



Capacitor Reliability Seminar

Instructors: Dr. Yuri Freeman, KEMET, yurifreeman@kemet.com
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COURSE SUMMARY

This tutorial will be presented in two sections. The first 90 minutes covers tantalum & electrolytic capacitors presented by Dr. Yuri Freeman from KEMET. The second half of the session covers a wide range of technologies ranging from ceramic to film, stacked modules and SuperCaps presented by Ron Demcko from AVX.

Tantalum & Electrolytic Capacitors (Dr. Yuri Freeman, KEMET)

Students will gain an understanding of capacitor construction and how performance characteristics are affected by time, temperature, voltage and frequency. End applications are discussed along with reliability expectations, common failure modes and de-rating methods for increased lifetime performance. Processing guidelines are presented and the availability and use of simulation models is shown.

Ceramic, Film, Stacked Modules and SuperCaps (Ron Demcko, AVX)

Students will gain an understanding of each capacitor technology ranging from construction, electrical performance and reliability. Performance characteristics are discussed relative to time, temperature, voltage and frequency. Distinctions are made between thin film capacitors and power film capacitors. Stacked capacitor modules - traditionally MLCC based are presented. Super capacitor technology is reviewed and super capacitor modules are introduced. A high-level selection guide and de-rating methods is given for all capacitors presented. Links to common simulation sites are provided.

INSTRUCTOR BIOS



Dr. Yuri Freeman is the Director of Advanced Research in the Tantalum (Ta) business unit and a member of the Advanced Technology Group at KEMET Electronics. Dr. Freeman received his PhD in Solid State Physics from Kharkov Technical University in Ukraine. Prior to KEMET, he worked as a principal scientist at Elitan, the largest producer in the Soviet Union of Ta and Niobium (Nb) capacitors, and at Vishay Sprague in the USA. He has published more than 30 papers and received 26 patents in the field of physics and technology of Ta and Nb-based capacitors. He is also the winner of the

Anders Gustaf Ekeberg Tantalum Prize, awarded annually for outstanding contribution to the advancement of the knowledge and understanding of the metallic element tantalum (Ta), for his 2018 book '[Tantalum and Niobium-Based Capacitors](#)'.



Ron Demcko graduated in 1982 from the Clarkson College of Technology BSEE. He is currently an AVX Fellow and manages TSG team at AVX Headquarters in Fountain Inn SC. This role centers on projects ranging from simulation models for passive components to product support / new product identification & applied development. Prior to that, Ron was the EMC lab Manager AVX Raleigh N.C. This lab concentrated on sub assembly testing and passive component fixes for harsh electrical and environmental. Before the EMC lab work, he held an Application Engineering position at AVX Product work included integrated passive components, EMI filters and Transient voltage suppression devices. Before joining AVX he

worked as a Product Engineer and later Product Engineering Manager at Corning Glass Works electronics division. In this role he supported production, sale and development of Pulse Resistant Capacitors, High Temperature Capacitors and radiation resistant capacitors. He developed high frequency test methods and co-developed high temperature test systems.