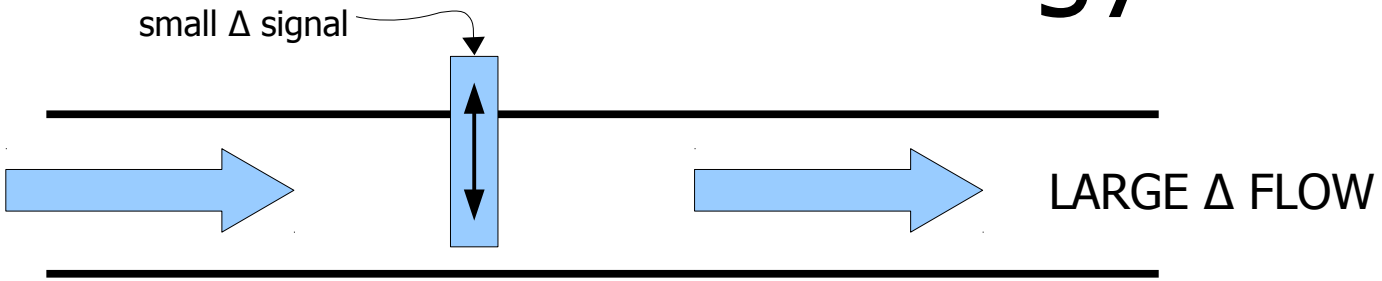
Field Effect Transistors

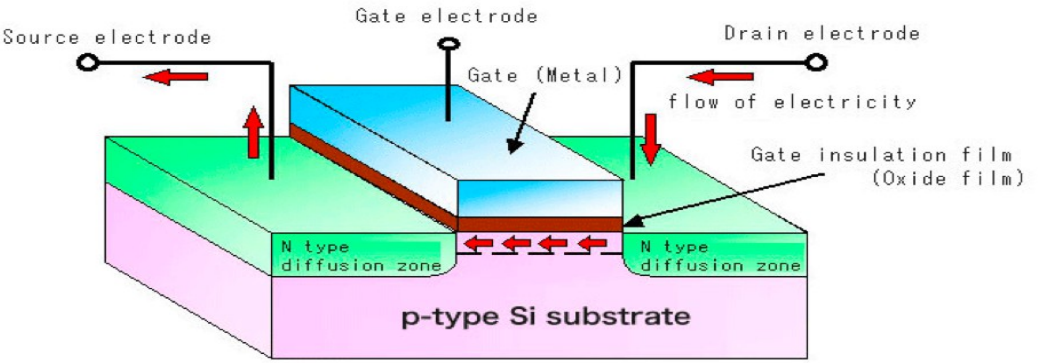
- Many types:
  - JFET (Junction FET)
  - MOSFET (metal-oxide-semiconductor FET)
  - DGMOSFET (Dual Gate MOSFET)
  - MESFET (Metal-Semiconductor FET)
  - HFET, MODFET, IGBT, FREDFET,ISFET, DNAFET
- MOSFETs rule.

Start with an Analogy



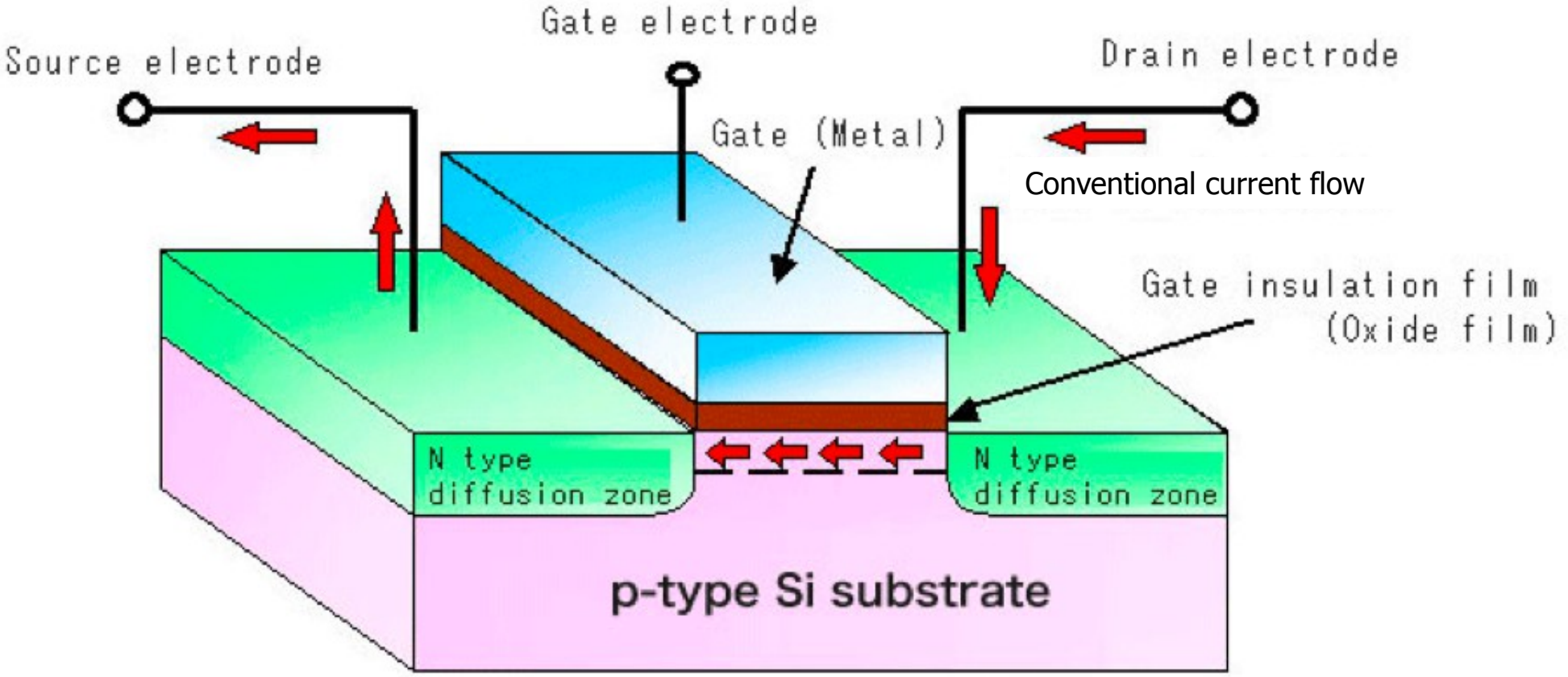
- Large pipe carrying water at high volume.
- In the pipe is a gate that restricts the flow of water.
- The gate is controlled by a small amout of force (think frictionless, massless gate).
- Now, let a small signal control the gate.
- For every small change in signal at the gate, we get a large change in current through the pipe.

Analogy Description



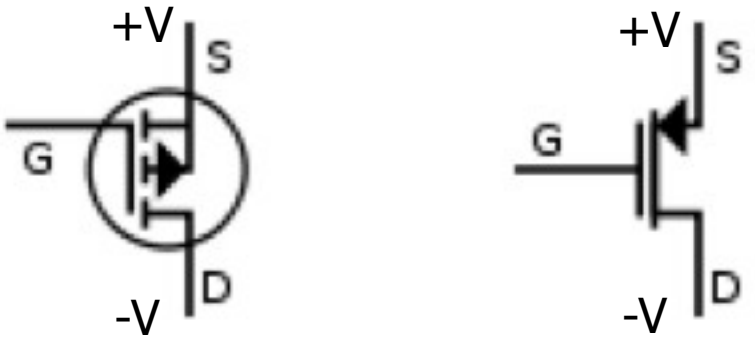
- The pipe with water flowing is the channel.
- The left end of the pipe is the source.
- The right end of the pipe is the drain.
- The gate that controls the flow is the gate.

MOSFET Construction

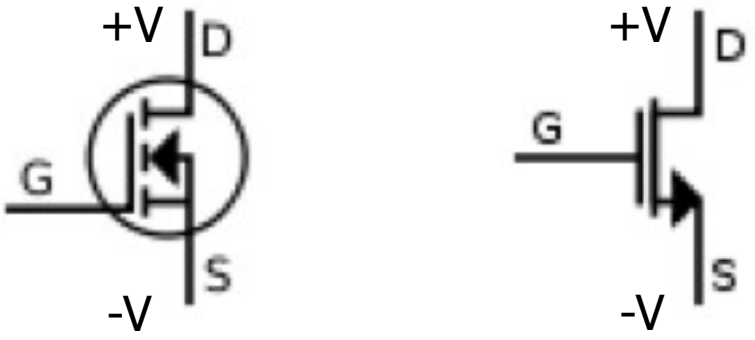


MOSFET Symbols

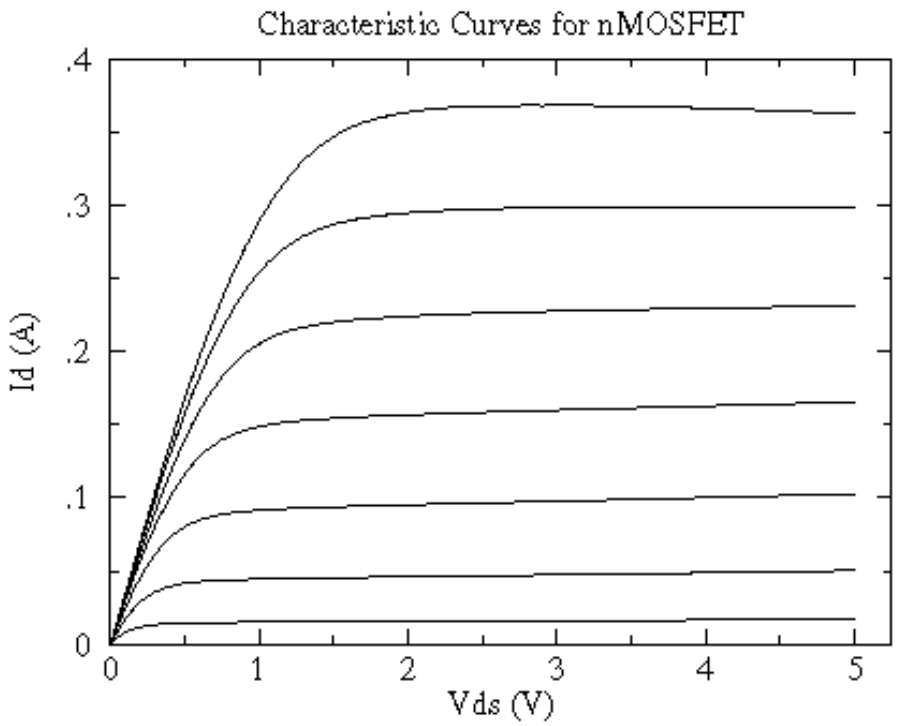
P-channel

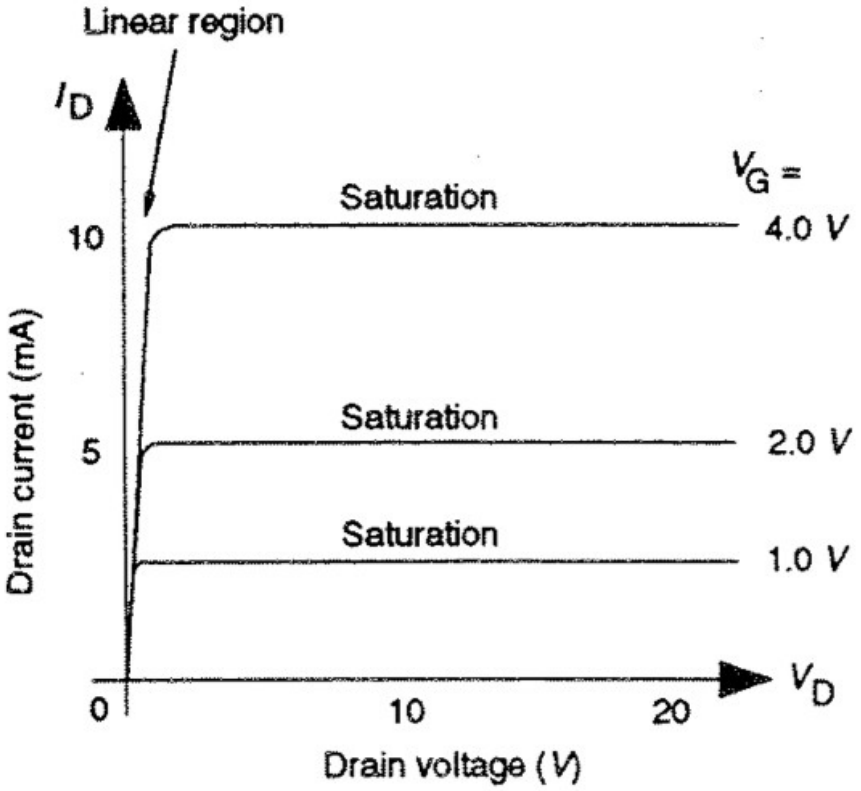


N-channel



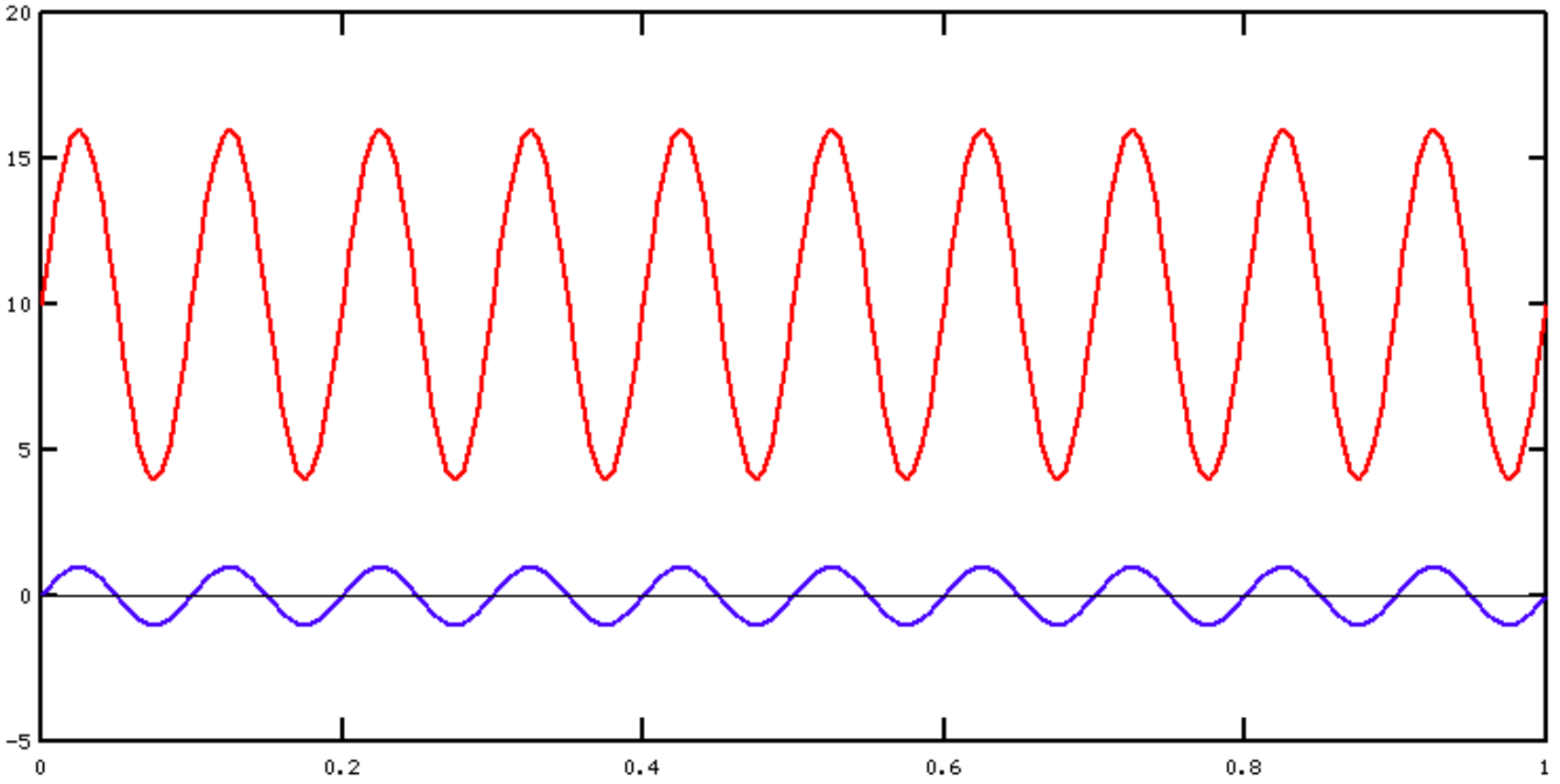
MOSFET Characteristic Curves





Analogy Signals

HOW DO WE GET FROM HERE ...



Analogy Signals

TO HERE?