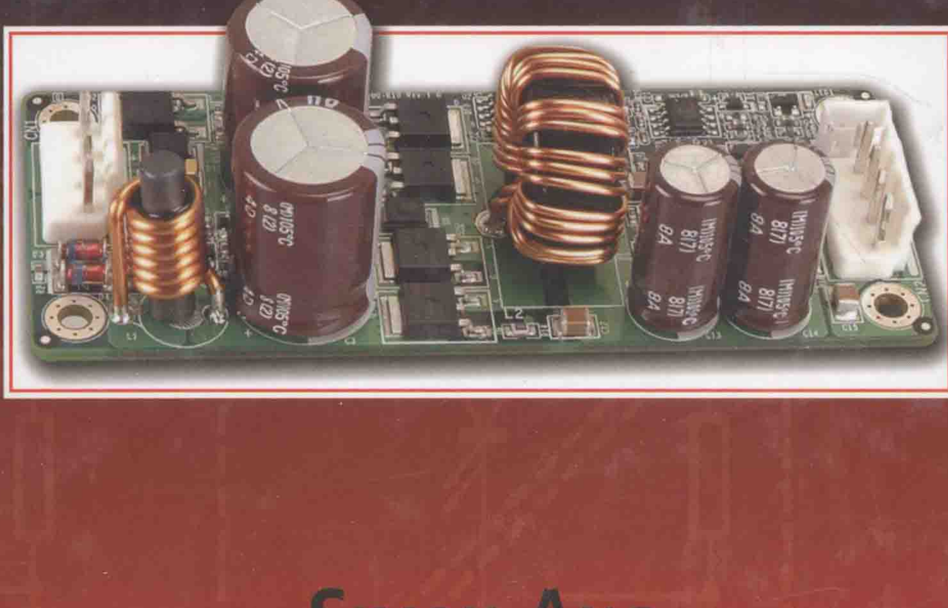
THIRD EDITION

POWER-SWITCHING CONVERTERS



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Power-Switching Converters

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Power-Switching Converters

Preface to the third edition

In this third edition, many new materials and a new chapter have been added. Several chapters have been completely revised and updated; the chapter on modeling and control of switching converters is now presented in four chapters and a new chapter on the applications of switching converters has been added.

Similar to its two previous editions, this book can be used as a textbook for a senior-level electrical/electronic engineering course on switching converters. The introductory course would cover the basic switching converter topologies described in Chapters 1 to 4, followed by an introduction to basic modulation techniques presented in Chapter 5. The instructor may choose to skip to Chapters 10 and 11 on interleaved converters and switching capacitor converters to complete the overview of switching converter topologies. Chapters 6 to 9 cover the modeling, closed-loop control and stability considerations in the design of switching converters. In particular, Chapters 6 and 7 cover continuous-time models and control techniques for switching converters, while Chapters 8 and 9 introduce discrete-time models and digital control for switching converters. Some of the materials can be skipped and covered later in a more advanced-level course.

Chapter 12 provides tools for the simulation of switching converters. It introduces both PSpice and MATLAB® simulations of switching converters. This chapter may be partially covered after Chapter 2 and concurrently during Chapters 4, 5, and 6, assigning some of the simulation exercises to increase understanding of the topology and operation of switching converters.

Chapter 13 introduces the basic concepts necessary to understand various actual and emerging applications for switching converters, such as in power factor correction, LED drivers, low-noise converters, and switching converter topologies for solar and fuel cells.

The discussion of switching converters is not complete until a switching converter is analyzed, designed, and finally prototyped. Chapter 14 contains several complete design examples, including experimental designs that may be used as technical references or for class laboratory projects.

Supplementary information and material will be updated periodically and are available at http://www.crcpress.com. These material include class slides, selected PSpice examples and MATLAB® scripts. The PSpice examples are designed to run on the OrCAD 9.2 student version and PSIM software.

Many individuals have contributed to this third edition of *Power-Switching Converters*. Several design case studies in Chapter 14 were adapted from the class projects of our former graduate students at the University of Arkansas, in particular, Kien Truong and Lan Phuong Bui Pham. We gratefully acknowledge our students at the Universidad Nacional del Sur: Leandro Stefanazzi, Germán Oggier, Hernán López, Juan Ugarte, Luciano García Rodríguez, Gastón Lanchas, Ángel Soto, Martín Ceci and Alfredo Falcón for preparing the figures, typing equations and proofreading the text. Finally, we would like to express our sincere gratitude to our families for their support and love.

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