

Spring 2015 Seminar Series

Presented by the ECE Division

ON DIODE AND SOLAR CELL MODEL PARAMETER EXTRACTION

FRIDAY APRIL 24, 2015

10:00 AM – ENG1 286

We review, scrutinize, and critically compared the main parameter extraction methods for diode and solar cell models. The comparisons are done by classifying these methods according to their corresponding lumped parameter equivalent circuit models: single-exponential, double-exponential, multiple-exponential, with and without series and parallel resistances. Multi-exponential models are needed when single-exponential equation is insufficient to model all significant conduction mechanisms observed in many real devices. Multi-exponential models have also been successfully used to describe post-breakdown current-voltage characteristics in MOSFETs. We consider that the best method for any particular application depends on the appropriateness of the lumped parameter equivalent circuit used to model the real device. In general, we recommend methods based on many data points, using for example numerical integration or optimization, as a means to reduce the extraction uncertainties arising from the presence of noise in the measured data.

ADELMO ORTIZ-CONDE IEEE

Adelmo Ortiz-Conde (S'82, M'85, SM'97) was born in Caracas, Venezuela, on November 28, 1956. He received the professional Electronics Engineer degree from Universidad Simón Bolívar (USB), Caracas, Venezuela, in 1979 and the M.E. and Ph.D. from the University of Florida, Gainesville, in 1982 and 1985, respectively. His doctoral research, under the guidance of Prof. J. G. Fossum, was on the Effects of Grain Boundaries in SOI MOSFET's. He has coauthored one textbook, *Analysis and Design of MOSFETs: Modeling, Simulation and Parameter Extraction* (Springer, 1998, ISBN: 978-0-412-14601-5), over 160 international technical journal and conference articles (including 15 invited review articles). His present research interests include the modeling and parameter extraction of semiconductor devices.

Dr. Ortiz-Conde is an EDS Distinguished Lecturer and the Chair of IEEE's CAS/ED Venezuelan Chapter. He is editor of IEEE Electron Device Letters in the area of Silicon Devices and Technology. He was the Region 9 Editor of IEEE EDS Newsletter from 2000 to 2005. He is a Member of the Editorial Advisory Board of various technical journals: *Microelectronics and Reliability*, "Universidad Ciencia y Tecnología" and "Revista Ingeniería UC". He regularly serves as reviewer of several international journals, including IEEE Transactions on Electron Devices, IEEE Electron Device Letters, IEEE Transactions on Circuits and Systems I, *Electronics Letters*, *Microelectronics Reliability*, *Solid State Electronics*, *Solar Energy Materials and Solar Cells*, *Semiconductor Science and Technology*, *Microelectronics Journal*, *Applied Energy*, and *Journal of Applied Physics*. He has been a member of the Technical Program Committees of a variety of international conferences: *Microelectronics Conference (MIEL)*, *International Conference on Solid-State and Integrated-Circuit Technology (ICSICT)*, *Symposium on Microelectronics Technology and Devices (SBMICRO)*, *Design of Circuits and Integrated Systems Conference (DCIS)*, *Latin American Symposium on Circuits and Systems (LASCAS)*, and *IEEE ANDESCON*. He was the General Chairperson of the first IEEE International Caribbean Conference on Devices, Circuits, and Systems (ICCDCS) in 1995, Technical Chairperson of the second, fourth and fifth editions of this conference in 1998, 2002 and 2004 respectively, and the Chairperson of the Steering Committee in 2000.

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