THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

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Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte HUA Q. TSERNG
and PAUL SAUNIER

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Appeal No. 1997-3484
Application 08/089,359[1]

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ON BRIEF

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Before JERRY SMITH, BARRETT, and LALL, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

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[1] Application for patent filed July 9, 1993, entitled "Integrated Circuit Capable Of Low-Noise And High-Power Microwave Operation," which is a division of Application 07/973,906, filed November 10, 1992, now U.S. Patent 5,254,492, issued October 19, 1993.

## DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-5. Claims 6-10 are indicated to be allowable. Claims 20-28 stand withdrawn pursuant to a restriction requirement.

We reverse.

## BACKGROUND

The disclosed invention is directed to an integrated circuit with two different types of field effect transistors which eliminates the need for epitaxial regrowth.

Claim 1 is reproduced below.

1. An integrated circuit for providing low-noise and high-power microwave operation comprising:

a material structure comprising:

a substrate;

a low-noise channel layer;

a low-noise buffer layer;

a power channel layer; and

a wide bandgap layer;

a first active region comprising:

a first source contact above said wide bandgap layer;

a first drain contact above said wide bandgap layer, wherein said first source contact and said first drain contact are alloyed and thereby driven into said material structure to make contact with said low-noise channel layer; and

a first gate contact to said low-noise buffer layer; and

a second active region comprising:

a second source contact above said wide bandgap layer;

a second drain contact above said wide bandgap layer, wherein said second source contact and said second drain contact are alloyed and thereby driven into said material structure to make contact with said power channel layer; and

a second gate contact to said wide band-gap [sic] layer;

wherein said first active region and said second active region are electrically isolated from one another.

The Examiner relies on the following prior art:

Itoh 4,866,490 September 12, 1989
Takikawa 5,302,840 April 12, 1994
(filed June 17, 1992)

Claims 1 and 3-5 stand rejected under 35 U.S.C. § 102(e) as anticipated by, or in the alternative, under 35 U.S.C. § 103 as being unpatentable over Takikawa.

Claim 2 stands rejected under 35 U.S.C. § 103 as being unpatentable over Takikawa and Itoh.

We refer to the Final Rejection (Paper No. 7) and the Examiner's Answer (Paper No. 14) (pages referred to as "EA__") for a statement of the Examiner's position and to the Amended Appeal Brief (Paper No. 16) (pages referred to as "Br__") for a statement of Appellants' arguments thereagainst.

OPINION

Initially, we conclude that the Examiner erred in the claim interpretation that nothing in claim 1 prevents using different labels on different halves of the structure in Takikawa. It is true that the claimed "material structure" comprising a substrate and four layers, by itself, does not positively require that the layers are coextensive with each other over the whole area of the substrate and does not recite the order of the layers. If it were just this limitation at issue, we would agree that it is only necessary that there be a structure corresponding to the substrate and the four layers; e.g., one region could have a substrate, a low-noise channel layer, and a wide bandgap

layer and a second region could have a substrate, a power-channel layer, and a wide bandgap layer. The same planar layer in Takikawa could have different functions in the different regions because the regions are separated by an isolation region 11. Of course, the same planar region on the same side of the isolation region 11 cannot have different functions. However, the Examiner's interpretation fails to account for the language that both the first source and drain contacts and second source and drain contacts are recited to be "driven into said material structure," which requires the same "material structure" in both active regions, not just parts of this structure.

The Examiner makes at least three errors.

First, Takikawa does not disclose the same four layers in the two different regions and, therefore, does not disclose that the contacts are "driven into said material structure."

Second, we agree with Appellants' argument (Br4) that Takikawa does not disclose "a first gate contact to said low-noise buffer layer." The Examiner relies on potential barrier layer 5 in Takikawa as the wide bandgap layer in

order to meet the limitations of "a first source contact above said wide bandgap layer," "a first drain contact above said wide bandgap layer," "a second source contact above said wide bandgap layer," "a second drain contact above said wide bandgap layer," and "a second gate contact to said wide band-gap [sic] layer." The Examiner finds the region above the p-channel region 3H to be the low-noise buffer layer (EA2) and considers the region with the plus signs in circles underlying the gate 12 as part of the gate contact with electrode 12 (EA5). However, this is an unreasonable distortion of Takikawa since gate electrode 12 is separated from the layer 4 above region 3H by layer 5 and, thus, there is no contact "to" this layer 4. above region 3H. The layer 5 is a potential barrier which is doped with impurities to retain ionized charges (indicated by the plus signs in circles) which shift the threshold voltage of the HEMT toward negative (col. 5, line 62 to col. 6, line 2) and is not part of the gate contact. Takikawa does not disclose "a first gate contact to said low-noise buffer layer."

Third, claim 1 does not teach alloyed source and drain contacts because, as noted by Appellants (Br4), Takikawa

discloses forming source and drain contacts on p-type regions 6 and 6 and n-type regions 8 and 9. Thus, the anticipation rejection is improper. The Examiner states (EA3-4): "Alternatively, it would have been obvious to alloy the contacts with the underlying material in order to obtain ohmic contacts." The Examiner cites no evidence to support this conclusion. "Even if obviousness of the variation is predicated on the level of skill in the art, prior art evidence is needed to show what that level of skill was." In re Kaplan, 789 F.2d 1574, 1580, 229 USPQ 678, 683 (Fed. Cir. 1986). "Assertions of technical facts in areas of esoteric technology must always be supported by citation to some reference work recognized as standard in the pertinent art." See In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970); accord In re Pardo, 684 F.2d 912, 917, 214 USPQ 673, 677 (CCPA 1982). See also In re Eynde, 480 F.2d 1364, 1370, 178 USPQ 470, 474 (CCPA 1973) (court will not take judicial notice of the state of the art). Regardless of what we may know personally, there is no evidence to support the Examiner's bare conclusion in any further judicial review.

Accordingly, the Examiner has failed to provide sufficient evidence to support a prima facie case of obviousness.

For the reasons stated above, the anticipation and obviousness rejections of claims 1 and 3-5 are reversed. The Itoh patent does not cure the deficiencies of Takikawa with respect to the rejection of claim 1. Accordingly, the rejection of claim 2 is also reversed.

REVERSED

JERRY SMITH )
Administrative Patent Judge )
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) BOARD OF PATENT
LEE E. BARRETT ) APPEALS
Administrative Patent Judge ) AND
) INTERFERENCES
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PARSHOTAM S. LALL )
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