

LINEAR INTEGRATED CIRCUITS

4-03

Voltage Regulators

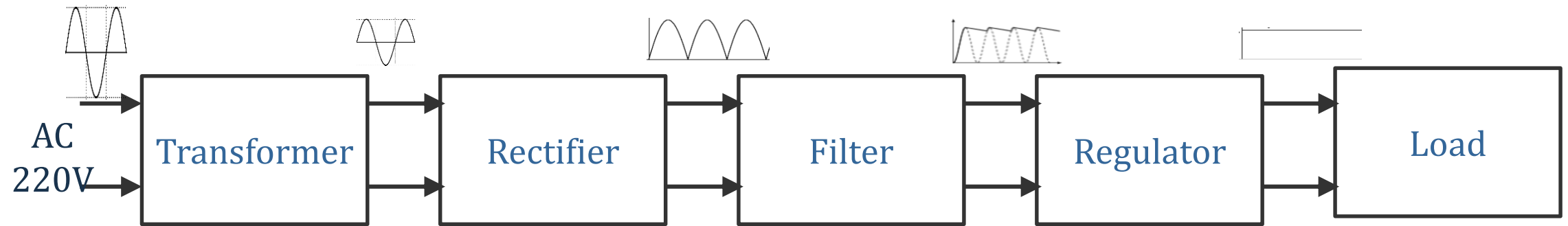
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Outline

1. What are voltage regulators?
2. Fixed voltage regulator.
3. Adjustable voltage regulators.
4. Switching Regulators

Voltage Regulators

- ❑ A normal power supply consists of a transformer, rectifier circuit and a filter that delivers fluctuating DC voltage to the load.



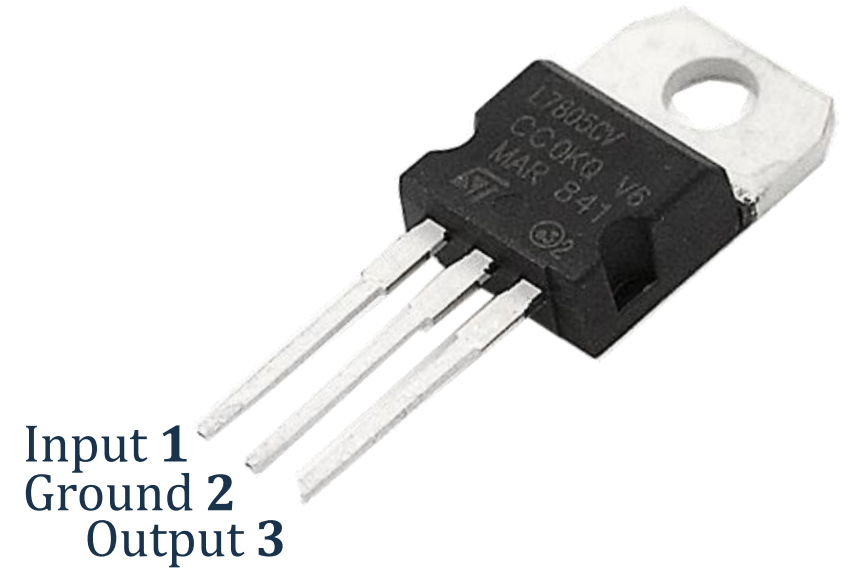
- ❑ For constant DC output voltage we use voltage regulators after filters.
- ❑ Voltage regulators provide Line Regulation and Load Regulation. Mathematically,

$$\text{Line Regulation} = (\Delta V_o / V_o) \times \frac{100}{\Delta V_{in}} \% \text{ and } \text{Load Regulation} = \left(\frac{V_{NL} - V_{FL}}{V_{FL}} \right) \times 100\%$$

- ❑ Basic Regulator Types: **(1) Linear** (a) Fixed & (b) Adjustable and **(2) Switching**

Linear: Fixed Voltage Regulators

- ❑ They provide constant output voltage
- ❑ Easy to use and low-cost voltage regulators
- ❑ 78XX are meant for positive voltage supply
 - ❑ 7805, 7806, 7808, 7812, 7815, 7818, 7824
 - ❑ Input voltage can be 35V (40V for 7824)
- ❑ 79XX are meant for negative voltage supply
 - ❑ 7902, 7905, 7905.2, 7906, 7908, 7912, 7915, 7918, 7924
 - ❑ Input voltage can be -35V (-40V for 7824)

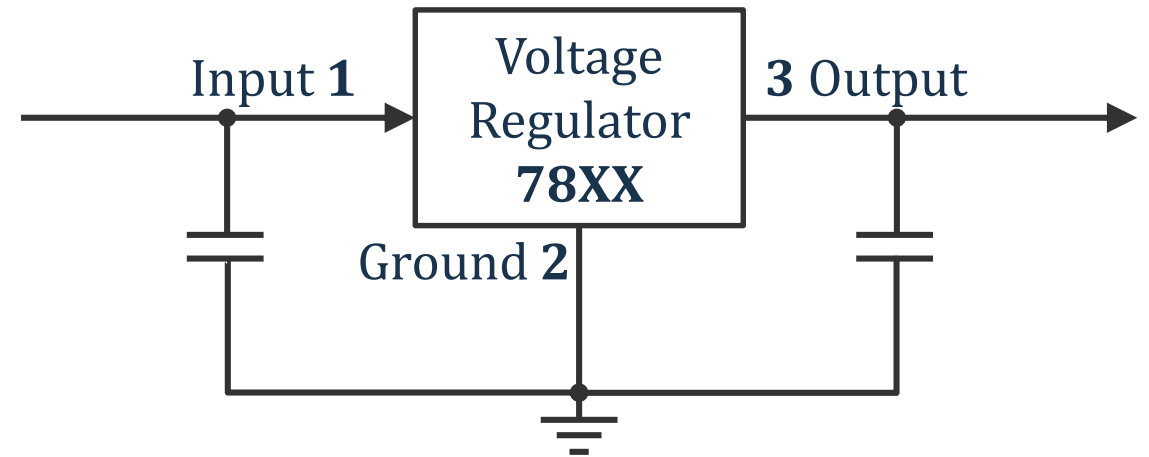


Linear: Fixed Voltage Regulators

If v_{in} is input voltage and v_o is output voltage, then dropout voltage is

$$v_d = v_{in} - v_o$$

Dropout voltage should be at least 2V.



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