

Preface

Low-power smart sensor technology has been receiving greater interests among scientists, physicians and engineers in the recent years as new and promising developments have been made in both sensor fabrication and wireless telemetry. The realization of complex analytical systems including sensors is now feasible because of the high degree of miniaturization of many classic measurement techniques. The recent advancements in CMOS technology have led to further development of the highly complex integrated circuits with significantly reduced power dissipation. This has made possible the realization of intelligent sensors with wireless transmission capabilities. This new class of sensors is extensively contributing to a broad range of activities with applications in environmental monitoring, agriculture, food safety, space applications as well as in counter terrorism. The emergence of the telemedicine concept coupled with tremendous growth of the wireless sensor networks has opened up a new and innovative application of wireless sensor technology in medical as well as in healthcare field. This effort attempted to cover the broad range of topics related to sensors and sensor electronics.

The book is aimed at the sensor research community as well as a text book for advanced graduate level courses in sensor technology. It is also intended to be a reference book for practicing engineers in industry and should assist them in the development of new products with improved features. The book includes: a cohesive treatment of the general concept of the working principle of a sensor and its applications, an extensive discussion on the fundamentals of the emerging sensor technologies, a discussion on device physics of bulk CMOS and SOI CMOS processes with respect to monolithic sensor integration and low-power sensor signal processing. In addition, the book provides an insight into the design challenges associated with low-power analog circuits, and the schemes to overcome them, and wireless telemetry schemes for low-power and short distance communications. This is followed by a compressive discussion on various sensor prototypes with applications in the areas as diverse as environmental monitoring, counter terrorism, and health care with emphasis on design of low-power sensor electronics.

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