TRANSISTORS

FROM CRYSTALS TO INTEGRATED CIRCUITS

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World Scientific

Singapore • New Jersey • London • Hong Kong

Published by

World Scientific Publishing Co. Pte. Ltd.

P O Box 128, Farrer Road, Singapore 912805

USA office: Suite 1B, 1060 Main Street, River Edge, NJ 07661

UK office: 57 Shelton Street, Covent Garden, London WC2H 9HE

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

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ISBN 981-02-2743-4

This book is printed on acid-free paper.

Printed in Singapore by Uto-Print

To my friends. M.L.
To my sons Kirill and Misha. G.S.

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Preface

This book will tell you about the design and work of transistors and diodes — the most important semiconductor devices.

A few years ago this book was published in Russian in Moscow and about 140 000 copies of it were sold in the former USSR.

We found that the majority of those who had bought it were senior grade pupils interested in semiconductors, those who thought about their future careers, those who were considering semiconductor physics, materials science, electrical engineering or semiconductor processing as their future profession, though they didn't quite realize what semiconductor electronics actually is.

Many of our readers were undergraduates (mainly freshmen). We were glad to know that the book had proved to be useful supplementary reading, facilitating their learning process.

We did not expect it and were happy to know that graduates and postgraduates were also interested in the book. Some of our readers have degrees (B.Sc., or M.Sc., some are getting PhDs), and yet they wrote to tell us that what had seemed to them most complicated and perceivable only by means of differential equations and computer simulation, became quite simple and understandable after they had read the book. Semiconductor designers and technologists were also interested in the book. They found some new ideas and unexpected approaches in the book.

Several professors, who deliver lectures in semiconductor physics and semiconductor devices, have written to us saying that they think it is expedient to recommend the book to their students as supplementary reading.

Thus, the book has proved to be interesting to quite a lot of people whose range and levels of knowledge are very different.

We are thankful to our friends and colleagues: Michael I. Dyakonov, Professor, Principal Scientist of the Ioffe Institute, St. Petersburg, Russia; Boris I. Shklovskii, Professor, University of Minnesota, USA; Igor M. Filanovskii, Professor, University of Alberta, Canada for their help in the work featured in this book. We are grateful to our wives Larisa and Marianna for their

patience, understanding and friendly support. We want to thank our children: Dina Levinshtein and Misha and Kirill Simin for their love which helped a lot. We are grateful to Minna M. Perelman, the translator of this book, and also of our book “Getting to Know Semiconductors”, published by World Scientific in 1992. Her energy and courage inspired our work. Our special thanks are also extended to Marianna A. Simin: her funny pictures created an easy and friendly atmosphere.

M. Levinshtein
G. Simin

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