

Advanced Packaging Update: Market and Technology Trends

Vol. 1-0518

This issue of the Advanced Packaging Update features special coverage of outsourced semiconductor assembly and test (OSAT) financials. A discussion of fan-out wafer level package (FO-WLP) trends, including TSMC's latest portfolio and an update on large-area panel activities are provided. The growing applications for 3D sensing are discussed along with details on VCSEL technology. Integrated photonics packaging trends are presented.

Table of Contents

- 1 Industry and Economic Trends
- 2 OSAT Financial Analysis
 - 2.1 Assembly and Test Revenue
 - 2.1.1 Outlook for Revenue Growth
 - 2.1.1.1 Mobile Communication and 5G Rollout
 - 2.1.1.2 Growth in China
 - 2.1.1.3 Memory Trends
 - 2.1.1.4 2018 Expansion Examples
 - 2.2 OSAT CAPEX
- 3 FO-WLP Developments
 - 3.1 TSMC's Portfolio Expands
 - 3.1.1 5G Mobile Platform
 - 3.1.2 High-Performance Computing
 - 3.2 Large Area Processing Panels
 - 3.3 ASE and Deca Technologies
 - 3.4 Nepes
 - 3.5 Powertech Technology
 - 3.6 Samsung Electro-Mechanics
 - 3.7 Unimicron
- 4 3D Sensing Modules
 - 4.1 VCSEL
- 5 Integrated Photonics Packaging
 - 5.1 Drivers for Integrated Photonics
 - 5.2 Technology Options (InP, Si, Polymer, Glass)
 - 5.3 Silicon Photonics Process
 - 5.4 Integrated Photonics Packaging
 - 5.4.1 Packaging Challenges
 - 5.4.2 Standards and Design Guidelines
 - 5.5 Consortia
 - AIM Photonics, IMEC, IRT Nanoelec, PETRA, PIXAPP Photonic Packaging Pilot Line
 - 5.6 Company Activities
 - Amkor, AOI Core, ASE, Cisco, ColorChip, Fabrinet, Finisar, Fujitsu, GLOBALFOUNDRIES, HP Enterprise Labs, Huawei, IBM, Infinera, Integra Technologies and Juniper, Intel, Lightwave Logic, Luxtera, Mellanox Technologies, POET Technologies, Rockley Photonics, TSMC

List of Figures

- 3.1. Hybrid FC-CSP versus MUST.
- 3.2. Fingerprint sensor in panel FO-WLP.
- 4.1. Modules of the Face ID system in iPhone X.
- 4.2. Cross-section of TriLumina's VCSEL array.
- 5.4. IMEC's optical module on a silicon interposer.
- 5.5. Dragonfly™ mid-board optical module.
- 5.6. PETRA's Silicon photonics package.
- 5.7. Sub-system with PETRA's optical I/O cores.
- 5.8. Silicon photonics transceiver chip.
- 5.11. Package substrate with polymer waveguides.
- 5.12. PIC integrated with bridge assembly.
- 5.15. 100Gbps silicon photonics chipset in QSFP.
- 5.16. Chip-on-chip and Chip on-wafer.
- 5.17. 200Gbps silicon photonics chipset.
- 5.18. GLOBALFOUNDRIES roadmap.
- 5.19. Flip chip CMOS/silicon photonics interposer.
- 5.20. IBM parallelized fiber array assembly.
- 5.21. IBM compliant polymer interface.
- 5.22. Self-aligned photonic flip chip assembly.
- 5.23. Silicon photonics compared to an InP PIC.
- 5.25. Infinera's ICE6 optical engine.
- 5.26. Intel's hybrid silicon laser.
- 5.27. Lightwave Logic's product roadmap.
- 5.28. Luxtera transceiver manufacturing flow.
- 5.30. Luxtera's concept for ASIC/transceiver.

List of Tables

- 2.1. Top 20 OSAT Revenues (millions)
- 2.2. OSAT CAPEX Trends (millions)
- 3.1. Apple's A10, A11, and Future Processors
- 3.2. Hybrid FC-CSP versus MUST
- 3.3. RF Transceiver in FC-CSP versus InFO
- 3.4. InFO_AiP for 5G RF FEM (mmWave)
- 3.5. FO-WLP Panel Production Plans
- 4.1. 3D Sensing Supply Chain
- 5.1. Benchmark of Silicon Photonics Transceivers
- 5.2. Material Choices for an Optical Platform
- 5.3. Integrated Photonics with Glass Interposer


TechSearch
INTERNATIONAL

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 – \$5,100 (4 issues)
Single issue – \$2,500
Corporate license – \$8,750