



Mobile System Engineering, Dankook University

Basic Mobile Lab II



2 PWM Experiment

1 PWM Experiment



Arduino ide

전체

이미지

동영상

도서

뉴스

더보기

도구

검색결과 약 27,200,000개 (0.47초)

[https://www.arduino.cc > software](https://www.arduino.cc/software)

Software | Arduino

2021. 12. 20. — The open-source **Arduino** Software (**IDE**) makes it easy to write code and upload it to the board. This software can be used with any **Arduino** ...

[Arduino IDE 2.0 \(beta\)](#) · [Arduino IDE 2.0 beta Forum](#) · [Donate](#) · [Getting Started](#)

[http://arduino.cc > Guide > Windows](http://arduino.cc/guide/windows)

Install the Arduino Software (IDE) on Windows PCs

Download the **Arduino** Software (**IDE**). Get the latest version from the download page. You can choose between the Installer (.exe) and the Zip packages. We suggest ...

[https://docs.arduino.cc > software > ide-v2](https://docs.arduino.cc/software/ide-v2)

Arduino IDE 2 Tutorials

Discover all the new features of the **Arduino** IDE 2, our faster and more powerful programming tool.

[https://www.arduino.cc > guide > environment](https://www.arduino.cc/guide/environment)

Arduino Integrated Development Environment (IDE) v1

The **Arduino** Integrated Development Environment - or **Arduino** Software (**IDE**) - contains a text editor for writing code, a message area, a text console, ...

관련 질문

What IDE is used for Arduino?

▼

Is Arduino IDE is free?

▼

아두이노 IDE (Arduino IDE)

소프트웨어

아두이노 통합개발환경은 편집기, 컴파일러, 업로더 등이 합쳐진 소프트웨어 환경이다. '아두이노 소프트웨어'라고도 불린다. 이와 더불어 기타 개발에 필요한 각종 옵션 및 라이브러리 관리를 할 수 있다. 위키백과

안정화 버전: 1.8.8 / 2018년 12월 6일 (3년 전)

종류: 통합 개발 환경

웹사이트: arduino.org, arduino.cc

운영 체제: 크로스 플랫폼

개발자: 아두이노 소프트웨어


프로그래밍 언어: C, C++, 자바

플랫폼: IA-32, x86-64, ARM 아키텍처

1. Search 'Arduino IDE' on Google
2. Click 'Software | Arduino'

2 PWM Experiment



HARDWARE SOFTWARE CLOUD DOCUMENTATION COMMUNITY BLOG ABOUT

[CODE ONLINE](#)[GETTING STARTED](#)

Examples

Libraries


Serial Monitor

ORDER BY LAST MODIFIED

Test (2)

YunExamples (18)

```
1 //
2 //
3 int brightness = 100;
4 int ledPin = 13;
5
6 void setup() {
7   pinMode(ledPin, OUTPUT);
8 }
```





Arduino IDE 1.8.19

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

Refer to the [Getting Started](#) page for Installation instructions.

SOURCE CODE

Active development of the Arduino software is [hosted by GitHub](#). See the instructions for [building the code](#). Latest release source code archives are available [here](#). The archives are PGP-signed so they can be verified using [this](#) gpg key.

DOWNLOAD OPTIONS

Windows Win 7 and newer
Windows ZIP file

Windows app Win 8.1 or 10 

Linux 32 bits
Linux 64 bits
Linux ARM 32 bits
Linux ARM 64 bits

Mac OS X 10.10 or newer

[Release Notes](#) [Checksums \(sha512\)](#)

Hourly Builds

Previous Releases

[Help](#)

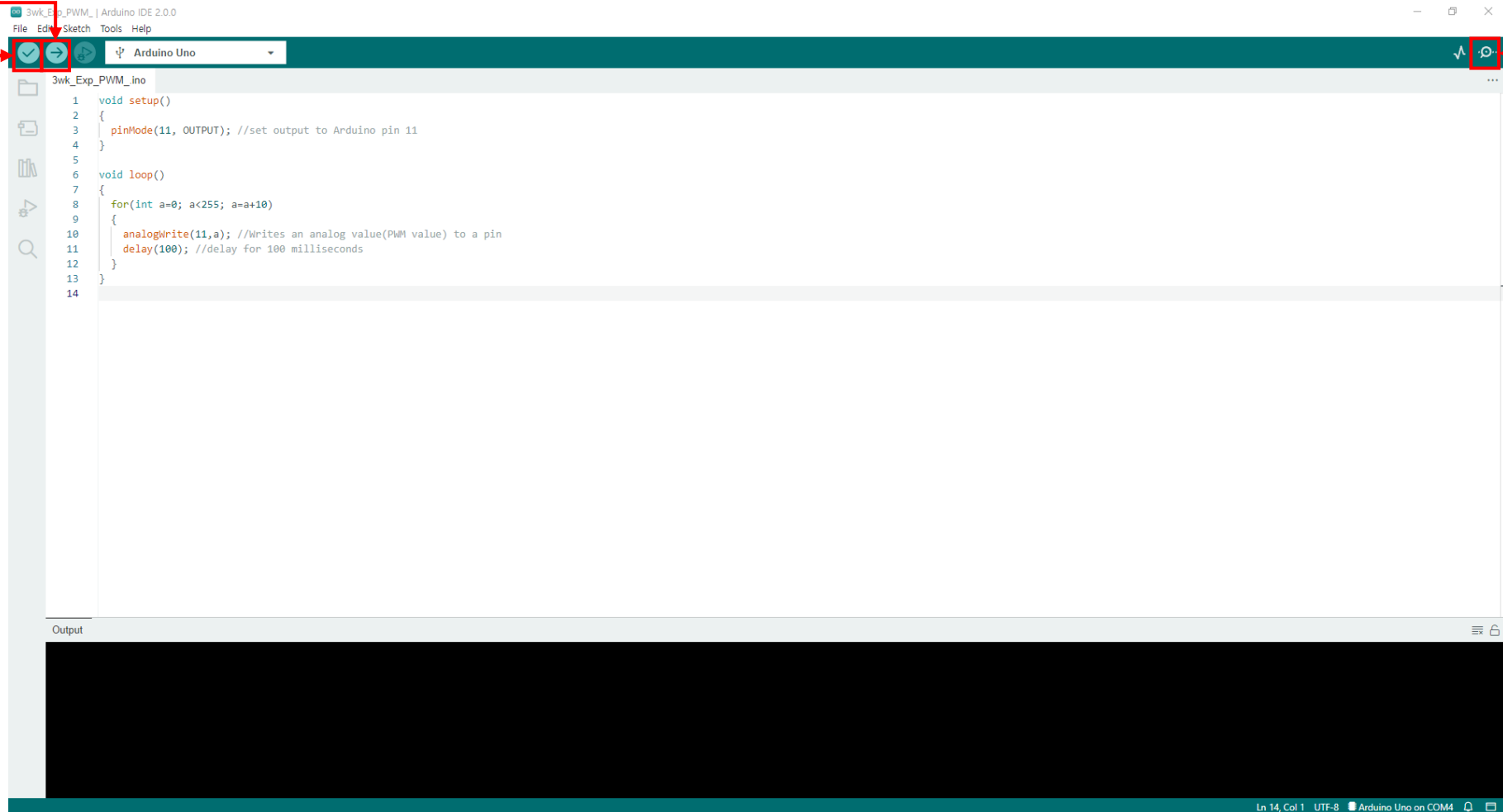
3. Download and install it

3 PWM Experiment



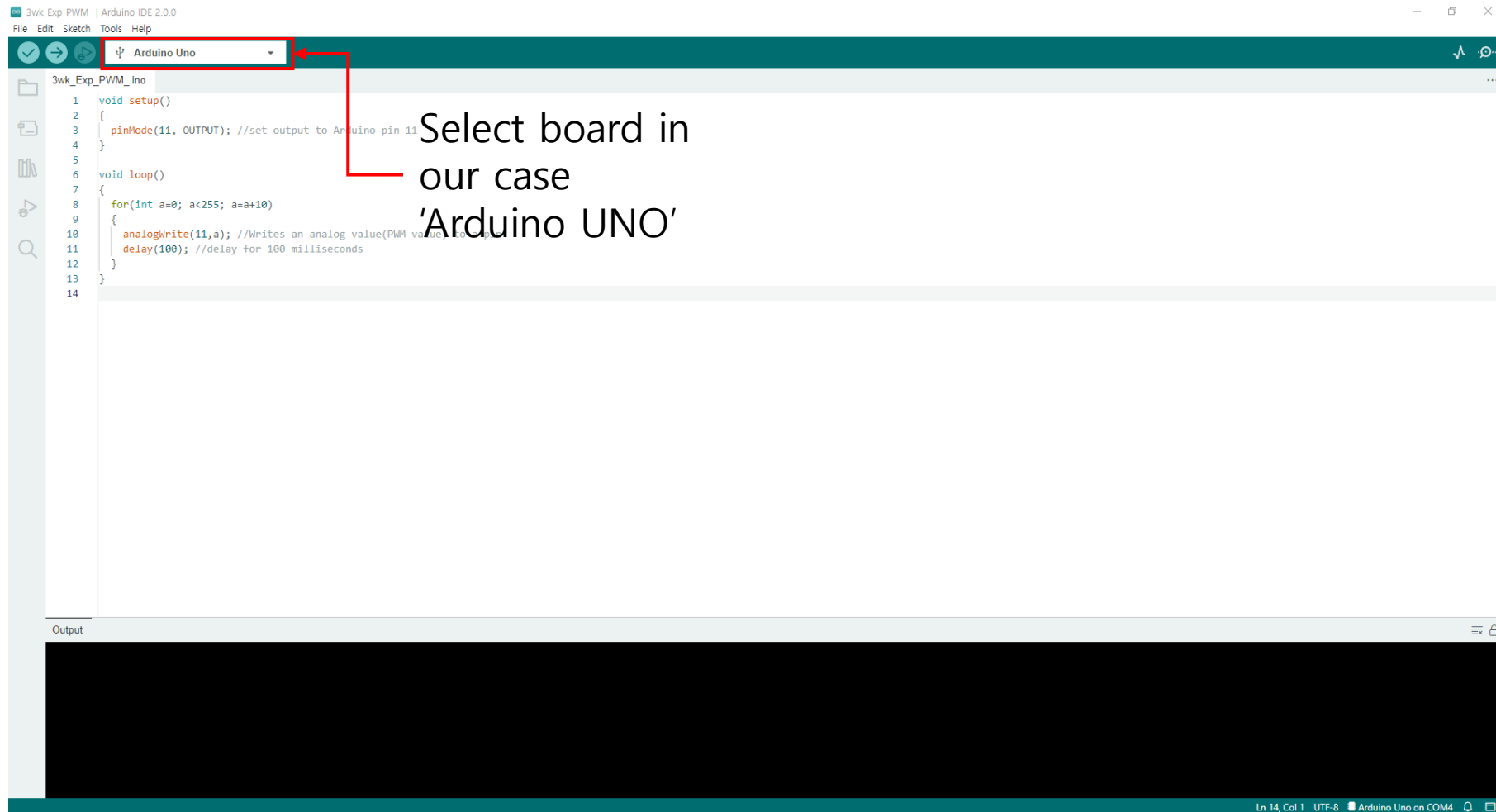
Upload

Compile

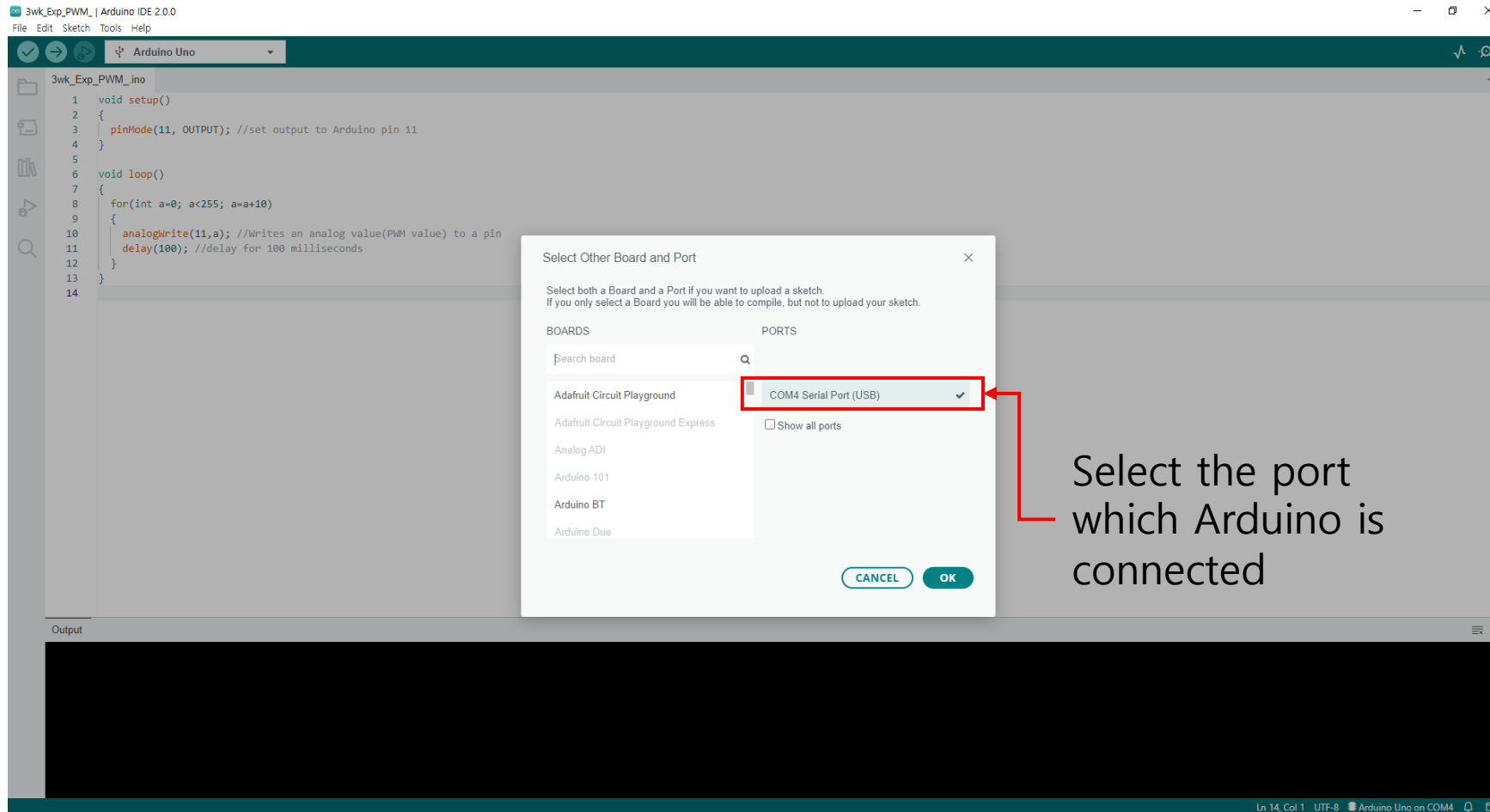


Serial
monitor

3 PWM Experiment

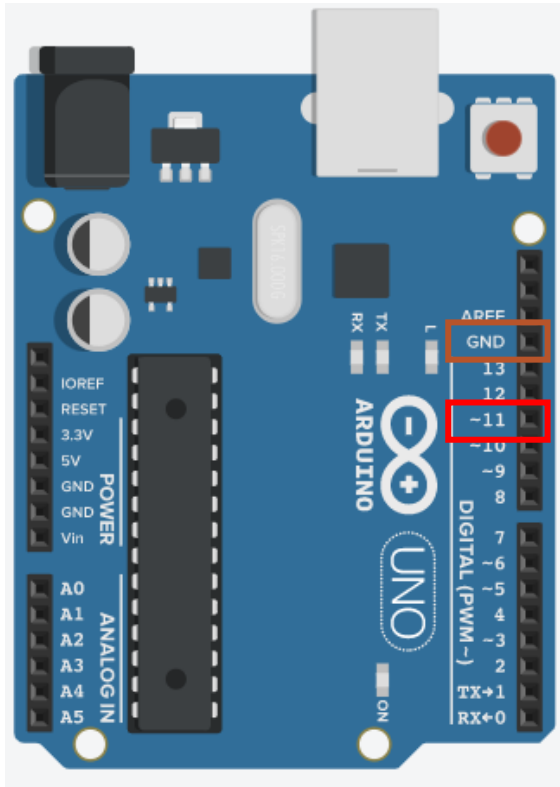


3 PWM Experiment



If there is no port to choose, call me.

4 PWM Experiment



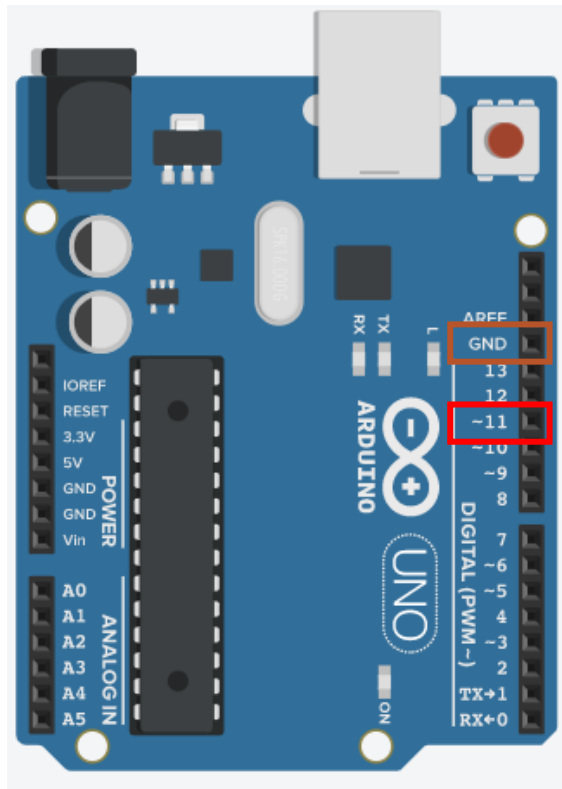
GND -> LED (-) pin
~11 -> LED (+) pin

```
3Wk_Exp_PWM_  
  
void setup()  
{  
  pinMode(11, OUTPUT); //set output to Arduino pin 11  
}  
  
void loop()  
{  
  for(int a=0; a<255; a=a+10)  
  {  
    analogWrite(11,a); //Writes an analog value(PWM value) to a pin  
    delay(100); //delay for 100 milliseconds  
  }  
}
```

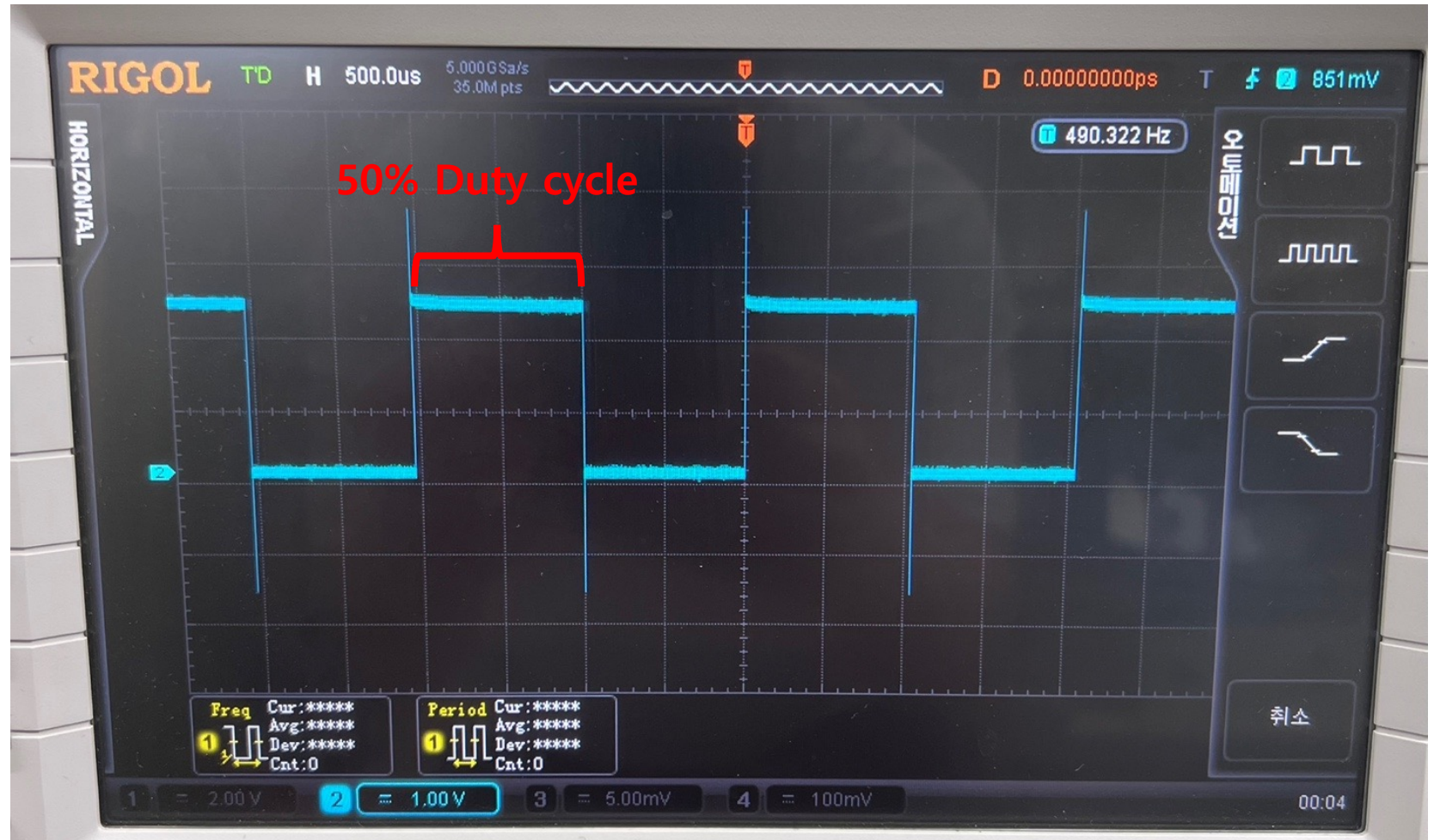
Arduino PWM range is **8 bit(0~255)**

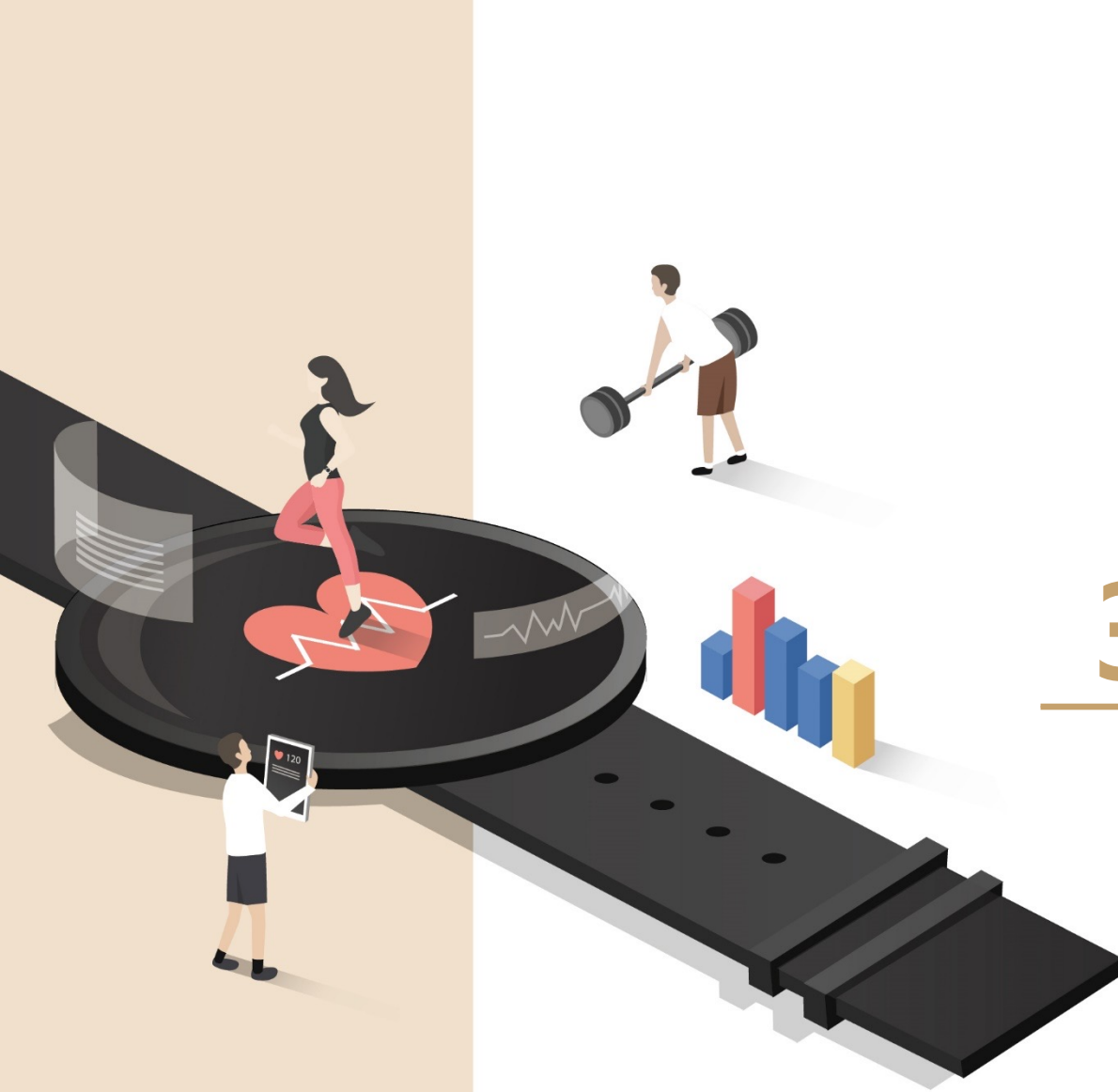
If you got an error while uploading, call me

5 PWM Experiment



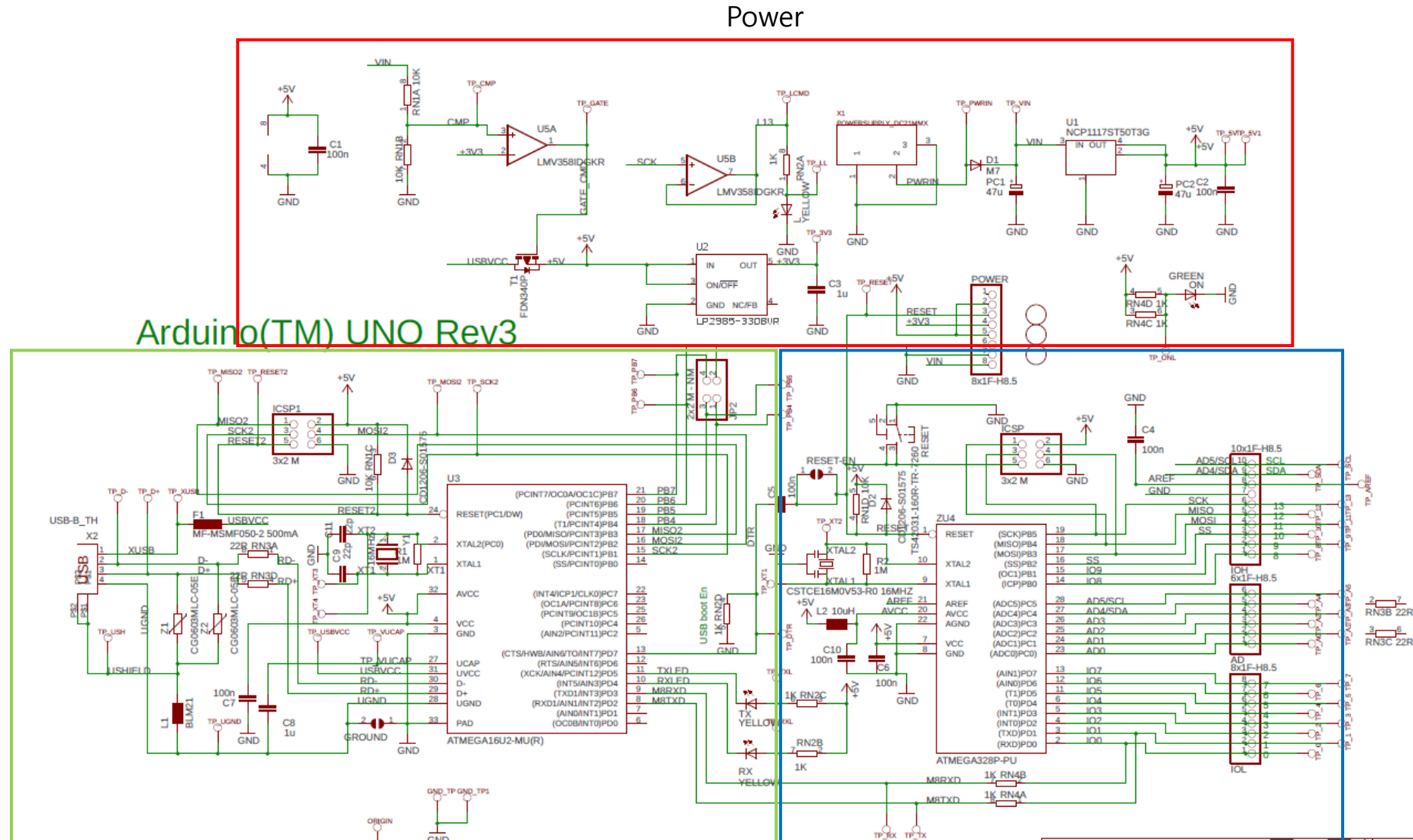
GND -> Probe GND
~11 -> Probe hook





3 Arduino UNO Rev3 Schematic

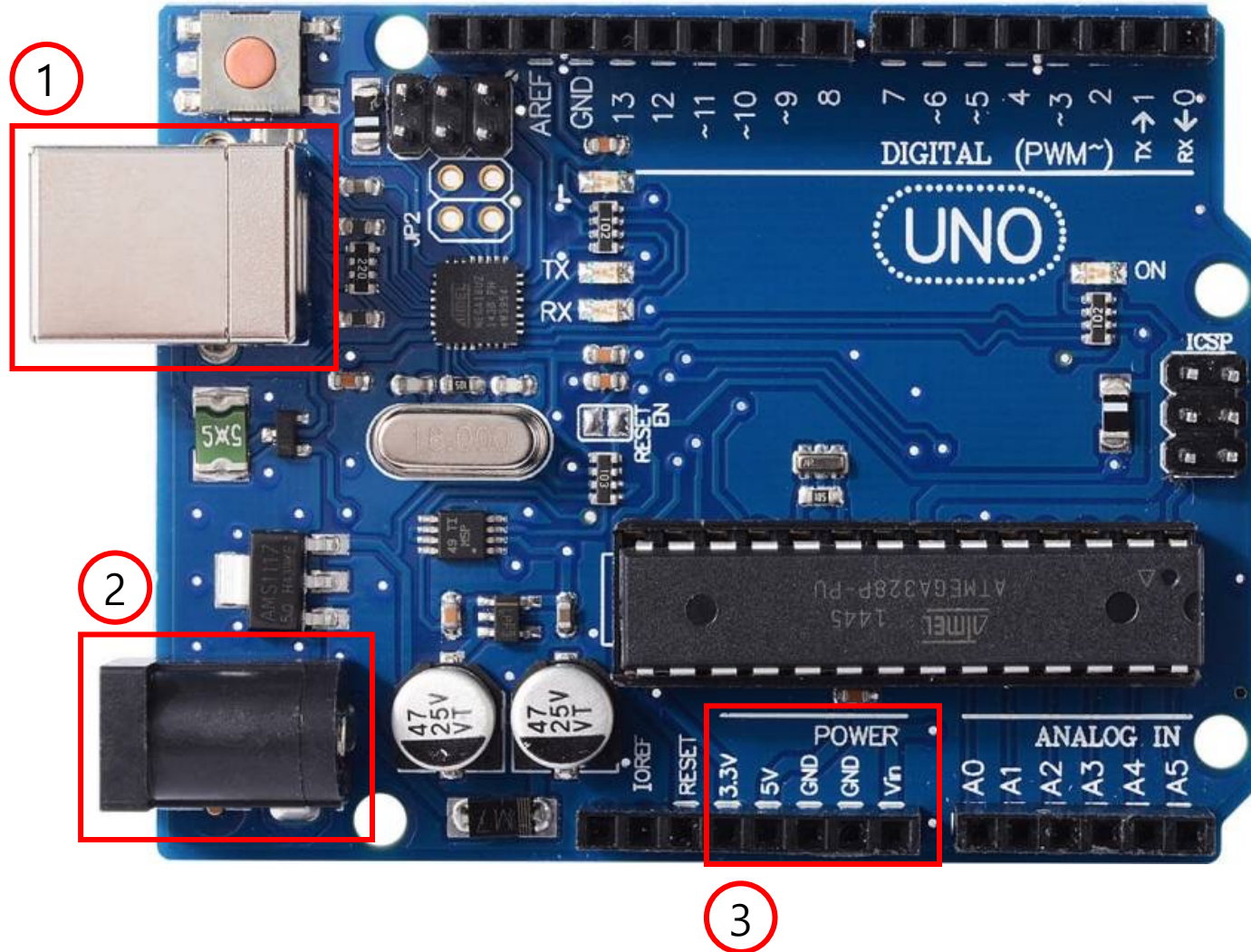
1 Arduino UNO Rev3 schematic



USB Bridge - Atmega16u2

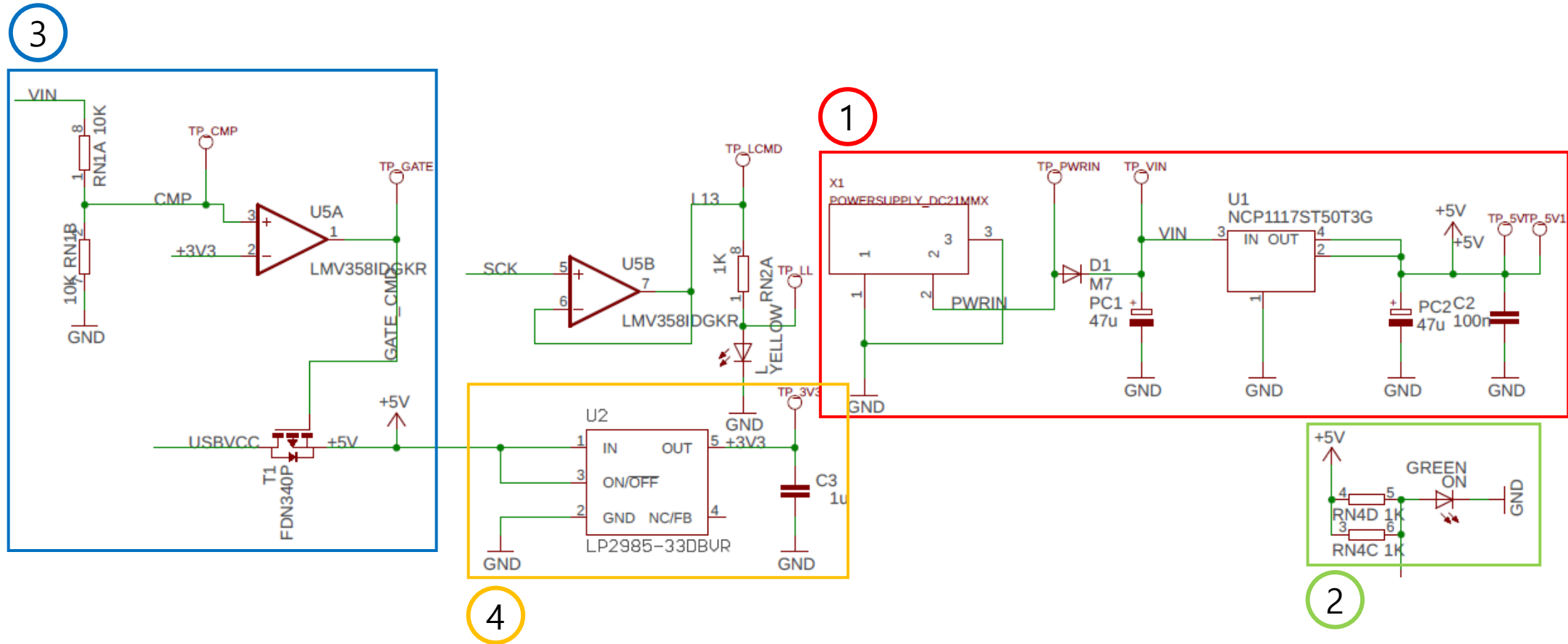
Microcontroller - Atmega 328p

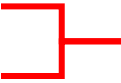
2 3 ways to power Arduino



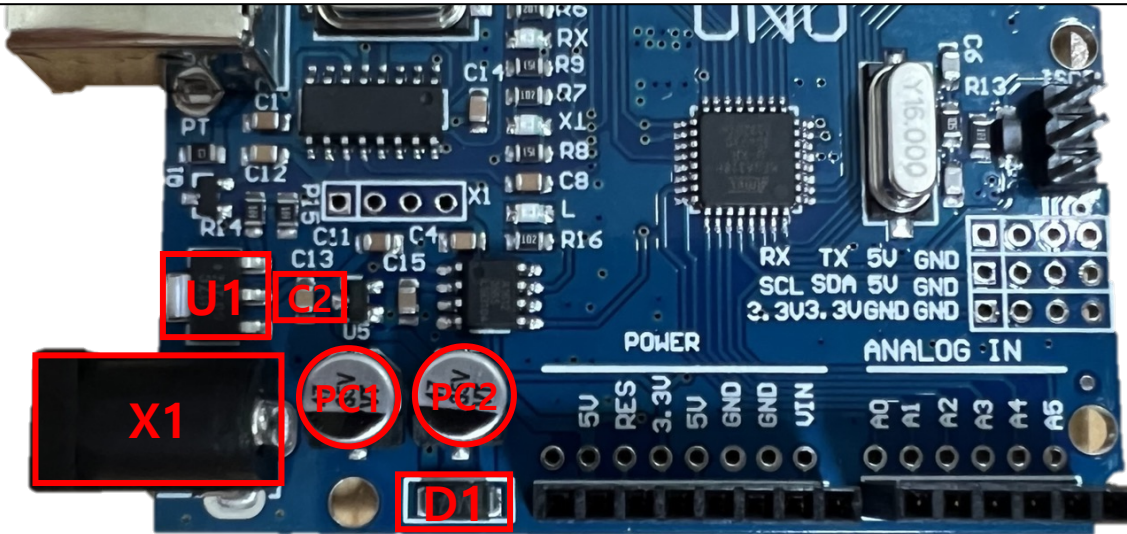
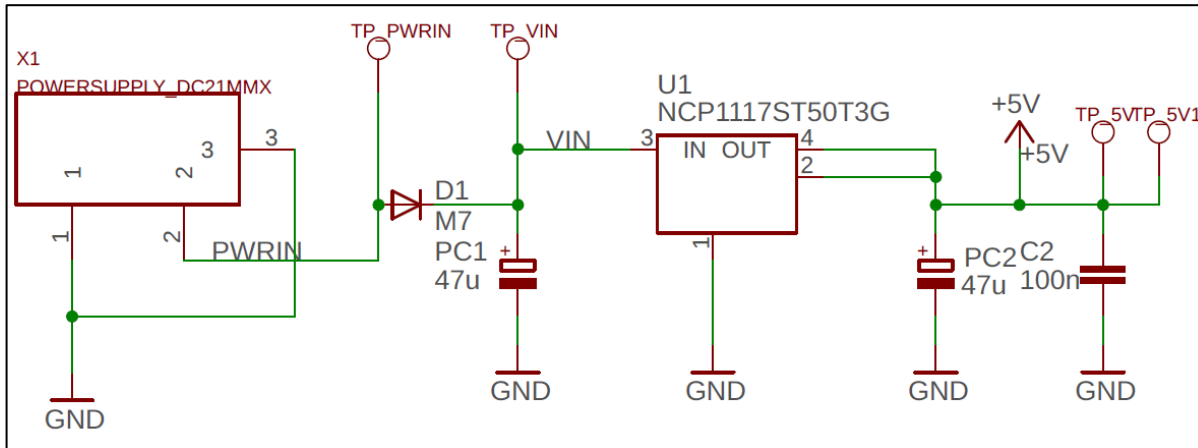
1. USB port(5V)
2. DC jack(7~12V)
3. Vin pin(7~12V)

3 Arduino auto power supply schematic



1. DC jack power
 2. Power supply indicator LED
 3. Power source switching circuit
 4. DC 3.3V regulator
-  Vin, USBVCC power

4 DC jack power



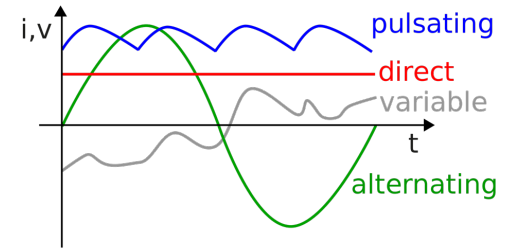
- 1) X1: DC power input 7~12V
- 2) D1: reverse voltage protection diode
 - Forward bias: Anode -> Cathode (Switch on)
 - Reverse bias: Cathode -> Anode (Switch off)
 - Voltage drop: 0.6-0.7V
- 3) PC1/PC2: Polarized condenser(=Capacitor)
- 4) U1: 5V regulator – output constant voltage
- 5) C2: Non-polarized Capacitor

5 DC jack power

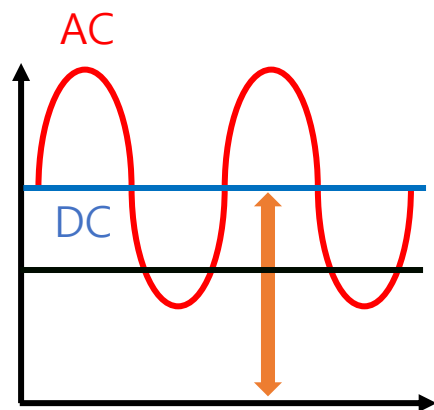


Uses of Capacitor

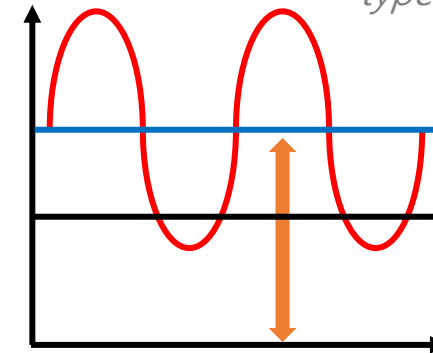
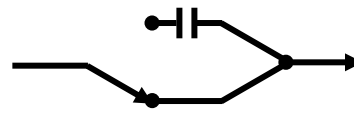
- 1) **coupling** – only AC signals pass through a mixture of DC signal and AC signal.
- 2) energy storage
- 3) smoothing – make a pulsating signal into a constant DC average voltage
- 4) bypass – send the noise to ground.



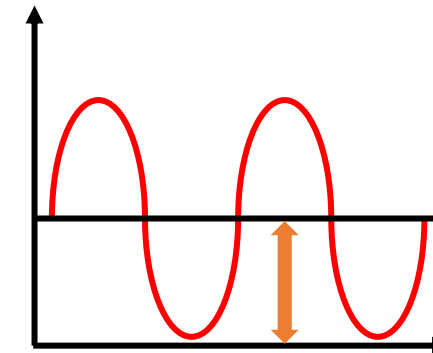
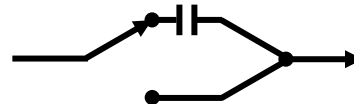
types of electric current



DC coupling



AC coupling

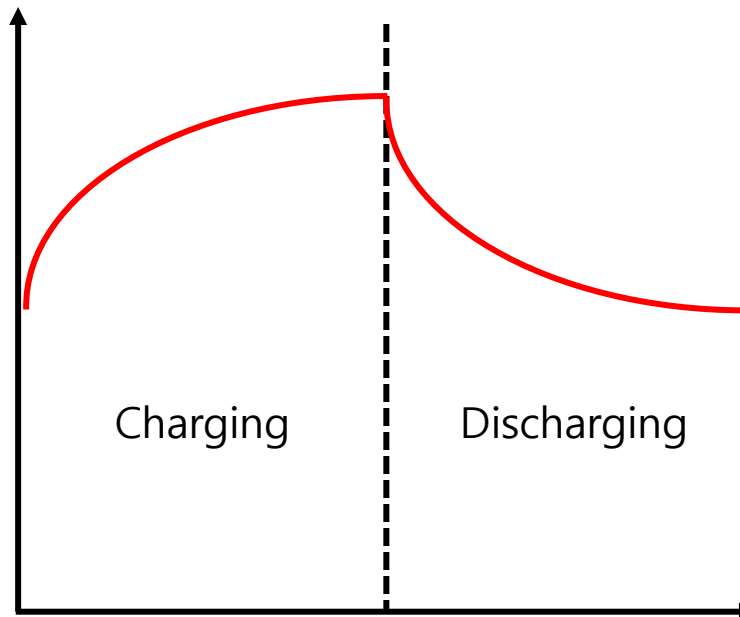
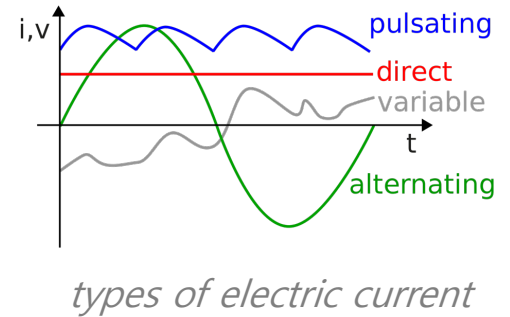


6 DC jack power



Uses of Capacitor

- 1) coupling – only AC signals pass through a mixture of DC signal and AC signal.
- 2) **energy storage**
- 3) smoothing – make a pulsating signal into a constant DC average voltage
- 4) bypass – send the noise to ground.

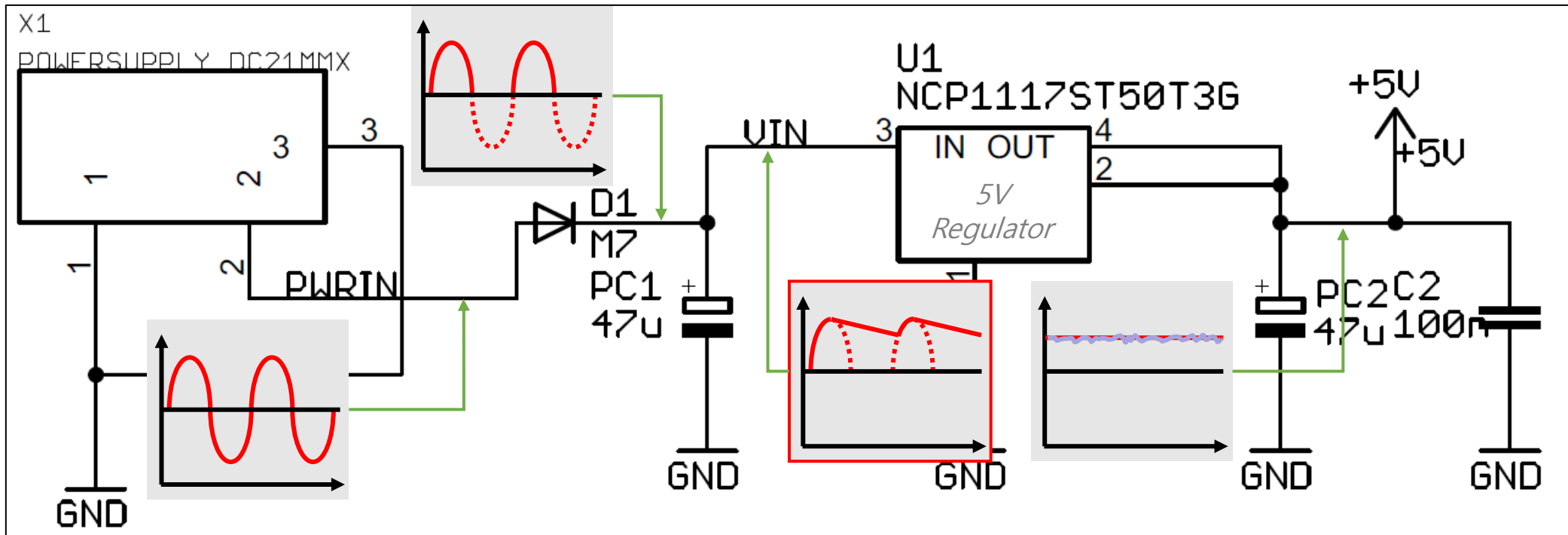
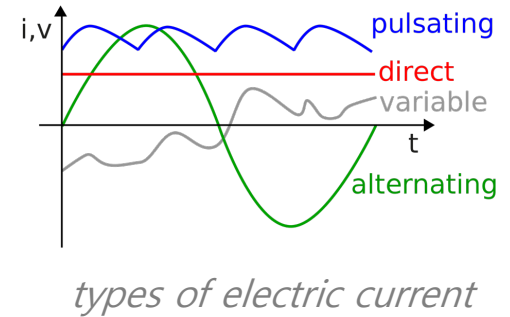


7 DC jack power



Uses of Capacitor

- 1) coupling – only AC signals pass through a mixture of DC signal and AC signal.
- 2) energy storage
- 3) **smoothing** – make a pulsating signal into a constant DC average voltage
- 4) bypass – send the noise to ground.

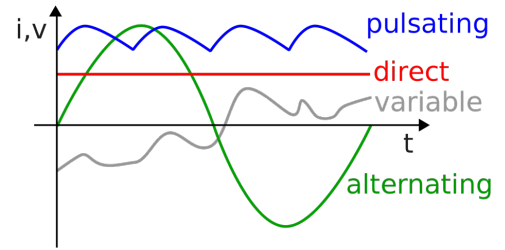


8 DC jack power

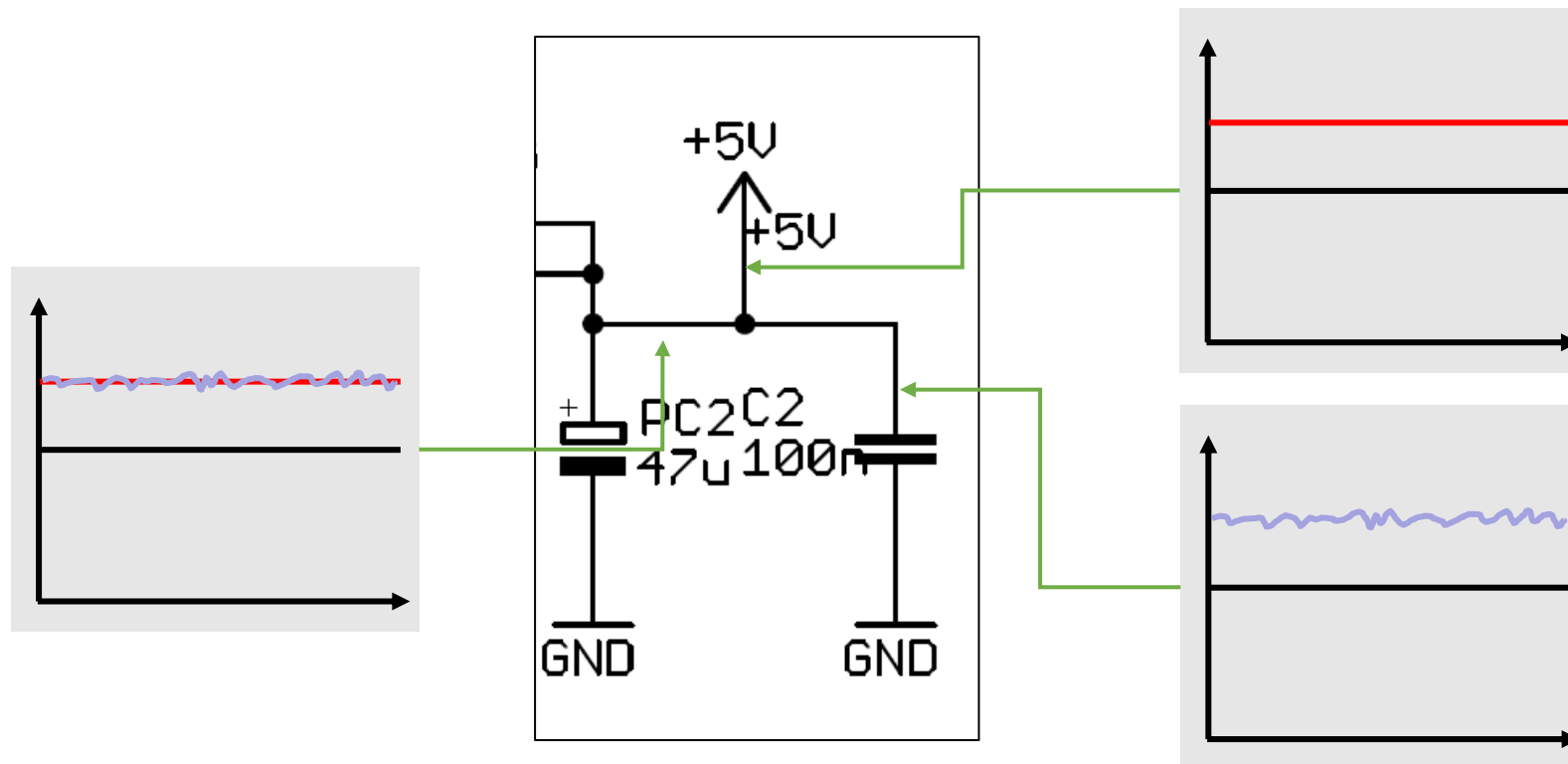


Uses of Capacitor

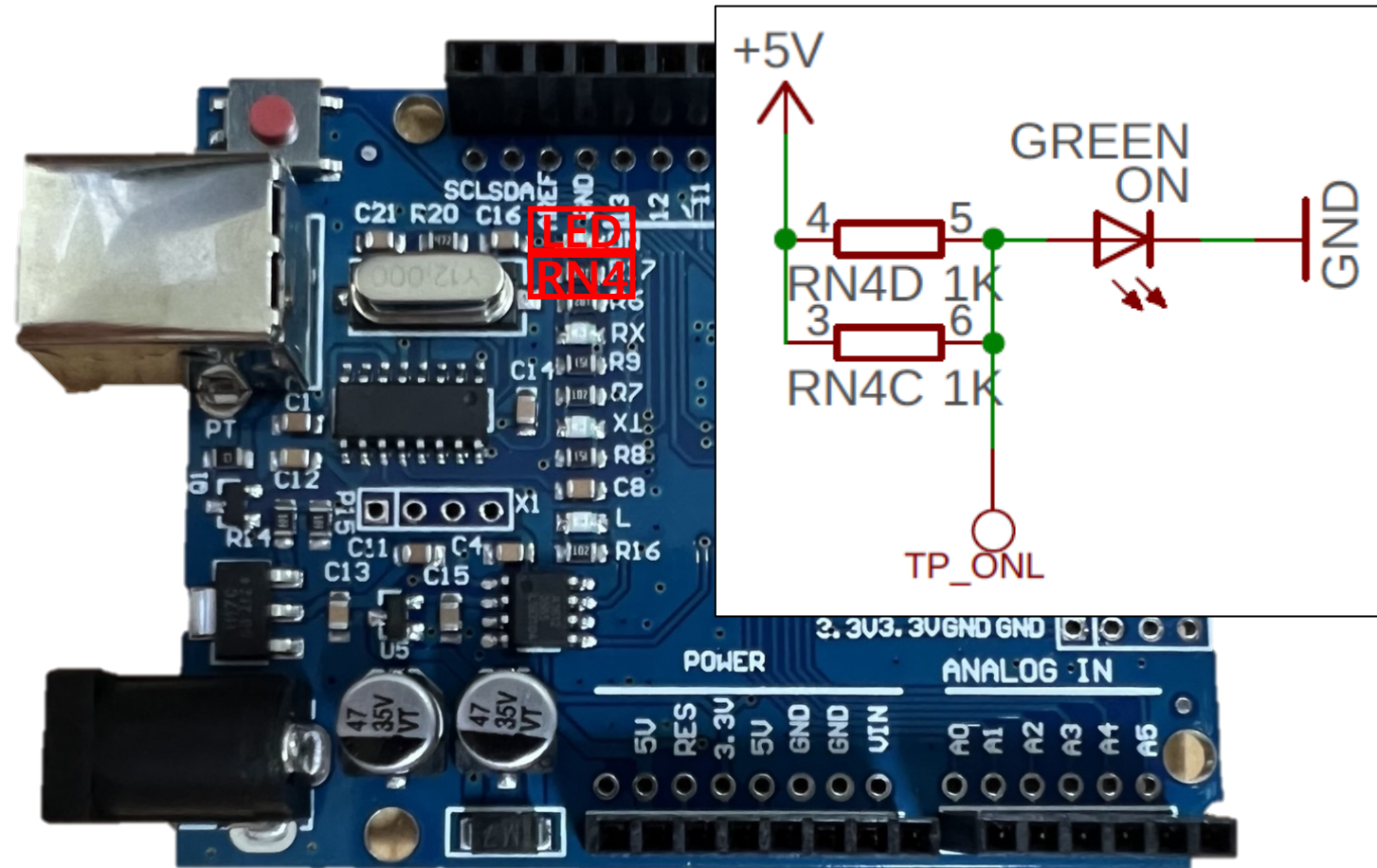
- 1) coupling – only AC signals pass through a mixture of DC signal and AC signal.
- 2) energy storage
- 3) smoothing – make a pulsating signal into a constant DC average voltage
- 4) **bypass** – send the noise to ground.



types of electric current

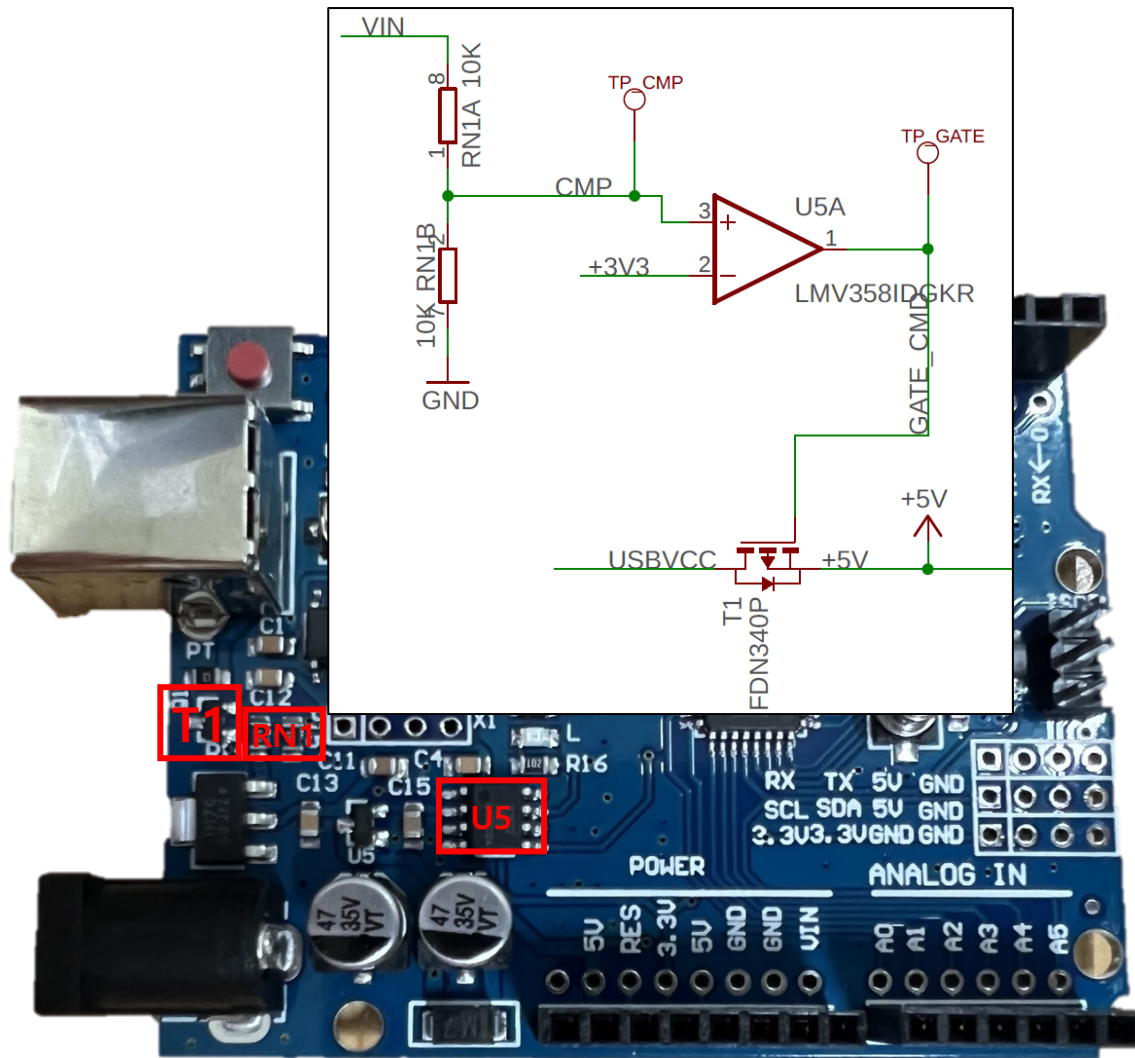


9 Power supply indicator LED



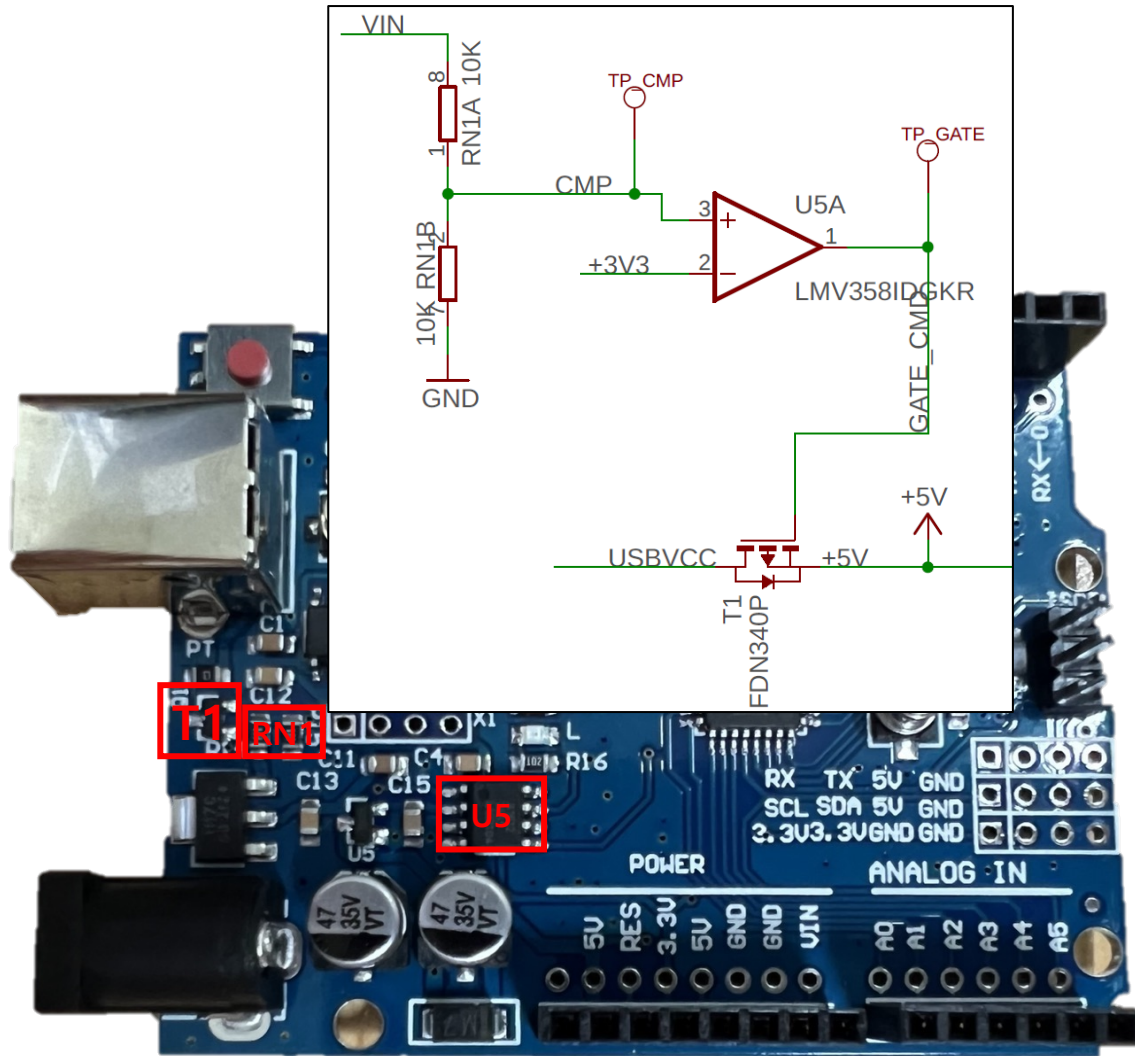
When DC 5V comes from regulator, indicator LED blinks.

10 Power source switch



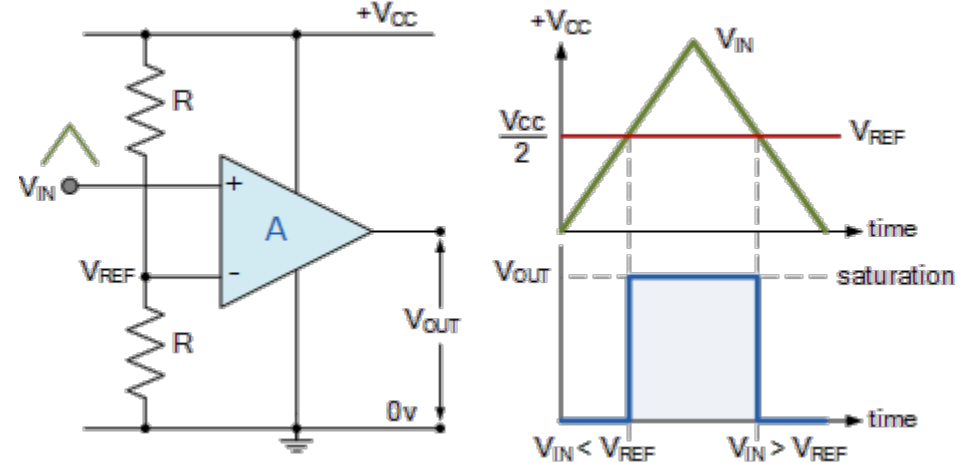
- 1) U5: Comparator
- 2) T1: P-channel MOSFET

11 Power source switch



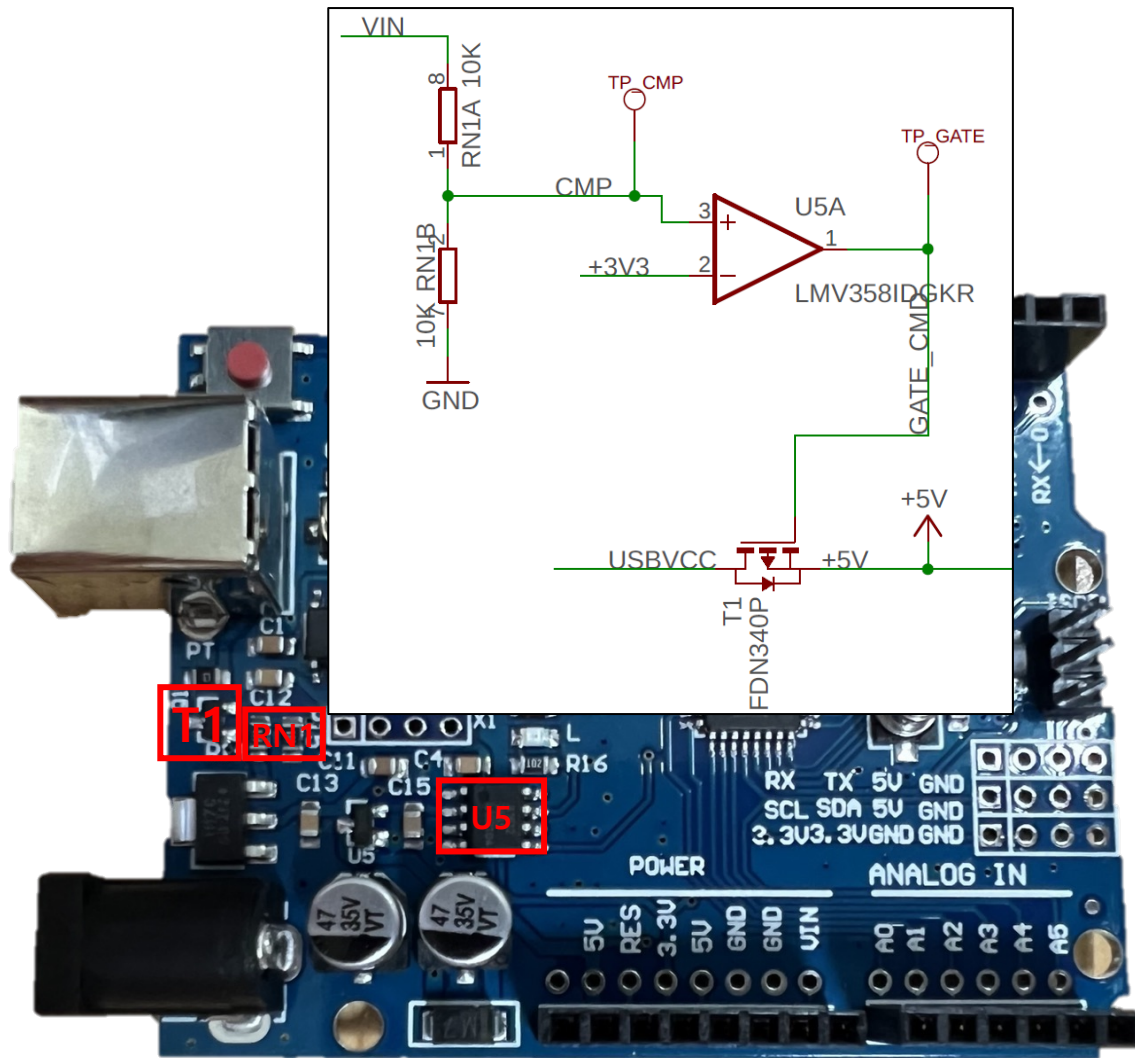
Comparator

: A device that compares two voltages or currents and outputs a digital signal indicating which is larger.



$$V_{out} = \begin{cases} 1, & \text{if } V_{in} > V_{REF} \\ 0, & \text{if } V_{in} < V_{REF} \end{cases}$$

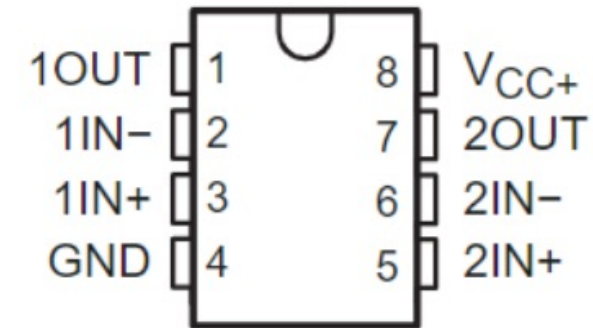
12 Power source switch



Comparator

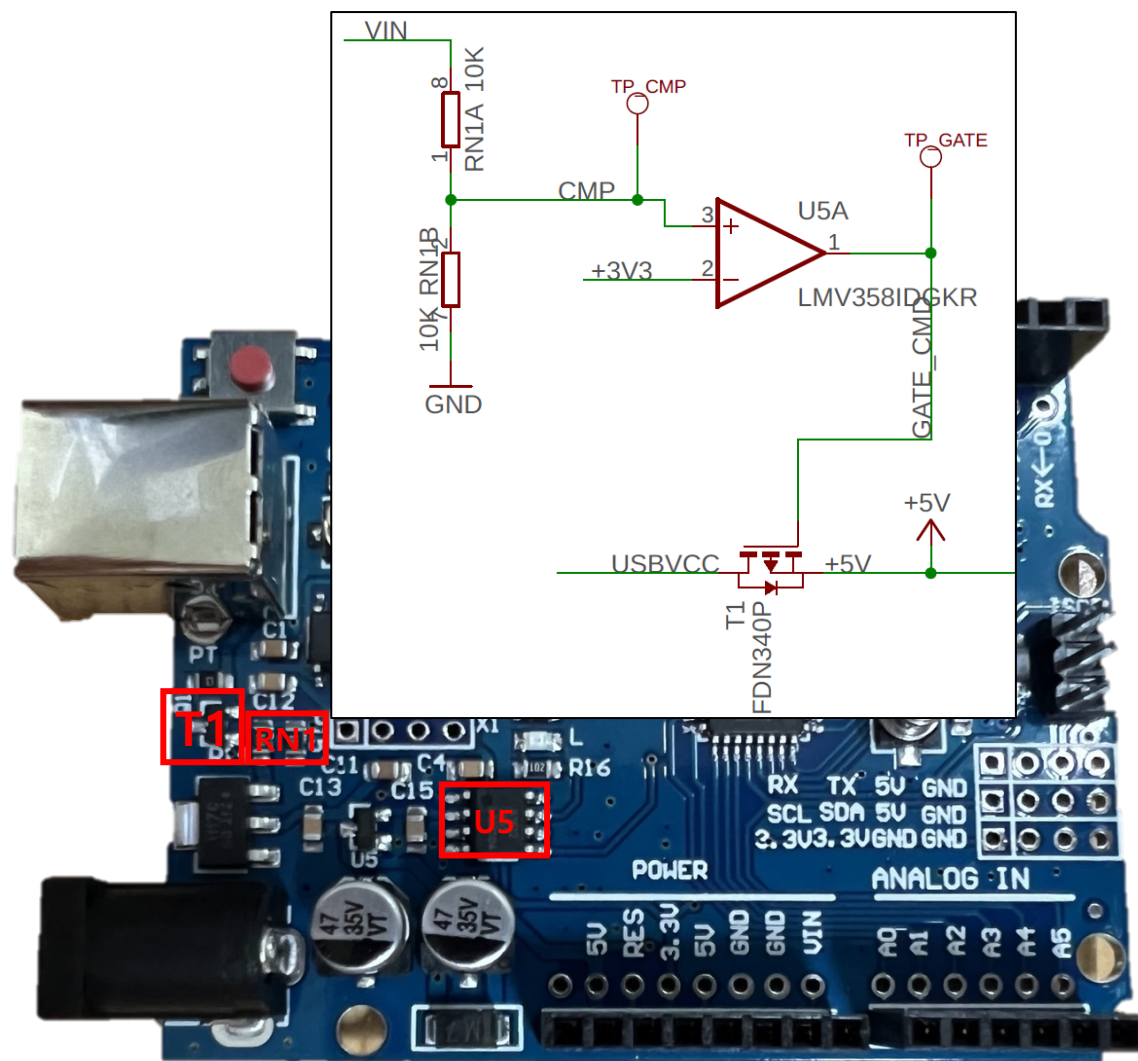
: A device that compares two voltages or currents and outputs a digital signal indicating which is larger.

LMV358 . . . D (SOIC), DDU (VSSOP),
DGK (MSOP), OR PW (TSSOP PACKAGE
(TOP VIEW)



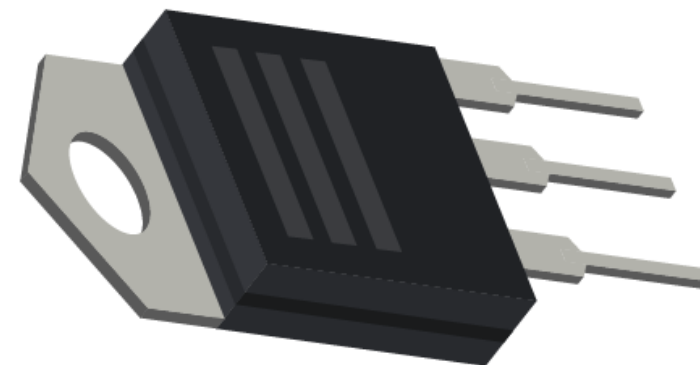
[LMV358IDGKR Datasheet, PDF - Alldatasheet](#)

13 Power source switch



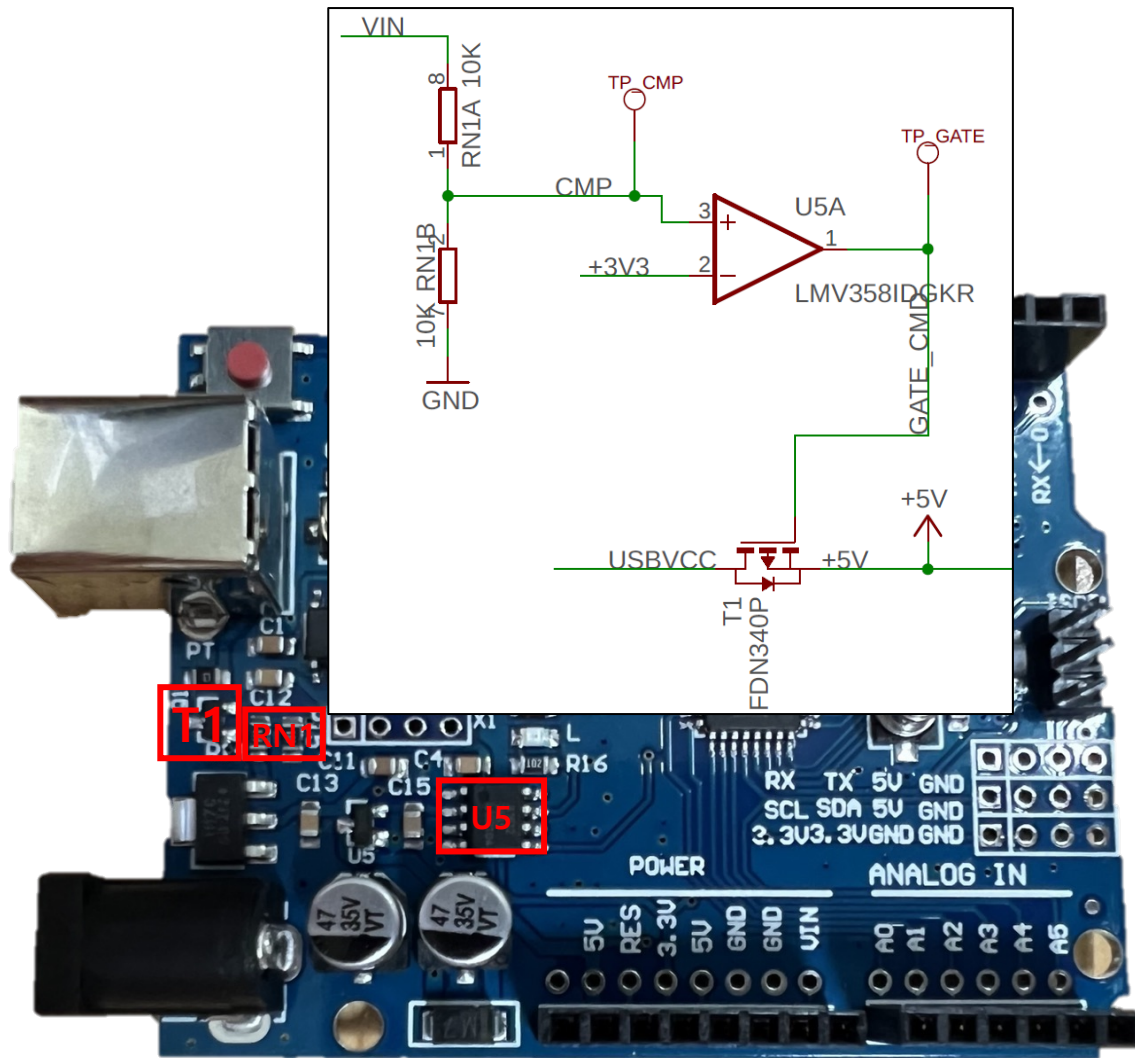
MOSFET(Metal-Oxide-Semiconductor-Field-Effect Transistor)
: electronic devices used to switch or amplify voltages in circuits.

- Source
- Gate
- Drain
- Body

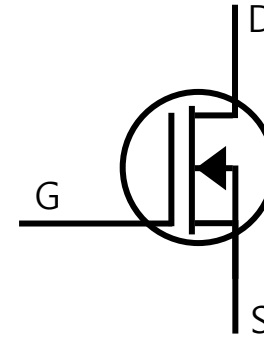
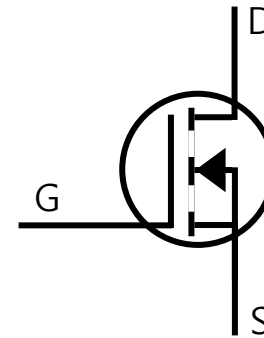


[FDN340P Datasheet, PDF - Alldatasheet](#)

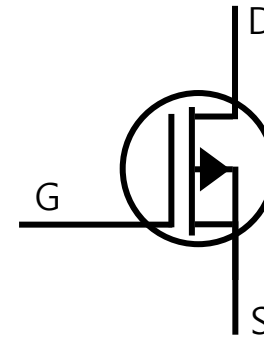
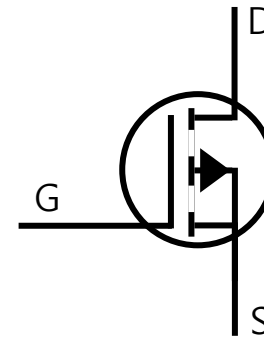
14 Power source switch



MOSFET types



N Channel

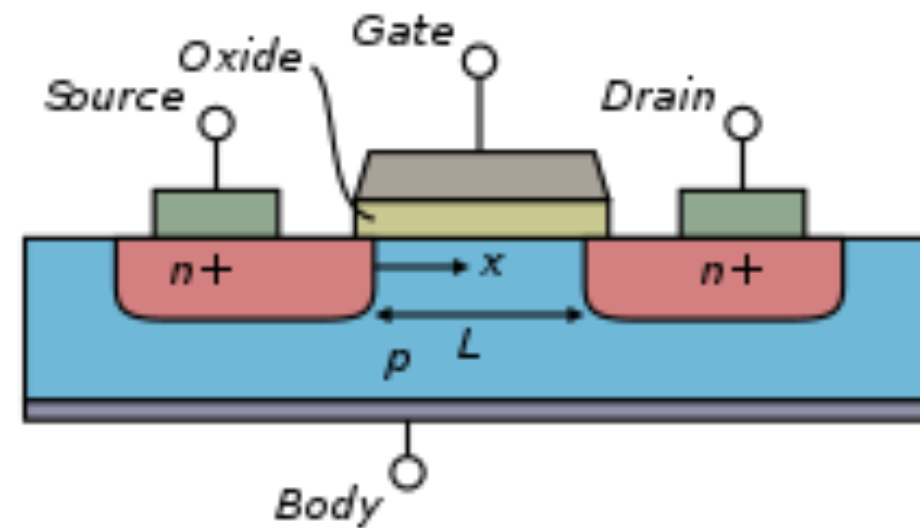


P Channel

Enhancement
mode

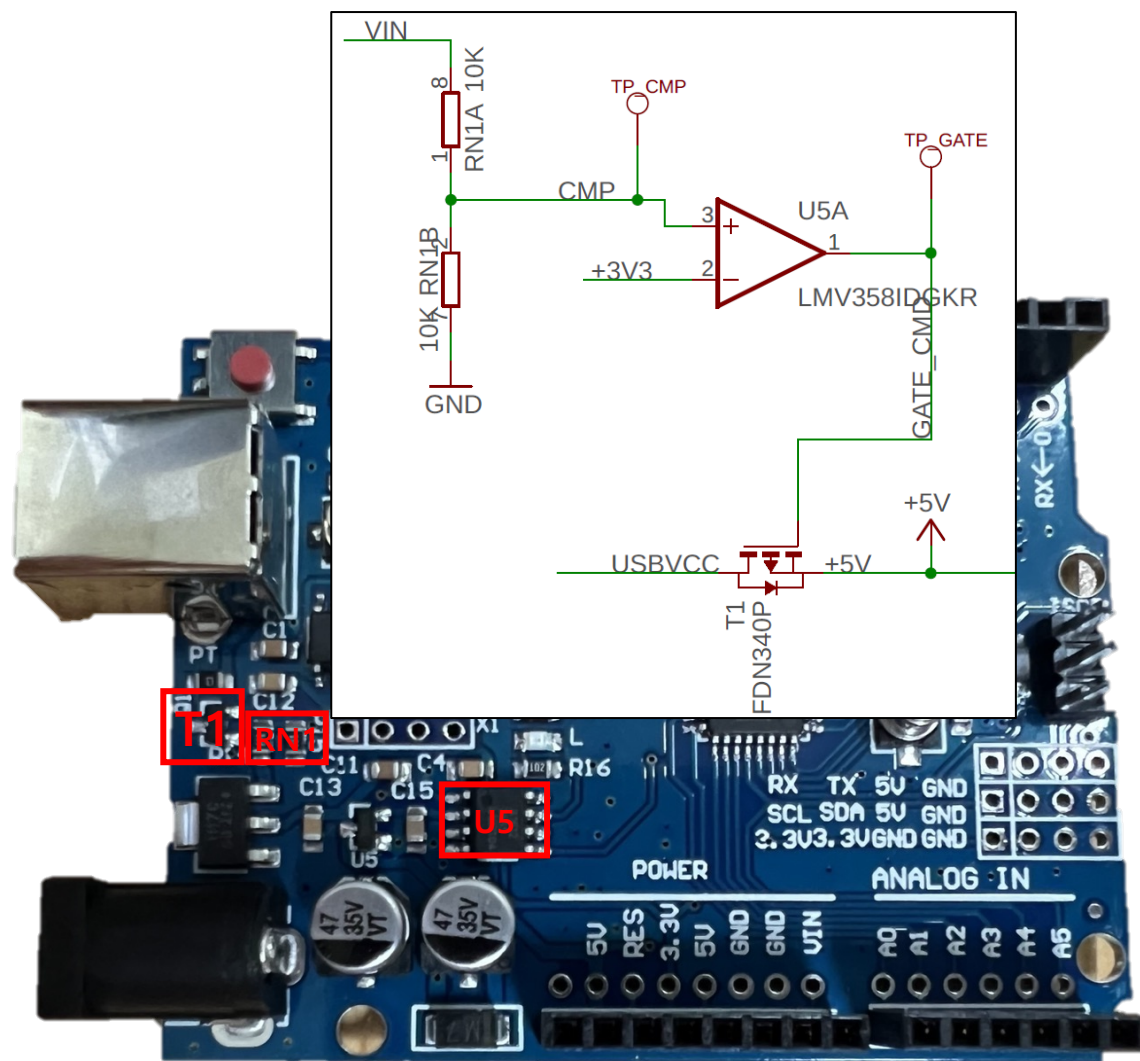
Depletion
mode

An illustration of a person in a black top and red pants running on a circular track. To the left is a bar chart with yellow, blue, and red bars. To the right is a line graph with a red line. The background is a light blue gradient.

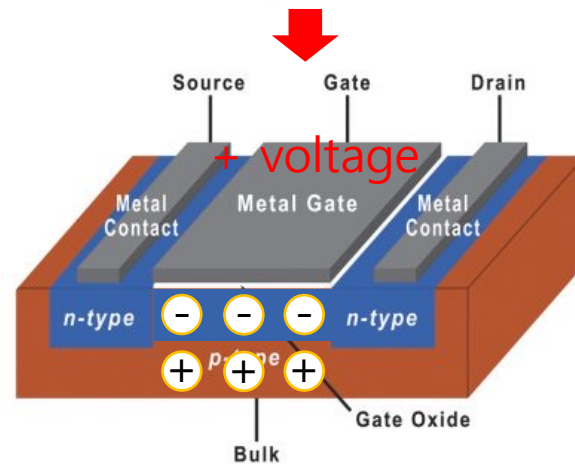
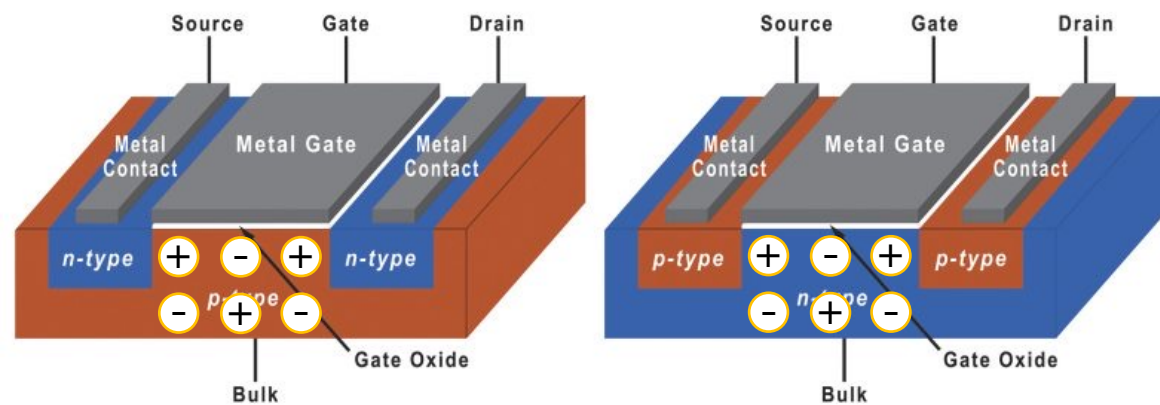


N-MOSFET

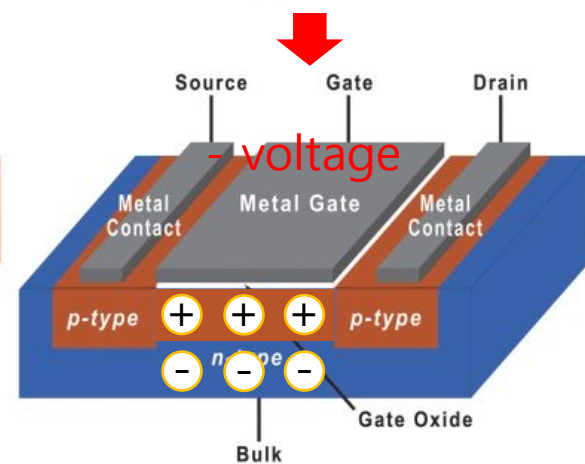
16 Power source switch



Enhancement mode MOSFET



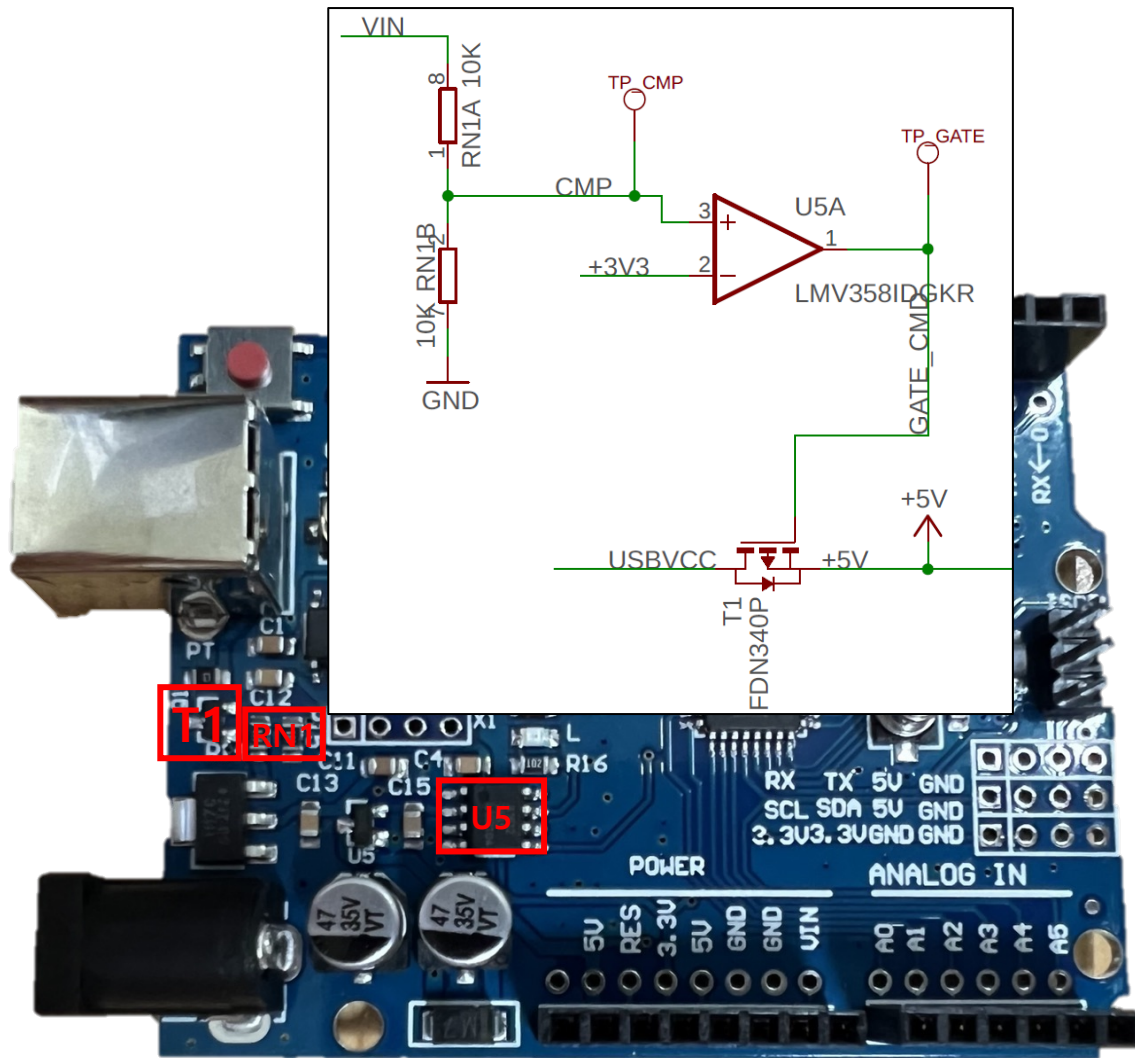
N-MOSFET



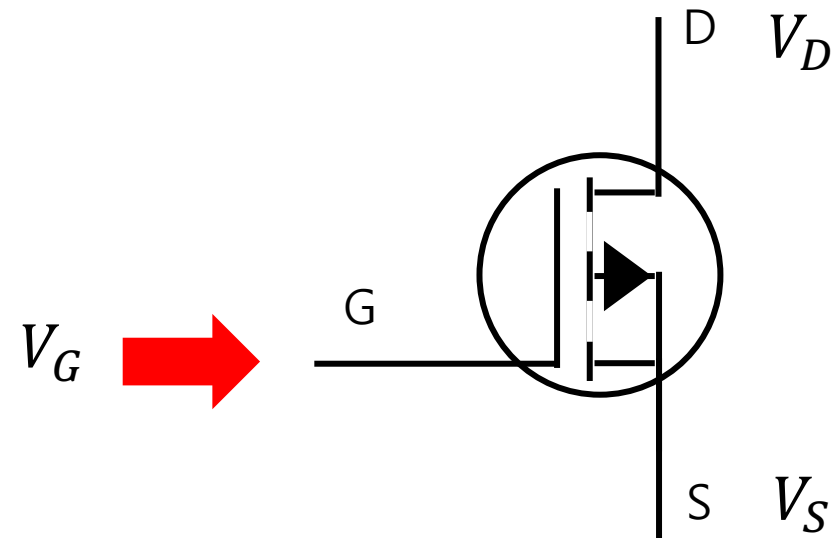
P-MOSFET



18 Power source switch

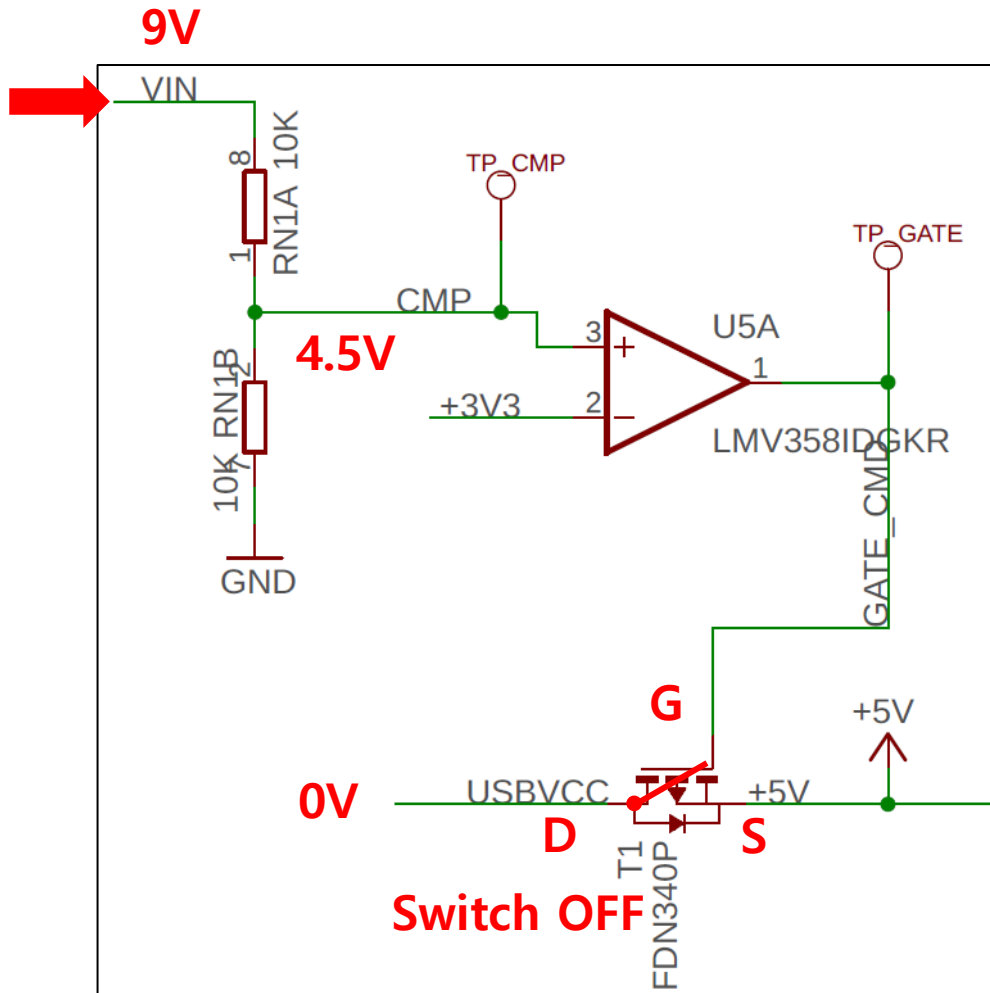


P-channel MOSFET

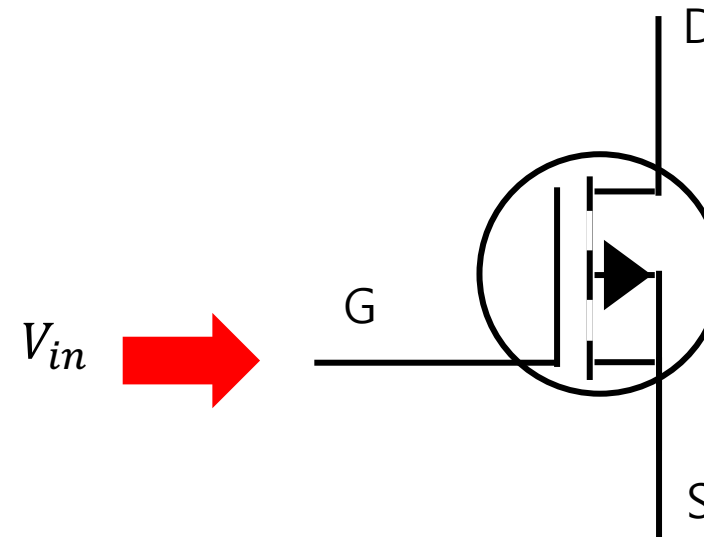


$$V_{GS(th)} = V_G - V_S < 0$$
$$\Rightarrow V_D, V_S \text{ Current flow}$$

19 Power source switch

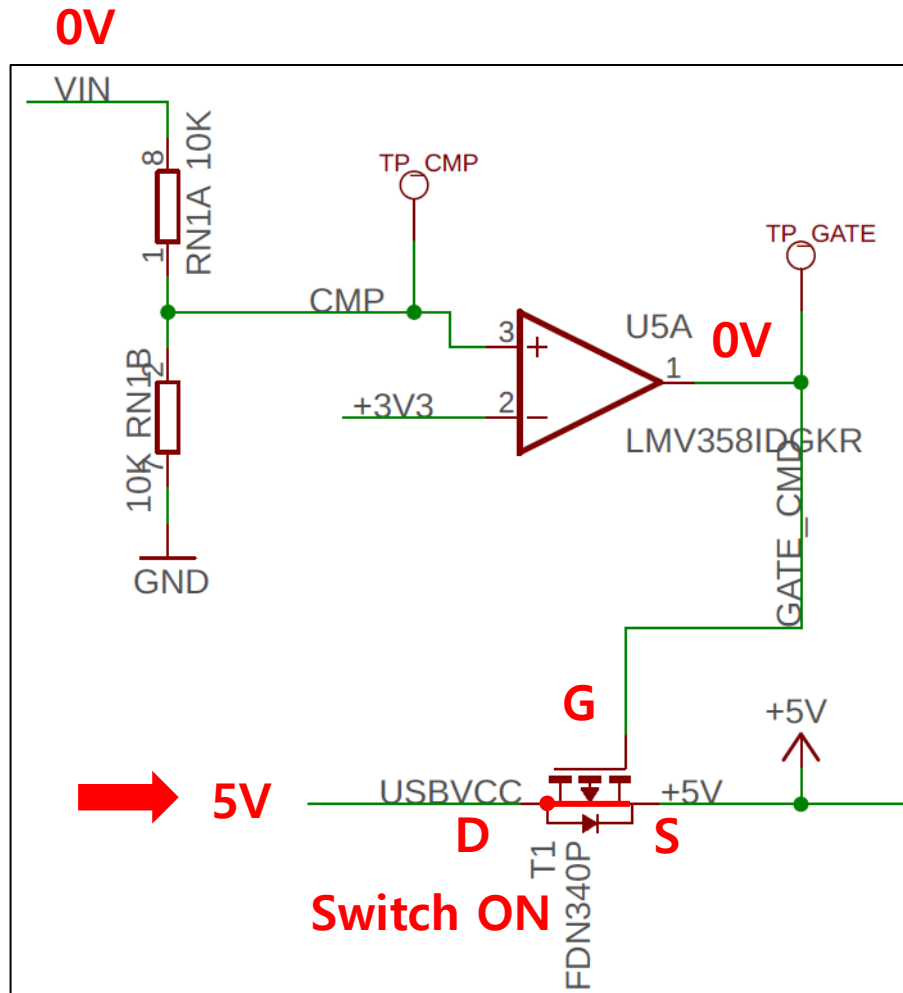


1. V_{in}

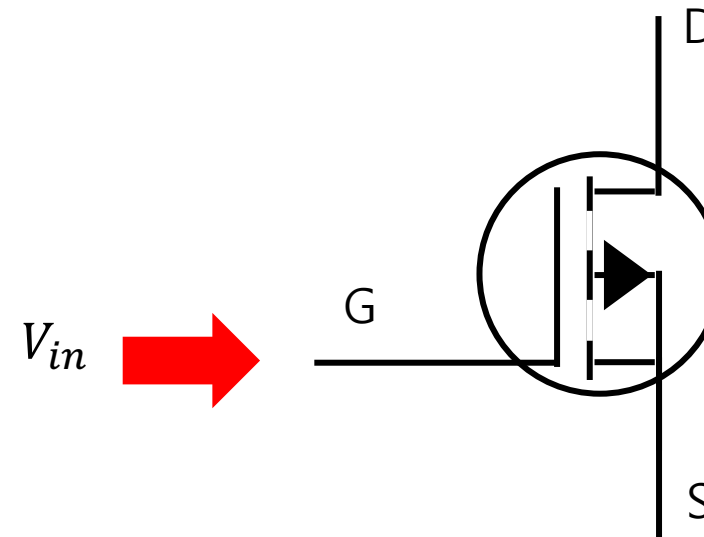


$$V_{GS(th)} = V_G - V_S > 0$$
$$\Rightarrow V_D, V_S \text{ Current flow } \mathbf{X}$$

20 Power source switch



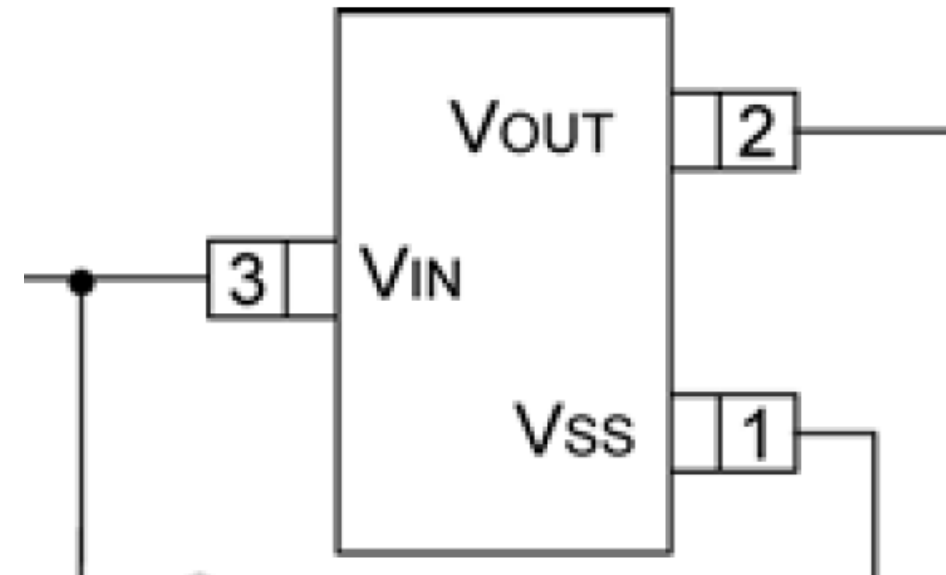
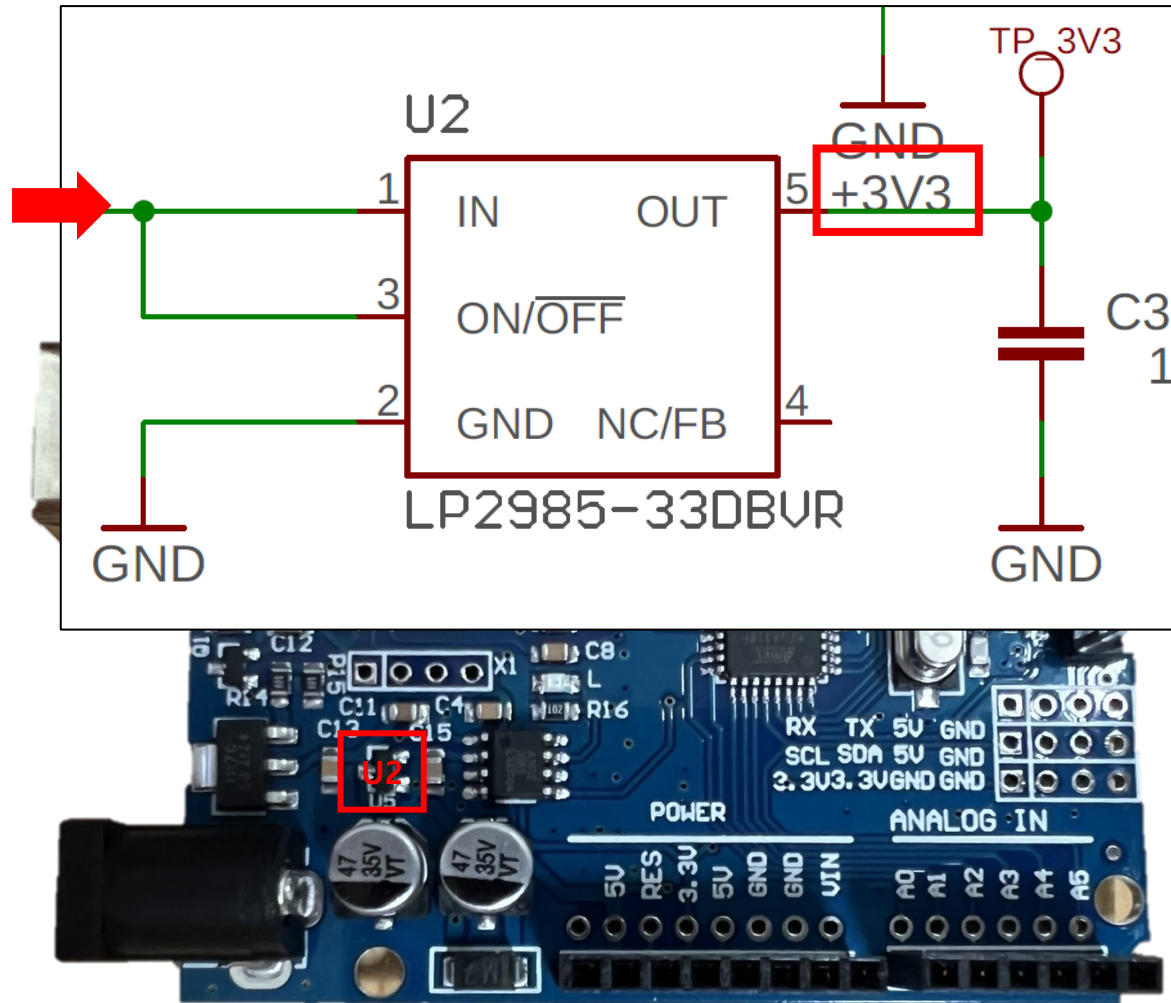
2. USBVCC



$$V_{GS(th)} = V_G - V_S < 0$$

$$\Rightarrow V_D, V_S \text{ Current flow}$$

21 3.3V Regulator



[SC662K Datasheet, PDF - Alldatasheet](#)