

Abstract geometric lines in the top-left corner of the slide, consisting of several overlapping, irregular polygons and lines that create a complex, layered effect.

# FLYBACK DIODE

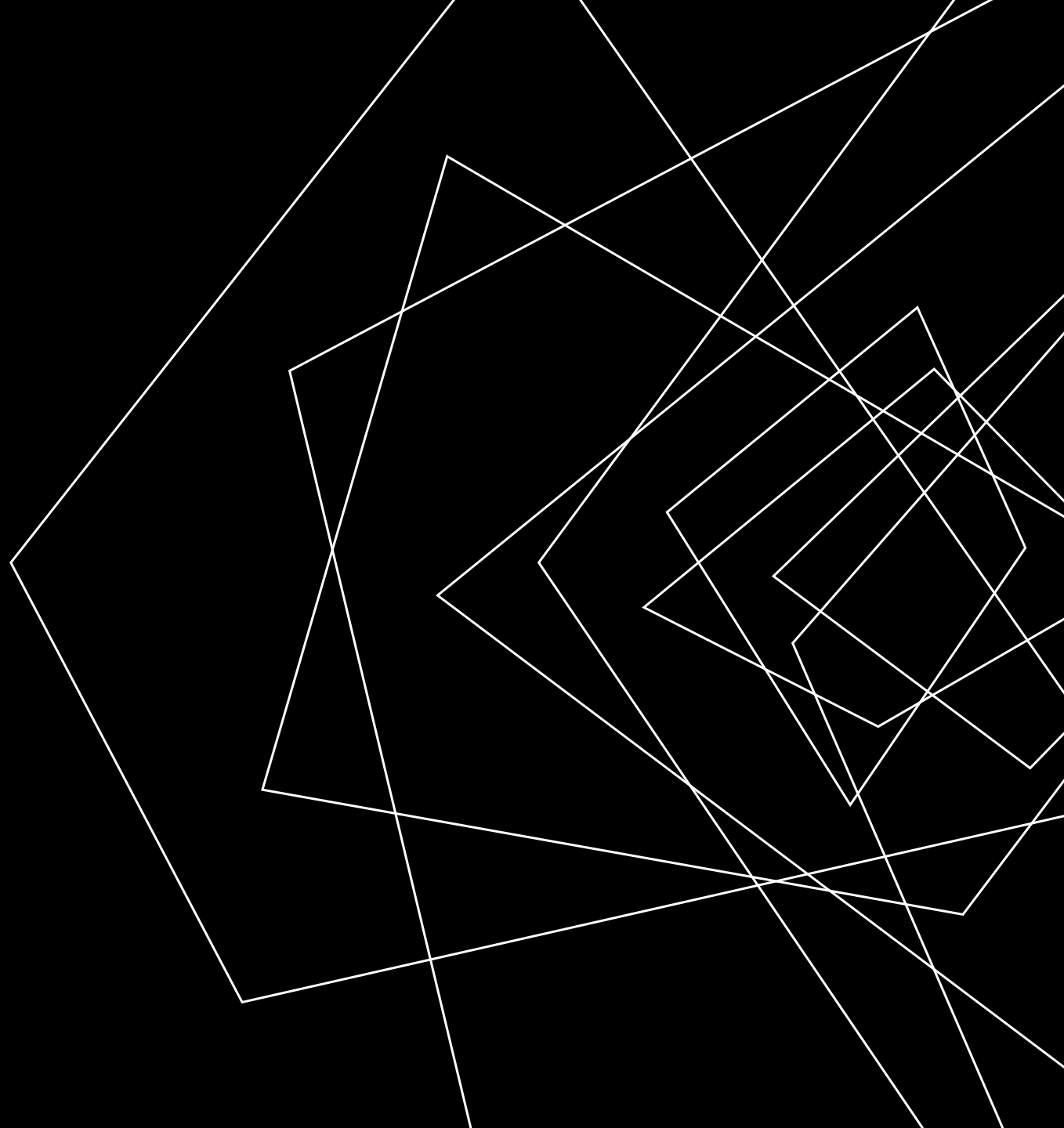
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Assignment 5.2: Circuit Card Inquiry Lab

## WHAT IT DOES:

When an inductive load is energized it stores energy in its magnetic field. Then when this circuit is suddenly stopped the magnetic field collapses which induces a high voltage across the load which can cause damage. 4 The flyback diode is designed to rectify this by being wired in parallel with the load in reverse bias. When the circuit is flowing normally the reverse bias of the diode causes it to not conduct or contribute to the circuit. However, when the field stops flowing normally and collapses, any spikes of power travelling backwards would be forward bias with the diode which will dissipate them.





## WHERE IT IS USED

Flyback diodes are used wherever there may be a sudden interruption of current particularly or charging such as USB devices, DC power plugs, automotive power circuits, mobile electronics, and battery powered systems such as power tools.

*(How does a flyback diode work?)*

## ADVANTAGES OF THE CIRCUIT

- It has ability to suppress voltage spikes.
  - It can protect semiconductor devices such as transistors and ICs.
  - It helps to reduce EMI (Electromagnetic Interference) in the circuit.
  - It can help to recover and reuse the energy stored in the inductive load.
  - It can help to prevent damage to other sensitive components in the circuit.
  - It can simplify circuit design.
  - They are cost effective components.
- ([rfwireless-world.com](http://rfwireless-world.com))



## DISADVANTAGES

Higher output voltage ripple compared to other topologies

Increased stress on output diode, especially in DCM

Reduced efficiency at higher power levels compared to other topologies

Complexity in designing high-frequency transformers

(Matan, 2023)

## VARIATIONS OF THE CIRCUIT

**Standard Diodes:** These are the most basic type of diodes and can be used as flyback diodes for low-frequency applications with moderate voltage and current ratings.

**Fast Recovery Diodes:** As the name suggests, these diodes have a shorter reverse recovery time, making them suitable for high-frequency applications where rapid switching is required.

**Schottky Diodes:** Schottky diodes have very low forward voltage drops and even faster reverse recovery times than fast recovery diodes. They are ideal for high-frequency and high-efficiency applications but have lower voltage and current ratings compared to other diode types.

*(The flyback diode: Voltage problems and switching solutions)*



# REFERENCES

*How does a flyback diode work?*. CircuitBread. (2024, January 12). <https://www.circuitbread.com/ee-faq/how-does-a-flyback-diode-work>

Cadence PCB solutions. (2022, October 13). *The flyback diode: Voltage problems and switching solutions*. Cadence. <https://resources.pcb.cadence.com/blog/2019-the-flyback-diode-voltage-problems-and-switching-solutions>

rfwireless-world.com. (n.d.). *What is flyback or freewheeling diode ?*. Flyback or Freewheeling diode | advantages and applications. <https://www.rfwireless-world.com/Terminology/Flyback-or-freewheeling-diode-advantages-and-applications.html>

Matan. (2023, October 26). *Flyback converter: How it works, application & advantages*. Electricity. <https://www.electricity-magnetism.org/flyback-converter-2/>