

NOTES - UNLESS OTHERWISE NOTED:


1. RESISTANCE VALUES ARE IN OHMS
2. CAPACITANCE VALUES ARE IN MICROFARADS ( $\mu$ F)
3. ALL 0.1 $\mu$ F and 0.01 $\mu$ F CAPACITORS ARE FOR DECOUPLING PURPOSES AND SHOULD BE PLACED CLOSE TO THE IC THEY ARE SHOWN NEAR ON THE SCHEMATIC.

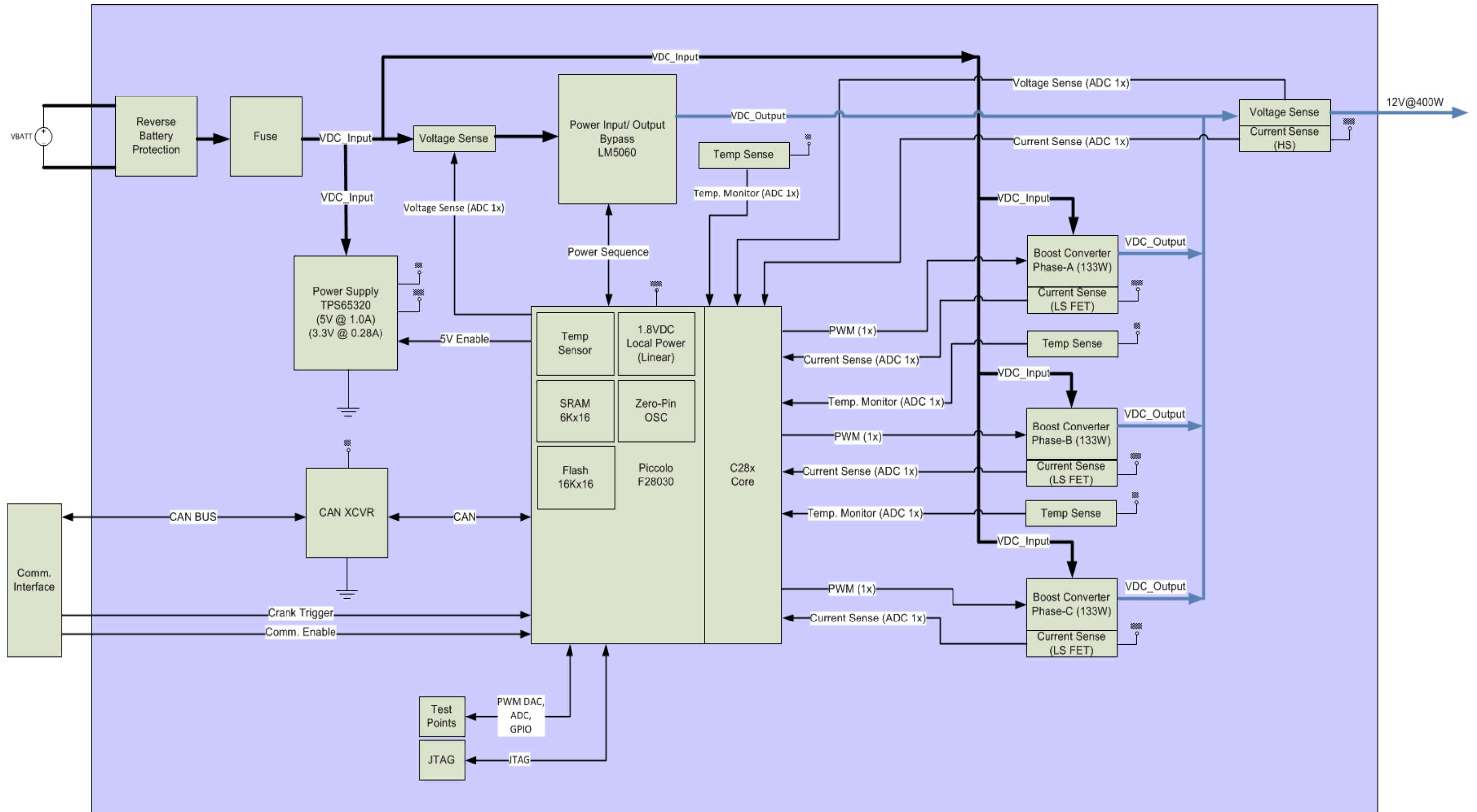
BARE BOARD

PCB-034014001

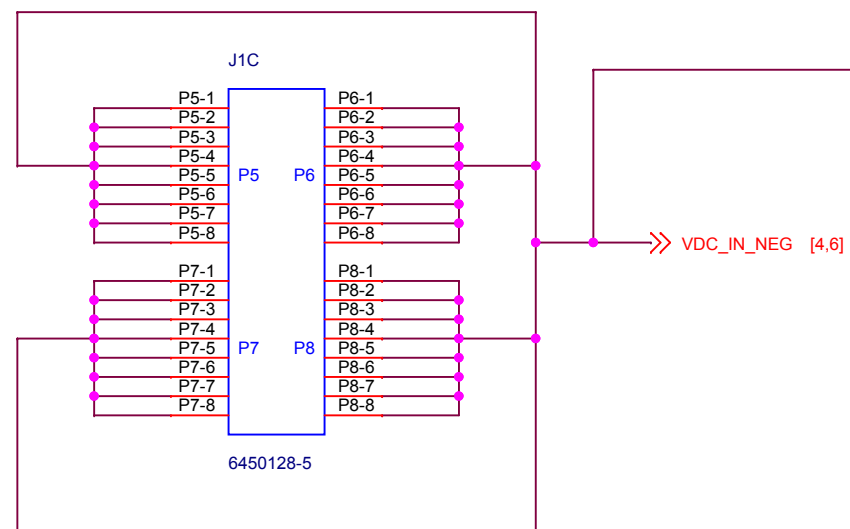
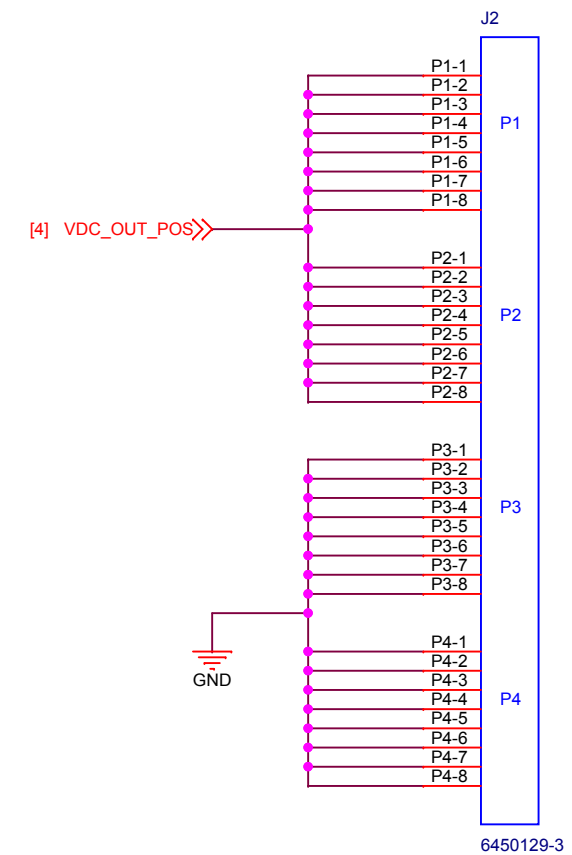
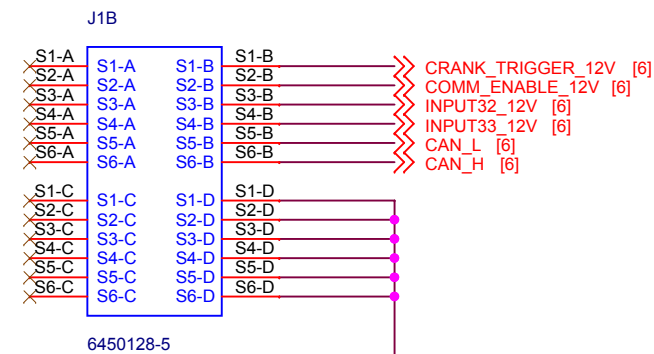
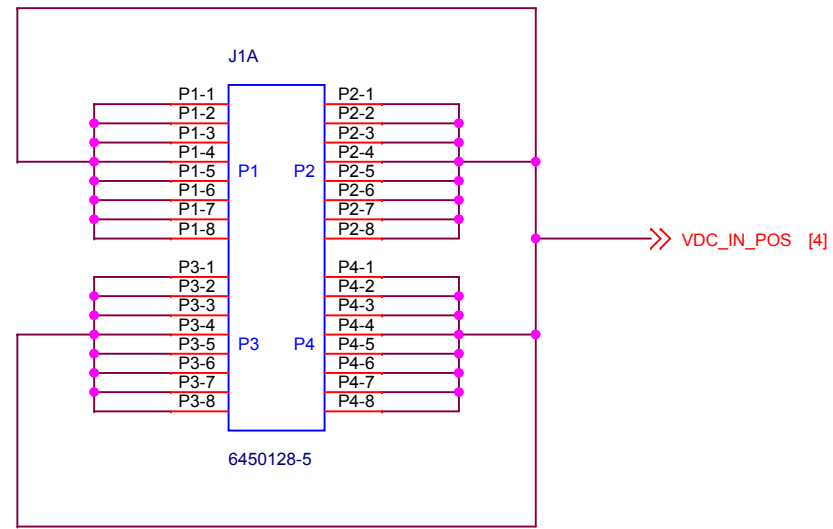
- PAGE 01 - Title - Index - Revisions
- PAGE 02 - Block Diagram
- PAGE 03 - Connectors
- PAGE 04 - Power Input/Output Bypass
- PAGE 05 - Power Rails (5.0V, 3.3V)
- PAGE 06 - Communication (CAN, Digital I/O)
- PAGE 07 - Processor
- PAGE 08 - Boost Coverter Voltage/Current/Temperature Sense
- PAGE 09 - Boost Conveter Gate Drive
- PAGE 10 - Boost Conveter Phases

REVISION HISTORY			
REV	DESCRIPTION	DATE	ENG
2	CHANGES INCORPORATED PER BUGS: 693 751 752 753 786 787	12/11/14	SN

 <b>D3 Engineering</b> Define   Design   Deploy	D3 Engineering 1057 E Henrietta Rd Rochester, NY 14623 p. (585) 429-1550 f. (585) 429-1551 www.d3engineering.com			
	TIDA-00282 AUTOMOTIVE BOOST MODULE			
	TABLE OF CONTENTS			
www.D3Engineering.com	SIZE B	CAGE CODE 3V6D5	DWG NO SCH-034014001	REV 2
Thursday, December 11, 2014	SCALE 1:1	DWN BY: SN	APRVD BY: SR	SHEET 1 OF 10



 <b>D3 Engineering</b> Define   Design   Deploy	D3 Engineering 1057 E Henrietta Rd Rochester, NY 14623 p. (585) 429-1550 f. (585) 429-1551 www.d3engineering.com			
	TIDA-00282 AUTOMOTIVE BOOST MODULE			
<a href="http://www.D3Engineering.com">www.D3Engineering.com</a>	BLOCK DIAGRAM			
	SIZE B	CAGE CODE 3V6D5	DWG NO SCH-034014001	REV 2
Thursday, December 11, 2014	SCALE 1:1	DWN BY: SN	APRVD BY: SR	SHEET 2 OF 10

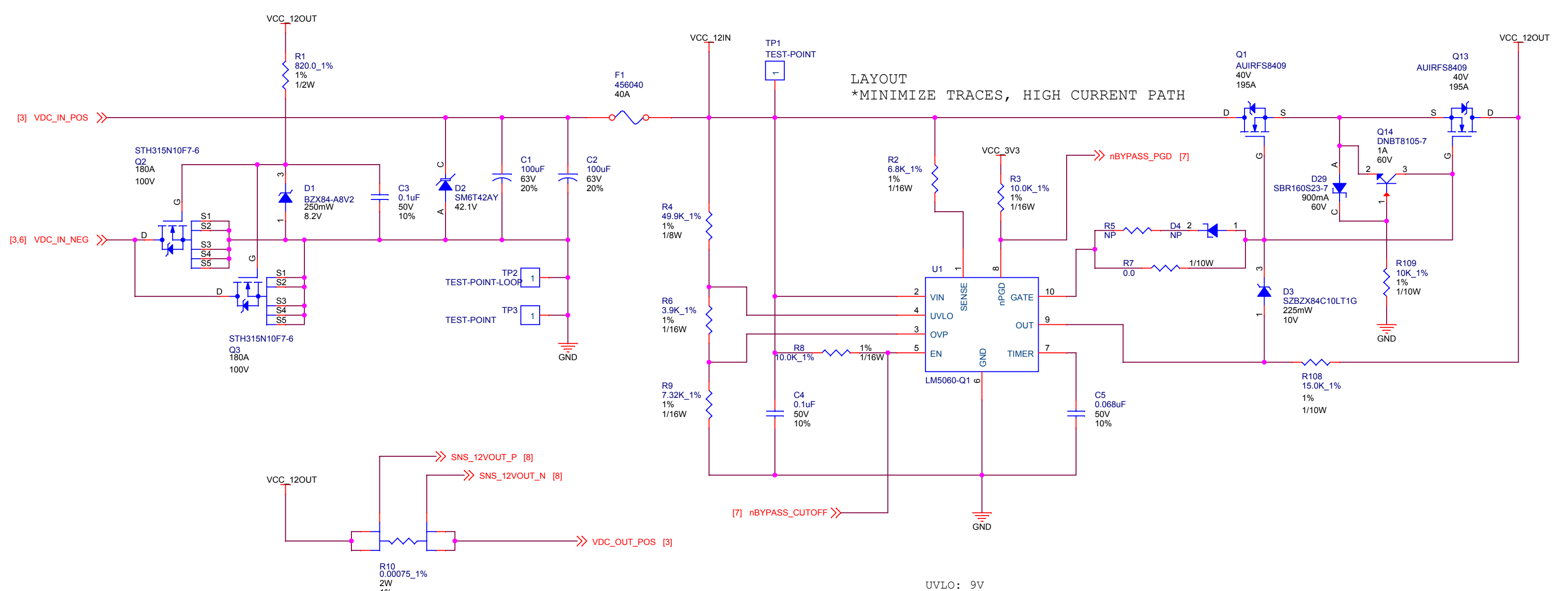


COMMS INPUT CONNECTION

POWER OUTPUT CONNECTION

POWER INPUT CONNECTION

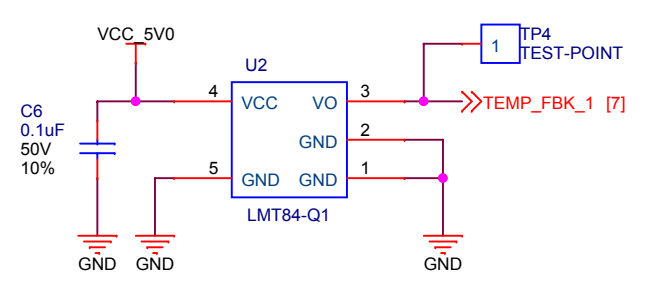
<p><b>D3 Engineering</b> Define   Design   Deploy</p>	<p>D3 Engineering 1057 E Henrietta Rd Rochester, NY 14623 p. (585) 429-1550 f. (585) 429-1551 www.d3engineering.com</p>		
	<p>TIDA-00282 AUTOMOTIVE BOOST MODULE</p>		
<p>www.D3Engineering.com</p>	<p>CONNECTORS</p>		<p>REV 2</p>
	<p>SIZE B</p>	<p>CAGE CODE 3V6D5</p>	<p>DWG NO SCH-034014001</p>
<p>Thursday, December 11, 2014</p>	<p>SCALE 1:1</p>	<p>DWN BY: SN</p>	<p>APRVD BY: SR</p>
		<p>SHEET 3 OF 10</p>	



Power: 0.817W @33 Amp  
 Voltage Drop: 33mV @44 Amp

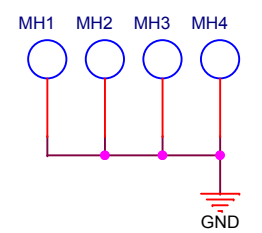
UVLO: 9V  
 OVP : 17V  
 VDS\_TH: 37.12mV  
 MAX\_CURR.: 49.5A (+/-9.33A)  
 VDS\_FAULT\_DELAY (Start-up): 23mS  
 VDS\_FAULT\_DELAY (Over-Cur): 12mS

TEMPERATURE SENSE

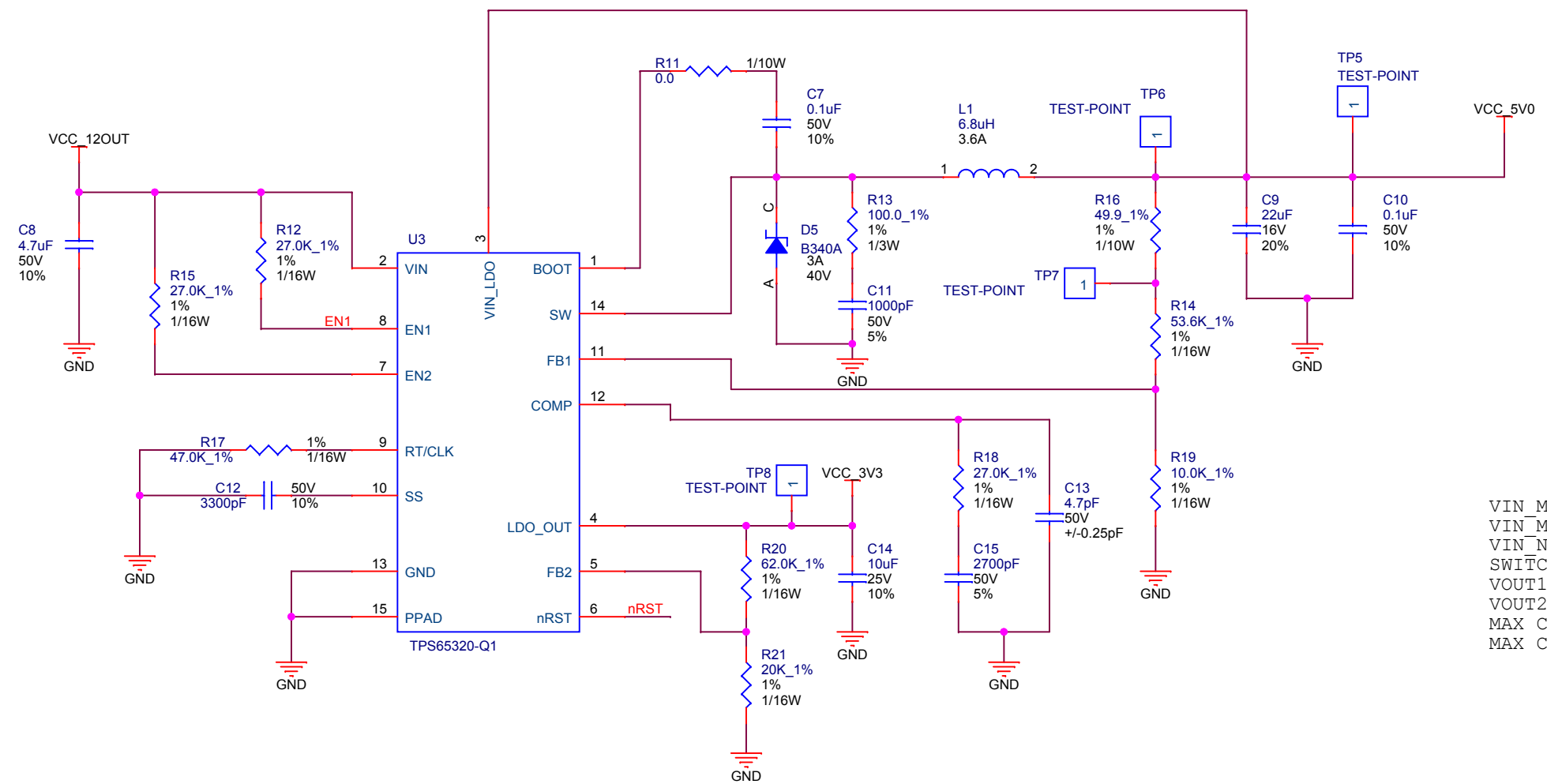


SCALING  
 $V_{out} = (-5.5mV/C) * T + 1035mV$

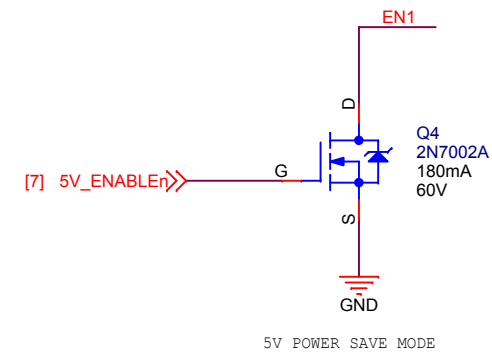
PCB MOUNTING HOLES



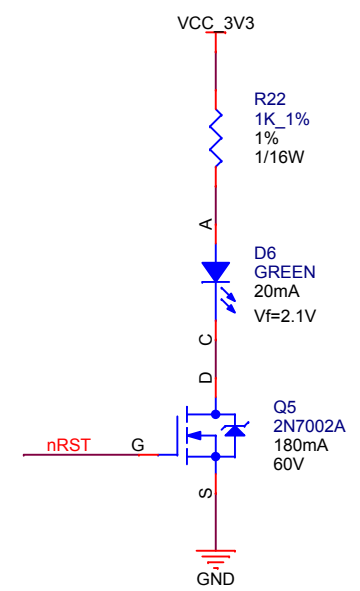
 Define   Design   Deploy	D3 Engineering 1057 E Henrietta Rd Rochester, NY 14623 p. (585) 429-1550 f. (585) 429-1551 www.d3engineering.com		
	TIDA-00282 AUTOMOTIVE BOOST MODULE		
www.D3Engineering.com	SIZE B	CAGE CODE 3V6D5	DWG NO SCH-034014001
	SCALE 1:1	DWN BY: SN	APRVD BY: SR
Thursday, December 11, 2014	SHEET 4	OF 10	REV 2



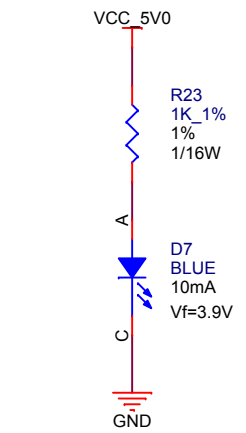
VIN\_MIN: 9V  
 VIN\_MAX: 17V  
 VIN\_NOM: 12V  
 SWITCHING\_FREQ: 2.2MHz  
 VOUT1: 5.0V (+/- 2%)  
 VOUT2: 3.3V (+/- 2%)  
 MAX\_CURR 5.0V: 1A  
 MAX\_CURR 3.3V: 0.280A



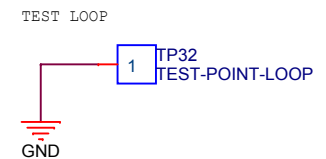
5V POWER SAVE MODE



3.3V POWER GOOD INDICATION

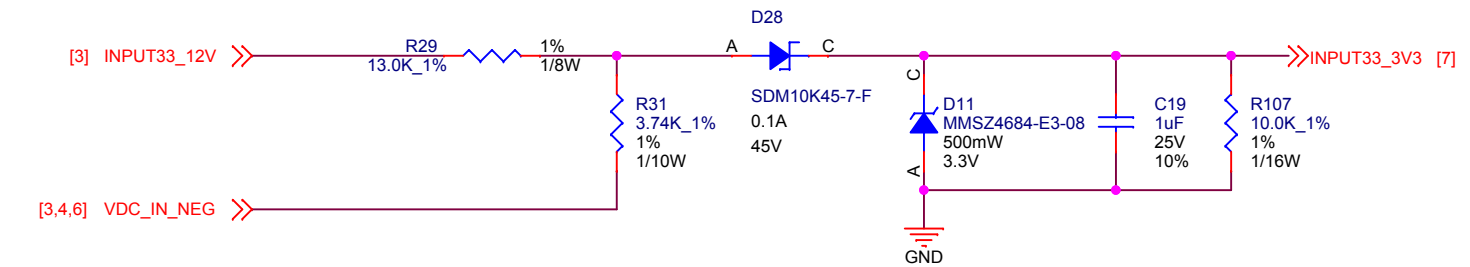
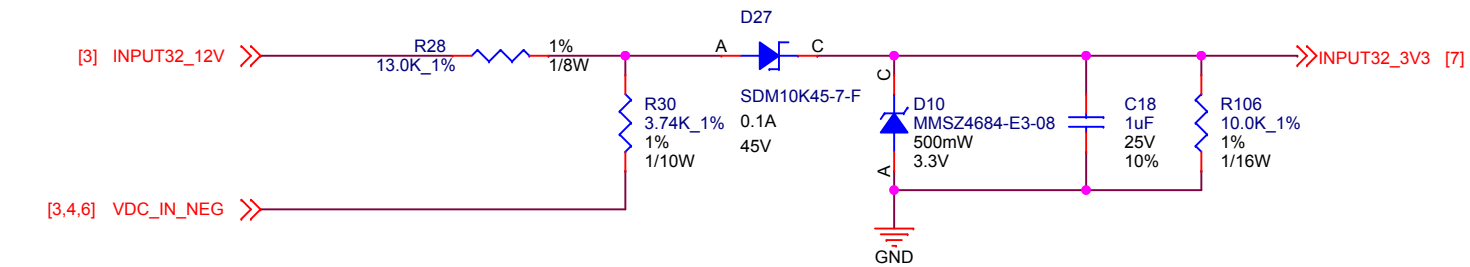
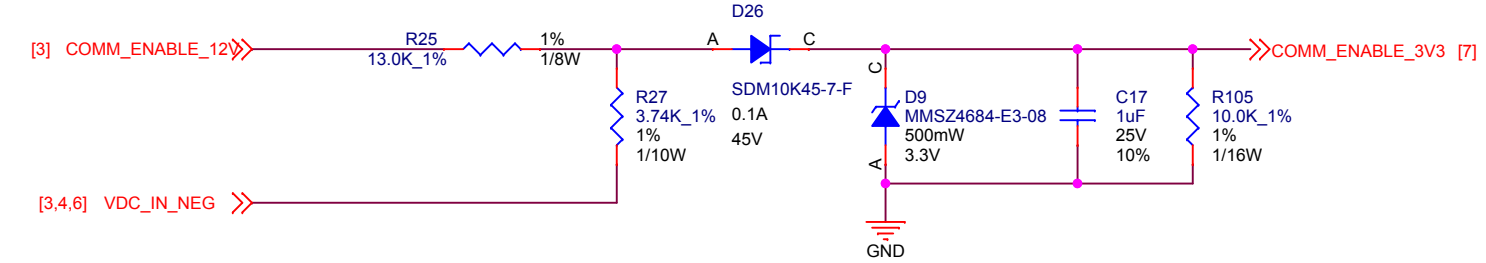
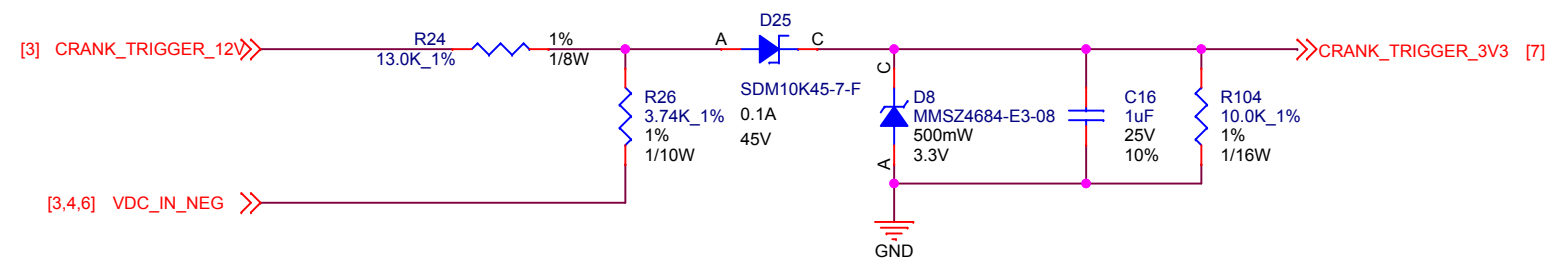


5.0V POWER GOOD INDICATION

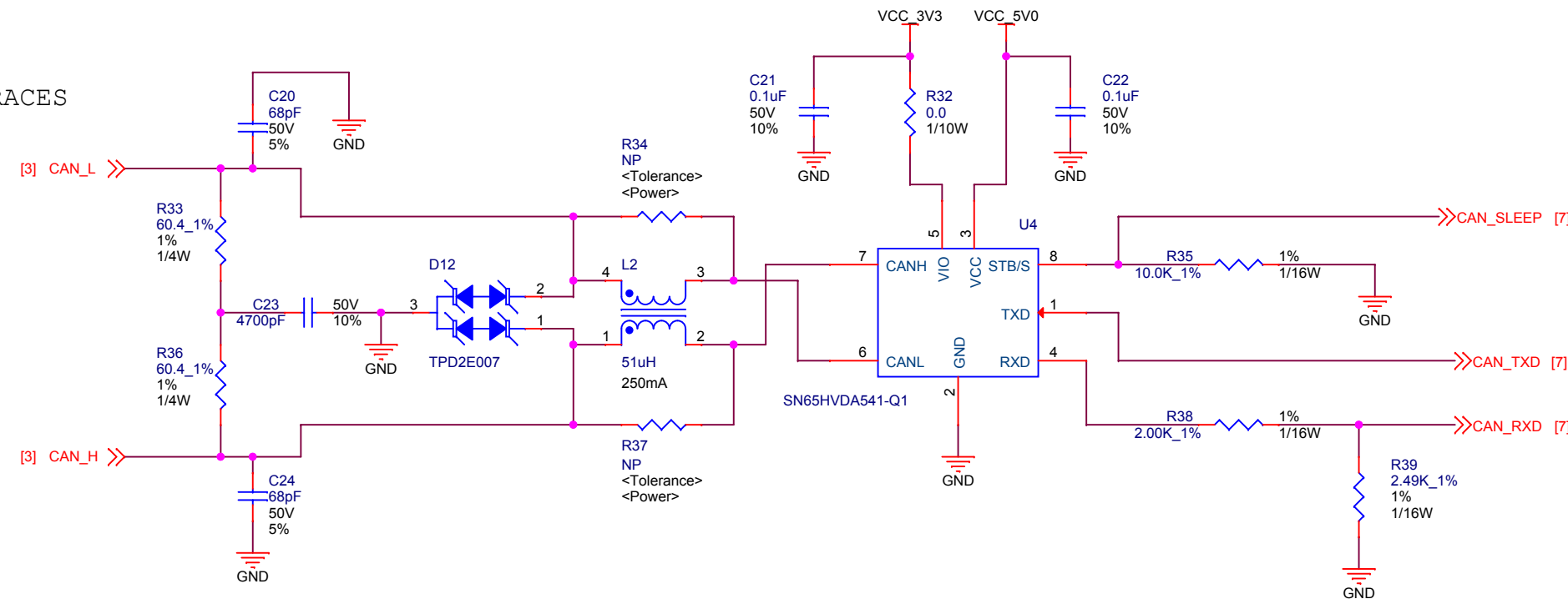


 <b>D3 Engineering</b> Define   Design   Deploy	D3 Engineering 1057 E Henrietta Rd Rochester, NY 14623 p. (585) 429-1550 f. (585) 429-1551 www.d3engineering.com		
	TIDA-00282 AUTOMOTIVE BOOST MODULE		
POWER RAILS (5.0V, 3.3V)			
www.D3Engineering.com	SIZE B	CAGE CODE 3V6D5	DWG NO SCH-034014001
Thursday, December 11, 2014	SCALE 1:1	DWN BY: SN	APRVD BY: SR
		SHEET 5 OF 10	REV 2

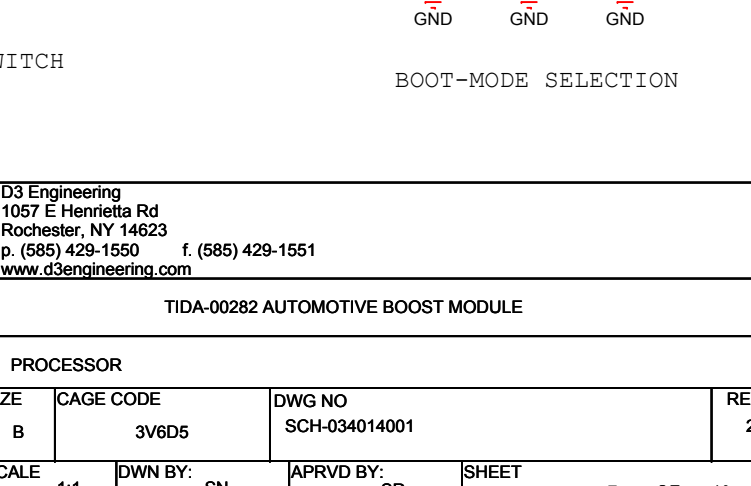
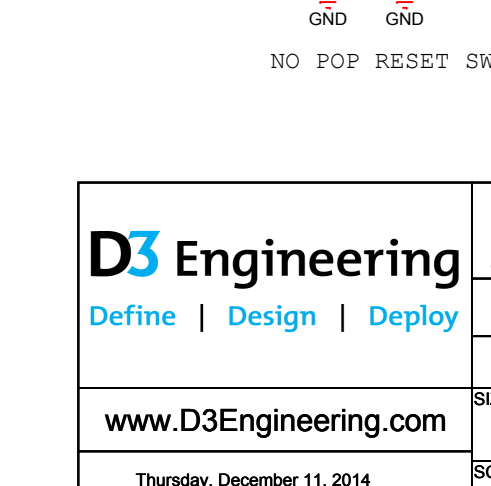
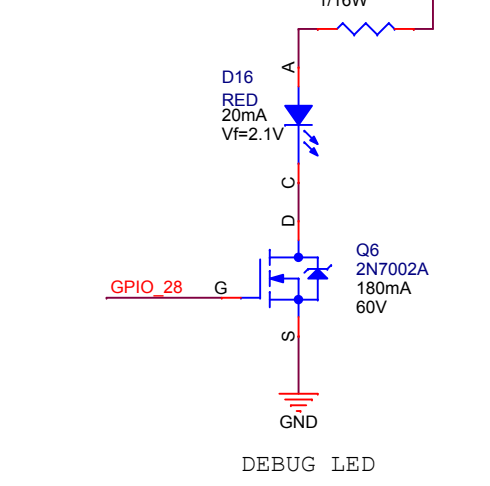
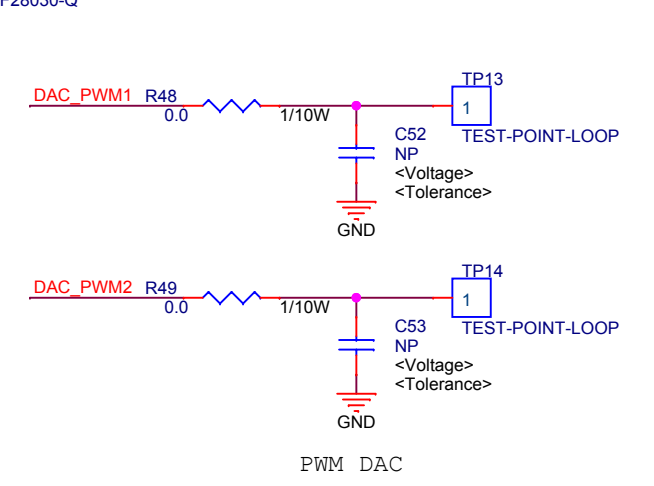
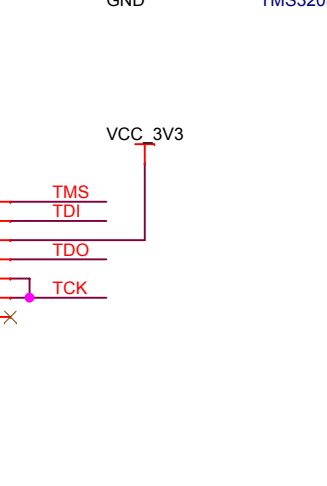
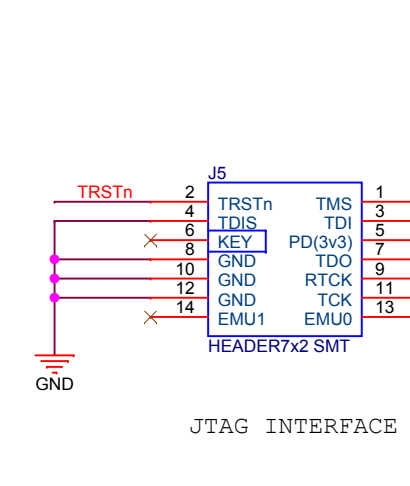
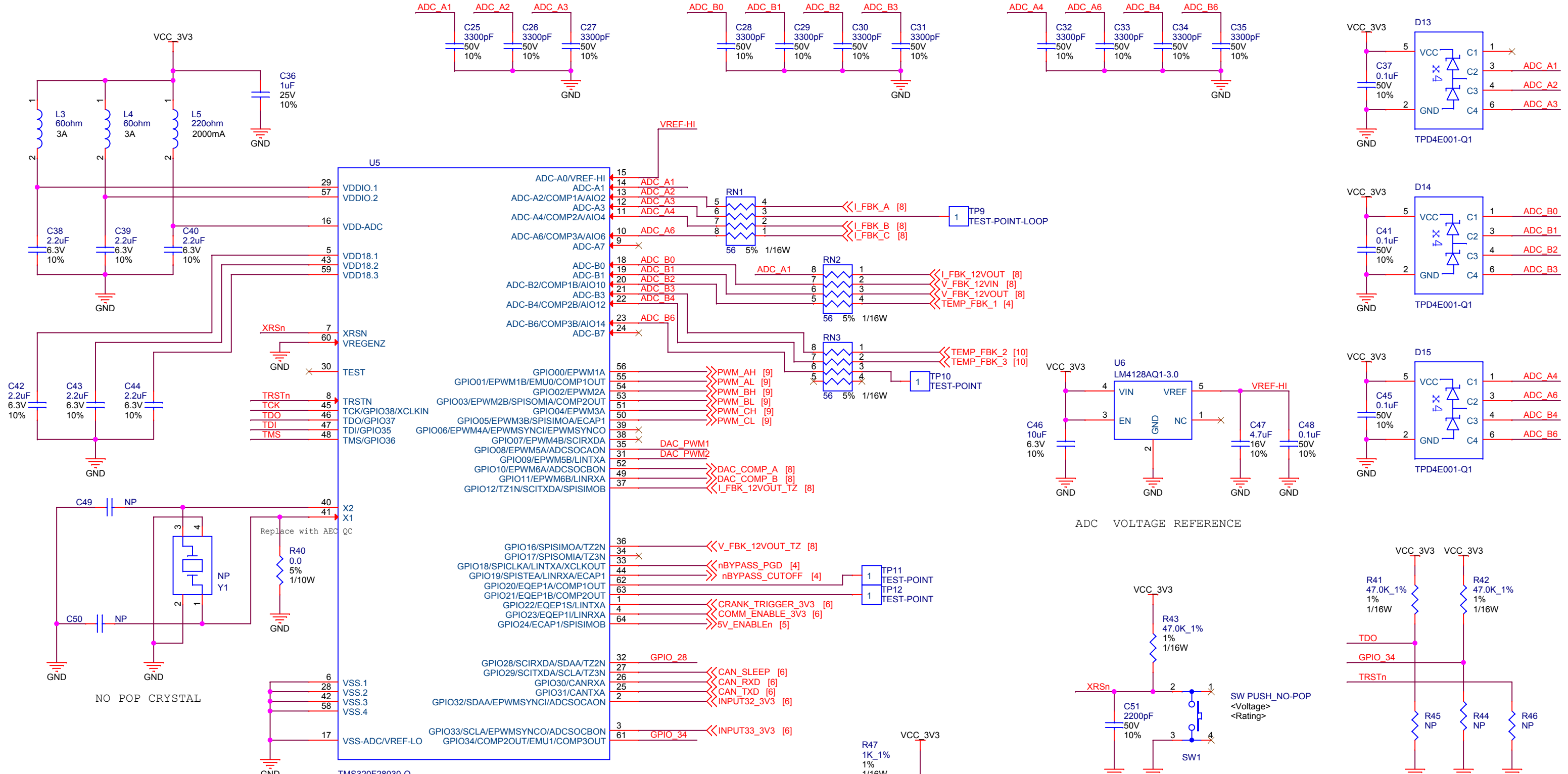
RESISTOR DIVIDER  
 $V_{out} = 0.1875 \cdot V_{in}$   
 $V_{in\_max} = 17.6V$



LAYOUT  
 \*CAN H/L DIFFERENTIAL TRACES



 <b>D3 Engineering</b> Define   Design   Deploy	D3 Engineering 1057 E Henrietta Rd Rochester, NY 14623 p. (585) 429-1550 f. (585) 429-1551 www.d3engineering.com		
	TIDA-00282 AUTOMOTIVE BOOST MODULE		
COMMUNICATION (CAN, DIGITAL I/O)			
<a href="http://www.D3Engineering.com">www.D3Engineering.com</a>	SIZE B	CAGE CODE 3V6D5	DWG NO SCH-034014001
Thursday, December 11, 2014	SCALE 1:1	DWN BY: SN	APRVD BY: SR
		SHEET 6 OF 10	REV 2



## D3 Engineering

Define | Design | Deploy

[www.D3Engineering.com](http://www.D3Engineering.com)

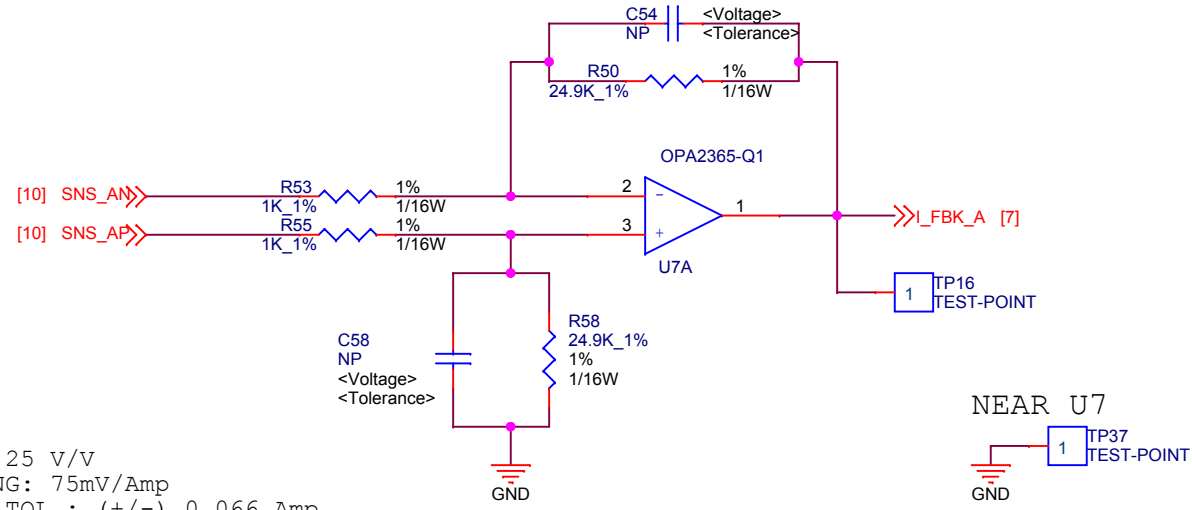
D3 Engineering  
1057 E Henrietta Rd  
Rochester, NY 14623  
p. (585) 429-1550 f. (585) 429-1551  
[www.d3engineering.com](http://www.d3engineering.com)

TIDA-00282 AUTOMOTIVE BOOST MODULE

PROCESSOR			
SIZE	CAGE CODE	DWG NO	REV
B	3V6D5	SCH-034014001	2
SCALE	DWN BY:	APRVD BY:	SHEET
1:1	SN	SR	7 OF 10

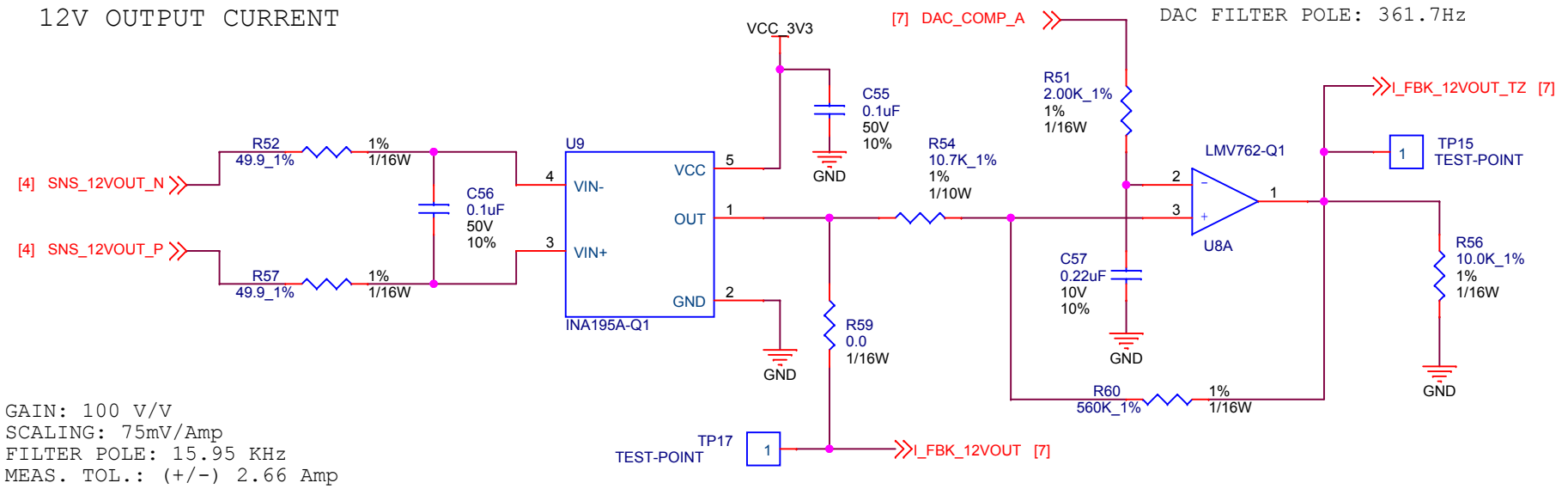
Thursday, December 11, 2014

PHASE-A CURRENT



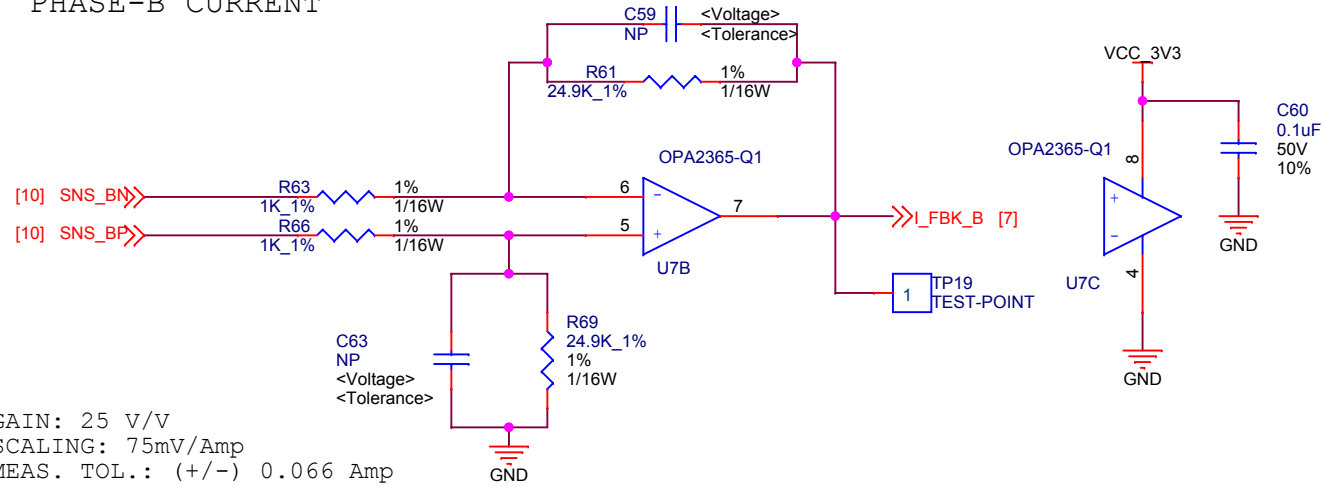
GAIN: 25 V/V  
 SCALING: 75mV/Amp  
 MEAS. TOL.: (+/-) 0.066 Amp

12V OUTPUT CURRENT



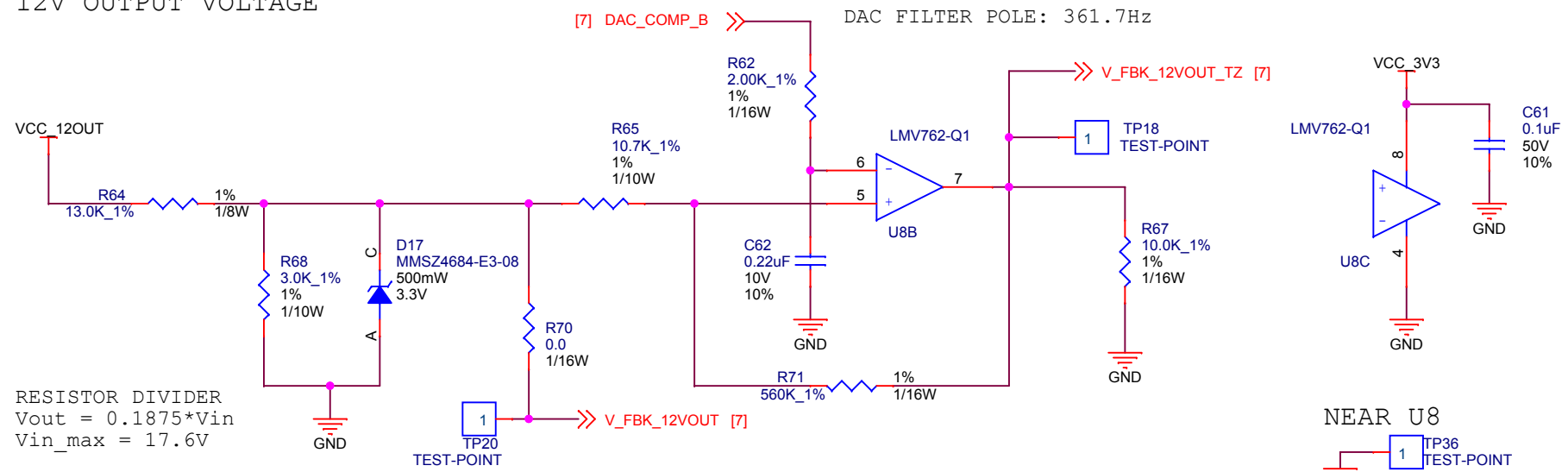
GAIN: 100 V/V  
 SCALING: 75mV/Amp  
 FILTER POLE: 15.95 KHz  
 MEAS. TOL.: (+/-) 2.66 Amp

PHASE-B CURRENT



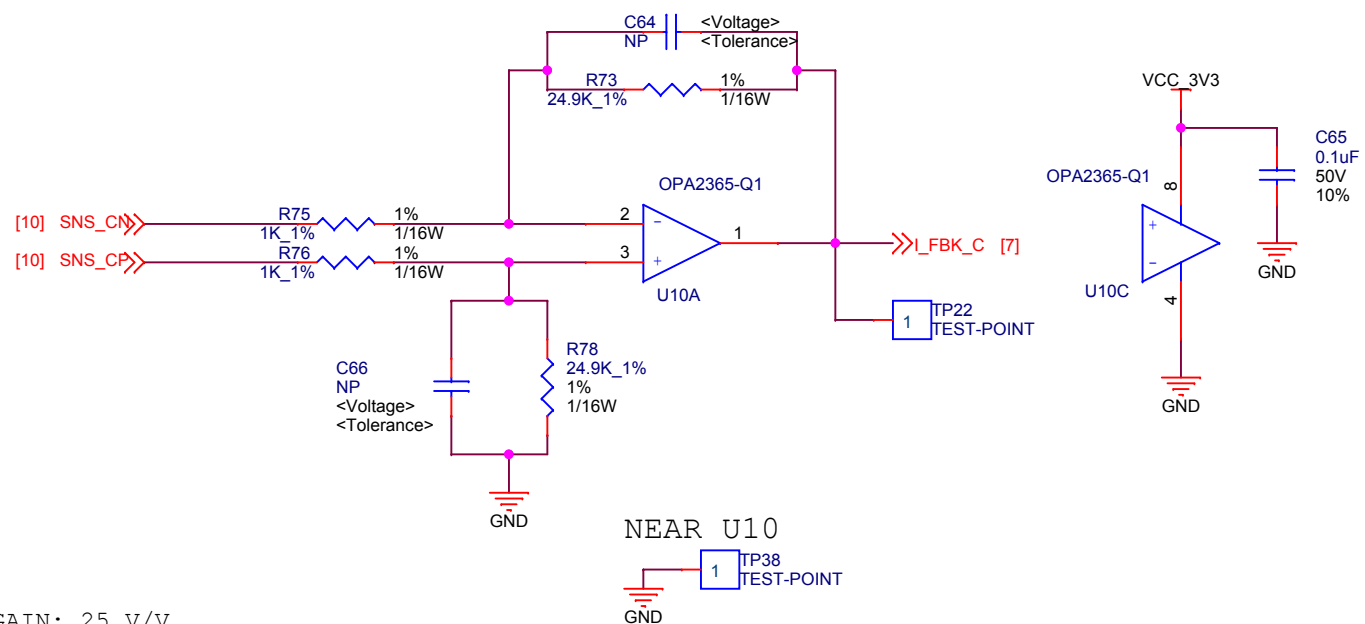
GAIN: 25 V/V  
 SCALING: 75mV/Amp  
 MEAS. TOL.: (+/-) 0.066 Amp

12V OUTPUT VOLTAGE



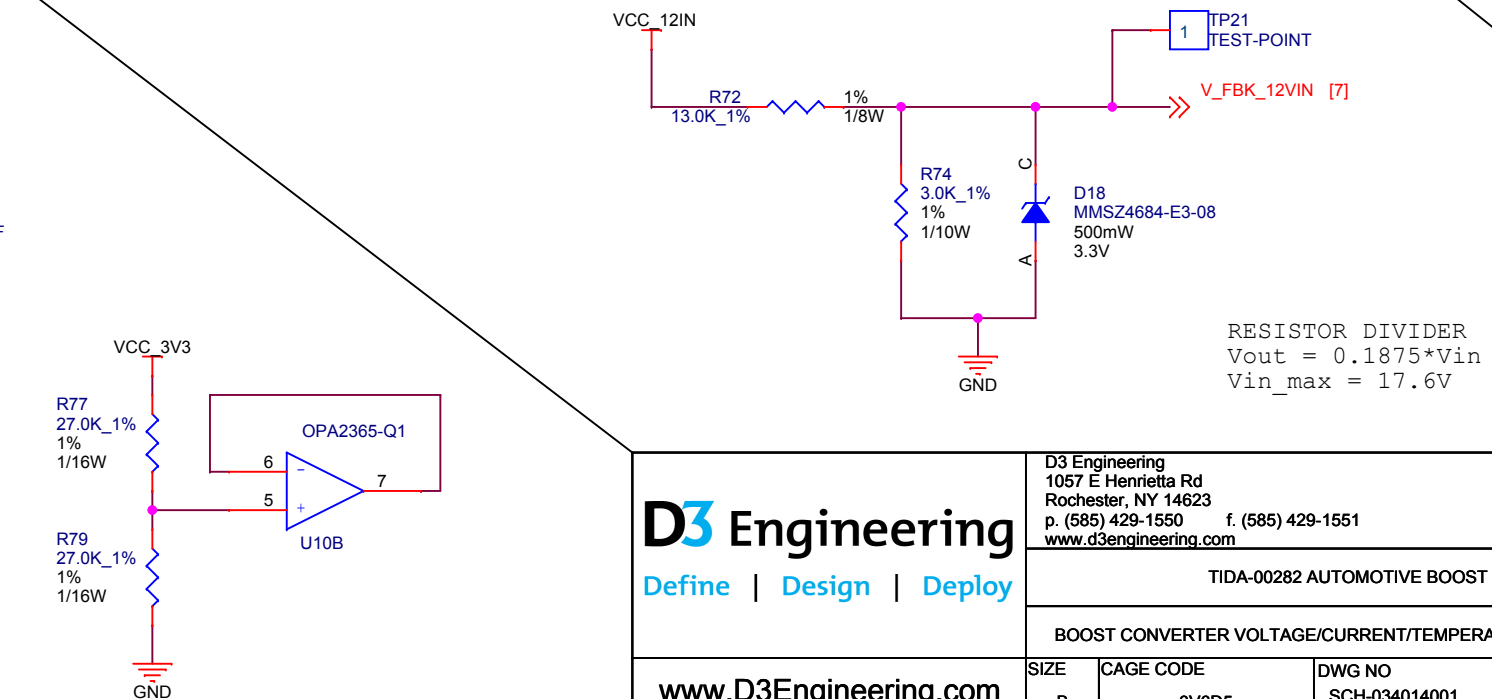
RESISTOR DIVIDER  
 $V_{out} = 0.1875 * V_{in}$   
 $V_{in\_max} = 17.6V$

PHASE-C CURRENT



GAIN: 25 V/V  
 SCALING: 75mV/Amp  
 MEAS. TOL.: (+/-) 0.066 Amp

12V INPUT VOLTAGE



RESISTOR DIVIDER  
 $V_{out} = 0.1875 * V_{in}$   
 $V_{in\_max} = 17.6V$

**D3 Engineering**  
 Define | Design | Deploy

www.D3Engineering.com

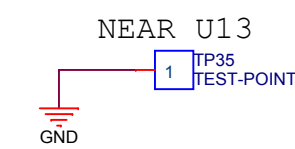
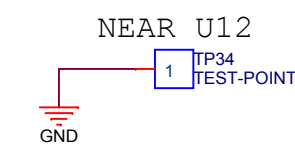
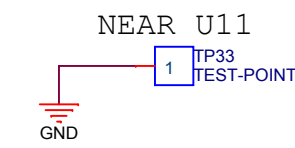
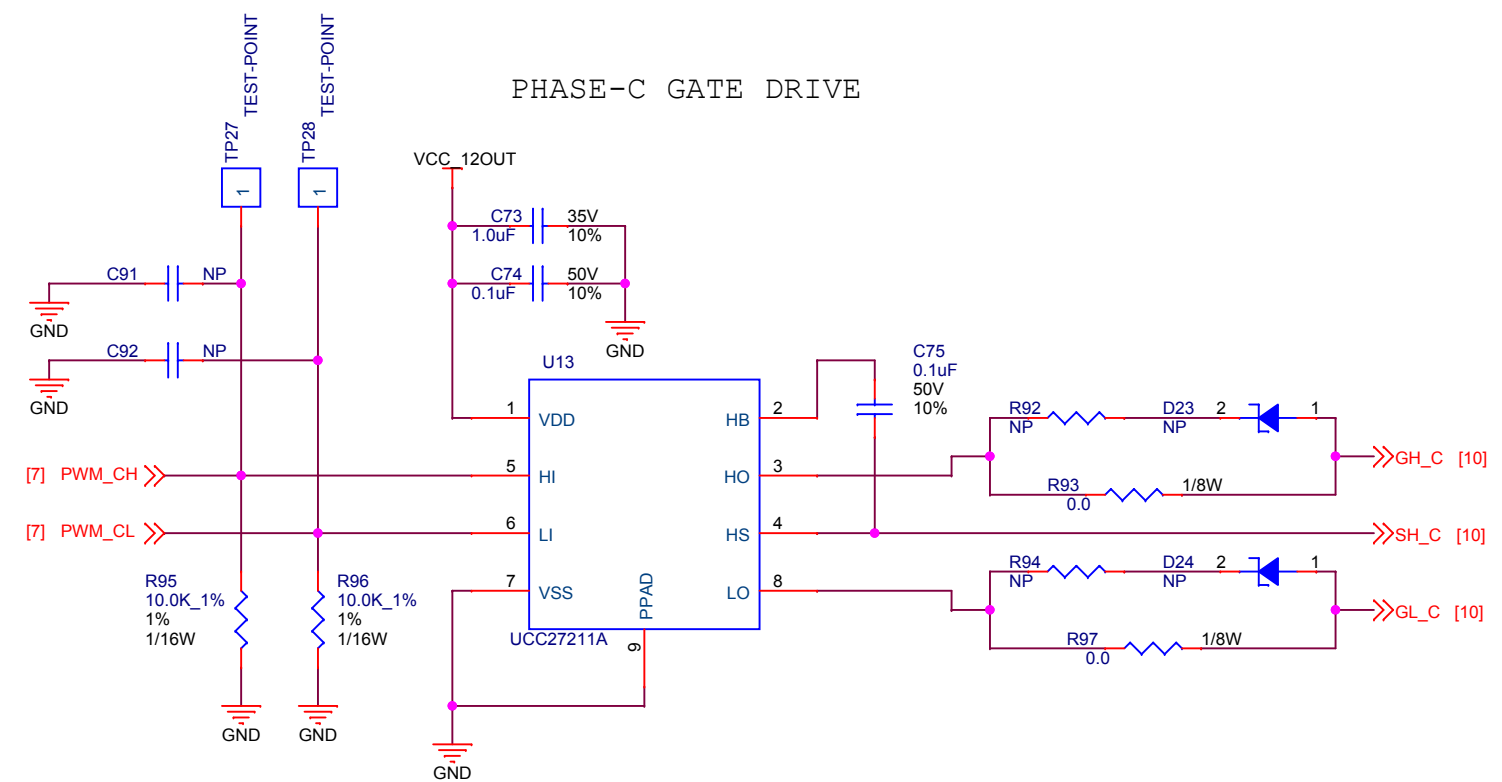
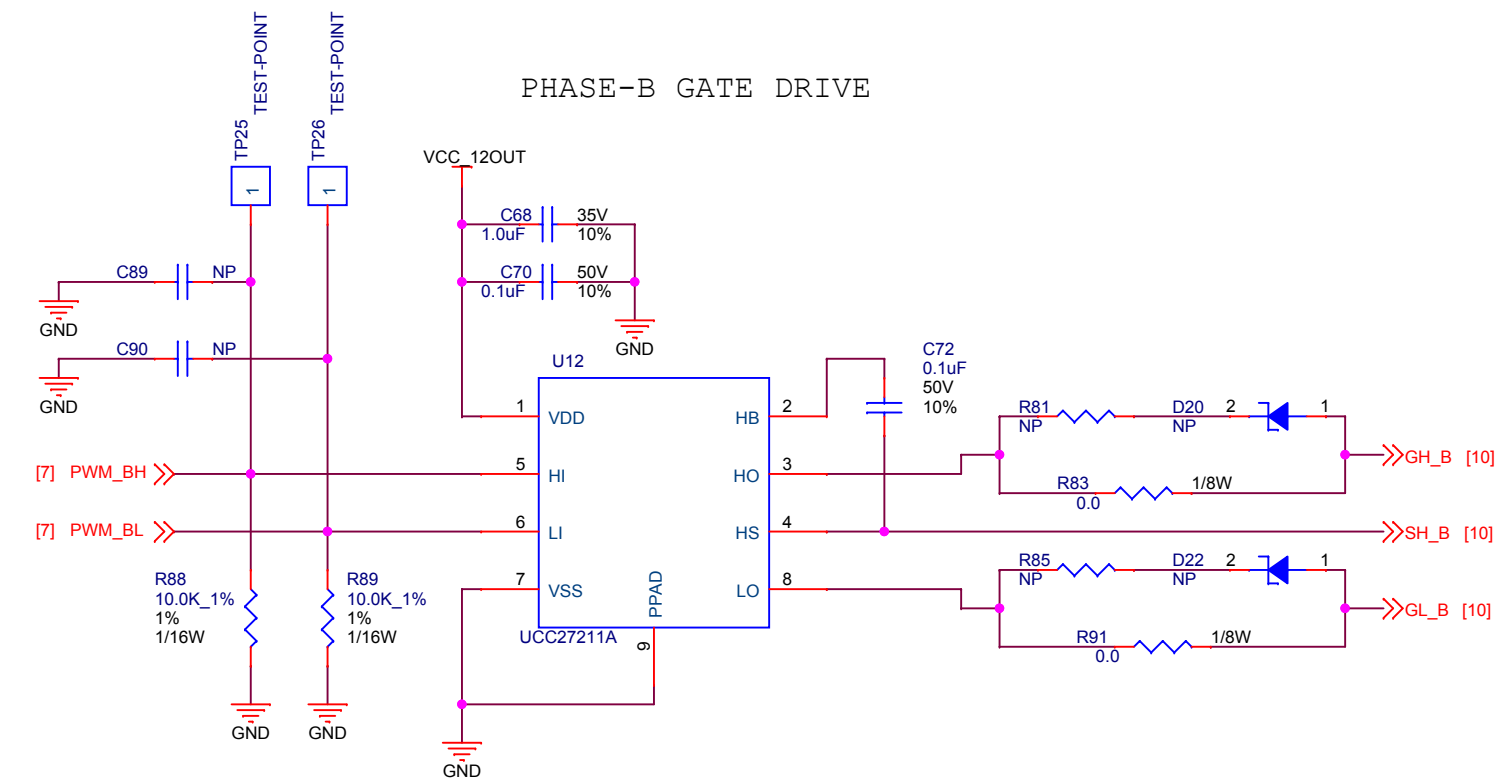
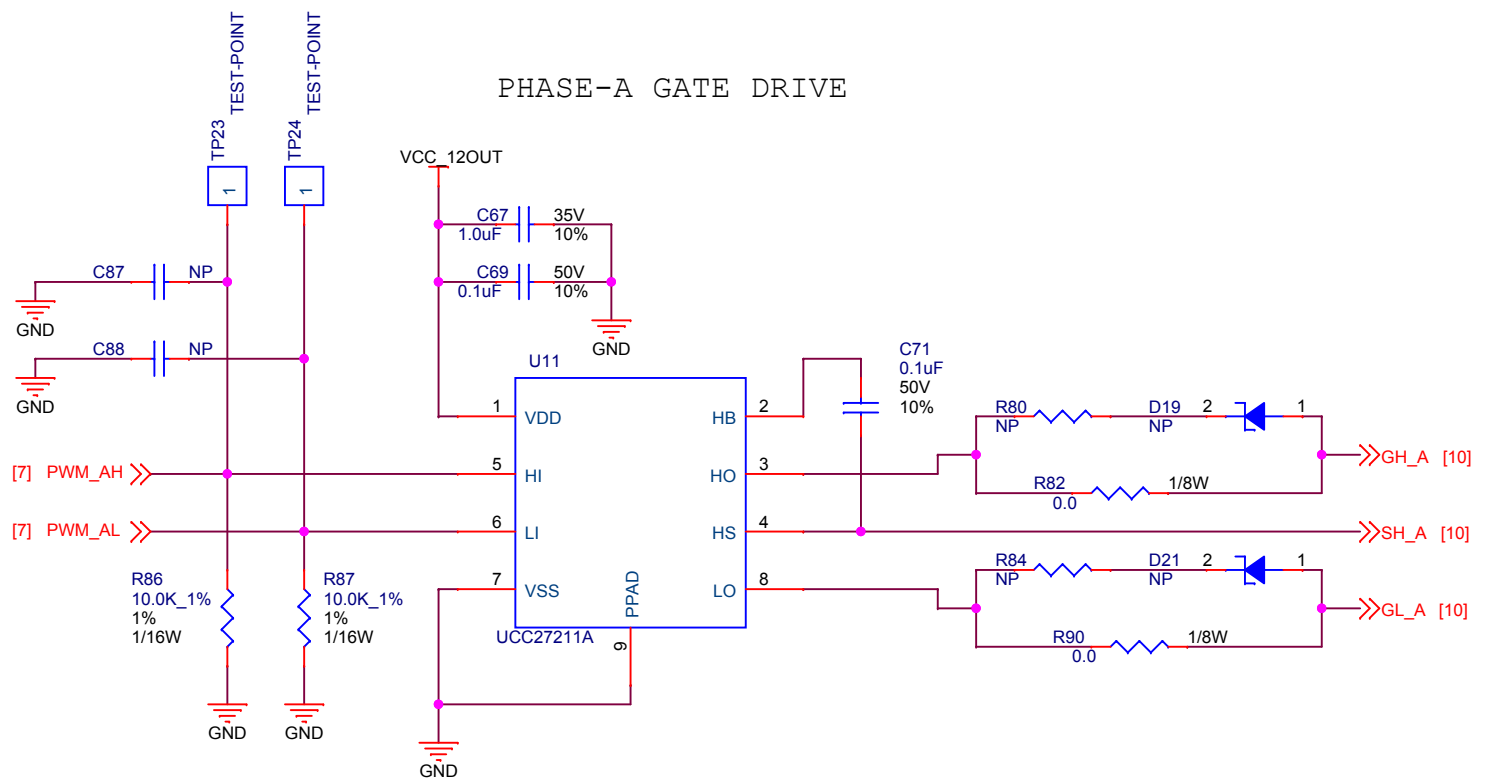
D3 Engineering  
 1057 E Henrietta Rd  
 Rochester, NY 14623  
 p. (585) 429-1550 f. (585) 429-1551  
 www.d3engineering.com

TIDA-00282 AUTOMOTIVE BOOST MODULE

BOOST CONVERTER VOLTAGE/CURRENT/TEMPERATURE SENSE

www.D3Engineering.com		SIZE B	CAGE CODE 3V6D5	DWG NO SCH-034014001	REV 2
Thursday, December 11, 2014		SCALE 1:1	DWN BY: SN	APRVD BY: SR	SHEET 8 OF 10





 <b>D3 Engineering</b> Define   Design   Deploy	D3 Engineering 1057 E Henrietta Rd Rochester, NY 14623 p. (585) 429-1550 f. (585) 429-1551 www.d3engineering.com		
	TIDA-00282 AUTOMOTIVE BOOST MODULE		
BOOST CONVERTER GATE DRIVE			
<a href="http://www.D3Engineering.com">www.D3Engineering.com</a>	SIZE B	CAGE CODE 3V6D5	DWG NO SCH-034014001
Thursday, December 11, 2014	SCALE 1:1	DWN BY: SN	APRVD BY: SR
		SHEET 9 OF 10	REV 2



## IMPORTANT NOTICE FOR TI REFERENCE DESIGNS

Texas Instruments Incorporated ("TI") reference designs are solely intended to assist designers ("Buyers") who are developing systems that incorporate TI semiconductor products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, evaluation and judgment in designing Buyer's systems and products.

TI reference designs have been created using standard laboratory conditions and engineering practices. **TI has not conducted any testing other than that specifically described in the published documentation for a particular reference design.** TI may make corrections, enhancements, improvements and other changes to its reference designs.

Buyers are authorized to use TI reference designs with the TI component(s) identified in each particular reference design and to modify the reference design in the development of their end products. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI REFERENCE DESIGNS ARE PROVIDED "AS IS". TI MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE REFERENCE DESIGNS OR USE OF THE REFERENCE DESIGNS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. TI DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO TI REFERENCE DESIGNS OR USE THEREOF. TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY BUYERS AGAINST ANY THIRD PARTY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON A COMBINATION OF COMPONENTS PROVIDED IN A TI REFERENCE DESIGN. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY AND WHETHER OR NOT TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, ARISING IN ANY WAY OUT OF TI REFERENCE DESIGNS OR BUYER'S USE OF TI REFERENCE DESIGNS.

TI reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques for TI components are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

Reproduction of significant portions of TI information in TI data books, data sheets or reference designs is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards that anticipate dangerous failures, monitor failures and their consequences, lessen the likelihood of dangerous failures and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in Buyer's safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed an agreement specifically governing such use.

Only those TI components that TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components that have **not** been so designated is solely at Buyer's risk, and Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.