activCirk Achieves First Pass MMIC Success with AWR Software

CUSTOMER BACKGROUND

Based in Newbury Park, California, activCirk is a design house specializing in the design and test of MMICs of all flavors using InP, GaN, and GaAs technologies. activCirk designs MMICs from S-band through 220GHz for both receiver and transmit applications, as well as develops high-performance wideband designs in specific full-waveguide bandwidths including V-, E- and W-bands. The company also provides design and test services to industry-leading companies that help them to reduce their time-to-market window.

THE DESIGN CHALLENGE

Multi-stage MMIC amplifiers are typically designed for stable operation using a single set of small-signal S-parameters at the nominal bias point. Simulation of low-noise amplifiers requires the inspection of the stability of the amplifier at all bias voltages that may be applied to the MMIC. This can require the extraction of a nonlinear noise model that is very difficult and/or costly to produce and also increases the uncertainty of the extracted model. Using small-signal noise models is more accurate but requires significant effort to organize and use the data.

THE SOLUTION

Thanks to the accuracy of the models within and the versatility of AWR's Microwave Office® and AXIEM® software, activCirk designers have a high level of confidence in the simulation of such complex MMIC designs. Microwave Office provides an incredible advantage by speeding up the layout process, since the schematic and the layout use the same database and, thus, any changes made in the layout are automatically updated in the schematic as well as the simulation results. In addition, AXIEM provides the ability to EM simulate the entire structure and to optimize the EM structure to avoid unwanted cross-coupling.

Through the use of Microwave Office software, activCirk engineers were able to develop a rapid method to verify the stable operation of low-noise amplifiers by integrating a database of device models at multiple bias points and computing the normalized determinant function (NDF) for each bias point to identify any potential for unloaded instability and loaded stability. Microwave Office is unique in its ability to rapidly calculate the NDF and ensure first pass success.
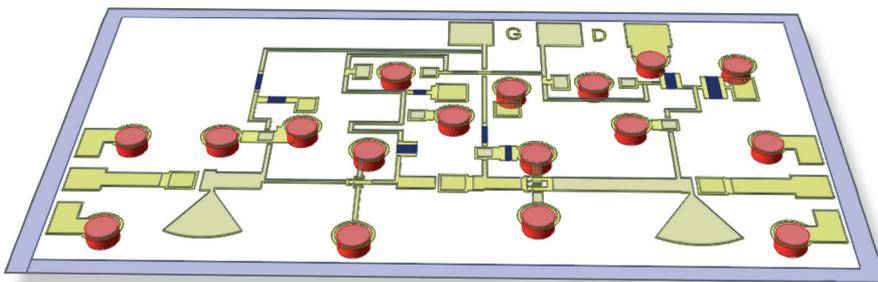
Microwave Office 3D layout view of an E-band low noise amplifier.

Application:
Complex MMIC design

AWR Software:
Microwave Office®
AXIEM®

"The ability to combine small signal and EM simulation data using an XML database provides a powerful platform to deliver first pass success for a variety of technologies. AWR is the leading edge tool developer that is delivering the next generation design tools that can be quickly configured to solve your most difficult design challenges."

Perry Macdonald
Technical Director
activCirk Corporation
www.activcirk.com