

EEE210 : Electronic Circuits and Devices

Lab #2 : Transfer Characteristic of Circuits with Diodes (Part 2)

Experimental work : Use diodes 1N4148 or an equivalent (such as 1N914). All oscilloscope readings are done with DC coupling of the input channels.

1. Start *Multisim* and build the circuit of figure 1. Adjust the Maximum time step TMAX simulation parameter to $10\ \mu\text{s}$ using :

Simulate > Analyses and simulation > Interactive
Simulation Settings

2. Connect a function generator on V_i and adjust it to a symmetrical triangular wave of frequency 100 Hz, amplitude 4 V and 0 DC–offset. Connect channels A and B of the oscilloscope on signals V_i and V_o respectively as shown in figure 2.
3. With the oscilloscope in the Y/T *deflection mode* and trigger set to **Normal**, observe the shape of the output signal V_o ; you should notice that the positive cycles of V_o resemble those of a sinewave. The circuit is a half-wave triangular-to-sinewave shaper and could be expanded into a full-wave shaper; we will not do that for simplicity.
4. Change the amplitude of V_i to 6 V (still with 0 DC–offset). Observe the transfer characteristic of the circuit by placing the oscilloscope in the B/A *deflection mode*.
5. Return the oscilloscope to the Y/T *deflection mode* and set the trigger to **Single**. After completion of the trace display, stop the simulation and save the oscilloscope data (**scp** format); this can be imported into a spreadsheet.

Report : Compare the experimental input–output transfer characteristic with that predicted by the theory. Use the piece-wise linear model of the diode that includes a 0.7 V voltage source.

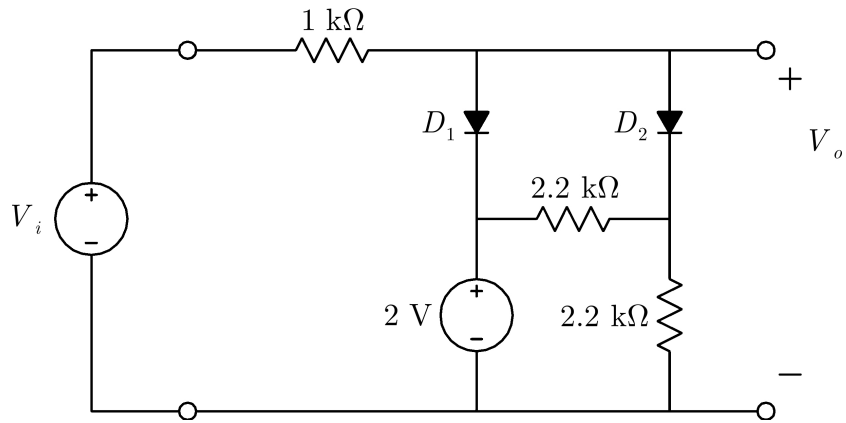


FIGURE 1 –

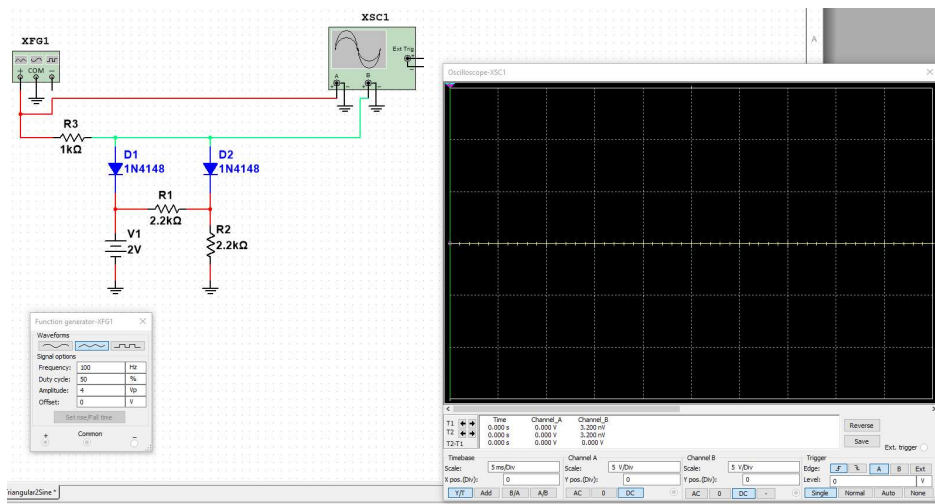


FIGURE 2 –