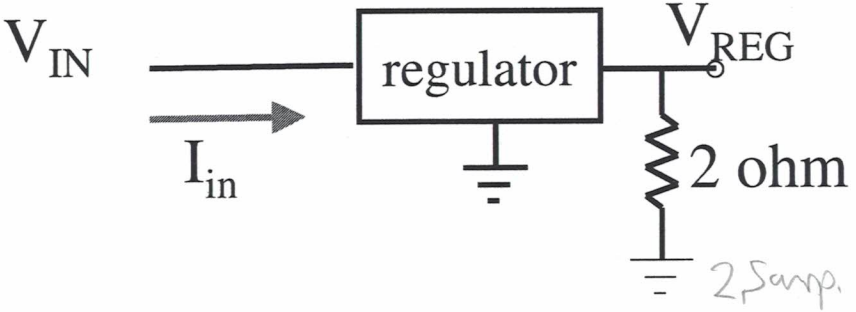
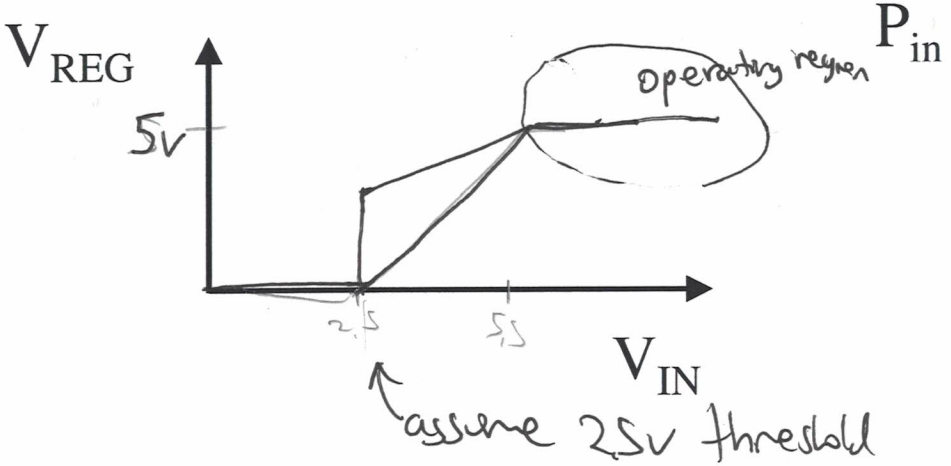
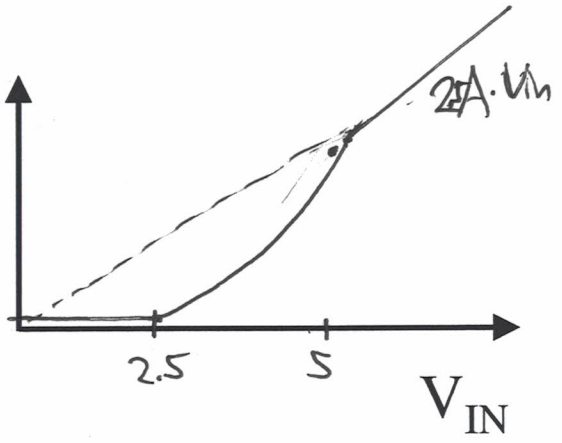
Approximate voltage regulator behavior

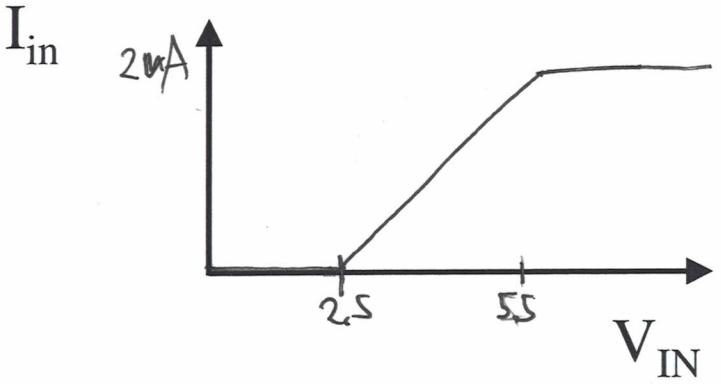


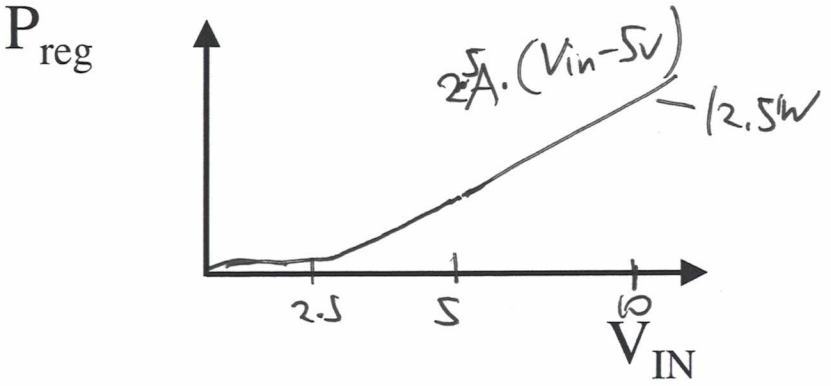
Linear Regulator
nominal output 5V,



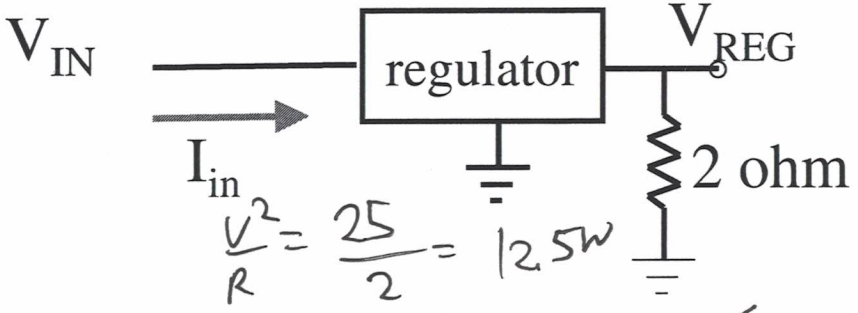


Power dissipated in regulator = $i_{IN}(V_{IN}-V_{REG})$

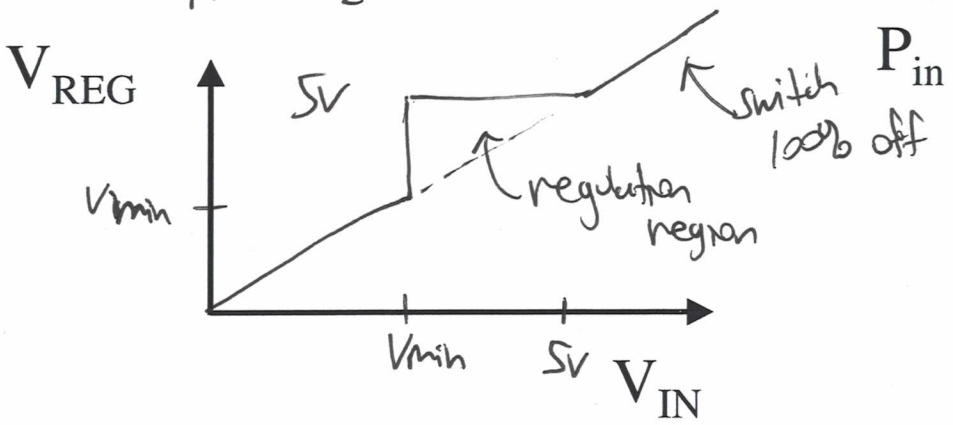


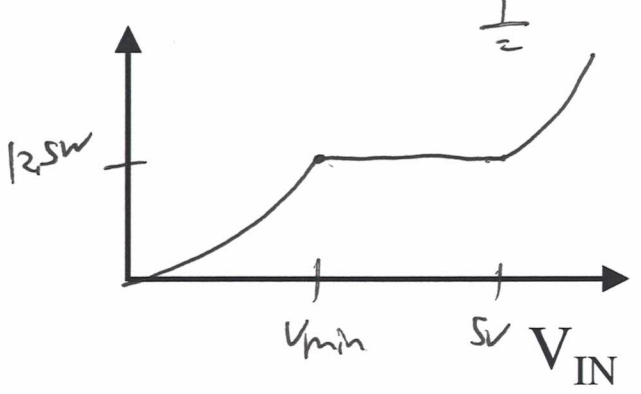


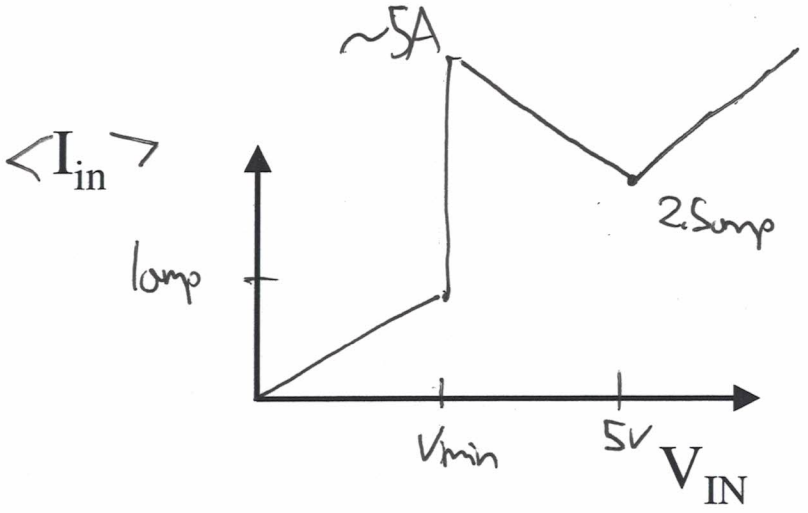
Approximate voltage regulator behavior



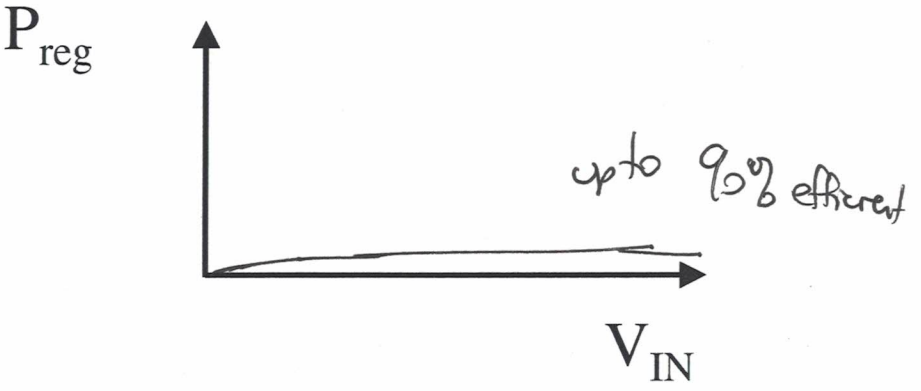
Boost Converter, nominal
Output 5V, $V_{IN} < V_{REG}$





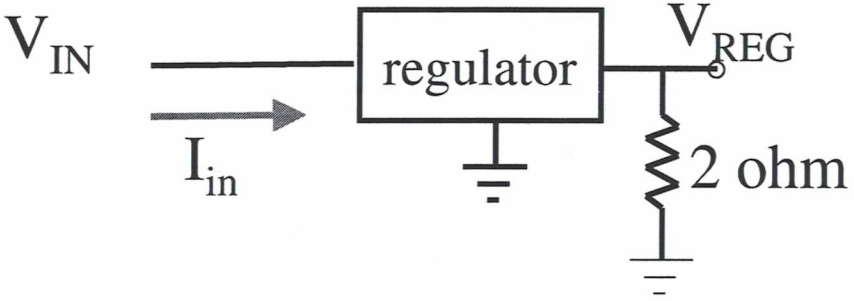


Power dissipated in regulator

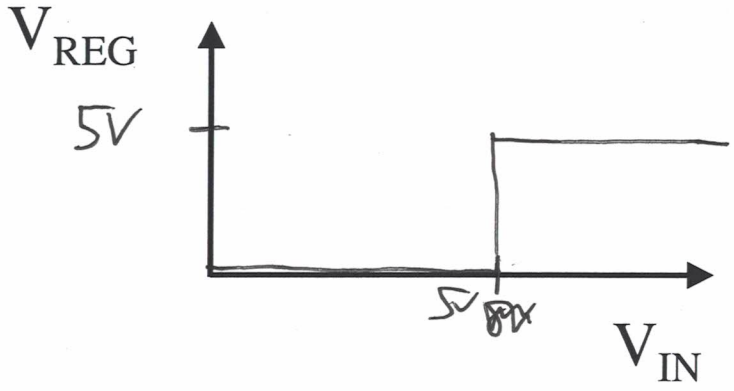


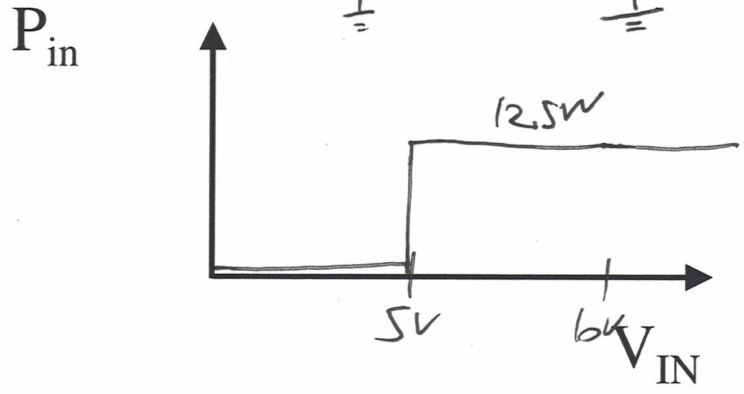
assumption: switch only cycles when $V_{min} < V_{in} < 5V$
2.4V

Approximate voltage regulator behavior

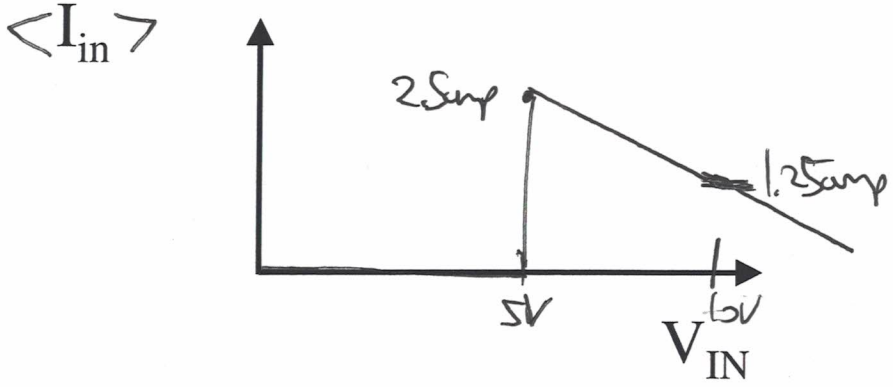


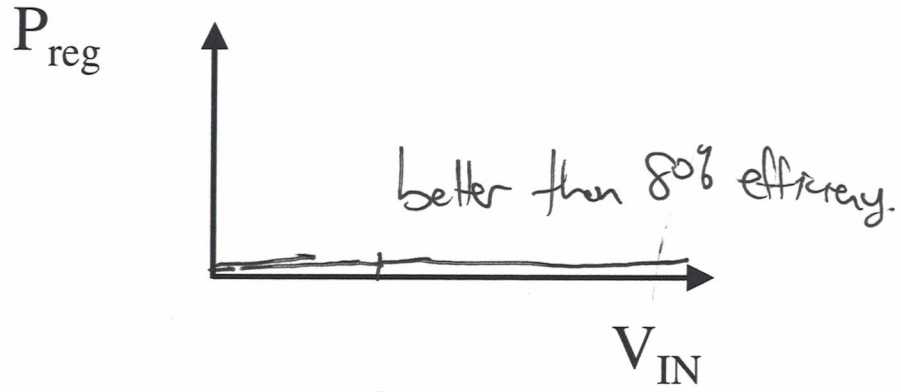
Buck Converter, nominal
Output 5V, $V_{IN} > V_{REG}$





Power dissipated in regulator





Assumption $V_{in} > 5V$ for switch operation
(LM2678 recommends 8V). Assume 100% eff.