

Environmental Assessment of High Voltage Ceramic Capacitors

What is a high volumetric efficiency capacitor?

High volumetric efficiency capacitors are found in all smart electronic devices, providing important applications within circuits, including flexible filter options, power storage and sensing, decoupling and circuit smoothing functions.

What is a BME multilayer ceramic capacitor (MLCC)?

Base metal electrode (BME) multilayer ceramic capacitors (MLCCs) are widely used in aerospace, medical, military, and communication applications, emphasizing the need for high reliability.

What are multilayer ceramic capacitors (MLCCs)?

Multilayer ceramic capacitors (MLCCs) are widely used passive components in modern electronics, ubiquitous in various devices spanning diverse industries.

Which dielectric material is used in high-capacitance MLCCs?

BaTiO₃ emerges as the dominant dielectric material utilized in high-capacitance MLCCs, offering exceptional dielectric characteristics including high permittivity, low dielectric loss, and the capacity to adjust parameters across a broad temperature range.

How does poor electrode quality affect MLCC reliability?

Poor electrode quality in MLCCs leads to elevated leakage current density, shortened failure times, and reduced DC breakdown field strength²⁰⁻²³. To enhance the overall reliability of MLCCs, a deliberate effort must be made to improve electrode quality.

This study focuses on evaluating the environmental impacts on high-voltage AECs and identifying the environmental hotspots including critical environmental impact ...

A cradle-to-grave life cycle assessment (LCA) of high-voltage AECs was performed to evaluate the environmental impacts and identify the corresponding ...

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High volumetric efficiency capacitors are found in all smart electronic devices, providing important applications within circuits, including flexible filter options, power storage and sensing, ...

This article identifies, quantifies, ranks and compares the environmental impacts of the MLCC and TEC supply chains using an integrated hybrid life cycle assessment framework. Three ...

Mica capacitor is being adopted for high voltage firing unit of guided weapon system because of its superior impact enduring property relative to ceramic capacitor. Reliability of localized mica ...

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The application of hybrid LCA framework to identify supply chain hotspots in the environmental profile of High Volumetric Efficiency Capacitors. The work demonstrates the ...

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Integrated hybrid life cycle assessment and supply chain environmental profile evaluations of lead-based (lead zirconate titanate) versus lead-free (potassium sodium ...

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In this context, novel ceramic capacitor technologies (e.g., PLZT) promise superior performance with respect to well established film-based solutions, featuring both ...

This article presents the characteristics and performances of a new range of high voltage ceramic capacitors manufactured using a new ceramic material. This dielectric allows to get under working voltage the same ...

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DOI: 10.1016/j.jclepro.2022.133244 Corpus ID: 251239690; A cradle-to-grave life cycle assessment of high-voltage aluminum electrolytic capacitors in China ...

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Life cycle assessment and environmental profile evaluations of high volumetric efficiency capacitors ... Multilayer ceramic capacitors (MLCCs) hold the major market share ...

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