

Now Available!

ADVANCED IC PACKAGING TECHNOLOGIES, MATERIALS, AND MARKETS

2015 EDITION

**A Strategic Report Covering the Latest
Technologies in IC Packaging, Enabling Portable and
Other Electronics**

Report Coverage

- Stacked Packages
- System-in-Packages
- Interconnection Technologies
- Through-Silicon-Vias (TSV)
- 2.5D and 3D Integration
- Multi-row QFNs
- Fan-out WLPs

Report Highlights

- Industry Outlook
- Market Analysis and Forecasts,
2013–2019
- Multichip Packaging
Technology Trends
- Key Application Forecasts
- Company Profiles

New Venture Research

337 Clay St., Suite 101
Nevada City, CA 95959
Tel: (530) 265-2004

A Technology Market Research Company

info@newventureresearch.com/
www.newventureresearch.com/
Fax: (530) 265-1998

Synopsis

The demand for consumer electronics and mobile communications devices that keep us connected is driving electronics manufacturers to deliver ever-more compact and portable electronic systems. Today's users ask for products with more functionality, added performance, higher speed, and smaller form factors. Advances in IC packaging technologies are providing solutions to meet these demands through a variety of techniques that result in ICs that are more powerful and provide greater functionality, while fitting into ever smaller and more highly integrated form factors. Multichip packages are on the leading edge of silicon integration, while advances in interconnection and substrate design are providing additional opportunities to improve package density. The future is bright for IC packaging.

This latest report from **New Venture Research (NVR)**, *Advanced IC Packaging Technologies, Materials and Markets, 2015 Edition*, captures the latest technology and market trends of the IC packaging industry by focusing on the most advanced packaging products and technologies - those most critical to success in developing cutting-edge products and maintaining technological leadership.

Chapter 3: Overview of Worldwide IC Packaging Markets, outlines the major IC packaging families and the latest market and application trends. Total market forecasts include units, prices, packaging revenue, package types and device types.

Chapter 4: Interconnection Technologies, provides an in-depth explanation of wire bonding and flip chip markets, as well as leading-edge technologies, such as 2.5D and 3D packaging using through silicon vias (TSVs). Units and revenue forecasts are provided.

Chapter 5: Multichip Packages, presents descriptions of 3D stacked packages (TSOPs, BGA/FBGAs,

QFNs and WLPs), as well as advanced multicomponent packages (PoPs, PiPs, and MCMs). Forecasts include multichip IC packaging units, revenue, prices, die usage and applications.

Chapter 6: System in Package (SiP) Solutions & Substrate Materials, presents a more in-depth look at the evolving multicomponent packages, and presents key market trends alongside forecasts of units and revenue. This chapter also examines the substrate materials and embedded components used in SiP assembly. Forecasts include package units and material area shipped, as well as revenue impact of substrate material trends.

Chapter 7: Advanced Single-Chip Packages, examines the latest product trends plus market forecasts for multi-row QFN packages and Fan-out WLPs. Includes forecasts of IC package units and revenue, as above.

Chapter 8: Company Profiles examines twenty of the leading companies making advanced packages today. Each profile gives a short company background and presents examples of their advanced packaging products.

Advanced IC Packaging Technologies, Materials and Markets, 2015 Edition is an effective tool for companies determined to stay informed about the latest advances in IC packaging technologies, and in assessing the future of this important segment of the semiconductor manufacturing industry. The report sells for \$3495 and is delivered by email as a single-user license PDF file. Additional single-user licenses are available for \$250 each and a corporate license is \$1000. With the purchase of the report, an Excel spreadsheet of all tables may be obtained for an additional \$750, or a printed copy may be purchased for \$250.

About the Author

Jerry Watkins is an independent senior analyst with more than 25 years of experience in the field of market research and consulting. He has worked for leading research companies such as **Frost & Sullivan**, **Lucid Information Services**, and **NSI Research** both in management and as a writer. Mr. Watkins has authored many syndicated reports, previously in the telecommunications sector and more recently in the computing and merchant embedded computing industry. He holds three university degrees, including a B.A. in History, as well as a M.A. in International Studies.

Chapter 1: Introduction

Chapter 2: Executive Summary

Chapter 3: Overview of IC Packaging Markets Worldwide

3.1 IC Package Families

- 3.1.1 Dual In-Line Packages
- 3.1.2 Small Outline Packages
- 3.1.3 Small Outline Transistors
- 3.1.4 Thin Small Outline Packages
- 3.1.5 Dual Flat Pack No Lead and Quad Flat Pack No Lead Packages
- 3.1.6 Chip Carriers
- 3.1.7 Quad Flat Pack Packages
- 3.1.8 Pin Grid Array Packages
- 3.1.9 Ball Grid Array Packages
- 3.1.10 Fine-pitch Ball Grid Array Packages
- 3.1.11 Wafer-Level Packages
- 3.1.12 Direct Chip Attach

3.2 IC Packaging Market and Unit Forecasts

- 3.2.1 Total Worldwide IC Packaging Market
- 3.2.2 IC Packaging by Devices

3.3 Total Semiconductor Device Assembly Market

- 3.3.1 Computer
- 3.3.2 Communications
- 3.3.3 Consumer
- 3.3.4 Industrial/Medical
- 3.3.5 Transportation

Chapter 4: Interconnection Technologies

4.1 Interconnection Techniques Overview

- 4.1.1 Methods of Interconnection
- 4.1.2 Interconnection Market Trends

4.2 Wire Bonding

- 4.2.1 The Benefit and Problem with Wire Bonding
- 4.2.2 Wire Bonding Methods
- 4.2.3 Wire Materials
- 4.2.4 Wire Bonding Market Trends and Forecasts

4.3 Tape Automated Bonding

4.4 Flip Chip

- 4.4.1 An Advanced Packaging Alternative
- 4.4.2 Benefits of Using Flip Chip
- 4.4.3 Wafer Bumping
- 4.4.4 Adhesives
- 4.4.5 In-Package Flip Chip Market Trends/Forecasts
 - 4.4.5.1 Total Flip Chip Market - Package Form Factors

4.4.5.2.1 Total Flip Chip Market - Pricing

4.4.5.2.2 Total Flip Chip Market - Devices

4.4.5.2.3 MPU Flip Chip Packages

4.4.5.2.4 32-bit & Up MCU Flip Chip Packages

4.4.5.2.6 DSP Flip Chip Packages

4.4.5.2.7 Gate Array Flip Chip Packages

4.4.5.2.8 Standard Cell & PLD Flip Chip Packages

4.4.5.2.9 Special-purpose Logic - Consumer Flip Chip Packages

4.4.5.2.10 Special-purpose Logic - Computer Flip Chip Packages

4.4.5.2.11 Special-purpose Logic - Communications Flip Chip Packages

4.4.5.2.12 Special-purpose Logic - Automotive Flip Chip Packages

4.4.5.2.13 Special-purpose Logic - Multipurpose & Other Flip Chip Packages

4.4.5.2.14 DRAM Flip Chip Packages

4.4.5.2.15 SRAM Flip Chip Packages

4.4.5.2.16 Flash Memory Flip Chip Packages

4.4.5.2.17 Application-specific Analog - Communications Flip Chip Packages

4.4.5.2.18 Application-specific Analog - Computer Flip Chip Packages

4.4.6 Bare-die Flip Chip Market Trends & Forecasts

4.5 Through-Silicon-Vias (TSV)

4.5.1 Enabling 2.5D and 3D

4.5.2 Characteristics of TSV

4.5.3 Interposers and 2.5D

4.5.4 Issues with TSVs

4.5.5 Forecasts of Through-Silicon-Via Markets

4.6 Quilt Packaging

Chapter 5: Multichip Packages

5.1 Multichip Packages Overview

5.1.1 What are Multichip Packages?

5.1.2 "Multichip" versus "Multicomponent"

5.1.3 3D Packaging Benefits and Disadvantages

5.1.4 Challenges Presented by 3D Packaging Designs

5.1.5 Interconnection of Stacked Packages

5.1.6 Wafer Thinning - Dice Before Grinding Process

5.1.7 Placing MCPs into Perspective - Forecasts of Total Market

5.1.8 Multichip Packages Application Trends

5.1.9 Device Types Found in MCPs

5.1.10 Interconnection Trends for MCPs

5.1.11 Note about MCP Forecast Tables

Table of Contents

- 5.2 Stacked TSOP Packages
 - 5.2.1 What are Stacked TSOPs?
 - 5.2.2 Major Market Trends & Forecasts
- 5.3 Stacked FBGA Packages
 - 5.3.1 What are Stacked FBGAs?
 - 5.3.2 Major Market Trends & Forecasts
- 5.4 Stacked QFN Packages
 - 5.4.1 What are Stacked QFNs
 - 5.4.2 Major Market Trends & Forecasts
- 5.5 Package-on-Package
 - 5.5.1 What are PoPs?
 - 5.5.2 Major Market Trends & Forecasts
- 5.6 Package-in-Package
 - 5.6.1 What are PiPs?
 - 5.6.2 Major Market Trends & Forecasts
- 5.7 Multichip Modules
 - 5.7.1 What are MCMs?
 - 5.7.2 Major Market Trends & Forecasts
- 5.8 Stacked Wafer Level Packages
 - 5.8.1 What are Stacked WLPs?
 - 5.8.2 Major Market Trends & Forecasts
- 5.9 Summary of the Total Multichip Packaging Market

Chapter 6: System-in-Package Solutions & Substrate Materials

- 6.1 SiP Market Overview
- 6.2 SiP Technology Trends
 - 6.2.1 Key Features of SiPs
 - 6.2.2 An Alternative to System-on-Chip Solutions
 - 6.2.3 The SiP Technology Roadmap
 - 6.2.4 Challenges for SiPs
- 6.3 SiP Market Trends and Forecasts
- 6.4 Substrates
 - 6.4.1 Ceramic Substrates
 - 6.4.2 Laminate Substrates
 - 6.4.3 High Density Interconnect Substrates
 - 6.4.4 Polyimide Flex Tape
 - 6.4.5 Embedded Components
- 6.5 Substrate Market Trends and Forecasts
 - 6.5.1 Substrate Material Usage
 - 6.5.2 Embedded Passives

Chapter 7: Advanced Single-Chip Packages

- 7.1 Multi-row QFNs
- 7.2 Wafer Level Packages/Fan-out WLPs

Chapter 8: Company Profiles

- 8.1 3D Plus, Inc.
- 8.2 Advanced Semiconductor Engineering, Inc.
- 8.3 Amkor Technology, Inc.
- 8.4 Carsem, Inc.
- 8.5 ChipMOS Technologies (Bermuda), Ltd.
- 8.6 CONNECTEC Japan Corporation
- 8.7 Deca Technologies
- 8.8 FlipChip International, LLC
- 8.9 HANA Micron Co., Ltd.
- 8.10 Interconnect Systems Inc. (ISI)
- 8.11 NANIUM, S.A.
- 8.13 Palomar Technologies
- 8.14 Powertech Technology, Inc.
- 8.15 Shinko Electric Industries Co, Ltd
- 8.16 Signetics Corporation
- 8.17 Siliconware Precision Industries Co.
- 8.18 SPEL Semiconductor, Ltd.
- 8.19 STATS ChipPAC, Ltd
- 8.20 United Test and Assembly Center, Ltd.
- 8.21 Xintec, Inc.

List of Tables:

- Table 3-1 Worldwide IC Packaging Unit Shipments by Market Segment, 2013-2019
- Table 3-2 Worldwide IC Packaging Annual Revenue by Market Segment, 2013-2019
- Table 3-3 Average IC Packaging Prices by Market Segment, 2013-2019
- Table 3-4 IC Packaging Types by Range of I/O Counts
- Table 3-5 Total IC Packaging Market by Range of I/O Count, 2013-2019
- Table 3-6 Total IC Packaging Unit Shipments by Semiconductor Device Category, 2013-2019
- Table 3-7 Total IC Packaging Annual Revenue by Semiconductor Device Category, 2013-2019

Table of Contents

Table 4-1 Total IC Packaging Unit Shipments by Interconnection Segment, 2013-2019	Table 4-22 Flip Chip Special-purpose Logic – Communications Packages by Unit Shipments and Revenue, 2013-2019
Table 4-2 Total IC Packaging Revenue by Interconnection Segment, 2013-2019	Table 4-23 Flip Chip Special-purpose Logic – Automotive Packages by Unit Shipments and Revenue, 2013-2019
Table 4-3 In-package Wire Bonded Unit Shipments by Device Type and I/O Count, 2013-2019	Table 4-24 Flip Chip Special-purpose Logic – Other Packages by Unit Shipments and Revenue, 2013-2019
Table 4-4 In-package Wire Bonded Package Revenue by Device Type and I/O Count, 2013-2019	Table 4-25 Flip Chip DRAM Packages by Unit Shipments and Revenue, 2013-2019
Table 4-5 Wire Usage of In-package Wire Bonding by Device type and I/O Count, 2013-2019	Table 4-26 Flip Chip SRAM Packages by Unit Shipments and Revenue, 2013-2019
Table 4-6 Wire Bond Material Usage by Type of Metal, 2013-2019	Table 4-27 Flip Chip Flash Packages by Unit Shipments and Revenue, 2013-2019
Table 4-7 Wire Bonded Revenue by Type of Metal, 2013-2019	Table 4-28 Flip Chip Application-specific Analog – Communications Packages by Unit Shipments and Revenue, 2013-2019
Table 4-8 Total Flip Chip Package Unit Shipments by Packaging Type, 2013-2019	Table 4-29 Flip Chip Application-specific Analog – Computer Packages by Unit Shipments and Revenue, 2013-2019
Table 4-9 Total Flip Chip Package Unit Shipments by Package Type and I/O Count, 2013-2019	Table 4-30 Bare Die Flip Chip Packages by Type of Interconnection, 2013-2019
Table 4-10 Total Flip Chip Package Revenue by Packaging Type, 2013-2019	Table 4-31 TSV Unit Shipments by Type of MCP, 2013–2019
Table 4-11 Total Flip Chip Package Revenue by Package Type and I/O Count, 2013-2019	Table 5-1 MCP Market by Unit Shipments, IC Shipments & Revenue, 2013-2019
Table 4-12 Total Flip Chip Packages by I/O Count, 2013-2019	Table 5-2 MCP Unit Shipments Compared to Total IC Packages Market, 2013-2019
Table 4-13 Total Flip Chip Package Unit Shipments by Device Type, 2013-2019	Table 5-3 MCP Revenue Compared to Total IC Packages Market, 2013-2019
Table 4-14 Total Flip Chip Package Revenue by Device Type, 2013-2019	Table 5-4 MCP Unit Shipments by Application, 2013-2019
Table 4-15 Flip Chip MPU Packages by Unit Shipments and Revenue, 2013-2019	Table 5-5 MCP Applications by Share of Market, 2013-2019
Table 4-16 Flip Chip 32-bit & Up MCU Packages by Unit Shipments and Revenue, 2013-2019	Table 5-6 MCP Units by Device Function, 2013-2019
Table 4-17 Flip Chip DSP Packages by Unit Shipments and Revenue, 2013-2019	Table 5-7 MCP Units by Interconnection Method, 2013–2019
Table 4-18 Flip Chip Gate Array Packages by Unit Shipments and Revenue, 2013-2019	Table 5-8 Stacked TSOP Market by Unit Shipments, Price and Revenue, 2013-2019
Table 4-19 Flip Chip Standard Cell & PLD Packages by Unit Shipments and Revenue, 2013- 2019	Table 5-9 Stacked TSOPs as a Percentage of Units and Revenue, 2013-2019
Table 4-19 Flip Chip Standard Cell & PLD Packages by Unit Shipments and Revenue, 2013-2019	Table 5-10 Stacked FBGA/BGA Market by Unit Shipments, Price and Revenue, 2013-2019
Table 4-20 Flip Chip Special-purpose Logic – Consumer Packages by Unit Shipments and Revenue, 2013-2019	Table 5-11 Stacked FBGAs as a Percentage of Units and Revenue, 2013-2019
Table 4-21 Flip Chip Special-purpose Logic – Computer Packages by Unit Shipments and Revenue, 2013-2019	Table 5-12 Stacked QFN/DFN Market by Unit Shipments, Price and Revenue, 2013-2019
	Table 5-12 Stacked QFN/DFN Market by Unit Shipments, Price and Revenue, 2013-2019

Advanced IC Packaging Technologies, Materials, and Markets, 2015 Edition

Table of Contents

Table 5-13 Stacked QFNs as a Percentage of Units and Revenue, 2013-2019

Table 5-14 PoP Market by Unit Shipments, Price and Revenue, 2013-2019

Table 5-15 PiP Market by Unit Shipments, Price and Revenue, 2013-2019

Table 5-16 Stacked MCM Market by Unit Shipments, Price and Revenue, 2013-2019

Table 5-17 Stacked WLP Market by Unit Shipments, Price and Revenue, 2013-2019

Table 5-18 Stacked WLPs as a Percentage of Units and Revenue, 2013-2019

Table 5-19 Total MCP Unit Shipments by Market Segment, 2013-2019

Table 5-20 Total MCP Revenue by Market Segment, 2013-2019

Table 5-21 Total Die in MCPs by Market Segment, 2013-2019

Table 5-22 MCPs as a Percentage Worldwide IC Packaging Unit Shipments, 2013-2019

Table 6-1 System-in-Package Market by Units, Price and Revenue, 2013-2019

Table 6-2 SiPs as a Percentage of Total MCPs by Units and Revenue, 2013-2019

Table 6-3 Total Substrate Package Unit Shipments by Type of Substrate, 2013-2019

Table 6-4 High Density Interconnect Substrate Unit Shipments, 2013-2019

Table 6-5 Total Substrate Package Revenue by Type of Substrate, 2013-2019

Table 6-6 Total Area of Shipped Substrate Material by Type of Substrate, 2013-2019

Table 6-7 Average Area Per Package by IC Package Type, 2013-2019

Table 6-8 Substrates with Embedded Passives by Type of Package, 2013-2019

Table 6-9 Embedded Components in SiPs by Type of Device, 2013-2019

Published January 2015, 300+ Pages

Order Form

Payment Method

Check in the amount of \$ _____ is enclosed.

Invoice per P.O. # _____

Please charge: Visa MasterCard American Express

Card # _____ Exp. _____

Name On Card _____

Signature _____ Date _____

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Telephone _____

Fax _____

E-mail _____

Advanced IC Packaging Technologies, Materials and Markets, 2015 Edition - single user license

\$3495

Extra Licenses (\$250 each), Corporate License (\$1000)

Returns: No return privileges. **International Orders:** Must be prepaid, please contact us for payment arrangements.

New Venture Research

337 Clay St., Suite 101

Nevada City, CA 95959

Tel: (530) 265-2004 Fax: (530) 265-1998

www.newventureresearch.com; info@newventureresearch.com

Excel Spreadsheet (\$750)

Subtotal

All files are in PDF format only

TOTAL