Objectives

• What are the advantages between active and passive bias networks?

• How is RF from DC decoupled?

• How do you dimension a passive bias network?
Biasing networks

• Biasing networks are needed to set appropriate operating conditions for active devices

There are two types:

• Passive biasing (or self-biasing)
  – resistive networks
  – drawback: poor temperature stability

• Active biasing
  – additional active components (thermally coupled)
  – drawback: complexity, added power consumption
Passive biasing

- Simple two element biasing
- Blocking capacitors $C_B$ and RFCs to isolate RF path
- Very sensitive to collector current variations
Passive biasing

- Voltage divider to stabilize $V_{BE}$
- Freedom to choose suitable voltage and current settings ($V_x, I_x$)
- Higher component count, more noise susceptibility

$I_B \approx 10\% I_X$
Active biasing

- Base current of RF BJT (Q₂) is provided by low-frequency BJT Q₁
- Excellent temperature stability (shared heat sink)
- High component count, more complex layout
Active biasing in common base

DC path

RF path
FET biasing

Bi-polar power supply

Uni-polar power supply

\[ V_G < 0 \text{ and } V_D > 0 \]