

62nd ECTC – San Diego, CA: May 29 – June 1, 2012

Special Panel

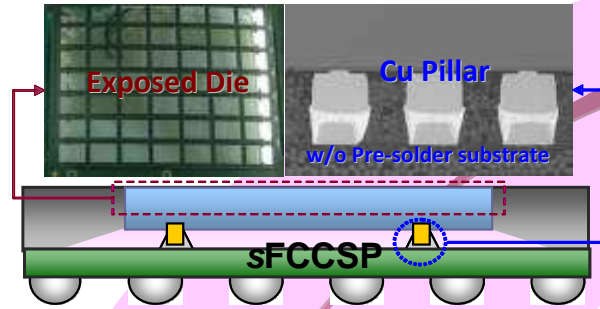
**Next Generation Packaging and
Integration**

- The Transformed Role of Packaging Foundry

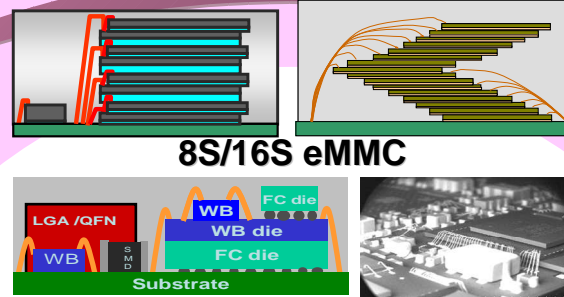
**Dr. Mike Ma, VP of Corporate R&D,
Siliconware Precision Industries Co., Ltd.**

Solution Providing Innovative Leader

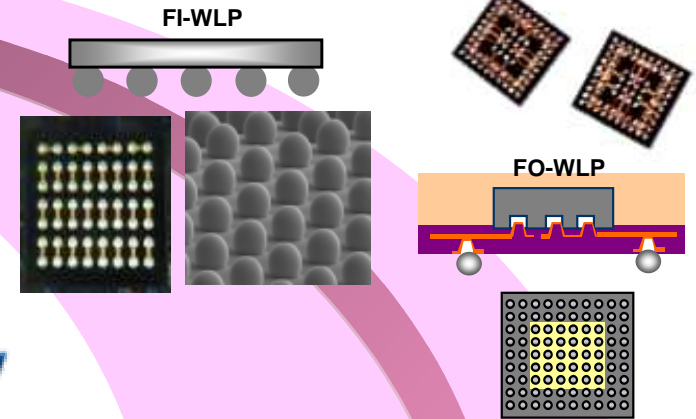
CSP



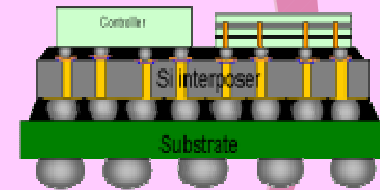
SiP



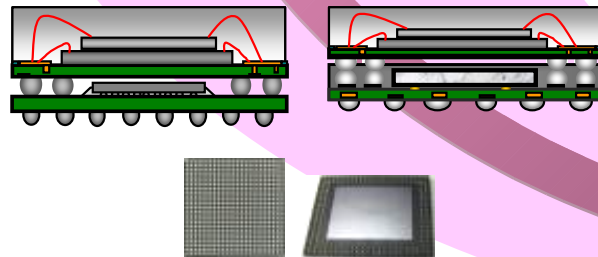
Wafer Level Package



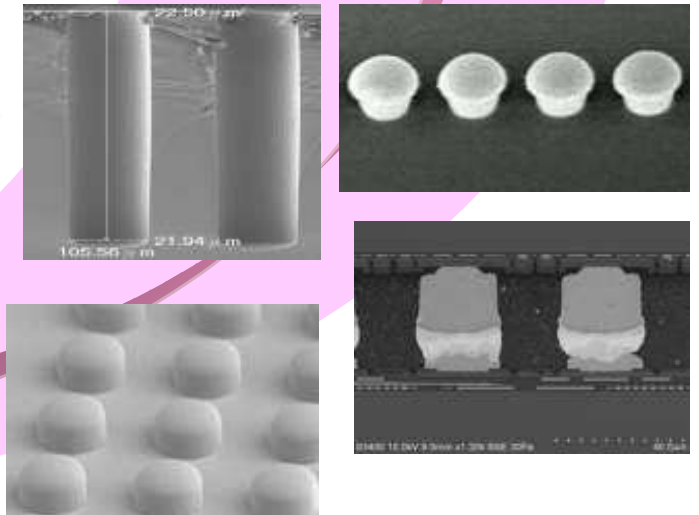
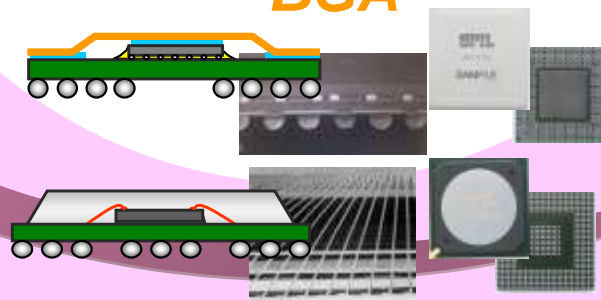
3D-IC



PoP (PKG on PKG)



BGA



Outline

- **Market Trend (by PKG & END Product)**
- **Electronic Product Packaging Trend**
 - **SPIIL Packaging Technology Roadmaps**
- **Summary**

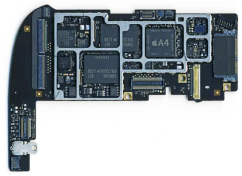





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- **Market Trend (by PKG & END Product)**
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 - SPIL Packaging Technology Roadmap
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Market Trend- End Product

- For mobile/communication devices:
 - ***Continue driving to smaller system 'form factor'***
more devices pack into a monolithic volume-vertically
 - Shortening inter-IC/ IC to board interconnect length- ***better system performance and lower power consumption***
 - Make room for bigger battery
 - System manufacturing flexibility (e.g. PoP)
- For other like 'consumer' applications utilizing legacy packaging:
 - ***Seeking cost effective solution*** to cope with world wide materials supply chain situations

Example of End Product Trend: Apple's iPads

	<i>iPad (1) 3G</i>	<i>iPad 2 3G</i>	<i>New iPad (3) 4G</i>
System dimensions (H x W x D -mm)	242.8*189.7*12.7	241.2*185.7*8.8	241*186*9.4
System Volume (cm ²)	585.0	394.2	421.0
Volume change % relative to iPad1	1	67.4%	72.0%
Logic Board			
Communication Board		 <small>iPad 2 AT&T GSM</small>	
Battery Power (Watt-hours)	24.8	25	42.5
Battery change x	1	1	1.71 x

A4:53.3 mm²

A5X: 165mm²

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Summary I: New Generation of Packaging

- **Package More** ICs (dies) into monolithic package
 - Package on Package
 - FCCSP, multi-dies embedded WLP
 - 2.5D IC (on Si interposer), 3DIC
- **Use Less** for cost effectiveness
 - Use less expensive materials -> Gold wire -> Cu (or Ag) wire
 - Use less amount of materials – reduced trace pitch/ laminate substrate layers or alternatives; wafer level packaging (substrate-less)

Summary II: Transformed Role of Packaging Foundry

- **Expanded role in system integration and final quality**
 - Further integration role of the entire supply chain
 - Up stream: direct and indirect materials (lead frame/ substrate) quality control, urgent demand, and quick turn around time for problem solving
 - Down stream: EMS side final assembly issue solving
- **The rise of wafer level packaging/ 3DIC also draw new competition from major wafer foundries**
 - The handling of the foundry–OSAT’s ‘*Coopetition*’ - market eventually will select the models (maybe multiple models to co-exist)