

The Transistor

Inventors: John Bardeen, Walter Brattain, and William Shockley



Source: en.wikipedia.org/wiki/History_of_the_transistor

The transistor. Most important invention of the 20th century?

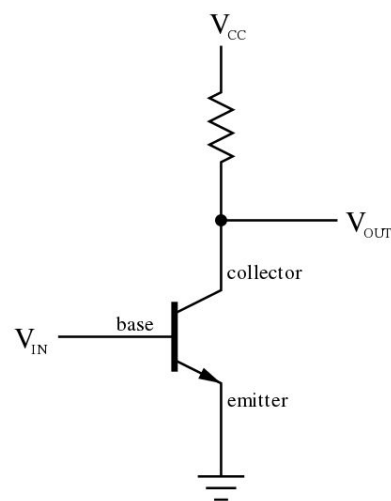
- 1947 - first transistor
- 1956 - John Bardeen, Walter Houser Brattain, and William Shockley win the Nobel Prize for Physics for research on semiconductors and their discovery of the transistor effect.
- 1954 - first working silicon transistor
- 1958 - first working integrated circuit, > 1 transistor on a chip by Kilby (part of team winning Nobel Prize in 2000)
- For 60 years - Moore's Law predicts # transistors on a chip will double every 2 years or so..smaller (usually) means faster too!
- 2018 Apple A11 iPhone chip has > 4B transistors

Two biggies:

1. Tech = exponential growth in many areas, ala Moore's law.
2. Tech is in a virtuous cycle,

A transistor is like an electronic switch, but in a solid device (solid state), not like vacuum tube gas or a light switch. A semiconductor is a device comprised of materials (like silicon) whose conductivity can be varied, sometimes conducting and sometimes insulating. Transistors form the basis of all logic gates in computers today.

One transistor (above) is an inverter: V_{CC} is power. $V_{OUT} = \text{not } V_{IN}$



Two transistors in **parallel** form a OR/NOR gate; in **series** they are a AND/NAND gate.
CSC 220: and, or, invert gives us all Boolean functions.

Fun examples here: hyperphysics.phy-astr.gsu.edu/hbase/Electronic/trangate.html

Sources:

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