Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MICHAEL REN HSING

Appeal No. 2003-0868
Application No. 09/710,101

ON BRIEF

Before GARRIS, LIEBERMAN and POTEATE, Administrative Patent Judges.

LIEBERMAN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner refusing to allow claims 1, 3 through 9 and 11 through 16 which are all the claims pending in this application.

THE INVENTION

The invention is directed to a high voltage transistor formed on a semiconductor substrate. According to the inventors, the transistor includes a spiral resistor on top of a thin oxide layer placed on a semiconductor substrate. One end of the spiral resistor is connected to the highest potential of the transistor and the other end is connected to the lowest potential in the resistor. A drift region underneath the spiral transistor is graded by the presence of a single dopant. See Brief, page 3. Additional limitations are described in the following illustrative claim.

THE CLAIM

Claim 1 is illustrative of appellant's invention and is reproduced below.

1. A high voltage transistor formed on a semiconductor substrate, the transistor comprising:

a thin gate oxide layer formed over said substrate;

a gate formed atop said gate oxide layer;

a drain formed in said substrate and separated from said gate by a drift region;

a source formed in said substrate adjacent to said gate;

a spiral resistor formed atop said gate oxide layer, said spiral resistor located between said drain and said gate, wherein a first end of said spiral resistor is connected to said drain and a second end of said spiral resistor is connected to said source; and

wherein said drift region is located in said substrate underneath said spiral resistor and includes at least two dopant zones, each of said dopant zones having different dopant concentrations, further wherein said drift region only includes one type of dopant.

THE REFERENCES OF RECORD

As evidence of obviousness, the examiner relies upon the following references:

Williams et al. (Williams)	5,237,193	Aug. 17, 1993
Shekar et al. (Shekar)	5,317,171	May 31, 1994
Mojaradi et al. (Mojaradi)	5,382,826	Jan. 17, 1995
Roth et al. (Roth)	6,153,916	Nov. 28, 2000

Hamza Yilmaz (Yilmaz) "Optimization and Surface Charge Sensitivity of High-Voltage Blocking Structures With Shallow Junctions" IEEE Transactions of Electron Devices, Vol. 38, No. 7, pp. 1666-1674 (July 1991).

THE REJECTIONS

Claims 1, 3, 5, 8, 9, 11, 13 and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth.

Claims 4 and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth and further in view of Williams.

Claims 7 and 15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth and further in view of Shekar.

Claims 6 and 14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth and further in view of Yilmaz.

OPINION

We have carefully considered all of the arguments advanced by the appellant and the examiner and agree with the appellant that the rejection of the claims under §103(a) is not well founded. Accordingly, we reverse the rejections for the reasons discussed herein.

The Rejection under § 103(a)

It is the examiner's position that, "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the multiple dopant zones as taught by Roth to Mojaradi's high voltage transistor with a spiral resistor for the purpose of increasing the output voltage endurance between the gate and drain as taught by Roth [Roth column 3, lines 25-30]." See Answer, page 6. We disagree with the examiner's conclusion.

Mojaradi is directed to a high voltage transistor having a spiral transistor connected between the gate and the drain. See Figure 2 and Brief, page 4. Both the examiner and the appellant agree that Mojaradi does not teach a drift region in the substrate underneath the spiral transistor having different dopant concentrations. See Answer, page 5 and Brief, page 4. The examiner accordingly relies upon the teachings of Roth directed to a drift region having multiple dopant areas, 24, 26 and 28 wherein the lowest dopant area is closest to the plate and the highest dopant area is closest to the drain to replace the constant doped drift region of Mojaradi. See Answer, pages 5 and 6.

As properly pointed out by the appellant, "the disclosure of the '916 patent

discloses a counter doping ring 40 that separates two of the lower dopant concentration rings 28 and 26." See Brief, page 7. The appellant further states that the purpose of the counter doping ring is the purpose of the spiral resistor, i.e., "to increase protection against breakdown in the gate oxide layer 30." *Id.* The examiner in error, however, relies upon the appellant's statement as a concession that, "one of ordinary skill in the art would not incorporate the counterdoping ring of the '916 patent into the spiral resistor transistor of the '826 patent." See Answer, Page 12. Accordingly, the examiner is proposing to replace the constant doped drift region disclosed by Mojaradi with the drift region disclosed in the Roth patent, omitting however, the counterdoping region 40 from the disclosed drift region. In so doing, the examiner has failed to establish why the person having ordinary skill in the art would have utilized the drift region of Roth while omitting the counterdoping layer, especially as there is no teaching of a spiral resistor in Roth, or indeed any resistor. Furthermore, the examiner has not explained why would the person having ordinary skill in the art utilize the drift region of Roth who utilizes no resistor in place of the Mojaradi reference which teaches a spiral resistor.

Based upon the above finding and analysis, we conclude that the examiner has not established a prima facie case of obviousness with respect to the aforesaid set of claims. See In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("[T]he best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.").

Furthermore, based upon the above analysis, we have determined that the examiner's legal conclusion of obviousness is not supported by the facts. "Where the legal conclusion [of obviousness] is not supported by [the] facts, it cannot stand." In re Warner, 379 F. 2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

Finally, no consideration has been given to the examiner's reliance upon the Yilmaz reference as discussed in the Answer on page 6. The only prior rejection relying on Yilmaz is directed to claims 6 and 14 wherein Yilmaz further teaches multiple zone extension and junction depth. There is no stated rejection on the record before us wherein Yilmaz provides further motivation to combine Mojaradi and Roth. It's reliance upon by the examiner on appeal is improper, particularly as there is no ground of rejection wherein Yilmaz is relied upon as providing motivation to combine Mojaradi and Roth.

A discussion of the tertiary references to Williams and Shekar are not needed in reaching our decision as they are directed to specific limitations required by dependent claims.

DECISION

The rejection of claims 1, 3, 5, 8, 9, 11, 13 and 16 under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth is reversed.

The rejection of claims 4 and 12 under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth and further in view of Williams is reversed.

The rejection of claims 7 and 15 under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth and further in view of Shekar is reversed.

The rejection of claims 6 and 14 under 35 U.S.C. §103(a) as being unpatentable over Mojaradi in view of Roth and further in view of Yilmaz is reversed.

The decision of the examiner is reversed.

REVERSED

BRADLEY R. GARRIS Administrative Patent Judge	)
PAUL LIEBERMAN Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
LINDA R. POTEATE Administrative Patent Judge	)

PL/dal

PERKINS COIE LLP
PATENT-SEA
P.O. BOX 1247
SEATTLE WA 98111-1247