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(54) **LATERAL DOUBLE DIFFUSION METAL-OXIDE-SEMICONDUCTOR (LDMOS) TRANSISTORS AND FABRICATION METHOD THEREOF**

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(58) **Field of Classification Search**

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See application file for complete search history.

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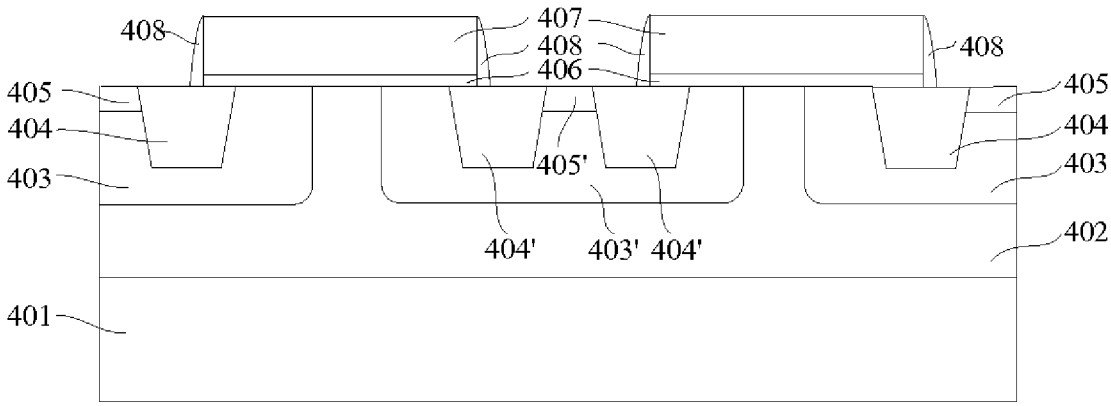
(57) **ABSTRACT**

A lateral double diffusion metal-oxide-semiconductor (LDMOS) transistor is provided. The LDMOS transistor includes a semiconductor substrate having a well region and a drain region in the well region. The LDMOS transistor also includes at least one drifting region in the well region and an annular source region in the drifting region surrounding the drain region. Further, the LDMOS transistor includes at least one annular isolation structure surrounding the drain region in the drifting region. Further, the LDMOS transistor also includes an annular gate dielectric layer on the well region and an annular gate on the annular gate dielectric layer.

19 Claims, 10 Drawing Sheets