MOS-AK

Review & Outlook

Dr. Min Zhang
Dr. Wladek Grabinski
MOS-AK Modeling Events 2021-2022

MOS-AK CM R&D Events Announcements:

- 4th MOS-AK/LAEDC Workshop, Puebla (MX) July 2022
- 6th Sino MOS-AK Workshop (CN), Aug. 2022
- 20th MOS-AK/ESSDERC/ESSCIRC, Milano (IT) Sept.19-22, 2022
- IRPhE'2022, Yerevan (AM) Sept. 27-30, 2022
- 3rd MOS-AK/India Conference, Hyderabad (IN) Postponed 2022

MOS-AK Past Events:

- Spring MOS-AK Workshop, (rescheduled) April 29, 2022
- MOS-AK Verilog-A Panel, (online) Feb.25, 2022
- 14th US MOS-AK Workshop, Silicon Valley (US) Dec. 2021 in timeframe of IEDM and Q4 CMC Meetings
- 19th MOS-AK at ESSDERC/ESSCIRC, Grenoble (F) Sept.6, 2021

www.mos-ak.org
MOS-AK China history

2014 compact model workshop 2015 compact model workshop

MOS-AK  上海  2016

MOS-AK  北京  2018

above 500 online attendees

MOS-AK  成都  2019

MOS-AK  杭州  2017

2014 compact model workshop 2015 compact model workshop
Question:

Prof. Yuehang Xu from UESTC

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MOS-AK China Target (实践篇)

- Abstract
- Introduction/Objectives
- Background of CISSOID in High Temperature Semiconductors
- Gate drivers for Wide Bandgap devices
- Gate driver thermal design
- Gate driver/power module co-design
- Simulation of Electric Performance
- Thermal Simulation Modeling
- LTSpice Simulation Library of CISSOID’s IPMs
- Other Notes of IPM Design and Simulation
- Applications of CISSOID IPMs
- Conclusions
- About the Speaker

We are Seeking for:

Higher Power Density,
Higher Working Temperature,
Higher Efficiency,
and,
Higher Reliability.
Other three DTCO: Prof. Wang (nanosheet), Prof. Xu (RF III-V), Prof. Ji (reliability)
Highly Efficient Perovskite Solar Cells and Modules

Yaohua Mai
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Abstract
Organic-inorganic hybrid lead halogenide perovskites have attracted vast attention ever since it was first applied to solar cells as light absorber in 2009. Efficiency as high as 25.7% was obtained for small area lab cells after a decade’s efforts made by researchers all over the world. However, prior to the mass production of this type of photovoltaic devices, some key issues, such as large area deposition, monolithically interconnected module design and stability improvement, have to be solved. In this talk, we will present our recent progress in the efficiency enhancement in all-inorganic and hybrid perovskite solar cells and modules. Aperture area efficiencies of 21.37% and 19.21%, certified by independent third party, were achieved for inverted perovskite mini-modules on glass and flexible polymer substrates, respectively. In addition, mini-module with efficiency over 30% measured under LED indoor light illumination was obtained for indoor light harvesting application, either.
Recent Advances in Machine-Learning Based GaN HEMT Modeling

Haorui Luo¹,²*, Wenrui Hu¹, and Yongxin Guo¹,²

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A Brief Introduction to the Multivalley Model of Strained Silicon

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A High-precision GaN HEMT Large Signal Hybrid Model of Compensation Based on the Transconductance Fitting

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**Fig. 1:** Overview of UTSOI 1, UTSOI 2 and L-UTSOI model (available in major SPICE tool): standard model dedicated to FDSOI

FDSOI 在超低功耗的应用势不可挡
数字, 模拟, 射频SOC的完美集成
Automated Analog Layout using ALIGN
Sachin S. Sapatnekar, University of Minnesota (USA)

Abstract: Design automation tools have been used routinely in the digital design flow for decades, but despite valiant efforts from the research community, analog design has stubbornly resisted automation. Several recent developments are helping turn the tide, driving wider adoption of automation within the analog design flow. This talk describes recent efforts in analog layout automation, with particular focus on the ALIGN (Analog Layout, Intelligently Generated from Netlists) project. ALIGN is a joint university-industry effort that is developing an open-source analog layout flow, leveraging a blend of traditional algorithmic methods with machine learning based approaches. ALIGN targets a wide variety of designs – low frequency analog circuits, wireline circuits for high-speed links, RF/wireless circuits, and power delivery circuits – under a single framework, and the talk will demonstrate the application of ALIGN to a variety of designs.

Overview of Selected Open Source Tools for Compact Modeling
Markus Müller, Mario Krattenmacher and Pascal Kuthe; TU Dresden and SemiMod UG (h.b.)

Abstract: We will give an overview of several open-source tools that are useful for compact model parameter extraction. In particular, we will present our own tool, VerilogAE, which is a novel compiler solution for compact model parameter extraction.

SweepMe! - a modular, flexible, and versatile software platform for device characterization
Axel Fischer, SweepMe!, Dresden (DE)

Abstract: Device characterization is typically based on several measurement instruments that need to be controlled. Then, the ready-to-use software of each manufacturer does not help much as it cannot control the other instruments. As a consequence, one has to start programming. For many institutes and companies, it is not easy to create and maintain a characterization software that can quickly adapt to the needs of the current project and that is versatile enough to cover a wide range of tasks. Here, our measurement software SweepMe! (sweep-me.net) can be a way out. Equipment can be implemented via an open python interface and existing drivers are shared open-source. Once an instrument is implemented, even people with no or little programming skills can create characterization procedures like an on-wafer transistor testing in short time. All users create their procedures by combining and configuring our ready-to-use modules. Therefore, everybody benefits whenever content is improved or added. Our approach also fosters the interaction between institutes and companies in order to create common characterization procedures as a equipment can easily be interchanged. Additionally, we provide a package for the open-source community that allows to create own programs based on our drivers.
1. Plan to introduce more about modeling related additional value (device, chip, module, application), let more people understand core value of device modeling.

2. Welcome all EDA/Design houses/Foundry to pass down request info related to the measurement, modeling, design related, which will be open to MOS-AK platform. (Welcome semiconductor related enterprises to pass down related technical problems to MOS-AK platform, which will be open to all participants.)

Wish you have a fruitful learning day & more open minded after MOS-AK  广州