An Introduction to Electronics Systems Packaging

Video Course -2012

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Quiz for Module 7

Surface Mount Technology

Video Sequence 32-38

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1. What is the basic difference between a SMT component and a PTH component?
2. List a few benefits in using SMT components for your design.
3. Mention a couple of limitations on the use of SMDs.
4. In about 6-7 steps write the process flow for SMT manufacturing (very general).
5. What are the limitations of hand soldering process?
6. What are the basic tools and materials required for a hand soldering process?
7. Write a flow chart for each of the machine soldering processes: reflow and wave soldering.
8. What is stencil printing? In SMT manufacturing where is it used?
9. What are the three type of reflow soldering processes known?
10. What is a fluxing agent? Why fluxing is necessary for SMD assembly?
11. List the soldering zones in typical equipments for wave soldering process.
12. How are PTH components attached in a wave soldering process?
13. In wave soldering, what is the wave made of?
14. Write the process steps for mixed board assembly- both PTH and SMDs.
15. What is the composition of a solder paste?
16. What is the difference between ‘tacky cure’ and ‘full cure’ process steps in SMT?
17. What kind of errors can arise during auto pick and place process for SMDs?
18. An SMD has the case form 1005. What does it denote?
19. An SMD resistor with 1% tolerance has the resistor code 5493 imprinted on it. What is the value of the resistor?

20. Give reasons for solder failure or solder joint failure after assembly of components.
21. How do you achieve a good and reliable solder joint?
22. How is reliability affected by improper wetting of solder on the substrate and on the solder pads?
23. Name three types of fluxes commonly used.
24. Is ‘no clean flux’ viable for large scale manufacturing?
25. Can SMDs be wave soldered?
26. When SMDs are wave soldered, what the possible defects that can be expected, and how to avoid these?
27. How to overcome ‘component shadow effect’ when you use small SMD components in your design?
28. What are the process zones in a typical reflow soldering large-scale equipment?
29. What are the precautions to be taken when doing double-sided SMD assembly by thermal reflow soldering process?
30. How is vapour phase reflow soldering from IR and convection based reflow soldering processes?
31. How do you plan to clean your assembled boards? What is the solvent used generally?
32. Write a few defects seen after reflow soldering is completed?
33. If you observe tomb stoning in a PCB after reflow soldering, how will you rectify this defect and eliminate this in future batches?
34. How do you inspect BGA sites for defects after reflow soldering process?
35. What are tin whiskers? How to avoid tin whisker formation in the long run? Any major change in solder material to be considered?
36. With the help of the tin-lead phase diagram discuss the Sn-Pb eutectic composition and temperature.
37. Temperature profiling for reflow soldering is very crucial for high yield in SMT manufacturing. Substantiate this statement.
38. Name three lead-free solder materials and their melting points.
39. Which lead-free material is the best alternative based on availability and cost? (You can do a web search on this, if needed.)
40. Can you justify use of lead-free solders for high reliability in place of lead-based solders?
41. What are RoHS and WEEE? Why is RoHS compliance important?