FULL WIRING DIAGRAM (text-based, exact)

(Optional noise filter)

```
Analog Signal +   ──────────────► Arduino A0
Analog Signal GND ──────────────► Arduino GND
```

```
A0 ──||── GND
     0.1µF
```

2 PWM → Analog Filter (this is where your 10µF 50V cap goes)

```
Arduino D9 (PWM)
        |
        |
       1kΩ
        |
        ├──────► Filter Node  ◄──── this becomes your "analog control voltage"
        |
       +| 10µF 50V (electrolytic)
       L|
        |
       GND
```

⚠️ Cap polarity

- \+ → Filter Node
- – → GND

3 MOSFET (P30N06LE) Power Stage

> Looking at the MOSFET **from the front (text facing you, legs down)**:

```
LEFT   = Gate
MIDDLE = Drain
RIGHT  = Source
```

Gate control

```
css


Filter Node ──220Ω──► Gate (LEFT)
Gate (LEFT) ──10kΩ──► GND
```

Load switching

```
scss


+5V External Supply ──────────► Load (+)
Load (–) ─────────────────────► Drain (MIDDLE)
Source (RIGHT) ───────────────► GND
```

🔌 VERY IMPORTANT: COMMON GROUND

All grounds **must be connected together**:

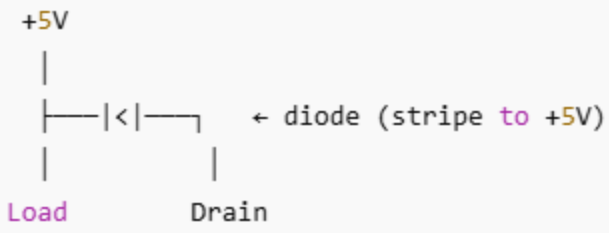
```
css


Arduino GND
External 5V Supply GND
Analog Signal GND
MOSFET Source
```

If grounds are not common → it will NOT work correctly.

🔁 If your load is inductive (motor, solenoid, relay)

Add a flyback diode **across the load**:

pgsql



Examples:

- 1N5819 (preferred)
- 1N4007 (OK for slow loads)