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Development of 4H-SiC Low-Gain Avalanche Detector

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Silicon carbide (SiC) has wider bandgap, higher atomic displacement energy, saturated electron drift velocity and thermal conductivity. It has the potential to become a high time resolution detector resistant to radiation and high temperature. A 4H-SiC Low-Gain Avalanche Detector (LGAD) epitaxial structure has been designed and epitaxial growth. The epitaxial structure of 4H-SiC LGAD was P++/N+ gain/N–bulk/N buffer/N++ substrate. In this work, the 4H-SiC LGAD fast time detector (Detector name: SICAR1) was successfully fabricated through the process of photolithography, etching, magnetron sputtering and annealing. The electronic properties of operating voltage, barrier height, effective doping and dark current were analyzed.

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