NPTEL Video Course - Electrical Engineering - An Introduction to Electronics Systems Packaging

Subject Co-ordinator - Prof. G.V. Mahesh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Objectives of the course
Lecture 2 - Definition of a system and history of semiconductors
Lecture 3 - Products and levels of packaging
Lecture 4 - Packaging aspects of handheld products; Case studies in applications
Lecture 5 - Case Study (continued); Definition of PWB, summary and Questions for review
Lecture 6 - Basics of Semiconductor and Process flowchart; Video on â Sand-to-Siliconâ •
Lecture 7 - Wafer fabrication, inspection and testing
Lecture 8 - Wafer packaging; Packaging evolution; Chip connection choices
Lecture 9 - Wire bonding, TAB and flipchip-1
Lecture 10 - Wire bonding, TAB and flipchip-2; Tutorials
Lecture 11 - Why packaging? & Single chip packages or modules (SCM)
Lecture 12 - Commonly used packages and advanced packages; Materials in packages
Lecture 13 - Advances packages (continued); Thermal mismatch in packages; Current trends in packaging
Lecture 14 - Multichip modules (MCM)-types; System-in-package (SIP); Packaging roadmaps; Hybrid circuits; Qui
Lecture 15 - Electrical Issues â I; Resistive Parasitic
Lecture 16 - Electrical Issues â II; Capacitive and Inductive Parasitic
Lecture 17 - Electrical Issues â III; Layout guidelines and the Reflection problem
Lecture 18 - Electrical Issues â IV; Interconnection
Lecture 19 - Quick Tutorial on packages; Benefits from CAD; Introduction to DFM, DFR & DFT
Lecture 20 - Components of a CAD package and its highlights
Lecture 21 - Design Flow considerations; Beginning a circuit design with schematic work and component layout
Lecture 22 - Demo and examples of layout and routing; Technology file generation from CAD; DFM check list and
Lecture 23 - Review of CAD output files for PCB fabrication; Photo plotting and mask generation
Lecture 24 - Process flow-chart; Vias; PWB substrates
Lecture 25 - Substrates continued; Video highlights; Surface preparation
Lecture 26 - Photoresist and application methods; UV exposure and developing; Printing technologies for PWBs
Lecture 27 - PWB etching; Resist stripping; Screen-printing technology
Lecture 28 - Through-hole manufacture process steps; Panel and pattern plating methods
Lecture 29 - Video highlights on manufacturing; Solder mask for PWBs; Multilayer PWBs; Introduction to microv

Lecture 30 - Microvia technology and Sequential build-up technology process flow for high-density interconnec
Lecture 31 - Conventional Vs HDI technologies; Flexible circuits; Tutorial session
Lecture 32 - SMD benefits; Design issues; Introduction to soldering
Lecture 33 - Reflow and Wave Soldering methods to attach SMDs
Lecture 34 - Solders; Wetting of solders; Flux and its properties; Defects in wave soldering
Lecture 35 - Vapour phase soldering, BGA soldering and Desoldering/Repair; SMT failures
Lecture 36 - SMT failure library and Tin Whiskers
Lecture 37 - Tin-lead and lead-free solders; Phase diagrams; Thermal profiles for reflow soldering; Lead-free
Lecture 38 - Lead-free solder considerations; Green electronics; RoHS compliance and e-waste recycling issues
Lecture 39 - Thermal Design considerations in systems packaging
Lecture 40 - Introduction to embedded passives; Need for embedded passives; Design Library; Embedded resistor
Lecture 41 - Embedded capacitors; Processes for embedding capacitors; Case study examples; Summary of materia
Lecture 42 - Chapter-wise summary