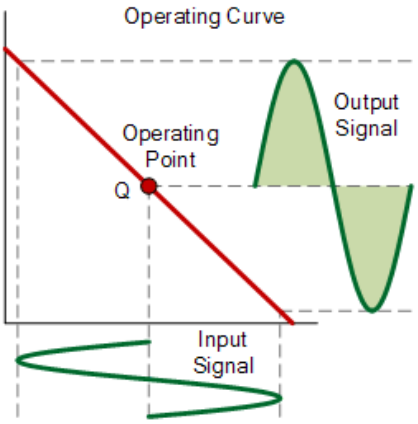
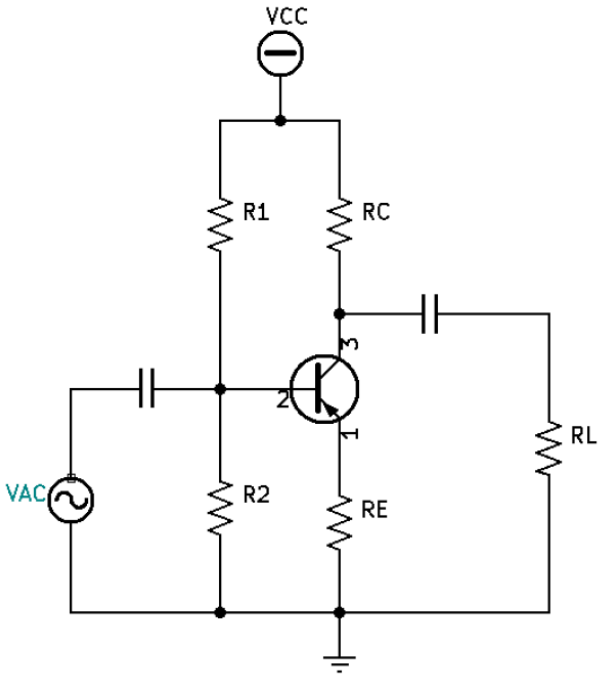
Class A amplification:

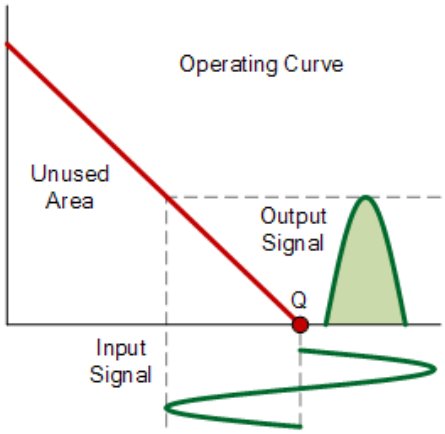
- Transistor Amplification is active for 360° of the input cycle (always on – DC current).
- Achieves a highest degree of linearity
- $Efficiency_{class\ A} = \frac{P_{out}}{P_{Consumed}} \approx \frac{P_{RL}}{IC \times VCE}$
- $MaxEfficiency_{class\ A} \approx 25\%$

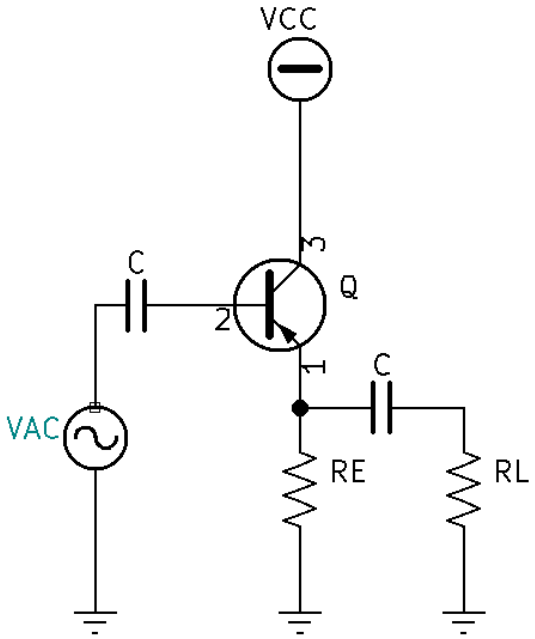




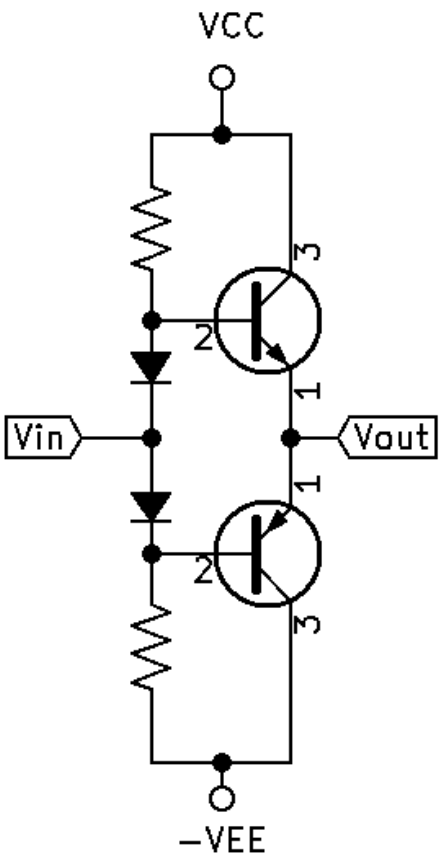
Class B amplification:

- Transistor Amplification is active for nearly 180° of the input cycle (on nearly 50% of the time).
- $MaxEfficiency_{class\ B} \approx 50\%$

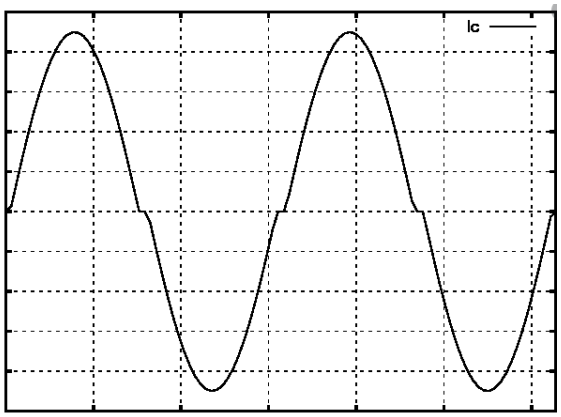




Class AB amplification:

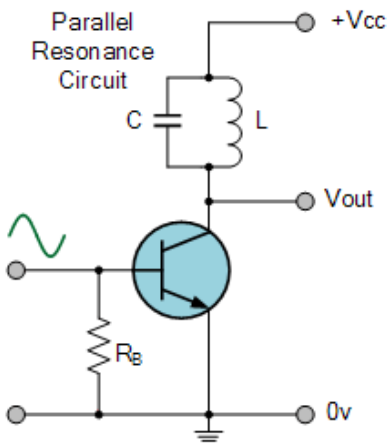


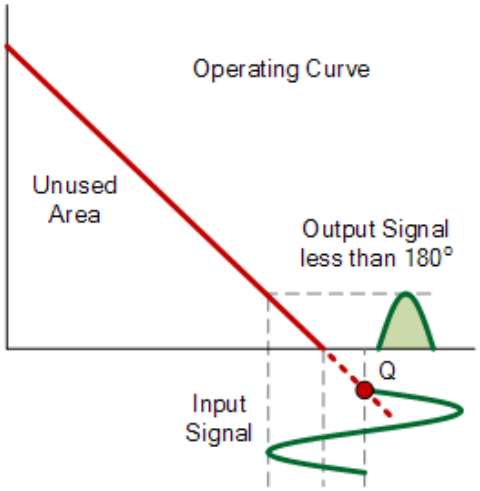
- Transistors are never on at the same time.
- Transistor Amplification is active for each transistor nearly 180° of the input cycle (on nearly 50% of the time). This means that nearly 360° of the input signal is amplified.
- Crossover distortion occurs when both transistors are off.
- Achieves a high degree of linearity
- $MaxEfficiency_{classAB} \approx 50\%$



Class C amplification:

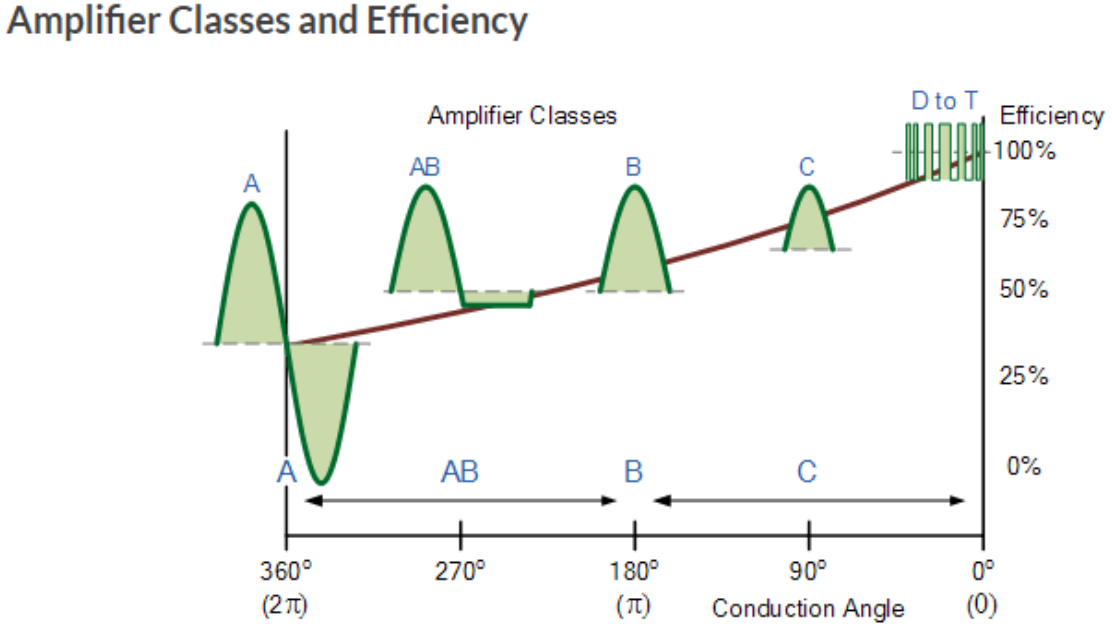
- Transistor Amplification is active less than 180° of the input cycle (less than 50% of the time).
- Commonly uses: high frequency sine-wave oscillators & radio frequency amplifiers
- Achieves a low degree of linearity
- $MaxEfficiency_{classC} \approx 75\%$





Class D amplification:

- Non-linear switching amplifier or PWM amplifier.
- No period during a cycle where the voltage and current waveforms overlap.
- $MaxEfficiency_{classC} \approx 100\%$



References:

"Amplifier Classification and Efficiencies." *Amplifier Classes*, www.electronics-tutorials.ws/amplifier/amplifier-classes.html.

Cross-over Distortion Image. www.researchgate.net/profile/George_Slade/publication/263115807/figure/fig7/AS:669483857350667@1536628798367/Class-B-push-pull-load-current-showing-crossover-distortion-near-zero-crossing-points.ppm.