I. Introduction to transistors and to the problem

- What is a transistor made out of

- What chemical properties do transistors have and how does this translate to a circuit

- Reasons for need to improve transistor (specific industries – supercomputing)

Sources to use: Semiconducting devices textbook, TED talk, articles about the problem and need for improvement

II. Gallium-nitride transistors: why they’re an improvement

- Focus on why they should be considered as a legitimate alternative to silicon transistors

- How does gallium-nitride differ from silicon in transistors – translate to specific effects in circuits

- Potential for improvement on silicon-based transistors (energy efficiency, power output)

- Talk about power electronics here, what improved energy-efficiency and output would mean for the device on which the circuit is running

Sources to use: Articles that show measured improvements with gallium-nitride, basics of GaN

III. How changes to the process of creating gallium-nitride transistors are increasing its feasibility for the near future

- How is a transistor usually made (don’t devote too much space – use as comparison to GaN)

- Why have gallium-nitride transistors not been phased in before

- What are the changes that have been made to the process by which gallium-nitride transistors are created

Sources to use: Textbook and TI article to talk about conventional process, journal articles and articles from new companies about current progress in updating the process by which GaN are made. Biggest section for visual aids as well, with equations/diagrams/pictures

IV. Current outlook of gallium-nitride transistors

- What has been holding back gallium-nitride transistors to this point: cost of production, safety, etc.

- Because of the changes to the process by which they are made, where does GaN stand in terms of replacing silicon in the applications it is designed for

- What companies are investing in gallium-nitride/what is the state of the research into improving these transistors

- Most common applications of GaN transistors (electric cars, supercomputing)

Sources to use: articles from companies about their current and future applications, objective assessments of GaN transistors, etc.