Department of Electrical and Computer Engineering
Colloquium

Advanced Packaging Technology Solutions for RF System Miniaturization

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Abstract
Functionality integration, form factor reduction and cost minimization are major drivers for modern RF communication systems. In order to improve portability and extend the battery lifetime of wireless communication devices such as cellular phones, PDA's, personal computers some RF packaging components that have traditionally been mounted as discrete parts on PCB have to be integrated on small form factor package substrates such as silicon, gallium arsenide, low-temperature co-fired ceramic (LTCC) or multilayer organic (MLO) substrate. In this presentation we will examine some recent advances in packaging for wireless communication systems. First we review the trends in radio architectures and illustrate the impact of multimode radios and broadband radio integration on both chip level and substrate level packaging. Second we discuss the development in both silicon and multilayer organic packages to satisfy the ever increasing need for form factor miniaturization. Finally, we introduce electromagnetic bangap structures as possible solutions for minimizing signal interference between different building blocks of highly integrated wireless communication systems.

Telesphor Kamgaing received the Diplom.-Ingenieur Degree in Electrical Engineering from Darmstadt University of Technology, Darmstadt, Germany, in 1997 and the M.S. and Ph.D. degrees in Electrical Engineering from the University of Maryland, College Park, both in 2003.
In 1999, he was a guest researcher with the National Institute for Standard and Technology (NIST) in Gaithersburg, Maryland, where he was involved in the modeling and applications of silicon carbide devices. From January 2000 to April 2004 he was with the Digital DNA Laboratories of Motorola Inc. in Tempe, Arizona, where he was involved in the development of silicon integrated passives and RF modules for wireless communication. Since April 2004, he has been working as Senior Electrical Packaging Engineer and most recently as TD Manager of the low-density-interconnect (LDI) and RF Packaging R&D team within the Core Competency team of Intel Corporation in Chandler, Arizona. His current research focuses on package solutions for CPU and RF applications. Dr. Kamgaing's main contributions in engineering include the development of broadband compact models for integrated RF transformers and inductors, the development of RF filters using passive components. He also performed pioneering work in the area of switching noise mitigation in high-speed digital circuits using high-impedance electromagnetic surfaces.