



THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Ting P. Yen
Serial No.: 08/561,951
Title: METAL PLUG LOCAL INTERCONNECT
Filed: November 22, 1995
Attorney Docket No.: 0325.00004
Examiner: V. Wallace
Art Unit: 2503
In Response To: Office Action mailed November 7, 1996

AMENDMENT PURSUANT TO 37 C.F.R. § 1.116

Box AF
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action mailed November 7, 1996, please consider the following amendment and remarks regarding the above-captioned patent application to place the patent application in condition for allowance.

IN THE CLAIMS

Please amend the claims as follows:

13. (AMENDED) A semiconductor structure comprising:
a silicon substrate having a top surface,

Initial Review

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a diffusion region formed in said substrate adjacent to said top surface,

a polysilicon gate formed on the top surface of said substrate juxtaposed to but not contacting said diffusion region,

a sidewall spacer adjacent to said polysilicon gate and disposed above said diffusion region,

an insulator layer substantially covering said polysilicon gate and said diffusion region, and

a conducting plug at least partially filling a via in said insulation layer that exposes said sidewall spacer in the absence of said conducting plug, said conducting plug providing direct electrical communication between said polysilicon gate and said diffusion region.

14. (AMENDED) A method of forming a local interconnect in a semiconductor structure, comprising the step of:

depositing an electrically conducting material in a via exposing at least a portion of a gate, a sidewall spacer adjacent to said gate and a portion of a diffusion region such that said electrically conducting material contacts and provides electrical communication between said gate and said diffusion region, said semiconductor structure comprising said diffusion region in a silicon substrate, said gate being on said substrate juxtaposed to

but not contacting said diffusion region, said sidewall spacer being disposed above said diffusion region, said via being in an insulating material on said gate.

SUPPORT FOR AMENDMENTS

Support for the above amendments can be found in FIG. 3B as originally filed along with United States Patents 4,566,175; 4,878,100; 4,962,060; 5,202,279; 5,286,674; and 5,521,118 and Wolf, Silicon Processing for the VLSI Era, Volume 2, pp. 144-145, 212-214, and 354-355 filed with the accompanying Information Disclosure Statement.

R E M A R K S

Rejection Under 35 U.S.C. § 102(e)

The rejection of claims 2-6, 8-14 and 16-17 under 35 U.S.C. § 102(e) as being anticipated by United States Patent 5,541,434 (hereinafter "Nicholls et al.") is respectfully traversed and should be withdrawn.

Nicholls et al. discloses a contact for electrically connecting adjacent portions within a semiconductor device. Nicholls et al. discloses a silicon substrate 52, a diffusion region 70, a polysilicon gate 56 which does not physically touch the diffusion region 70, a dielectric region 74, a contact via 76 and an electrically conducting plug 80. Nicholls et al. does not, however, disclose a sidewall spacer adjacent to the polysilicon

gate 56 and disposed above the diffusion region 70 in the via containing the electrically conducting plug 80. In fact, Nicholls et al. discusses etching the sidewall spacer out of the via containing the conducting plug, thus appearing to lead one of ordinary skill in the art away retaining a side wall spacer in this position. (Column 5, lines 15-20.)

Claims 13 and 14, as amended, recite a sidewall spacer adjacent to the polysilicon gate and disposed above the diffusion region in the via containing the conducting plug. Therefore, the present claims 13 and 14 overcome the rejection under 35 U.S.C. § 102(e).

REJECTIONS UNDER 35 U.S.C. 103

The rejection of Claim 15 under 35 U.S.C. § 103(a) as being unpatentable over Nicholls et al. in view of United States Patent 5,313,089 (hereinafter "Jones, Jr.") is respectfully traversed.

Jones, Jr. discloses a semiconductive device including a conductive plug region 32. Glue layers are generically identified as being used in conductive plug technology.

Jones is silent with regard to a conducting plug providing electrical communication between a polysilicon gate and a diffusion region. Therefore, Jones, Jr. fails to cure the

deficiencies of Nicholls et al. with regard to the presently claimed invention. Furthermore, one ordinary skill in the art would not be motivated to include a sidewall spacer adjacent to a polysilicon gate and disposed above a different region in a via containing or to subsequently contain a conducting plug. One might reasonably expect a sidewall spacer to reduce the available surface area for direct ohmic contact between the polysilicon gate and the diffusion region thus reducing the likelihood for success, particularly when the sidewall spacer comprises an oxide, a well-known electrical insulator (see, e.g., Wolf). Therefore, the rejection under 35 U.S.C. § 103(a) should be withdrawn.

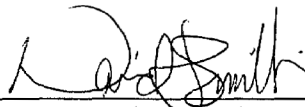
Accordingly, the present application is in condition for allowance. Early and favorable action by the Examiner is respectfully solicited.

The Examiner is respectfully invited to call the Applicant's representative should it be deemed beneficial to further advance prosecution of the application.

If any additional fees are due, please charge our Deposit Account No. 02-2712.

Respectfully submitted,

BLISS MCGLYNN, P.C.



David J. Simonelli
Registration No. 36,680
2075 West Big Beaver Road, Suite 600
Troy, MI 48084-3443
(248) 649-6090

Dated: 09 June 97

Docket No.: 0325.00004



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IN RE APPLICATION OF Ting P. Yen

SERIAL NUMBER: 08/561,951

FILED: November 22, 1995

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ART UNIT: 2503

EXAMINER: V. Wallace

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

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RESPONSE TRANSMITTAL AND
EXTENSION OF TIME REQUEST

(IF REQUIRED)

Initial Review

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Sir:

Enclosed please find an amendment, Information Disclosure Statement with cited references and a postcard along with the fee calculation below:

FEE CALCULATION FOR ENCLOSED AND EXTENSION REQUEST (IF ANY)

	Claims Remaining	Highest No. Previous	Extra Rate	Additional Fee
Total Claims	10 minus	12 =	0 x \$ 22.00	\$ 0.00
Independent Claims	10 minus	3 =	0 x \$ 80.00	\$ 0.00
Multiple Dependent Claim First Added			+ \$260.00	\$ 0.00

TOTAL IF NOT SMALL ENTITY \$ 0.00

[] SMALL ENTITY STATUS - If applicable, divide by 2 \$ 0.00
[] Verified statement enclosed, if not previously filed.

[] Applicant also requests a ____ month extension of time
for response to the outstanding Office Action. The fee is \$ 0.00

[X] Fee set forth in 37 C.F.R. 1.17 (p) for Information Disclosure
under 37 C.F.R. 1.97 (c). \$ 230.00

TOTAL FEE \$ 230.00

The Commissioner is hereby authorized to charge any overpayment or underpayment of the above fee associated with this Communication to Deposit Account No. 02-2712. A duplicate copy of this sheet is attached.

BLISS McGLYNN, P.C.

2075 W. Big Beaver, Suite 600
Troy, MI 48084-3443
(248) 649-6090

By: Joseph G. Burgess
Joseph G. Burgess
Reg No.: 33,362

I hereby certify that this letter, the response or amendment attached hereto are being deposited with the United States Postal Service as first class mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231, on June 9, 1997.

By: Theresa A. Wilmoth
Theresa A. Wilmoth