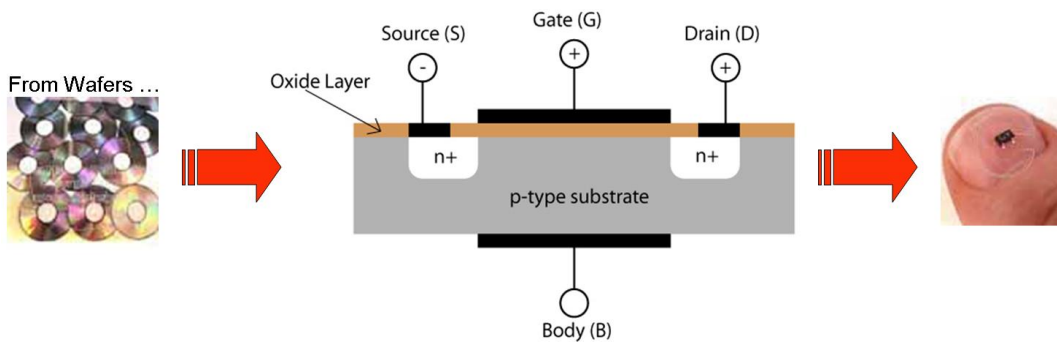
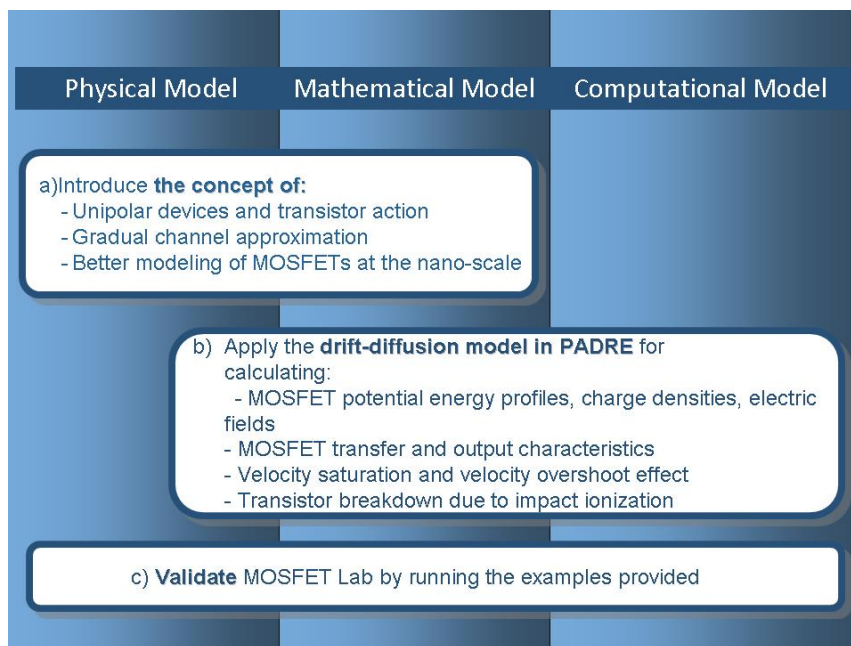


## MOSFet Learning Materials



By completing the MOSFET Lab in [ABACUS - Assembly of Basic Applications for Coordinated Understanding of Semiconductors](#), users will be able to understand a) the operation of MOSFET devices, b) the limitations of the gradual channel approximation, and c) the limitations of the drift-diffusion model.

The specific objectives of the MOSFET Lab are:



## Recommended Reading

Users who are new to the operation and modeling of MOSFET devices should consult the following resources:

1. Michael Shur. (1990). *Physics of Semiconductor Devices*. Englewood Cliffs, NJ: Prentice Hall.

2. Simon M. Sze and Kwok K. Ng. (2007). *Physics of Semiconductor Devices*. 3rd ed. Hoboken, NJ: Wiley.

3. Dragica Vasileska, Stephen M. Goodnick and G. Klimeck. (2010). *Computational Electronics: Semiclassical and Quantum Device Modeling and Simulation*. Boca Raton, LA: CRC Press.

### **Demo**

[MOSFet: First-Time User Guide](#)

[MOSFet Demonstration: MOSFET Device Simulation and Analysis](#)

### **Theoretical Descriptions**

\* [Tutorial PADRE Simulation Tools.pdf](#) (tutorial)

\* [Lecture 3A: The Ballistic MOSFET](#)

\* [Lecture 3B: The Ballistic MOSFET](#)

\* [MOSFET Operation Description](#)

\* [Physics of Nanoscale MOSFETs](#)

### **Tool Verification**

[Verification of the Validity of the MOSFET Tool](#)

### **Examples**

[MOSFET Worked out problems 1](#)

### **Exercises and Homework Assignments**

1. [MOSFET - Theoretical Exercises](#)

2. [MOSFET Exercise](#)

3. [Exercise for MOSFET Lab: DIBL Effect](#)

4. [Exercise for MOSFET Lab: Long Channel vs. Short Channel Device](#)

5. [MOSfet Homework Assignment - Role of Dielectric Constant and Thickness](#)

### 6. [Exercise for MOSFET Lab: Device Scaling](#)

## Solutions to Exercises

Work in progress!

## Evaluation

This test will assess users' conceptual understanding of the physical, mathematical and computational knowledge related to operation of MOSFET devices.

[ABACUS: Test for MOSFET Tool](#)

## Challenge

In this final challenge users will integrate what they have learned about the operation of MOSFET devices.

[MOSFET Lab - Scaling](#)