Fujitsu Semiconductor and Mie Fujitsu Semiconductor License Nantero’s NRAM And Have Begun Developing Breakthrough Memory Products for Multiple Markets

Date : August 31, 2016

Agreement covers joint development and licensing of ultrafast, ultrahigh-density NRAM, non-volatile RAM using carbon nanotubes

Yokohama, Japan and Woburn, Mass., USA, August 31, 2016 – Fujitsu Semiconductor Limited and Mie Fujitsu Semiconductor Limited today announced that they have reached an agreement with US-based Nantero, Inc. to license that company’s technology for NRAM, non- volatile RAM using carbon nanotubes, and to conduct joint development towards releasing a product based on 55-nm process technology.

Three companies are aiming to develop a product using NRAM non-volatile RAM that achieves several 1000 times faster rewrites and many thousands of times more rewrite cycles than embedded flash memory, making it potentially capable of replacing DRAM with non-volatile memory. Fujitsu Semiconductor plans to develop an NRAM-embedded custom LSI product by the end of 2018, with the goal of expanding the product line-up into stand-alone NRAM product after that. Mie Fujitsu Semiconductor, which is a pure-play foundry, plans to offer NRAM-based technology to its foundry customers.

Comment from Masato Matsumiya, System Memory VP, Fujitsu Semiconductor

Non-volatile memory using Nantero’s carbon-nanotube technology is a marked advance beyond conventional technology. Fujitsu Semiconductor has been designing and producing FRAM, a type of non-volatile RAM, since the late 90s, and is one of the few companies to have integrated FRAM design and production capabilities. We will be able to build on our experience and skill in this field to develop and produce NRAM as well. The combination of Nantero’s technology with our design and production capabilities promises to meet the longstanding needs of our customers for non-volatile memory that is higher density, faster, more energy efficiency, and with a higher rewrite cycle.

I am confident that Nantero and Fujitsu Semiconductor will become partners with the highest mutual regard, and I look forward to working with Nantero to develop memory with revolutionary performance. As always, Fujitsu Semiconductor is committed to offering a more complete range of memory solutions, and to meeting the needs of its customers.

Comment from Masahiro Chijiiwa, Director and Corporate SVP, Mie Fujitsu

Semiconductor

Nantero's NRAM technology is based on carbon nanotubes and allows for non-volatile memory with high density and random access, promising to expand Mie Fujitsu Semiconductor's line of embedded non-volatile memory products, which are a major focus of our business. In working with Nantero to develop their technology into products and license that technology, together with Fujitsu Semiconductor, I am certain we will be able to offer our customers new kinds of non- volatile random-access memory solutions.

Comment from Greg Schmergel, Co-Founder, Chairman & CEO, Nantero, Inc.

Fujitsu Semiconductor and Mie Fujitsu Semiconductor are ideal commercialization partners for Nantero as their experience with FRAM makes them among the world's most successful companies in mass production of new memory devices. Nantero is honored to be working with them on breakthrough memory products, and after years of intensive evaluation of our NRAM technology, our three companies have built a very strong relationship.

Through over a decade of intensive R&D, Nantero has been able to bring CNT-based memory technology to a state of maturity and manufacturing readiness where world-class companies such as Fujitsu Semiconductor and Mie Fujitsu Semiconductor are working with us on productization for multiple markets. NRAM technology, with its combination of nonvolatility, high speed and high density, is uniquely positioned to allow for the continued evolution of memory beyond the projected limits and capabilities of classical technologies.

About Fujitsu Semiconductor

Fujitsu Semiconductor Group includes a system memory group that is focused on high quality, high performance Ferroelectric random access memory (FRAM), wafer foundry group that has excellent technology and support, and the sales business of Fujitsu Electronics and overseas sales companies. Headquartered in Yokohama, we established as a subsidiary of Fujitsu Limited on March 21, 2008. Through its global sales and development network, with sites in Japan and throughout Asia, Europe, and the Americas, we offer semiconductor solutions to the global marketplace.

For more information, please see: http://www.fujitsu.com/jp/fsl/en/

About Mie Fujitsu Semiconductor

Mie Fujitsu Semiconductor is a pure-play foundry company based on 300mm wafer manufacturing facilities located in Kuwana city, Mie, Japan. Headquartered in Yokohama, it was established as a subsidiary of Fujitsu Semiconductor Limited on December 1, 2014. UMC became its minority shareholder in March 2015. Mie Fujitsu Semiconductor provides high-quality technology and

services, with wide-ranging expertise focusing on Ultra-Low-Power, Non-Volatile Memory and RF Technology.
For more information, please see: http://www.fujitsu.com/jp/mifs/en/

About Nantero

As the world leader in carbon nanotube electronics, Nantero has developed a new generation of memory called NRAM® (non-volatile random access memory) that can enable a variety of exciting new features and products in both consumer and enterprise electronics. This new super- fast, ultra-high density memory can replace both DRAM and flash in a single chip, or enable new applications as a storage class memory, while also delivering the low power, high speed,
reliability, and endurance needed to drive the next wave of electronics innovation. Nantero at www.nantero.com or follow Nantero at Twitter @nantero.

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