

# Selecting the Proper Polymer Tantalum Capacitor for Space Applications

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Polymer tantalum capacitors offer several advantages over standard MnO<sub>2</sub> tantalum capacitors. These advantages include lower ESR (equivalent series resistance), a wider useful frequency range and a benign failure mode. Unfortunately, polymer based capacitors can display an anomalous leakage charging current if all the moisture is removed from the capacitor. This effect appears as an unexpected current surge that could affect circuit operation. Raytheon noted some aspects of this phenomenon in 2011 when qualifying this technology for Airborne applications. However, the scope of this anomaly did not become apparent until designers began to consider these components for Space applications. To understand these phenomena and to aid in selecting components for Class A Space applications, Raytheon performed extensive testing under vacuum. We will present test results for two groups of capacitors. The first group was selected from available product; the second group was specially suggested by two suppliers as having improved behavior under vacuum. Our results will demonstrate the importance of understanding how to select COTS components that are appropriate for Space applications.

Suggested additions:

Tests for the Mil Specs for screening and QCI plus DPA in Mil-STD-1580.