Advanced characterization of carrier profiles in germanium using micro-machined contact probes - DTU Orbit (20/01/2019)

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The accurate determination of the sheet resistance and carrier depth profile, i.e. active dopant profile, of shallow junction isolated structures involving new high mobility materials, such as germanium, is a crucial topic for future CMOS development. In this work, we discuss the capabilities of new concepts based on micro machined, closely spaced contact probes (10 μm pitch). When using four probes to perform sheet resistance measurements, a quantitative carrier profile extraction based on the evolution of the sheet resistance versus depth along a beveled surface is obtained. Considering the use of only two probes, a spreading resistance like setup is obtained with small spacing and drastically reduced electrical contact radii (~10 nm) leading to a substantial reduction of the correction factors which are normally required for converting spreading resistance profiles. We demonstrate the properties of both approaches on Al+ implants in germanium with different anneal treatments.

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