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Enhanced OFF state resistance in reconfigurable graphene p-n junction PRATIK AGNIHOTRI, SURAJIT SUTAR, EVERETT COMFORT, State Univ of NY - Albany, JAMES HONE, Columbia University, PHILIP KIM, Harvard University, JI UNG LEE, State Univ of NY - Albany — Graphene, since its discovery, has proved to be a promising candidate to meet the challenges facing CMOS-based logic devices. PN junctions made of graphene have the unique property of angle dependent charge transport, which can be used for reconfigurable logic. Electrons in graphene behave like photons in optoelectronic devices with zero mass and linear energy dispersion relation. A graphene PN junction refracts electrons and can perform logic operations by focusing and defocusing the electron flow. In our work, we present the fabrication and characterization of graphene p-n junctions, formed using electrostatic doping techniques from buried split gates. Each gate can be individually biased to create all possible p-n configurations. Angle dependent charge transport studies are conducted on sandwich hexagonal boron nitride-graphene stack and on single domain CVD graphene on hexagonal boron nitride. Normal conduction modes which are perpendicular to the junction are blocked geometrically by rotating the channel with respect to the junction. Due to this effect conductance in graphene at charge neutrality point is lower than the minimum conductivity of graphene commonly reported in many articles as $4e^2/h$.

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