Australian Standard®

Printed Board Assemblies

Part 5: Surface mount technology

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Australian Electrical and Electronic Manufacturers Association

Australian Tin Information Centre

Civil Aviation Authority

Confederation of Australian Industry

Department of Defence

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PREFACE

This Standard was prepared by the Standards Australia Committee on Printed Board Assemblies. Grateful acknowledgement is made for the assistance received for ANSI/IPC-CM-770C and ANSI/IPC-SM-782 during preparation of the Standard.

The purpose of the document is to illustrate and provide guidance to the user on accepted, effective methods of mounting individual components of various kinds on printed boards. The manufacture of equipment for electronics and telecommunications purposes involves consideration of the assembly, soldering, testing, repair and rework of printed board assemblies; one of the major costs being the actual mounting operation, irrespective of the type of component used in the equipment. This activity is considered critically important to every subsequent operation, and fundamental to the performance and reliability of the equipment. Since technology is constantly changing, in practice the Standard is unlikely to provide more than guidance on the subject of surface mount technology.

The development of Standards on these subjects is lagging behind the need for them at present, hence the adoption of system based techniques rather than manually based skills is important for a number of reasons. Pressure is created for the adoption of techniques such as those described to handle specialized components e.g. miniaturized discrete components or complex multiple components, such as integrated circuits, in ways which maximize the use of computer controlled, automatically placed circuitry which uses a variety of newly developed soldering techniques and minimizes the manual handling of individual components.

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard provides guidelines considered to be most effective for the assembly of printed board assemblies. It discusses aspects of design criteria, automated techniques for assembly, and considers associated mass soldering, cleaning and coating processes.

1.2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS
1099 Basic environmental testing procedures for electrotechnology
1199 Earthing procedures and tables for inspection by attributes
1399 Guide to AS 1199, Sampling procedures and tables for inspection by attributes
2546 Printed boards
2546.0 Part 0: Terms and definitions
2546.1 Part 1: General requirements and test methods

2547 Semiconductor devices
2547.1.1 Part 1.1: Discrete devices—General

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3508.1 Part 1: Preparation, handling and assembly
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3508.4 Part 4: Acceptability of solder, printed board and solder joints—pictorial representation—pictorial presentation
3508.5 Part 6: Surface mounted land patterns

3900 Quality systems—Guide to selection and use
3901 Quality systems for design/development, production, installation and servicing
3902 Quality systems for production and installation
3903 Quality systems for final inspection and test
3904 Quality systems—Guide to quality management and quality system elements

ANSI/IPC -SM
782 Surface mount land patterns

IEC
326 Printed boards
326.5 Part 5: Specification of single and double sided boards with plated-through holes
326.6 Part 6: Specification for multilayer printed boards

1.3 DEFINITIONS. For the purpose of this Standard the definitions of AS 2546.0 and those below apply.

1.3.1 Castellation—metallized features recessed on the edges of a chip carrier used to interconnect conducting surfaces or planes within or on the chip carrier.

1.3.2 Chip carrier—a low-profile rectangular component package, with a mounting area which is a large fraction of the package size with external connections usually on all four sides of the package.

1.3.3 Coefficient of thermal expansion (CTE)—the linear thermal expansion per unit change in temperature.

1.3.4 Component mounting site—a location on a packaging and interconnection structure that consists of a land pattern and conductor fanout.

1.3.5 Constraining core—a supporting plane that is internal to a packaging and interconnecting structure.

1.3.6 Dual-in-line package (DIL or DIP)—a component which terminates in two straight and parallel rows of pins or lead wires.

NOTE: The abbreviation DIL is used for ceramic packages and DIP for plastic packages.

1.3.7 Flat pack—a component with straight rows of leads (normally on 0.050 inch centres) which are parallel to the component body.

1.3.8 Integrated circuit (IC)—an assembly of miniature electronic components simultaneously produced in batch processing, on or within a single substrate, to perform an electronic circuit function.

1.3.9 Land pattern—a combination of lands intended for the mounting, interconnection and possible testing of a particular component.

1.3.10 Lead projection—the distance which a component lead protrudes through the printed board on the side opposite from which the component is mounted.

1.3.11 Leadless chip carrier—a chip carrier with external connections consisting of metallized terminations.

1.3.12 Leaded chip carrier—a chip carrier with external connections consisting of leads around the sides of the package.

1.3.13 Mixed mounting technology—a component mounting technology that uses both through-hole and surface-mounting technologies on the same packaging and interconnecting structure.

1.3.14 Packaging and interconnecting assembly (P&IA)—the generic term for an assembly that has electronic components mounted on either one or both sides of a packaging and interconnecting structure.