Extracting HiSIM HV 1.02 model parameters of state of the art HVMOS and LDMOS devices

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Introduction

- The Compact Model Council selected the HiSIM HV model from Hiroshima University / Japan as the first standard model for high voltage MOS devices.
- The challenge for both, the model and the related parameter extraction is, that they have to cover the behavior of a huge variety of different device flavors:
  - Transistors can have a symmetrical or assymmetrical drain/source structure.
  - The supply voltage range starts at 5V and goes up to a few hundreds volts.
- Our poster presents an extraction methodology which overcomes these difficulties and which accounts for the very special behavior of high voltage MOS transistors.

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Summary

- By establishing a set of rules for the extraction of parameters the presented extraction methodology can handle a wide range of HV device types.
- The poster shows two completely different cases of high voltage applications:
  - Fully scalable symmetrical HV devices
  - RF LDMOS devices with a fixed channel length
- With the extension to S-parameter modeling, HiSIM HV models can be applied to classical RF designs like power amplifiers as well as to high speed switching mode applications.