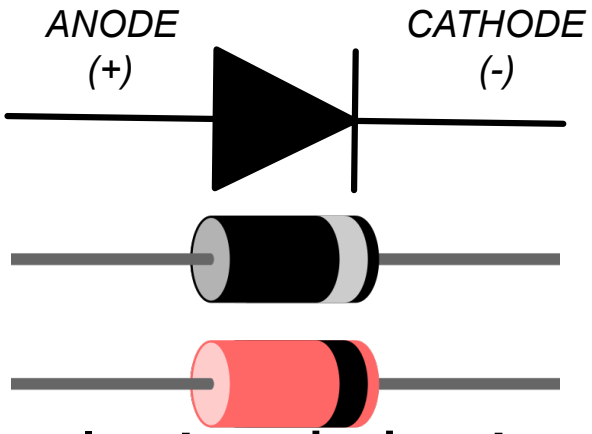
# CG1111: Engineering Principles and Practice I

Preparation for Week 7, Studio 1

**Diode and Diode Bridge Rectifiers**

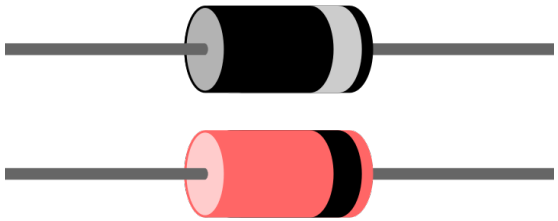
# Diode

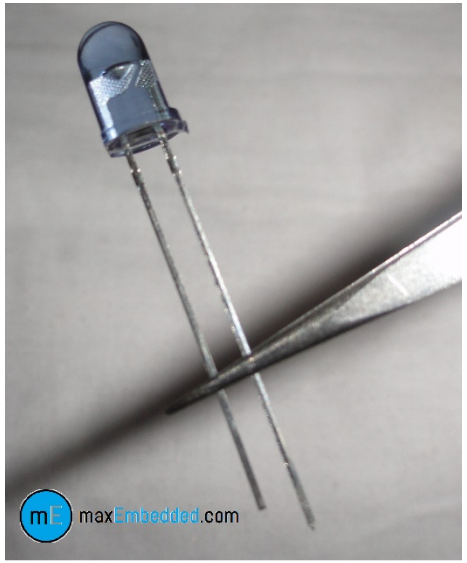


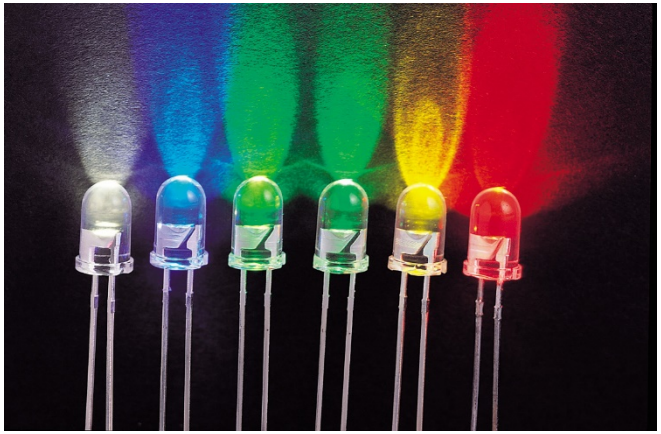

- A diode is a polarized device that allows current to flow only in one direction.
- The positive side "+" is called the anode where the current enters, and the negative side "-" is called the cathode where the current leaves.

Note: The symbolic diagram of a diode consists of a triangle and a line. The triangle in the symbol points to the forward direction in which the current flows.

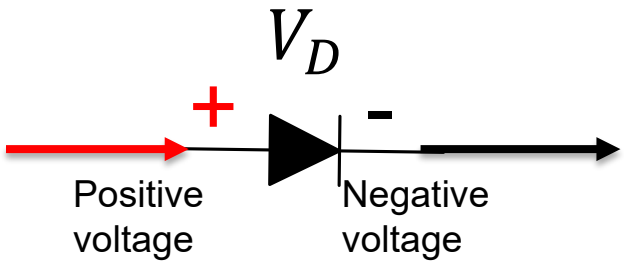
# Different Types of Diodes





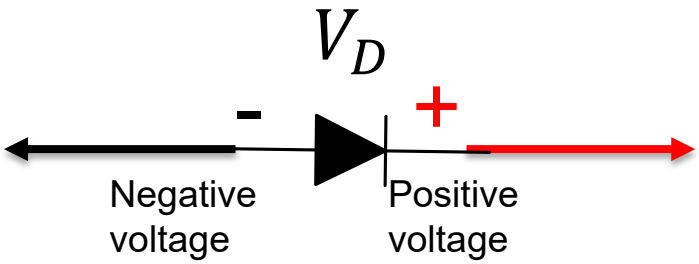



# Diode : Forward Biased



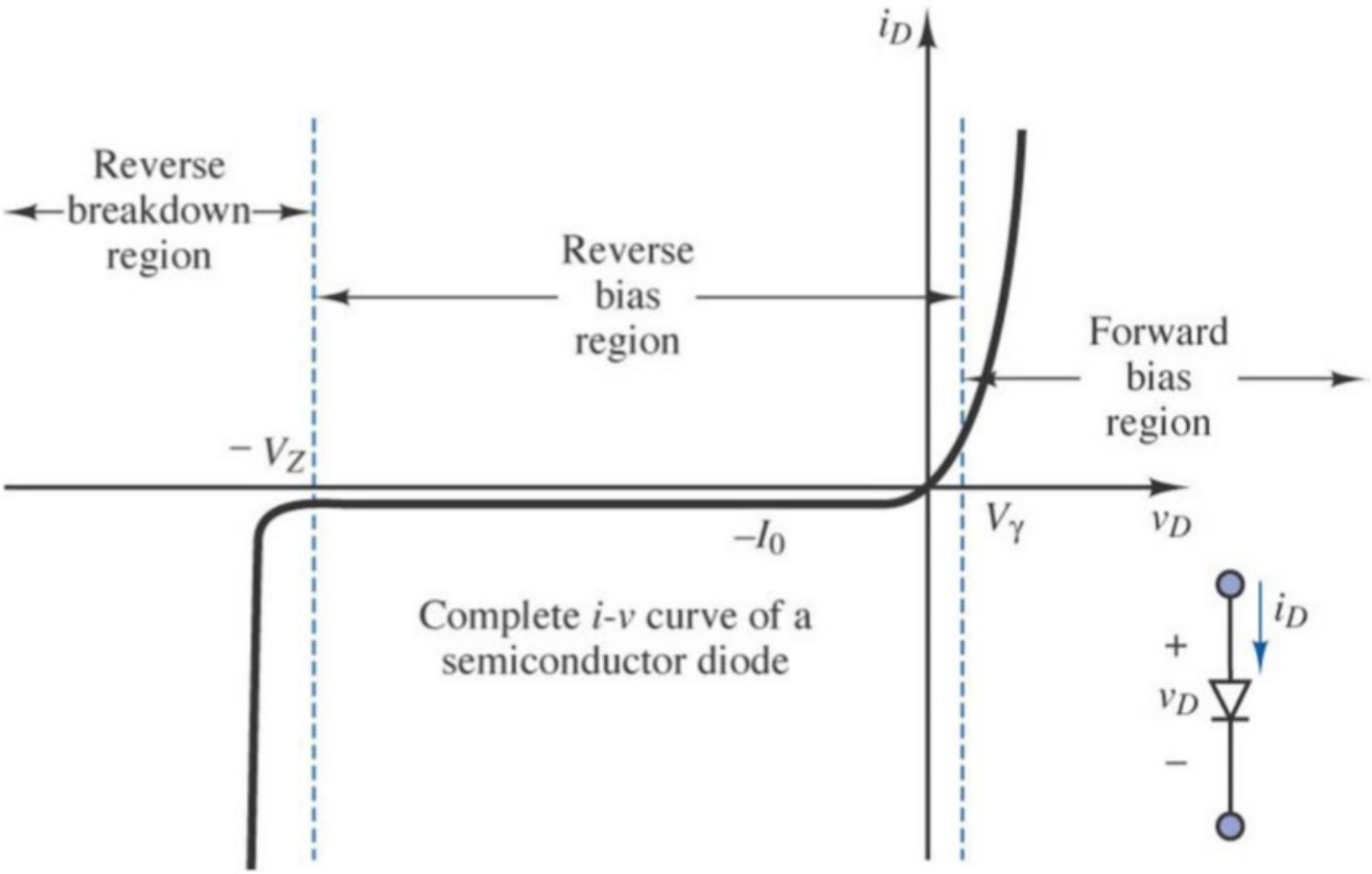

- Diode is “forward-biased” when a positive voltage is applied across the diode i.e the anode is at a higher voltage compared to the cathode
- Only when the applied voltage exceeds a threshold, the diode starts to conduct current
- Current grows exponentially with increment voltage beyond this threshold

# Diode: Reverse Biased



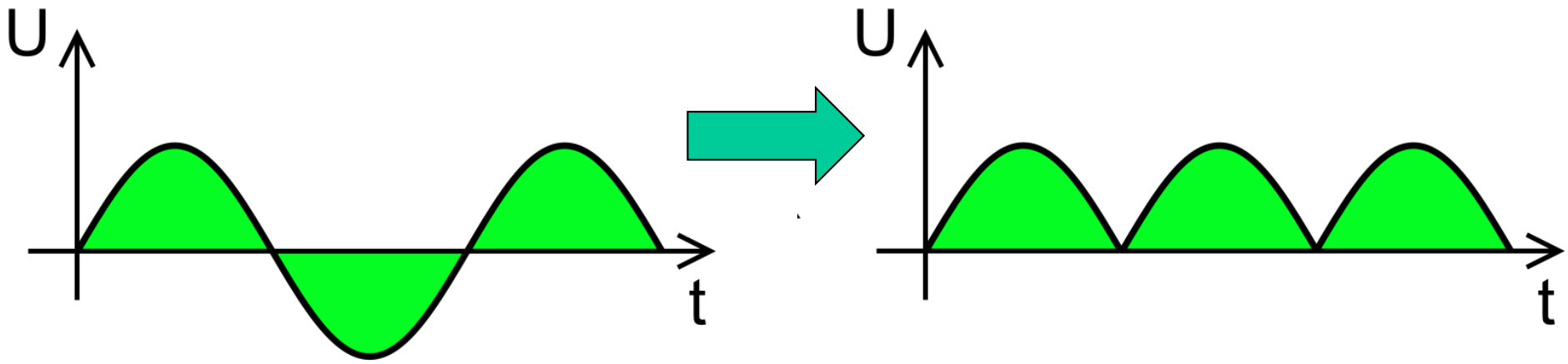

- When a negative voltage is applied across the diode (anode has a lower voltage than the cathode), the diode is "reverse-biased"
- Negligible current flows through the diode in this state
- When the reverse-biased voltage is beyond a limit, the diode breaks down
- This limit is called the breakdown voltage

# Diode I-V Characteristics

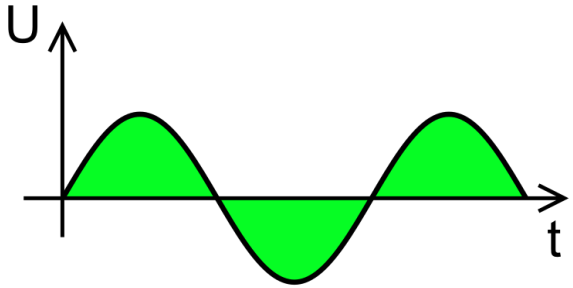


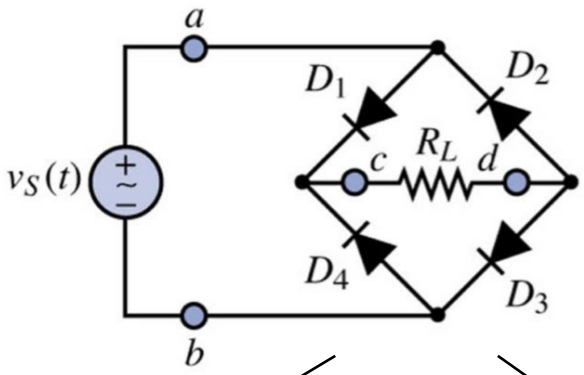
# Rectifier

- A rectifier is a circuit which converts alternating current (AC) to direct current (DC)

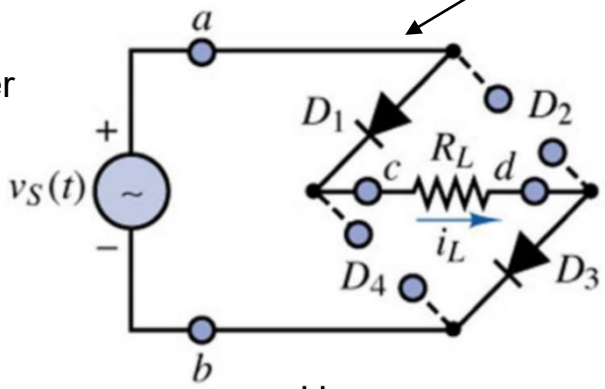


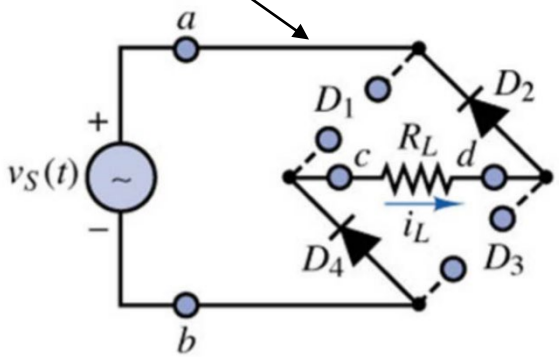
# Diode bridge rectifier



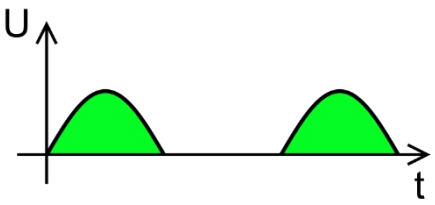




During the positive half cycle, the rectifier circuit simplifies to →




During the negative half cycle, the rectifier circuit simplifies to ←

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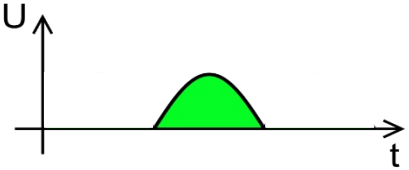


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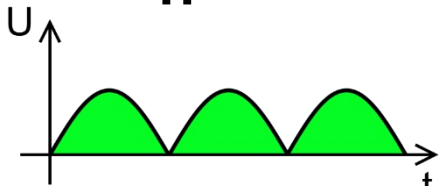


The rectifier output during the two half cycles combine to give the full rectified DC

# THANK YOU