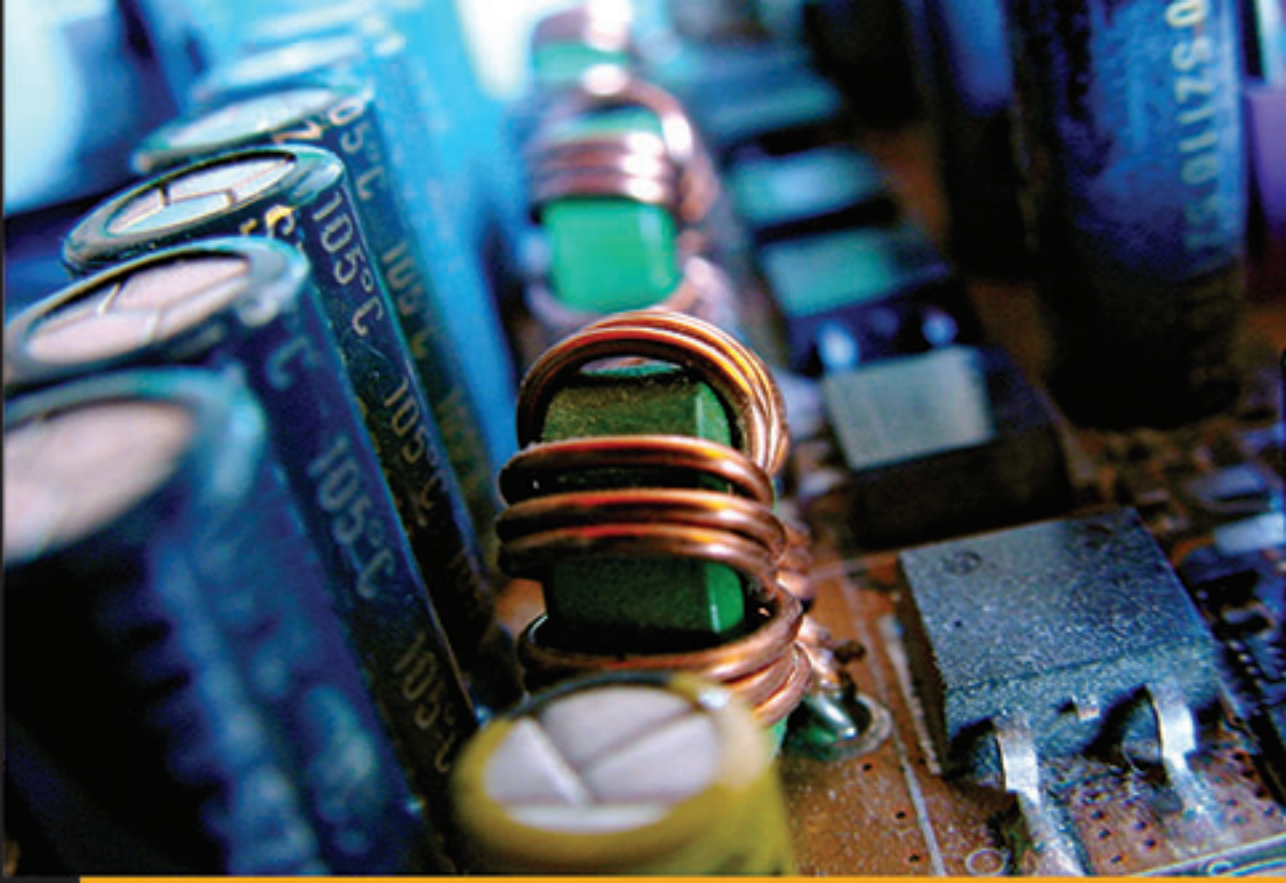

A Simplified Approch to

Basic Electronics

SANGUINE

Dr. UB Mahadevaswamy

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to
Basic Electronics

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His Holiness
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Shree Shree Shree Shivaratri Rajendra Mahaswamigalavaru,
Founder President
J. S. S. Mahavidyapeeta
Mysore.

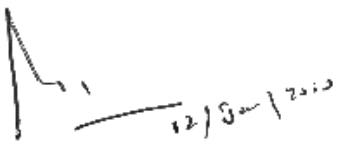
In Fond Memory of My Grand Mother
Late Smt. M. S. Basamma
and
My Father
Late Shree T. N. Basavaraju
who are responsible for what I am today.

Foreword

It gives me immense pleasure to present before you this book on **BASIC ELECTRONICS** authored by my colleague Dr. U.B. Mahadevaswamy. The book has been carefully drafted with enormous number of practical examples to support the theoretical concepts explained in this book. Difficult concepts are explained in simple and easily understandable terms backed by ample illustrations.

This book is a result of over 25 years of teaching experience of the author at various levels. I am sure that the readers will find the book extremely useful from both theoretical and practical point of view.

I wish the author success and sincerely hope that more publications would emerge out of his vast experience of teaching and research in electronics.



(Dr. Syed Shakeeb ur Rehman)
Principal

Preface

This text book entitled Basic Electronics is written for beginners with a thirst of understanding the fundamentals of Electronics. This book is written in a simple and reader friendly manner so that the reader feels as if he is reading a novel. The concepts presented are in a simple and lucid manner. The book is packed with plenty of numerical examples which covers both analysis and design aspects.

This book covers topics in Basic Electronics such as Semiconductor Diodes and their Applications, Transistor Basics and Biasing, Op-Amp and its Applications. It also covers the fundamentals of Digital Electronics, basics of Microprocessors and Micro controllers. The operating principle of various types of Transducers and their applications has also been discussed. Finally it also discusses the basics of Communication and different types of Advanced Communication Systems.

I hope that this book will definitely serve as an excellent reference material for beginners and teachers. In spite of several readings by reviewers, few mistakes might have crept in. I open heartedly welcome the suggestions from the readers, teachers to make this book to come in a better form. You may send your comments to *info@sanguineindia.com.*

U. B. MAHADEVASWAMY

Acknowledgments

Firstly, I submit my reverential pranams at the lotus feet of His Holiness parama poojya Jagadguru Shree Shree Shree Shivarathri Deshikendra Mahaswamigalavaru, President, JSS Mahavidyapeetha, Mysore. His divine blessing has always been a continuous source of inspiration in all my endeavors.

I greatly acknowledge all the encouragement and support rendered by Dr. Syed Shakeeb Ur Rehman, principal, SJCE Mysore, in drafting this book.

I deeply remember Late Dr. R.D Sudhaker Samuel, my teacher, my former H.O.D, who taught me the art of book writing.

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My heartfelt thanks to my friend, colleague Prof. V. Nattarasu for his continuous support and guidance in making this book.

I must acknowledge the support and encouraging words rendered by my teacher, colleague and my well-wisher Dr.Chamaraju, Professor Department of Mathematics, SJCE, Mysore, in making this book.

I also thank my Colleague Dr. Shankaraiah, Professor, EC Department, SJCE, Mysore for his support in making this book.

I thank Mr. R Subramanian of Sanguine Technical Publishers for his meticulous review of this book and valuable suggestions for improving the quality of this book.

My special thanks to Smt. Rashmi S., Assistant professor, EEE department, VVCE Mysore for her sincere effort in reviewing the content of this book several times and her valuable suggestions for improving the quality of this book both in technical as well as conceptual presentation aspects. Her husband Mr. G.V. Krishna also needs a special mention for his encouraging words while drafting this book.

I must acknowledge all the encouragement and support from my wife Smt. K.S. Umadevi and my son Master Jeevan M. Swamy in making this project a success. I appreciate their patience and tolerance in sparing me for not accessible to them for long hours during most of the days while drafting this book. The encouraging words of my brother Mr.B. Chandra ShekaraMurthy , Quality control Engineer, Muscat, over phone is unforgettable.

I cherish in my heart, the heartfelt blessings of my mother Smt. K.P.Leelavathy at each and

every stage of drafting this book. The support rendered by all my family members need a special mention.

Finally I express my sincere gratitude for Sanguine Publishers for their constant support to convert my dreams into reality.

U. B. MAHADEVASWAMY

Contents

Chapter 1

p-n Junction Diode

The term diode denotes a two electrode device. **Di** means **two** and **ode** means electrode. A semiconductor diode is a two layer single junction two terminal unidirectional device. The current in a diode is contributed by both holes and electrons. Diode is the simplest of all semiconductor devices but plays a very important role in electronic systems. Diodes are used in variety of applications including communication systems, radio, TV, computers, power supplies and so on. This chapter begins with an explanation of the *p-n* junction diode and proceeds with its characteristics and parameters. Diode approximations, dc and ac equivalent circuits, temperature effects are presented with numerous examples. Zener diode and its characteristic have also been discussed at the end of this chapter.

1.1 *p-n* junction

A *p-n* junction diode is a two terminal unidirectional device with a *p*-type anode and an *n*-type cathode as shown in Fig. 1.1. It is said to be forward biased when its anode is kept at a positive potential with respect to its cathode. Under this condition, it offers a low resistance to the flow of current and acts as the closed condition of a switch. The current flowing in this condition is called forward current, I_F.

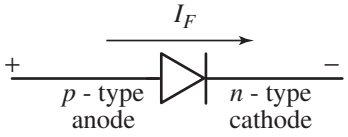
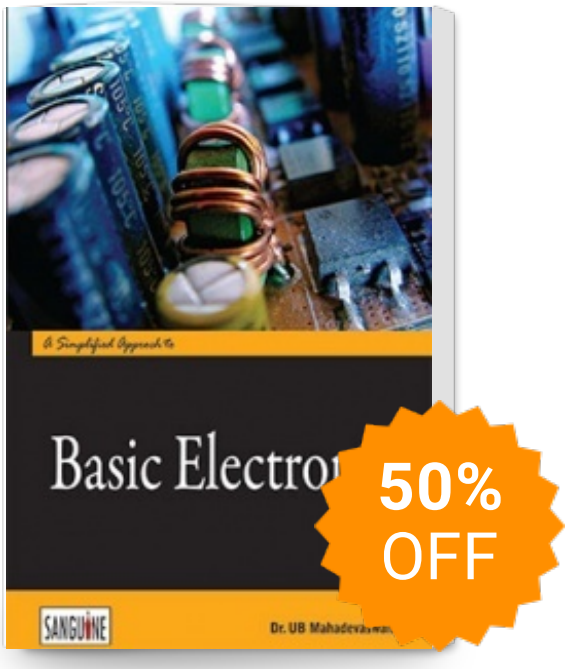


Fig. 1.1: *Forward biased p-n junction diode*

Basic Electronics



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