
CHAPTER 1: Introduction

1.1 General Information

BSIM3v3 is the latest industry-standard MOSFET model for deep-submicron digital and analog circuit designs from the BSIM Group at the University of California at Berkeley. BSIM3v3.3 is based on its predecessor, BSIM3v3.2.4, with the following changes:

- A channel thermal noise formulation varying smoothly from linear region to saturation region. The formulation comes from Cadence Spectre.
- A BSIM4 ACNQS model that enables the NQS effect in AC simulation.
- A new parameter LINTNOI introducing an offset to the length reduction parameter(Lint) to improve the accuracy of the flicker noise model;
- Known bugs are fixed.

1.2 Organization of This Manual

This manual describes the BSIM3v3.3 model in the following manner:

- Chapter 2 discusses the physical basis used to derive the I-V model.
- Chapter 3 highlights a single-equation I-V model for all operating regimes.
- Chapter 4 presents C-V modeling and focuses on the charge thickness model.
- Chapter 5 describes in detail the restructured NQS (Non-Quasi-Static) Model.
- Chapter 6 discusses model parameter extraction.
- Chapter 7 provides some benchmark test results to demonstrate the accuracy and performance of the model.

Organization of This Manual

- Chapter 8 presents the noise model.
- Chapter 9 describes the MOS diode I-V and C-V models.
- The Appendices list all model parameters, equations and references.