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[54] METHOD FOR FORMING A P-N JUNCTION IN SILICON CARBIDE

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[57] ABSTRACT

A method for forming a p-n junction in silicon carbide includes the steps of amorphizing a portion of a monocrystalline silicon carbide substrate, implanting dopant ions into the amorphous portion of the substrate and then recrystallizing the amorphous portion to thereby form a substantially monocrystalline region including the dopant ions. In particular, the amorphizing step includes the steps of masking an area on the face of the monocrystalline silicon carbide substrate and then directing electrically inactive ions to the masked area so that an amorphous region in the substrate is formed. Accordingly, the amorphous region has sidewalls extending to the face that are substantially orthogonal to the bottom edge of the amorphous region. Once the amorphized region is defined, electrically active dopant ions are implanted into the amorphous region. The dopant ions are then diffused into the amorphous region and become uniformly distributed. Next, the doped amorphized region is recrystallized to obtain a substantially monocrystalline doped region. If the regions. surrounding the recrystallized region are of opposite conductivity type, a vertically walled p-n junction is formed.

10 Claims, 1 Drawing Sheet