

# Introduction to Electronics



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*An introduction to electronic components and a study of circuits containing such devices.*

**TECH**



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# Module 3: Transistors Introduction and MOSFET Physics

*Study the physics of MOSFETs*

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## Lesson Objective

- Introduce the uses of transistors
- Investigate the physics of MOSFETs

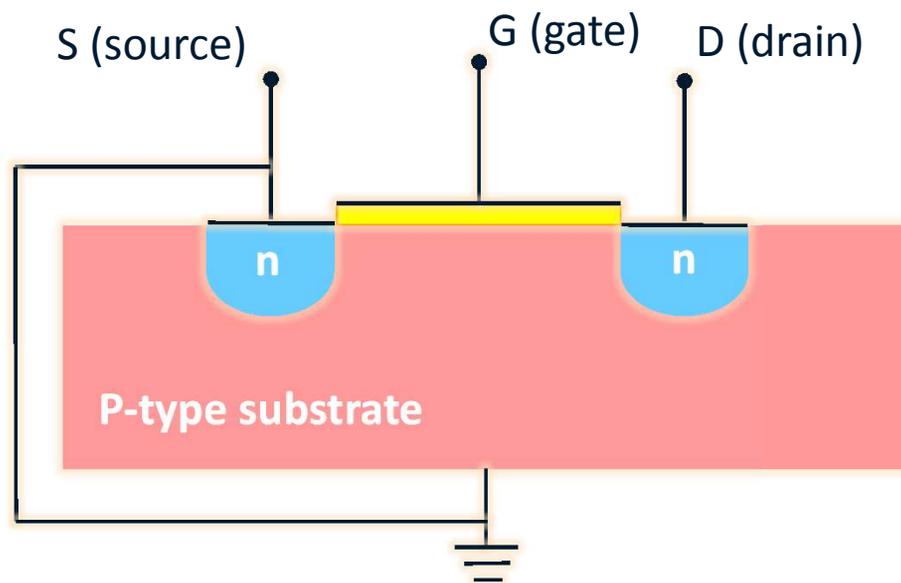
# Types of Transistors

- ⦿ MOSFET (metal-oxide-semiconductor silicon field-effect transistor)
- ⦿ BJT (bipolar junction transistor)

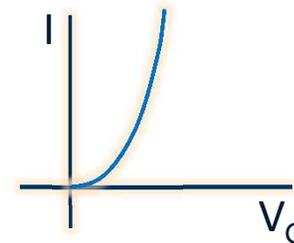
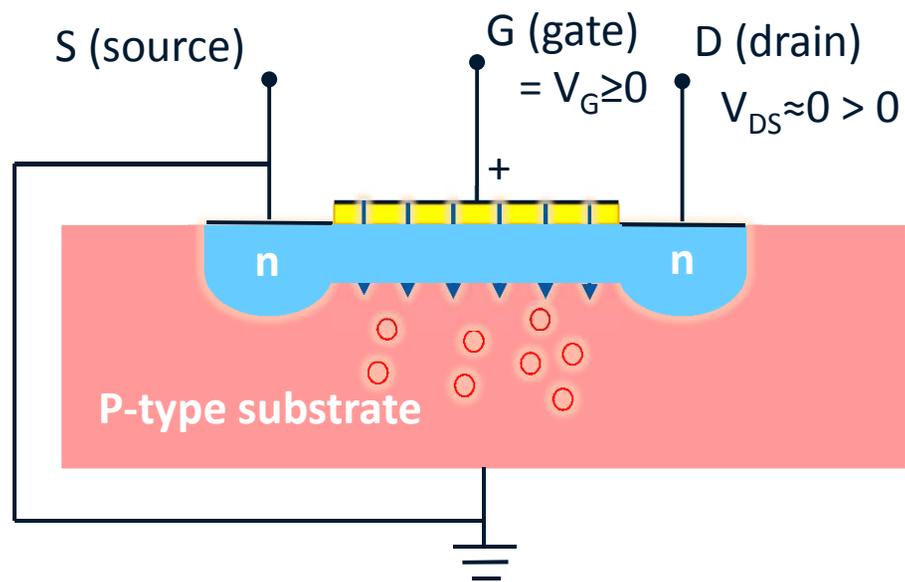
## Uses of Transistors

- ⦿ Electrically controlled switch (digital circuits/computers)
- ⦿ Amplifier (op amps)
- ⦿ Resistor with value electrically controlled

# NMOS (N-type MOSFET)

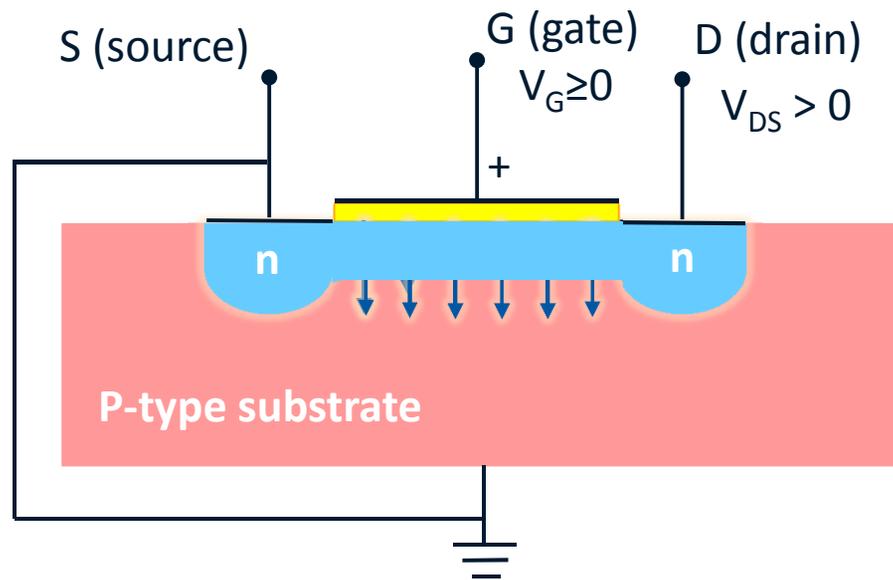


# NMOS: Vary $V_G$

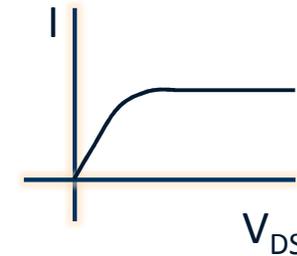


$V_{DS}$  small and constant

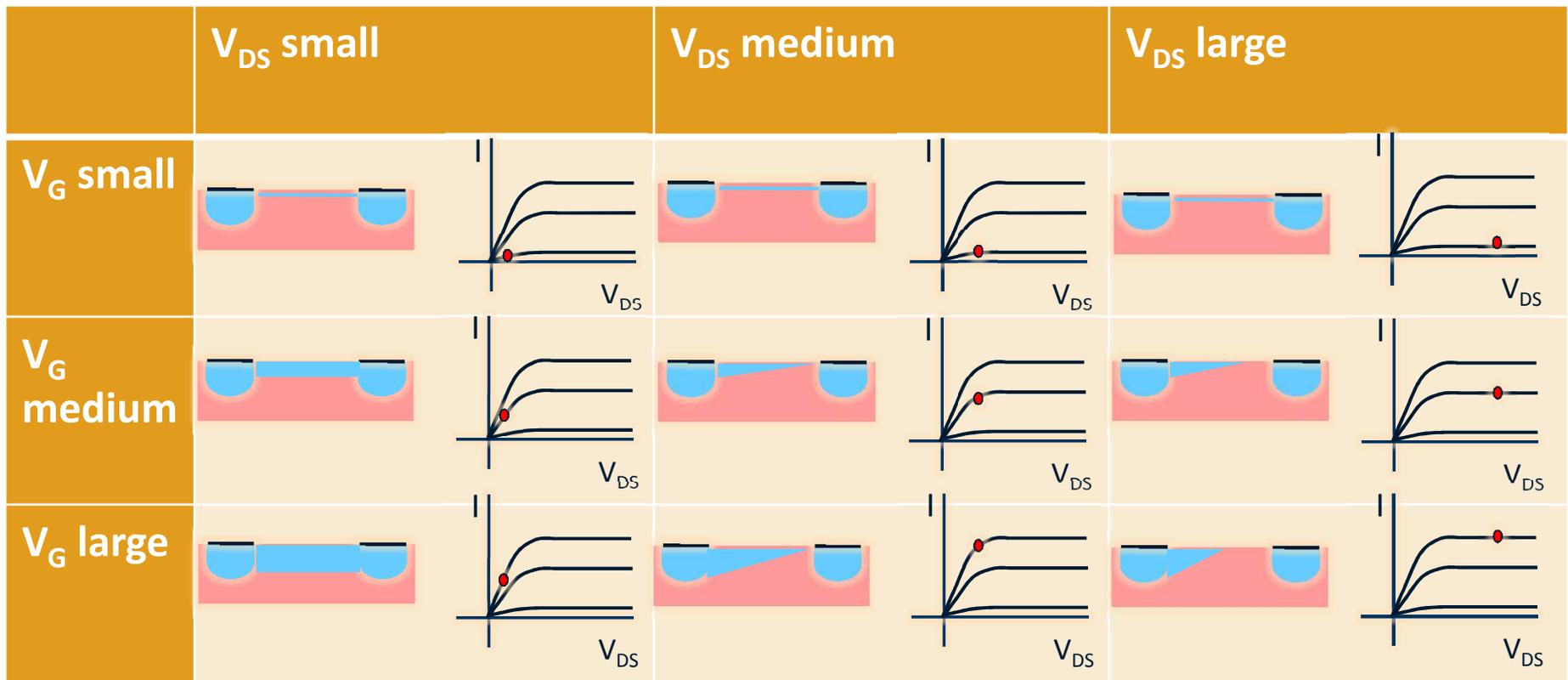
# NMOS: Vary $V_{DS}$



$V_G$  constant



# Summary



# Remainder of Module

- ⦿ MOSFET switches
- ⦿ MOSFET amplifiers
- ⦿ BJTs