GREEN
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Introduction to Advanced Microelectronics Packaging Technologies

Course Outline

Introduction and Overview of Microelectronic Packaging

- What is microelectronic packaging
- What are we trying to package and why?
- Microelectronic packaging drivers
  - Cost, Size, Weight, Thermal
- Market segments
  - Commercial, Automotive, Medical, Aerospace etc.
- Terminology and product definitions
  - Includes pass around of sample packages
- Who are the players?
- How does the supply chain work
- Basic review of IC Fab processes
- Wafer sawing and thinning
- Substrates
  - HDI laminates, LTCC/HTCC, Flex, Teflon and RF board material
- Fundamentals of component attach
  - Epoxy adhesives and eutectic solders
- Wirebonding Interconnect technology
  - Gold and copper ball bonding, wedge bonding
- Flip chip assembly processes
- Transfer molding of high volume plastic packages
  - JEDEC Pub 95 ..registered outline drawings for micro packages
  - Dual Leadframe (SOT, SOIC, SSOP, TSSOP, PSOP, TSOP, …)
- Hermetic packaging processes

Advanced Micro Packaging and Emerging Technology

- QFP (Quad Flat Packs)…QFN (Quad flat No lead)
- BGA (Ball Grid Array) style packages
- Wafer-level packaging (WLP)
  - Wafer Level Chip Scale Packaging (WLCSP)
  - Solder bumping processes
  - WLP (Fan In and Fan Out) FO-WLP
  - RDL (Redistribution Layers)

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    - Stacked CSPs
- SIP (System in a Package)
- MCMs (Multi chip modules)
- POP (Package on package)
- PIP (Package in Package)
- Emerging technologies 2.5 to 3D
    - What is the difference?
    - What are the trends
- 3D Chip Stacking
- TSVs (Through Silicon Via) for 3D stacking
- Interposer technology
    - Glass vs Silicon
- Integration of photonic devices
- Thermal design …How to get the heat out
    - Thermal resistance test methods and JESD51-2A
- Electrical design concerns from a packaging perspective
- Reliability of micro packages
    - Qualification testing of new package designs
- Common failure modes
    - Plastic and hermetic type packages
- Industry Roadmaps

Instructor Biography:

Mr. Thomas Green is the principle at TJ Green Associates LLC, a veteran owned small business focused on training and consulting for military, space and medical microelectronic devices. He teaches a variety of microelectronics packaging courses around the globe and in plant at major corporations and consults for a variety companies in the military/industrial and medical device industries. He has thirty three years of experience in microelectronics working at positions in industry, academia and government. Tom has demonstrated expertise in die attach, wirebond, visual inspection, failure analysis, hermetic seal and leak testing processes. Tom is an active IMAPS (International Microelectronics and Packaging Society) member and Society Fellow. He has a B.S. in Materials Engineering from Lehigh University and a Masters from the University of Utah. Curriculum Vitae