Project Summary:

Elevated Leakage Current in BME Ceramic Capacitors

DfR was asked to perform a root-cause analysis of BME ceramic capacitors to discover why the insulation resistance decreased in a certain electronic medical device. The capacitors were subjected to initial measurements of the loose components then subjected to SQUID microscopy. The inability of the SQUID microscopy to identify a leakage path indicated that the increased leakage current was due to the cathodic migration of the oxygen vacancies. Recommended actions included ensuring a sufficient number of grain boundaries across the dielectric layer and using dopants to minimize the oxygen vacancy migration effect.

Keywords: base metal electrode ceramic capacitors, Superconducting Quantum Interference Device microscopy, SQUID, aging, deaging, leakage path, rating, migrating electrode, grain boundaries, dielectric breakdown, coarse grain, fine grain, dopants, rare earth oxides

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