

ENEE 417 -Fall 2004

Week #6

Designs #3: Ring Oscillator Circuit Designs & Layout; Op-amp Oscillators

In this experiment the CMOS inverter will be used for a ring oscillator design.

1 Design a three stage and a five stage ring oscillator. Run Spice simulations and then construct and test the circuit using the 4007 CMOS transistors. Use automated testing to bias and test the circuit and to record the oscillations.

2. Insert equal capacitors between the stages and note the effects. Then insert one Super capacitor. Vary the bias voltage and see how the circuit operates in subthreshold.

3. Do a MAGIC layout for 1.6u transistors of a three stage and a five stage ring oscillator and do a Spice extraction to check your layout results versus a PSpice run used for design (for the 1.6u MOSIS transistors).

4. Insert your ring oscillator circuits into 1.6u pads. Prepare for a MOSIS submission (those who wish to have theirs fabricated may actually submit).

5. Write a one to two page report summarizing your study.

Reference:

CMOS inverters - any standard electronics textbook