**IC’s:**

* **Inside “Power Switch” module:**
  + **Infiniteon PROFET BTS 6163D -- high-side power switch**
    - It was impossible to find an IC power switch that combined the fast turn-on time, high operating voltage, and high current requirements given in the specs
    - I found the BTS6163, which has the required operating voltage and turn-on-time, but about half the required nominal load current
    - So to compensate for that, I placed two of them in parallel, hooked up to the same ON signal, input, and output
  + **Fairchild NC7SZ14M5X – digital inverter**
    - The BTS6163’s “IN” signal (which I labeled ~ON) must be grounded in order to allow current to pass through the switch, but the requirements needed an active-hi signal to enable the switch
    - I chose a 5V-driven inverter so the same 5V rail could drive this inverter *and* the INA212 current monitor (see below)
    - The inverter provides a logic 1 of at *least* 1.55V, which is enough to disable the load switch, and has V­(IH) and V(IL) that match the LVTTL standard
* **Inside TOP module:**
  + **Vishay Semiconductor MBRB1050 – rectifier**
    - I needed a reverse-biased diode in parallel with the inductive load to burn off the large induced negative voltage across it when it’s powered off
    - This one is rated for 10A of forward current, which is the same as what the load draws (I figured the current would likely be at least a little smaller than it is during normal operation)
    - It also can handle up to 60V of backward voltage without breaking down, which we need to prevent the 48V DC input from bypassing the load through this rectifier
    - Finally, its forward voltage is at worst .95V, which should be easily overcome by the voltage backwash at power off
* **Inside “Current Monitor” module**
  + **Texas Instruments INA212 – current sensor**
    - First—I placed the current sensor on the high-side of the load so it can detect surges drawn by the load itself. If the sensor were on the low-side of the load, these sorts of surges—caused by a short or other issue inside the load itself—wouldn’t be detected, since the current would be sunk inside the load before it reached the sensor
    - I picked this particular current monitor because it has:
      * Very low offset drift (which enables its output range to be based at almost exactly GND, as requested)
      * a wide variety of gain options (the 212 has Gain = 1000 volts/volts
      * high sensitivitiy—I used a 5mOhm resistor as Rs
  + **Panasonic Aluminum Electrolytic Capacitor EEE-ICA1005R**
    - Standard 10uC capacitor to smooth out noise in Vdd for the current sensor’s power supply
  + **Vishay Foil Resistor Y14880R0050089R**
    - Very low-error-tolerance resistor to ensure accurate current measurement
    - I picked it to ensure that the output of the current sensor would remain within the 0-5V range, given its 1000x gain—5V/(10A\*1000) = 5 mOhm