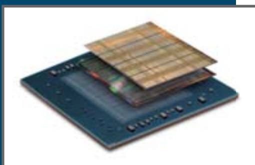
Advanced Packaging Update:

Market and Technology Trends

Vol. 2-0316



The Advanced Packaging Update (2-0316) describes the latest trends in laminate substrates for flip chip BGAs and CSPs. An update on silicon interposers and alternatives, including organic interposers, is also provided. TechSearch International's annual survey on substrate design rules includes substrate design rules from suppliers of organic flip chip BGA and CSP substrates, PBGAs, and laminate CSPs (FBGAs) worldwide. The design rules include body size, core thickness, via and pad diameter, minimum bump pitch supported, and substrate finish. A special feature section examines the growing market for fingerprint sensors with detailed examples.

Table of Contents

1 Industry and Economic Trends
- 1.1 Economic Trends
  - 1.1.1 Macroeconomic Trends

2 Fingerprint Sensors
- 2.1 Apple
- 2.2 Fingerprint Cards
  - 2.2.1 CrucialTec and FPC in Sony Xperia Z5
- 2.3 Synaptics
- 2.4 Goodix Invisible Fingerprint Sensor
- 2.5 IDEX Off-Chip Touch Sensor
- 2.6 Ultrasonic Wave Sensors
  - Qualcomm, Sonavation, InvenSense
- 2.7 NEXT Biometrics Active Thermal Sensing
- 2.8 Vkansee Optical Fingerprint Sensor
- 2.9 OSAT Developments

3 Laminate Substrate Trends
- 3.1 Flip Chip PBGA
  - 3.1.1 Bump Pitch
  - 3.1.2 Package Sizes
  - 3.1.3 Substrate Trends
  - 3.1.4 Thermal Challenges
  - 3.1.5 Substrate Warpage
- 3.2 Flip Chip CSP
  - 3.2.1 Package Trends
- 3.3 Coreless Substrates
- 3.4 Interposers for High-Performance Packaging
- 3.5 Alternatives to Silicon Interposers
  - 3.5.1 Intel's EMIB
  - 3.5.2 Organic Interposers

4 Substrate Design Rules
- 4.1 Today's Laminate Feature Size
- 4.2 Company Design Rules
  - Access, ASE Materials, AT&S, Daeduck, Daisho Denshi, Eastern, Fujitsu, Ibiden, i3 Electronics, Kinsus, Kyocera, LG Innotek, Nan Ya PCB, SEMCO, Samsung Techwin, Shennan Circuits, Simmtech, Toppan Printing, Tripod, Unimicron

List of Figures

2.1. Fingerprint sensor market for mobile devices.
2.2. Touch ID 2 is two-die stack with 29 TSVs.
2.3. CrucialTec's Biometric TrackPad.
2.4. Synaptics Natural ID™ fingerprint sensor.
2.5. Synaptics FS4304 fingerprint sensor.
2.6. IDEX fingerprint sensor cost comparison.
2.7. Sonavation ultrasonic fingerprint sensors.
2.8. CMOS-MEMS ultrasonic sensor.
2.9. NEXT's bezel-less sensor for smartphones.
2.10. Vkansee optical sensor.
2.11. TSV versus trench/RDL for fingerprint sensor.
3.1. Organic interposer test vehicle for HBM.

List of Tables

2.1. Biometric ID Technology Characteristics
2.2. Touch Fingerprint Sensor Suppliers
2.3. Fingerprint Sensor Module Assemblers
2.4. Package and Module Integrators
2.5. Apple's Touch ID Sensors
2.6. Smartphones/Tablets with Fingerprint Sensors
2.7. Fingerprint Sensor OSATs
3.1. FC-BGA/LGA Substrate Market Forecast
3.2. FC-CSP Substrate Market Forecast
3.3. FC-PBGA Substrate Trends
3.4. FC-CSP Substrate Trends
3.5. Emerging Packaging Technology Platform
3.6. EMIB versus Silicon Interposers
3.7. Interposer Design Rule Comparison
3.8. Organic Interposer Suppliers and Technology
3.9. APX Technology Roadmap
3.10. iTHOP® Features
4.1. Build-up FC-PBGA Substrate Suppliers
4.2. Build-up FC-CSP Substrate Suppliers
4.3. Laminate PBGA/CSP Substrate Suppliers
4.4. Design Rules for ASE PBGA/CSP Substrates

Annual subscription – $4,995 (4 issues)
Single issue – $2,500
Corporate license – $8,500

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

Contents and specifications subject to change without notice. 5/4/2016