



IPC-2152

Standard for Determining Current Carrying Capacity in Printed Board Design

August 2009

A standard developed by IPC

Association Connecting Electronics Industries



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Developed by the Current Carrying Capacity Task Group (1-10b) of the
Printed Board Design Committee (1-10) of IPC

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

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Acknowledgment

Any document involving a complex technology draws material from a vast number of sources. While the principal members of the Current Carrying Capacity Task Group (1-10b) of the Printed Board Design Committee (1-10) 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.

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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.

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Standard for Determining Current Carrying Capacity in Printed Board Design

1 SCOPE

This document is intended as a general guide to understanding the relationship between current, conductor size, and temperature, and can be used more specifically in the design and evaluation of copper conductors in printed boards (PBs).

1.1 Purpose The purpose of this document is to provide guidance on determining the appropriate conductor sizes on the finished PB as a function of the current carrying capacity required and the acceptable conductor temperature rise.

1.2 Presentation All dimensions and tolerances in this standard are expressed in hard SI (metric) units and parenthetical soft imperial (inch) units. Users of this standard are expected to use metric dimensions.

1.3 Interpretation “**Shall**,” the imperative form of the verb, 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 is supplied to justify the exception.

The words “should” and “may” are used whenever it is necessary to express non-mandatory provisions.

“Will” is used to express a declaration of purpose.

To assist the reader, the word “**shall**” is presented in bold characters.

1.4 Definition of Terms The definition of all terms used herein **shall** be in accordance with IPC-T-50 and as defined in 1.4.1 through 1.4.13.

1.4.1 Ambient The surrounding environment coming into contact with the system or component in question.

1.4.2 Base Material The insulating material upon which a conductive pattern may be formed (The base material may be rigid or flexible or both. It may be a dielectric or insulated metal sheet).

1.4.3 Circuitry Layer A layer of PB containing conductors, including ground and voltage planes.

1.4.4 Conductive Pattern The configuration or design of the conductive material on a base material. (This includes conductors, lands, vias, planes, and passive components when these are an integral part of the PB manufacturing process.)

1.4.5 Conductor Spacing The observable distance between adjacent edges (not center-to-center spacing) of isolated conductive patterns in a conductor layer.

1.4.6 Conductor Thickness Thickness of a conductor including additional metallic coatings but excluding non-conductive coatings.

1.4.7 Conductor Width The observable width of a conductor at any point chosen at random on a PB as viewed from directly above unless otherwise specified.

1.4.8 Convection Heat transfer that occurs at the interface of a solid and a fluid or gas that is due to their differences in temperature.

1.4.9 Copper Weight The mass of copper per unit area for a foil, typically expressed in ounces per square foot or grams per square centimeter (these units are not equivalent).

1.4.10 Current-Carrying Capacity The maximum electrical current that can be carried continuously by a conductor, without causing an objectionable degradation of electrical or mechanical properties of the product.