IPC/DAC-2552

General Electronic Components Model Based Definition (MBD) Standard

Developed by the Model Based Definition (MBD) for Digital Twins Task Group (2-12b) of the Electronic Product Data Description Committee (2-10) of IPC and the Digital Association of China (DAC)

Users of this publication are encouraged to participate in the development of future revisions.

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General Electronic Components Model Based Definition (MBD) Standard

1 SCOPE

This standard defines the set of specification elements for components and parts to be assembled and connected onto printed boards. These specification elements mainly cover the component specifications in strong correlation with board-level manufacturing (e.g., SMT, THT, Press-Fit), assembly and board-level reliability.

1.1 Purpose This standard provides a digital model-based standard defined to realize efficient and high-quality digital design of board-level assembly (e.g., mounting, assembly, reliability) and to support the final realization of virtual manufacturing of electronic assembly.

1.1.1 Application of This Standard This standard is applicable to components and parts to be mounted and assembled on printed boards. These components mainly include passive components (e.g., RC, soldered structural parts), discrete components (e.g., transistors), IC, on-board connectors, RF components, optical components, etc.

The potential uses of data from this standard will be applicable to, for example, printed board layout, DFX, SMT machine data libraries, operation documentation, incoming material inspection, material purchasing decision-making, printed board CAD to 3D-CAD conversion, etc.

The implementation of this standard is based on the 3D model of components, and on this basis, the key specification elements to be included in the 3D model of components are defined.

The key specification elements defined in this standard are derived from the requirements of board-level design and simulation activities, with the purpose of achieving better DFX (design for manufacturability, assembly and reliability) characteristics. This standard mainly focuses on the structure, material and process characteristic parameters of components related to board-level manufacturing process and long-term application.

1.2 Classification IPC standards recognize that electrical and electronic assemblies are subject to classifications by intended end-item use. Three general end-product classes have been established to reflect differences in manufacturability, complexity, functional performance requirements, and verification (inspection/test) frequency. It should be recognized that there may be overlaps of equipment between classes.

CLASS 1 General Electronic Products

Includes products suitable for applications where the major requirement is function of the completed assembly.

CLASS 2 Dedicated Service Electronic Products

Includes products where continued performance and extended life is Required, and for which uninterrupted service is desired but not critical. Typically, the end-use environment would not cause failures.

CLASS 3 High Performance/Harsh Environment Electronic Products

Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment must function when Required, such as life support or other critical systems.

1.3 Definition of Requirements The words **shall** or **shall not** are used in the text of this document wherever there is a requirement for materials, preparation, process control or acceptance.

The word “should” reflects recommendations and is used to reflect general industry practices and procedures for guidance only.

Line drawings and illustrations are depicted herein to assist in the interpretation of the written requirements of this Standard. The text takes precedence over the figures.

1.4 Order of Precedence The contract **shall** take precedence over this standard, referenced standards and drawings.

In the event of conflict, the following order of precedence applies:

1) Procurement as agreed and documented between user and supplier.
2) Master drawing, design brief or tech pack reflecting the user’s detailed requirements.
3) When invoked by the customer or per contractual agreement, this standard.

When documents other than this standard are cited, the order of precedence **shall** be defined in the procurement documents.

The user can specify alternate acceptance criteria.

1.4.1 Conflict In the event of conflict between the requirements of this standard and the applicable drawing(s) and documentation, the applicable user-approved drawing(s) and documentation govern.

Some examples of documentation include the contract, purchase order, technical data package, engineering specification or performance specification. In the event of a conflict between the text of this standard and the applicable documents cited herein, the text of this standard takes precedence. In the event of conflict between the requirements of this standard and drawing(s) and documentation that has not been user approved, this standard governs.

1.4.2 Clause References When a clause in this document is referenced, its subordinate clauses apply, unless the requirement references specific subordinate clauses.

1.5 Abbreviations and Acronyms See Appendix A for full spellings of abbreviations (including elements) and acronyms used in this standard.

1.6 Terms and Definitions The definitions of terms used in this standard are in accordance with IPC-T-50.

1.7 Use of "Lead" For readability and translation, this document uses the noun lead only to describe leads of a component. The metallic element lead is always written as Pb.

2 APPLICATION DOCUMENTS

2.1 IPC[1]

IPC-T-50 Terms and Definitions for Interconnecting and Packaging Electronic Circuits

IPC-A-610 Acceptability of Electronic Assemblies

2.2 Joint Standards[2]

IPC/JEDEC J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies

ANSI/ESDA/JEDEC JS-001 Human Body Model Testing of Integrated Circuits

JS-002 ANSI/ESDA/JEDEC Joint Standard for Electrostatic Discharge Sensitivity Testing – Charged Device Model (CDM) – Device Level

IPC/JEDEC J-STD-006 Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications

IPC/JEDEC J-STD-020 Moisture/Reflow Sensitivity Classification for Nonhermetic Surface Mount Devices

IPC/JEDEC J-STD-033 Handling, Packing, Shipping and Use of Moisture, Reflow, and Process Sensitive Devices

IPC/JEDEC J-STD-075 Classification of Non-IC Electronic Components for Assembly Processes

2.3 ASTM International[3]

ASTM F1249 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

2.4 EIA[4]

EIA 481 8 mm Through 200 mm Embossed Carrier Taping and 8 mm & 12 mm Punched Carrier Taping of Surface Mount Components for Automatic Handling

2.5 ISO[5]

ISO 10303-42 Industrial automation systems and integration – Product data representation and exchange – Part 42: Integrated generic resource: Geometric and topological representation

ISO 10303-203 Industrial automation systems and integration – Product data representation and exchange – Part 203: Application protocol: Configuration controlled 3D design of mechanical parts and assemblies

ISO 10303-214 Industrial automation systems and integration – Product data representation and exchange – Part 214: Application protocol: Core data for automotive mechanical design processes

ISO 10303-242 Industrial automation systems and integration – Product data representation and exchange – Part 242: Application protocol: Managed model-based 3D engineering

1 www.ipc.org
2 www.ipc.org / www.jedec.org
3 www.astm.org
4 www.ecianow.org
5 www.iso.org