

Basic Electronics - Video course

1. Semiconductor Diodes

- Semiconductor materials- intrinsic and extrinsic types
- Ideal Diode
- Terminal characteristics of diodes:
 - p-n junction under open circuit condition
 - p-n junction under forward bias and reverse bias conditions
 - p-n junction in breakdown region

- Diode small signal model
- Zener diode and applications
- Rectifier Circuits
- Clipping and Clamping circuits

2. Bipolar Junction Transistors (BJTs)

- Physical structure and operation modes
- Active region operation of transistor
- D.C. analysis of transistor circuits
- Transistor as an amplifier
- Biasing the BJT: fixed bias, emitter feedback bias, collector feedback bias and voltage divider bias
- Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers
- Transistor as a switch: cut-off and saturation modes
- High frequency model of BJT amplifier

3. Field Effect Transistor (FET)

- Enhancement-type MOSFET: structure and physical operation, current-voltage characteristics
- Depletion-type MOSFET
- D.C. operation of MOSFET circuits
- MOSFET as an amplifier
- Biasing in MOSFET amplifiers
- Basic MOSFET amplifier configuration: common source, common gate and common drain types
- High frequency model of MOSFET amplifier
- Junction Field-Effect Transistor (JFET)

4. Operation Amplifier (Op-amps)

- Ideal Op-amp
- Differential amplifier: differential and common mode operation
common mode rejection ratio (CMRR)
- Practical op-amp circuits: inverting amplifier, non-inverting amplifier, weighted summer, integrator, differentiator
- Large signal operation of op-amps
- Other applications of op-amps: instrumentation circuits, active filters, controlled sources, logarithmic amplifiers, waveform generators, Schmitt triggers, comparators

5. Power Circuits and Systems

- Class A large signal amplifiers, second-harmonic distortion
- Transformer coupled audio power amplifier
- Class B amplifier
- Class AB operation
- Power BJTs
- Regulated power supplies
- Series voltage regulator
- Four layer diodes: p-n-p-n characteristics
- Silicon controlled rectifier



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