

13 级微电子模电课程小结

Chapter1 Diode

1. I-V Characteristics of Junction Diodes
2. Analysis of Diode Circuits (ideal or constant voltage drop)
3. Understanding basic rectifier circuits and related input/output waveforms
4. Zener diode circuit

Chapter 2 Semiconductor physics

1. Understanding *intrinsic semiconductor*, *extrinsic semiconductor*, *n-type*, *p-type*, *majority/minority carriers*, *donor*, *acceptor*
2. Understanding basic theory of pn junction

Chapter 3, 4, 5, 6 BJT

1. Current relationship
2. Three basic configurations (CE, CB and CC) and their basic characteristics
3. Transistor operation regions (Active/Cutoff/Saturation)
4. DC analysis of BJT Circuits
5. AC analysis of BJT circuits with r_e model
6. Understanding the concept of lower and upper cutoff frequencies
7. Bode plot of 1st-order passive low/high-pass filter

Chapter 7

1. Feedback concepts and types of negative feedback
2. Effects of negative feedback (gain/ R_{in} / R_{out} /bandwidth)
3. Find out feedback and determine the type of feedback for practical feedback circuits

Chapter 8-9 Operational Amplifiers

1. Understanding the concept of differential mode, common mode, and CMRR
2. Operation circuits
3. Basic active filters and their characteristics, understanding the cutoff frequency and can draw the bode plot for basic 1st-order active low/high/band-pass filters
4. Analysis of comparator circuit
5. Understanding the basic operation of Schmitt Trigger and why hysteresis is used

Chapter 10 Power amplifiers

1. Understanding the definition and maximum power efficiency of class A, B, C and AB amplifiers
2. Calculation of power efficiency and power consideration of class A and class B power amplifiers

Chapter 11-12 FETs

1. Symbols, constructions, I-V relationship of different FETs
2. Concepts of depletion and enhancement modes
3. CMOS logic circuits and basic idea of power consumption
4. Enhancement MOSFET operation regions (Cutoff, Linear/Triode, Saturation and basic characteristics of 3 configurations (CS, CD, CG))
5. DC analysis and AC analysis for single-stage MOSFET amplifier (can draw the ac equivalent circuit with small-signal model of MOSFET)
6. Understanding the basic operation principle of current mirror and know to calculate
7. Advanced MOSFET circuits analysis