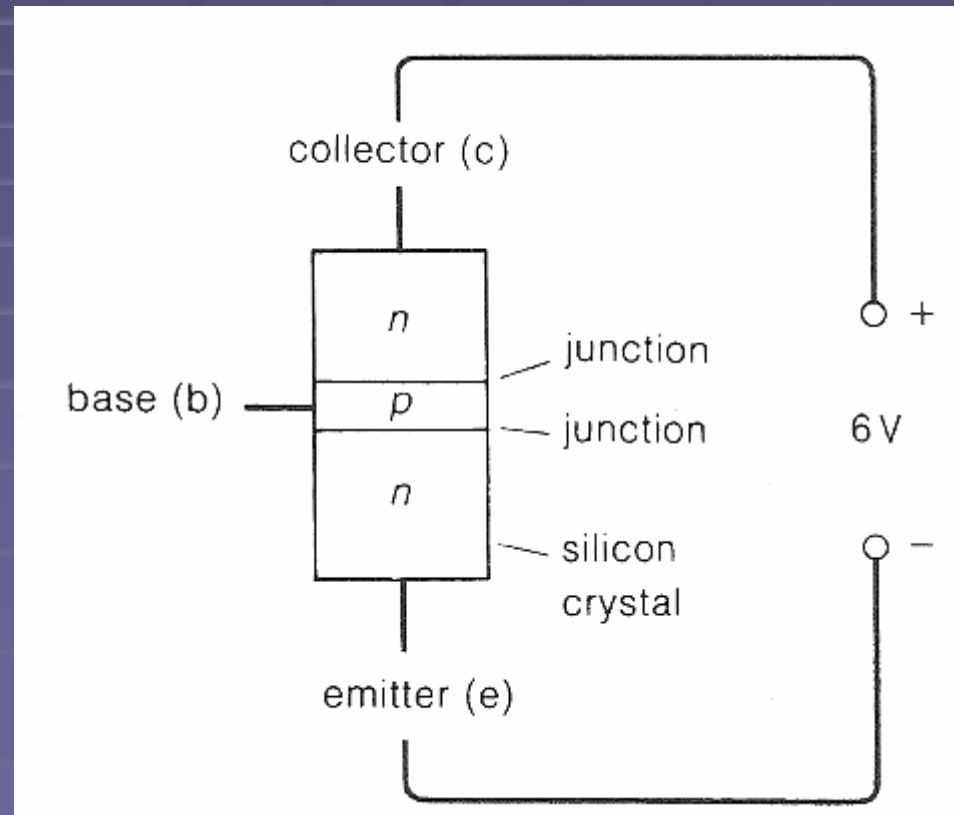


The amplifier

Transistor

- Consists of a semiconductor chip, usually silicon, doped so that two p-n junctions diodes are formed back to back.
- The n-type regions are the emitter and collector, the p-type region is the base.
- If the battery is connected across the transistor, the upper junction is reverse biased, so no current flows.



- If a small p.d. is applied across the lower junction so that it is forward biased. A current flows through the base, but this current greatly reduces the 'current blocking' effect of the upper junction. The junction starts to conduct and current flows between emitter and collector.
- Typically, a small current in the base or input circuit can cause a current fifty to a hundred times larger to flow in the collector or output circuit.
- Amplification: $A = u_2 / u_1$ (u_1 – the original p.d., u_2 – amplified p.d.)

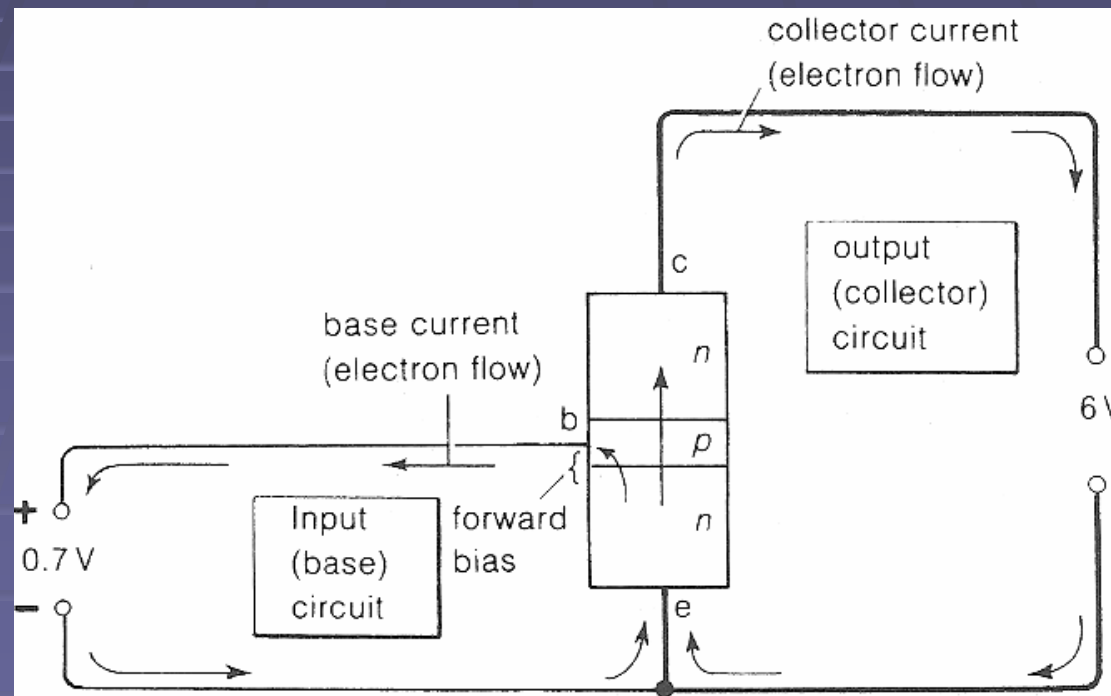


Figure 3 When a forward bias is applied to the base-emitter junction, a current flows.

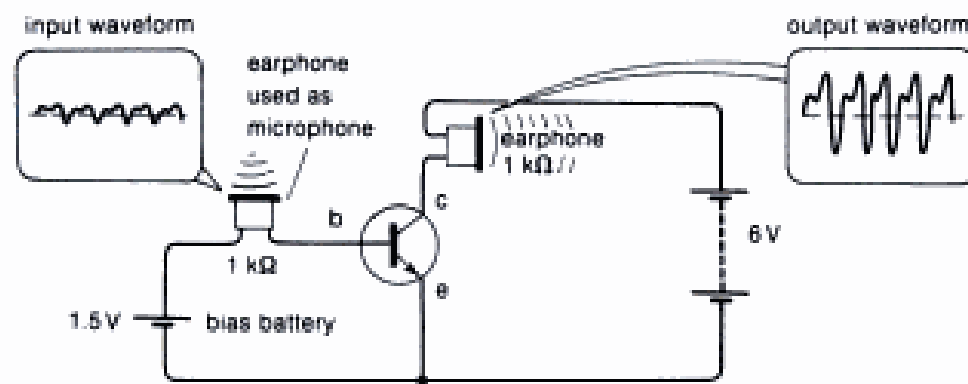


Figure 5 A simple transistor amplifier. The small variations in the base current affect the resistance of the transistor so that similar, but much greater current variations occur in the collector circuit

- In low-frequency amplifiers we usually use capacitors with capacity of 10^4pF . What is their capacitance at frequency of 1kHz?