EGR326 F'09

Assignment #3

Due Date**: Monday, September 28, 11:00 AM**

Laboratory Exercises

1. Build a +5V –> +3.3V isolated flyback voltage converter. A Coiltronics DRQ125-471-R 470μH inductor will be provided for you. This is a surface-mount device thus you will have to tack-solder wires onto the 4 leads. A datasheet for this inductor is available from Digi-Key (part number 513-1300-1-ND), or directly from Coiltronics, or from this local copy:

   `http://claymore.engineer.gvsu.edu/~steriana/courses/Downloads/datasheets/Coiltronics.DRQSeries.pdf`

   Note that this device is actually a transformer – see page 5 of the datasheet. You will want to use the device in the "Dual Inductor" configuration. Take care to orient the "dots" in the right way!

   Use a DMM as the "observer" and a function generator as the "controller". As with the boost converter design, adjust the duty cycle to achieve the desired output voltage (3.3V).

2. Characterize your circuit's load regulation using the electronic load. Also measure input current (estimate from power supply) and output voltage ripple (peak-to-peak) at each load point. Your table of values should have four columns: load current, output voltage, input current, output voltage ripple.

   At each load current point, adjust the duty cycle for 3.3V output (anything from 3.25V to 3.35V is OK...that's a $\pm$1.5% regulator). Keep "pushing" the load current until things start getting "hot" (most likely your switch transistor). Also keep an eye on your transformer's maximum current ratings!

Report

Submit the following:

1. A clear schematic illustrating the circuit you designed, including specific part numbers and values.
2. Your table of values from Step #2 above.
3. A "datasheet" for your design, including:
   (a) Eye-catching part number
   (b) A graph of your circuit's load regulation properties
   (c) The maximum amount of power your circuit is able to deliver to the load (before things get "hot")
   (d) A graph of your circuit's efficiency at each load current (don't start at 0%....that won't sell)