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Design and Assembly Process Implementation for Ball Grid Arrays (BGAs)

Developed by the Ball Grid Array Task Group (5-21f) of the Assembly & Joining Processes Committee (5-20) of IPC

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

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Design and Assembly Process Implementation for Ball Grid Arrays (BGAs)

1 SCOPE

This standard describes design and assembly implementation for ball grid array (BGA) and fine-pitch BGA (FBGA) technology, focusing on inspection, repair and reliability issues associated with design and assembly of printed boards using these packages.

1.1 Purpose The purpose of this standard is to provide useful and practical information to those who use or are considering using BGAs. The target audiences for this document are managers, designers and process engineers who are responsible for design, assembly, inspection and repair processes of printed boards and printed board assemblies.

1.1.1 Intent This document describes how to successfully implement robust design and assembly processes for printed board assemblies using BGAs as well as ways to troubleshoot some common anomalies which can occur during BGA assembly. For accept/reject criteria and requirements for BGA assemblies, see J-STD-001 and IPC-A-610.

1.1.2 Interpretation of "Shall" The imperative form of the verb "**shall**" is used throughout this standard whenever a requirement is intended to express a provision that is mandatory. Deviation from a "**shall**" requirement may be considered if sufficient data are supplied to justify the exception. To assist the reader, the word "**shall**" is presented in bold characters.

The words "should" and "may" are used whenever it is necessary to express nonmandatory provisions. "Will" is used to express a declaration of purpose.

1.1.3 Presentation All dimensions and tolerances in this specification are expressed in hard SI (metric) units and bracketed soft imperial [inch] units. Users of this specification are expected to use metric dimensions. All dimensions ≥ 1 mm [0.0394 in] will be expressed in millimeters and inches. All dimensions < 1 mm [0.0394 in] will be expressed in micrometers and microinches.

1.1.4 Use of "Lead" For readability and translation, this document uses the word lead only to describe leads of a component (sometimes referred to as terminations).

1.1.5 Abbreviations and Acronyms Periodic table elements are abbreviated in this standard. See Appendix B for full spellings of abbreviations (including elements) and acronyms used in this standard.

2 APPLICABLE DOCUMENTS

2.1 IPC[1]

IPC-T-50 Terms and Definitions for Printed Boards and Printed Board Assemblies

IPC-D-279 Design Guidelines for Reliable Surface Mount Technology Printed Board Assemblies

IPC-A-610 Acceptability of Electronic Assemblies

IPC-TM-650 Test Methods Manual[2]

2.4.42 Torsional Strength of Chip Adhesives

IPC-SM-785 Guidelines for Accelerated Reliability Testing of Surface Mount Attachments

IPC-SM-817 General Requirements for Dielectric Surface Mounting Adhesives

IPC-CC-830 Qualification and Performance of Electrical Insulating Compound for Printed Wiring Assemblies

IPC-HDBK-830 Guidelines for Design, Selection and Application of Conformal Coatings

IPC-1401 Corporate Social Responsibility and Sustainability Protocols for Electronic Manufacturing Industry

IPC-1601 Printed Board Handling and Storage Guidelines

IPC-1751 Generic Requirements for Declaration Process Management

1. www.ipc.org
2. Current and revised IPC Test Methods are available on the IPC Web site (www.ipc.org/test-methods.aspx)