# Comparison of the three transistor configurations

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# Advantages of the CE configuration

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# Comparison of the three transistor configurations

| Parameter | CB | CE | CC |
|---|---|---|---|
| Input resistance | | | |
| Output resistance | | | |
| Current gain | | | |
| Voltage gain | | | |
| Power gain | | | |

# Input Resistance

| | CB | CE | CC |
|---|---|---|---|
| Input is applied between | Emitter and base | Base and emitter | Base and collector |
| | Forward biased | Forward biased | Reverse biased |
| Input resistance | Low | Low | Very high |
| | $r_{in}=\frac{\Delta V_{EB}}{\Delta I_E}$ | $r_{in}=\frac{\Delta V_{BE}}{\Delta I_B}$ | $r_{in}=\frac{\Delta V_{BC}}{\Delta I_B}$ |
| | About 100Ω | About 750Ω | About 750kΩ |

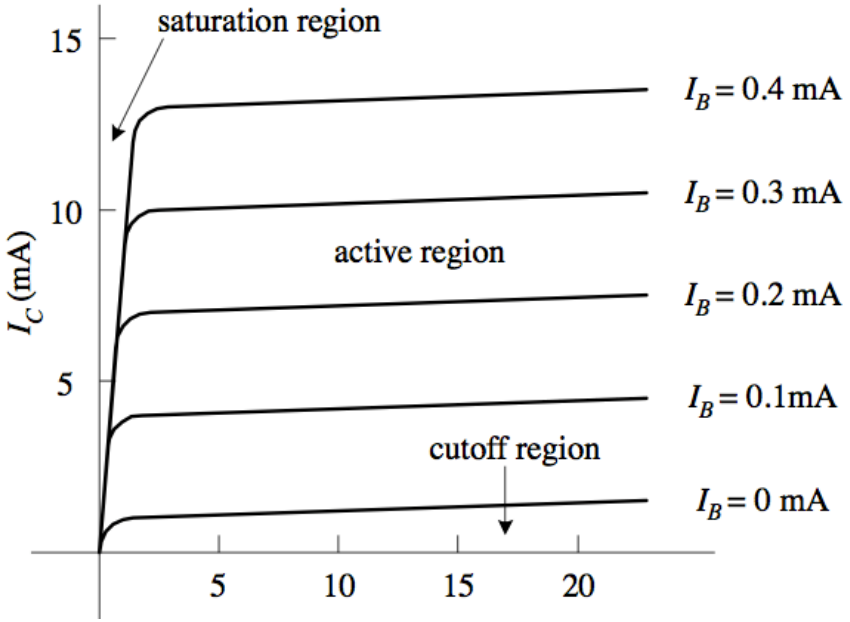
# Comparison of the three transistor configurations

| Parameter | CB | CE | CC |
|---|---|---|---|
| Input resistance | Low (about 100Ω ) | Low (about 750Ω ) | Very large ( about 750 kΩ) |
| Output resistance | | | |
| Current gain | | | |
| Voltage gain | | | |
| Power gain | | | |

# Output Resistance

| | CB | CE | CC |
|---|---|---|---|
| Output is applied between | Collector and base | Collector and emitter | Emitter and collector |
| | Reverse biased | | |
| Output resistance | Very large | Large | Low |
| | $r_{out}=\frac{\Delta V_{CB}}{\Delta I_C}$ | $r_{out}=\frac{\Delta V_{CE}}{\Delta I_C}$ | $r_{out}=\frac{\Delta V_{EC}}{\Delta I_E}$ |
| | About 450kΩ | About 45 kΩ | About 50Ω |

Output characteristics of CE configuration



# Comparison of the three transistor configurations

| Parameter | CB | CE | CC |
|---|---|---|---|
| Input resistance | Low (about 100Ω ) | Low (about 750Ω ) | Very large ( about 750 kΩ) |
| Output resistance | Very large (about 450 kΩ) | Large ( about 45 kΩ) | Small (50 Ω) |
| Current gain | | | |
| Voltage gain | | | |
| Power gain | | | |

# CURRENT GAIN

| | CB | CE | CC |
|---|---|---|---|
| Current gain | $\alpha = \frac{\Delta I_c}{\Delta I_E}$ | $\beta = \frac{\Delta I_C}{\Delta I_B}$ | $\gamma = \frac{\Delta I_E}{\Delta I_B}$ |
| | Almost unity (less than 1) | Large (ranges from 20 to 500) | Large ( $\approx$ current gain of CE configuration) |
| | | | |
| Voltage gain | Large (About 150) | Large (About 500) | Almost unity ( less than 1) |
| Reason | Very high output circuit resistance | | Very low output resistance |
| | | | |
| Power Gain | Large | Very large | Small |

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| Input resistance | Low (about 100Ω ) | Low (about 750Ω ) | Very large ( about 750 kΩ) |
| Output resistance | Very large (about 450 kΩ) | Large ( about 45 kΩ) | Small (50 Ω) |
| Current gain | Almost unity (less than 1) | Large (ranges from 20 to 500) | Large (ranges from 20 to 500) |
| Voltage gain | Large (about 150) | Large (about 500) | Almost unity ( less than 1 ) |
| Power gain | Large | Very large | Small |

# Advantages of the CE configuration

CE transistor configuration is used in about 90 to 95% of all transistor applications.

- It has high current gain which may range from 20 to 500.
- It has the highest voltage gain and power gain of three transistor connections.
- It has moderate output to input impedance ratio (about 50). This makes CE configuration an ideal one for coupling between various transistor stages.

# Thank You