

1. Record Nr.	UNINA9910820781903321
Autore	Costello Suzanne
Titolo	Hermeticity testing of MEMS and microelectronic packages / / Suzanne Costello, Marc P.Y. Desmulliez
Pubbl/distr/stampa	Boston : , : Artech House, , [2013] [Piscataway, New Jersey] : , : IEEE Xplore, , [2013]
ISBN	1-5231-1728-1 1-60807-527-3
Descrizione fisica	1 online resource (197 p.)
Collana	Integrated microsystems series
Disciplina	621.381
Soggetti	Microelectromechanical systems Microelectronics Microelectromechanical systems - Testing Microelectronics - Testing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface; References; Part 1 Introduction to Hermetic Package; 1 The Evolution of Packages, Their Sealing Methods, and Modes of Fabrication ; 1.1 Introduction; 1.2 The Evolution of Microelectronics and MEMS Packages; 1.3 MEMS Sealing Techniques and Mode Package Fabrication; 1.3.1 Materials; 1.3.2 Sealing Techniques; 1.4 Summary of MEMS Packaging Materials and Techniques; References; 2 Assembly, Packaging, and Environmentally Induced Failures in MEMS; 2.1 Introduction; 2.2 Particle Contamination ; 2.3 Thermomechanical Constraints; 2.3.1 Thermomechanical Constraints in Di. 2.3.2 Thermomechanical Constraints in Pa2.3.3 Thermomechanical Constraints in Wa; 2.3.4 Thermomechanical Constraints in FI; 2.4 Moisture and Gas Absorption; 2.4.1 Moisture Absorption; 2.4.2 Barrier Coatings: A Protection Aga; 2.4.3 Outgassing; 2.5 Conclusions: Reliability Demonstration and Accelerated Testing; References; 3 Packaging Requirements for Hermeticity; 3.1 The Need for Hermeticity in MEMS and; 3.2 Balancing Maximum Permissive Leak Ra; References; 4 The Different Types of Leaks in MEMS and Microelectronics Packaging; 4.1 Introduction; 4.2 Leak Channels or Capillary Leaks.

4.3 Permeation; 4.4 Outgassing; 4.5 Conclusion; References; Part 2 Traditional Hermeticity Test Techniques and Standards; 5 Ex Situ Hermeticity Test Methods; 5.1 Introduction; 5.2 Fine Leak Tests; 5.2.1 Helium Fine Leak Test; 5.2.2 Radioisotope Leak Detection Method; 5.3 Gross Leak Tests; 5.3.1 Fluorocarbon Liquid and Vapor Gross Leak Detection; 5.3.2 Gross Bubble Test; 5.3.3 Weight Gain; 5.3.4 Dye Penetrant Gross Leak Test; 5.4 Combinational Tests; 5.4.1 Optical Fine/Gross Leak Detection ; 5.4.2 Cumulative Helium Leak Detection (CHLD) Method; References.

6 The History of Hermeticity Standards MIL-STD-883 T.M. 1014 and MIL-STD-750 T.M. 10716.1 Introduction: The First Hermeticity Tests; 6.2 The Introduction of the Military Standards; 6.3 The First Problems with Traditional Hermeticity Tests and Standards; 6.4 Military Standard Revisions; 6.5 Summary; References; Part 3 Limitations of Existing Hermeticity Test Methods in Low Volume Packages; 7 Permeation; 7.1 Introduction; 7.2 Mathematics of Permeation; 7.3 Limitations of the Packaging Material; 7.4 Conclusions; References; 8 Outgassing and Residual Gas Analysis (RGA); 8.1 Outgassing.

8.2 Residual Gas Analysis; References; 9 Low-Cavity Volume Capillary Leak Limitations; 9.1 Limitations of the Helium Fine Leak Test Method; 9.1.1 Volume Limitations; 9.1.2 Minimum Detectable Leak Rate; References; Part 4 Novel Methods of Leak Detection; 10 Q-Factor Monitoring of Resonant Microstructures as a Hermeticity Measurement Method; 10.1 Introduction; 10.2 Lumped Element Modeling of a Microresonator; 10.3 Definitions and Measurement Methods of the Quality Factor Q; 10.3.1 Definition in Terms of Stored Energy; 10.3.2 Definition in Terms of Bandwidth.

Sommario/riassunto

Packaging of microelectronics has been developing since the invention of the transistor in 1947. With the increasing complexity and decreasing size of the die, packaging requirements have continued to change. A step change in package requirements came with the introduction of the Micro-Electro-Mechanical System (MEMS) whereby interactions with the external environment are, in some cases, required. This resource is a rapid, definitive reference on hermetic packaging for the MEMS and microelectronics industry, giving practical guidance on traditional and newly developed test methods. This book in.
