

#### US006509234B1

# (12) United States Patent Krivokapic

(10) Patent No.: US 6,509,234 B1

(45) **Date of Patent: Jan. 21, 2003** 

## (54) METHOD OF FABRICATING AN ULTRA-THIN FULLY DEPLETED SOI DEVICE WITH T-SHAPED GATE

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(\*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/200,652

(22) Filed: Jul. 22, 2002

### Related U.S. Application Data

(62) Division of application No. 10/081,104, filed on Feb. 21, 2002, now Pat. No. 6,452,229.

(51) **Int. Cl.**<sup>7</sup> ...... **H01L 21/336**; H01L 21/00; H01L 21/28

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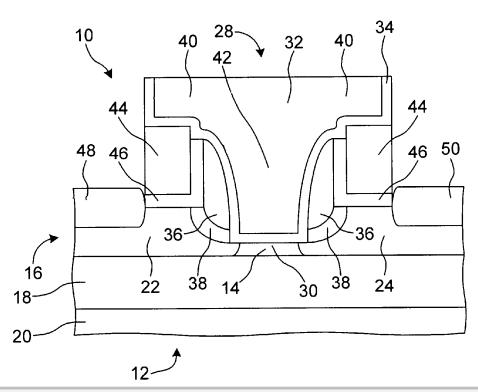
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Sklar, LLP

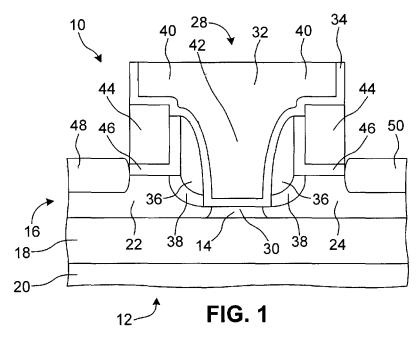
### (57) ABSTRACT

A method of forming a fully depleted semiconductor-oninsulator (SOI) field effect transistor (FET). The method includes forming a T-shaped gate electrode formed at least in part in a recess formed in a layer of semiconductor material and over a body region that is disposed between a source and a drain. The method includes spacing the gate electrode from the body by a gate dielectric made from a high-K material.

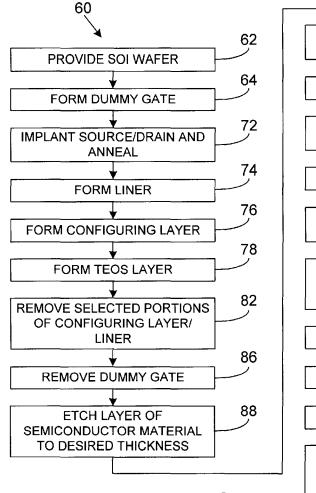
### 15 Claims, 5 Drawing Sheets







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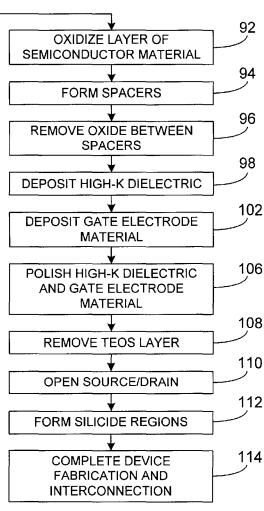
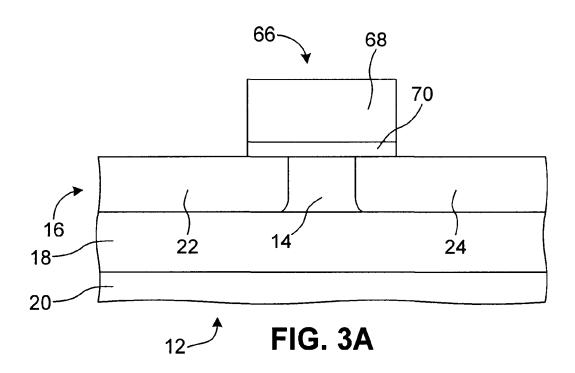
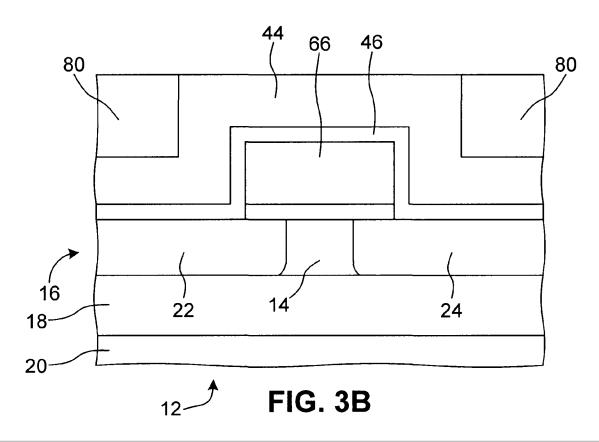
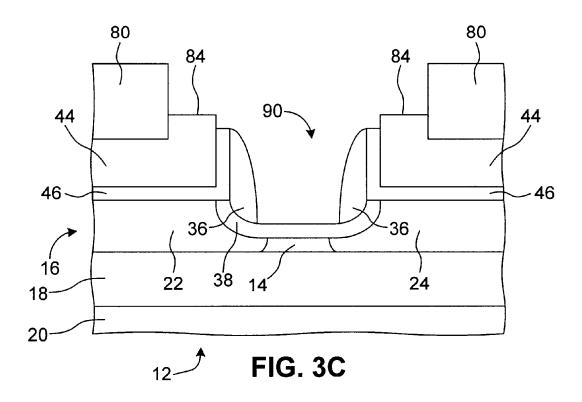


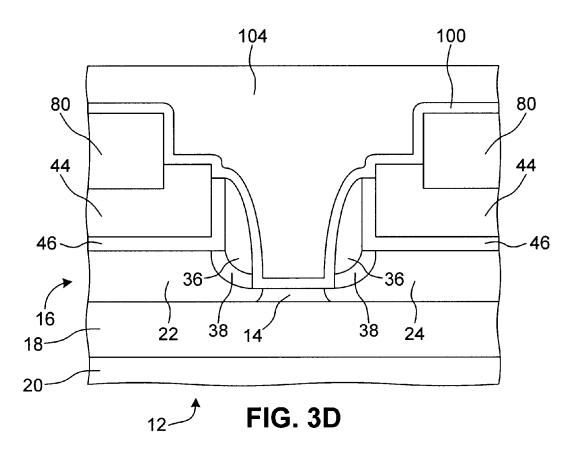
FIG. 2



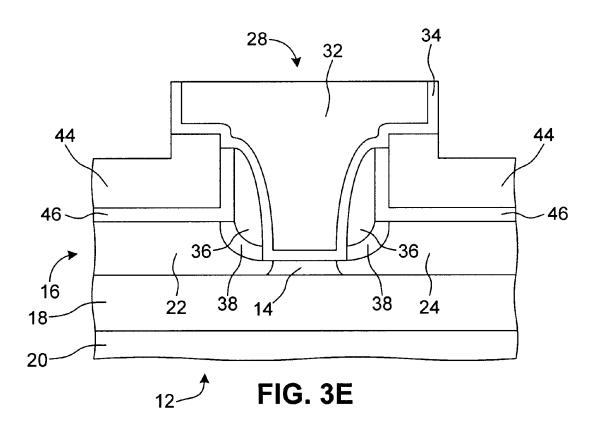


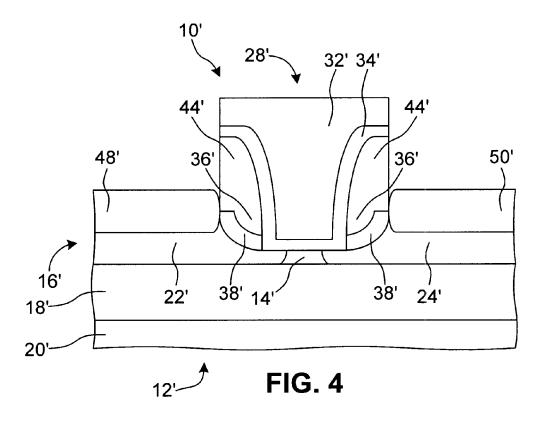














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