Experiment 5

**Objective –** To study the properties of a diode.

**Theory** - For small ac signals a diode can be considered as a dc voltage in series with a small resistor. The dc voltage for a silicon diode is around 0.6V in the forward region. In the reverse bias region diode doesn’t have any significant current.

**Procedure**- Assemble the circuit as shown in Fig. 1. The diode D1N4148 is available in the EVAL library. The dc current source is present in the source library. We would like to observe the phase difference between the input V2 and the output Vo.

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Vo

**Fig. 1**

Do the time-domain analysis. The simulation setting is the following.

* Run to time = 150us
* Start saving data after = 100us
* Maximum step size = 0.1us

Run the simulation and you would get the voltage across the capacitor. In order to get the phase difference, one would need to compare it with the input voltage V2. In order to get the input voltage on the same screen, do the following.

* Open the simulation window and click on PLOT. Then select “ADD PLOT TO WINDOW”. A new window opens on the same screen.
* We would like to obtain input voltage (V2) on this window. To do that go to TRACE→ADD TRACE→V(V2:+). Now V2 is plotted right on top of Vo.
* To get the phase shift between the two curves, one needs to get the physical shift in the time axis. On the simulation window there is an icon that says “Toggle Cursor”. This brings the cursor for the measurement of the position of the peaks in the two curves. Click on this icon.
* Move the cursor to the peak of the first curve. The value of the position is shown on the box on the bottom-right corner. Then move the cursor to the adjacent peak of the second curve.
* The difference in the two values is the phase shift on the time axis. Since for the 100KHz frequency, the time period is 10 µs (360 degree), a difference of 1 µs would be equivalent of a phase shift of 36 degree.
* For the parameters in Fig. 1 obtain the phase shift in degree. Then change I1 to get a phase shift of 36 degree.