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Qualification and Performance Specification for Printed Boards Containing Embedded Active and Passive Circuitry

Supersedes IPC-6017
March 2009

An international standard developed by IPC

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Standards Should:
- Show relationship to Design for Manufacturability (DFM) and Design for the Environment (DFE)
- Minimize time to market
- Contain simple (simplified) language
- Just include spec information
- Focus on end product performance
- Include a feedback system on use and problems for future improvement

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- Inhibit innovation
- Increase time-to-market
- Keep people out
- Increase cycle time
- Tell you how to make something
- Contain anything that cannot be defended with data

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Developed by the Embedded Devices Process Implementation Subcommittee (D-55) of the Embedded Components Committee (D-50) of IPC

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

Contact:

IPC
3000 Lakeside Drive, Suite 105N
Bannockburn, Illinois
60015-1249
Tel 847 615.7100
Fax 847 615.7105

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Embedded Components Committee

Chair
Steve Vetter
Naval Surface Warfare Ctr

Embedded Devices Process Implementation Subcommittee

Chair
Rajesh Kumar
TTM Technologies

Vice Chair
Bruce Hughes
Nvidia Corporation

Technical Liaison of the IPC Board of Directors

Bob Neves
Microtek (Changzhou) Laboratories

Embedded Devices Process Implementation Subcommittee

Neil Bolding
MacDermid Alpha Automotive

Marc Carter
Aeromarc, LLC

Zhiman Chen
Zhuzhou CRRC Times Electric Co., Ltd.

Robert Cooke
NASA Johnson Space Center

Nathaniel Dobrzynski
MacDermid Alpha Automotive

Don Dupriest
Lockheed Martin Missiles & Fire Control

Ernst Eggelaar
Microtronic

Gary Erickson
Sanmina Corporation

Dennis Fritz
MacDermid Enthone Electronics Solutions

Mahendra Gandhi
Northrop Grumman Space Systems

Arnaud Grivon
Thales Global Services

Hardeep Heer
FTG Circuits

Leo Huang
APCB Electronics (Thailand) Co., Ltd

Bruce Hughes
Nvidia Corporation

Jennie Hwang
H-Technologies Group

Suriyakan Kleitz
Schlumberger Well Services

Rajesh Kumar
TTM Technologies

John Lauffer
TTM Technologies

James Monarchio
TTM Technologies

Robert Neves
Microtek Laboratories China

William Newhard
DownStream Technologies, LLC

Jan Obrzut
NIST

Jan Pedersen
Elmatica AS

Michael Schleicher
Semikron Elektronik GmbH Co. KG

Bhanu Sood
NASA Goddard Space Flight Center

Crystal Vanderpan
UL LLC

Udo Welzel
Robert Bosch GmbH

Martin Wickham
National Physical Laboratory

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Bhanu Sood
NASA Goddard Space Flight Center

Table of Contents

Figures

Tables

Qualification and Performance Specification for Printed Boards Containing Embedded Active and Passive Circuitry

1 SCOPE

This specification covers qualification and performance of embedded active and passive circuitry within the finished printed board.

1.1 Purpose The purpose of this standard is to define the electrical, mechanical and environmental requirements specific to embedded passive and active circuitry. These requirements are in addition to the applicable requirements of other performance specification(s) (e.g., IPC-6010 series, J-STD-001). Where specified, the requirements in this specification may supersede those requirements.

Substrates, as pertain to this standard, are materials (e.g., prepreg, laminate, films, cores, etc.) that serve as a platform for the embedded circuitry.

See IPC-7092 for additional guidance and information on embedded circuitry.

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 Measurement Units All dimensions and tolerances in this specification are expressed in hard SI (metric) units. Users of this specification are expected to use metric dimensions. All dimensions ≥ 1.0 mm will be expressed in mm. All dimensions < 1.0 mm will be expressed in µm.

1.4 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.

Where the word **shall** is used in this Standard, the requirements for each class are in brackets next to the requirement.

N = No requirement has been established for this Class
A = Acceptable
P = Process Indicator
D = Defect

Examples:
[A1P2D3] is Acceptable Class 1, Process Indicator Class 2 and Defect Class 3
[N1D2D3] is No requirement has been established Class 1, Defect Classes 2 and 3
[A1A2D3] is Acceptable Classes 1 and 2, Defect Class 3
[D1D2D3] is Defect for all Classes