Diodes and Transistors

1   <u>Diodes</u>

1.1   Construction

1.1.1   P-N Junction
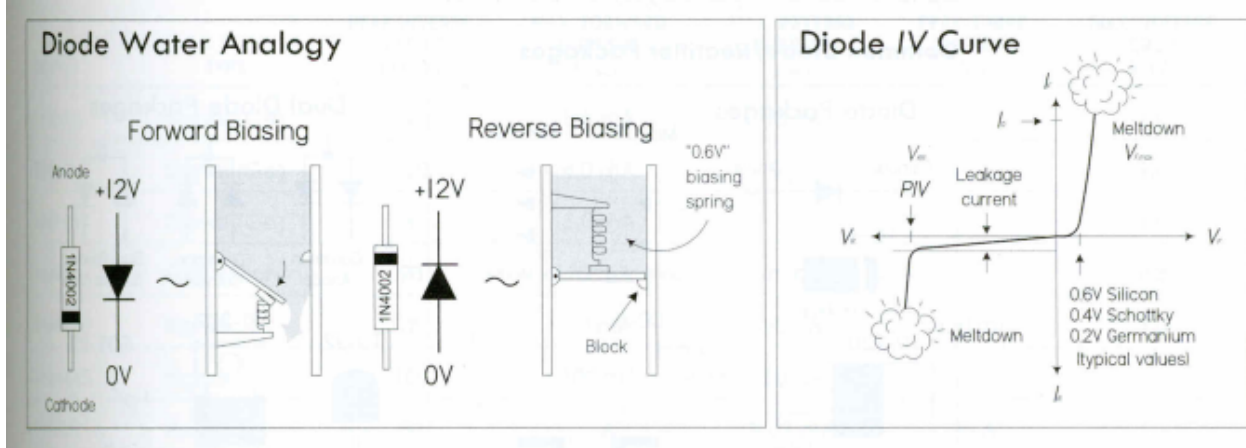
1.2   Biasing

1.2.1   Forward Bias – if greater than _____ V, then current flows from anode to cathode

1.2.2   Reverse Bias – Does current flow? Y N

1.2.3   I-V curve and effective resistance

1.2.3.1   Need to limit current through a diode when forward biased

1.3   Mechanical Analogy

Source: Scherz, P. (2006). Practical Electronics for Inventors, McGraw-Hill. ISBN 0071452818

1.3.1   Like a _____ _____
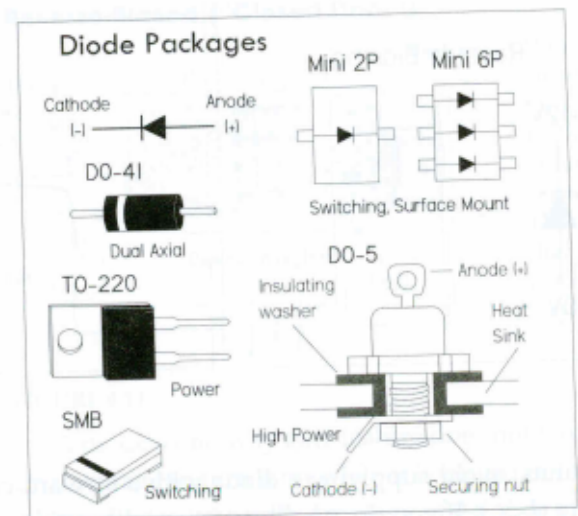
1.4   Circuit Symbol

1.5   Varieties and Applications

1.5.1   One-way current flow

1.5.2   Voltage clamp

1.5.3   Rectification

1.5.4   Producing light! LED

Source: Scherz, P. (2006). Practical Electronics for Inventors, McGraw-Hill. ISBN 0071452818

2 Transistors

2.1 Construction

2.1.1 NPN

2.1.2 PNP

2.2 Circuit Models

2.2.1 Diode model

2.2.2 Simplified schematic

2.3 Mechanical Analogy

2.3.1 NPN

2.3.2 PNP

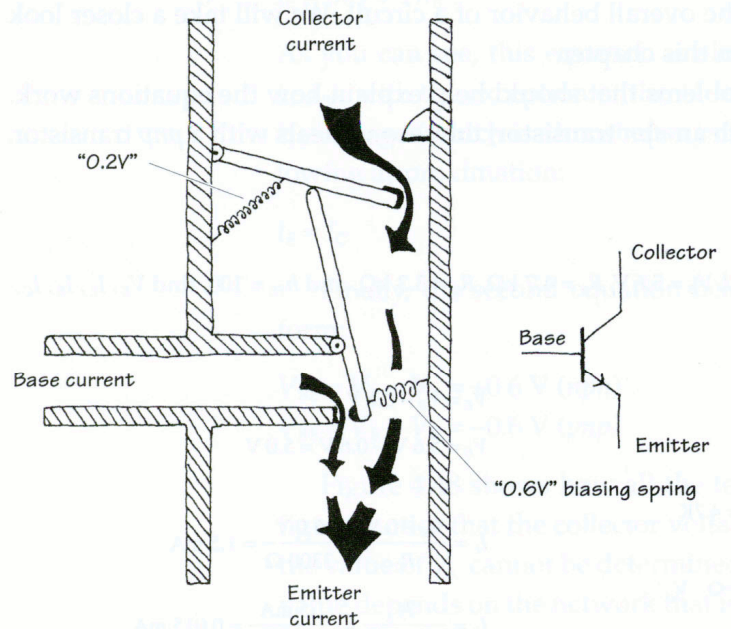2.4 Transistor Action

2.4.1 States
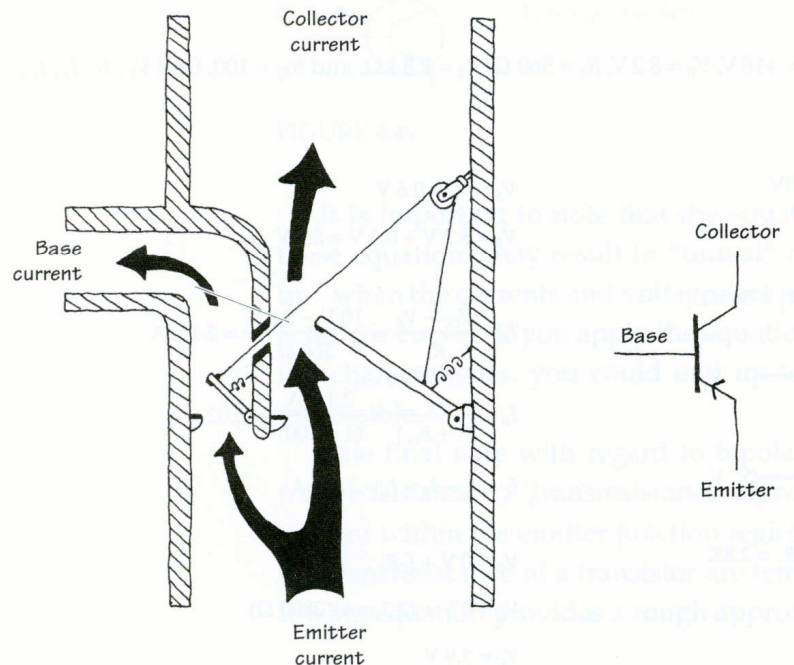
2.4.1.1 Cutoff

2.4.1.2 Linear

2.4.1.3 Saturation

2.4.1.3.1 We will use transistors in cutoff saturation states. Why?

NPN WATER ANALOGY

Collector current

"0.2V"

Base current

"0.6V" biasing spring

Emitter current

Collector

Base

Emitter

PNP WATER ANALOGY

Collector current

Base current

Emitter current

Collector

Base

Emitter

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