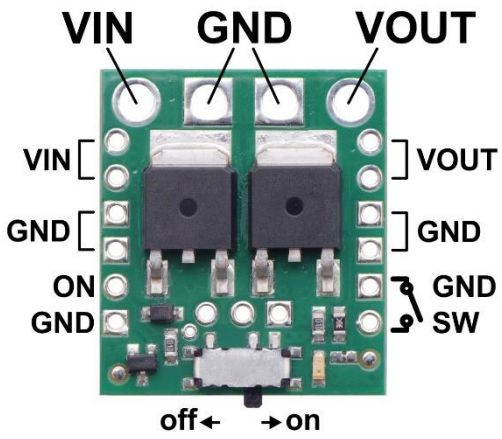
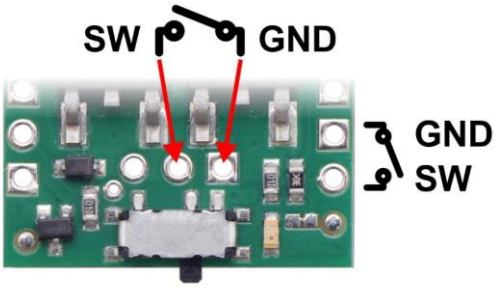
BIG PUSHBUTTON POWER SWITCH WITH REVERSE VOLTAGE PROTECTION, HP

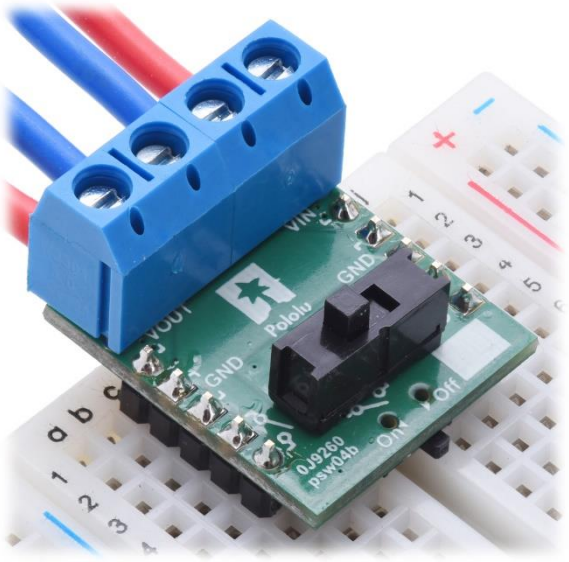
USER'S GUIDE

USING THE MOSFET SLIDE SWITCH





In the most basic application, power can be applied to the VIN and ground pins, with the on-board mini slide switch controlling power on the VOUT pins. To use an alternate SPST switch to control the MOSFETs, set the on-board slide switch to the off position and connect the alternate switch between ground and the switch control terminal, which is accessible both in the center of the board and along the side. The following example shows a larger slide switch soldered directly to the three through-hole pins in the center of the board:

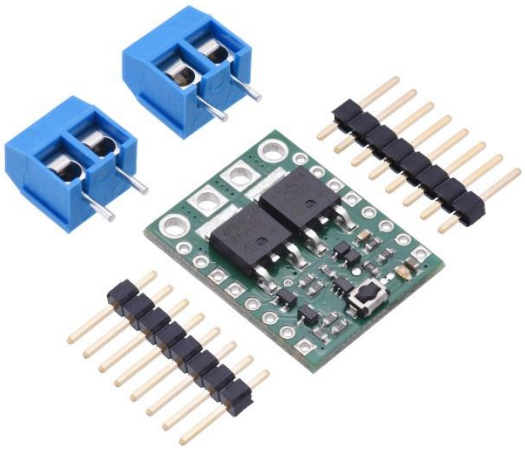


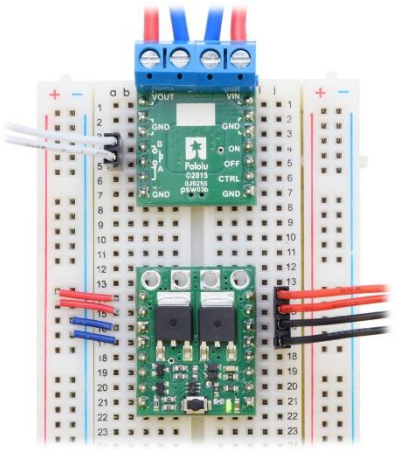
An example of using a different through-hole slide switch with the Big MOSFET Slide Switch.

If the physical switch is in the “off” position, the switch state can also be controlled by a digital signal (e.g. from a microcontroller) via the “ON” control pin. Driving the “ON” pin low (or leaving it disconnected) will leave the switch off; driving the pin beyond approximately 1 V will turn the switch on. The maximum voltage for the “ON” pin is 30 V, independent of the switch voltage (VIN).

Each power node can be accessed through a large hole along the top side of the board or two smaller 0.1″-spaced holes along the sides of the board. For applications drawing more than 5 A, you should either use the large holes or both 0.1″-spaced holes for each power connection.

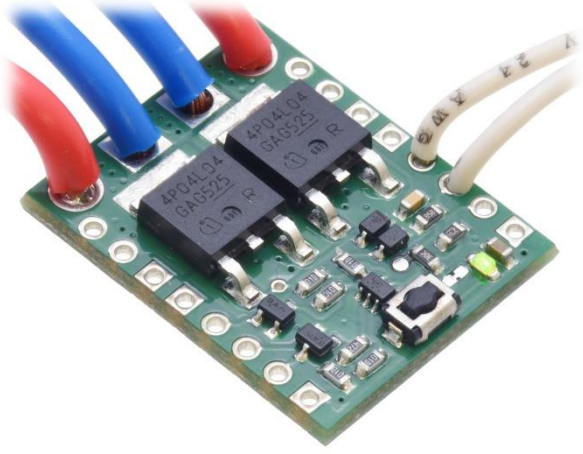
INCLUDED HARDWARE





Two 6-pin straight breakaway male headers and two 2-pin 5mm terminal blocks are included with each switch, and you can choose which of these components, if any, to solder to the board. The terminal blocks work with the four large holes, and the header strips allow the switch to be used with solderless breadboards and perforated circuit boards with standard 0.1″ spacing. If you want to use the terminal blocks, we recommend you install them on the side of the board without components, as shown in the above breadboard picture. The terminal blocks will cover one of each of the smaller VIN and VOUT holes, so you should not solder header pins into those holes if you plan on using terminal blocks.

Note that the terminal blocks are only rated for 16 A, so for higher-power applications, thick wires should be soldered directly to the board.



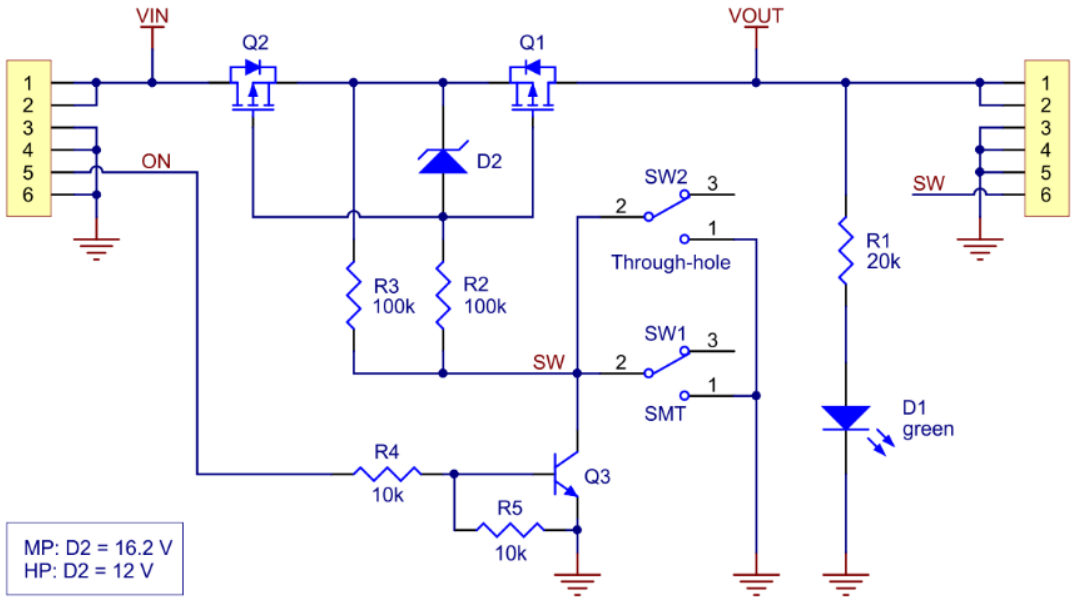
THERMAL AND POWER DISSIPATION CONSIDERATIONS

Because MOSFETs in the on state are effectively resistive, the power heating the board is proportional to the square of the current flowing through it. The comparison table near the top of this page shows typical currents that heat the MOSFETs to 55°C, where the MOSFETs start being noticeably warm but are still generally safe to touch, and currents that heat the MOSFETs to 150°C, the absolute limit for the MOSFETs. With adequate cooling, or for brief periods if the MOSFETs are not hot to begin with, currents up to the listed maximums are attainable.

TRANSIENT PROTECTION

Interrupting large currents can cause voltage spikes (positive on the input side and negative on the output side) that depend on the inductance of the power connections and that can exceed the limits of the device. Appropriate measures to limit the size of these spikes include minimizing lengths of wires, placing capacitors at the power switch to smooth the spikes and absorb some of the energy, placing a schottky diode across the power output to absorb negative spikes, and placing a transient voltage suppressor (TVS) across the power input to absorb positive spikes.

SCHEMATIC DIAGRAM



Schematic diagram of the Big MOSFET Slide Switch with Reverse Voltage Protection.