

PBA Design-for-Reliability Guideline

EDM-D-100
Reliability Quantification

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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.

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1. Applicable Documents

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

EDM-D-007	Quality and Test Coverage Quantification. Design-for-Test.
IPC-7912	End-Item DPMO for Printed Circuit Board Assemblies
IEC-TR-62380	Reliability data handbook – Universal model for reliability prediction of electronics components, PCBs and equipment.
IEC-61709	Electric components - Reliability - Reference conditions for failure rates and stress models for conversion
Siemens SN-29500	Electronic Reliability Prediction Software (IEC-61709)
MIL-HDBK-217	Reliability prediction of electronic equipment
217plus	Handbook of 217plus Reliability Prediction Models (Quanterion)
Telcordia SR-332	Reliability Prediction Procedure for Electronic Equipment
Fides 2009	FIDES guide 2009 - Reliability Methodology for Electronic Systems
GJB/Z 299C	Reliability Prediction Handbook for Electronic Equipment (Chinese)

2. Applicability of the PBA DfR Guideline EDM-D-100

- This guideline provides the user with a methodology to quantify the reliability and the lifetime of a PBA.
- It provides the user with a mathematically correct method to quantify the screening coverage of production screening tests such as Environmental Stress Screening (ESS) and burn-in.