

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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 SARAH E. KIM and R. SCOTT LIST

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Appeal No. 2006-2317  
Application No. 10/334,196

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ON BRIEF

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Before THOMAS, KRASS, and SAADAT, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION

Appellants have appealed to the Board from the examiner's final rejection of claims 1 through 22, 35, 37 and 38. The examiner has indicated the allowability of claim 36 and claims 23 through 34 have been withdrawn.

Representative independent claim 1 is reproduced below:

1. A method to vertically interface wafer-based microelectronic devices comprising:

bonding a first device to a second device, each of the first and second devices comprising a substrate layer having an active layer adjacent a bulk substrate layer and a series of conductive lines coupled to the active layer, by interfacing the conductive lines of the first device with the conductive lines of the second device to provide an electrical connection between the active layer of the first device and the active layer of the second device;

forming a conductive layer across the bulk substrate layer and a portion of the active layer of the first device, the conductive layer having a via portion and an external contact portion, the external contact portion protruding beyond the bulk substrate layer of the first device, the via portion providing an electrical connection between the external contact portion and the one of the conductive lines of the first device.

The following reference is relied on by the examiner:

Patti	6,642,081	Nov. 4, 2003
		(Filed April 11, 2002)

Claims 1 through 22, 35, 37 and 38 stand rejected under 35 U.S.C. § 102(e)  
as being anticipated by Patti.

Rather than repeat the positions of the appellants and the examiner, reference is made to the brief and reply brief for appellants' positions, and to the answer for the examiner's positions.

### OPINION

Essentially for the reasons set forth by the examiner in the answer, as emphasized and expanded upon here, we sustain the rejection of all claims on appeal under 35 U.S.C. § 102.

At the outset, we note that arguments are presented before us only as to independent claims 1 and 13 on appeal, with the brief remarks at the bottom of page 11 of the principal brief on appeal relying for patentability of the dependent claims upon those arguments of their parent independent claims. It is emphasized as well that no arguments are presented to us as to independent claim 35 and its dependent claims 37 and 38. Page 2 of the principal brief on appeal recognizes these claims are on appeal, yet only asserts comments with respect to claims 1 through 22.

Since

appellants have not formally withdrawn the appeal to claims 35, 37 and 38 and because no arguments are presented in the brief and reply brief as to these claims, the rejection of them is summarily affirmed.

As to appellants' arguments emphasized in the brief and reply brief, the principal issues between the examiner and the appellants are the characterizations of the recitations of conductive lines and a conductive layer and the examiner's correlations of these features to the teachings and showings in Patti.

The examiner essentially characterizes metal conductors 114 and 115, such as in Patti's figure 2 which are apparently analogous to the metal conductors 25, 35 and 45 in figure 1, as conductive lines in claim 1. Additionally, the examiner characterizes the vertical conductor 50 comprising separate component conductors 51, 52 and 53 in figure 1 of Patti as corresponding to the claimed conductive layer in claim 1. With this assessment of the teachings and showings in Patti, we fully agree.

Independent claim 1 recites that the bonding occurs between devices. In Patti, the devices/wafers are directly bonded to each other as recited. The additional recitation of bonding by interfacing conductive lines in claim 1 does not recite that the interfacing is a direct interfacing between the conductive lines by

directly bonding them between devices. As recited in claim 1, Patti plainly teaches and shows, according to the examiner's analysis, interfacing conductive lines by bonding the two devices together. It's readily apparent to us and the artisan that the interfacing that is in accordance with the examiner's view in Patti is an indirect interfacing of the metal conductors 25, 35 and 45 as comprising the claimed conductive lines, in addition to the direct bonding of the flush copper pad 132 in figures 6 and 7 and the identical depicted direct bonding between wafers as bonding pads 210, 211 in figures 8 and 9, for example. These additional showings are consistent with the initial showings in figure 1.

Essentially, the claim language actually set forth in representative independent claim 1 on appeal is not consistent with appellants' arguments thereagainst. Based on the examiner's correlation of the teachings and showings in Patti and our own understanding of this reference, we do not agree with the appellants' urging in the brief and reply brief that the only conductors interfaced to bond devices together in Patti are the conductor elements 51, 52 and 53 in figure 1, also appearing as conductors 210, 211 in figures 8 and 9. We, therefore, do not agree with appellants' characterization that these elements are the only possible structures of Patti that can be conductive lines.

On the other hand, we fully agree with the examiner's views expressed best in the response to argument portion of the answer. As noted by the examiner in the paragraph bridging pages 8 and 9 of the answer, the examiner correctly notes that claim 1 does not recite that the conductive lines of a first device and the conductive lines of the second device form an interface or a direct interface. The examiner makes the point, with which we agree from our own interpretation of claim 1, that the manner in which claim 1 is recited merely implies that two devices are bonded through a connecting or interfacing means of conductive lines of the two devices. The examiner correctly emphasizes that "an interface is formed between the conductors of two devices and this interface is not exclusively formed by the conductive lines through a direct contact between them." The examiner again emphasizes this point at page 10 of the answer where it is stated that "interfacing the conductive lines of two devices is not equivalent to forming an interface [directly] between the conductive lines of two devices. Again, it is pointed out that the instant invention does not recites [sic recite] the conductive lines of two devices form an [sic a direct] interface."

It also appears to us in passing that the actual body of claim 1 on appeal does not recite a vertical interfacing approach between any wafers notwithstanding the recitation to that effect in the preamble of this claim. No vertical interfacing is set forth at all in independent claim 13.

Appellants' arguments with respect to independent claim 13 essentially rely upon similar or the same arguments with respect to those urging patentability of independent claim 1 on appeal which we have not agreed with. As the examiner points out at page 11 of the answer, the term "internal contact" is not in actuality a contact internal to a device/wafer. In fact, the examiner correctly notes that the claimed internal contacts in fact really are the conductive lines, such as line 111 in figure 1 of the disclosed invention and lines 115 and 116 in figure 2A of the disclosed invention. As such, they are in fact really unclaimed external or surface contacts of the respective devices/wafers. The claimed trench is analogous to the via 120 in representative figure 3 of Patti which has been filled with copper as shown in figures 6 and 7 as element 132 and depicted as completed and bonded elements in figures 8 and 9 labeled elements 210, 211.

The corresponding discussion in Patti, as to these figures, makes a point of explaining that a conductive layer of copper extends beyond the substrate layer (elements 21, 31 and 41 in Patti's figure 1) as claimed. Additionally, the artisan may well interpret claim 13 as being met by the features of the mated/bonded vertical conductors/component conductors themselves as comprising the claimed internal contacts. Bonding between devices/wafers in Patti occurs at/by surface contacts 210, 211 in Figures 8 and 9 viewed as "internal" to the stacked wafers. Lastly, as illustrated in the various figures of Patti, the via 120 and filled via 120 depicted as copper pad 132 in the latter figures extends "across" or through all of or substantially all of the respectively stacked component layers/wafers 20, 30 and 40 in figure 1 of Patti.

In view of the foregoing, the decision of the examiner rejecting all claims on appeal under 35 U.S.C. § 102 is affirmed.

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

AFFIRMED

JAMES D. THOMAS	)	
Administrative Patent Judge	)	
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	)	
	)	BOARD OF PATENT
ERROL A. KRASS	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
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	)	
MAHSHID D. SAADAT	)	
Administrative Patent Judge	)	

JDT/pgc

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