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Saito

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(54) **POWER SEMICONDUCTOR DEVICE**

(75) Inventor: **Wataru Saito**, Kanagawa-ken (JP)

(73) Assignee: **Kabushiki Kaisha Toshiba**, Tokyo (JP)

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See application file for complete search history.

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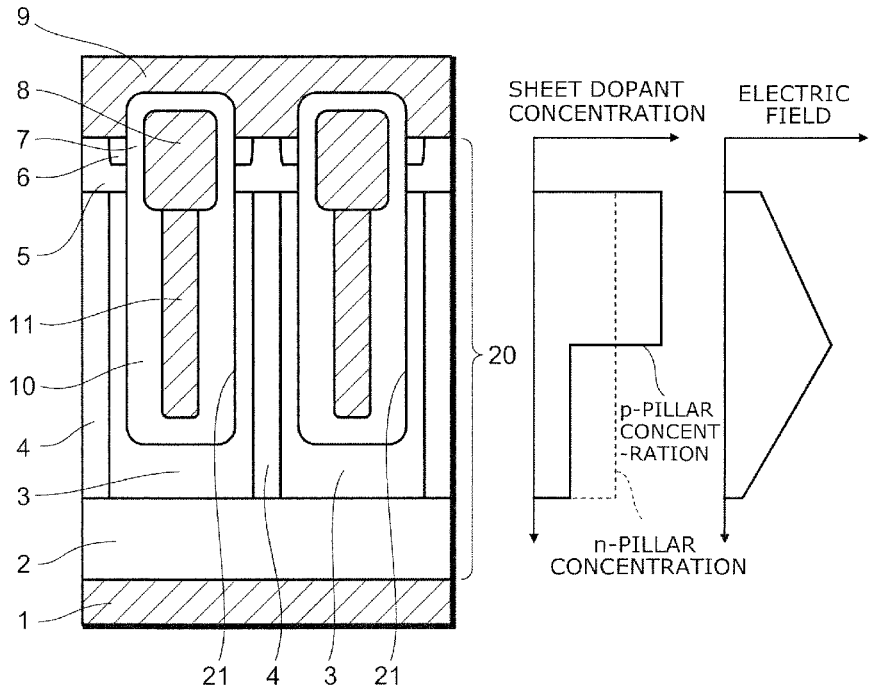
Primary Examiner—Long K Tran
(74) *Attorney, Agent, or Firm*—Oblon, Spivak, McClelland, Maier & Neustadt, L.L.P.

(57) **ABSTRACT**

A power semiconductor device includes a semiconductor substrate having a plurality of trenches formed in an upper surface thereof; a buried insulating film; a buried field plate electrode; a control electrode; a first main electrode provided on a lower side of the semiconductor substrate; and a second main electrode provided on an upper side of the semiconductor substrate. The semiconductor substrate includes: a first semiconductor; a second semiconductor layer of the first conductivity type and a third semiconductor layer of a second conductivity type; a fourth semiconductor layer; and a fifth semiconductor layer. The buried insulating film is thicker than a gate insulating film. At least one of the second semiconductor layer and the third semiconductor layer has a portion with its sheet dopant concentration varying along a depth direction of the semiconductor substrate.

20 Claims, 25 Drawing Sheets