Effect of Thermal Annealing on 4H-SiC Radiation Detector

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Abstract. Silicon carbide exhibits high electron mobility, high radiation, and high temperature resistance. The detectors made from this material are applicable in conditions of aggressive environment and at elevated temperatures. In this paper, radiation detectors based on a high-quality 4H-SiC epitaxial layer with varied annealing temperature of front-side circular Ni Schottky contacts and back-side full-area Ti/Pt/Au Ohmic contact were studied. Current-voltage characteristics in the reverse and forward directions of prepared detectors were measured. A positive effect on reverse current was observed at 550 °C and 450 °C, which were lowest annealing temperatures of Ohmic and Ni Schottky contact, respectively. The value of reverse current was by two orders of magnitude lower than reverse current of detector annealed at 850 °C (Ohmic contact) and 650 °C (Schottky contact), respectively.