

# The ECE 118 DS3658 Driver Module

Dept. of Electrical and Computer Engineering, UCSC

## Background:

The DS3658 is a four-channel, high-current peripheral driver, manufactured by National Semiconductor. It integrates logic-level inputs, four open-collector output channels (each capable of sinking a maximum of 600mA), and internal kickback diodes. The outputs can be ganged in parallel in order to sink up to 2.4A.

The ECE118 DS3658 Driver Module PCB provides a convenient and robust interface to the DS3658. The digital inputs are clamped using a TL7226 chip to limit input voltages to between -0.2 and 5.2V. A 2950 regulator is used to provide the 5V for the clamp and to power the DS3658.

The data sheet for the DS3658 Low-Side peripheral driver chip can be found on the TI.com website at: <http://www.ti.com/product/ds3658>

## Using the ECE118 DS3658 Driver Module:

In order to make use of the ECE118 DS3658 Driver 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 (J2):

Access to the logic-level inputs of the DS3658 is provided through J2. In order to turn on a channel's high-current, open-collector output, a logic-level high must be supplied to that channel's input pin.

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 J2 is as follows (all other pins are NO CONNECT):

J2	Connection
Pin 3	Input A
Pin 5	Input B
Pin 7	Input C
Pin 9	Input D

### High Current Switched Outputs (J1):

Access to the open-collector switched outputs is provided through the screw-terminal connector at J1. Each channel is capable of sinking a maximum of 600mA, and multiple channels may be used in parallel to provide additional current capability. The pinout of J1 is as follows:

J1	Connection
Pin 1	Output A
Pin 2	Output B
Pin 3	Output C
Pin 4	Output D

### Integrated Kickback Diodes (J3):

The DS3658 has internal kickback diodes to protect the open collector output from excessive voltages from switching inductive loads. These are attached to the jumper at J3 such that if the jumper is closed, then the clamp diodes are connected to Vcc. If the clamp diodes are not needed, then the jumper can be left open.

J3	Connection
OPEN	DIODES unconnected
CLOSED	DIODES to VCC

### **Power Supply and High-Current Ground Connector (J4):**

**J4, pin 1:** The DS3658 requires a power supply for its logic circuitry. Provisions for this are made through J4, pin 1. A 2950 low drop-out, 100mA voltage regulator is provided on the DS3658 Driver Module PCB so that any voltage between 5.2V (minimum) and 30V (maximum) may be supplied to J4, pin 1. This makes the DS3658 module much easier to use, since it includes its own voltage regulation and does not require an externally regulated +5V supply.

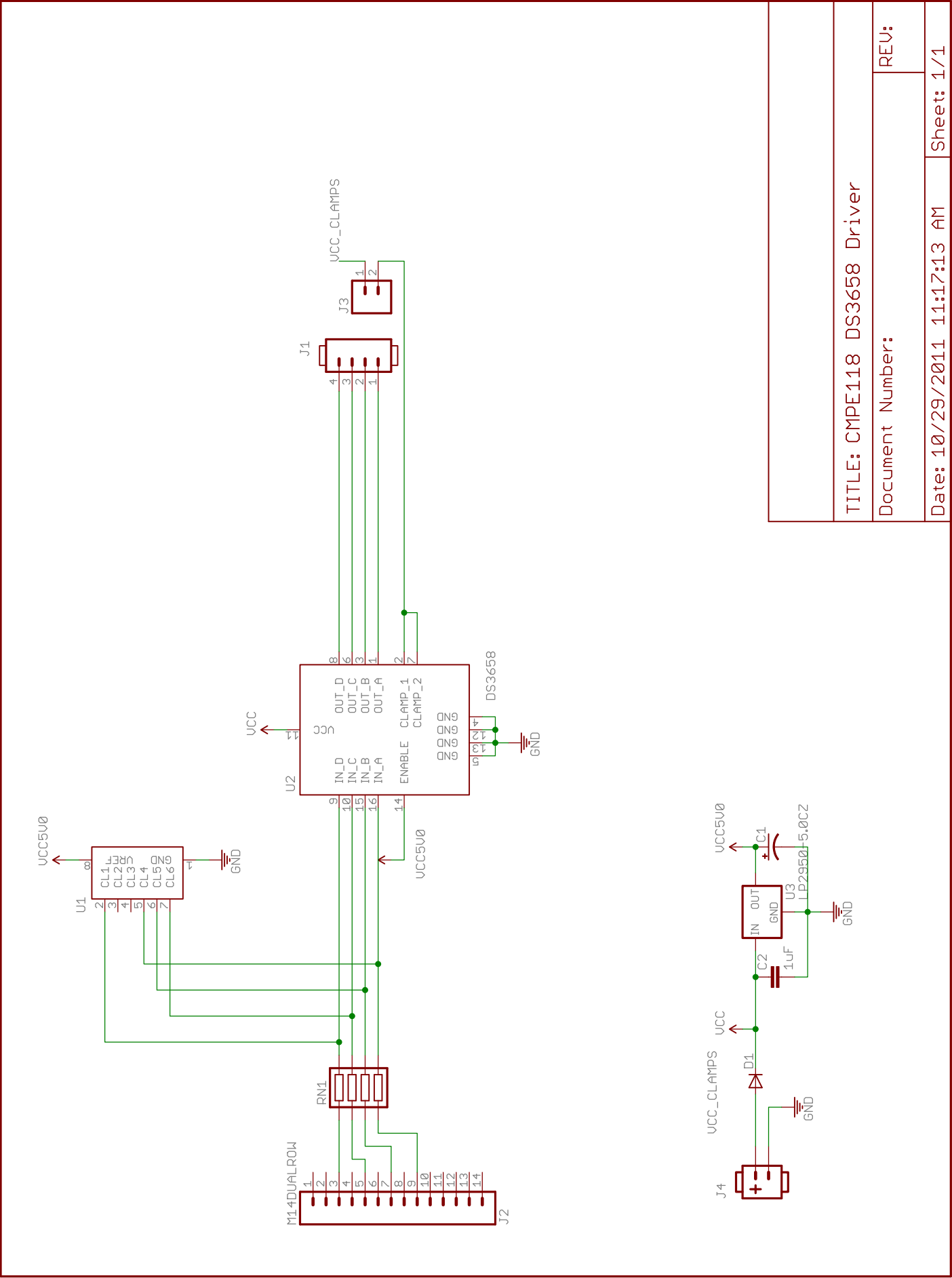
***DS3658 Power Supply Requirements:***     $+5.2V < V_{in} (J4, \text{pin } 1) < +30V$

**J4, pin 2:** Since the DS3658 is capable of switching four channels at a maximum of 600mA 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 J4, pin 2. A separate connection should be made between J4, pin 2 and the power supply of the load(s) connected to the IC's outputs. This will ensure that the logic power supply maintains a clean ground

<b>J4</b>	<b>Connection</b>
Pin 1	Power (5.2V to 30V)
Pin 2	High Current Ground

### **CMPE118 DS3658 Driver Module Schematic:**

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