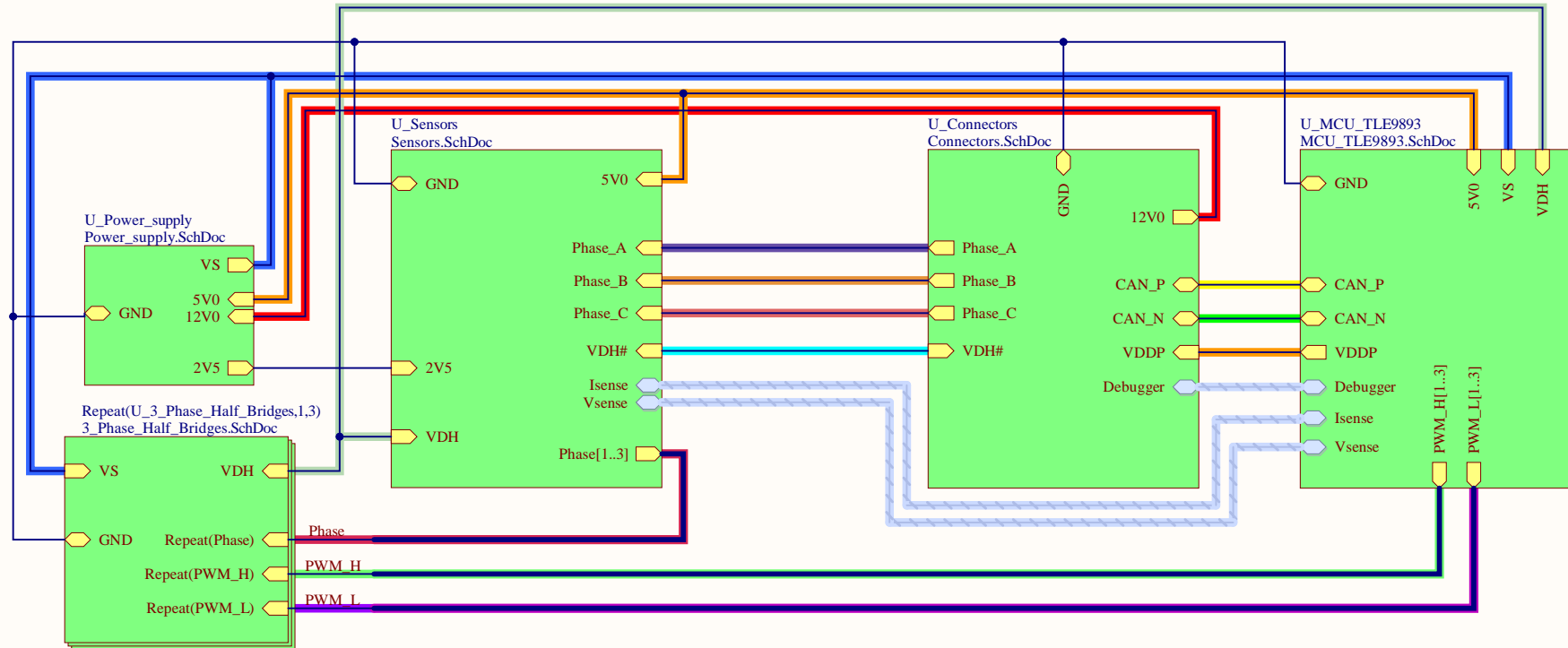
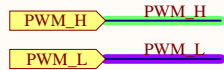


System Topology

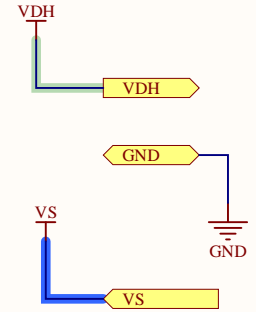


Half Bridges

Signals

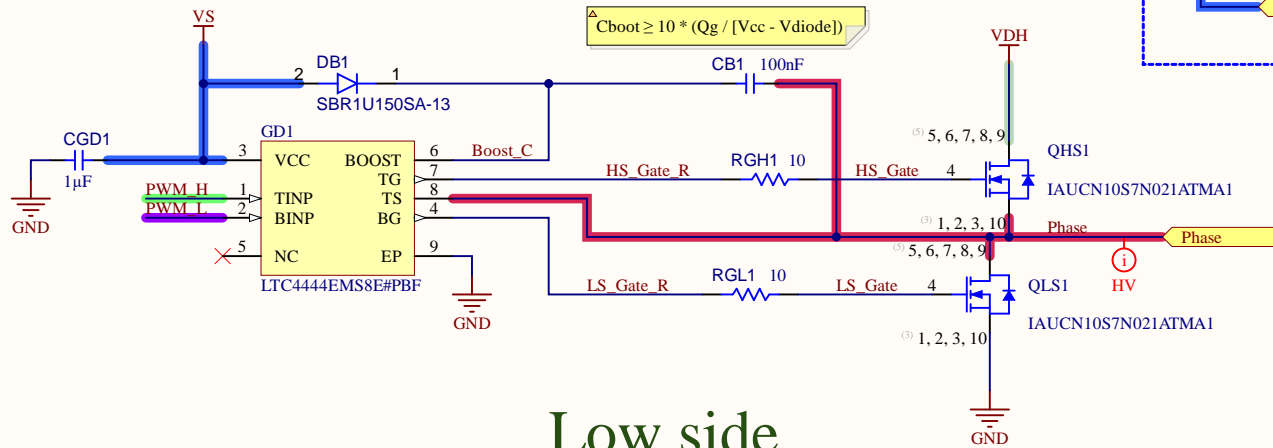


Power



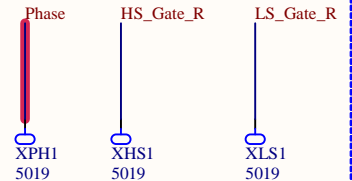
High side

Low side



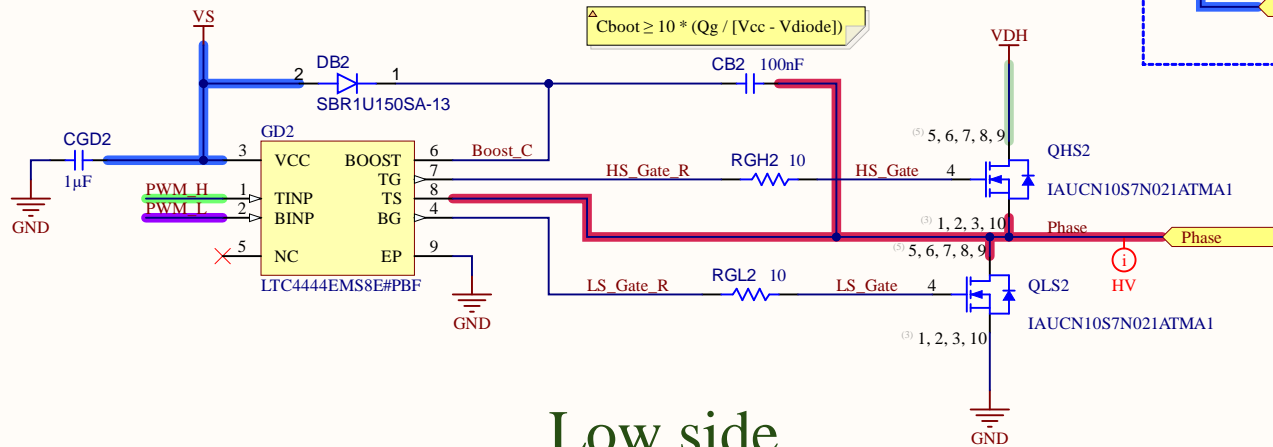
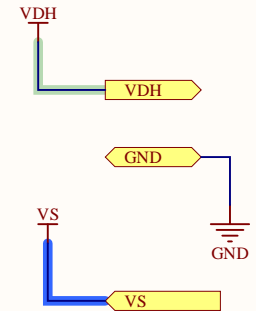
Using MOSFET model: IAUCN10S7N021ATMA1.
PWM_H is the control signal "1" used to turn on the high side MOSFET during rectification.

Test Points

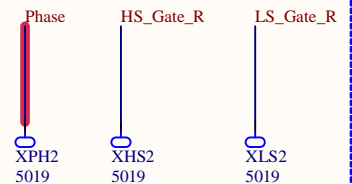


High side

Power



Test Points



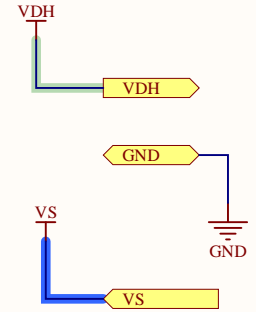
Using MOSFET model: IAUCN10S7N021ATMA1.
PWM_H is the control signal "1" used to turn on the high side MOSFET during rectification.

Half Bridges

Signals

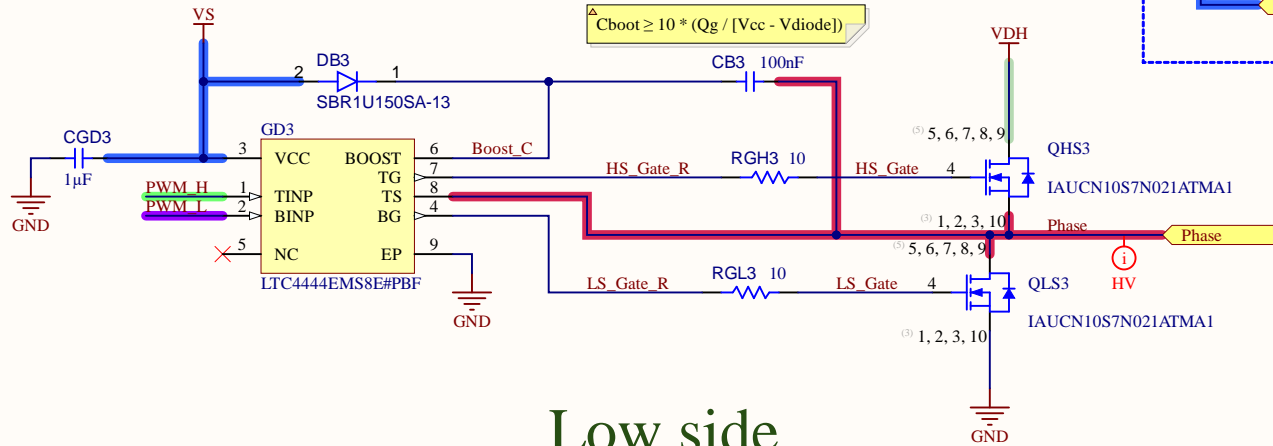


Power



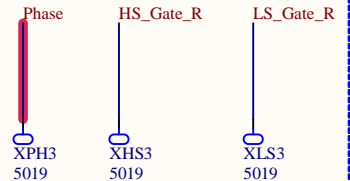
High side

Low side



Using MOSFET model: IAUCN10S7N021ATMA1.
PWM_H is the control signal "1" used to turn on the high side MOSFET during rectification.

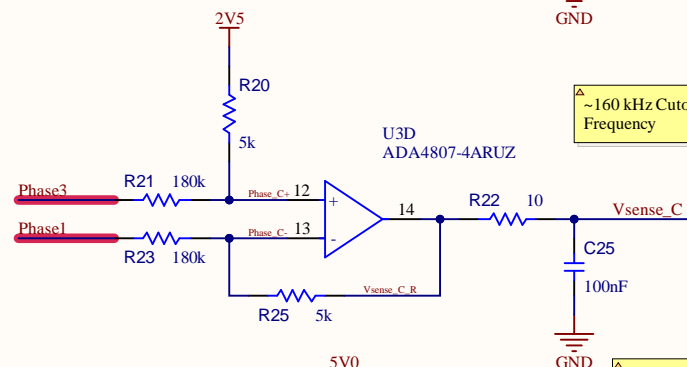
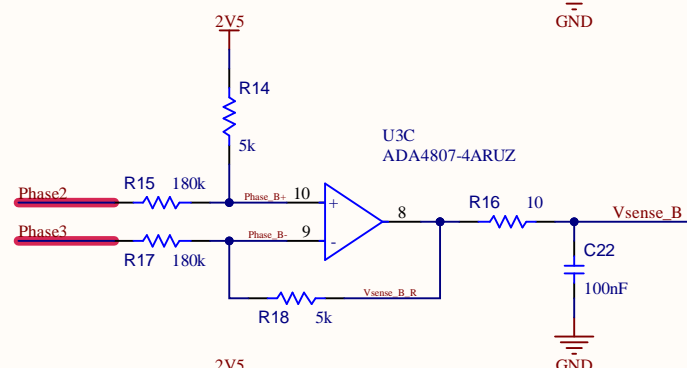
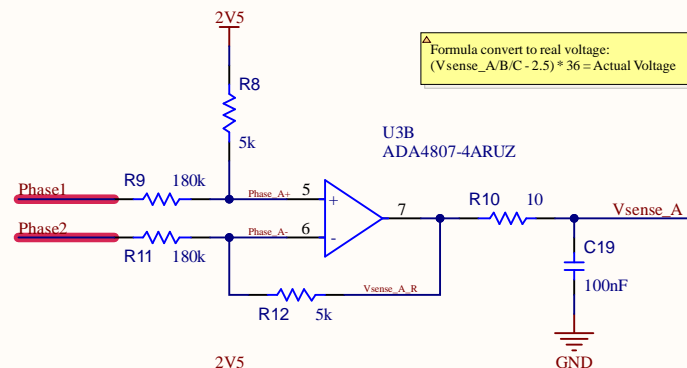
Test Points



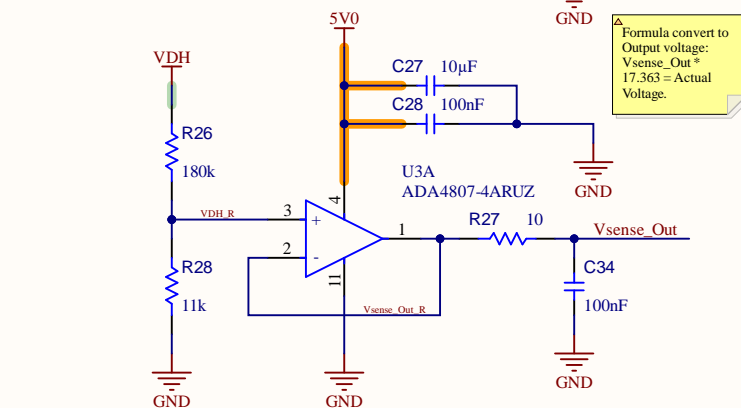
Voltage Sense

▲ Voltage sense buffers for Phase A/B/C & rectified output voltage.
Input voltage range for Phase A/B/C: -85V to +85V.
Max Voltage for VDH: 80V
Output voltage range: 0V to +5V

▲ Formula convert to real voltage:
(Vsense_A/B/C - 2.5) * 36 = Actual Voltage



▲ ~160 kHz Cutoff Frequency



▲ Formula convert to Output voltage:
Vsense_Out * 17.363 = Actual Voltage.

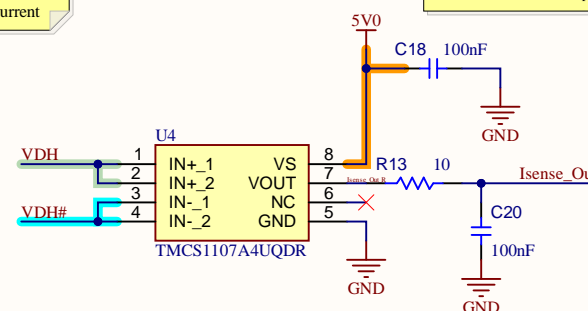
Sensors

Current Sense

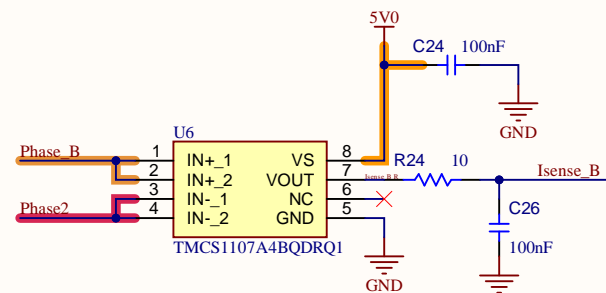
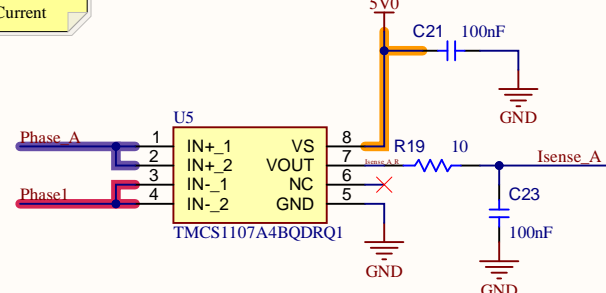
▲ Current Sensors for input and output currents.
Input Phase A/B/C current range: -3.5A to +3.5A
Max output current: 5A

▲ Formula convert to real current:
Isense_Out * 0.0025 = Amps

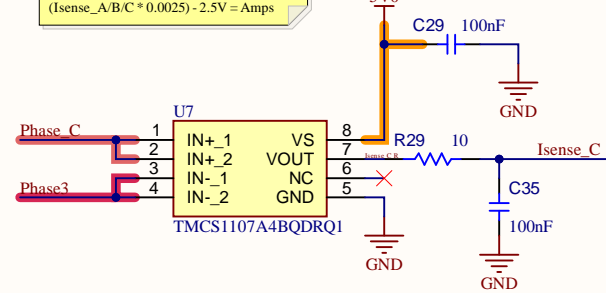
▲ Output Current



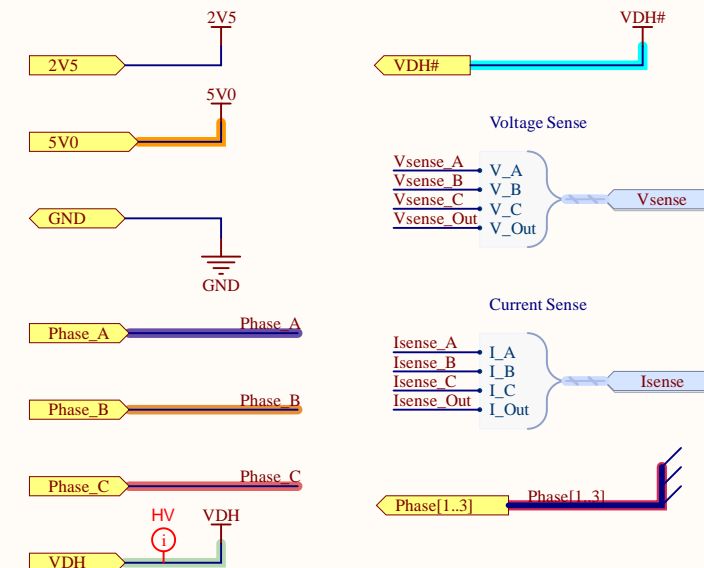
▲ Input Current



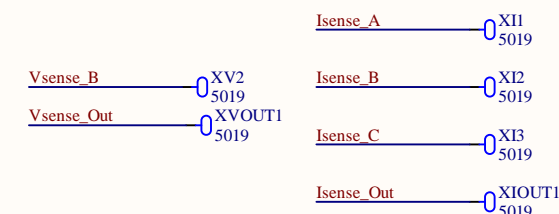
▲ Formula convert to real current:
(Isense_A/B/C * 0.0025) - 2.5V = Amps



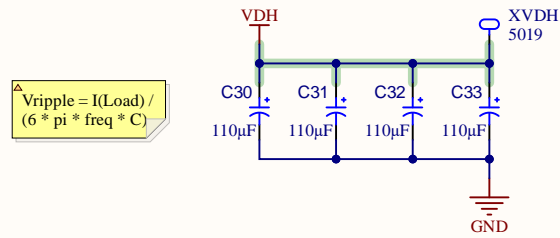
IO's



Test Points



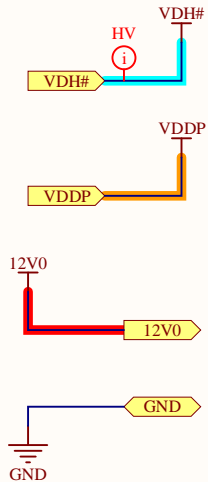
Output Capacitors



▲ Vripple = I(Load) / (6 * pi * freq * C)

Connectors

Power

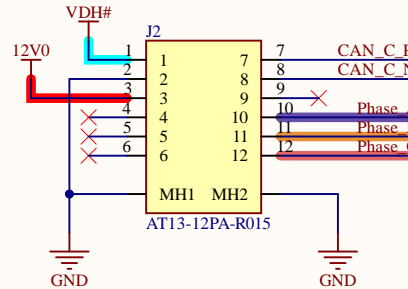


Harness Connector

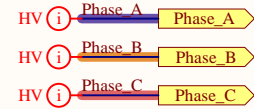
Max Output Voltage: 85V
Max Current: 4.8A

Input Voltage: 12V
Max Current Draw: 150mA

AC Input Voltage: 60 Vrms
(170 Vp-p)
Max Current Range: $\pm 3.5A$

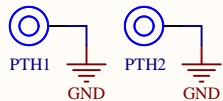


Signals



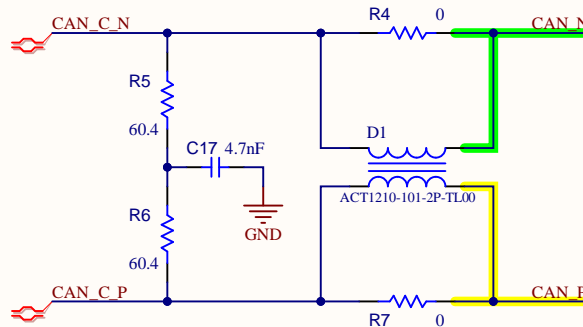
Mounting Holes

M4 size mounting holes



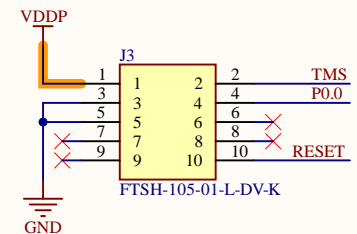
CAN Termination & Noise Reduction

CAN baud rate: 1 Mbps
Optional Termination w/ DNPed Resistors



Debug Connector

Intended to communicate over SWD to an XMC Link



LSI29K-G1J2-1-Z

5V

R1
1k

LED1

GND

Δ Max current through diode:
5V-1.7V / 1k
= 3.3mA

Y1 NX3225GA-16.000M-STD-CRG-2

P2.0/XTALI 1 2 3 4 XTALO_R R2 100 P2.1/XTALO

C14 12pF C15 12pF

GND

16 MHz crystal, Load capacitors and damping resistor based on HW guideline recs

The schematic diagram illustrates the power supply and pin connections for the TLE98932QKW62SXUMA1 microcontroller. Key components and connections include:

- Power Supply:** VDDP (1.5V regulator output) and VDDC (1.5V regulator output) are connected to the microcontroller. VDDP is connected to pins 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. VDDC is connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- Capacitors:** C1 (100nF), C2 (1μF), C3 (100nF), C4 (1μF), C5 (100nF), C6 (1μF), C7 (1μF), C8 (1μF), C9 (100nF), C10 (10μF), C11 (1μF).
- Resistors:** R2 (100).
- Pin Connections:**
 - EP (pin 65) to GND.
 - CAN P (pin 64) to GND.
 - CAN N (pin 63) to GND.
 - CAN L (pin 62) to GND.
 - VCAN (pin 61) to GND.
 - VDD/EXT (pin 60) to GND.
 - VDDP (pin 59) to GND.
 - VDDP/VSSP (pin 58) to GND.
 - VDDC/VSSC (pin 57) to GND.
 - VDDC (pin 56) to GND.
 - P2.0/XTAL1 (pin 55) to GND.
 - P2.1/XTAL0 (pin 54) to GND.
 - P2.9 (pin 53) to GND.
 - P2.8 (pin 52) to GND.
 - Isense C (pin 51) to GND.
 - VAREF (pin 50) to GND.
 - P2.7 (pin 49) to GND.
 - VAGND (pin 48) to GND.
 - P2.6 (pin 47) to GND.
 - P2.5 (pin 46) to GND.
 - Isense A (pin 45) to GND.
 - Vsense B (pin 44) to GND.
 - Vsense A (pin 43) to GND.
 - CSAP (pin 42) to GND.
 - CSAN (pin 41) to GND.
 - P0.9 (pin 40) to GND.
 - P0.8 (pin 39) to GND.
 - PWM L2 (pin 38) to GND.
 - PWM H2 (pin 37) to GND.
 - PWM L3 (pin 36) to GND.
 - PWM H3 (pin 35) to GND.
 - SCLK (pin 34) to GND.
 - P0.4 (pin 33) to GND.
 - P0.3 (pin 32) to GND.
 - MRST MIS (pin 31) to GND.
 - MTSR MOS (pin 30) to GND.
 - P0.2 (pin 29) to GND.
 - P0.1 (pin 28) to GND.
 - TMS (pin 27) to GND.
 - RESET (pin 26) to GND.
 - P0.10 (pin 25) to GND.
 - P0.0 (pin 24) to GND.
 - PI.0 (pin 23) to GND.
 - PI.1 (pin 22) to GND.
 - CS (pin 21) to GND.
 - PI.3 (pin 20) to GND.
 - PI.2 (pin 19) to GND.
 - PI.1 (pin 18) to GND.
 - GL.1 (pin 17) to GND.
 - GL.2 (pin 16) to GND.
 - GL.3 (pin 15) to GND.
 - SL (pin 14) to GND.
 - GND/VSSP (pin 13) to GND.
 - SH3 (pin 12) to GND.
 - GH3 (pin 11) to GND.
 - GL1 (pin 10) to GND.
 - GL2 (pin 9) to GND.
 - GL3 (pin 8) to GND.
 - SL (pin 7) to GND.
 - GND/VSSP (pin 6) to GND.
 - SH1 (pin 5) to GND.
 - GH1 (pin 4) to GND.
 - SH2 (pin 3) to GND.
 - GH2 (pin 2) to GND.
 - CP2L (pin 1) to GND.
 - CP2H (pin 0) to GND.
 - VCP (pin -1) to GND.
 - CP1H (pin -2) to GND.
 - CP1L (pin -3) to GND.
 - VSD (pin -4) to GND.
 - VDH (pin -5) to GND.
 - FIFO (pin -6) to GND.
 - MON1 (pin -7) to GND.
 - MON2 (pin -8) to GND.
 - MON3 (pin -9) to GND.

Diagram showing the connection of P1.1, P1.3, and P2.8 to a J1 connector. A yellow box contains the text "P1.1/1.3 GPIO" and "P2.8 SDADC". Three lines connect the pins to the connector: P1.1 to pin 1, P1.3 to pin 2, and P2.8 to pin 3. The connector is labeled J1 and TSW-103-07-TS.

Communicates over SPI to the TLE
Use ADC122S051 QIMMx/NOPB
(Automotive Grade) for production

MTSR_MOSI 6 → DIN VA 2
Vsense_Out 5 → IN1 DOUT 7
Isense_Out 4 → IN2 MRST_MISO
SCLK 8 → SCLK
CS 1 → CS GND 3
ADC122S051CIMM/NOPB

5V0
C12 100nF
C13 1µF
GND

Voltage Sense

Module Pin	Target Pin
<u>Vsense_A</u>	V_A
<u>Vsense_B</u>	V_B
<u>Vsense_Out</u>	V_C
	V_Out

Current Sense

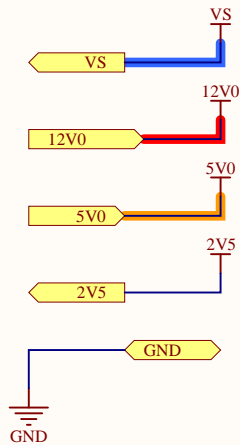
Module Pin	Target Pin
<u>Isense_A</u>	I_A
<u>Isense_B</u>	I_B
<u>Isense_C</u>	I_C
<u>Isense_Out</u>	I_Out

Debugger

Module Pin	Target Pin
<u>P0.0</u>	P0.0
<u>TMS</u>	TMS
<u>RESET</u>	RESET

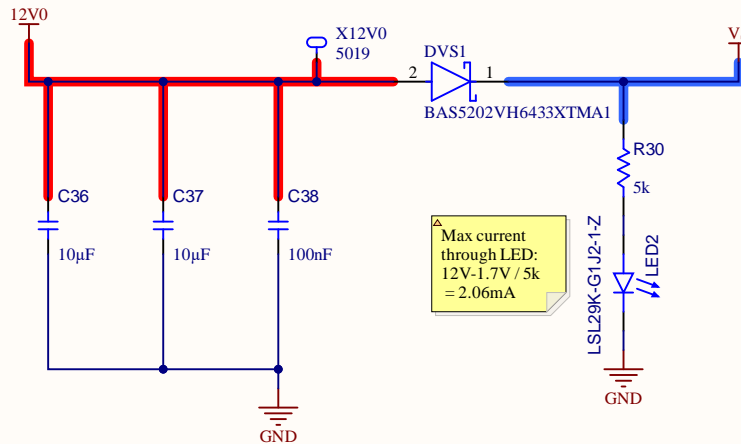
Diagram showing four test points (TP1, TP2, TP3, TP4) connected to VDDEXT, VDDC, VAREF, and VDDP respectively. A callout box indicates "85 mil pads".

Power

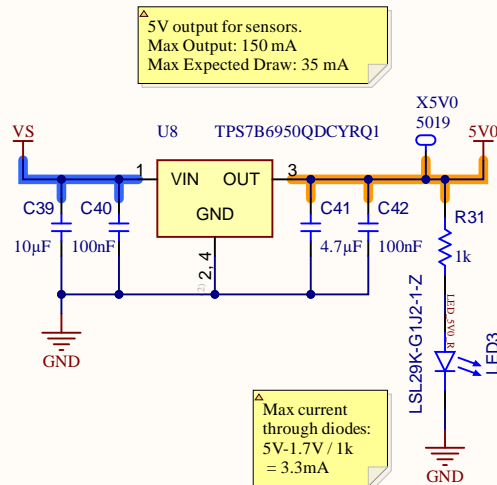


Power Supply

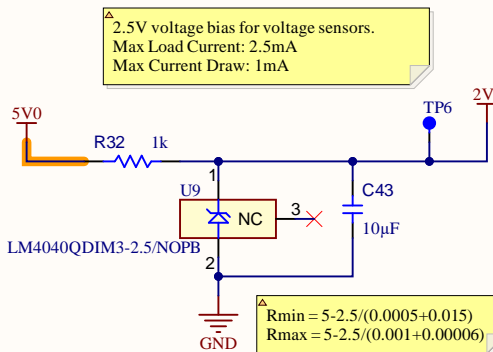
Decoupling Ripple Filter



5V Regulator



2.5V VREF



Test Points

