

A Comparison of Commercial, Automotive and Aerospace Capacitors

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It is well understood that there are risks associated with using components in critical applications that take them beyond their design specification. The potential for serious system failures can exist if any of the long-term performance attributes of a particular technology are overlooked. The growth in automotive electronics has led to an increase in the availability of automotive grade commercial reliability products. While these parts are designed for harsh environment applications, they may still show an early life failure rate which would not be appropriate for flight applications. In addition, long-term parametric stability beyond automotive grade may also be required. This paper is intended to provide a comparison of the mechanical, electrical and reliability characteristics of commercial, automotive and military/aerospace grade ceramic and Tantalum capacitors.

Of primary focus will be the design and testing protocols involved in qualifying ceramic and Tantalum capacitors to a commercial, automotive or aerospace reliability levels. Source control drawings and COTS+ are also discussed. Guidelines are presented which match appropriate component grades to specific applications.

This paper will be of interest to design, component and quality engineers, and program managers working on high reliability applications.