

PBA Design-for-Manufacturing Guideline

EDM-D-004
Design-for-Assembly

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The Design-for-eXcellence Guidelines principles

The PBA Design-for-eXcellence (DfX) Guidelines are designed to provide all electronic supply chain actors involved in the design, qualification, industrialization and production of Printed Board Assemblies practical guidelines to master the multi-disciplinary hardware aspects of electronic module realization and operation in a cost-effective way. The PBA DfX Guidelines are not electrical design guidelines. The PBA DfX guidelines provide the electrical designer the boundary conditions of industrial electronic manufacturing technology and operational reliability. It is intended to support the development of cost-effective, reliable PBA with a short time-to-market requiring a minimum number of design iterations.

Some of the characteristics of the PBA DfX Guidelines are:

- The PBA DfX Guidelines are oriented towards the overall optimization of the physical design of the final PBA based product.
- The guidelines refer to the relevant industry standards that are predominantly used in the international electronics industry such as those published by organizations as IPC and JEDEC. The guidelines do not replace industrial standards but define or recommend what options in the standards to use and will fill-in gaps if necessary. They provide the basis on which a company/product/product-line or application specific approach for design, industrialization and/or realization can be defined.
- Scientific argumentation and physical models form the basis of a large part of the guidelines and of the associated tools. This allows the use of the guidelines beyond the boundary of the users' experience domain. Therefore, it provides a powerful product and process innovation aid.
- The PBA DfX Guidelines will not specify, recommend or exclude specific brands of materials, components, suppliers or products. They will put forward minimal requirements on quality, physical and chemical properties and testing. They define and provide the DfManufacturing window for PBA realization.
- The PBA DfX Guidelines are based on verifiable physical models, standards and empirical data.

PBA DfX Guidelines Scope

- The PBA DfX guidelines cover lead-free SnAgCu and SnPb solder based assembly.
- The PBA DfX guidelines include: Design-for-Manufacturing, Design-for-Assembly, Design-for-Test, Design-for-Reliability, Design-for-RoHS, etc.

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1. Applicable Documents

This PBA DfX Guideline refers as part of the guideline to the most recent versions of the following documents and standards including their amendments.

EDM-D-002	Electronic Component Specification for Printed Board Assembly
EDM-D-003	PBA Assembly Material Specification
J-STD-001	Requirements for Soldered Electrical and Electronic Assemblies
IPC-2221	Generic Standard on Printed Board Design
IPC-2222	Sectional Design Standard for Rigid Printed Boards
IPC-CM-770	Guidelines for Printed Board Component Mounting
IPC-A-610	Acceptability of Electronic Assemblies
IPC-7711/7721	Rework, Modification and Repair of Electronic Assemblies

2. Applicability of the PBA DfX Guideline EDM-D-004

- Specification recommendations given in the guideline are intended to help the user in maximizing the manufacturability, reliability, testability, etc., of the final PBA. These recommendations are of a generic nature. Therefore, in specific cases more optimal solutions may exist.
- Design specification takes precedence over this guideline.
- IPC class 2 requirements and test procedures apply unless specified otherwise in this document.
- The guideline provides general requirements and recommendations regarding Design-for-Assembly of printed boards. It treats automated board handling, PBA type selection, BOM design, component placement, compatibility with different assembly process steps (placement, soldering ...), repair, depanelization.

3. PBA Quality Requirements

- 3.1. The goal of the PBA quality requirements is to achieve a board assembly quality and reliability level suitable for professional applications.
- 3.2. The PBA shall be designed such that the class 2 requirements of the most recent versions of J-STD-001 and IPC-A-610 can be met by the assembly operation, unless where specified otherwise.
- 3.3. The PBA design shall take into account the guidelines and recommendations of the latest versions of the PCB design standards IPC-2221, IPC-2222 and the assembly design standard IPC-CM-770 or equivalent documents.
- 3.4. The assembly plant shall assemble per the most recent version of J-STD-001 and IPC-A-610, unless where specified otherwise.