



# Silicon RF Power Mosfets

*By B Jayant Baliga*

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The world-wide proliferation of cellular networks has revolutionized telecommunication systems. The transition from Analog to Digital RF technology enabled substantial increase in voice traffic using available spectrum, and subsequently the delivery of digitally based text messaging, graphics and even streaming video. The deployment of digital networks has required migration to multi-carrier RF power amplifiers with stringent demands on linearity and efficiency. This book describes the physics, design considerations and RF performance of silicon power Metal-Oxide-Semiconductor Field Effect Transistors (MOSFETs) that are at the heart of the power amplifiers. The recent invention and commercialization of RF power MOSFETs based on the super-linear mode of operation is described in this book for the first time. In addition to the analytical treatment of the physics, extensive description of transistor operation is provided by using the results of numerical simulations. Many novel power MOSFET structures are analyzed and their performance is compared with those of the laterally-diffused (LD) MOSFET that are currently used in 2G and 3G networks.

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