

EE311 Exp. #1

Diode Characteristics

Report #1

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***CAUTIONARY REMARK: All questions will be answered in the assigned blanks. Don’t use extra place for the answers due to the fact that they are not guaranteed to be evaluated.***

**Part 1--Introduction:** Explain the main objective of the first experiment on your own words. (10pts)

**Part 2--Procedure: a) Conventional Diode Basics:** Describe $R\_{DC}$ and $r\_{AC}$ of conventional diode in mathematical expression. Comment on the meaning of those. (10pts)

**b)** Solve Figure.1 using linear diode model. Take as $ r\_{d}=30Ω$ , $V\_{on}=0.7V, R\_{1}=2.2k and V\_{SS}=17V$ (10pts)



**Figure.1**

**c)** Plot $V\_{SS}$ versus $I\_{D} $and $V\_{D}$ versus $I\_{D}$ using your measurements during the lab by considering the Figure.2. (20pts)



**Figure.2**

**d)** Plot $V\_{SS}$ versus $I\_{D} $and $V\_{D}$ versus $I\_{D}$ by using LT-Spice considering the Figure.2. Compare lab measurements and simulation results for Figure.2. If you have any differences, comment on them. (**Important Note:** Not use spice default libraries or models when you use diodes. You must utilize from a diode model presented in the *appendix part*.) (30 pts)

**e) Research** *‘zener diodes’* and solve the following circuit by taking as VS =20V, R2=1MΩ and D1 is zener diode whose Vz = 6V. (**Hint:** Vz is equal to zener voltage.) (15pts)

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**Part-3--Conclusion:** Conclude your report with your learning from this experiment on your own words. Moreover, you can discuss or criticize some over-expected or under-expected sides of the experiment. (10pts)

**Part-4--References:** If you have referred parts, specify their references below. (5pts)

**Part-5--Appendix:**

You will use the following diode model for LT-Spice simulations:

.model Da1N4004 D (IS=18.8n RS=0 BV=400 IBV=5.00u CJO=30 M=0.333 N=2)