

# PCB Design Guidelines for 0.5mm Package-on-Package Applications Processor, Part I

K. Gutierrez, Keven Coates

## ABSTRACT

Ball grid array (BGA) packages having 0.5mm ball pitch require careful attention to printed circuit board (PCB) design parameters to successfully yield reliable and robust assemblies. PCBs with package-on-package (PoP) technology have additional assembly requirements and options that need to be considered when designing the PCB.

Fine-pitch PCB design is a team effort and may require more than a common list of design rules. Close coordination and communication between component supplier, PCB designer, PCB fabricator, and PCB assembly vendor is mandatory.

The following factors have a major effect on the quality and reliability of PCB assembly: pad design, via-in-pad (VIP) guidelines, via finishing, stencil design, solder paste requirements, solder paste deposition, and reflow profile. This application report provides a starting point for establishing a set of design guidelines. It is strongly recommended that you perform actual studies in conjunction with your PCB assembly vendor and PCB fabricator to optimize the process.

**Figure 1. Applications Processor (bottom device) and PoP Memory (top device) Stack Up on PCB**



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**Andrea Chen,Randy Hsiao-Yu Lo**



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Semiconductor International ,2007      **Electronic Design** ,1996      *Complete PCB Design Using OrCad Capture and Layout* Kraig Mitzner,2011-04-01 Complete PCB Design Using OrCad Capture and Layout provides instruction on how to use the OrCAD design suite to design and manufacture printed circuit boards The book is written for both students and practicing engineers who need a quick tutorial on how to use the software and who need in depth knowledge of the capabilities and limitations of the software package There are two goals the book aims to reach The primary goal is to show the reader how to design a PCB using OrCAD Capture and OrCAD Layout Capture is used to build the schematic diagram of the circuit and Layout is used to design the circuit board so that it can be manufactured The secondary goal is to show the reader how to add PSpice simulation capabilities to the design and how to develop custom schematic parts footprints and PSpice models Often times separate designs are produced for documentation simulation and board fabrication This book shows how to perform all three functions from the same schematic design This approach saves time and money and ensures continuity between the design and the manufactured product Information is presented in the exact order a circuit and PCB are designed Straightforward realistic examples present the how and why the designs work providing a comprehensive toolset for understanding the OrCAD software Introduction to the IPC JEDEC and IEEE standards relating to PCB design Full color interior and extensive illustrations allow readers to learn features of the product in the most realistic manner possible

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**Electronic Packaging of High Speed Circuitry** Stephen G. Konsowski, Arden R. Helland, 1997 A comprehensive guide to the packaging of high speed circuits for today's advanced electronic products This is a unique and expert guide to the design and packaging of the high frequency circuitry crucial to the performance of today's advanced electronic products such as Pentium chips HDTV and mobile communications Written by two of the leading innovators in the field this book fully explains integrated design approaches that will enable you to take advantage of all the latest advances in electronic devices circuit design materials and circuit packaging You'll read about approaches that include basic signal transmission theory digital circuit design and how these are integrated with the packaging and interconnection characteristics There is detailed coverage of signal behavior in both high speed digital circuits as well as crucial aspects of materials selection and manufacturing This state of the art resource also provides you with practical design guidelines plus information on the major issues of design verification and performance evaluation

*PCB Design Guidelines* David Boswell, 1991

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**Guidelines** Michael Pecht,1994 *Reliable IC Package Design Guidelines* Ajay Arora,Donald Barker,Aris Christou,Abhijit Dasgupta,Mike Huang,MARYLAND UNIV COLLEGE PARK.,1992 This effort was intended to transition design and assembly constraint information and mathematical analyses of microelectronic packaging into a consolidated set of design guidelines which would enable the selection of materials and processes suitable for anticipated assembly testing handling operational and environmental stress levels The guidelines were intended to be used later in developing computer aided design software The Statement of Work required the University of Maryland CALCE to analyze common failure modes occurring in conventional package types Package design guidelines and models including theoretical and practical considerations were to be documented such that a package design engineer could understand and implement them All assumptions made were to be documented An example calculation was required for each model to insure reasonableness Rome Laboratory has chosen not to publish this report In light of the limited practicality of the work submitted in the draft final report and the limited supporting technical basis Rome Laboratory will not publish this report

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