

Preface

I have presented numerous courses in the form of noontime tutorials during my career with Robicon Corporation. These covered such essential subjects as transformers, transmission lines, heat transfer, transients, and semiconductors, to name but a few. The attendees were design engineers, sales engineers, technicians, and drafters. The tutorials were designed to present an overview of the power electronics field as well as design information for the engineers. They were very well received and appreciated. The material was useful to design engineers, but the technicians, drafters, and sales engineers appreciated the fact that I did not talk over their heads. I have also given tutorials to national meetings of the IEEE Industrial Applications Society as well as local presentations. This book represents a consolidation and organization of this material.

In this book, I have defined power electronics as the application of high-power semiconductor technology to large motor drives, power supplies, power conversion equipment, electric utility auxiliaries, and a host of other applications. It provides an overview of material no longer taught in most college electrical engineering curricula, and it contains a wealth of practical design information. It is also intended as a reference book covering design considerations that are not obvi-

ous but are better not learned the hard way. It presents an overview of the ancillary apparatus associated with power electronics as well as examples of potential pitfalls in the design process. The book approaches these matters in a simple, directed fashion with a minimum reliance on calculus. I have tried to put the overall design process into perspective as regards the primary electronic components and the many associated components that are required for a system.

My intended audience is design engineers, design drafters, and technicians now working in the power electronics industry. Students studying in two- and four-year electrical engineering and engineering technology programs, advanced students seeking a ready reference, and engineers working in other industries but with a need to know some essential aspects of power electronics will all find the book both understandable and useful. Readers of this book will most appreciate its down-to-earth approach, freedom from jargon and esoteric or non-essential information, the many simple illustrations used to clarify discussion points, and the vivid examples of costly design goofs.

When I was in graduate school, I was given a copy of *The Westinghouse Electrical Transmission and Distribution Reference Manual*. This book covered both theory and practice of the many aspects of the generation, transmission, and distribution of electric power. For me and thousands of engineers, it has been an invaluable reference book for all the years of my work in design. I hope to serve a similar function with this book on power electronics.

Acknowledgments

I have attempted to write about the things I worked with during my 50 years in industry. Part were spent with Westinghouse in magnetic amplifiers and semiconductors and the last 30 with Robicon Corporation, now ASI Robicon. I had the privilege of working with some very talented engineers, and this book profits from their experiences as well as my own. As Engineering Manager of the Power Systems

group at Robicon, I had the best job in the world. My charge was simply to make whatever would work and result in a profit for the company. The understanding was that it would be at least loosely associated with power semiconductors, although I drifted into a line of medium-voltage, passive harmonic filters. Yes, we made money on them. The other aspect of my job was to mentor and work with some very talented young engineers. Their enthusiasm and hard work actually made me look good. My thanks to Junior, Ken, Pete, Bob, Frank, Geoff, Frank, Joe, Mark, Joe, Gene, and John. I also owe a debt of gratitude for the professional associations with Bob, Harry, Dick, and Pete. I gratefully acknowledge the personnel at SciTech Publishing, who helped develop the book, and J. K. Eckert & Co., who performed the editing and layout.

Lastly, I apologize for any errors and omissions and hope the book will prove useful in spite of them.

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