



**Professional Development Course speaker:**

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**Title of the Presentation:**

**Selected Tips for Making Successful Power Distribution Designs**

Istvan Novak is a Principal Signal and Power Integrity Engineer at Samtec, working on advanced signal and power integrity designs. Prior to 2018 he was a Distinguished Engineer at SUN Microsystems, later Oracle. He worked on new technology development, advanced power distribution, and signal integrity design and validation methodologies for SUN's successful workgroup server families. He was engaged in the methodologies, designs and characterization of power-distribution networks from silicon to DC-DC converters. He is a Life Fellow of the IEEE with twenty-nine patents to his name, author of two books on power integrity, teaches signal and power integrity courses, and maintains a popular SI/PI website. Istvan was named Engineer of the Year at DesignCon 2020.

## **Abstract**

This course will highlight four important power-integrity topics in 45-minute sessions. In the first module we will discuss the distribution of DC power. We will look at ways to size and shape our printed circuit board planes and will show with detailed numerical simulation results that sharp right-angle corners in power plane shapes may be risky for high-current applications. The second module will discuss the large and sometimes surprisingly unexpected loss of capacitance in some multi-layer ceramic capacitor (MLCC) applications. We will look at the reasons, explain the mechanisms how this can happen, look at the resulting potential signal integrity and power integrity problems in different applications and will also suggest generic remedies. Based on the learnings from the first two topics, the third block will explore power distribution filters, power distribution networks with a series inductor or ferrite bead. We will devise a straightforward process to find the component values, will show the effect of DC bias voltage and DC load current and will show the proper ways to characterize power filters. The fourth module will focus on the scattering parameters of bypass capacitors. We will explain with measured and simulated data, how to use the Touchstone models that are created for series or parallel connected capacitors.