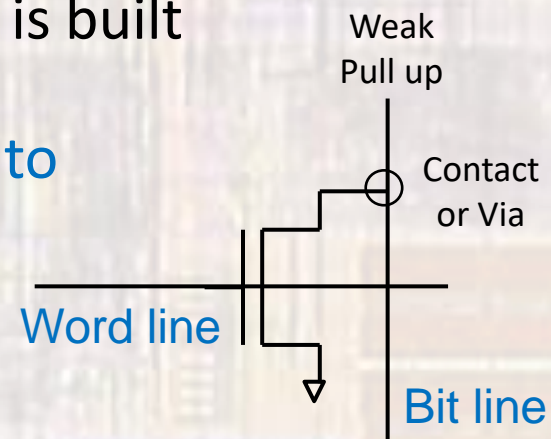# ROM

Last updated 2/5/24

Memory - ROM

- ROM – Read Only Memory

  - Memory cell (1 bit) is based on whether a MOSFET is or is not connected between the bit line and word line

  - The MOSFET structure is always part of the bit cell
    - It can be connected to the bit line through a contact or via (via ROM)
    - It can be disable by removing the S/D diffusion (diffusion ROM)

  - Cannot be modified once the part is built

  - Typically used as Boot memory or to hold chip configuration data

Weak Pull up

Contact or Via

Word line

Bit line

Memory - ROM

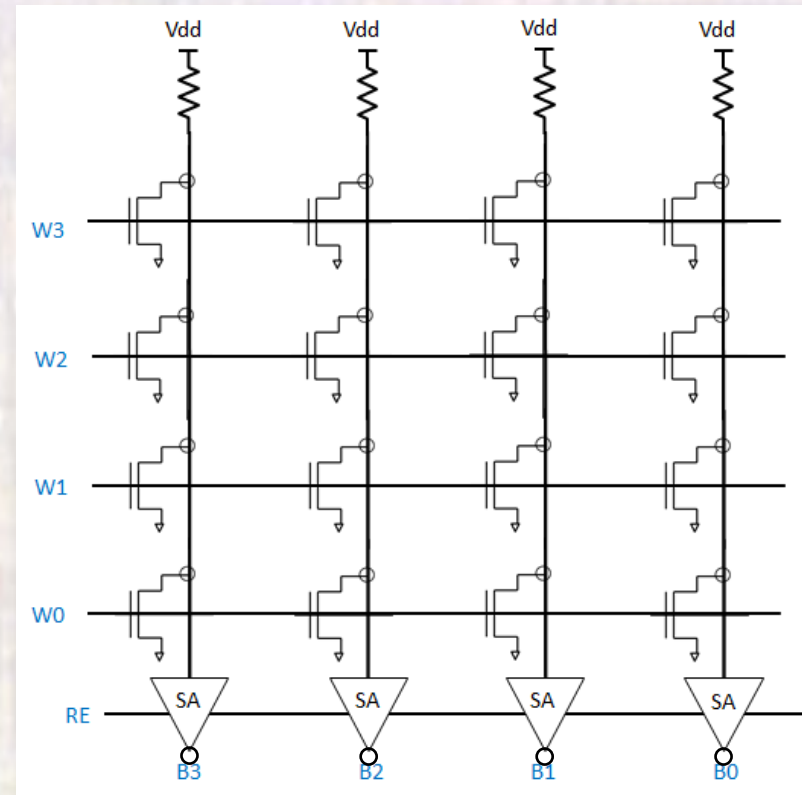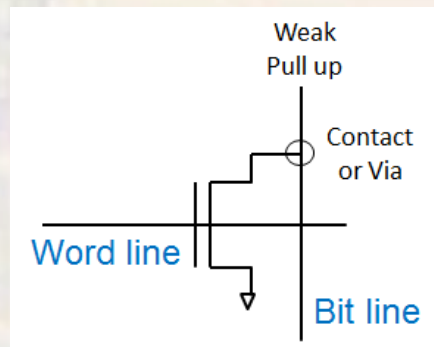- ROM – Read Only Memory
  - Read
    - All Word lines low
    - Read Enable (RE) high

    - Strobe the desired word line high

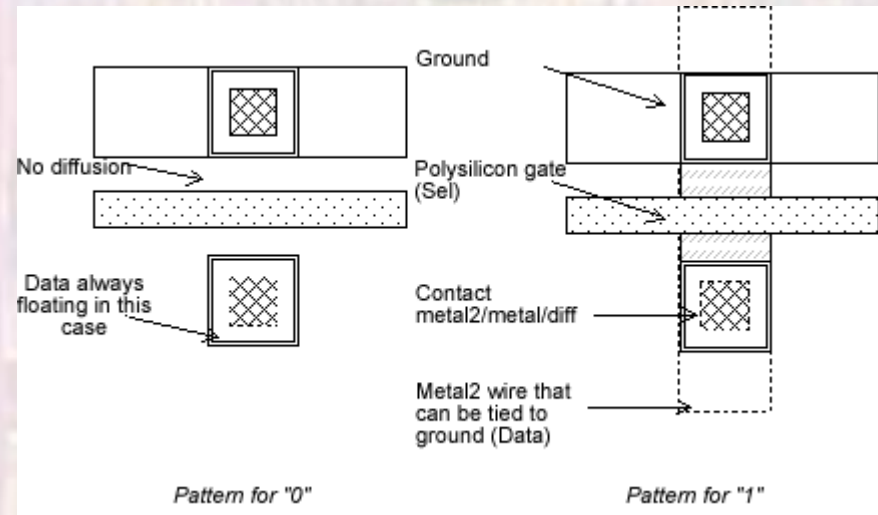   - Sense amplifiers read the value of the bit lines
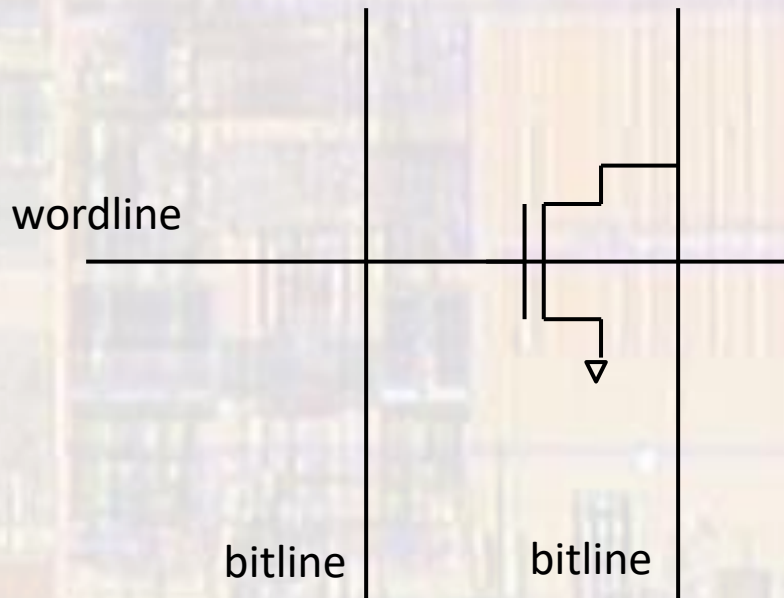   If connected – will read a "0"
    If not connected – will read a "1"

Memory - ROM

- ROM – Read Only Memory – Diffusion ROM

wordline

bitline   bitline

Ground

No diffusion

Polysilicon gate
(Sel)

Data always
floating in this
case

Contact
metal2/metal/diff

Metal2 wire that
can be tied to
ground (Data)

Pattern for "0"   *Pattern for "1"*

Memory - ROM

- ROM – Read Only Memory – Via (contact) ROM

wordline

bitline   bitline

Ground

Polysilicon gate (Sel)

Contact metal2/metal/diff

Metal2 wire that can be tied to ground (Data)

Pattern for "0"

Ground

Polysilicon gate (Sel)

Contact metal2/metal/diff

Metal2 wire that can be tied to ground (Data)

Pattern for "1"