The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte WILLIAM W. DOSTALIK, ROBERT KRAFT
and KENNETH D. BRENNAN

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Appeal No. 2006-0473
Application 10/430,558

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ON BRIEF

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Before THOMAS, BARRETT, and NAPPI, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellants have appealed to the Board from the examiner's final rejection of claims 1 through 19.

Representative claim 1 is reproduced below:

1. An integrated circuit comprising:

a semiconductor substrate;

a front-end structure coupled to said semiconductor substrate;

a single damascene layer coupled to said front-end structure;

a dual damascene layer coupled to said single damascene layer, said dual damascene layer comprising trenches and vias within a dielectric material; and

a dual damascene pattern liner coupled at least partially between said vias and said dielectric material but not between said trenches and said dielectric material.

The following references are relied on by the examiner:

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| Lim et al. (Lim) | 6,380,084 | Apr. 30, 2002 |
| Merchant et al. (Merchant) | 6,686,662 | Feb. 3, 2004 (Filed May 21, 2002) |

Claims 1, 2, 4, 5, 8, 11, 12, 14 and 15 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Lim. As to all the other claims on appeal, claims 3, 6, 7, 9, 10, 13 and 16 through 19, the examiner rejects these claims under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Lim in view of Merchant.

Rather than repeat the positions of the appellants and the examiner, reference is made to the brief (no reply brief has been filed) for appellants' positions, and to the answer for the examiner's positions.

OPINION

For the reasons set forth by the examiner as amplified here, we sustain the rejections of all claims on appeal.

The subject matter of independent claim 1 very closely resembles the subject matter of independent claim 11 on appeal. Whereas the last clause of claim 1 on appeal recites a dual damascene pattern liner coupled at least partially between said vias and said dielectric material but not between said trenches and said dielectric material, claim 11 recites that this liner is coupled at least partially between said trenches and said dielectric material but not between said vias and said dielectric material.

Before we continue with our analysis, we make reference to the examiner tutorial as to what is a dual damascene pattern liner and a single damascene pattern liner as expressed at pages 5 and 6 of the answer. As pointed out by the examiner here, these terms relate to processes in the art such that in a dual damascene process, only a <u>single</u> metal <u>deposition step</u> is used to simultaneously form metal lines in trenches <u>and</u> metal in the vias. The examiner also notes that even though a via or a trench structure may be typically in a single dielectric layer, structures formed in multilayer dielectrics are also common in the art. This analysis has not been questioned by appellants since no reply brief has been filed. We therefore agree with the examiner's observations at page 6 of the answer that the

underlining issue in this appeal inherently relates to product-by-process limitations relating to this dual damascene feature. Without evidences from the appellants to the contrary, the final structure produced by dual damascene is still a via or a trench filled with a metal.

Even the column 1 discussion of Lim indicates that it was known in the art that a single copper layer may be deposited in both a via and a connective line trench as depicted in prior art figures 1 through 3 of that reference. Most simply expressed at column 2, lines 43 through 46 of Lim, is a method of forming dual damascene interconnects whereby the first copper layer of the vias can be used as a seed layer for the subsequent deposition of a second copper layer into the upper interconnect trenches. This is emphasized in the remaining portions of the Summary of The Invention, for example, in two respects. The paragraph bridging columns 2 and 3 relates to the first embodiment shown in figure 4 through 14 of Lim where it is emphasized at lines 17 through 21 of column 3 that a single deposition of copper is also a part of Lim's invention. The same may be said of the second embodiment in figures 18 through 23, which is summarized in the paragraph beginning at the middle of column 3, with emphasis on similar statement made at lines 56 through 60 indicating again that a single deposition of copper is made. These statements clearly make the teachings of Lim in a dual damascene environment, as argued by the examiner.

With this background, we do not agree with appellants' views expressed as to independent claim 1 at pages 13 and 14 of the brief, urging that Lim does not use the term dual damascene in the manner commonly accepted in the industry. On the contrary, appellants have presented no evidence to us to led us to believe that such is the case. Not only is the examiner's assessment of the prior art dual damascene tutorial at pages 5 and 6 of the answer not challenged by appellants in a reply brief, Lim makes clear that his invention is in context of a dual damascene layer arrangement. If anything, to the extent that there is any merit to the appellants' argument without any evidences at all, it appears that the art/industry would appear to accept more than one meaning of it to the extent it differs from appellants' urging.

The additional urging that Lim's structure of a dual damascene structure actually involves two single damascene structures - - one single damascene structure for the via layer and another, separate, single damascene structure for the trench layer - - is without merit. This argument is not persuasive because of the previously noted product-by-process nature of the term dual damascene as well as the examiner's simple observation in the paragraph bridging pages 6 and 7 of the answer that indicates that Lim's structure has features 64/84 [in figure 14] as the via/trench 'dual-damascene' structure in the dielectric layer 52,72. The 'dual-damascene' pattern liner 60 is clearly

not coupled between the trench and the dielectric material but only coupled between the via and the dielectric material. A similar observation may be made with respect to the showings in figure 14 as to the feature at the end of independent claim 11. Note also the additional showing in figure 23's second embodiment of Lim that the pattern liner 112 in this figure is at least partially located between said trenches and the dielectric material but not between the vias and the dielectric material as required at the end claim 11.

We therefore do not agree with appellants' other general urging that Lim teaches away from the claimed invention because it teaches the use of a liner that fully covers both the trenches and the vias. The language chosen for both independent claims 1 and 11 does not exclude the inclusive capability as observed by the examiner.

As to the respective dependent claims included within the rejection under 35 U.S.C. § 102, we agree with examiner's observations at pages 2 and 3 of the answer that the corresponding remarks in the brief merely are restatements of the arguments with respect to the independent claims with additional mere statements of the limitations of the dependent claims which do not comply with 37 CFR 41.37(c)(1)(vii).

We turn next to the rejection of additional dependent claims under 35 U.S.C. § 103 as being obvious over Lim in view Merchant. We affirm this rejection for the reasons set forth by the

examiner at pages 4 and 5 of the answer as briefly embellished upon by the examiner at page 7 of the answer. There the examiner essentially repeats the essence of the teaching value of Merchant to the subject matter of Lim.

At least with respect to dependent claim 3, appellants' remarks at pages 26 and 27 of the brief do not challenge what the examiner relies upon for combinability with Lim. Instead appellants argue the same argument as to Merchant as to Lim previously argued, only generally alleging that both references teach away because both teach the liners cover both trenches and vias. In this respect then our same response as indicated earlier with respect Lim alone is pertinent here as well.

Additionally, the argument appears not to be pertinent to the actually features recited in representative dependent claim 3, for example, which merely recites that the previously recited low-k material is comprising OSG. The examiner has previously relied upon column 4, lines 50 through 61 and column 6, lines 53 through 58 in Lim for respective dielectric materials having a low-k dielectric. The same is true for the corresponding teachings relied upon by the examiner at column 2, lines 55 through 60 and the specific teaching of utilizing OSG at column 3, lines 39 through 45 of Merchant as a low-k dielectric. This teaching at column 3 indicates that low-k dielectrics can additionally include organosilicate glass (OSG) which apparently has trade names including Black Diamond which is specifically

mentioned at the above-noted portions of columns 4 and 6 of Lim. Therefore, at least with respect to most of the dependent claims rejected under 35 U.S.C. § 103, the artisan may well appreciate that Lim alone teaches these features anyway.

Lastly, with respect to the other dependent claims in this rejection under 35 U.S.C. § 103, the examiner has identified pertinent corresponding teachings with respect to titanium nitride and silicon nitride. Appellants' additional remarks with respect to the remaining dependent claims rejected under 35 U.S.C. § 103 after claim 3, are also within the same form noted by the examiner at pages 2 and 3 of the answer as those presented with respect to claim 3. Again, merely adding statements as to what the limitations are of respective dependent claims are not arguments of patentablity within 37 CFR as noted by the examiner at the top of page 3.

In view of the foregoing, the decision of the examiner rejecting various claims under 35 U.S.C. § 102 and 35 U.S.C. § 103 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

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| JAMES D. THOMAS<br>Administrative Patent Judge | ) | |
| LEE E. BARRETT<br>Administrative Patent Judge | ) | BOARD OF PATENT APPEALS AND INTERFERENCES |
| ROBERT E. NAPPI<br>Administrative Patent Judge | ) | |

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