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IPC-4821

Specification for Embedded Passive Device Capacitor Materials for Rigid and Multilayer Printed Boards

Developed by the Embedded Component Materials Subcommittee (D-52) of the Embedded Components Committee (D-50) of IPC

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

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Foreword:

IPC-4821 was developed based on industry knowledge at the time. Embedded passive devices may be made with a large variety of materials and cover a wide range of fabrication processes. At the time of writing this specification, use of these materials was not widespread. As such, it is anticipated that updates to this document will be needed in the future. In the meantime, it is recommended that the customer and supplier work together to set the criteria for acceptance of embedded passive material products.

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1 SCOPE

This document describes materials that can be used for the fabrication of embedded passive capacitor devices within the finished printed circuit board substrate. For this document, embedded passive devices and the phrase embedded passives are considered to be equivalent. It provides information on general designations and associated characteristics of embedded passive device (EPD) capacitor materials. The document **shall** be used as a qualification and conformance standard for these materials.

This document contains material designation, conformance (requirements), qualification (characterization) and quality assurance specifications. IPC-4821 **shall** be used in conjunction with IPC-2000 series design standards and IPC-6000 series performance standards.

Embedded passive resistor material designation, conformance (requirements), qualification (characterization) and quality assurance specifications are contained in IPC-4811.

1.1 General This document covers the requirements for dielectric, conductive, and insulating materials that are used with materials for the manufacture of printed circuit boards containing embedded passive capacitor functionality. Figures 1-1a & 1-1b show representations of how embedded passives may appear in a PWB.

- Embedded passives are used to enhance high speed, high frequency performance.

- Embedded passives are used to increase circuit density and simplify design of circuitry features such as decoupling capacitance and terminating resistors.
- Embedded passives are used to simplify assembly by mounting fewer components, thereby increasing functionality and/or reducing total board area.

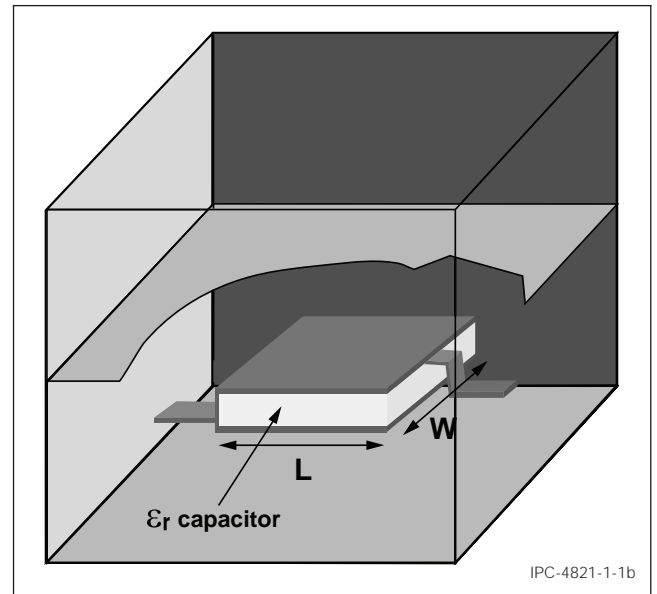


Figure 1-1b Embedded Discrete Capacitor Defined by Plate Size and Separating Dielectric

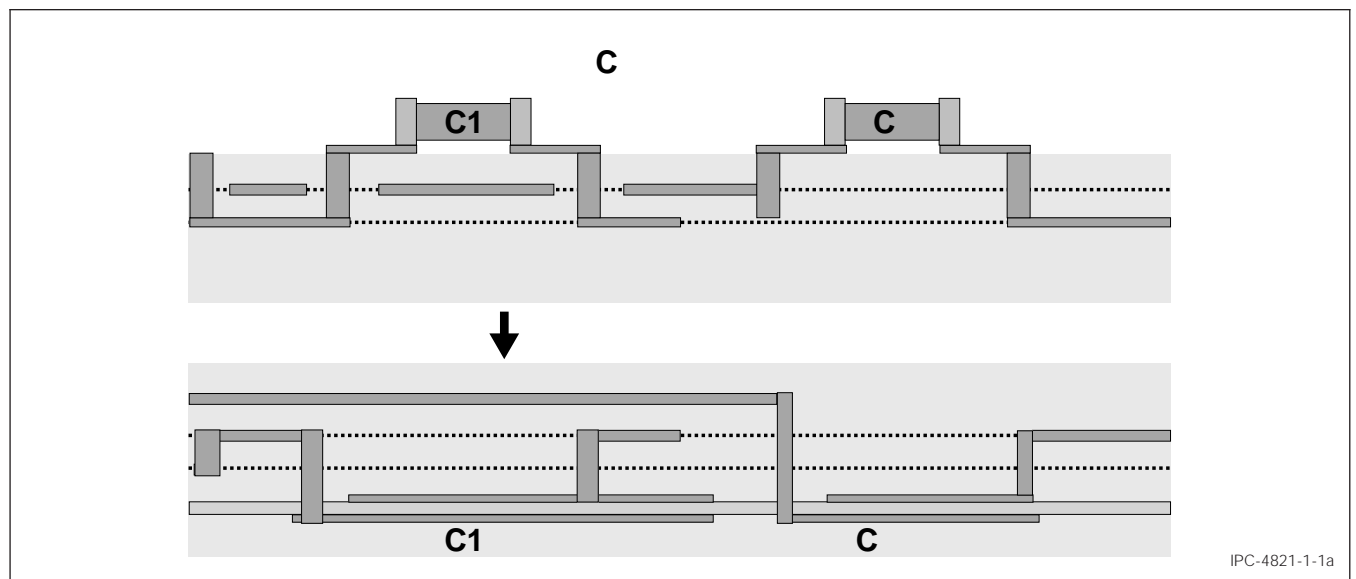


Figure 1-1a Embedded Planar Capacitor Saves Valuable Surface Real Estate