



*THE INSTITUTE FOR
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Design and Application Guidelines for Surface Mount Connectors

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1.0 INTRODUCTION

1.1 Scope With the present packaging trend in system design moving towards compact, low-power consumption configurations, the use of Surface Mount Technology offers a viable approach toward achieving the desired packaging goals. Sophisticated electronic assemblers, using a variety of interconnection and packaging techniques, employ the best of today's technology, intermixed with the appropriate state-of-the-art component and attachment processes. The degree of advancement in packaging of electronic components is predicated on the type of product being produced; the need for miniaturization and weight savings; plus the off-the-shelf availability of different component types.

The growing popularity of surface mount technology for packaging electronics has raised a need for surface mount connectors to provide a common packaging approach.

This document provides guidelines for the design, selection and application of soldered surface mount connectors for all types of printed boards, rigid, flexible-rigid and back-planes. (It does not cover solderless interconnections, such as those that employ conductive elastomers.)

1.2 Purpose The purpose of this document is to provide information on design and application of connectors for surface mount application in order to aid the designer in effectively interconnecting this package. The connector material, design and mounting characteristics are discussed. Land patterns, solder joint configurations, assembly techniques, rework and repair procedures are also covered.

Adherence to the guidelines set forth in this document will generally assure adequate reliability for the majority of applications; however, more rigid requirements may be appropriate for more critical applications.

The methods listed herein shall not be construed as standards since the state-of-art is constantly changing and applications and requirements may vary beyond the scope of this publication.

1.3 Terms and Definitions The definition of terms used herein shall be in accordance with IPC-T-50 and the following:

1.3.1 Coefficient of Thermal Expansion (CTE) The linear dimensional change of a material per unit change in temperature.

1.3.2 Co-planarity of Leads The measure of variation of planarity of leads from a common reference plane.

1.3.3 Double-sided Assembly A packaging and interconnecting structure with components mounted on both the primary and secondary sides.

1.3.4 Footprint (See preferred term "Land Pattern.")

1.3.5 Land Pattern A combination of lands intended for the mounting, interconnection and testing of a particular component.

1.3.6 Mating Force The force required to mate a connector pair.

1.3.7 Packaging and Interconnecting (P&I) Structure The general term for a completely processed combination of base materials, supporting planes or constraining cores, and interconnection wiring used for the purpose of mounting components.

1.3.8 Primary Side That side of a packaging and interconnecting structure so defined on the master drawing. (It usually contains the most complex or most number of components.)

1.3.9 Secondary Side That side of a packaging and interconnecting structure that is opposite the primary side. (It is the same as the "solder side" in through-hole component mounting technology.)

1.3.10 Single-Sided Assembly A packaging and interconnecting assembly with components mounted only on the primary side.

1.3.11 Solder Tail The portion of a connector contact which is designed for soldering to a printed board.

1.3.12 Thermal Expansion Mismatch (See 1.3.1) The absolute difference in thermal expansion of two components.

1.3.13 Unmating Force The force required to unmate a connector pair.

1.3.14 Vapor Phase Reflow The process of reflow soldering by direct contact condensation heating.

1.4 Applicable Documents

IPC-SM-780 Component Packaging and Interconnecting with Emphasis on Surface Mounting