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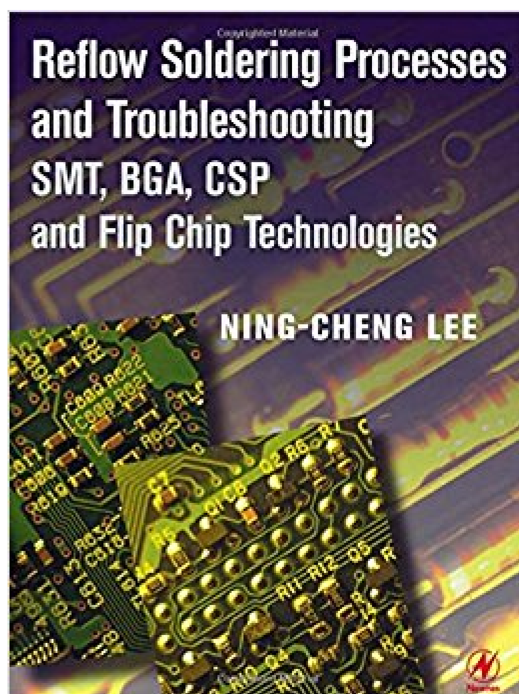
Reflow Soldering Processes



Synopsis

Focused on technological innovations in the field of electronics packaging and production, this book elucidates the changes in reflow soldering processes, its impact on defect mechanisms, and, accordingly, the troubleshooting techniques during these processes in a variety of board types. Geared toward electronics manufacturing process engineers, design engineers, as well as students in process engineering classes, Reflow Soldering Processes and Troubleshooting will be a strong contender in the continuing skill development market for manufacturing personnel. Written using a very practical, hands-on approach, Reflow Soldering Processes and Troubleshooting provides the means for engineers to increase their understanding of the principles of soldering, flux, and solder paste technology. The author facilitates learning about other essential topics, such as area array packages--including BGA, CSP, and FC designs, bumping technique, assembly, and rework process,--and provides an increased understanding of the reliability failure modes of soldered SMT components. With cost effectiveness foremost in mind, this book is designed to troubleshoot errors or problems before boards go into the manufacturing process, saving time and money on the front end. The author's vast expertise and knowledge ensure that coverage of topics is expertly researched, written, and organized to best meet the needs of manufacturing process engineers, students, practitioners, and anyone with a desire to learn more about reflow soldering processes. Comprehensive and indispensable, this book will prove a perfect training and reference tool that readers will find invaluable. Provides engineers the cutting-edge technology in a rapidly changing fieldOffers in-depth coverage of the principles of soldering, flux, solder paste technology, area array packages--including BGA, CSP, and FC designs, bumping technique, assembly, and the rework process

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Customer Reviews

This excellent book on reflow soldering, by noted expert Doctor Ning-Cheng Lee, offers a unique approach that will be invaluable to anyone concerned with the practical applications of microelectronics packaging. - FlipChips Dot ComDr. Lee makes good use of the large (7 by 10 inch) format to place multiple graphics on almost every page. At less than one inch thick, this 280-page book can be easily slipped into an ordinary briefcase, and carried without muscle strain. - FlipChips Dot ComAn extensive list of references to technical literature follows each chapter, although only a specialist or a nut case would need to dig deeper than the material included in Dr. Lee’s book. My major criticism of the book is that the title doesn’t do full justice to Dr. Lee’s unique approach. "Troubleshooting Reflow Soldering for Health and Happiness" would be my choice. - FlipChips Dot Com...tool for those involved in reflow soldering surface mounted electronics devices. -SMT, April 2002Lee is a well-known authority on soldering science, and is the author of numerous technical papers and studies. -SMT, April 2002

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This excellent book on reflow soldering, by noted expert Doctor Ning-Cheng Lee, offers a unique

approach that will be invaluable to anyone concerned with practical applications of microelectronics packaging.Many books, including this one, tell you how reflow soldering should work. Dr. Lee's book goes beyond those basics, to tell you in great detail what most other books do not long dwell upon: what to do when reflow soldering does not work as expected. How to identify the problems. How to cure or compensate for problems to achieve good solder reflow interconnections. How to use the defects themselves to eliminate defects and to optimize your solder reflow process.The first four chapters are a clear and complete exposition of reflow soldering and of surface mount assembly processes. They cover surface mount technology in general, solders and solder pastes, and the beginning-to-end steps in surface mount assembly. Nourishment for the technical mind ranges from the organic chemistry of fluxes to equations relating surface tension and solder spread. These four chapters provide an excellent summary of how reflow soldering is supposed to work.The next seven chapters place a strong focus on trouble-shooting. Not on how things go when all is well, but on what things can go wrong, and how to fix, to compensate for, or to work around them when they do go wrong. The logical structure is clear: three chapters on reflow problems, titled "Before Reflow," "During Reflow," and "After Reflow." Three chapters on the special techniques and the potential problems encountered in solder bumping area array packages, in assembling and reworking BGA & CSP packages, and in reflowing solder-bumped flip chips. Each chapter first covers the required materials and processes, and then details all of the potential problems that might be encountered, and how best to solve them.The capstone chapter describes how to optimize a reflow process through the proper analysis of the defect mechanisms encountered. This chapter requires 39 sub-sections to systematically step through identifying, analyzing, and correcting defects. It turns defect analysis into a powerful tool for optimizing the reflow process. Further discussion extends this optimization approach to other alloys and systems, and suggests that your creativity might carry it still further.The final chapter is a now-obligatory look at the "lead-free" juggernaut bearing down on the industry, with some recognition that this juggernaut carries its own baggage of potential problems.Dr. Lee makes good use of the large (7 by 10 inch) format to place multiple graphics on almost every page. At less than one inch thick, this 280-page book can be easily slipped into an ordinary briefcase, and carried without muscle strain. Some current reviews incorrectly state that this book has 384 pages. Apparently they copied another book's page count from the multiple back cover blurbs, instead of opening the book themselves. An extensive list of references to technical literature follows each chapter, although only a specialist or a nut case would need to dig deeper than the material included in Dr. Lee's book. My major criticism of the book is that the title doesn't do full justice to Dr. Lee's unique approach. "Troubleshooting Reflow Soldering for Health and

Happiness" would be my choice.

I wish I could have gotten this book earlier. It explains and demonstrates all of the known possible defects I have ever encountered in my professional years and their respective causes and solutions. I would recommend it to not only the SMT process engineers but all electronic engineers who need to make PCBAs.

Few people have made more contributions to reflow soldering than Dr. Lee has. He has been a driving force in taking surface mount technology (SMT) from an art to a science. This book is a compilation of these successes with ample references to the important work of others. Those who work in this field will find this book indispensable in setting up and optimizing SMT assembly processes. In my opinion Dr. Lee's book is unequal in its value to practitioners in SMT.

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