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(54) **METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE**

(71) Applicant: **Powerchip Semiconductor Manufacturing Corporation**, Hsinchu (TW)

(72) Inventor: **Hiroshi Yoshida**, Hsinchu City (TW)

(73) Assignee: **Powerchip Semiconductor Manufacturing Corporation**, Hsinchu (TW)

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(57) **ABSTRACT**

A method of manufacturing a semiconductor device includes forming a gate oxide layer on a substrate, where the substrate includes a high voltage region and a low voltage region. The gate oxide layer is disposed in the high voltage region. Wet etching is performed on the gate oxide layer to reduce a thickness of the gate oxide layer. Multiple trenches are formed around the high voltage region in the substrate, where forming the trenches includes removing an edge of the gate oxide layer to make the thickness of the gate oxide layer uniform. An insulating material is filled in the trenches to form multiple shallow trench isolation structures, where an upper surface of the shallow trench isolation structures close to the edge of the gate oxide layer is coplanar with an upper surface of the gate oxide layer.