

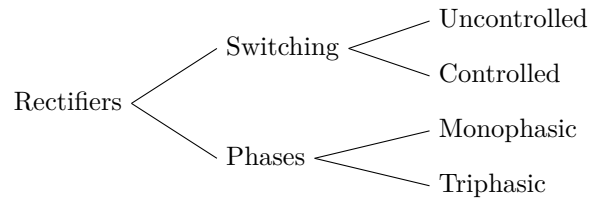
# AC to DC Converters

Diego Trapero

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# 1 AC to DC Converters, Rectifiers

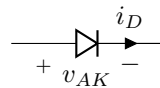


## 1 Monophasic Rectifiers

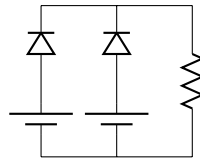
Uncontrolled rectifiers use diodes as switching devices. They don't need a control circuit.

- Half Wave Rectifier
- Full Wave Rectifier

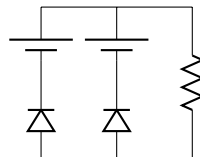
### Diodes



**Common Cathode Diodes** If two or more diodes are connected with a common cathode, the closed diode is the one with the most positive anode voltage. The rest of the diodes are open.



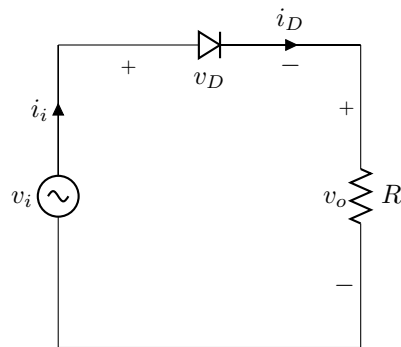
**Common Anode Diodes** If two or more diodes are connected with a common anode, the closed diode is the one with the most negative anode voltage. The rest of the diodes are open.



Configuration	Circuit diagram	Conducting Diode
Common Cathode		The diode with the most positive anode voltage
Common Anode		The diode with the most negative cathode voltage

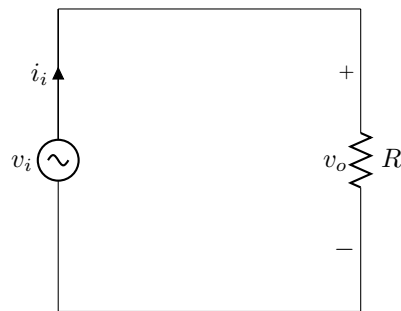
General rule: The most polarized diode is the one conducting. The one with the biggest  $v_{AK}$

## 1 Half Wave Rectifier

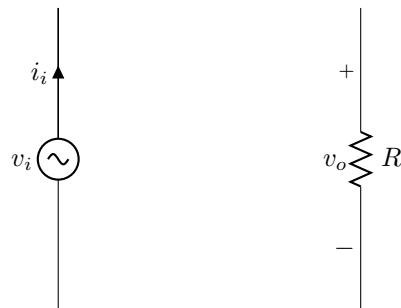


- $v_i > 0$  : D ON,  $i > 0$
- $v_i < 0$  : D OFF,  $i = 0$

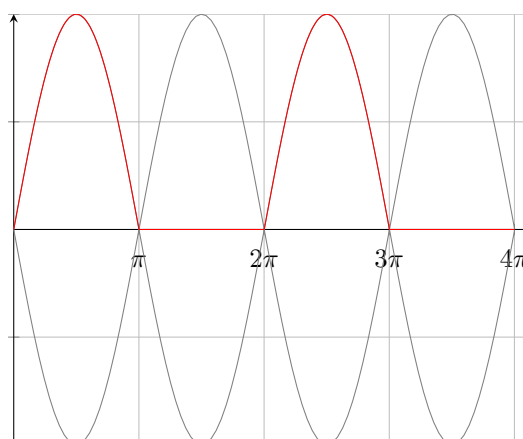
$v_i > 0$  (D ON) equivalent circuit



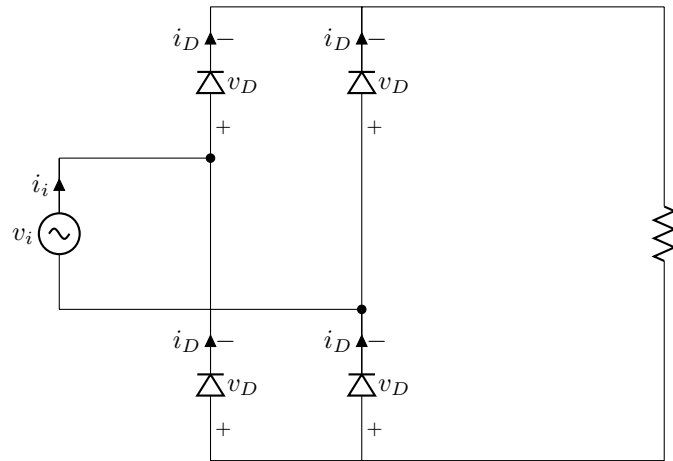
$v_i < 0$  (D OFF) equivalent circuit



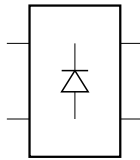
$v_o$



## 1 Full Wave Rectifier



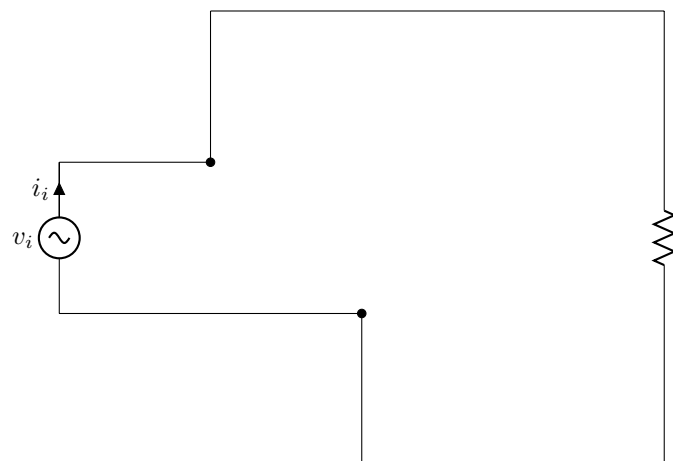
### Full Wave Rectifier Symbol



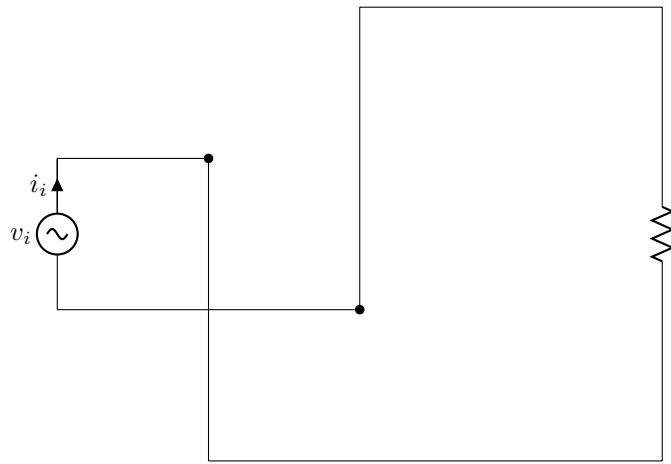
### Diode table

	D1	D2	D3	D4
$v_i > 0$	ON	OFF	OFF	ON
$v_i < 0$	OFF	ON	ON	OFF

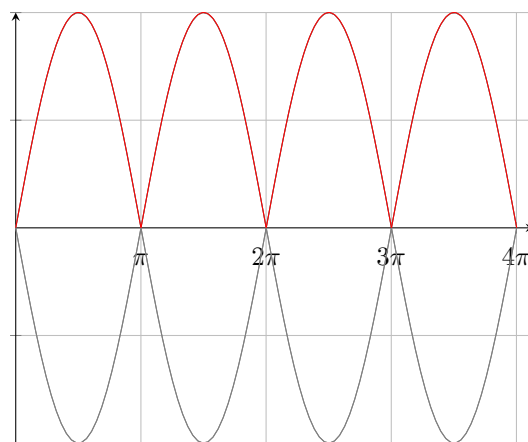
$v_i > 0$  equivalent circuit: D1, D4 are ON



$v_i < 0$  equivalent circuit: D2, D3 are ON

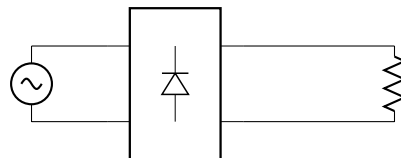


$v_o$

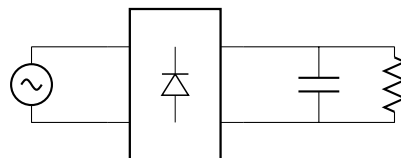


### Filtering output voltage

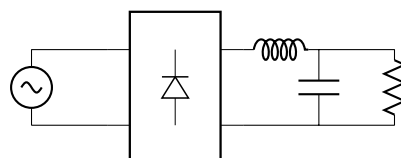
R load:



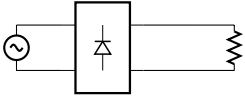
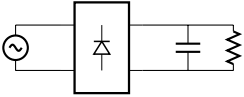
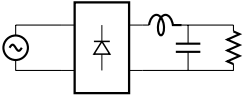
RC Load



RLC Load



What	R load	RC load	RLC load
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Circuit Diagram			
$v_g$ vs $i_g$		RC	RLC

**Flyback Diode**

**1 Triphasic Rectifiers**

**1 Half Wave Triphasic Rectifier**

**1 Full Wave Triphasic Rectifier**

**2 Reference**

asdasd

wave: