

Are ceramic or plastic cores for circuit boards better



Article Overview

Ceramic cores excel in thermal conductivity and high-temperature performance, while plastic cores offer flexibility, cost-effectiveness, and mechanical durability.

Thermal and Electrical Performance

Ceramic cores provide superior thermal conductivity, often exceeding $20 \text{ W/m}\cdot\text{K}$, which allows efficient heat dissipation for high-power or high-frequency applications. They also have excellent electrical insulation and low dielectric loss, making them ideal for RF circuits, power modules, and high-speed electronics. In contrast, plastic cores like FR-4 or reinforced plastics have much lower thermal conductivity (typically below $1 \text{ W/m}\cdot\text{K}$) and higher dielectric constants, which can limit performance in high-frequency or high-heat environments.

Mechanical Properties

Plastic cores are lightweight, flexible, and resistant to impact, moisture, and chemicals, making them suitable for flexible PCBs and cost-sensitive consumer electronics. They are less brittle than ceramics and can withstand bending without cracking. Ceramic cores, while extremely hard and chemically inert, are brittle and more prone to cracking under mechanical stress, which can complicate handling and assembly.

Temperature Resistance...

Article Content

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Printed circuit board

Printed circuit board manufacturing involves manufacturing bare printed circuit boards and then populating

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What Is Ceramic PCB? Materials, Types, and Benefits

What Is Ceramic PCB? Ceramic PCB uses ceramic materials like aluminum oxide, aluminum nitride, or beryllium oxide

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PCB Substrates and Their Applications: A Comprehensive Guide

Explore the types of PCB substrates—FR-4, ceramic, metal-core, polyimide, and high-frequency materials. Learn

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PCB Material: A Comprehensive Guide to Understanding and

Materials like ceramic or metal-core laminates greatly improve k (20–200+ W/m·K), which helps keep components

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What are Ceramic PCBs

From the layers of the circuit boards, there are the single-layer, double-layer, and multilayer. Here we only put the

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Making Sense of PCB Material Choices for Today's Electronics

What are circuit boards made of? Compare FR-4, PTFE, polyimide, and metal core PCB materials to choose the best fit for your

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What is the Difference: Ceramic PCB vs. FR4 vs. MCPCB

What's the Difference Between Ceramic PCB, FR4 & MCPCB? If you're using printed circuit boards, you can use the standard FR4

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What are the differences between ceramic circuit boards and

Ceramic circuit boards, with their superior thermal, electrical, and environmental properties, serve a critical role in

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Ceramic PCBs – A Complete Guide

Discover everything about ceramic PCBs – from materials, types, features, benefits, applications, manufacturing

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What Is A Ceramic Substrate And Why It Matters For PCBs

PCB manufacturing using ceramic circuit board material has increased heat dissipation, reduced signal loss, and

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PCB Board Material Guide: FR-4 vs Ceramic vs Aluminum — How to

For general electronics, FR-4 remains the best all-around choice. For high-power or high-temperature designs,

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PCB Materials Guide: Types, Properties & Selection Tips

For high-frequency circuits or harsh environments, materials like Rogers or ceramic are better suited. Consider signal

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PCB Substrate and Core Materials: A Comprehensive Guide

Selecting the right substrate and core materials is critical in PCB design, since it can influence the performance,

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Comparing PCB Substrate Materials for Thermal Resistance and

Printed circuit boards (PCBs) are an essential part of modern electronics, serving as the backbone for many devices from

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PCB Material Types Explained: FR4, Polyimide, Ceramic, and More

Learn the different types of PCB materials, including FR-4, polyimide, PTFE, ceramic, and metal cores. Compare their

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Reinforced plastic vs. ceramic for circuit boards

Ceramic materials for circuit boards exhibit superior thermal conductivity, often exceeding 20 W/m*K, compared to reinforced

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What is Ceramic PCB? | A Complete Guide to Ceramic Circuit Boards

An Introduction to Ceramic PCB In the modern electronic industry, a PCB is expected to dissipate heat better and

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Different Types of PCB Substrate Materials and Their Properties

Learn how to choose the right PCB substrate material for your design. Compare FR-4, Rogers, PTFE, ceramic,

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PCB Material: A Comprehensive Guide to Understanding and

Introduction Printed Circuit Board (PCB) materials form the foundation of electronic circuits, serving as the

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Printed Circuit Boards | PCB Materials

Printed circuit board (PCB) substrate materials are the base layers that make up the PCB. They are typically made of

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Printed Circuit Board Materials and Their Role in Electronics ...

Learn what printed circuit boards are made of, including substrates, copper layers, and protective coatings, and how

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PCB Substrate and Core Materials: A Comprehensive Guide

Printed Circuit Boards (PCB) are the backbone of all modern electronics. It serves as the platform for electronic

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PCB Thermal Conductivity Performance: FR4 Vs. Ceramic Vs. Metal Core

The choice of printed circuit board substrate material has a major impact on thermal performance. Materials like FR4, ceramic, metal

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Reinforced plastic vs. ceramic for circuit boards

Reinforced plastic offers lightweight durability and excellent flexibility for circuit boards, making it ideal for flexible PCBs and cost

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Ceramic PCB vs FR4: Which PCB Material Should You Choose?

Choosing between ceramic PCB VS FR4 PCB is not only a material decision. It affects heat flow, electrical stability,

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Ceramic PCBs

Ceramic PCBs use ceramic materials; metallic oxides, nitrides, carbides or crystalline silicon and carbon structures as their base.

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What Are Printed Circuit Boards Made Of? Understanding the

Printed circuit boards (PCBs) are typically made of a combination of insulating materials such as fiberglass or plastic, copper for

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Comparing the Pros and Cons of Different PCB Materials: Choosing

Printed circuit boards (PCBs) are the foundation of electronic devices, connecting all the components that make them

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Metal PCB Materials Differences: Aluminum Vs. Copper Core Vs. Iron ...

Introduction Metal core printed circuit boards (MCPCB) refer to boards which incorporate a metal plate or substrate as the central

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