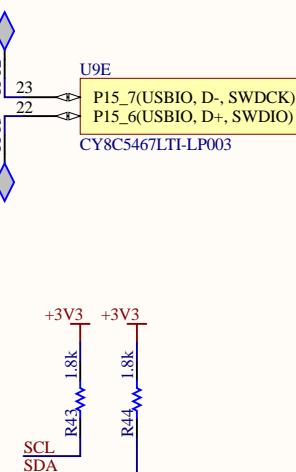
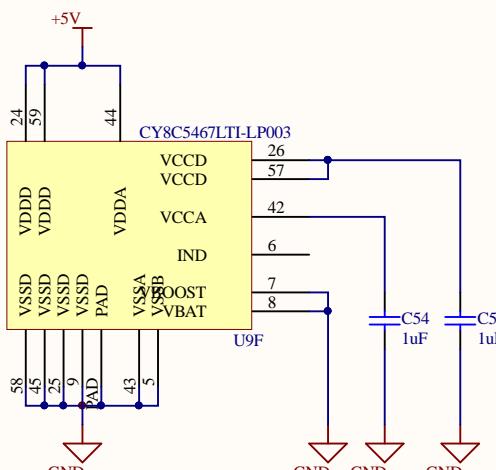
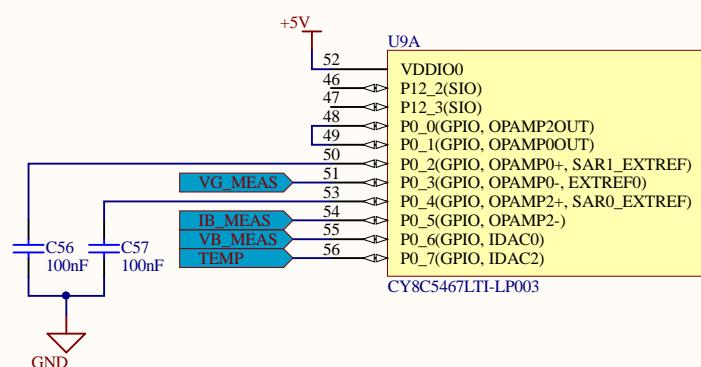
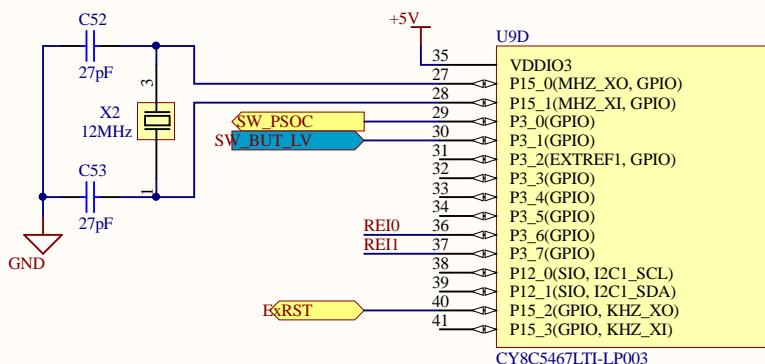
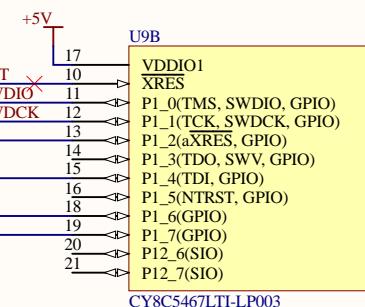
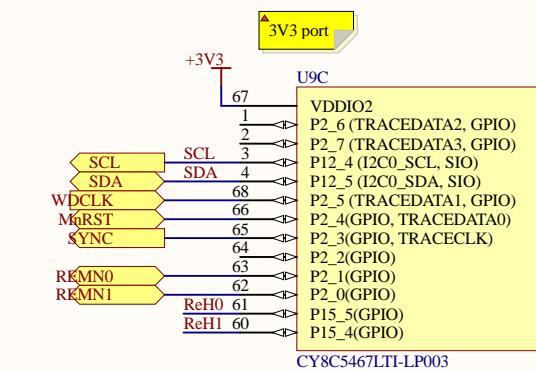
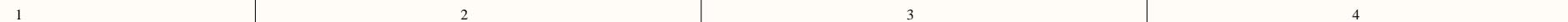
File: Regulate-Power.SchDoc

Dephy, Inc.
50 Terminal St
Building 2 Unit 520
Boston, MA 02129
USA

DEPHY



Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Number:	Revision:	
Date: 11/7/2017	Time: 11:00:08 AM	Sheet 20 of	
File: Regulate-IV-Sense.SchDoc			



Title			<i>Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA</i>	DEPHY 
Size:	Letter	Number:	Revision:	
Date:	11/7/2017	Time:	11:00:09 AM	Sheet 21 of
File:	Regulate-PSoC.SchDoc			

A

A

B

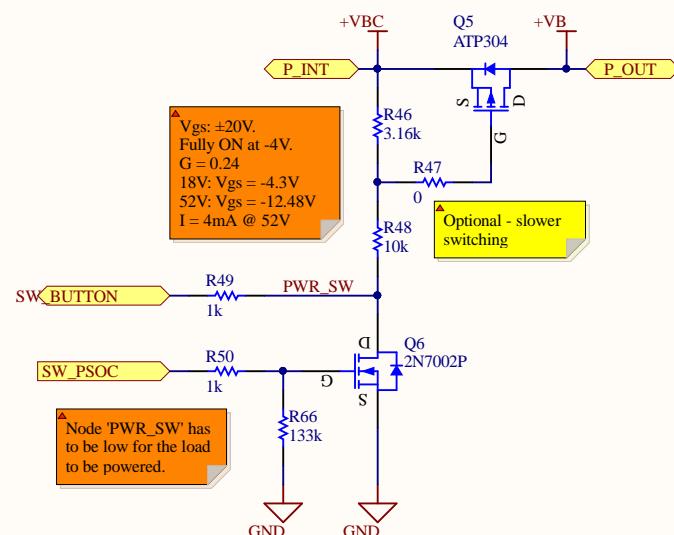
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C

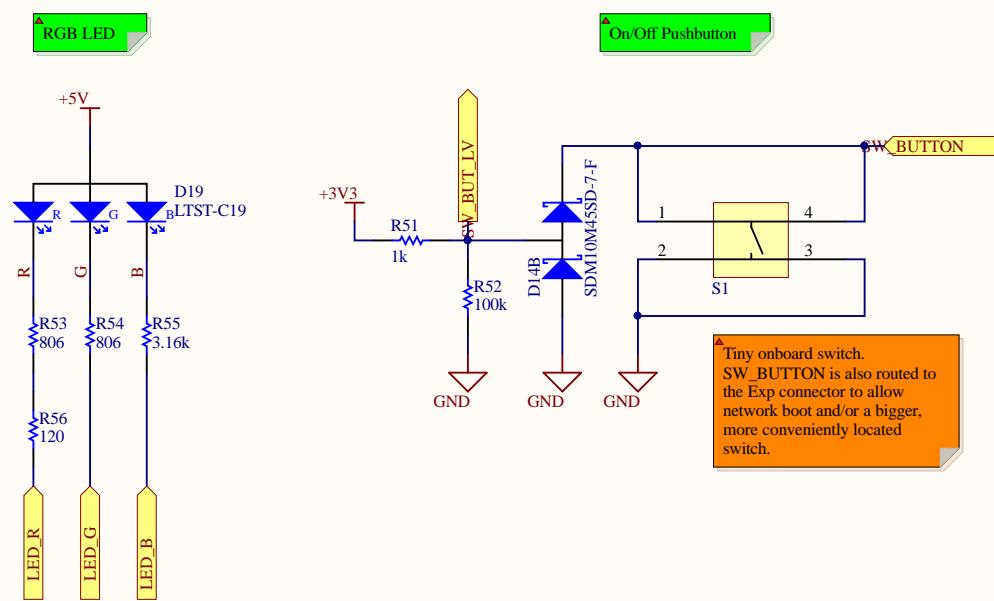
C

D

D



Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	
File:	Regulate-Switch.SchDoc	Revision:	



Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size: Letter	Number:	Revision:	
Date: 11/7/2017	Time: 11:00:10 AM	Sheet 23 of	
File: Regulate-UL.SchDoc			

A

A

B

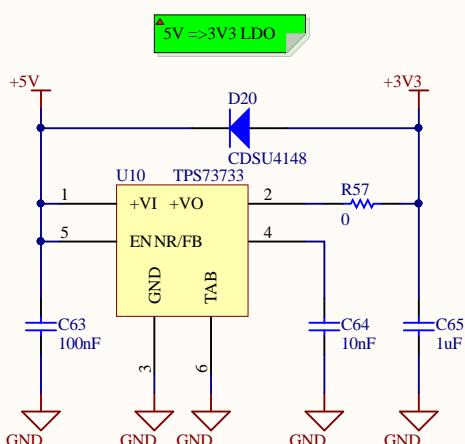
B

C

C

D

D



$P = (5V - 3.3V) * 1A = 1.7W$
25C ambient, 53.1C/W \Rightarrow 115C worst case.

0 ohm present just in case we need to add resistance to prevent instability, and to measure the current during optimization.

Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	
File:	Regulate-3V3-LDO.SchDoc	Sheet 28 of	

A

A

B

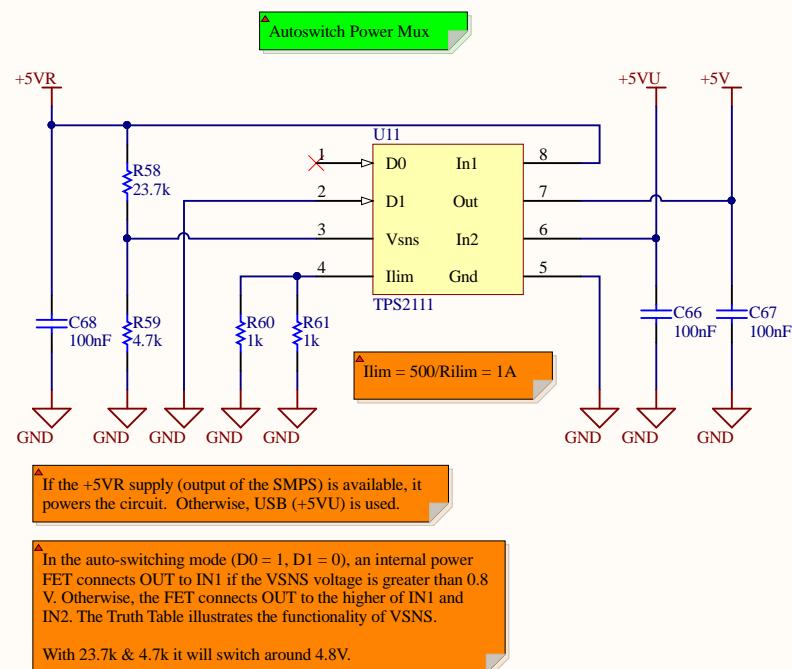
B

C

C

D

D



+5VR: From the 5V SMPS (Battery > VG > 5V)
+5VU: From Manage's USB connector

Title			Dephy, Inc. 50 Terminal St Building 2 Unit 520 Boston, MA 02129 USA
Size:	Letter	Number:	
Date:	11/7/2017	Time:	
File:	Regulate-5V-Mux.SchDoc		

