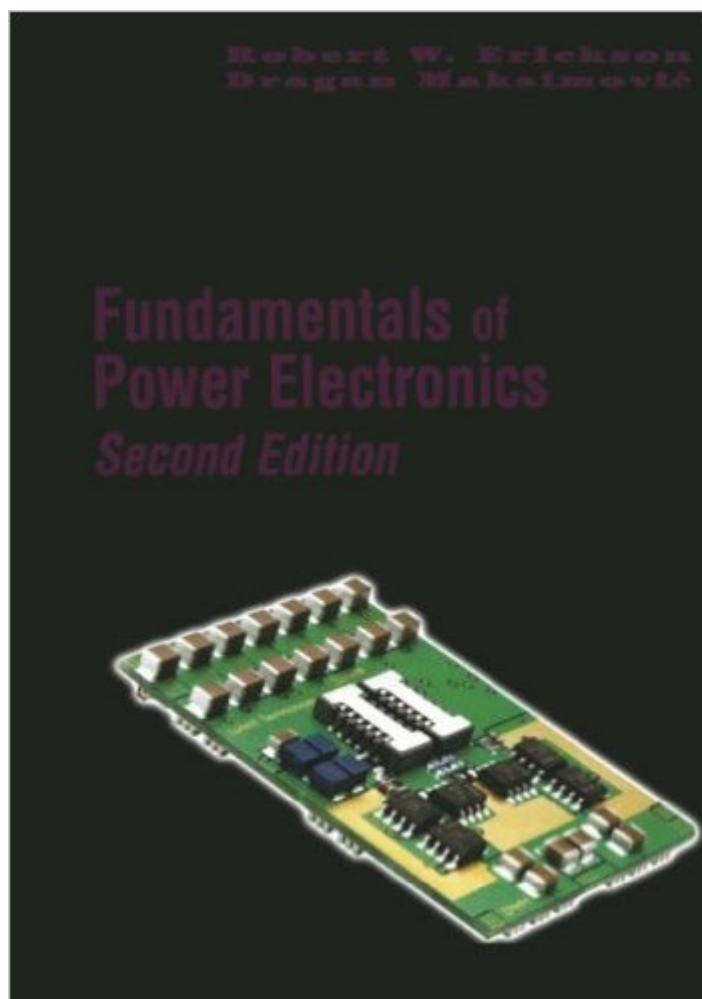


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# Fundamentals Of Power Electronics



## Synopsis

Fundamentals of Power Electronics, Second Edition, is an up-to-date and authoritative text and reference book on power electronics. This new edition retains the original objective and philosophy of focusing on the fundamental principles, models, and technical requirements needed for designing practical power electronic systems while adding a wealth of new material. Improved features of this new edition include: A new chapter on input filters, showing how to design single and multiple section filters; Major revisions of material on averaged switch modeling, low-harmonic rectifiers, and the chapter on AC modeling of the discontinuous conduction mode; New material on soft switching, active-clamp snubbers, zero-voltage transition full-bridge converter, and auxiliary resonant commutated pole. Also, new sections on design of multiple-winding magnetic and resonant inverter design; Additional appendices on Computer Simulation of Converters using averaged switch modeling, and Middlebrook's Extra Element Theorem, including four tutorial examples; and Expanded treatment of current programmed control with complete results for basic converters, and much more. This edition includes many new examples, illustrations, and exercises to guide students and professionals through the intricacies of power electronics design.

Fundamentals of Power Electronics, Second Edition, is intended for use in introductory power electronics courses and related fields for both senior undergraduates and first-year graduate students interested in converter circuits and electronics, control systems, and magnetic and power systems. It will also be an invaluable reference for professionals working in power electronics, power conversion, and analog and digital electronics.

## Book Information

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## Customer Reviews

Fundamentals of Power Electronics, by Erickson and Maksimovic, has become one of my new favorite reference books for DC-DC Converter design. My library is full of similar books, but most only contain insignificant bits of information, are needlessly difficult, or just plain worthless (but a requisite in the power engineering bookcase). The massive FPE combines the best of them all, exceeding even my former favorites (those by Tater, Billings, or Pressman). Although written as a textbook with the usual exercises at the end of each chapter (and frustratingly, with no answers) it is full of practical, applicable information. It has excellent chapters on inductors and transformers, with practical information such as inter-weaved windings for reduced leakage. It has one of the best treatments of Bode plots than any one book I have contains (I can now retire my old Valkenburg). Thankfully, it does not waste pages with useless Nyquist or other esoteric loop stability analysis methods. Nice index and appendix. I wish Maksimovic had included a section on his famous switched-capacitor circuit, even if not technically a power circuit. I highly recommend this book for any engineer seriously involved in power electronics.

First off, this book is NOT a cookbook. It will not tell you how to design a power supply for a specific application. But this is not the books purpose. This book is written for those who wish to understand in depth knowledge of power conversion. It is written as a text book. If the reader took the time to understand what is written (and it is written well) then the person would be able to design a power supply for any application using any topolgy. It teaches you the first principles of power conversion in order for you to apply it. Out of all my power electronic books this is my favorite book by far. If you are a power supply designer this book is a must.

This book helped me to really understand beyond the conceptual level. This book will guide the reader through the different aspects of analysis and design of power electronics systems without left behind the very practical hints. The course slides from the book web site are an excellent resource for instructors using this book. I dare my self to say that this book after Kassakian's is the best book in power electronics.

I haven't finished the course yet, so I haven't finished the book by a long shot. So far it's fine. The first few chapters cover Buck, Boost, Buck-Boost, and Cuk converters. Steady state, ripple analysis,

and continuous vs discontinuous conduction mode. I assume we'll get to transient analysis before too long too. If you have a strong sense of what Power Electronics is (what the combination of those two words together means specifically) then the material should be easy enough to grasp for you.

Chapter Titles:

- 1 Introduction
- 2 Principles of Steady State Converter Analysis
- 3 Steady-State Equivalent Circuit Modeling, Losses, and Efficiency
- 4 Switch Realization
- 5 The Discontinuous Conduction Mode
- 6 Converter Circuits
- 7 AC Equivalent Circuit Modeling
- 8 Converter Transfer Functions
- 9 Controller Design
- 10 Input Filter Design
- 11 AC and DC Equivalent Circuit Modeling of the Discontinuous Conduction Mode
- 12 Current Programmed Control
- 13 Basic Magnetics Theory
- 14 Inductor Design
- 15 Transformer Design
- 16 Power and Harmonics in Nonsinusoidal Systems
- 17 Line-Commutated Rectifiers
- 18 Pulse-Width Modulated Rectifiers
- 19 Resonant Conversion
- 20 Soft Switching

I found this book to be one of the best technical text books I've ever read, for general, electrical engineering students. Chapters can be long and hard to chew through at times, but the explanations are very well laid out, with examples/discussion on topics that lead you prepared, directly into the problems in the text. The only thing really lacking is a solutions set with answers, although you can find a highly abbreviated version on Erickson's webpage. Bode plots section, magnetics/transformer design sections were very good. I would recommend this book to anyone wanting a solid understanding in introductory power electronics circuit design!

The book is an excellent text for understanding power electronics and power supplies. My background is in analog circuits, microelectronics, RF, and high-voltage, and I found this book very easy to follow and extraordinarily thorough. The device physics in this book is a little thin, but not a concern to me. I would recommend Mohan's book for a more in-depth treatment of device physics or other device physics texts. Having already read half the book, I am currently in the midst of repairing a 14kVDC power supply for a radar system and this book made it very easy to troubleshoot and repair an inoperative power supply. I would highly recommend this book for someone looking to understand the inner-workings of power supplies, or power electronics in general down to its 'nuts and bolts'.

I would agree with the other reviewer that this is not a "how to" book. The book approaches the subject from an academic viewpoint. The reader is expected to fill in between the lines with previous experience. It appears that the authors, professors at U of C, supplement the text with worked out

examples for their students. I would recommend it to people already versed in the subject and want more information. I found it for half price and this makes it worth buying as a reference.

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