

Common-Emitter Amp

Electrical Engineering

Biasing the voltage-divider stage, then reading gain off two resistors.

Bias first, gain second. A stage biased badly cannot be rescued by gain.

1 Set the quiescent point

Aim for V_{CE} near half the supply so the output can swing both ways.

2 Choose the emitter resistor

One or two volts across R_E makes the bias immune to β and to heat.

3 Size the bias divider

Divider current about ten times I_B keeps the base voltage stiff.

4 Find the gain

$A_v \approx -R_C/R_E$ when degenerated, or $-g_m R_C$ with R_E bypassed.

5 Add coupling capacitors

Each cap and its resistance set a low corner; place them below the band.

Bypassing R_E buys gain and loses stability: the gain then follows g_m , which moves with bias current and temperature.