

EE 492 WEEKLY REPORT 4

Project title: Fast, Compact, High, Strength, Magnetic Pulse Generator

Group number: DEC1622

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Team Communication Leaders: Jia yu Hong

Key Concept Holder: Aqila-Sarah Zulkifli

Weekly Summary

For this week, the team will look into the inductor parasitic resistance. We will need to determine an accurate method of measuring the resistance due to its small value. Since our project deals with small but fast signals, the parasitic resistance can greatly affect the results even with a low value. Two methods we have determined are by using a RLC model and to try using a network analyzer which is a new and foreign device to us.

On the other hand, we have a working prototype and we will allocate some time to determine the consistency of its result. The prototype will be tested multiple times and each results will be recorded.

Finally, we will also tackle the project from a different perspective in hopes of improving its performance. We had some help and decided the C_{gs} value of our transistor played an important role in determining the rising time of our output.

Past week accomplishments

We tried to analyze all the possibilities that could improve the rising time. We focused on the physical measure the inductors. Jiayu tried to use simple RLC circuit to measure the coil, but there is limitation. Our coil was small, so it was not accurate at all. Then we moved to the network analyzer. We could measure some data from network analyzer, however, we did not have enough background to understand the data. In order to ensure consistent results, we need to have 3 separated measurements. Wingyi and Aqila worked on the first time measurement. The measurement included transition time, computation is about 10% output to 90% output and 20% output and 80% output, and average voltage. Thanks to Leif, he inspired us to do more research on MOSFET's C_{gs} . Jiayu was in charge to do research on C_{gs} .

Individual contributions

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Wei Shen Theh	Worked on determining inductor parasitic resistance and Cgs effect on results	4	71
Wing Yi Lwe	Simulations on Pspice, group meetings and report writing	3	62
Jiayu Hong	Worked on measuring coil, tried to measure in network analyzer, do research on Cgs, made sure members contributed on the weekly report and submitted the report	6	69
Aqila-Sarah Zulkifli	Attended group-advisor meetings, weekly report, simulations on Pspice	3	60

Summary of weekly advisor meeting

A reminder was given to reassess our previous board by taking measurements at different intervals. We should try to shift our focus onto the coils instead and make them more ideal to our circuit requirements (smaller in Henrys and thinner) using copper wires. Also, we will try to find other MOSFET alternatives for simulation purposes that will help us test our theory on the different Cgs values.

Plan for coming week

Our plan for this coming week is to keep on working on the prototype. We need to do at least three separate measurements in order to get a consistent result. Since we don't have any fixed inductor that we need for our project, we will be making at least two coils with different values just to test it. Besides, we will be having our usual meeting on Wednesday at 3:30 PM with our advisors to discuss more about our progress and share any new ideas that we have. Other than that, we will continue updating our weekly reports.