NCR CAMPUS, MODINAGAR

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Analog and Digital Electronics Laboratory (18CSS201J)

Title of Experiment	: **Experiment No. 4 : Transistor as a Switch**
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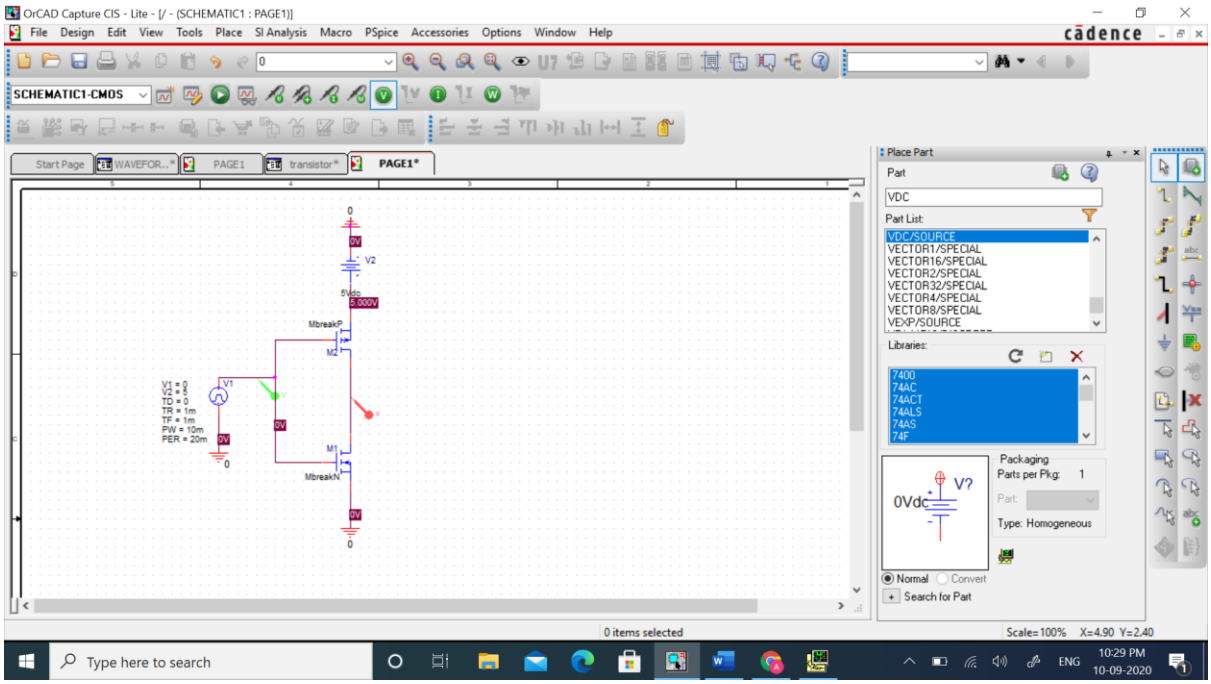
Branch-Section	**: CSE-I**

Experiment No. 4 : Transistor as a Switch

Aim: Design and implement transistor as a switch.

Apparatus Require: Transistor/Trainer Kit, Patch cords, DC Power supply, Function Generator,

Circuit Diagram:



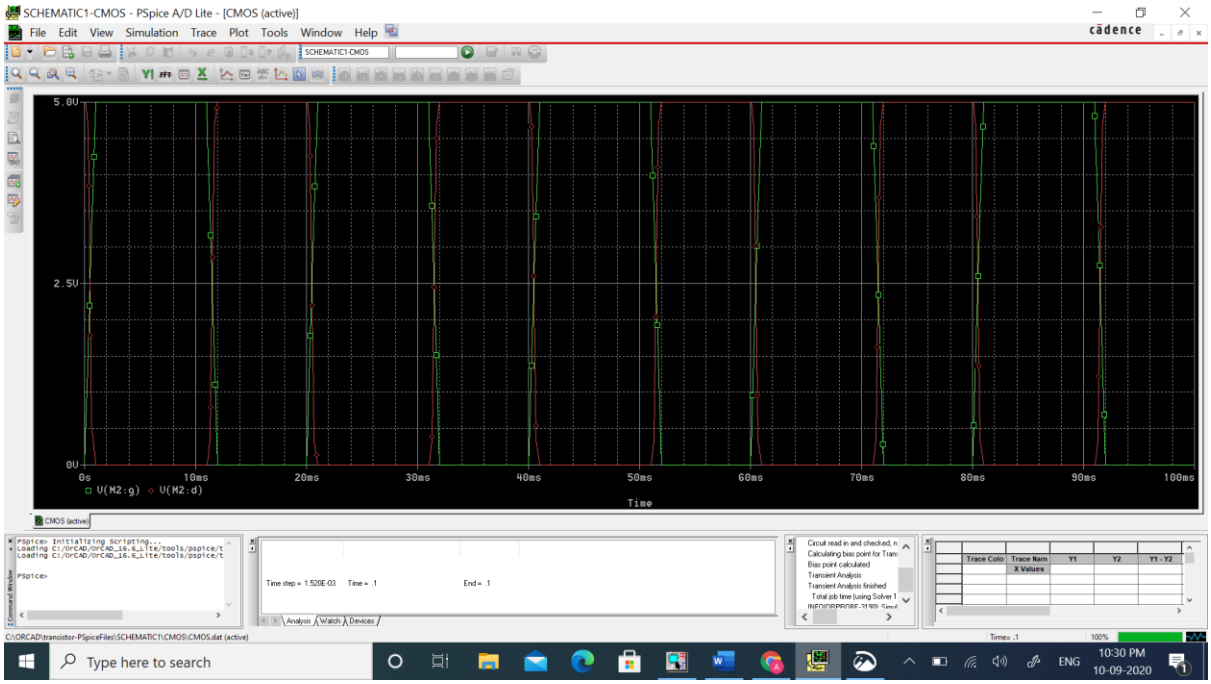
Theory

Transistor is a three terminal, bipolar, current controlled device. It works in three different regions: Active, Cutoff and Saturation according to applied biasing condition. In this circuit, a square wave input is applied. When input is high, the transistor is turned on and works in saturation region. So maximum current I_C flows through transistor as well as LED. Hence LED emits the light. When input is low (low means not enough to turn on the transistor), the transistor remains in cutoff. So current I_C is zero thus LED does not emit the light. As the input is square wave, the LED will turn on and off alternately. If output is observed on CRO from the collector then it will be also a square wave but out of phase by 180° with input. Thus transistor is working as a switch which can be made on or off by an external input.

Procedure:

1. Connect the circuit as shown in figure.
2. Apply 1 Hz square wave signal to the base and ground from function generator.
3. Apply 5V V_{CC} to collector and ground.
4. Observe the indication of LED and see the output waveforms on CRO.

Result:


SCHEMATIC1-CMOS - PSpice A/D Lite - [CMOS (active)]
File Edit View Simulation Trace Plot Tools Window Help
cadence
5.0V
2.5V
0V
0s 10ms 20ms 30ms 40ms 50ms 60ms 70ms 80ms 90ms 100ms
V(M2:g) V(M2:d)
Time
CMOS (active)
Time step = 1.520E-03 Time = .1 End = .1
Analysis Watch Devices
Trace Color Trace Name Y1 Y2 Y1 - Y2
X Values
C:\ORCAD\transistor-PSpiceFiles\SCHEMATIC1\CMOS\CMOS.dat (active)
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