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[54] **LATERAL SILICON CARBIDE SEMICONDUCTOR DEVICE HAVING A DRIFT REGION WITH A VARYING DOPING LEVEL**

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[52] **U.S. Cl.** **257/76**; 257/77; 257/493

[58] **Field of Search** 257/77, 493

[56] **References Cited**

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[57] **ABSTRACT**

A lateral silicon carbide (SiC) semiconductor device includes a SIC substrate of a first conductivity type, a SiC epitaxial layer of the first conductivity type on the substrate and a SiC surface layer on the SiC epitaxial layer. The SiC surface layer has a SiC first region of the first conductivity type, a SiC lateral drift region of a second conductivity type opposite to that of the first conductivity type adjacent the first region and forming a p-n junction therewith, and a SiC second region of the second conductivity type spaced apart from the first region by the drift region. By providing the drift region with a variable doping level which increases in a direction from the first region to the second region, compact SiC semiconductor devices such as high-voltage diodes or MOSFETs can be formed which can operate at high voltages, high temperatures and high frequencies, thus providing a substantial advantage over known devices.

5 Claims, 1 Drawing Sheet