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## Advanced Silicon MMICs for mm-Wave Automotive Radar Front-Ends

By Alexander Kravets

Cuvillier Verlag Jun 2015, 2015. Taschenbuch. Book Condition: Neu. 213x149x9 mm. Neuware - This work presents a high-linearity automotive radar front-end at 77 GHz in 0.25  $\mu\text{m}$  SiGe technology. The passive elements were realized using thin-film microstrip lines. A detailed transformer balun synthesis procedure was developed. The realized passive baluns (rat-race and transformer) show excellent commonmode rejection ratios exceeding 30 dB and low losses of 2.5 dB. On the active side, a low-gain, high-linearity single stage common-emitter LNA was realized. The selected topology allowed finer trade-off between linearity and sensitivity of the front-end compared to multi-stage LNA solutions. For the mixer, a low-voltage supply, high-linearity, low-noise double-balanced concept was employed. It uses AC-coupling between the two stages, which allowed an independent optimization of transconductance, core sizing, and bias. The transconductance was designed for best noise performance, while the core was chosen for maximum linearity. A high-fidelity two-channel receiver was realized using these circuit components, which achieved a performance comparable to the published state-of-the-art results in SiGe: Single sideband noise figure better than 16.5 dB, 1 dB compression point exceeding -12 dBm, while consuming moderate 82 mA DC current from a 1.6 V supply for both channels. 136 pp. Englisch.



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