Advanced Packaging Update: Market and Technology Trends

Vol. 4-0713



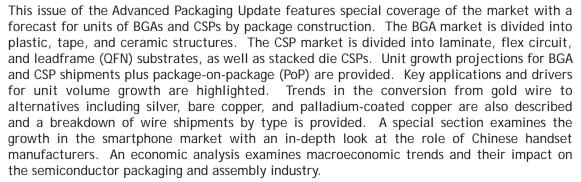




Table of Contents

1 Industry and Economic Trends

- 1.1 Economic Trends
- 1.2 Semiconductor Recovery

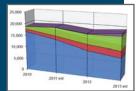
2 Smartphone Markets and Drivers

3 Alternatives to Gold Wire

- 3.1 Silver Alloy Wire
- 3.2 Trends in Bonding Wire
- 3.3 OSAT Bonding Wire Offerings
- 3.4 Company Activities
- 3.4.1 Wire Suppliers

Heraeus, MKE, Nippon Micrometal, Tanaka, Tatsuta, Wire Technology

3.4.2 OSATs, IDMs, and Research Organizations ASE, Amkor, Carsem, iNEMI, J-Devices, JCET, LSI, OSE, PTI, Signetics, SPIL, STATS ChipPAC



4 BGA Applications and Market Growth

PCs, Game Machines, Network Systems, Telecom, and Servers

5 CSP Applications and Market Growth

- 5.1 Mobile Phones
- 5.2 Tablets
- 5.3 Portable Games, Digital Cameras, iPods
- 5.4 Leadframe CSPs (QFNs)
- 5.5 Laminate and Flex Circuit CSPs
- 5.6 Stacked Die CSPs
- 5.6.1 Alternate Wire Types for Stacked Die
- 5.6.2 Company Activities

Carsem, Invensas, PTI, Seiko Epson, Signetics, STATS ChipPAC, Toshiba

5.7 CSP Market Projections

2012 BGA and CSP Bibliography

Partial List of Figures

- 1.1. Monthly U.S. housing starts.
- 3.1. Resistivity of bonding wire alloys.
- 3.2. Bonding wire shipments from 2010 to 2013.
- 3.4. Strength and elongation of silver alloy wires.
- 3.6. Total bonding wire shipments (2010-2015).
- 3.7. Comparison of PCC wires in HTS 220°C, QFP.
- 3.9. Concerns about copper wire bonding.
- 3.10. Silver and copper wire bonding at SPIL.
- 3.11. Cost savings for PCC vs. gold.
- 4.1. Intel's Haswell PBGA with two die.
- 4.2. Flip chip as a percentage of PBGA shipments.
- 5.1. Invensas DFD™ in Quadrank RDIMM
- 5.3. PoP market projections.

Partial List of Tables

- 1.1. IC Package Subcontractor Revenue
- 1.2. Subcontractor CAPEX Growth
- 2.1. Smartphone Growth
- 2.2. Components in Chinese Domestic Smartphones
- 3.1. Bonding Wire Types and Applications
- 3.2. Pros and Cons of Copper, Silver and Gold Wires
- 3.3. Silver Alloy Wire Reliability Data
- 3.4. Comparison of PCC to Bare Copper Wire
- 3.6. HAST for Ag Alloy vs. 4N Au Wire
- 4.1. BGA Market Projections
- 5.1. CSPs in Smartphones
- 5.2. Selected CSPs in Samsung's Galaxy S3
- 5.3. Tablets with CSPs
- 5.4. Stacked Die Examples
- 5.5. Examples of Wire Type for Stacked Die
- 5.11. CSP Market Projections
- 5.12. Subcontractor CSP Shipments



4801 Spicewood Springs Road • Suite 150 Austin, Texas 78759 Tel: 512-372-8887 • Fax: 512-372-8889 tsi@techsearchinc.com • www.techsearchinc.com

Annual subscription – \$4,200 (4 issues) Single issue – \$1,200