

PBA Design-for-Manufacturing Guideline

EDM-D-003 PBA Assembly Material Specification

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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.

GR-78-CORE	Generic Requirements for the Physical Design and Manufacture of Telecommunications Products and Equipment
IEC 61189-5	Test methods for electrical materials, interconnection structures and assemblies – Part 5: Test methods for printed board assemblies
IEC 61190-1-1	Attachment materials for electronic assembly – Part 1-1: Requirements for soldering fluxes for high-quality interconnects in electronics assembly
IEC 61190-1-2	Attachment materials for electronic assembly – Part 1-2: Requirements for solder pastes for high –quality interconnections in electronics assembly
IEC 61190-1-3	Attachment materials for electronic assembly – Part 1-3: Requirements for electronic grade solder alloys and fluxed and non-fluxed solid solders for electronic soldering applications
IPC-3406	Guidelines for Electrically Conductive Surface Mount Adhesives
IPC-3408	General Requirements for Anisotropically Conductive Adhesive Films
IPC-9201	Surface Insulation Resistance Handbook
IPC-CA-821	General Requirements for Thermally Conductive Adhesives
IPC-CC-830	Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies
IPC-CH-65	Guidelines for Cleaning of Printed Boards and Assemblies
IPC-HDBK-001	Handbook and Guide to Supplement J-STD-001
IPC-HDBK-850	Guidelines for Design, Selection and Application of Potting Materials and Encapsulation Processes Used for Electronics Printed Circuit Board Assembly
IPC-SM-817	General Requirements for Dielectric Surface Mounting Adhesives
IPC-SM-840	Qualification and Performance Specification of Permanent Solder Mask and Flexible Cover Materials
IPC-TM-650	IPC Test Methods
J-STD-001	Requirements for Soldering and Electronic Assemblies
J-STD-002	Solderability tests for Component leads, Terminations, lugs, terminals and Wires.
J-STD-003	Solderability Tests for Printed Boards
J-STD-004	Requirements for Soldering Fluxes
J-STD-005	Requirements for Soldering Pastes
J-STD-006	Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Applications
J-STD-020	Moisture/Reflow Sensitivity Classification for Non-hermetic Solid State Surface Mount Devices
J-STD-030	Guideline for Selection and Application of Underfill Material for Flip Chip and Other Micropackages
J-STD-075	Classification of Non-IC Electronic Components for Assembly Processes
J-STD-609	Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Lead-Free (Pb-Free) and Other Attributes.
2011/65/EU	DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast)
2011/37/EU	COMMISSION DIRECTIVE 2011/37/EU of 30 March 2011 amending Annex II to Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles