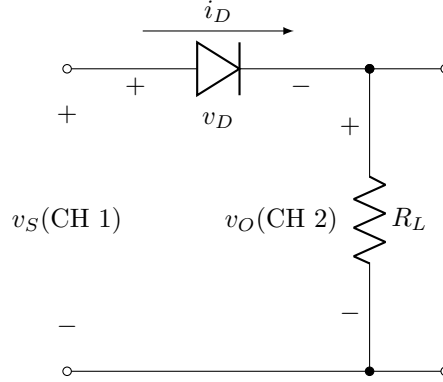# Diode Circuits Prelab

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1 Diode Circuits

Aim: Measure the output waveforms of Diode circuits with sinusoidal inputs.
$v_s = 6\sin(2\pi f t)$ for Silicon, $v_s = 12\sin(2\pi f t)$ for Zener, $R_L = 10$ kΩ

Procedure:
1. For $f = 1$ kHz, measure the input (CH 1) and output (CH 2) waveforms **in Y-t mode and X-Y mode** respectively.
2. For $f = 1$ kHz, estimate the cut-in voltage(v_D) of the Si-based diode.
3. For $f = 200$ kHz, measure the input (CH 1) and output (CH 2) waveforms **X-Y mode**.
4. For $f = 1$ kHz, replace the Si diode with the **Zener Diode**, and achieve its **i-v** curve.

Precaution
1. Change the **coupling mode** from **ac to dc** for **CH 2**.
2. Check the **probe scale** of **CH 1 and CH 2** both at **1x**.

2 Effects of a Capacitor on the Rectifier

Aim: Measure the output waveforms of Rectifier circuit with a Capacitor with sinusoidal inputs.
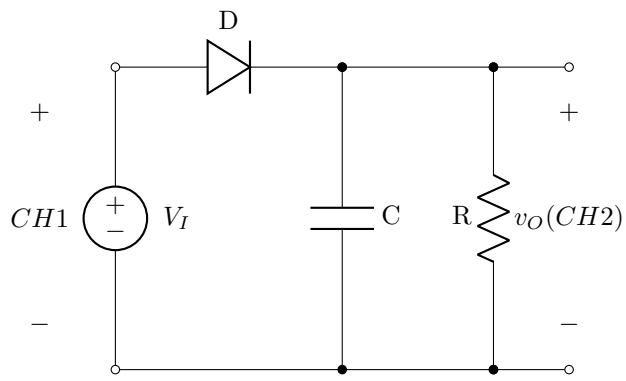
$v_I = 6\sin(2\pi f t)$, $f = 60$ Hz,
Case 1. $R = 10$ kΩ, $C = 0.1$ μF (104)
Case 2. $R = 100$ kΩ, $C = 0.1$ μF (104)
Case 3. $R = 1$ MΩ, $C = 0.2$ μF (104 || 104)

Procedure:
1. Measure the input (CH 1) and output (CH 2) waveforms **in Y-t mode**.
2. Estimate the **conduction interval Δt** and the peak-to-peak **ripple voltage** V_r.
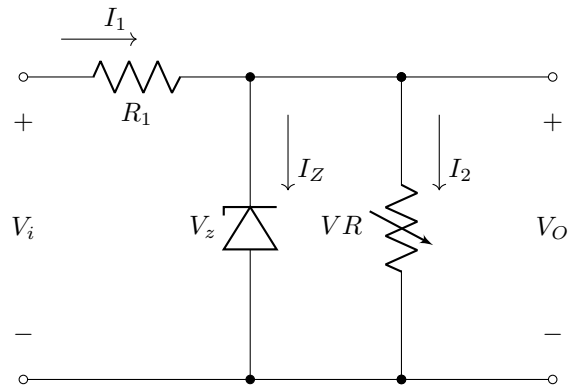3. Make a conclusion according to the experimental results.

Precaution
Change the **coupling mode** from **ac to dc** for **CH 2**.

3 Voltage Regulator

Aim: Measure the regulator effect of a zener diode.

$V_i = 9$ V (DC), $\quad R_1 = 10$ kΩ, $\quad V_z < 5$ V

Procedure:

1. For VR = 2 kΩ, 20 kΩ, measure I_1, I_2, I_z and V_0.

2. For VR = 400 kΩ, 600 kΩ, 800 kΩ, 1 MΩ, measure V_o, select one among these to measure I_1, I_2 and I_z

3. Make a conclusion according to the experimental results.