Controlling an actuator with a N-channel Mosfet

What is Mosfet?

A MOSFET (Metal-Oxide-Semiconductor Field-Effect Transistor) is a type of transistor used to switch or amplify electrical signals in electronic devices. It's one of the most common components in electronic circuits, especially in digital and analog systems.

Structure

A MOSFET has three main terminals — Gate, Drain, and Source. The Gate is separated from the channel by a thin insulating layer of silicon dioxide (SiO_2).

Operation

A small voltage applied to the Gate controls the current flow between the Drain and Source terminals. By adjusting this voltage, the MOSFET can act as a switch (turning the current on or off) or as an amplifier (controlling the level of current flow).
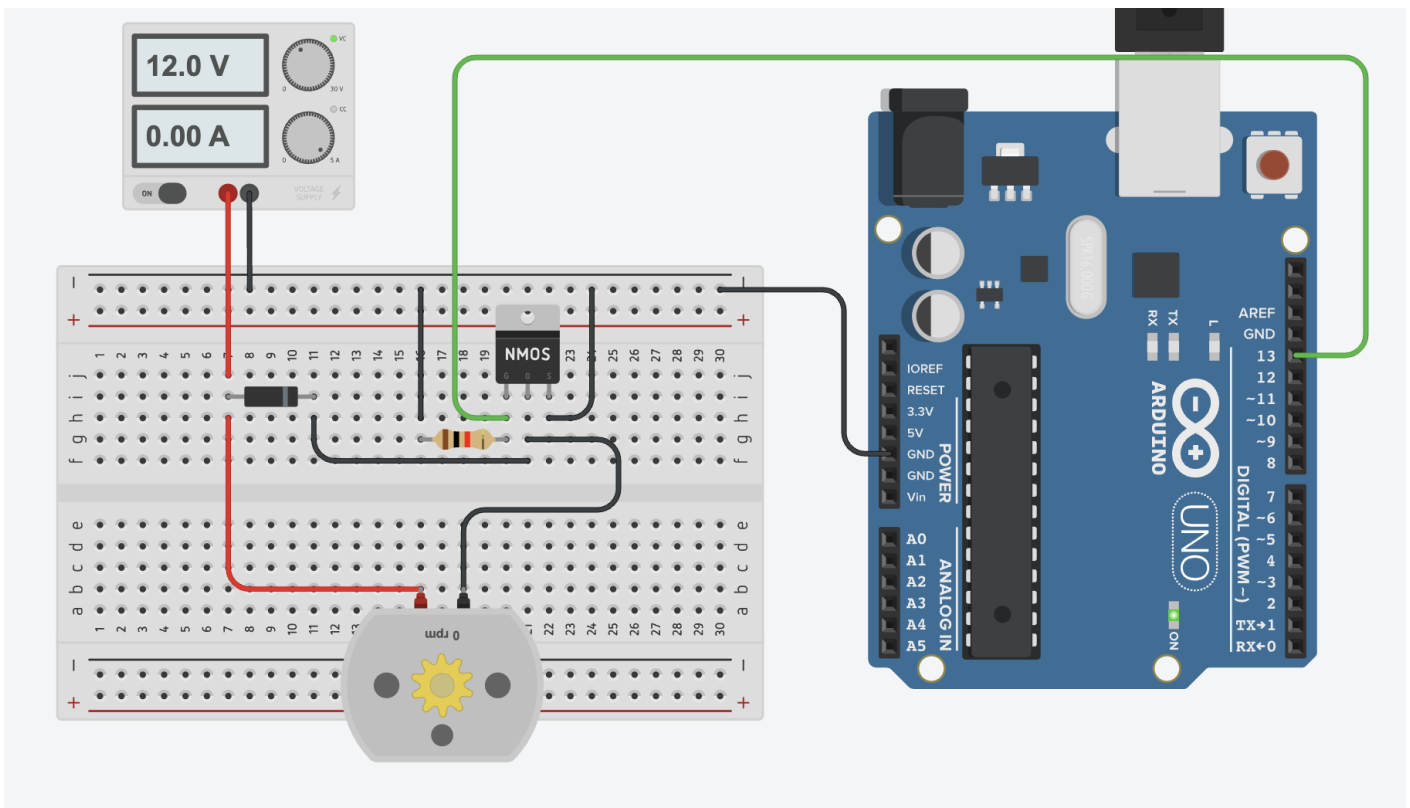
Types

There are two main types of MOSFETs, we will be using a N-channel Mosfet in this tutorial.e

1. N-channel MOSFETs: These conduct when a positive voltage is applied to the Gate relative to the Source.
2. P-channel MOSFETs: These conduct when a negative voltage is applied to the Gate relative to the Source.

Wiring

1. Source (S) to `GND`
2. Drain (D) to `actuator(-)` & to `diode(-)`
3. Gate (G) to `GND` via 1k resistor & to `Pin 13`
4. Power Supply(+) to `actuator(+)` & `diode(+)`
5. Power Supply(-) to `GND`

Basic Example

This basic example is effectively the blink sketch, the TinkerKit Mosfet operates just like any other digital device.

```
#define actuatorPin 13

void setup() {
    pinMode( actuatorPin, OUTPUT );
  }

void loop() {
    digitalWrite( actuatorPin, HIGH );
    delay( 1000 );

    digitalWrite( actuatorPin, LOW );
    delay( 1000 );
  }
```

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