TEXAS A&M UNIVERSITY
Department of Electrical and Computer Engineering
College Station, Texas 77843-3128
TEL (979) 845-9583 FAX (979) 845-7161
ella@ece.tamu.edu
http://amsc.tamu.edu

S E M I N A R

Room 1003 ETB

Tuesday, September 18, 2012 3:55-5:10 P.M.

Integrated Circuit Applications of AlGaN/GaN HEMTs and Rectifiers

by

Xiaosen Liu
Texas A&M University
Analog & Mixed Signal Center

Abstract: Wide Bandgap GaN-based devices are capable of high voltage and high current operation, and feature high switching frequency that favors down-scaling of the indispensable passive components in switch-mode power converters. In addition, GaN maintains excellent semiconductor stability at high temperature and can operate at temperature much higher than allowed by the mainstream Si devices. This work focuses on utilizing and integrating the AlGaN/GaN HEMTs and rectifiers for analog and digital integrated circuits using a recently developed smart power IC platform. The demonstrated analog circuits include a high performance bootstrapped comparator, current mirror and voltage level shifter, and the DCFL digital functional blocks include NOR/NAND gates and Schmitt trigger. Their high temperature capability has already been verified as high as 275 ^{o}C.

Xiaosen Liu (S'08) was born in Jiangsu Province, China, in 1985. He received the B.Sc. and M. Phil. degrees in electrical engineering from Southeast University, Nanjing, China, and Hong Kong University of Sci & Tech (HKUST), Hong Kong, in 2008, and 2011, respectively. He is currently working toward the Ph.D. degree in electrical and computer engineering at Texas A&M University, College Station. From 2008 to 2011, he was a Teaching and Research Assistant at HKUST. He worked in the Nanoelectronics Fabrication Facility (NFF) as a process development scientist for compound semiconductors, where he was involved with the development of the world's first GaN E/D-HEMT mixed signal circuits. His research interests include green energy harvesting system, smart power management systems, RF integrated circuits (RFIC) design, and application circuits for compound semiconductor.