

1. (8 points) A buck converter operates at 500kHz at a duty cycle of 0.35. It provides an output voltage of 2.5 Volts DC to a 20 Ohm load. The inductor is 100 μ H. Assume an ideal transistor switch and diode; Assume negligible voltage ripple on the output voltage.
 - a. (2 points) Draw a circuit diagram for this buck converter. Label currents and voltages that you use in this problem.

 - b. (3 points) Find and sketch the diode voltage waveform. Label its maximum voltage, its minimum voltage, and the times that switching occurs during at least one switching cycle.

 - c. (3 points) Find and sketch the inductor current and label its maximum current value.

2. (2 points) For our buck converter, we find that our transistor switch has a forward voltage of 0.2V and our diode has a forward voltage of 0.6V. For an input voltage of 8.0V, estimate the output voltage for the same 20 Ohm load. Assume continuous conduction.