The CMPE 118 DRV8814 Dual 2.5A H-Bridge Module

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Background:

Texas Instruments' DRV8814 is a high-current dual H-bridge driver with integrated control logic. It comes in a 24pin HTSSOP packages with integrated thermal ground pad. Internal circuit protection includes thermal shutdown with hysteresis, undervoltage monitoring, and crossover/short circuit current protection. An error pin is available for monitoring the state of the chip.

The CMPE118 DRV8814 Dual 2.5A H-bridge Module provides a convenient and robust interface for two A3949s. Separate connectors provide access to the logic-level inputs, H-bridge output connections, and the IC's power supply. This module makes use of a DRV8814 5.0V regulator for pull-ups and a TL7726QP latch for protecting the digital inputs. External Clamping diodes are included to complement the DRV8814 and protect against inductive kickback.

The data sheet for the DRV8814 motor driver 2.5A H-bridge chip can be found on the TI.com website at: http://www.ti.com/product/drv8814

Using the CMPE118 DRV8814 Dual 2.5A H-Bridge Module:

In order to make use of the CMPE118DRV8814ww Dual H-Bridge Module, you will need to be familiar with the various connectors and their purposes. Since each connector has a single logical function (inputs, outputs, power supply, etc.) this is straightforward.

Logic-Level Inputs (J1):

Access to the logic-level inputs of the DRV8814 is provided through J1. Directional and enable control for each of the two H-Bridges is specified through these connections, and marked on the PCB.

There is no logic ground on this board to reduce noise. As such, care must be taken to provide a common ground.

The pinout of J1 is as follows (all other pins are NO CONNECT):

J1	Connection
Pin 11	Direction A
Pin 12	Enable A
Pin 7	Direction B
Pin 8	Enable B

Note that pin 1 is on the upper right side of the board. Counting from Lower left (as normal conventions), then the equivalent is (3-DirA, 4-EnaA, 7-DirB, 8-EnaB).

Motor/Load Connections (J2):

Connections of one or two independent motors or similar loads should be made through the screw-terminal connector located at J3. The pinout of J3 is as follows:

J2	Connection
pin 1 & pin 2	motor/load A
pin 3 & pin 4	motor/load B

Fault Indicator LED (LED6):

The DRV8814 has an internal circuitry to detect undervolt lockout, over temperature, open circuit and short circuit protection. The DRV8814 board has a fault LED (LED6) that indicates when the chip has faulted. Power must be disconnected and reapplied to reset the fault condition.

Coast/Brake Decay Mode Selector (J6):

The DRV8814 has an internal current mirror and FETs for an active field collapse mode. In this mode, the coil current is actively driven to zero and then the FETs released into a high state mode (coast). Alternately, the high side FETs are released and both low-side FETs are enabled for dynamic braking. This is selected with the jumper on J6: OPEN is BRAKE mode, and CLOSED is COAST mode.

J6	Connection
OPEN	BRAKE
CLOSED	COAST

Power Supply and High-Current Ground Connector (J3):

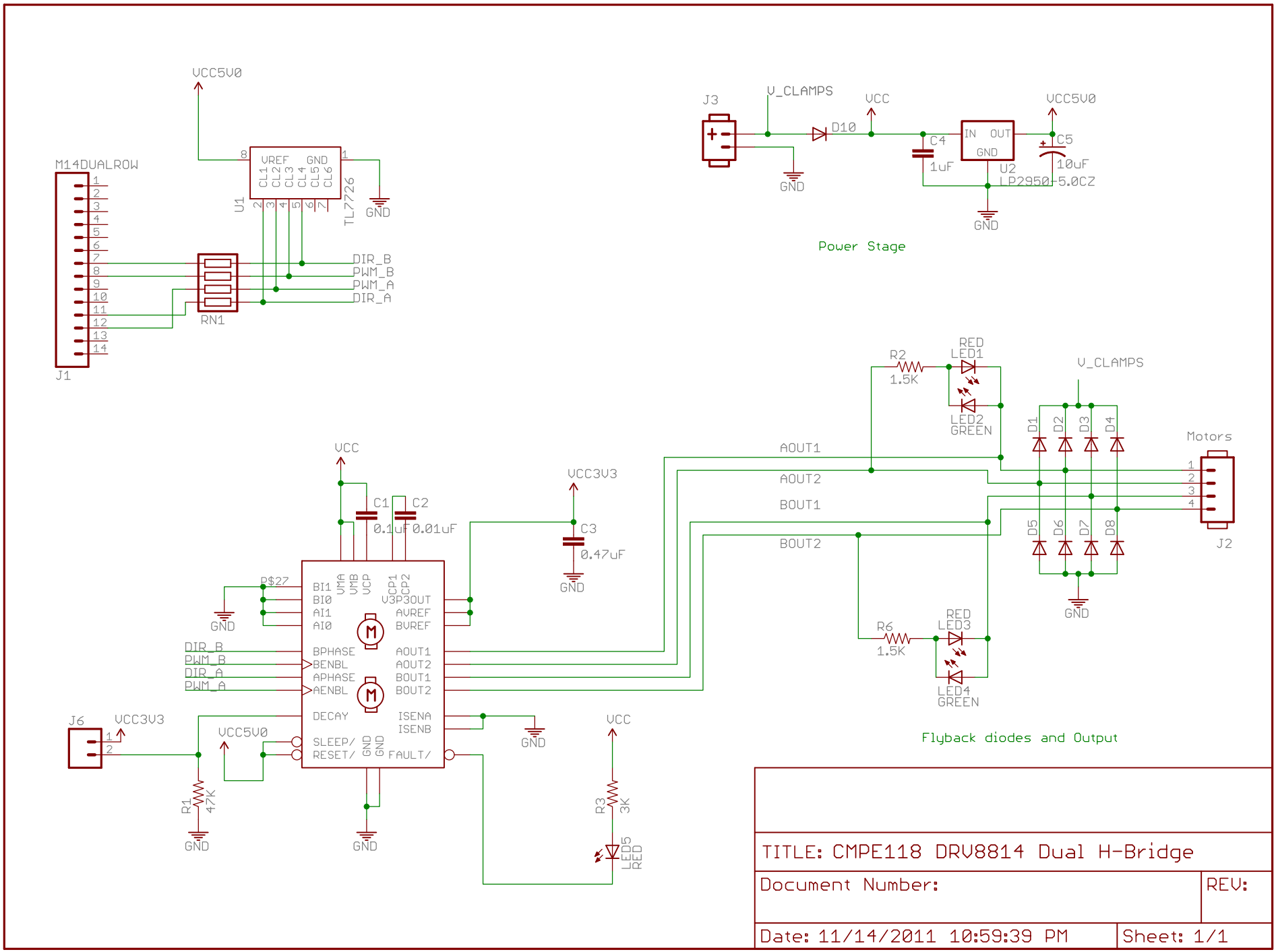
J3, pin 1: The DRV8814 requires a power supply for both the motors as well as its logic circuitry. Provisions for this are made through J1, pin 1, which includes a diode to provide reverse bias protection. A 2950 low drop-out, 100mA voltage regulator is provided on the Module PCB to clamp the digital inputs between -0.2V and 5.2V. The chip will operate between 8V (minimum) and 30V (maximum). This makes the DRV8814 Module much easier to use, since it includes its own voltage regulation and does not require an externally regulated +5V supply. Note that there is no ground connection between the input port (J1) and the power input (J3), for noise reasons. The source of the input signal should be connected back to ground at the power supply or batteries.

DRV8814 Power Supply Requirements: +8V < Vin (J1, pin 1) < +30V

J3, pin 2: Since the module is capable of switching two H-Bridge channels at a maximum of 2.5A each, care must be taken in the methods employed returning this substantial current to ground. For this reason, a separate high-current ground connection is available at J3, pin 2. A separate connection should be made between J3, pin 2 and the power supply of the motors/loads connected to the IC's outputs. This will ensure that the logic power supply maintains a clean ground.

J3	Connection
Pin 1	Power (8V to 30V)
Pin 2	High Current Ground

CMPE118 DRV8814 Dual 2.5A H-Bridge Module Schematic:


VCC5V0
M14DUALROW
J1
U1
TL7726
VREF
GND
RN1
DIR_B
PWM_B
PWM_A
DIR_A
J3
V_CLAMPS
D10
VCC
C4
1uF
IN
OUT
GND
U2
LP2950-5.0CZ
C5
10uF
Power Stage
R2
1.5K
RED
LED1
LED2
GREEN
V_CLAMPS
D1
D2
D3
D4
Motors
J2
AOUT1
AOUT2
BOUT1
BOUT2
VCC
VCC3V3
C1
C2
0.1uF
0.01uF
C3
0.47uF
P$27
BI1
BI0
AI1
AI0
VMA
VMB
VCP
CP1
CP2
V3P3OUT
AVREF
BVREF
BPHASE
BENBL
APHASE
AENBL
DECAY
ISENA
ISENB
SLEEP/
RESET/
FAULT/
D5
D6
D7
D8
R6
1.5K
LED3
LED4
GREEN
Flyback diodes and Output
J6
R1
47K
R3
3K
LED5
RED
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Sheet: 1/1