



Séminaires  
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## POWER MICROELECTRONICS – MY PERSPECTIVE

par

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# résumé de l'exposé

Electricity is the most common form of energy used in all walks of life. Nearly 40% of the energy generated is consumed in the form of electricity. The growth of energy consumption increases at a rate of 2.6 % worldwide. Power Semiconductors are essential control elements used in electricity generation, transmission and delivery. These power semiconductors can be classified as (a) discrete power devices; (b) integrated power chips (IPC), and; (c) power integrated circuits (PICs). Both discrete and Intelligent Power Chips can be used in modules and intelligent power modules. Power ICs, on the other hand, are used in power management systems.

Power semiconductor devices belong to a separate segment of the semiconductor market, differing both in production technology and end-user applications. The power semiconductor industry, in contrast to the low voltage integrated circuit sector with its handful of major mass producers, has still room for smaller industries with innovative, differentiated products.

Worldwide, extensive research is underway to develop technologies based on silicon and wide band gap semiconductors to achieve ultra low power losses. In general, the losses in power semiconductor devices are typically small – typically less than 0.5 % of the switched energy is dissipated as heat – the amount of energy handled by semiconductor devices is large and therefore the total loss is substantial. In addition to exhibiting low losses, these technologies have to withstand high voltages, be reliable, and be able to withstand operation over a wide range of temperatures.

My talk will provide an overview of developments in silicon based technologies and will attempt to provide a wider perspective for the future.

# l'orateur



**E.M. Sankara Narayanan @ Shankar N Ekkanath Madathil (M'87 & SM'00)** was born in India, in 1962. He received his B.Sc, M.Sc degrees from PSG College of Technology, Coimbatore, M.Tech from Indian Institute of Science, Bangalore in India and Ph.D degree from the University of Cambridge. He was a Maudslay Engineering Research Fellow of Pembroke College, Cambridge and Research Associate in Cambridge University Engineering Department between 1992 and 1994. He was the Head of Emerging Technologies Research Centre between 1994 and 2007. Presently, he holds the Rolls Royce/Royal Academy of Engineering Chair in Power Electronics Systems at Sheffield University. His present research interests are in integrated and discrete power device technologies, design for manufacturability and compact power converters for automotive/aerospace applications. His other interests include functional materials, thin film transistors, RF technologies and technology strategies in microelectronics. He has published over 200 articles and 7 patents (approved/pending approval). Prof. Ekkanath Madathil is a member of the technical program committees of ISPSD, ISPS and other international conferences. He is an ex-officio member of the IEEE Ad Com committee in the area of compact modelling. He is a Fellow of IET and IOP.