

BJT vs MOSFET

Electrical Engineering

Current control against voltage control, and what each choice costs in a real design.

Bipolar transistor

- Current controlled: $I_C = \beta I_B$
- Needs continuous base current
- $V_{CE(sat)}$ around 0.2 V when on
- Better matching for analogue pairs
- On-state loss rises with temperature

MOSFET

- Voltage controlled by V_{GS}
- Gate takes current only when switching
- On state behaves as a resistance
- Very high input impedance
- $R_{DS(on)}$ rises with temperature

THE DIFFERENCE THAT MATTERS

MOSFETs parallel safely because a hot device takes less current; bipolar devices do the opposite and hog it.

Gate charge, not gate current, sets MOSFET drive needs — a large part still wants amps of peak gate current to switch fast.