

BJT Amplifier Configurations

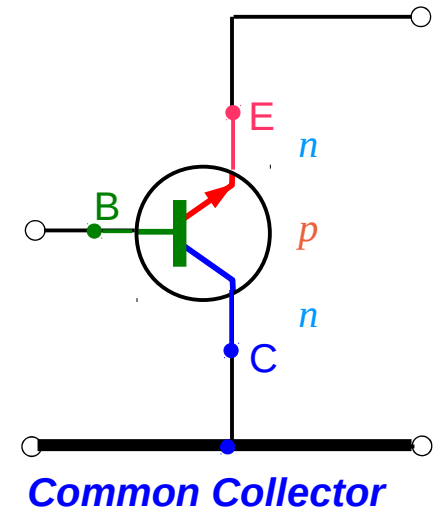
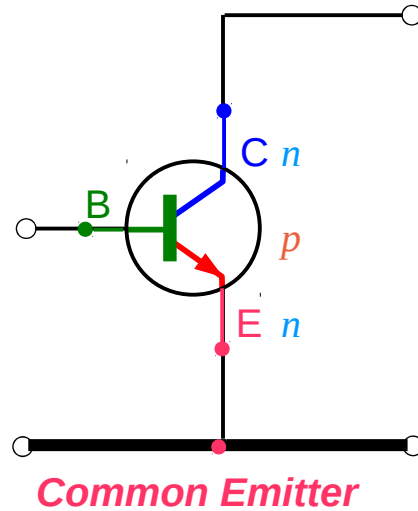
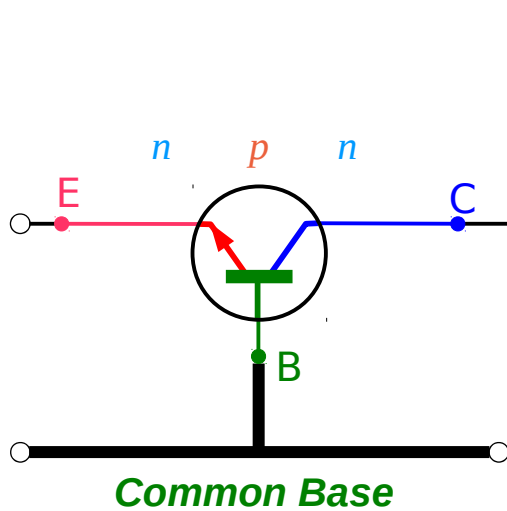
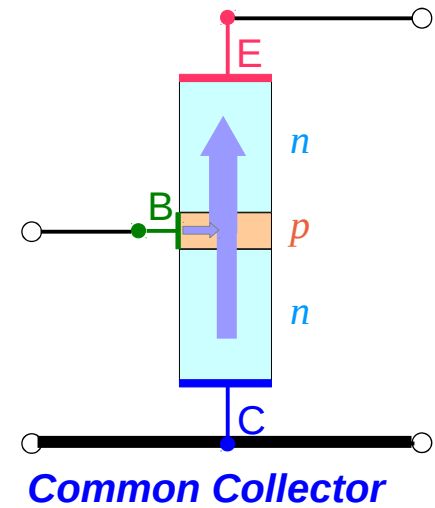
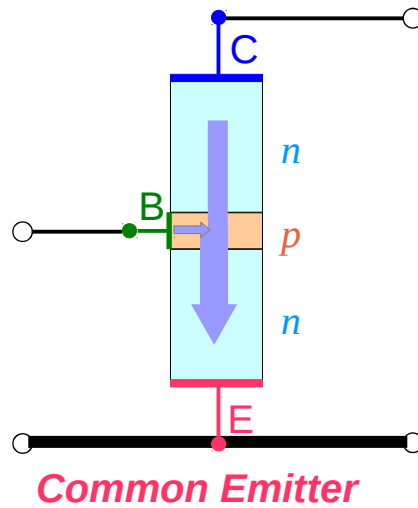
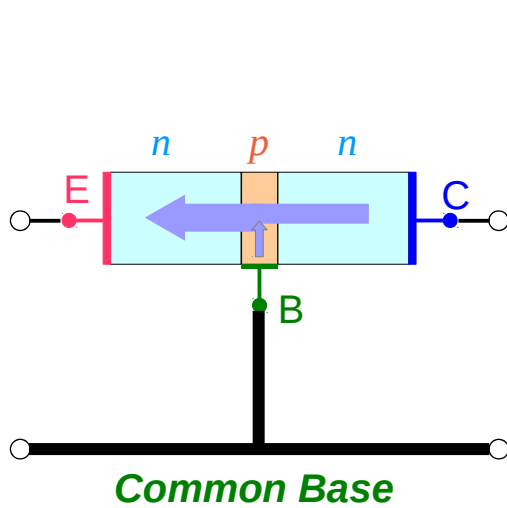
Copyright (c) 2012 - 2017 Young W. Lim.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

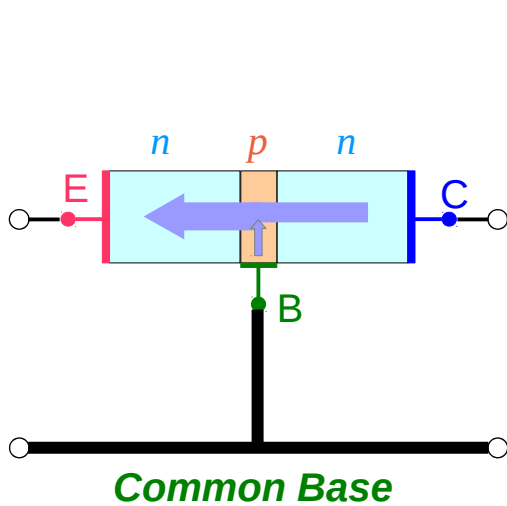
Please send corrections (or suggestions) to youngwlim@hotmail.com.

This document was produced by using OpenOffice and Octave.

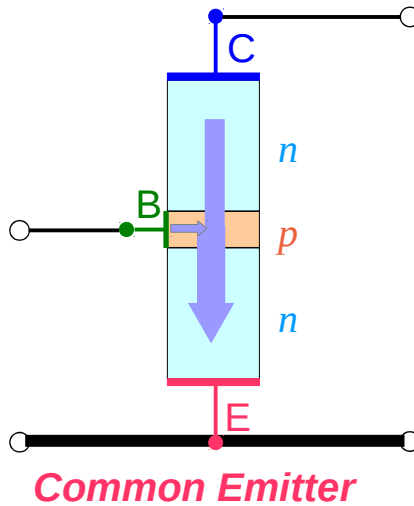
BJT Amplifier Configurations



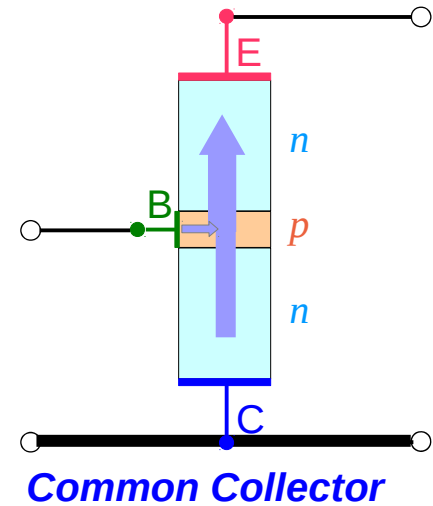
BJT Configuration Properties



input Z : low EB
output Z : high CB
voltage gain : high
current gain : unity

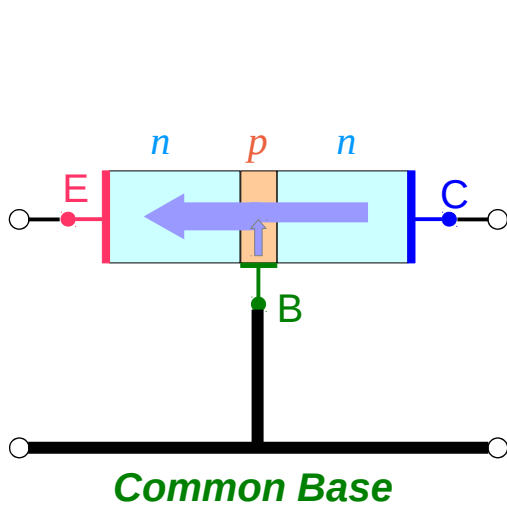


input Z : medium BE
output Z : medium CE
voltage gain : high
current gain : high

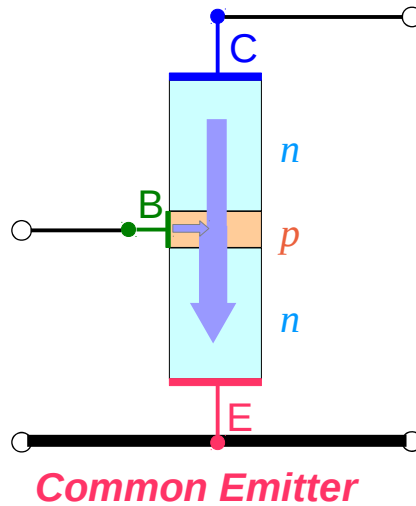


input Z : high BC
output Z : very low EC
voltage gain : unity
current gain : high

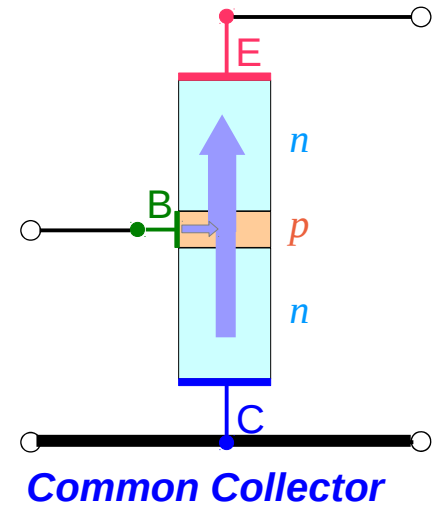
BJT Configuration Properties



Z_{in} : low r_e'
 Z_{out} : high r_C
 A_v : high r_C/r_e'
 A_i : unity 1

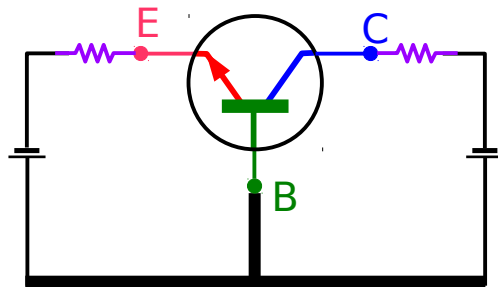


Z_{in} : medium $\beta r_e'$
 Z_{out} : medium r_C
 A_v : high r_C/r_e'
 A_i : high β



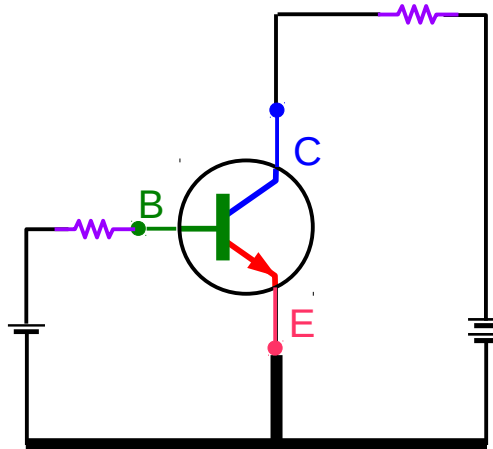
Z_{in} : high $\beta(r_e' + r_e)$
 Z_{out} : very low r_e'
 A_v : unity 1
 A_i : high β

DC Bias



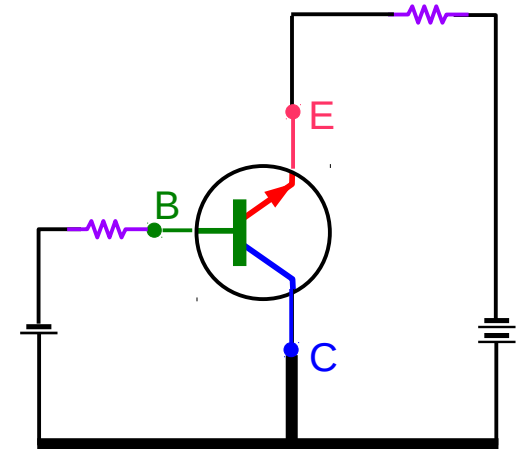
Common Base

RF Applications



Common Emitter

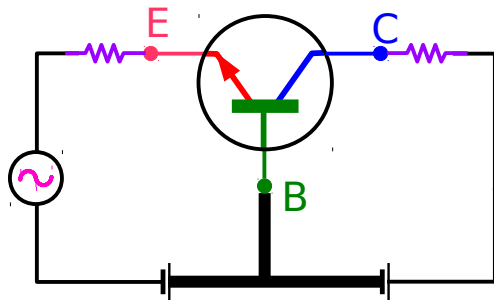
Widely used



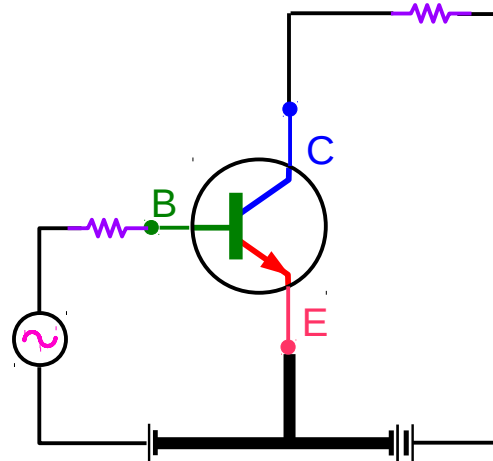
Common Collector

*Emitter Follower
Buffer to
Low Impedance Load*

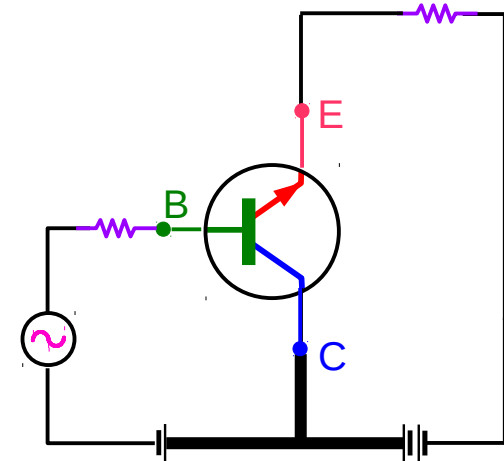
DC Bias + AC Small Signal



Common Base

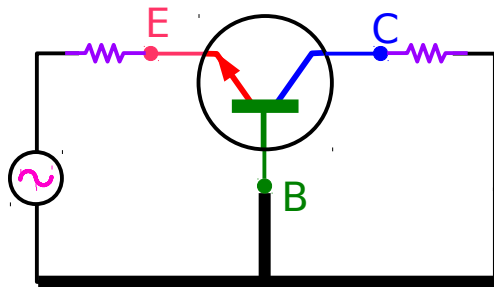


Common Emitter

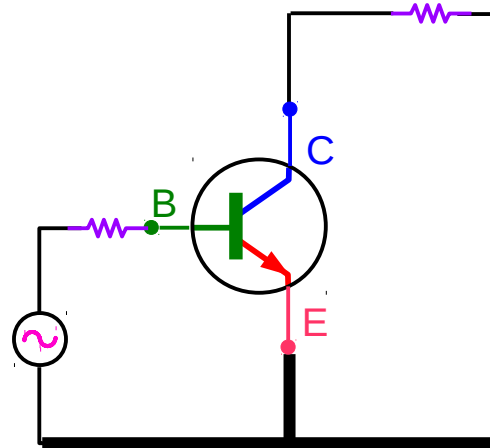


Common Collector

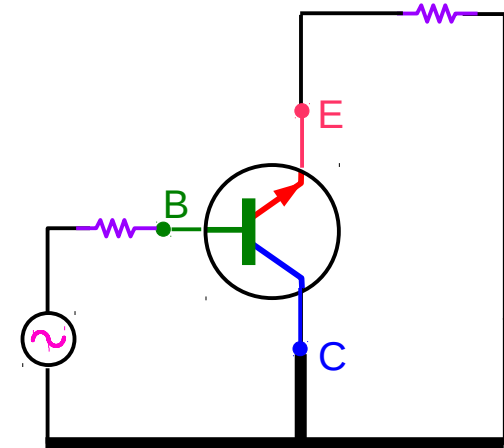
AC Equivalent Circuits



Common Base

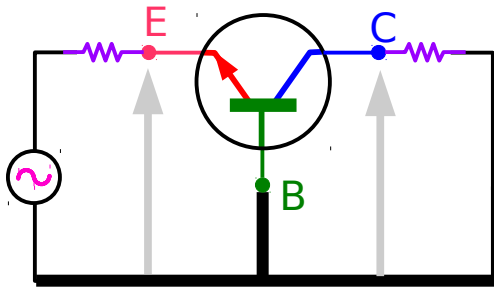


Common Emitter

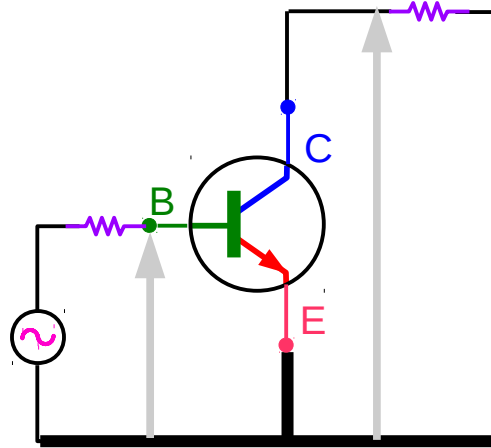


Common Collector

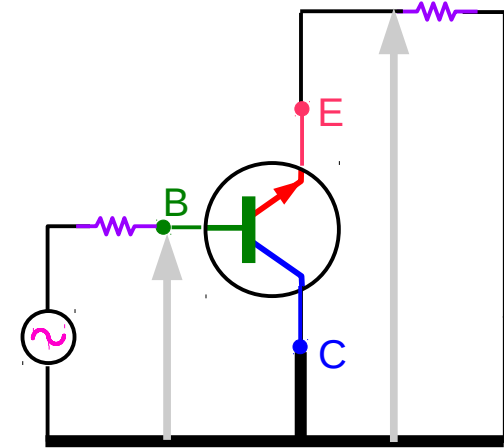
Voltage Gain



Common Base

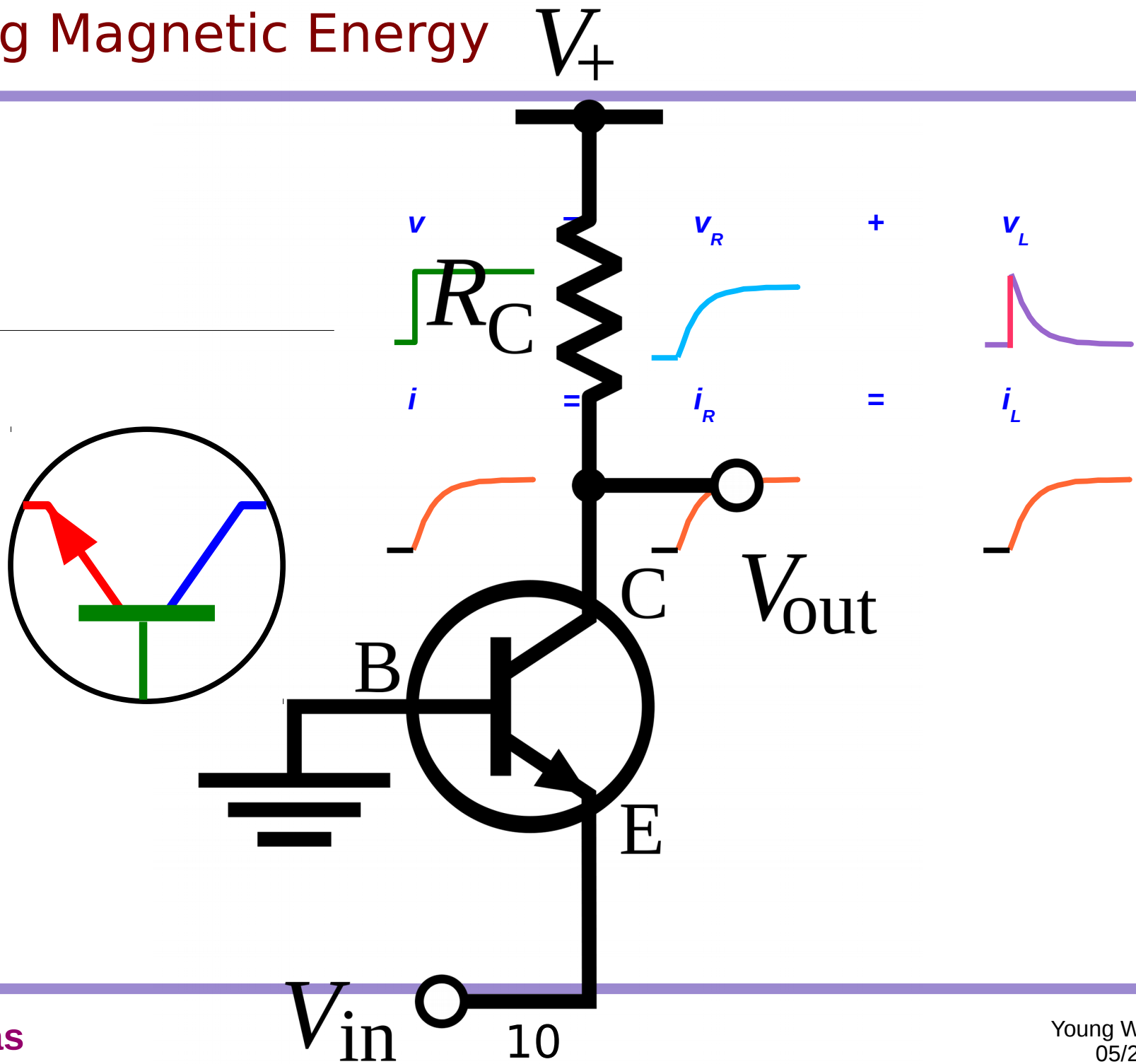


Common Emitter



Common Collector

Storing Magnetic Energy



References

[1] <http://en.wikipedia.org/>

[2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003