Solid State TECHNOLOGY
Insights for Electronics Manufacturing

EU project to industrialize world record high-density capacitors

CEA-Leti, Fraunhofer IPMS-CNT and three European companies — IPDiA, Picosun and SENTECH Instruments — have launched a project to industrialize 3D integrated capacitors with world-record density.

The two-year, EC-funded PICS project is designed to develop a disruptive technology through the development of innovative ALD materials and tools that results in a new world record for integrated capacitor densities (over 500nF/mm^2) combined with higher breakdown voltages. It will strengthen the SME partners' position in several markets, such as automotive, medical and lighting, by offering an even higher integration level and more miniaturization.

The fast development of applications based on smart and miniaturized sensors in aerospace, medical, lighting and automotive domains has increasingly linked requirements of electronic modules to higher integration levels and miniaturization (to increase the functionality combination and complexity within a single package). At the same time, reliability and robustness are required to ensure long operation and placement of the sensors as close as possible to the "hottest" areas for efficient monitoring.

For these applications, passive components are no longer commodities. Capacitors are indeed key components in electronic modules, and high-capacitance density is required to optimize – among other performance requirements – power-supply and high decoupling capabilities. Dramatically improved capacitance density also is required because of the smaller size of the package.

IPDiA has for many years developed an integrated capacitors technology that out performs current technologies (e.g. tantalum capacitors) in terms of stability in temperature, voltage, aging and reliability. Now, a technological solution is needed to achieve higher capacitance densities, reduce power consumption and improve reliability. The key enabling technology chosen to bridge this technological gap is atomic layer deposition (ALD) that allows an impressive quality of dielectric.

The PICS project consortium will address all related technological challenges and set up a cost-effective industrial solution. Picosun will develop ALD tools adapted to IPDiA's 3D trench capacitors. SENTECH Instruments will provide a new solution to more accurately etch high-K dielectric materials. CEA-Leti and Fraunhofer IPMS-CNT will help the SMEs create innovative technological solutions to improve their competitiveness and gain market share. Finally, IPDiA will manage the industrialization of these processes.

About PICS The PICS project has received funding from the European Union's Seventh Framework Program managed by REA-Research Executive Agency http://ec.europa.eu/rea (FP7/2007-2013) under grant agreement n° FP7-SME-2013-2-606149.

The PICS Project will last for two years and the consortium consists of three SMEs: IPDiA (France, coordinator), Picosun (Finland) and Sentech Instruments (Germany), and two leading research organizations: Fraunhofer IPMS-CNT (Germany) and CEA-Leti (France). Project objectives are to bring to mass production high density and high voltage capacitors based on ALD and etching development. Further information is

available at www.fp7-pics.eu

About IPDiA IPDiA is a preferred supplier of high performance, high stability and high reliability silicon passive components to customers in the medical, automotive, communication, computer, industrial, and defense/aerospace markets. The company portfolio includes standard component devices such as silicon capacitors, RF filters, RF baluns, ESD protection devices as well as customized devices. IPDiA headquarters are located in Caen, France. The company operates design centers, sales and marketing offices and a manufacturing facility certified ISO 9001 / 14001 / 18001 / 13485 as well as ISO TS 16949 for the Automotive market. For further information, please visit www.ipdia.com

About Picosun Picosun is the world leading provider of ALD solutions for global industries. Picosun's pioneering, unmatched expertise in ALD equipment design and manufacturing reaches back to the invention of the technology itself. Today, PICOSUN™ ALD systems are in daily production use in numerous prominent industries around the globe. Picosun is based in Finland, it has its subsidiaries in USA and Singapore, and world-wide sales and support network. For more information, visit www.picosun.com.

About SENTECH Instruments SENTECH Instruments GmbH develops, manufactures, and sells worldwide advanced quality instrumentation for Plasma Process Technology, Thin Film Measurement, and Photovoltaics. The medium-sized company founded in 1990 has grown fast over the last decades and has today 60 employees. SENTECH is located in Berlin, capital of Germany, and has moved to its own company building in 2010 in order to expand its production facilities.

SENTECH plasma etchers and deposition systems including ALD support leading-edge applications. They feature high flexibility, reliability, and low cost of ownership. SENTECH's plasma products are developed and manufactured in-house and thus allow for customer-specific adaptations. More than 300 units have been sold to research facilities and industry for applications in nanotechnology, micro-optics, and optoelectronics. More information: www.sentech.de

About Fraunhofer IPMS-CNT Fraunhofer IPMS-CNT is a German research institute that develops advanced 300 mm semiconductor process solutions for Front-End and Back-End-of Line applications on state-of-the-art process- and analytical equipment. Research is focused on process development enabling 300 mm production, innovative materials and its integration into Systems (SoC/SiP) as well as nanopatterning through electron beam lithography. Fraunhofer is largest application-oriented research organization in Europe with 66 institutes and 22,000 employees. More information: www.cnt.fraunhofer.de

About CEA-Leti By creating innovation and transferring it to industry, Leti is the bridge between basic research and production of micro- and nanotechnologies that improve the lives of people around the world. Backed by its portfolio of 2,200 patents, Leti partners with large industrials, SMEs and startups to tailor advanced solutions that strengthen their competitive positions. It has launched more than 50 startups. Its 8,000m² of new-generation cleanroom space feature 200mm and 300mm wafer processing of micro and nano solutions for applications ranging from space to smart devices. Leti's staff of more than 1,700 includes 200 assignees from partner companies. Leti is based in Grenoble, France, and has offices in Silicon Valley, Calif., and Tokyo. Visit www.leti.fr for more information.

POST A COMMENT

Easily post a comment below using your Linkedin, Twitter, Google or Facebook account. Comments won't automatically be posted to your social media accounts unless you select to share.

EDITOR'S PICKS

- Imec demonstrates world's first III-V FinFET devices monolithically integrated on 300mm silicon wafers
- LED applications to be key drivers for bulk GaN market
- Larger screen sizes and higher resolution are driving TV panel demand in a struggling market
- SRC launches synthetic biology research for novel semiconductor applications
- Book-to-bill ratio reflects seasonal softening
- Power management, industrial analog units post strong gains
- Booming market for touch-screen

TOP BLOG POSTS

- World record solar cell with 44.7% efficiency
- Next Generation Metrology and Inspection
- $14 trillion opportunity in Internet of Things, predicts Cisco
- NEWLED aims to revolutionize the way the world is lit
- STMicro: 28nm FD-SOI is ready for manufacturing
- 2013: Building the internet of things with MEMS and 3D advances
- Status update on logic and memory roadmaps

notebook PC displays hits speed bump in second quarter

LIVE NEWS FEED

- LCD/LED and plasma TVs
- Televisions
- Overview
- MICRON TECHNOLOGY REPORTS MULTIPLE TRANSACTIONS BY DIRECTOR BAILEY (Idaho)

RECENT ARTICLES

- SUNY Nanocollege and Albany Law School partner to create nanotech education program
- Are we using Moore's name in vain?
- Imec demonstrates world's first III-V FinFET devices monolithically integrated on 300mm silicon wafers
- QEOS announces advanced LED lighting system
- Rubicon launches first commercial line of large diameter patterned sapphire substrates

SEMICONDUCTORS ARTICLES

- Are we using Moore's name in vain?
- Imec demonstrates world's first III-V FinFET devices monolithically integrated on 300mm silicon wafers
- Rubicon launches first commercial line of large diameter patterned sapphire substrates
- New techniques produce cleanest graphene yet

PACKAGING ARTICLES

- Are we using Moore's name in vain?
- Toshiba launches new embedded NAND flash memory using 19nm process technology
- Silicon interposers, CoWoS and microbumps
- How to verify incident implant angles on medium current implants

MEMS ARTICLES

- SUNY Nanocollege and Albany Law School partner to create nanotech education program
- New techniques produce cleanest graphene yet
- Defective nanotubes turned into light emitters
- InvenSense introduces first MotionTracking SoC for Google's KitKat 4.4

LEDS ARTICLES

- QEOS announces advanced LED lighting system
- Rubicon launches first commercial line of large diameter patterned sapphire substrates
- Revival in semiconductor industry drives growth in the surface mount technology equipment market
- LED applications to be key drivers for bulk GaN market

DISPLAYS ARTICLES

- Non-ITO film to make up 34% of transparent conductive film market in 2017
- Will 2014 be the Next Golden Year?
- Larger screen sizes and higher resolution are driving TV panel demand in a struggling market
- Micron appoints Brian Angell as VP of Advanced Controller Development

NEW PRODUCTS

- **Mentor Graphics introduces new Valor supply chain tools**

10/31/2013 **Mentor Graphics Corporation yesterday announced the Valor Information Highway and the Valor Warehouse Management products, two supply chain-focus...**

- **Jordan Valley lands order for FEOL tool**

10/15/2013 **Jordan Valley Semiconductors Ltd. received another order for its recently introduced JVX7300LMI scanning X-ray in-line metrology tool for patterned and blanket ...**

» Brooks Instrument unveils new MFCs

10/07/2013 **Brooks Instrument, a provider of advanced flow, pressure, vacuum and level solutions, has expanded its GF 40/80 Series portfolio of thermal mass flow controllers (MFC...**