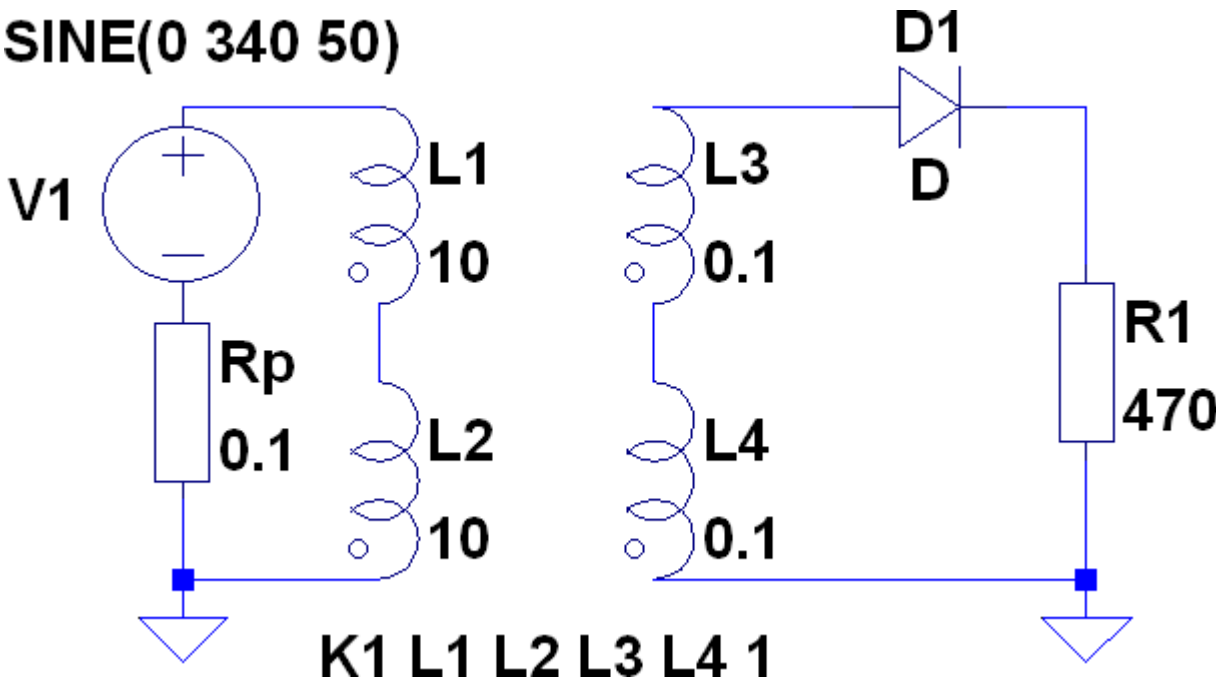
Rectifier circuits.

Half wave rectifier:

These are rarely used in practice. They draw unipolar current from the transformer which can lead to magnetization and hence saturation of the core.



Ltspice notes.

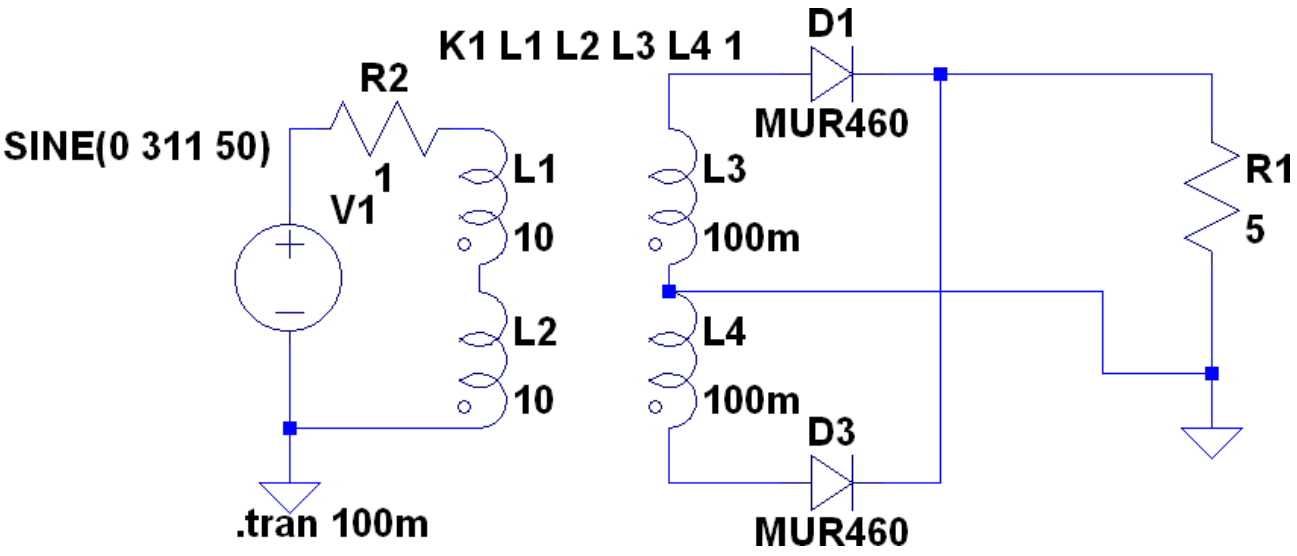
The resistor Rp in the diagram below is included to eliminate a voltage/inductor loop which SPICE is unable to simulate.

Transformers are modelled as coupled inductors. The SPICE directive K1 L1 L2 … above defines the coupling between the inductors. A coupling factor of '1' implies perfect coupling so there is no leakage inductance.

The square root of the inductance ratio = turns ratio

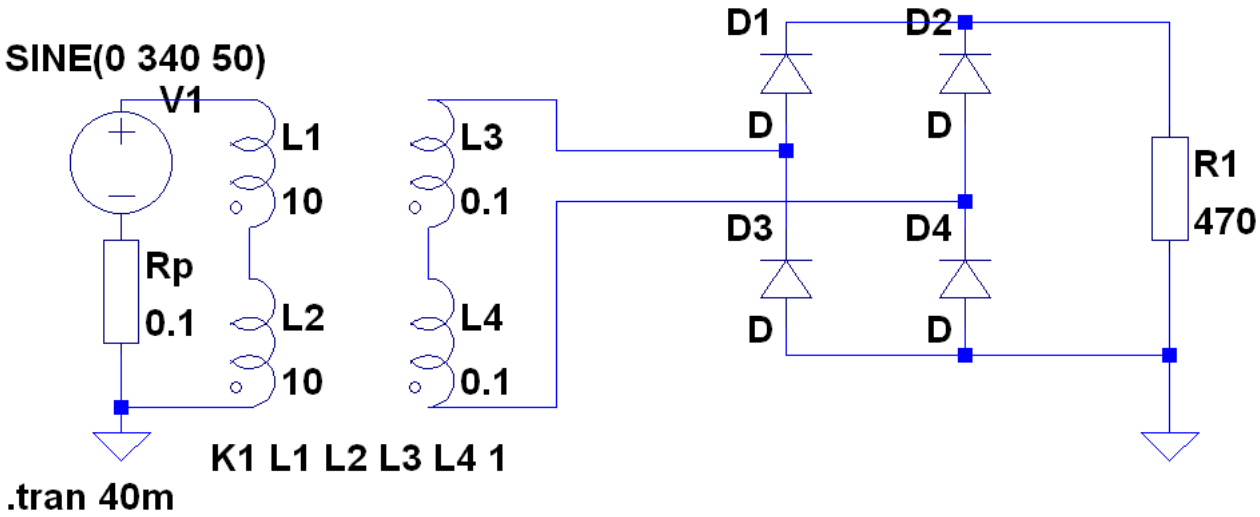
Push-Pull (Centre-tapped) Full wave rectifier

This rectifier requires a transformer with a pair of secondary windings or a single winding with a centre tap. It uses only 2 diodes. Each diode conducts during alternative half cycles.



Full wave bridge rectifier

This rectifier uses 4 diodes as shown below. Often the diodes are contained in a single 4 terminal package (a bridge rectifier). Diagonally opposite diodes conduct in alternative half cycles.



Full wave bipolar bridge rectifier.
This circuit is similar to the bridge rectifier but requires a centre tap on the secondary winding. It is used to create a bipolar DC supply (e.g. +15,0.-15 supply).