

Low frequency model of stacked film capacitors inductance

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Abstract: - Polypropylene metallized capacitors are of general use in power electronics because of their reliability, their self healing capabilities, and their low price. Though the behavior of metallized coiled capacitors have been discussed [1, 2, 3, 4], no work was done about stacked and flattened metallized capacitors.

The purpose of this article is to propose a simple analytical low frequency model of stacked capacitors. We solve the equation of propagation of the magnetic potential vector (A) in dielectric [5], in order to calculate the stray inductance of the capacitor.

We propose an original method of resolution, based upon the finite element method [6, 7], in order to present an analytical but approximate solution of our problem. Then, we give some experimental results proving that the physical knowledge of the parameters of the capacitor (width, height, and thickness) enables the calculation of the stray inductance.

Key-Words: - Capacitor, Stray-inductance, Finite Element Method, Galerkin method, Power Electronics.

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