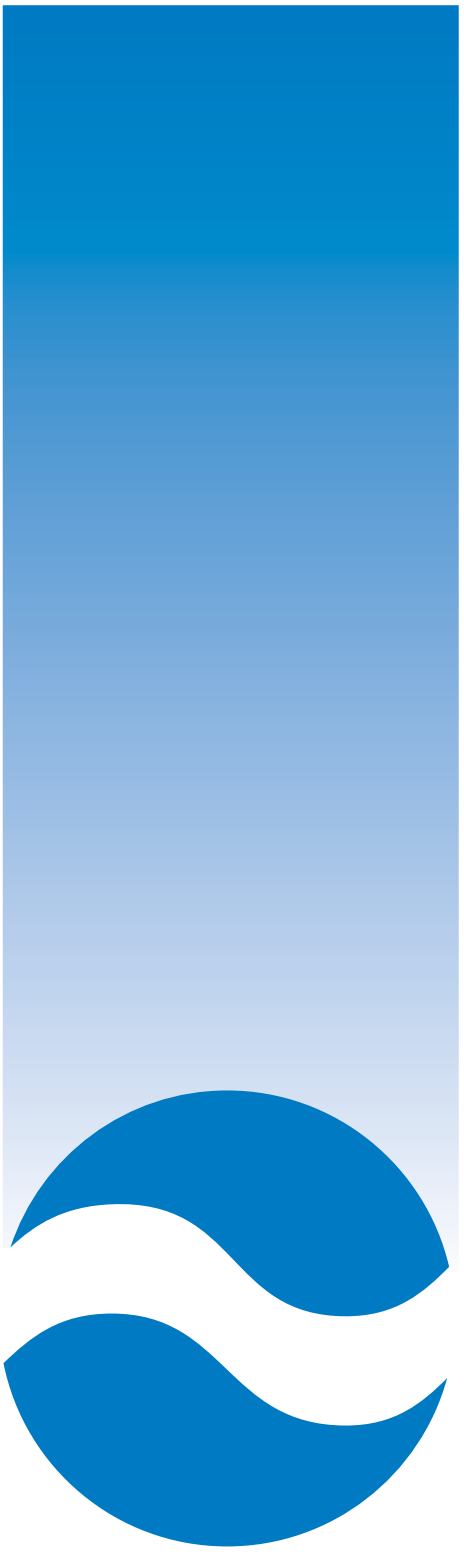
IPC/JEDEC J-STD-609B
October 2016
Supersedes IPC/JEDEC J-STD-609A
June 2010

JOINT INDUSTRY STANDARD

Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Lead-Free (Pb-Free) and Other Attributes



IPC and JEDEC Standards and Publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such Standards and Publications shall not in any respect preclude any member or nonmember of IPC or JEDEC from manufacturing or selling products not conforming to such Standards and Publications, nor shall the existence of such Standards and Publications preclude their voluntary use by those other than IPC or JEDEC members, whether the standard is to be used either domestically or internationally.

Recommended Standards and Publications are adopted by IPC or JEDEC without regard to whether their adoption may involve patents on articles, materials, or processes. By such action, IPC or JEDEC do not assume any liability to any patent owner, nor do they assume any obligation whatever to parties adopting the Recommended Standard or Publication. Users are also wholly responsible for protecting themselves against all claims of liabilities for patent infringement. The material in this joint standard was developed by the Marking, Symbols and Labels for Identification of Assemblies, Components and Devices Task Group (4-34b) of the Materials Identification Subcommittee (4-34) and JEDEC Committee JC14.4 Quality Processes and Methods.

For Technical Information Contact:

JEDEC
Solid State Technology Association
3103 North 10th Street, Suite 240-S
Arlington, VA 22201-2107
Tel 703 907.0026
Fax 703 907.7501

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

Please use the Standard Improvement Form shown at the end of this document.

IPC/JEDEC J-STD-609B

Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Lead-Free (Pb-Free) and Other Attributes

A joint standard developed by the Marking, Symbols and Labels for Identification of Assemblies, Components and Devices Task Group (4-34b) of the Materials Identification Subcommittee (4-34) and JEDEC Committee JC14.4 Quality Processes and Methods

Supersedes:

IPC/JEDEC J-STD-609A - March 2010
IPC/JEDEC J-STD-609 - May 2007
JESD97 - May 2004
IPC-1066 - January 2005

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

Contact:

JEDEC
Solid State Technology Association
3103 North 10th Street, Suite 240-S
Arlington, VA 22201-2107
Tel 703 907.0026
Fax 703 907.7501

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

FOREWORD

Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment, commonly referred to as the ''RoHS Directive[1]'', and other legislation are driving the electronics industry towards the use of lead-free (Pb-free) solders and components with Pb-free 2nd level interconnect terminal finishes and materials.

There are different Pb-free solders being used for the various soldering operations in electronics. Each of these solders may require different processing temperatures for assembly, rework, and repair. Some means of communicating the identity of the Pb-free or Pb-containing solder must be provided so that those performing assembly, rework and repair are aware of the temperature capabilities and limitations of these solders, and are able to distinguish between Pb-free and Pb-containing solders.

Marking of components and/or labeling their shipping containers are needed to identify and distinguish Pb-containing and Pb-free 2nd level interconnect terminal finishes and materials. Labeling electronic assemblies using Pb-free solder materials will facilitate end-of-life recycling of electronic equipment. This standard sets forth minimum requirements and includes options for the provision of additional information.

This paradigm shift to Pb-free electronics has created a need for identification of traditional Pb-containing coatings, finishes and solders. This standard can be utilized to identify the presence of Pb for those markets as described in Sections 5 (Marking/Labeling Categories) and 8 (Marking and/or Labeling of Pb-Containing Components, PCBs, and PCB Assemblies). This standard supersedes IPC/JEDEC J-STD-609, JESD97 and IPC-1066.

1. The RoHS Directive itself is not a law; rather, it is a direction to the European Union Member States to implement their own laws embodying the requirements of the Directive. These laws were required to be in effect as of July 1, 2006.

Acknowledgment

Any document involving a complex technology draws material from a vast number of sources across many continents. While the principal members of the Marking, Symbols and Labels for Identification of Assemblies, Components and Devices Task Group (4-34b) of the Materials Identification Subcommittee (4-34) are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of the IPC extend their gratitude.

Materials Identification Subcommittee

Chair
John Sharp
Qorvo

Marking, Symbols and Labels for Identification of Assemblies, Components and Devices Task Group

Co-Chairs
Stephen Tisdale
Intel Corporation

Lee Wilmot
TTM Technologies, Inc.

JEDEC COMMITTEE JC14.4 - Quality Processes and Methods

Chair
Curtis Grosskopf
IBM Corporation

Technical Liaisons of the IPC Board of Directors

Peter Bigelow
IMI Inc.

Sammy Yi
Aptina Imaging Corporation

Marking, Symbols and Labels for Identification of Assemblies, Components and Devices Task Group

Annie Abram, IBM Corporation
Koji Akiyama, Tokai Shinei Denshi Kogyo
Bo Andersson, NCAB Sweden AB
Tony Batalha, NEO Technology Solutions
Frederick Beltran, L-3 Communications
Ross Berntson, Indium Corporation
James Mark Bird, MBird and Associates
Erik Bjerke, BAE Systems
Gerald Leslie Bogert, Bechtel Plant Machinery, Inc.
Bret Bruhn, TTM Technologies
Calette Chamness, U.S. Army Aviation & Missile Command
Forrest Christian, Innovation Machine Ltd.
John Ciba,
Donald Clark, Vishay Micro-Measurements
Thomas Cleere, BAE Systems Platform Solutions
Steve Cmiel, NSWC - Dahlgren
Marie Cole, IBM Corporation
David Corbett, Defense Supply Center Columbus
Krista Crotty, Alberi EcoTech
Jerry Czerwonka, Avnet EMG
Sun Davis, Flextronics America, LLC
Don Dupriest, Lockheed Martin Missiles & Fire Control
Stephen Edward, TTM Technologies
Harold Ellison, Quantum Corporation
Brett Estes, NSWC Crane
Jeff Ferry, Circuit Technology Center, Inc.
Mark Frimann, Texas Instruments Inc.
Dennis Fritz, MacDermid Enthone Electronics Solutions
Lou Fuda, General Dynamics Mission Systems
James Gagne, Schneider Automation Inc.
Tim Gallagher, BAE Systems
Poh Poh Gan, Bose Corporation
Mahendra Gandhi, Northrop Grumman Aerospace Systems
Andrew Ganster, NSWC Crane
Denis Gignac, Nortel
Constantino Gonzalez, ACME Training & Consulting
Curtis Grosskopf, IBM Corporation
Mick Harvey, Selex ES
Gerhard Haubner, Infineon Technologies AG
Robert Heber, Defense Supply Center Columbus
Thom Hermann, Qualcomm Technologies Inc.
David Hillman, Rockwell Collins
Eddie Hofer, Rockwell Collins
Scott Houthuysen, LSI Corporation
Ife Hsu, Intel Corporation
Bruce Hupfer, Identco International
Bruce Hupfer, Unknown Address
Michael Hutchings, Oracle America, Inc.
Thanh Huynh, Dassault Systemes
Nancy Jaster, IPC
Kenneth Jonsson, NCAB Sweden AB
Kurk Kan, Murata Power Solutions, Inc.
Joseph Kane, BAE Systems Platform Solutions
Sarah Kubic, Honeywell International

Vijay Kumar, Lockheed Martin Missile & Fire Control
Mark Kwoka, Intersil Corporation
Leo Lambert, EPTAC Corporation
Gary Latta, SAIC
Nicholas Lycoudes, Freescale Semiconductor
James Maguire, Intel Corporation
Steven Martell, Sonoscan Inc.
Barney Martin, NEDA
Jerry Martinez, Honeywell Aerospace
Karen McConnell, Northrop Grumman Corporation
Gregory Munie, IPC
Terry Munson, Foresite, Inc.
David Nelson, Adtran Inc.
Aaron Pedigo, NSWC Crane
Elvira Preecha, Qualcomm Technologies Inc.
Markus Riester, maris TechCon
Margaret Riley, NEO Technology Solutions
Tom Rogers, Polyonics, Inc.
Patrick Ryan, Panduit Corp.
John Sharp, Unknown Address
Joseph Sherfick, NSWC Crane
Joel Sherman, KEMET Electronics Corp.
Akikazu Shibata, JPCA-Japan Electronics Packaging and Circuits Association
Jeff Shubrooks, Raytheon Company
Doug Sober, Essex Technologies Group Inc.
Vern Solberg, Solberg Technical Consulting
Kerry Spencer, Unknown Address
Valerie St. Cyr, Teradyne Inc.
Toshiyasu Takei, NSK Co., ltd.
Stephen Tisdale, Intel Corporation
Denise Turley, Fujitsu Network Communications
David Weatherford, Teledyne Printed Circuit Technologies
Michael Weinhold, PLUS Leiterplatten G
Kevin Weston,
George Wilkish, Prime Consulting
Schuyler Williams, Lockheed Martin Missile & Fire Control
Timothy Wodrich, John Deere Electronic Solutions, Inc.
Linda Woody,
Scott Worley, NASA Marshall Space Flight Center
Bai Chun Xiang, Huawei Technologies Co., Ltd.
Michael Yuen, Foxconn CMMSG-NVPD
Hak Hyun Yun, I-SAC Electronic Co., Ltd.

A special note of thanks goes to the following individuals for their dedication to bringing this project to fruition. We would like to highlight those individuals who made major contributions to the development of this standard.

Lee Wilmot, TTM Technologies Inc.
Stephen Tisdale, Intel Corporation
David Corbett, Defense Supply Center Columbus
Curt Grosskoph, IBM Corporation
Dr. Beverley Christian, Ph. D. ABC Electronics Manufacturing Consulting
Linda Woody, Linda Woody Consulting

Table of Contents

Figures

Tables