ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES ®

IPC-2226

Sectional Design Standard for High Density Interconnect (HDI) Printed Boards

Developed by the HDI Design Subcommittee (D-41) of the HDI Committee (D-40) of IPC

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

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Sectional Design Standard for High Density Interconnect (HDI) Printed Boards

1 SCOPE

This standard establishes requirements and considerations for the design of organic and inorganic high density interconnect (HDI) printed boards and its forms of component mounting and interconnecting structures.

1.1 Purpose The requirements contained herein are intended to establish design principles and recommendations that **shall** be used in conjunction with the detailed requirements of IPC-2221. In addition, when the core material reflects requirements identified in the sectional standards (IPC-2222, IPC-2223, IPC-2224 and IPC-2225), that information becomes a mandatory part of this standard.

The standard provides recommendations for signal, power, ground and mixed distribution layers, dielectric separation, via formation and metallization requirements and other design features that are necessary for HDI-advanced IC interconnection substrates. Included are trade-off analyses required to match the mounting structure to the selected chip set.

1.2 Document Hierarchy Document hierarchy **shall** be in accordance with the generic standard IPC-2221.

1.3 Presentation All dimensions and tolerances in this standard are represented in SI (metric) units with Imperial units following as a hard conversion for reference only (e.g., 0.01 cm [0.0039 in]).

1.4 Interpretation Interpretation **shall** be in accordance with the generic standard IPC-2221.

1.5 Classification of HDI Types Classification **shall** be by category in accordance with the requirements based on end use and as stated in 1.5.1 and 1.5.2 of this standard.

1.5.1 Core Types When HDI products utilize core interconnections, the core type(s) and their materials **shall** be in accordance with IPC-2222 for rigid and IPC-2223 for flexible core interconnections. For passive or constraining core boards the materials **shall** be in accordance with IPC-2221.

1.5.2 HDI Types The design designation system of this standard recognizes the six industry approved design types (see 5.2) used in the manufacture of HDI printed boards. The designations in this section determine the HDI design type by defining the number and location of HDI layers that may or may not be combined with a substrate (core [C] or passive [P]).

For instance, an HDI printed board with two layers of HDI on one side of the core and one layer of HDI on the other side of the core would be 2 [C] 1.

The following definitions apply to all forms of HDI.

TYPE I 1 [C] 0 or 1 [C] 1 - with through vias connecting the outer layers (see 5.2.1).

TYPE II 1 [C] 0 or 1 [C] 1 - with buried vias in the core and may have through vias connecting the outer layers (see 5.2.2).

TYPE III ≥2 [C] ≥0 - may have buried vias in the core and may have through vias connecting the outer layers (see 5.2.3).

TYPE IV ≥1 [P] ≥0 - where P is a passive substrate with no electrical connection (see 5.2.4).

TYPE V Coreless constructions using layer pairs (see 5.2.5).

TYPE VI Alternate constructions (see 5.2.6).

1.6 Via Formation Via formation may be different from that considered in IPC-2221 since additional methods for via formation, in addition to drilled vias, will be used. The methods for via formation, lamination/coating and sequential layer process are covered in 9.1.1.

1.7 Design Features Figure 1-1 provides a color key to be used with all of the figures within this standard.

2 APPLICABLE DOCUMENTS

The following documents form a mandatory part of this standard and all requirements stated therein apply, unless modified in the section where they are invoked.

The revision of the document in effect at the time of solicitation **shall** take precedence over the applicable section of this document.

2.1 IPC[1]

IPC-T-50 Terms and Definitions for Interconnecting and Packaging Electronic Circuits

1. www.ipc.org