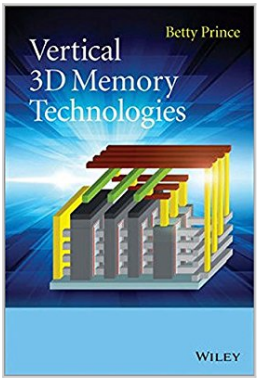

Vertical 3D Memory Technologies

By Betty Prince

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The large scale integration and planar scaling of individual system chips is reaching an expensive limit. If individual chips now, and later terrabyte memory blocks, memory macros, and processing cores, can be tightly linked in optimally designed and processed small footprint vertical stacks, then performance can be increased, power reduced and cost contained. This book reviews for the electronics industry engineer, professional and student the critical areas of development for 3D vertical memory chips including: gate-all-around and junction-less nanowire memories, stacked thin film and double gate memories, terrabit vertical channel and vertical gate stacked NAND flash, large scale stacking of Resistance RAM cross-point arrays, and 2.5D/3D stacking of memory and processor chips with through-silicon-via connections now and remote links later.

Key features:

- Presents a review of the status and trends in 3-dimensional vertical memory chip technologies.
- Extensively reviews advanced vertical memory chip technology and development
- Explores technology process routes and 3D chip integration in a single reference

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Editorial Review

Review

“In summary, Betty Prince has produced a piece of work that is timely and will undoubtedly become a classic text for 3D memory technologies.” (*3dincites.com*, 30 September 2014)

"As the semiconductor memory industry moves to the third dimension a plethora of competing technologies has arisen each claiming to be the logical, lucrative successor to existing two dimensional versions. The very breadth of these new technologies can be confusing even to experienced industry professionals. Dr Prince's book appears at the right time to remove this confusion by explaining each technology's structure, function and potential advantages in a way that is accessible to both interested spectators and those working in the industry. It provides a welcome solid foundation to anyone interested in understanding the various technologies vying for success in this migration.”
—Andrew Walker, Schiltron Corporation, USA

“This is a great review on the current state-of-the-art in the highly topical subject of vertical 3D memories. It comprises the challenges and current solutions of 3D memory integration with respective to different memory technologies. It is a highly valuable resource for researchers and engineers in the field of memory technology.”
— Dr. Stephan Menzel, Forschungszentrum Jülich (PGI-7), Germany

“…. one to consider if you want to bring yourself up to speed on recent research behind today’s and tomorrow’s 3D memory technologies. The book provides capsule summaries of over 360 papers and articles from scholarly journals organized into sections of related technologies to provide an invaluable reference on a particular 3D technology. It’s a useful tool for locating research covering any of the numerous 3D technologies that are now finding their way into early production.”
— Jim Handy, TheMemoryGuy.com, OBJECTIVE ANALYSIS Semiconductor Market Research, USA

From the Back Cover

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About the Author

Dr Betty Prince has over 30 years' experience in the semiconductor industry having worked with Texas Instruments, N.V. Philips, Motorola, R.C.A., and Fairchild and is currently CEO of Memory Strategies International. She has authored four books and served from 1991-1994 on the Technical Advisory Board of IEEE Spectrum magazine. She is a Senior Life Member of the IEEE and served as an IEEE SSCS Distinguished Lecturer and on the Program Committee of the IEEE Custom Integrated Circuit conference. She was founder of the JEDEC JC-16 Interface Standards Committee and was active for many years on the JC-42 Memory Committee where she was co-chair of the SRAM standards group. She has been U.S. representative to the IEC SC47A WG3 Memory Standards Committee. Dr Prince has served on the Technical Advisory Board of several memory companies and has been on the Board of Directors of Mosaid Technologies. She holds patents in the memory, processor and interface areas and has degrees in Physics, Math, and Finance with doctoral dissertation in fractal modeling.

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