



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**

(75) Inventor: **Zoran Krivokapic**, Santa Clara, CA
(US)

(73) Assignee: **Advanced Micro Devices, Inc.**,
Sunnyvale, CA (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

5,552,620 A * 9/1996 Lu et al.
5,567,966 A 10/1996 Hwang
6,013,553 A 1/2000 Wallace et al.
6,020,024 A 5/2000 Wu
6,060,749 A 5/2000 Wu
6,100,204 A 8/2000 Gardner et al.
6,127,216 A * 10/2000 Yu
6,127,699 A * 10/2000 Ni et al.
6,159,781 A * 12/2000 Pan et al.
6,333,229 B1 * 12/2001 Furukawa et al.
6,348,385 B1 * 2/2002 Cha et al.
6,452,229 B1 * 9/2002 Krivokapic

* cited by examiner

(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.⁷ **H01L 21/336**; H01L 21/00;
H01L 21/28

(52) U.S. Cl. **438/270**; 438/297; 438/303;
438/151; 438/572; 438/574; 438/576; 438/580

(58) Field of Search 438/149, 151,
438/270, 297, 303, 572, 574, 575, 576,
579, 580, 581, 58

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,358,885 A * 10/1994 Oku et al.

Primary Examiner—John F. Niebling

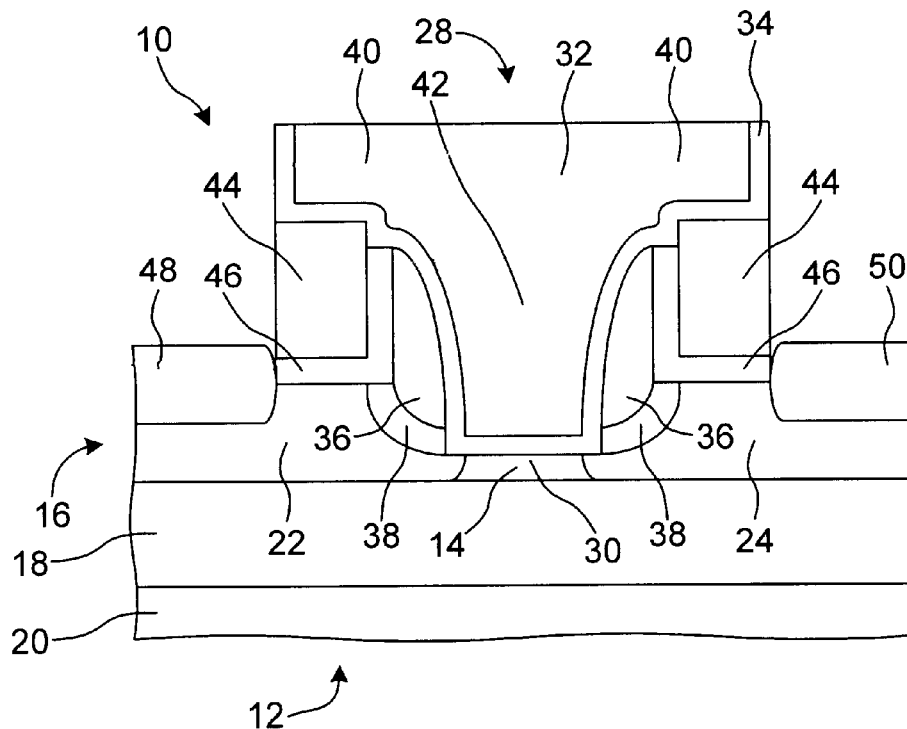
Assistant Examiner—Stanetta Isaac

(74) *Attorney, Agent, or Firm*—Renner, Otto, Boisselle &
Sklar, LLP

(57) **ABSTRACT**

A method of forming a fully depleted semiconductor-on-insulator (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



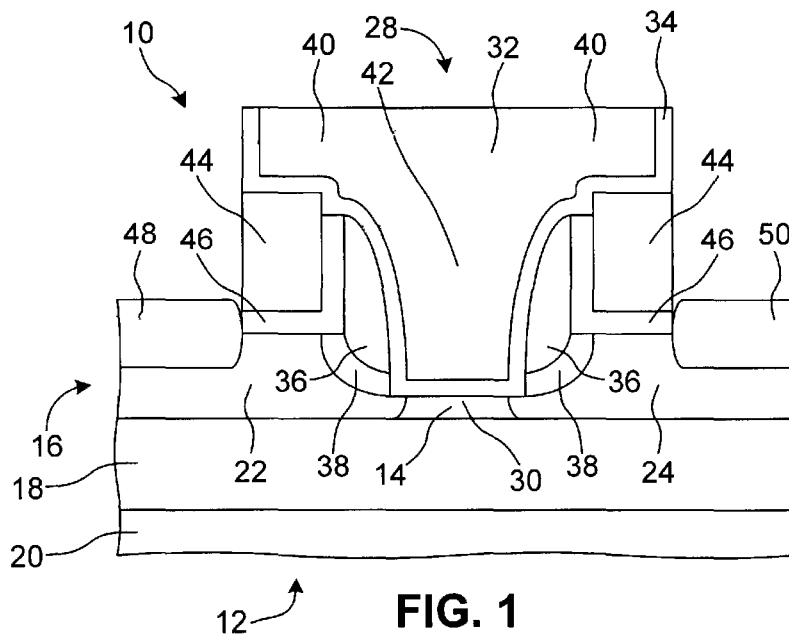


FIG. 1

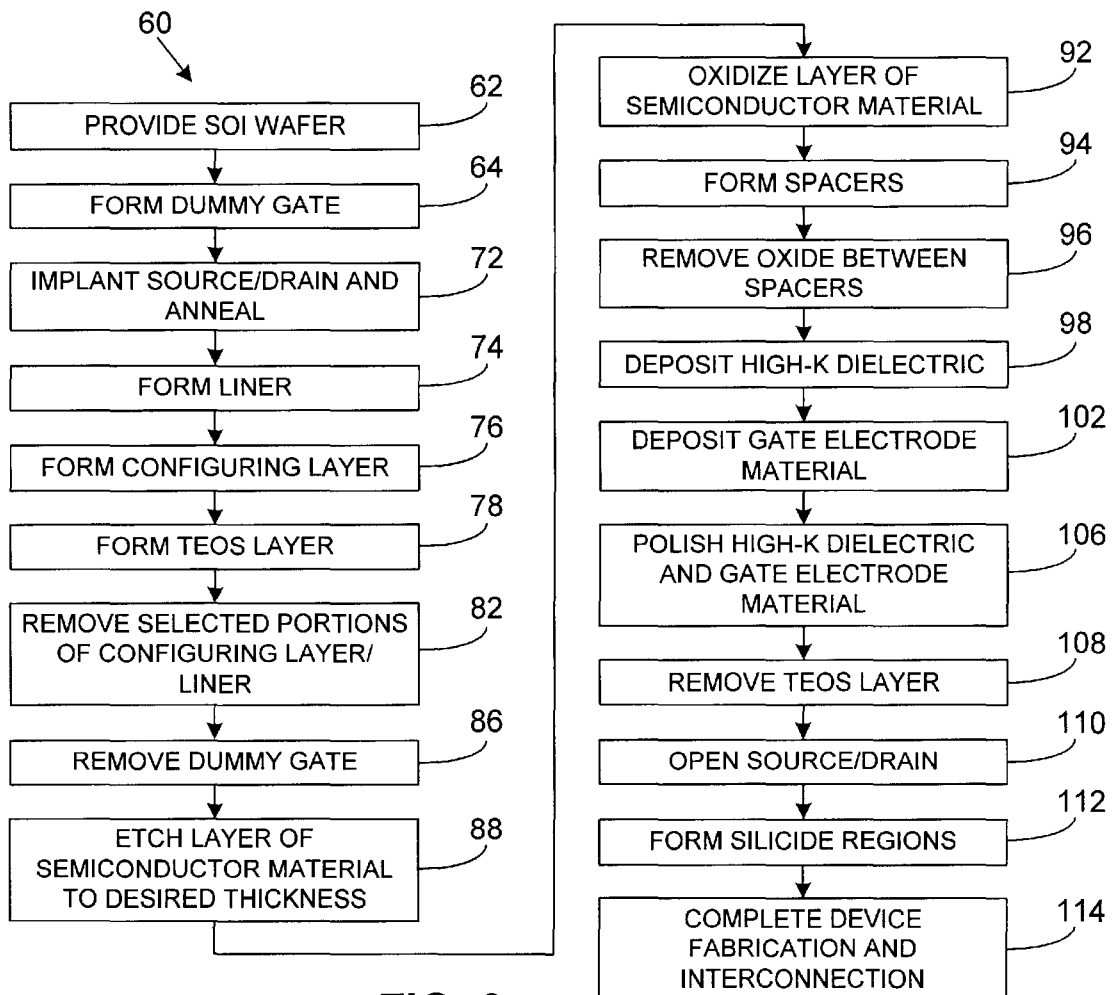
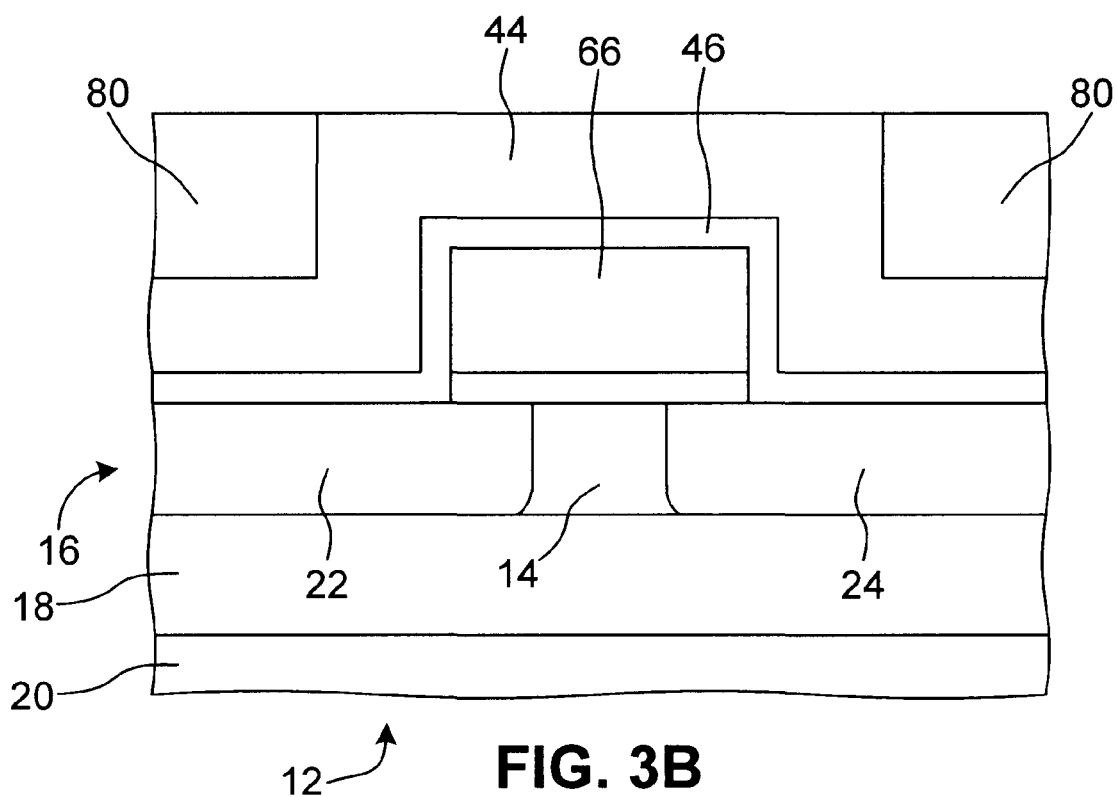
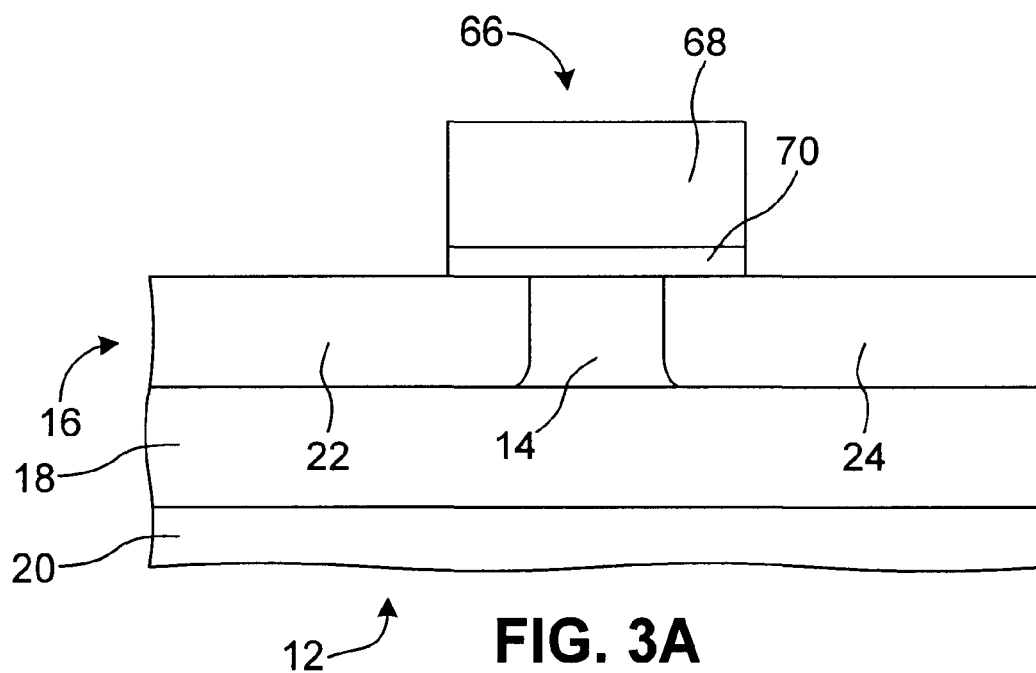
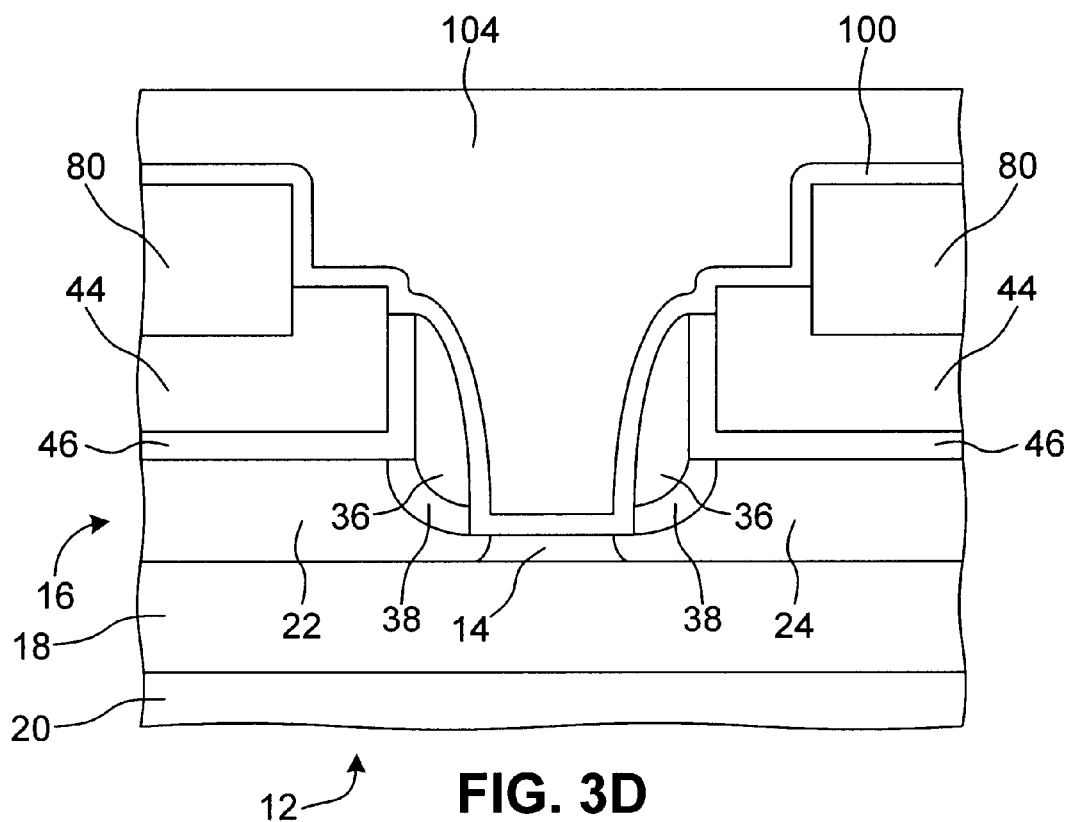
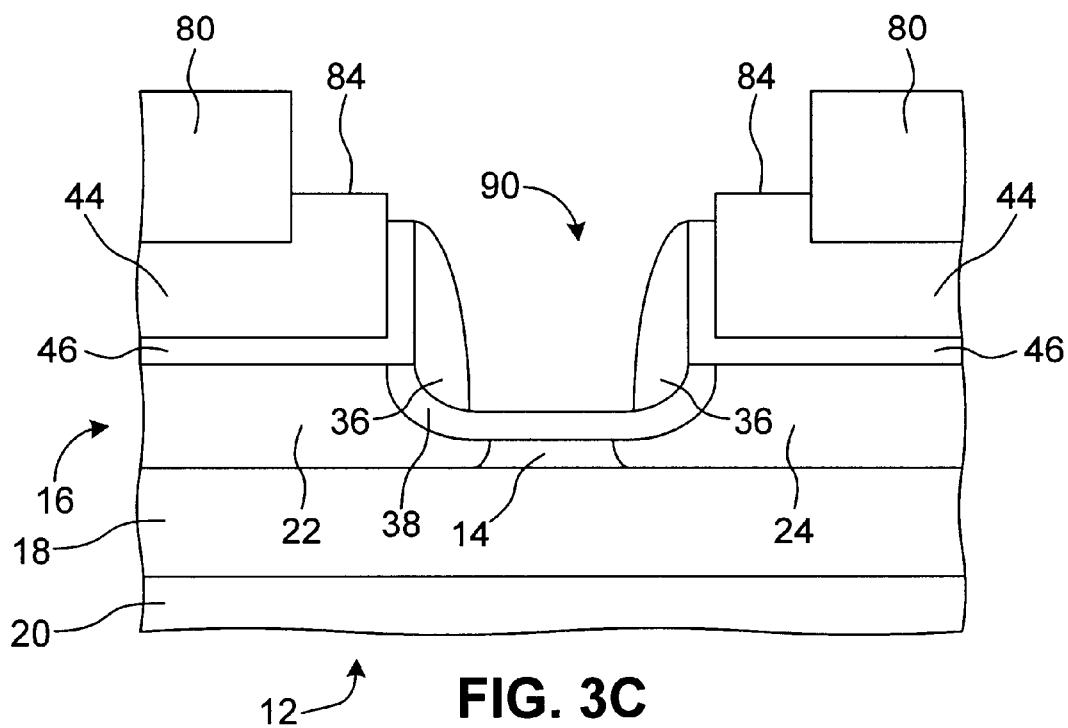
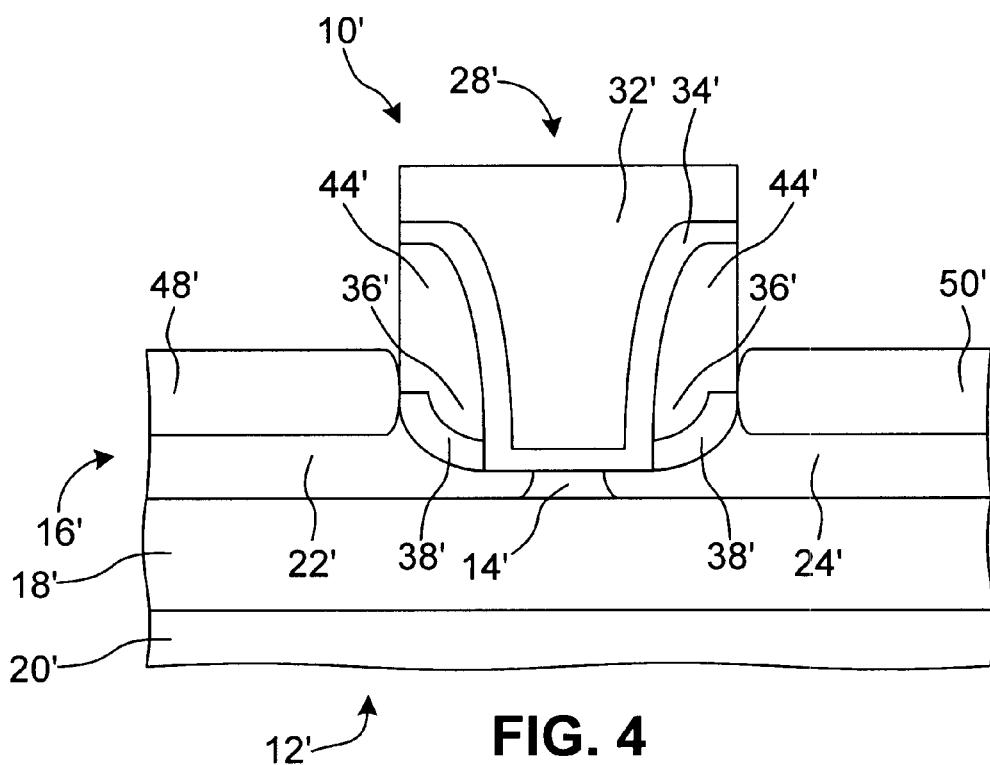
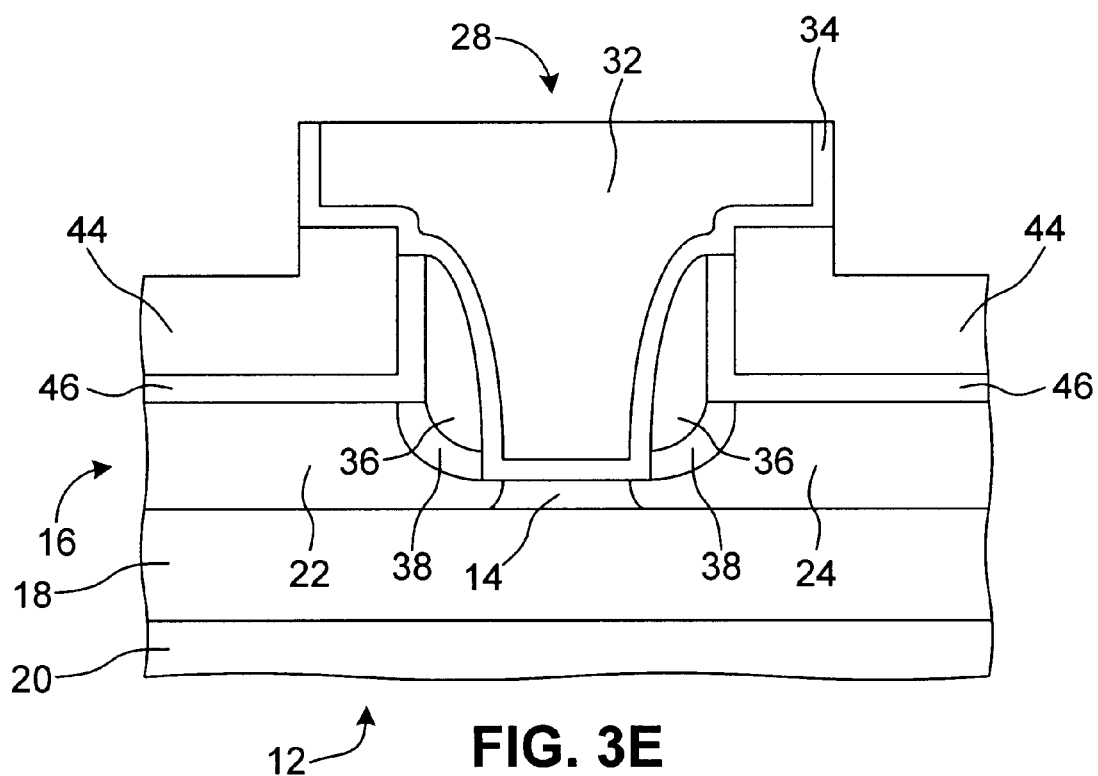


FIG. 2







Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.