

Randal S. Schwindt

EDUCATION

University of Illinois at Urbana-Champaign

9/1999 – 10/2004

Urbana, Illinois

Ph.D. in Electrical and Computer Engineering

- Research topic: AlGaIn/GaN high electron mobility transistors (HEMTs) for low noise and high power microwave applications
- Advisor: Prof. Ilesanmi Adesida
- Area of specialization: physical electronics
- GPA: 4.00/4.00
- Characterized and modeled small signal and low noise operation of AlGaIn/GaN HEMTs
- Designed AlGaIn/GaN-based X-band monolithic microwave integrated circuit (MMIC) low noise amplifiers
- Specified and installed Focus Microwaves automated load pull system for large signal characterization
- Designed, characterized, and modeled CPW-based passive elements for MMIC matching networks on sapphire substrate (transmission lines, spiral inductors, MIM capacitors, resistors)
- Coursework includes: semiconductor device physics, integrated circuit fabrication, electromagnetic theory, laser electronics, remote sensing and propagation

Texas A&M University

9/1990 – 12/1993

College Station, Texas

M.S. in Electrical Engineering

- Thesis title: *Analysis and Applications of Two and Three Coupled Lines*
- Advisor: Dr. Cam Nguyen
- Area of specialization: electromagnetics and microwaves
- GPA: 4.00/4.00

Hardin-Simmons University

9/1986 – 5/1990

Abilene, Texas

B.S. in Physics and Mathematics (double major)

- GPA: 3.97/4.00

PROFESSIONAL EXPERIENCE

TriQuint Semiconductor, Inc.

9/1993 – 7/1999

Richardson, Texas

Microwave Design Engineer

- Designed microwave integrated circuits (MICs) and monolithic microwave integrated circuits (MMICs): PIN diode attenuators and single and multistage pHEMT amplifiers ranging in frequency from 500 MHz to 35 GHz and R- and X-band microwave modules
- Received TriQuint Semiconductor's President's Award for millimeter-wave power amplifier project

OTHER WORK EXPERIENCE

Dept. of Electrical Engineering, Texas A&M University

9/1991-5/1993

Graduate Teaching Assistant

- Taught undergraduate electrical engineering labs
- Labs TA'd: electrical circuit theory, intro to digital systems design, and electrical circuits course for non-EE engineering majors

Los Alamos National Laboratory

Summers 1989, 1990

Los Alamos, New Mexico

Undergraduate Research Assistant

- Assisted in fixed-target particle physics experiment
- Duties focused on detector and data acquisition electronics: ordering, assembling, and testing

PROFESSIONAL MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE)

HONOR SOCIETIES

Alpha Chi (general)

Sigma Pi Sigma (physics)

Kappa Mu Epsilon (mathematics)

Beta Beta Beta (biology)

AWARDS & SCHOLARSHIPS

Willson Graduate Fellowship – Texas A&M University, 1990-1991

Byrnum Mathematics Award – Hardin-Simmons University, 1990

Freshman Physics Award – Hardin-Simmons University, 1988

Freshman Chemistry Award – Hardin-Simmons University, 1988

Freshman Mathematics Award – Hardin-Simmons University, 1987

Freshman Biology Award – Hardin-Simmons University, 1987

National Merit Scholar Finalist Scholarship – Hardin-Simmons University, 1986-1990

REFERENCES

Available upon request

PUBLICATIONS

Journal Publications

1. V. Kumar, A. Kuliev, R. Schwindt, M. Muir, G. Simin, J. Yang, M. Asif Khan, and I. Adesida, "High performance 0.25 μm gate-length AlGaIn/GaN HEMTs on sapphire with power density of over 4.5 W/mm at 20 GHz," *Solid-State Electronics*, Vol. 47, Sep. 2003, pp. 1577-1580.
2. R.S. Schwindt, V. Kumar, A. Kuliev, G. Simin, J.W. Yang, M.A. Khan, M.E. Muir, and I. Adesida, "Millimeter-wave high-power 0.25 μm gate-length AlGaIn/GaN HEMTs on SiC substrates," *IEEE Microwave and Wireless Components Letters*, Vol. 13, March 2003, pp. 93-95.
3. D.-H. Youn, V. Kumar, J.-H. Lee, R. Schwindt, W.-J. Chang, J.-Y. Hong, C.-M. Jeon, S.-B. Bae, M.-R. Park, K.-S. Lee, J.-L. Lee, and I. Adesida, "High power 0.25 μm gate GaN HEMTs on sapphire with power density 4.2 W/mm at 10 GHz," *Electronics Letters*, Vol. 39, March 2003, pp. 566-567.
4. A. Kuliev, V. Kumar, R. Schwindt, D. Selvanathan, A. M. Dabiran, P. Chow and I. Adesida, "0.15 μm gate-length AlGaIn/GaN HEMTs with varying gate recess length," *Solid-State Electronics*, Vol. 47, Jan. 2003, pp. 117-122.
5. W. Lu, V. Kumar, R. Schwindt, E. Piner, and I. Adesida, "DC, RF, and microwave noise performances of AlGaIn/GaN HEMTs on sapphire substrates," *IEEE Trans. on Microwave Theory and Techniques*, Vol. MTT-50, Nov. 2002, pp. 2499-2504.
6. W. Lu, V. Kumar, R. Schwindt, E. Piner and I. Adesida, "A comparative study of surface passivation on AlGaIn/GaN HEMTs," *Solid-State Electronics*, Vol. 46, Sep. 2002, pp. 1441-1444.
7. V. Kumar, W. Lu, R. Schwindt, A. Kuliev, G. Simin, J. Yang, M. Asif Khan, and I. Adesida, "AlGaIn/GaN HEMTs on SiC with f_T of over 120 GHz," *IEEE Electron Device Letters*, Vol. 23, Aug. 2002, pp. 455-457.

8. V. Kumar, W. Lu, F.A. Khan, R. Schwindt, A. Kuliev, G. Simin, J. Yang, M. Asif Khan, and I. Adesida, "High performance 0.25 μm gate-length AlGaIn/GaN HEMTs on sapphire with transconductance of over 400 mS/mm," *Electronics Letters*, Vol. 38, Feb. 2002, pp. 252-253.
9. V. Kumar, W. Lu, F.A. Khan, R. Schwindt, E. Piner, and I. Adesida, "Recessed 0.25 μm gate AlGaIn/GaN HEMTs on SiC with high gate-drain breakdown voltage using ICP-RIE," *Electronics Letters*, Vol. 37, Nov. 2001, pp. 1483-1485.
10. V. Kumar, W. Lu, R. Schwindt, J. Van Hove, P. Chow, and I. Adesida, "0.25 μm gate-length, MBE-grown AlGaIn/GaN HEMTs with high current and high f_T ," *Electronics Letters*, Vol. 37, June 2001, pp. 858-859.
11. R.S. Schwindt and C. Nguyen, "On the variational analysis of three parallel-coupled suspended striplines and microstrip lines in an inhomogeneous isotropic medium," *Microwave and Optical Technology Letters*, Vol. 13, Dec. 1997, pp. 307-312.
12. R.S. Schwindt and C. Nguyen, "Generalized scattering parameters for two-coupled transmission line structures in an inhomogeneous medium," *Microwave and Optical Technology Letters*, Vol. 12, Aug. 1996, pp. 335-342.
13. R. Schwindt and C. Nguyen, "Spectral domain analysis of three symmetric coupled lines and application to a new bandpass filter," *IEEE Trans. on Microwave Theory and Techniques*, Vol. MTT-42, July 1994, pp. 1183-1198.
14. R.S. Schwindt and C. Nguyen, "Computer-aided analysis and design of a planar multilayer Marchand balun," *IEEE Trans. on Microwave Theory and Techniques*, Vol. MTT-42, July 1994, pp. 1429-1434.

Presentations and Conference Proceedings

1. A. Kuliev, V. Kumar, R. Schwindt, D. Selvanathan, A.M. Dabiran, P. Chow, and I. Adesida, "Effect of recess length on DC and RF performance of gate-recessed AlGaIn/GaN HEMTs," *2002 IEEE Lester Eastman Conference on High Performance Devices Proceedings*, Aug. 2002, pp. 428-435.
2. V. Kumar, W. Lu, F.A. Khan, R. Schwindt, A. Kuliev, J. Yang, A.A. Khan, and I. Adesida, "High performance 0.15 μm recessed gate AlGaIn/GaN HEMTs on sapphire," *2001 International Electron Devices Meeting Technical Digest*, Dec. 2001, pp. 25.1.1 -25.1.4.
3. D.C. Dumka, W.E. Hoke, P.J. Lemonias, R. Schwindt, G. Cueva, and I. Adesida, "Monolithic integration of InAlAs/InGaAs enhancement and depletion (E/D)-mode metamorphic HEMTs on GaAs substrate," *2001 Device Research Conference*, June 2001, pp. 49-50.
4. R. Schwindt and C. Nguyen, "Generalized scattering parameters of two-coupled transmission lines," *1997 IEEE AP-S International Symp.*, July 1997.
5. R. Schwindt and C. Nguyen, "Analysis of three multi-layer parallel-coupled lines," *IEEE AP-S International Symp. and URSI Radio Science Meeting Digest*, June 1994, pp. 1866-1869.
6. C. Nguyen, R. Schwindt, and M. Tran, "The use of negative characteristic impedances in microwave circuit analysis and design," *1994 IEEE AP-S International Symp. and URSI Radio Science Meeting Digest*, June 1994, p. 278.
7. R. Schwindt and C. Nguyen, "A CAD procedure for the double-layer broadside-coupled Marchand balun," *1994 IEEE MTT-S Int. Microwave Symposium Digest*, May 1994, pp. 389-391.
8. R. Schwindt and C. Nguyen, "A new compact band-pass filter employing three parallel-coupled lines," *1994 IEEE MTT-S Int. Microwave Symposium Digest*, May 1994, pp. 245-247.
9. R. Schwindt and C. Nguyen, "Variational analysis of three coupled suspended striplines and microstrip lines," *9th COMPUMAG Conference on the Computation of Electromagnetic Fields Proceedings*, Oct. 1993.