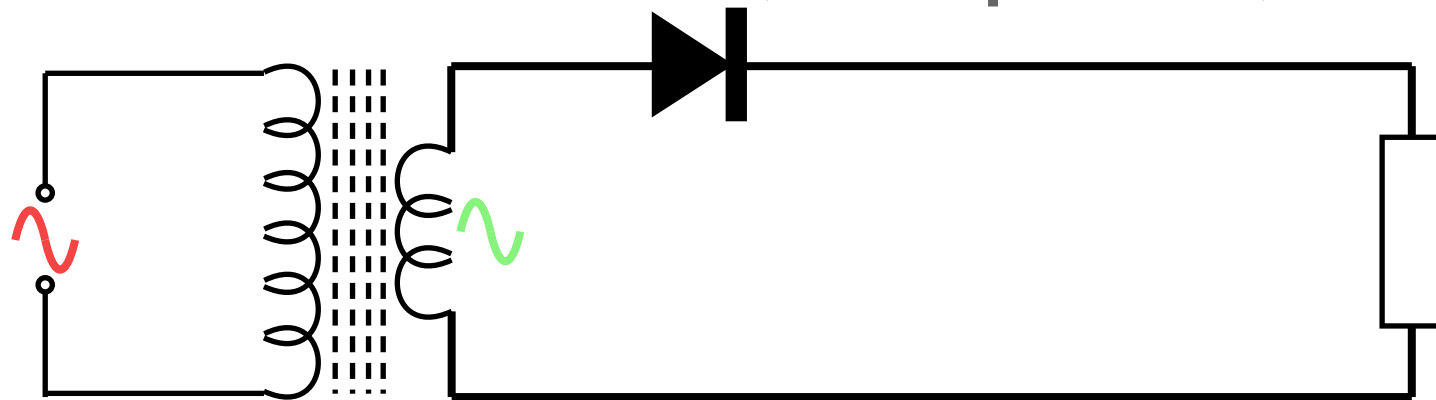


Diode Rectifier Reverse Voltage Rating

Semiconductor diodes are used in a number of types of rectifier circuit, and it is important to ensure that diodes with sufficient reverse voltage rating are used. Here are the calculations needed.

Half wave rectifier (no capacitor)

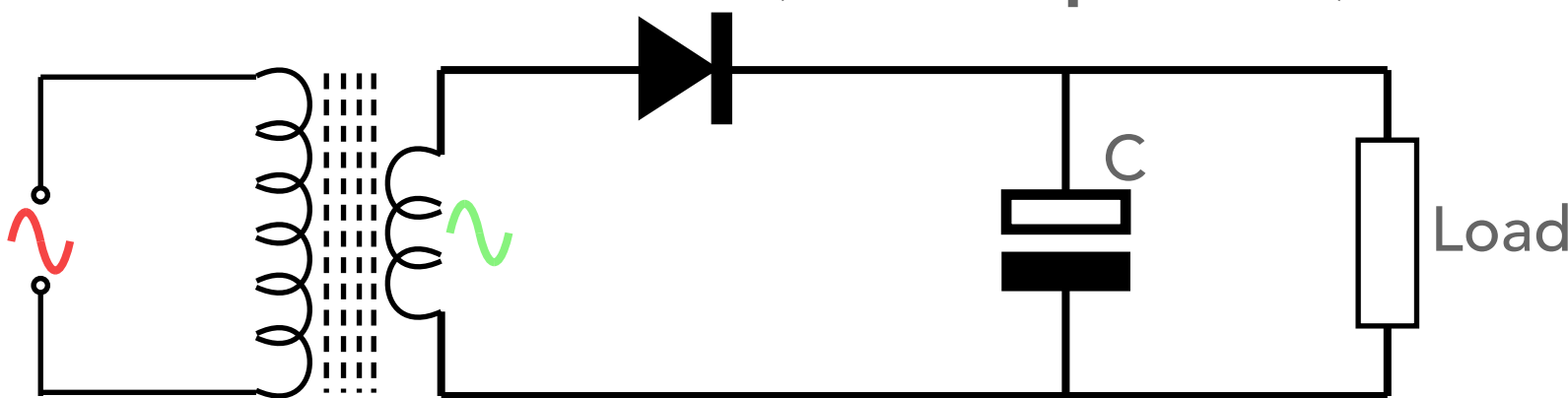


$$V_R = \sqrt{2} \times V_{in}$$

Due to peak reverse voltage from incoming waveform.

Beware: Only applicable if no capacitance in load

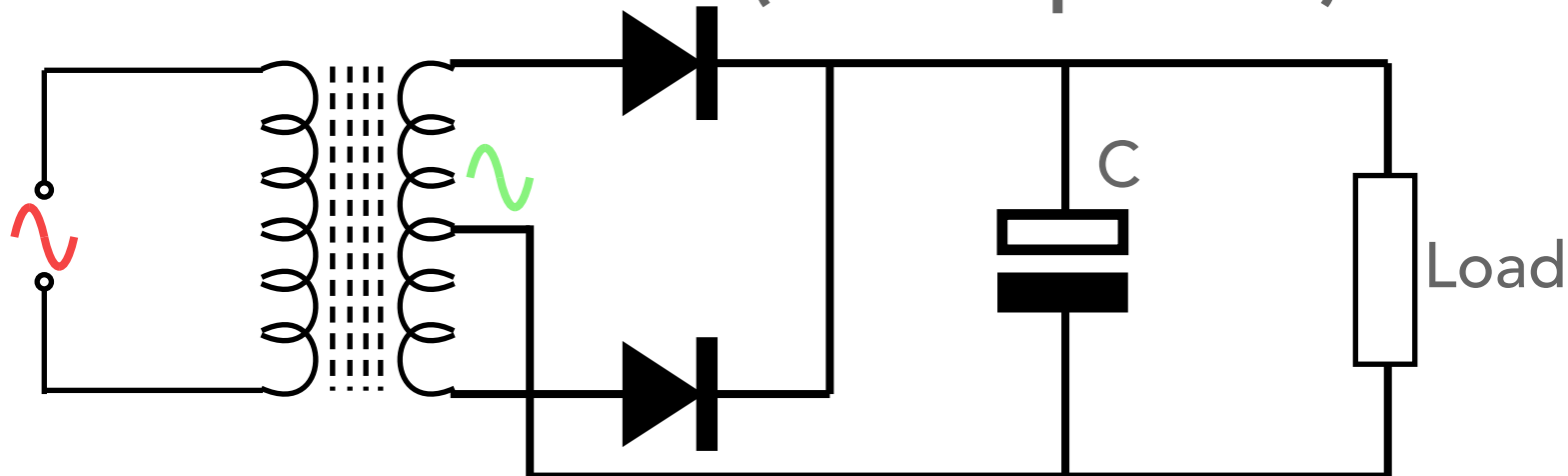
Half wave rectifier (with capacitor)



$$V_R = 2\sqrt{2} \times V_{in}$$

Due to peak reverse voltage from incoming waveform and stored voltage from smoothing capacitor.

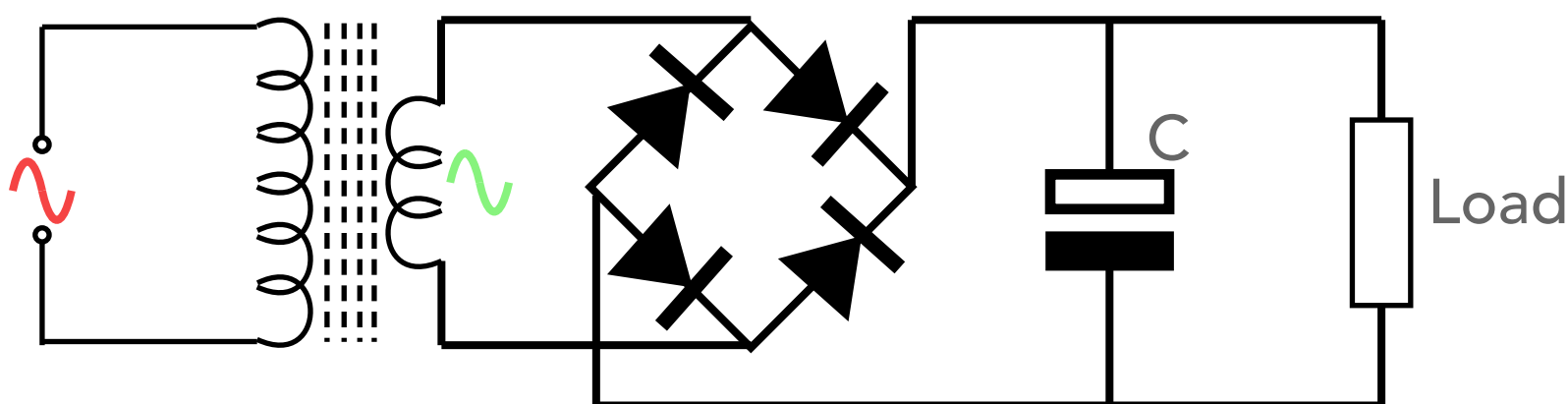
Full wave rectifier (with capacitor)



$$V_R = 2\sqrt{2} \times V_{in}$$

Due to peak reverse voltage from incoming waveform and stored voltage from smoothing capacitor.

Bridge rectifier (with capacitor)



$$V_R = \sqrt{2} \times V_{in}$$

Due to peak reverse voltage from incoming waveform and stored voltage from smoothing capacitor, but assumes each of two diodes reverse biased equally share reverse voltage.

V_{in} = RMS transformer voltage

V_R = diode max reverse voltage

In order to protect against transients on line or mains power, many have a V_R of three or four times the basic value calculated above.