

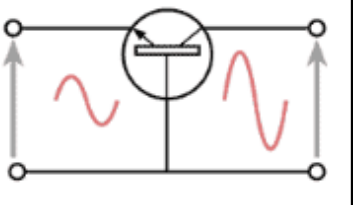
# Transistor Circuit Configurations

## Common Base: Common Collector; Common Emitter

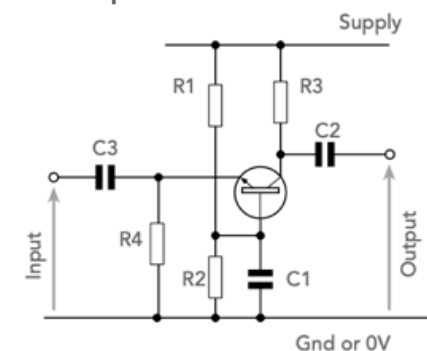
There are three circuit configurations that can be used for transistor circuit designs, namely the common base, common collector (emitter follower) and the common emitter. Each has its own characteristics so it's necessary to select the right type for any circuit design.

### Common Base

Theoretical circuit



Example circuit



The common base transistor circuit gains its name because the base electrode is common to the input and output circuits. Although not as commonly used as the other configurations, it offers a low input impedance.

Typical applications:

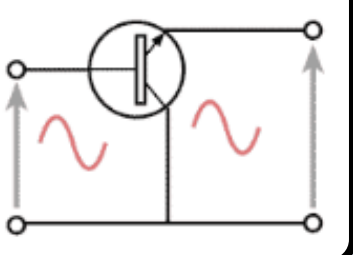
- RF amplifiers
- Low impedance microphone preamplifiers
- Applications needing low input impedance

#### General characteristics

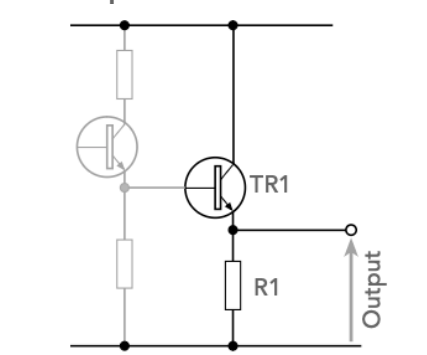
PARAMETER	CHARACTERISTICS
Voltage gain	Medium
Current gain	Low
Power gain	Low
Input / output phase relationship	0°
Input resistance	Low
Output resistance	Medium

### Common Collector

Theoretical circuit



Example circuit



The common collector gains its name from the fact that the collector is common to the input and output.

It's normally called an emitter follower, because the emitter follows the base voltage although with a 0.6V difference

Typical applications:

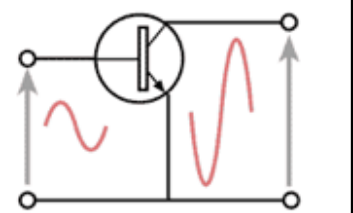
- buffer amplifier
- The input resistance is  $\beta$  times the emitter resistor giving it a high input resistance.

#### General characteristics

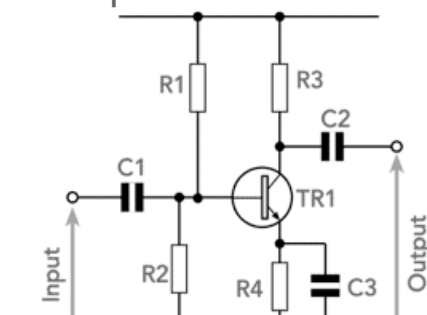
PARAMETER	CHARACTERISTICS
Voltage gain	Unity
Current gain	High
Power gain	Medium
Input / output phase relationship	0°
Input resistance	High
Output resistance	Low

### Common Emitter

Theoretical circuit



Example circuit



Gains its name from the fact that the emitter is common to both input and output circuits.

It is the most common of the formats for transistor amplifier stages.

Typical applications:

- general purpose amplifier
- digital drivers
- general purpose driver

#### General characteristics

PARAMETER	CHARACTERISTICS
Voltage gain	Medium
Current gain	Medium
Power gain	High
Input / output phase relationship	180°
Input resistance	Medium
Output resistance	Medium