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Nota di contenuto

Basics and Theory -- Integrated Silicon Photodetectors -- Detectors in Thin Crystalline Silicon Films -- SiGe Photodetectors -- Design of Integrated Optical Receiver Circuits -- 6 Examples of Optoelectronic Integrated Circuits -- Circuits for Electronic-Photonic Integration.

Sommario/riassunto

This book reviews various topics in optoelectronics and the design of microelectronic circuits. It introduces readers to the essential features of optical absorption and device physics of photodetectors, as well as their integration in modern CMOS and BiCMOS technologies. This information provides the basis for understanding the underlying mechanisms of Optoelectronic Integrated Circuits (OEICs), which are described in the main part of the book. In the second edition of this book, new and outstanding integrated high-bandwidth pin photodiodes as well as avalanche photodiodes in the linear mode and in the Geiger mode are introduced. To cover the topic comprehensively, the book presents detailed descriptions of OEICs for a wide range of applications: from various optical sensors, smart sensors, image sensors, 3D-sensors and optical storage systems, to fiber receivers and receivers for optical wireless communication, as well as single-photon detection. This new edition also reflects the latest trends in OEIC research on integrated optical receivers at the quantum limit and electronic-photonic integration, and highlights outstanding 3D-integrated application examples like a multi-node optical switch, an optical transceiver, and a high-resolution 3D sensor. .