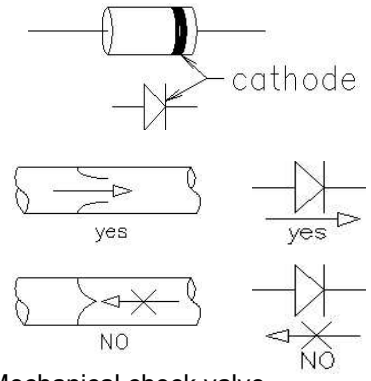
Stuff Exam 1 Friday, 2/7/03
Chapters 1 & 2, Lectures through 1/31
HWs 1 - 8 Understand problems.
Try some old exams (Web HW page, download view and print ASAP, some people have trouble with my pdf files).

HW #9, due M, 2/10
Ch. 3, Ex3.1 - Ex3.5, Repeat Ex3.1 - Ex3.5 using the 0.7V drop model of the diode.
Ex3.4c book ans. wrong, should be: -5V

Diodes

Textbook gets into the details of how they work before talking about models and circuits. My lectures will be the other way around.

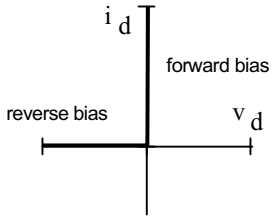
Diodes let current flow if the direction of the arrow, but not the other way. They are NOT linear parts. Neither were op amps. Op amps had three linear regions, +rail, -rail, and the active region.

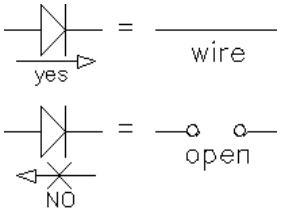


Mechanical check valve Diode

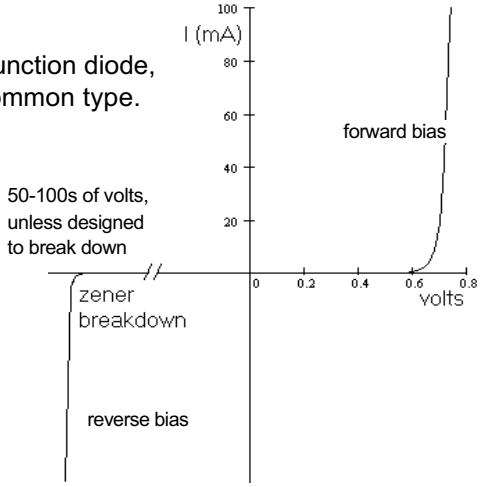
Nonlinear parts
Define two or more linear regions.
Assume part is operating in one of the linear regions (make educated guess).
Analyze circuit with linear model.
Check to see if part was really in the assumed region.
Repeat if necessary.

Ideal diode
Simplest model. We'll only use it for half of HW #9 and then almost never again. It is useful to quickly guess weather diodes are conducting or not.



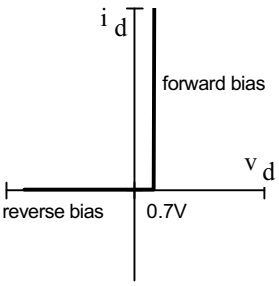


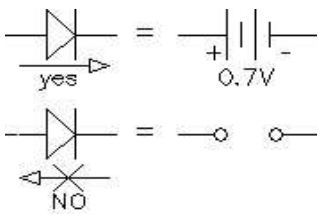
Diode curve
Silicon pn junction diode, the most common type.



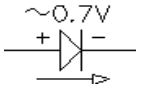
Constant-voltage-drop model

This is the most common diode model. It is only slightly harder to use than the ideal model but gives quite accurate results in most cases.



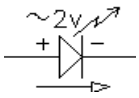


silicon diode

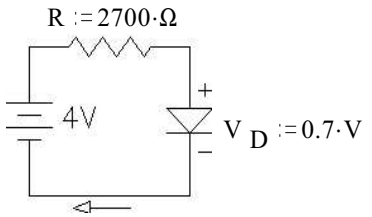


light-emitting diodes (LEDs) are modeled by 2v drop in forward direction:

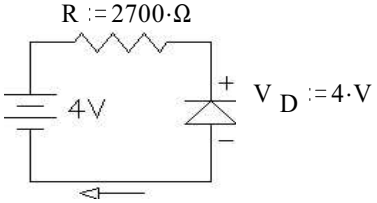
LED



Examples

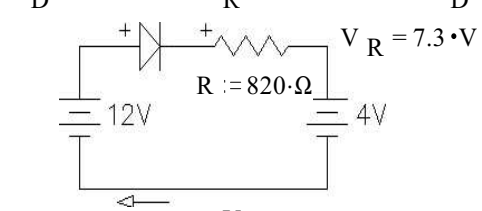


$$I = \frac{4\cdot V - 0.7\cdot V}{2700\cdot\Omega} = 1.222\cdot mA$$



$I_D := 0\cdot mA$

Diode is reverse biased



$$I := \frac{V_R}{R} \quad I = 8.9\cdot mA$$