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	Autore	Johannes : , Dacus
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2.	Record Nr.	UNINA9910299893803321
	Autore	Boukhayma Assim
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Livello bibliografico	Monografia
Note generali	"Doctoral Thesis accepted by Ecole Polytechnique Federale de Lausanne, Switzerland."
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Introduction -- Low-Noise CMOS Image Sensors -- Noise Sources and Mechanisms in CIS -- Detailed Noise Analysis in Low-Noise CMOS Image Sensors -- Noise Reduction in CIS Readout Chains -- Design of a Sub-electron Readout Noise Pixel in a Standard CIS Process -- Characterization of a Sub-electron Readout Noise VGA Imager in a Standard CIS Process -- A Passive Switched-Capacitor Circuit For Correlated Multiple Sampling -- Downscaling Effects Towards Photon Counting Capability in CIS -- An Ultra Low Noise CMOS THz Imager -- Conclusion.
Sommario/riassunto	This thesis provides a thorough noise analysis for conventional CIS readout chains, while also presenting and discussing a variety of noise reduction techniques that allow the read noise in standard processes to be optimized. Two physical implementations featuring sub-0.5-electron RMS are subsequently presented to verify the proposed noise reduction techniques and provide a full characterization of a VGA imager. Based on the verified noise calculation, the impact of the technology downscaling on the input-referred noise is also studied. Further, the thesis covers THz CMOS image sensors and presents an original design that achieves ultra-low-noise performance. Last but not least, it provides a comprehensive review of CMOS image sensors.