

Miniaturization of PME Ceramic Capacitors for Space and Defense Applications

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For many years, Exxelia has been conducting extensive work to miniaturize the multilayer ceramic capacitors suitable for space use.

Two different ways can be used to achieve this goal: reducing the chip size or decreasing the rated voltage and the dielectric thickness (allowing a higher capacitance value in a single layer and a higher number of stacked layers for a given chip thickness).

Chip capacitors sizes 0603 to 2220 (16V to 100V) are already in the ESA QPL. Exxelia went further in the miniaturization process with the space qualification of two range extensions:

- Size 0402, with a nominal voltage from 10V to 50V
- 10V rated voltage range (from size 0402 to 1210)

In addition, a new range of high voltage ceramic capacitors has been developed by Exxelia to answer the need of miniaturization in power applications. This range is made with a material whose performances are intermediate between NPO and X7R characteristics.

This C48X dielectric allows to obtain the same capacitance values under working conditions than a X7R material without the heating due to power dissipation.

This range has been space evaluated for both through-hole mounting and SMD capacitors.

A second evaluation has been conducted with this new material and is dedicated to middle voltage small sizes components. The goal is to obtain about 4 times the capacitance values available today with NPO ranges.