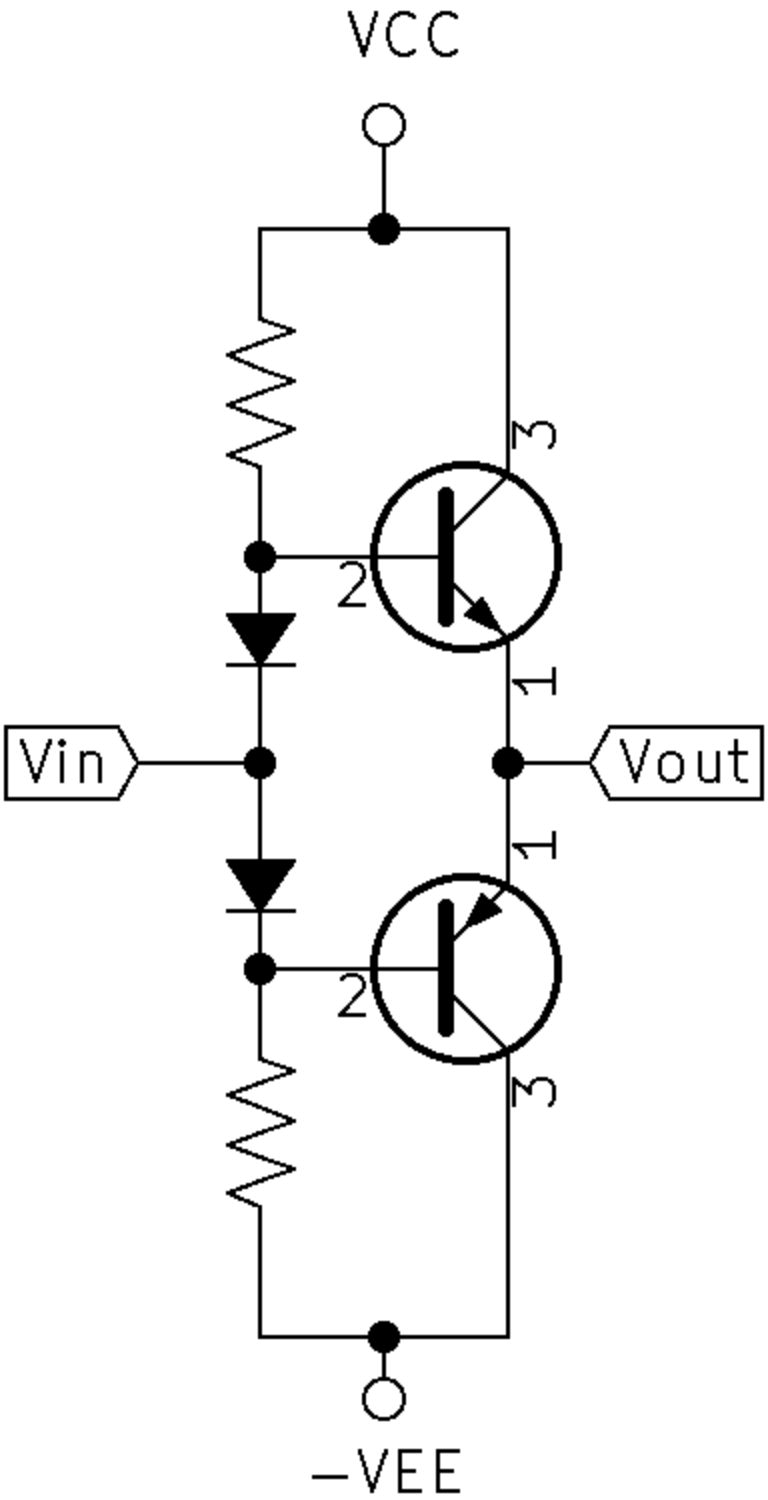
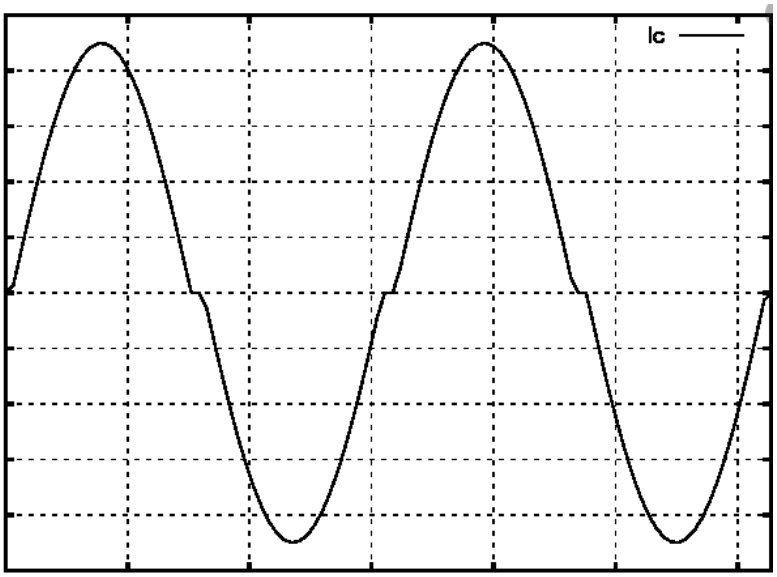
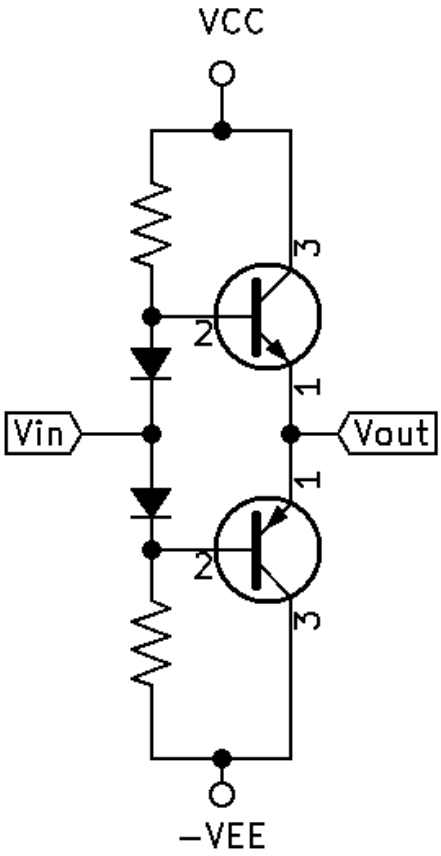

VCC
3
2
1
Vin
Vout
1
2
3
−VEE

Class AB amplification Characteristics:

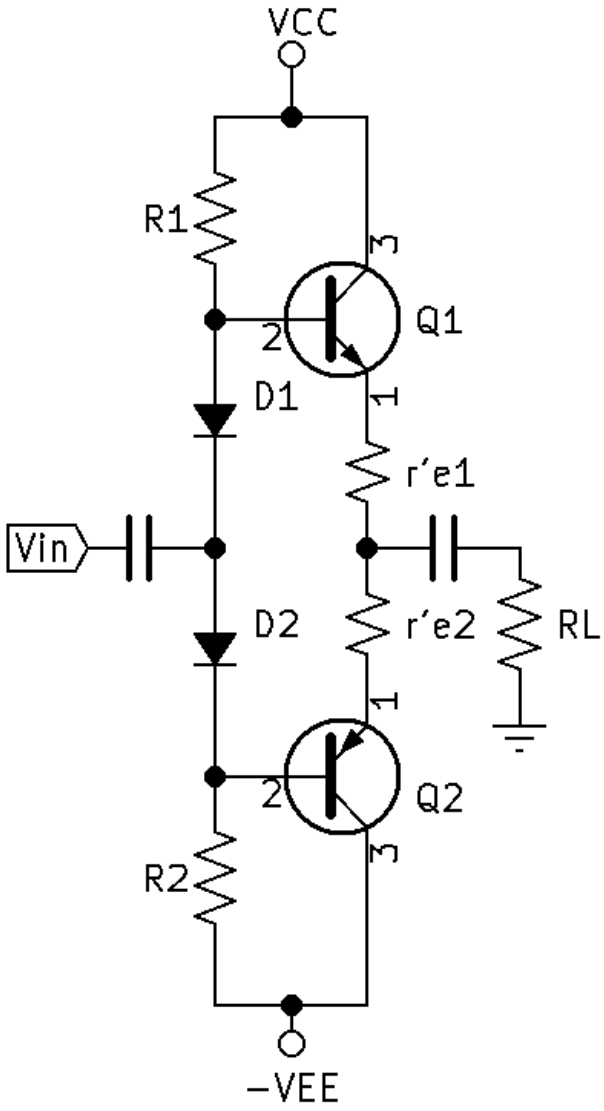
- $\Delta v = 1, \Delta i = \text{high}$
- High Zin and Low Zout
- Improved efficiency over Class A
- $MaxEfficiency_{classAB} \approx 50\%$
- Transistors are never on at the same time. Current path is through the load only.
- Transistor Amplification is active for each transistor nearly 180° of the input cycle (on nearly 50% of the time). This means that nearly 360° of the input signal is amplified.
- Achieves a high degree of linearity
- Crossover distortion occurs when both transistors are off.





Design:

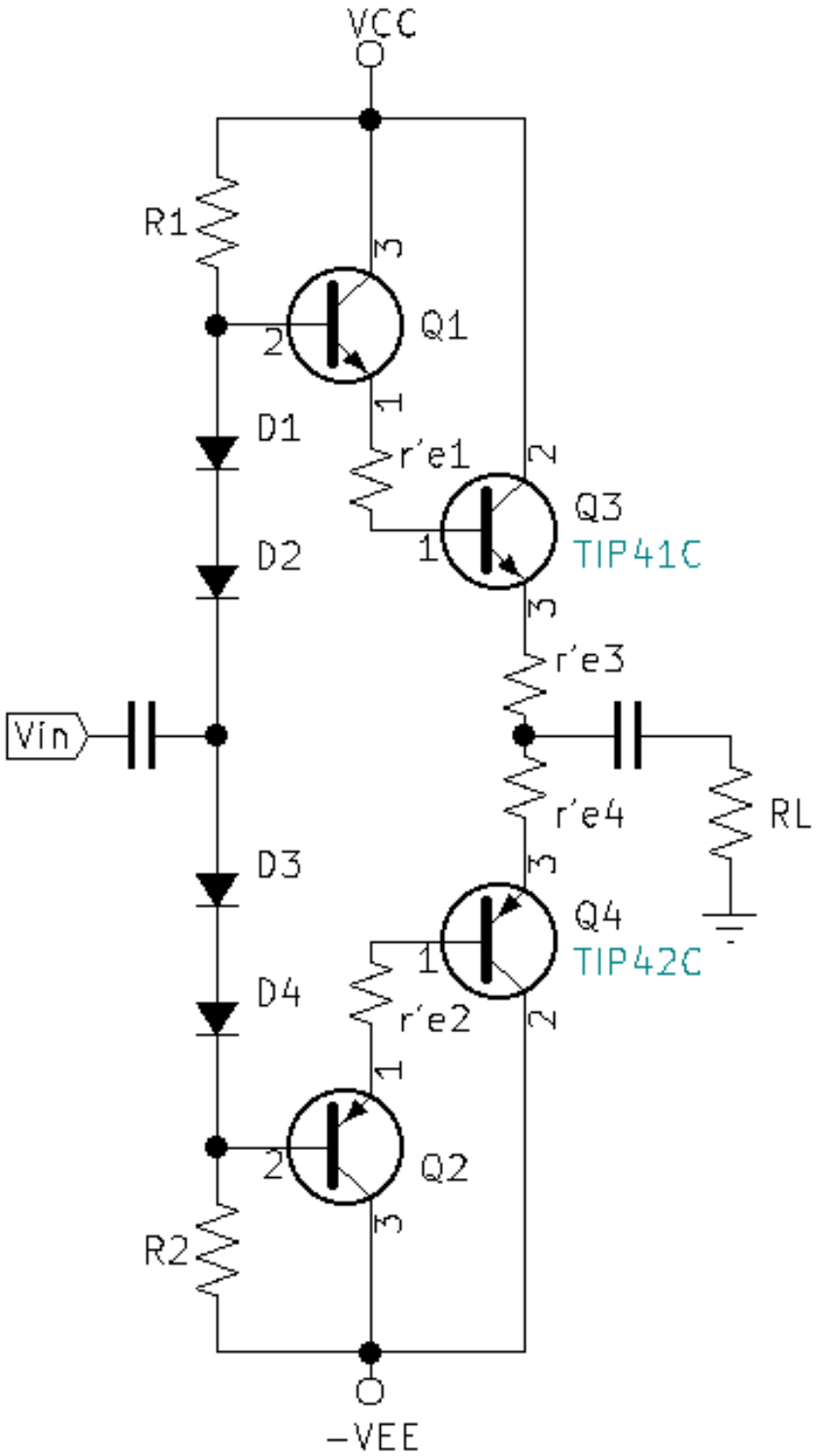
- $Q1\ beta \approx Q2\ beta$
- $Voutmaxp \approx \frac{VCC+VEE}{2}$
- $Vinmaxp \approx Voutmaxp$
- $Ie_{max} \approx \frac{Voutmaxp}{RL}$
- $Ib_{max} \approx \frac{Ie_{max}}{B+1}$
- $IR1 \geq 10 \times Ib_{max}$
- $VR1 = \frac{VCC+VEE}{2} - VD1 - VD2$
- $R1 = \frac{VR1}{IR1}$
- $R2 = R1$



- Treat as though Q1 is on and Q2 is off. Then find Zin and Zout.
  - $Zin = [((RL + r'e1)(B + 1)//R1) + r'd1]//[r'd2 + R2]$
    - $r'd = \frac{0.026}{I_F}$
  - $Zout = \frac{[Rgen//(r'd2+R2)+r'd1]//R1}{B+1} + r'e1$

High Power Push-Pull:

- Follow the previous process, compensate for additional components.



Shoot-Through:

- Shoot-Through is a non-desirable condition in which the transistors are conducting current at the same time.

- Shoot-Through can occur due to a voltage bias mismatch between the transistors and the diodes additionally Shoot-Through can be thermally or heat induced.

- Shoot-Through can be eliminated by using a small Swamping Resistor. The larger the Swamping resistor the greater the Cross-Over Distortion will be. Typically 0.1Ω