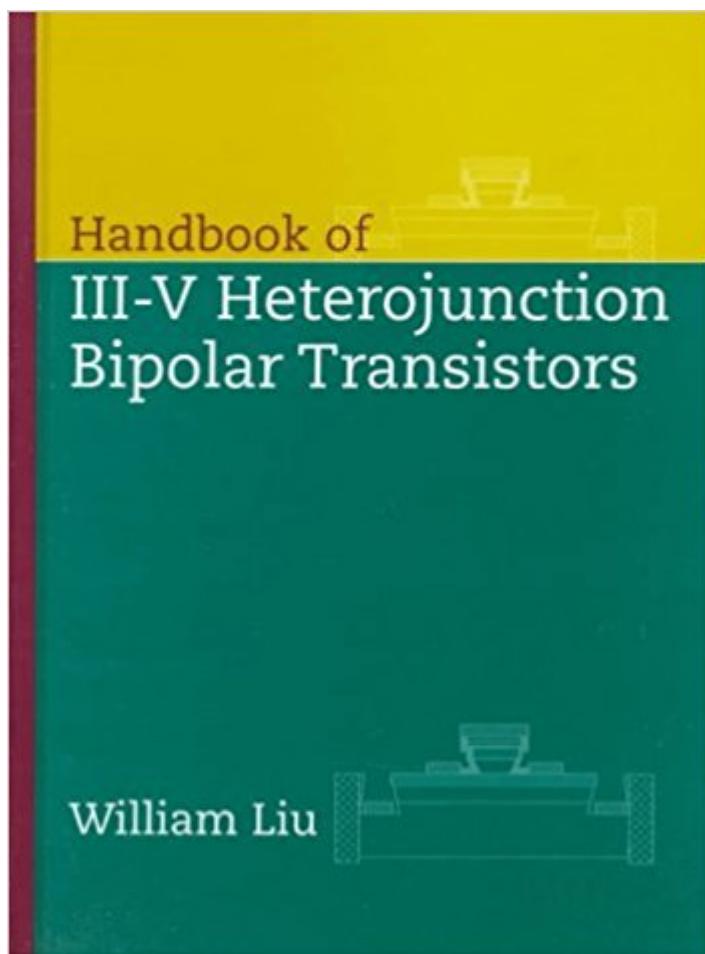


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Handbook Of III-V Heterojunction Bipolar Transistors



Synopsis

The definitive hands-on guide to heterojunction bipolar transistors In recent years, heterojunction bipolar transistor (HBT) technology has become an intensely researched area in universities and industry worldwide. Boasting superior performance over silicon bipolar transistors with its combined high speed, high linearity, and high power requirements, the III-V HBT is fast becoming a major player in wireless communication, power amplifiers, mixers, and frequency synthesizers. Handbook of III-V Heterojunction Bipolar Transistors presents a comprehensive, systematic reference for this cutting-edge technology. In one self-contained volume, it covers virtually every HBT topic imaginable--introductory and advanced, theoretical and practical--from device physics, to design issues, to HBT performance in digital and analog circuits. It features: * A user-friendly, integrated approach to HBTs and circuit design that can be applied in diverse disciplines * A discussion of factors determining transistor operation, including thermal properties, failure mechanisms, high-frequency measurements and models, switching characteristics, noise and distortion, and modern device fabrications * Over 800 illustrations, showing how to use concepts and equations in the real world * An introduction to device physics and semiconductor basics * Many worked-out examples and end-of-chapter problem sets * Fully developed mathematical derivations Handbook of III-V Heterojunction Bipolar Transistors is an important reference for practicing engineers and researchers in cellular wireless communication and microwave-millimeter electronics as well as for wireless circuit design engineers. It is also extremely useful for advanced undergraduate and graduate students studying advanced semiconductor and microwave circuits.

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Customer Reviews

Heterojunction bipolar transistors (HBT) offer substantial improvements in performance over the silicon bipolar transistor. HBTs will permit performance improvements by combining high speeds with low power requirements. Important applications are found in such fields as wireless communications, power amplifiers, mixers and frequency synthesizers.

The definitive hands-on guide to heterojunction bipolar transistors In recent years, heterojunction bipolar transistor (HBT) technology has become an intensely researched area in universities and industry worldwide. Boasting superior performance over silicon bipolar transistors with its combined high speed, high linearity, and high power requirements, the III-V HBT is fast becoming a major player in wireless communication, power amplifiers, mixers, and frequency synthesizers. Handbook of III-V Heterojunction Bipolar Transistors presents a comprehensive, systematic reference for this cutting-edge technology. In one self-contained volume, it covers virtually every HBT topic imaginable—introductory and advanced, theoretical and practical—from device physics, to design issues, to HBT performance in digital and analog circuits. It features: A user-friendly, integrated approach to HBTs and circuit design that can be applied in diverse disciplines A discussion of factors determining transistor operation, including thermal properties, failure mechanisms, high-frequency measurements and models, switching characteristics, noise and distortion, and modern device fabrications Over 800 illustrations, showing how to use concepts and equations in the real world An introduction to device physics and semiconductor basics Many worked-out examples and end-of-chapter problem sets Fully developed mathematical derivations Handbook of III-V Heterojunction Bipolar Transistors is an important reference for practicing engineers and researchers in cellular wireless communication and microwave-millimeter electronics as well as for wireless circuit design engineers. It is also extremely useful for advanced undergraduate and graduate students studying advanced semiconductor and microwave circuits.

This is an excellent advanced reference of HBTs covering in great detail GaAs/AlGaAs, GaAs/InGaP and fair coverage of InGaAs/InAlAs HBTs. Despite being an old book (published in 1998) in a very dynamic field it is almost impossible to be outdated any time soon for at least the following reasons:1- It covers working concepts of HBTs in meticulous detail making very clever and

extensive use of Mathematics without eclipsing the underlying physics.2- Excellent strategy of applying Poisson equation for heterostructures and then using that knowledge for drawing the band diagrams (Kroemer will love it!)3- Complete chapter on Electrical-thermal modelling solving heat conduction equation again in a manner which is both intuitive and rigorous followed by extensive real-world data and its analysis.4- Complete chapter with examples on failure mechanisms in HBTs of different material systems.5- Extensive discussion of different components of base current, their idealities and their dependence on device layout followed by their role in carrier transport and hence their effect on the gain of an amplifier.6- Complete, unabridged derivations of small signal models starting from basic drift-diffusion equations all the way to getting Y, S and other parameters and then leading to the expressions for cut-off (fT) and maximum oscillation (fmax) frequency.7- Very thorough coverage of parasitics covering extrinsic resistances and capacitances and their effect on transistor performance. Complete worked out examples starting from solving Poisson equation for heterojunctions to deriving fT and fmax values.8- Very good coverage of Ebers-Moll and Gummel-Poon models with very valuable details of the measurement setup for Vector Network Analyzer or other parameter analyzers.9- Excellent set of problems to apply and master the concepts discussed in the main text. The omission of SiGe HBTs is logical as the book's title is III-V HBTs and any effort to include it in subsequent editions will probably render this book too thick to be used frequently and conveniently and especially as a graduate textbook. The only downside of the book is that it has some and rather insidious typos. In short it is a must-read for any research student or professional in the area of HBTs.

I am William Liu, the author. People ask me about the content of the book enough times that, I'd like to put it here.

Chapter 1: Basic Properties and Device Physics of III-V Materials

- 1-1 semiconductor crystalline properties
- 1-2 molecular beam epitaxy
- 1-3 metalorganic chemical vapor deposition
- 1-4 lattice-mismatched layers
- 1-5 basic device physics
- 1-6 continuity equations and quasi-neutrality assumption
- 1-7 material parameters

Chapter 2 Two-Terminal Heterojunction Devices

- 2-1 p+-N heterojunction under thermal equilibrium
- 2-2 p+-N heterojunction under external bias
- 2-3 p-N+, P+-n, and P-n+ heterojunctions
- 2-4 graded heterojunctions
- 2-5 diode current-voltage characteristics
- 2-6 space charge recombination and generation currents
- 2-7 isotype heterojunctions

Chapter 3 DC Current Gain

- 3-1 basic transistor operation
- 3-2 base current components
- 3-3 collector current ideality factor
- 3-4 current gain flattening
- 3-5 surface passivation
- 3-6 surface current ideality factor
- 3-7 base contact recombination
- 3-8 temperature dependence
- 3-9 base quasi-electric field
- 3-10 analytical solution of the continuity equation
- 3-11 critical base-emitter contact spacing
- 3-12 minority-carrier

lateral diffusion length3-13 device simulator results3-14 parasitic conduction in the passivation ledgeChapter 4 Nonideal DC Characteristics4-1 current gain fall-off mechanisms4-2 emitter crowding4-3 d.c. intrinsic base resistance4-4 emitter doping effects4-5 Kirk effects4-6 self-heating effects4-7 two-dimensional current flow4-8 avalanche breakdown4-9 leakage current4-10 knee voltage and offset voltage4-11 current gain oscillationChapter 5 Thermal-Electrical Properties5-1 the heat conduction equation5-2 steady-state junction temperature due to self-heating5-3 thermal-electrical coupling5-4 temperature-dependent thermal conductivity5-5 experimental determination of steady-state junction temperature5-6 transient thermal response5-7 temperature at the metal strip line5-8 thermal resistance in a dot structure5-9 heat conduction through electrical carriersChapter 6 Collapse of Current Gain6-1 basic characteristics6-2 collapse loci, regression loci, and s-factor loci6-3 gain collapse in one-finger HBT6-4 thermal coupling6-5 numerical model6-6 prevention techniques6-7 base ballasting6-8 substrate temperature effects6-9 interaction with avalanche breakdown6-10 constant V_{be} and common-base operations6-11 collapse inverter6-12 gain collapse in GaInP/GaAs HBTs6-13 gain collapse in InP/InGaAs HBTs6-14 Newton-Raphson numerical techniqueChapter 7 Failure Mechanisms and Reliability Issues7-1 failure mechanisms of AlGaAs/GaAs HBTs7-2 Si BJTs versus AlGaAs/GaAs HBTs7-3 safe operating area7-4 failure mechanisms of InP/InGaAs HBTs7-5 reliability basics7-6 degradation characteristics7-7 degradation mechanismsChapter 8 Small-Signal Properties8-1 a simple circuit model8-2 intrinsic common-base y-parameters8-3 intrinsic common-emitter y-parameters8-4 r.f. intrinsic base impedance8-5 hybrid-pi model8-6 intrinsic z- h- and s-parameters8-7 base quasi-electric field8-8 epitaxial resistances8-9 contact resistances8-10 cutoff frequency (f_T)8-11 maximum oscillation frequency (f_{max})8-12 second-order small-signal model8-13 second-order expression for f_T8-14 second-order expression for f_{max}8-15 inductance effectsChapter 9 Epitaxial Layer Design9-1 example: calculation of f_T and f_{max}9-2 emitter layer design9-3 collector layer design9-4 double collector and inverter-field collector designs9-5 subcollector layer design9-6 base layer design9-7 dopant-graded baseChapter 10 Geometrical Layout Design10-1 emitter width design10-2 base contact width design10-3 contact spacing and collector contact width design10-4 emitter length design (base metal resistance consideration)10-5 emitter length design (thermal consideration)10-6 dot geometry transistor design10-7 comparison of stripe and dot geometriesChapter 11 Power Amplifier11-1 sinusoidal power11-2 small-signal power amplifier11-3 large-signal power amplifier11-4 power gain and power-added-efficiency11-5 overdriven and selectively tuned amplifiers11-6 sources of undesirable power dissipations11-7 emitter inductance11-8 unit-cell designChapter 12 Distortion and Noise12-1 harmonic distortion12-2 intermodulation distortions and two-tone characteristics12-3

mixer12-4 differential pair12-5 noise characteristics12-6 noise figureChapter 13 Switching Characteristics and SPICE Models13-1 basic charge-control model13-2 second-order analysis13-3 rise time and fall time13-4 switching of transistors in saturation13-5 storage charge13-6 junction capacitive charges13-7 Ebers-Moll SPICE model13-8 Gummel-Poon SPICE model13-9 area and temeprature dependences and noise models13-10 extraction of SPICE parametersChapter 14 Transistor Fabrication14-1 d.c. fabrication process14-2 single-figner-device r.f. fabrication process14-3 GaInP (InP) and InGaAs processing14-4 MMIC r.f. fabrication process14-5 ashering effectsChapter 15 Measured Transistor Performances15-1 d.c. characteristics15-2 small-signal characteristics15-3 high-frequency performance at high current15-4 emitter doping effects15-5 Pnp HNTs15-6 d.c. current gain and cutoff frequency15-7 electron saturation velocity in GaIP15-8 InP based HBTs15-9 unit-cell large-signal results15-10 GaInP/GaAs/GaInP DHBT characteristics15-11 linearity characteristics15-12 MMIC amplifier performance15-13 latterally etched undercut results15-14 1/f noise characteristics15-15 HBT-on-Si15-16 conductive substrate and leaky subcollector

It is a good book for HBTs with a lot of details in it.

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