



US005472890A

United States Patent [19]

[11] **Patent Number:** 5,472,890

Oda

[45] **Date of Patent:** Dec. 5, 1995

[54] **METHOD FOR FABRICATING AN INSULATING GATE FIELD EFFECT TRANSISTOR**

FOREIGN PATENT DOCUMENTS

502614A2	9/1992	European Pat. Off.	257/759
62-147776	7/1987	Japan	.
2-270335	11/1990	Japan	.

[75] Inventor: **Noriaki Oda**, Tokyo, Japan

OTHER PUBLICATIONS

Pfiester, J. R., "LDD MOSFET's Using Disposable Sidewall Spacer Technology", IEEE Elec. Dev. Lett., vol. 9, No. 4, Apr. 1988, pp. 189-192.
 "Copper Multilevel Interconnections", IBM Tech. Disc. Bull., vol. 33, No. 11, Apr. 1991, pp. 299-300.

[73] Assignee: **NEC Corporation**, Tokyo, Japan

[21] Appl. No.: **427,816**

[22] Filed: **Apr. 26, 1995**

[30] Foreign Application Priority Data

Apr. 28, 1994 [JP] Japan 5-090882

Primary Examiner—T. N. Quach
Attorney, Agent, or Firm—Young & Thompson

[51] **Int. Cl.⁶** **H01L 21/336**

[57] ABSTRACT

[52] **U.S. Cl.** **437/41; 437/44; 437/235; 437/236; 748/DIG. 113**

A LDD MOS transistor having a small fringe capacitance is fabricated by the steps of forming, lightly-doped source and drain regions by introducing impurities into a semiconductor substrate by using gate electrode as a mask, forming a pair of sidewall spacers above side surfaces of the gate electrode, forming heavily doped source and drain regions by an ion implantation method using the pair of sidewall spacers as a mask, removing the pair of sidewall spacers, and forming a pair of new sidewall spacers having a dielectric constant lower than that of silicon oxide above the side surface of the gate electrode, including the use of polyimide or boron nitride as the spacer material.

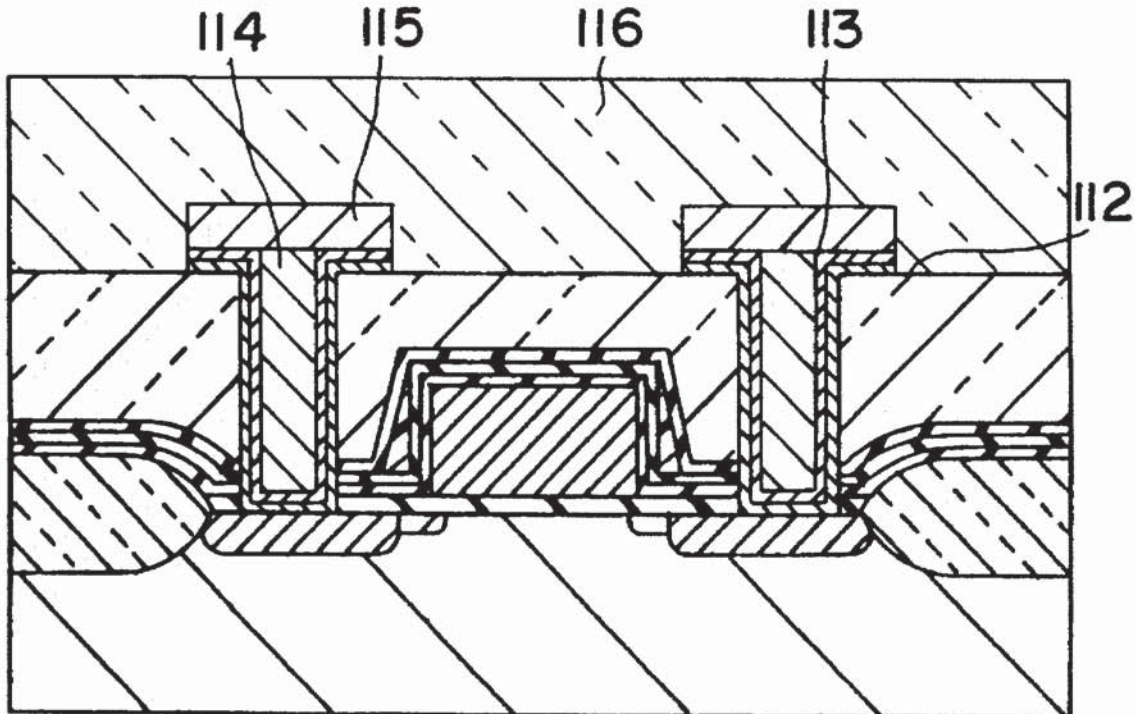
[58] **Field of Search** 437/44, 235, 236, 437/41 SW, 41 RLD; 748/DIG. 113; 257/336, 408, 759

[56] References Cited

U.S. PATENT DOCUMENTS

4,753,898	6/1988	Parmilo et al.	437/44
4,769,686	9/1988	Horiuchi et al.	257/373
4,776,922	10/1988	Bhattacharyya et al.	156/643
4,838,991	6/1989	Cote	156/643
4,924,279	5/1990	Shimbo	257/58
5,081,559	1/1992	Fazan et al.	361/313
5,166,096	11/1992	Cote et al.	437/195
5,324,690	6/1994	Gelatos et al.	437/236

10 Claims, 4 Drawing Sheets



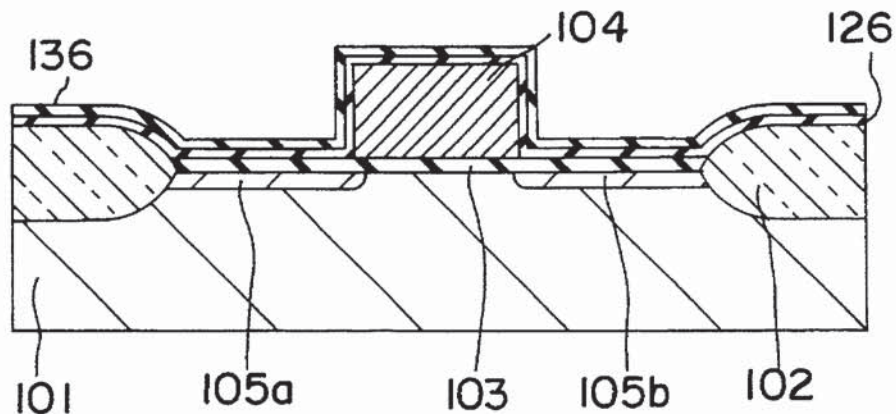


FIG. 1(a)

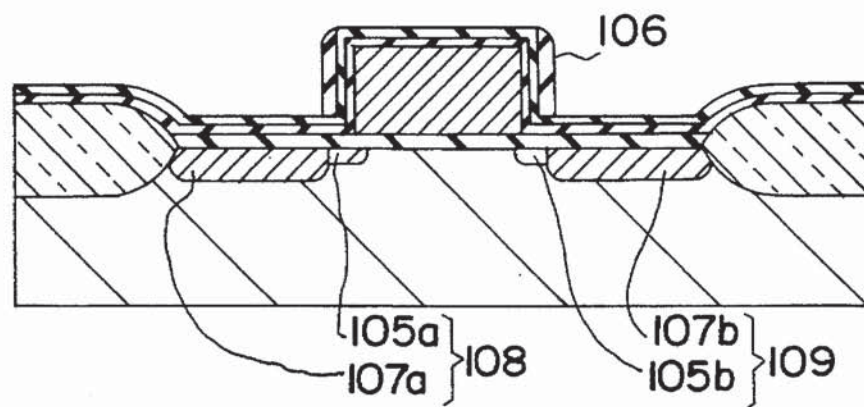


FIG. 1(b)

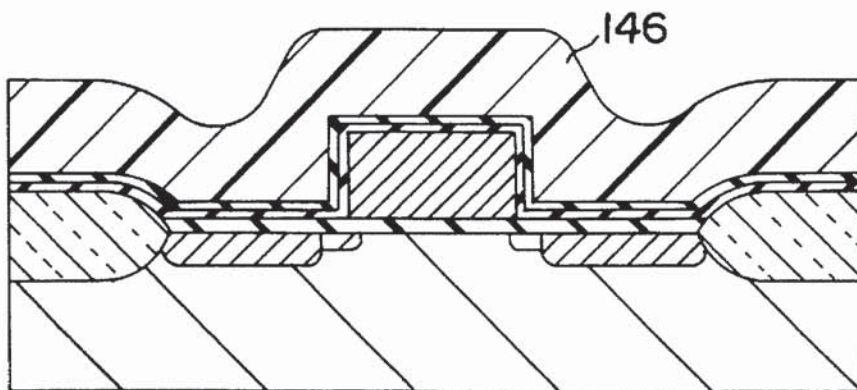


FIG. 1(c)

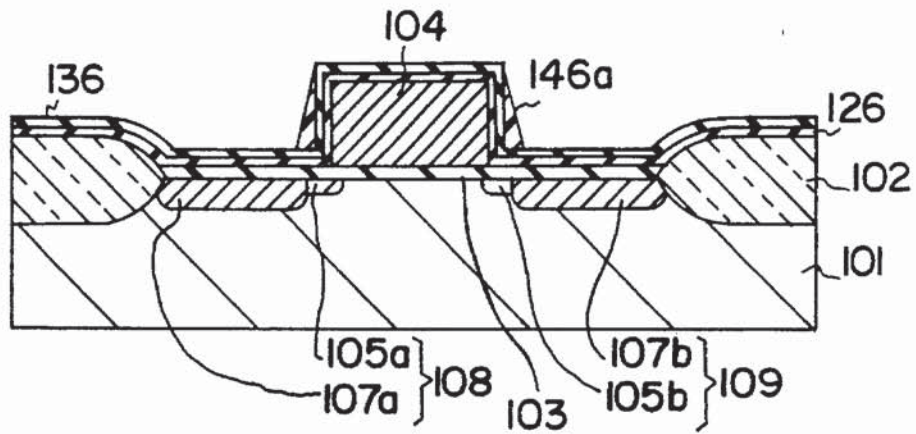


FIG. 1(d)

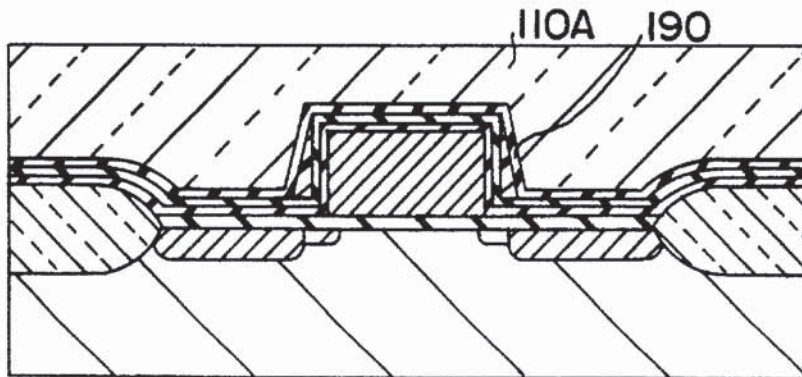


FIG. 1(e)

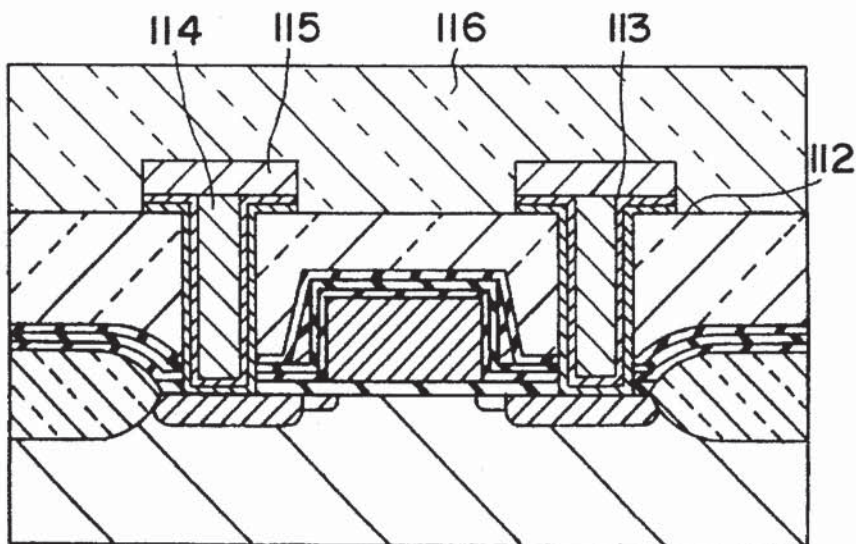


FIG. 1(f)

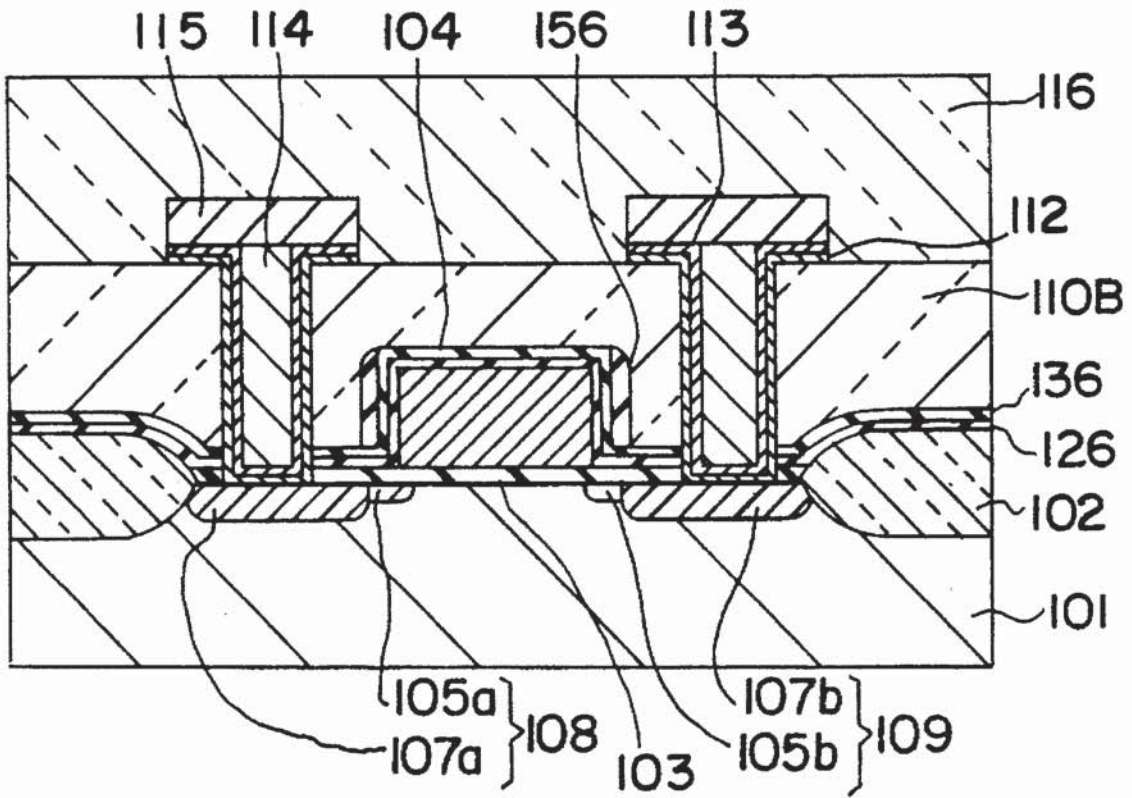


FIG. 2

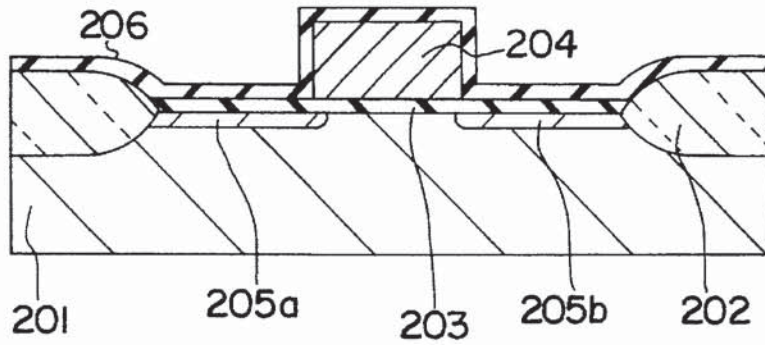


FIG. 3(a)
PRIOR ART

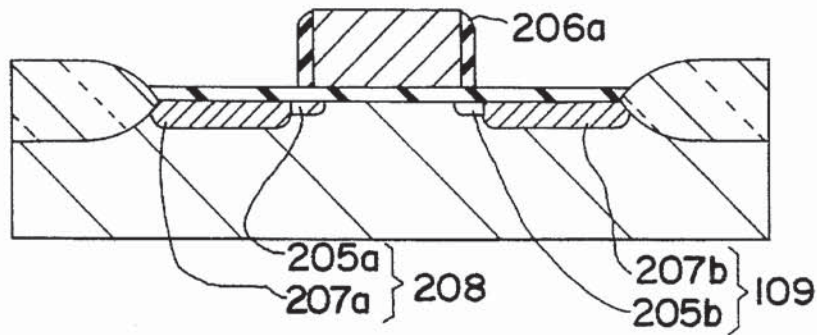


FIG. 3(b)
PRIOR ART

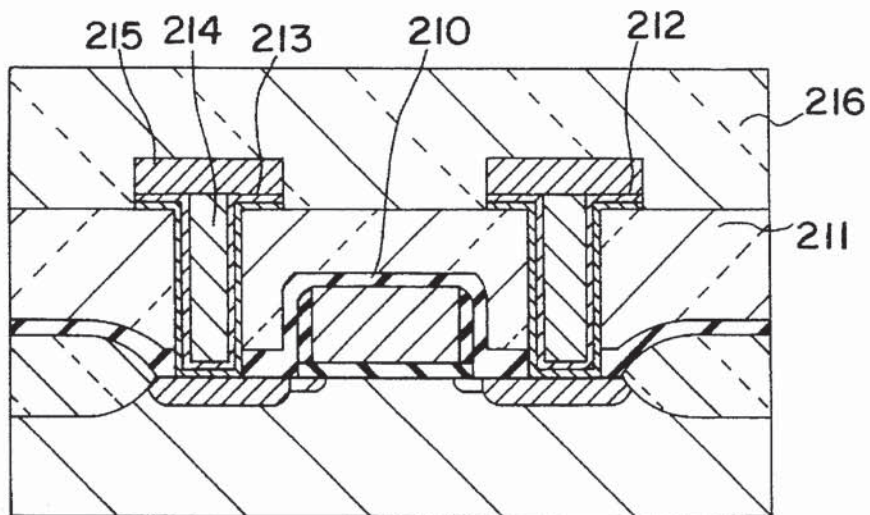


FIG. 3(c)

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.