

THEMATIC NETWORK
ON SILICON ON
INSULATOR
TECHNOLOGY, DEVICES
AND CIRCUITS.



EUROSOI

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IN THIS NUMBER:

Editorial	1
Tutorial Section on the EUROSOI website	1
AMD smashes the 7.1 GHz barrier	2
New Six-Core AMD Opteron™ Processor	2
Next Generation AMD Athlon™ II	3
GlobalFoundries gears up	3
EUROSOI Exchange Grants	4
MIGAS Summer School 2009	4
Calendar	5



EDITORIAL

Denis Flandre
Université Catholique
de Louvain, Belgium

FD SOI Revival and Promises

Following the adoption of partially-depleted (PD) SOI by the industry about ten years ago, the ever postponement of fully-depleted (FD) wider introduction and the focus of R&D on FinFETs and multiple-gate transistors, it was generally believed that the roadmap would jump onto the latter for scaling to ultimate CMOS. Intensive research on FD SOI was then substantially dropped, as can be clearly noticed from a lack of development of new FD device compact models.

The mood has changed since a bit more than a year. The emergence of the variability issue as the main limiting factor for circuit performance beyond the 65nm node has triggered a revamping of FD SOI in the form of undoped, ultra-thin body (UTB), and possibly ultra-thin buried oxide. With such features, FD SOI sub-45nm processes have been presented in major conferences and journals, demonstrating unrivaled "(un)variability" figures of merit and electrostatic control for gate lengths as short as 15nm. As discussed at the last EUROSOI conference in Goteborg, European groups with CEA-LETI (using SOI substrates with about 10nm thick body and down to 11nm BOX) and STM (using their SON

process) are clearly leading the pack, along with IBM in the USA.

Our group in UCL has further shown at the 2008 IEEE Int. SOI Conference, that taking such excellent device properties into account, undoped UTB FD SOI 45nm-CMOS holds the promise at circuit level, as compared to Bulk, for delay improvement by up to a factor 8 or power reduction at isospeed by more than 3, at supply voltages below 0.5V. This is way beyond the previous expectations of a twofold benefit.

But there is no free lunch. The electrical behaviours of undoped UTB FD SOI MOSFETs, especially with ultra-thin BOX, reveal several surprises. One recently uncovered dominant effect on device characteristics is that the channel can't any longer be assumed to lie at the front gate oxide interface. Depending on biases, it can move all through the film depth, a bit like with volume inversion in double gate transistors, with impact on mobility values, subthreshold

swing, short channel effects, etc. This is a major issue for FD compact models which all presently appear to be using the charge-sheet approximation. Precise circuit simulations of UTB devices thus require new compact modelling concepts which have lately been quite disregarded, as mentioned above.

To conclude, I think that the EUROSOI community has the potential to yield a significant contribution for solving the modelling issue and developing high-performance FD UTB circuits, thanks to the CEA-LETI technological platform promoted within our project. Strong European leadership on FD UTB SOI is our horizon...

ANNOUNCEMENT

the EUROSOI Website

Following the efforts that the EUROSOI team is making to improve its work and with the dedication that has been shown thus far, the tutorial section is now complete containing the different tutorials held since the first EUROSOI Workshop in Granada in 2005.

Tutorial Section on

The different tutorials are organized according to their dates and places and a search engine by years has been also developed. For further details take a look at:
<http://www.eurosoi.org/tutorials.asp>

NEWS

AMD smashes the 7.1 GHz barrier with Phenom II

955 CPU!



AMD and Phenom II - everybody knows the name of current over-

clocking darling. Manufacturing wizards at GlobalFoundries tweaked up the 45nm SOI [Silicon-On-Insulator] with Silicon-Germanium material and enabled a flexible transistor design.

Combine that manufacturing skill with architectural improvements and the results are in: World Record for a multi-core CPU goes to Phenom II 955, originally clocked at 3.2 GHz. The team of overclockers in LimitTeam, consisted out of Sigh, Qoootry and Ultra40 overclocked the

Phenom II 955 to 7,127.85 MHz, or 7.13 GHz, using a HyperTransport base clock of 250 MHz.

The team used ASUS M4A79T Deluxe motherboard, ATI Radeon 4800 series graphics card and 2x2GB of DDR3-833 memory by Apacer Technology. You can see the screenshot of CPU-Z validated score on the left, and the Phenom II 955@7.13 GHz project ID is 556849.

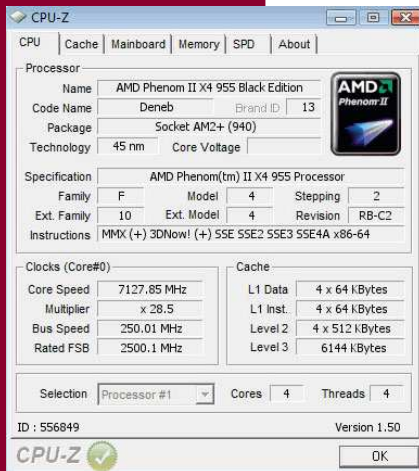
Both the graphics and memory were seriously underclocked to achieve as high clock as possible, with processor eating all the juice that mot-

herboard was able to give.

This CPU belongs to Deneb's C2 revision, equal to the one we have in our Labs. So far, our Phenom II 955 achieved stable 4.1 GHz clock on air... it would be really, really interesting to see could this 7.1 GHz overclock pass the Linpack test... that score would be sure to give a lot of wet dreams to HPC administrators and engineers.

In any case, kudos to the LimitTeam and AMD for making a seriously overclockable processor.

[Source: *Bright Side of News*]



NEWS

New Six-Core AMD Opteron™ Processor Delivers Up to Thirty-

Four Percent More Performance-per-Watt in Exact Same Platform



AMD announced availability of the world's first six-core server processor with Direct Connect Architecture for two-, four- and eight-socket servers. Six-Core AMD Opteron™ processors (code-named "Istanbul") extend AMD's commitment to offering server customers superior value at every price point with unmatched platform flexibility.

Across a single platform, AMD can address the need for more cores and greater scalability with the new Six-Core AMD Opteron processor and offer a cost- and power-efficient solution with Quad-Core AMD Opteron processors. Systems based on Six-Core AMD Opteron processors are expected to be available beginning this month from leading OEMs including

Cray, Dell, HP, IBM and Sun Microsystems, along with support from motherboard and infrastructure partners. HE, SE and EE versions of the Six-Core AMD Opteron processor are planned for the second half of 2009.

- Six-Core AMD Opteron processors leverage existing platform infrastructure and a low-cost, power-efficient DDR-2 memory architecture which can help lower system acquisition costs;
- HPC, virtualization and database workloads can benefit from increased 4P STREAM memory bandwidth of up to 60 percent enabled by HyperTransport™ technology HT Assist, which helps reduce processor to processor latency and traffic;
- AMD Virtualization™ (AMD-

V™) technology and the AMD-P suite of power management features are available across all performance and power bands, ensuring no-compromise choice;

- The new Six-Core AMD Opteron processor has up to 34 percent more performance-per-watt over the previous generation quad-core processors in the exact same platform.

"The new Six-Core AMD Opteron processor meets the increasing need for a combination of low total cost of ownership, superior performance-per-watt and scalability. Simply put, Six-Core AMD Opteron processors deliver top-line performance that's bottom-line efficient.", said Patrick Patla, vice president and general manager, Server and Workstation Business, AMD

[Source: AMD]

"The new Six-Core AMD Opteron processor meets the increasing need for a combination of low total cost of ownership, superior performance-per-watt and scalability", said Patrick Patla

NEWS

AMD Introduces Next Generation AMD Athlon™ II Processor, Adds Dual Core to Record-Setting AMD Phenom™



Bringing its acclaimed 45nm technology to new high-volume processor designs, AMD announced two

new dual-core desktop processors. Building on 10 years of AMD Athlon™ processor innovation, the new 45nm AMD Athlon™ II X2 250 processor gives mainstream consumers exceptional performance, efficiency and value. For enthusiasts and overclockers, AMD also announces the AMD Phenom™ II X2 550 Black Edition processor, the first ever dual-core AMD Phenom II CPU. With this latest addition to the AMD Phenom II processor family, users can now experience the power of AMD platform technology, codenamed "Dragon," with dual-, triple- and quad-core configurations.

AMD Athlon II X2 Processor Details

- The AMD Athlon II X2 250 performs exceptionally well when combined with AMD chipsets and integrated graphics solutions to create an all-AMD platform. Platforms featuring all-AMD technology can deliver up to twice the graphics performance of those with Intel integrated graphics.

- Windows® 7 is optimized for multi-core processors like AMD Athlon™ II processors to give consumers an amazingly fast, simple and engaging PC experience.** For example, Windows 7 is tuned to make the most of these new processors' power management features, such as AMD PowerNow!™ 3.0 technology. AMD power management technologies, in combination with Windows 7, can help OEMs and partners to build exceptionally green, cool and quiet PCs.

- Based on AMD's acclaimed 45nm process technology, the AMD Athlon II dual-core processor has a TDP of 65W and can slash power consumption by up to 50 percent when doing basic tasks, up to 40 percent when running heavy workloads and up to 50 percent when at idle.

AMD Phenom II X2 550 Black Edition Details

- AMD Black Edition processors, like the AMD Phenom™ II X2 550, help users to take control and unleash the maximum potential of Dragon platform technology's unprecedented performance tuning capabilities.* The same massive headroom that set world records in recent months is at users' finger tips, offering impressive performance at a price the competition can't beat.

- Users can also maximize their overclocking experience by utilizing the new features and capabilities of AMD OverDrive™ 3.0, designed to enable quick and effective tuning of their PC experience for optimal performance.

- With dual-, triple- or quad-core processors, AMD provides platform level solutions at multiple price points, each of which exceeds expectations for virtually any user.

[Source: AMD]

FEATURE

GlobalFoundries gears up

Scott Wasson

AMD's decision to spin off its manufacturing business into a separate entity has created a fairly unique event in semiconductor manufacturing: an ostensible newcomer has opened some of the world's most advanced chip fabrication capabilities to paying customers of all stripes. Last week, we traveled to the new offices of GlobalFoundries in Saratoga County, New York to meet with the firm's executives and to understand their plans for the newly minted chip foundry.

Although much is new about GlobalFoundries, including the company's name and mission, key parts will be familiar to industry observers, because they include many assets and personnel formerly from AMD. Those assets include two

chip fabrication plants in Dresden, Germany. Now called Fab I module 1, the former Fab 36 produces AMD's processors, including Phenom II and Opteron CPUs, using an advanced 45nm silicon-on-insulator process on 300 mm wafers. The former Fab 30 is being retooled for 300 mm wafers, as well, and has been renamed Fab I module 2 in GlobalFoundries' lexicon.

The transaction that created GlobalFoundries gave majority ownership in the firm to the Advanced Technology Investment Company, which is wholly owned by the government of Abu Dhabi, in exchange for a multi-billion-dollar investment. AMD retained 34% ownership in GlobalFoundries and voting rights equal to ATIC's. AMD will be GlobalFoundries' single most important customer for the foreseeable future, as well.

The big change introduced by the spin-off is GlobalFoundries' intention to enter the foundry business and, as we've noted, offer its chip fabrication capabilities to a range of clients. To that end, GlobalFoundries has been assembling a team of veteran executives, both from within the former ranks of AMD and from outside, with experience in key phases of the semiconductor business. Hearing them talk about GlobalFoundries as "a big startup" may fall strangely on the ear of anyone familiar with AMD, but there's more than a kernel of truth in the sentiment.

Grope point blank

GlobalFoundries CEO Doug Grose makes the case for a new entrant in this business by arguing that chip design is most fundamental to innovation. The foundry's role, as a partner, is to provide leading-edge manufacturing capabilities to its customers, so they can remain focused on design. Staying at the forefront of chipmaking technology is no trivial undertaking, he points out, with R&D budgets and fab construction costs ballooning in recent years. The barriers to reaching new process nodes, or "red brick walls," are getting higher and thicker. By consolidating the knowledge gained from its technology alliance with IBM and other partners, and by serving a diverse portfolio of customers, GlobalFoundries aims to provide a stable source of manufacturing capacity while remaining at the forefront of process advances.

ANNOUNCEMENT



EUROSIO+ launches the third Call for Proposals to fund exchanges in terms of travelling and research visits for scientists (students and senior scientists) in order to enhance collaborations and information exchange.

How to apply for this grants?

Send a proposal to agodoy@ugr.es before June 30th 2009, including a short CV, an invitation letter from the institution to be visited and a comprehensive description of the visit purpose, destination, duration, budget, etc)

The following requirements must be fulfilled:

- The field should fall within research

There will be another call for proposals on November 2009 and May 2010.

EUROSIO Exchange Grants

domains defined by EUROSIO+

- At least one EUROSIO member should be involved in the project research
- Priority will be given to industrial partners to allow a better integration of the European industry in the Network
- Less than 4 weeks
- Gender aspects will be considered (promote the participation of women)
- Not salary costs or expenses generated by research activities.
- The visit should be carried out before the end of December 2009 (remember that there will be another call for proposals on November 2009 and May 2010)

After the visit (less than one month), the participant should provide a report describing the work developed during the visit. Please, take into account that:

- The daily allowance depends on the destination and including lodging and travel expenses with a maximum of 1400€ per week. More details can be provided in terms of specific information.
- Each visit must be shorter than 4 weeks.
- The reimbursement is always after the visit.

The EUROSIO Management Board in its next meeting will decide which proposals are funded.

ANNOUNCEMENT

International Summer School on Advanced Microelectronics. MIGAS 2009



MIGAS Summer School is designed to foster and promote expertise in new, advanced topics of microelectronics. The aim of MIGAS is to offer every year a forum of detailed presentations on emerging topics of microelectronics.

It is also a unique opportunity for senior and junior researchers to update their knowledge in a very specific and emerging field. MIGAS brings together scientists from all over the world and from research institutes, universities, R&D small, medium and large companies.

This year 2009 MIGAS Summer School will be held from 21st - 27th June in Autrans-Grenoble, a renowned resort, dedicated to alpine and cross-country skiing in winter, and to tourism in summer, located in the Regional Natural Park of the Vercors mountains, 30 km away from Grenoble.

MIGAS 2009 topic is "Advanced SOI concepts: from materials to devices and applications".

The lectures will be given by world-class experts, including: J-P. Colinge (Ireland), T. Hiramoto (Tokyo), A. Zaslavsky (USA), R. Schrimpf (USA), C. Fenouillet-Béranger

(STMicroelectronics), A. Asenov (Glasgow), O. Faynot, T. Ernst and B. de Salvo (LETI), F. Gamiz (Granada), S. Cristoloveanu (Grenoble), etc.

Details and information for registration available on the MIGAS website: <http://www.migas.inpg.fr/>





EUROSIO Network

Thematic network on silicon on insulator technology, devices and circuits.

If you want to contribute to the EUROSIO Newsletter, you can email us with any outstanding event, announcement or news

Mail: eurosoi@ugr.es

The EUROSIO network embraces a broad range of research areas related to Silicon-On-Insulator technology (from materials to end-user electronic applications in traditionally strong European industrial sectors such as automotive, communications, space). EUROSIO aims at federating the existing research work on SOI topics and at providing an appropriate communication channel between academic groups and industrial production centres.

CALENDAR

- MIGAS International Summer School

Autrans-Grenoble, France.

June 20th - 26th, 2009

- 39th European Solid State Device Research Conference and 35th European Solid State Circuits Conference

Athens, Greece.

September 15th - 19th, 2009

- INFOS 2009

Clare College, Cambridge, United Kingdom.

June 29th - July 1st, 2009

- European School On Nanosciences & Nanotechnologies

Grenoble, France.

August 23rd - September 12th, 2009