

Design for Manufacturability and Sourcing

Introduction

Definition

Interplay between design and manufacturer's capability

Printed circuit board

- ◆ Prepreg/laminate selection
- ◆ Plated through holes
 - Diameter
 - Aspect ratio
 - Non-functional pads
 - Annular ring
 - Cap
- ◆ Conductor width and spacing
 - Traces
 - Plated through holes
- ◆ Keep out zones and depaneling
- ◆ Copper balancing
- ◆ Microvias
- ◆ Via fill technologies
 - Tenting
 - Capping
 - Planarization
 - Conductive
 - Non-conductive
- ◆ Multiple lamination
- ◆ Equipment process controls and reliability testing
 - Interconnect stress testing (IST)
 - Cross-sections
 - Process optimization
 - Environment
- ◆ Matching PCB complexity to supplier capabilities – low/middle/high tiering strategies
- ◆ Partering & off-shore strategies
- ◆ Importance of supplier report cards, monitoring quality and reliability

Circuit card assembly

- ◆ Process material selection, qualification and optimization
- ◆ Pad geometries, component spacing, location of components on PCB
- ◆ Influence of PCB thickness, cut-outs, depanelization techniques
- ◆ Surface mount vs. wave soldering vs. hand soldering
 - Quad flat pack no-lead (QFN) / land grid array (LGA)
 - Ball grid array (BGA) / chip scale package (CSP)
 - 0201 chip components
 - Ceramic chip capacitors
- ◆ Heat sink selection – influence of weight
- ◆ Standoffs
- ◆ Wiring
- ◆ Repair / rework process considerations
 - Spacings
 - Blow off
 - Remelt
- ◆ Hand assembly & mechanical processes
 - Press fit
 - Heat sink attach
 - Module assembly
 - Torque specs
- ◆ Monitoring stress and strain induced by processes
- ◆ MSL, handling, process optimization, control strategies