Solid State Electronics

Unit 2: PN Junctions and Diodes

Study Guide

1. Review course structure.

2. Review diagrams of Common Diode and Zener Diode found with the Topic Unit 2 documents.

3. Read Chapter One in All About Circuits about Conventional Versus Electron Flow found at: http://www.allaboutcircuits.com/textbook/direct-current/chpt-1/conventional-versus-electron-flow/

4. Read Chapter Three in All About circuits on the Introduction to Diodes and Rectifiers found at: http://www.allaboutcircuits.com/textbook/semiconductors/chpt-3/introduction-to-diodes-and-rectifiers

5. Read information on PN Junction and Semi-Conductor Diodes found at: http://www.physics-and-radio-electronics.com/electronic-devices-and-circuits/semiconductor-diodes/pnjunctionsemiconductordiode.html

6. Read the Diode Voltages tutorial, including the examples found at: http://www.hobbyprojects.com/the_diode/diode_voltages.html

7. **Watch**: https://www.youtube.com/watch?v=MVy_MG0X2h4
   Title: What is a Diode?
   Author: electronhacks

8. **Watch**: https://www.youtube.com/watch?v=4SlfaocMfdA
   Title: Formation and Properties of Junction Diodes – Physics
   Author: Elearnin

9. Read the information on "The Doping of Semiconductors" found at http://hyperphysics.phy-astr.gsu.edu/hbase/solids/dope.html

10. Read the information on "Hole Flow" found at http://www.radartutorial.eu/21.semiconductors/hl06.en.html

11. Read the information on Barrier Voltage entitled "What is Barrier Voltage and What causes it?" found at http://www.physics-and-radio-electronics.com/electronic-devices-and-circuits/semiconductor-diodes/barrier-voltage.html

Solid State Electronics

Unit 2: PN Junctions and Diodes

Study Guide

12. Read the information on the PN Junction found at http://hyperphysics.phy-astr.gsu.edu/hbase/solids/pnjun.html

13. **Watch**: https://www.youtube.com/watch?v=9_xRw30ufKs
    Title: Depletion region PN junction
    Author: yoududeuser

14. Read the information on N-type and P-type material, and Trivalent and Pentavalent material found at https://en.wikibooks.org/wiki/Semiconductor_Electronics/Semiconductor/Doping

15. Read PDF document on Doping found at http://www.emsb.qc.ca/laurenhill/science/mosfet.pdf

16. Review the commonly used Doping Elements found with the Topic Unit 2 documents.

17. Read "Basic Semi-Conductor Crystal Structure" found at http://www.play-hookey.com/semiconductors/basic_structures/basic_structure.html

18. Read "Understanding Diode Specifications & Parameters" found at http://www.radio-electronics.com/info/data/semicond/diodes/specifications-parameters-ratings-characteristics.php

19. Read "Diode Ratings" found at http://www.allaboutcircuits.com/textbook/semiconductors/chpt-3/diode-ratings

20. Review the Two Most Common Diode Ratings found with the Topic Unit 2 documents.

21. Complete the worksheet related to Diode Specs found with the Topic Unit 2 documents.

22. Complete the Spec Sheet found with the Topic Unit 2 documents.

23. Review the Common Semi-Conductor Schematic Symbols found with the Topic Unit 2 documents.

24. Read information related to PN Junctions found at http://www.allaboutcircuits.com/textbook/semiconductors/chpt-2/the-p-n-junction/

25. Watch the following YouTube videos regarding PN Junctions:
    a. **Watch**: https://www.youtube.com/watch?v=ar7xDMR4P_U
       Title: PN Junction

Solid State Electronics

Unit 2: PN Junctions and Diodes

Study Guide

Author: Red Inc

b. **Watch**: https://www.youtube.com/watch?v=O3x7NdUuu0Q
Title: 14 P and N Type Semiconductors
Author: inamkhan05

c. **Watch**: https://www.youtube.com/watch?v=4SlfaocMfdA
Title: Formation and Properties of Junction Diode - Physics
Author: Elearnin

d. **Watch**: https://www.youtube.com/watch?v=Hk1E7G-nuKM
Title: np-type semiconductors
Author: bryansanctuary

26. Review the definition of Holes found with the Topic Unit 2 documents.

27. **Watch**: https://www.youtube.com/watch?v=b8gPSKpbXQs
Title: diodes in circuits and testing them
Author: Heli-Chair

28. Read "Meter Check of a Diode" found at
http://www.allaboutcircuits.com/textbook/semiconductors/chpt-3/meter-check-of-a-diode/

29. Complete the lab on Diode Troubleshooting found with the Topic Unit 2 documents.

30. Complete the Diode Circuits Exercise found with the Topic Unit 2 documents.

31. Complete the Semi-Conductor Diodes Lab found with the Topic Unit 2 documents.

Solid State Electronics

Unit 2: PN Junctions and Diodes

Study Guide

SAFETY DISCLAIMER:

M-SAMC educational resources are in no way meant to be a substitute for occupational safety and health standards. No guarantee is made to resource thoroughness, statutory or regulatory compliance, and related media may depict situations that are not in compliance with OSHA and other safety requirements. It is the responsibility of educators/employers and their students/employees, or anybody using our resources, to comply fully with all pertinent OSHA, and any other, rules and regulations in any jurisdiction in which they learn/work. M-SAMC will not be liable for any damages or other claims and demands arising out of the use of these educational resources. By using these resources, the user releases the Multi-State Advanced Manufacturing Consortium and participating educational institutions and their respective Boards, individual trustees, employees, contractors, and sub-contractors from any liability for injuries resulting from the use of the educational resources.

DOL DISCLAIMER:

This product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.

RELEVANCY REMINDER:

M-SAMC resources reflect a shared understanding of grant partners at the time of development. In keeping with our industry and college partner requirements, our products are continuously improved. Updated versions of our work can be found here: http://www.msamc.org/resources.html.