

Handbook of Electronic Packaging Design, Ed. by Michael Pecht, Marcel Dekker Inc., New York, 1991. Price \$150.00.

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This book contains twelve chapters written by twelve authors having diversified professional backgrounds combining industrial and academic experiences. It is a well-planned and carefully written handbook which covers fundamental as well practical design aspects including a state-of-the-art review of the various topics related to electronic packaging.

In the first chapter, an overview of the electronics packaging process is presented including discussions on the role of electrical and mechanical engineers in electronic packaging design and an overview of the concept of concurrent engineering design. In the next four chapters, fundamental design issues related to development of a complete electronic system are examined. They include detailed definitions, design factors, and manufacturing processes in electronic components, microelectronic packages, printed circuit boards, elementary and hybrid assemblies, and electronic connections and interconnections at various levels of assembly. Important aspects of layout, placement, and routing are presented in Chapter 6. In

the next five chapters, the book addresses various analysis techniques needed in the electronic packaging design process.

Thermal analysis and design is discussed in Chapter 7 including fundamental heat transfer mechanisms, temperature measurements, and empirical correlations for thermal convection in electronic applications. In Chapter 8, mechanical design including thermomechanical aspects of electronic assemblies are treated. Simple analytical tools for stress analysis, empirical models for fatigue (including its interaction with creep), and failure mechanisms in microelectronic packages are discussed. Failure due to vibration and/or shock in electronic systems is addressed in Chapter 9 and environmental failure mechanisms associated with humidity and corrosion are discussed in detail in Chapter 10. Techniques for reliability analysis are presented in Chapter 11 including discussions of various failure modes and mechanisms which occur in electronic packages. Finally, in Chapter 12, the properties, behavior, and typical applications of electronic materials are presented. Extensive data are provided for polymers, ceramics, and metals commonly used in electronic devices and systems.

Several exercises covering theoretical as well as practical extensions of the textbook material have been included at the end of each chapter. An extensive, up-to-date list of references is provided for each topic. This handbook is suitable as a textbook in a teaching environment and it is a valuable reference for practitioners in the field of electronic packaging. It is one of the most complete up-to-date references on this broad subject.

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