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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/527,330	09/27/2006	Jae-Kyeong Jeong	P58112	4392
8439	7590	03/14/2013	EXAMINER	
ROBERT F. BUSHNELL & LAW FIRM			NGUYEN, DAO H	
2029 K STREET NW			ART UNIT	
SUITE 600			PAPER NUMBER	
WASHINGTON, DC 20006-1004			2818	
			NOTIFICATION DATE	
			DELIVERY MODE	
			03/14/2013	
			ELECTRONIC	

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* JAE-KYEONG JEONG, HYUN-SOO SHIN,  
and YEON-GON MO

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Appeal 2011-002173  
Application 11/527,330  
Technology Center 2800

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Before ROBERT E. NAPPI, HUNG H. BUI, and LYNNE E. PETTIGREW,  
*Administrative Patent Judges.*

PETTIGREW, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from a final rejection of claims 1, 4, 5, 8, 11, 12, and 29-31.<sup>1</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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<sup>1</sup> Claims 6, 7, 9, 10, and 13-28 have been withdrawn from consideration. Ans. 2. Claims 2 and 3 have been cancelled. *Id.*

## STATEMENT OF THE CASE

### *Introduction*

According to Appellants, their invention relates to a transparent thin film transistor (TFT) and its method of manufacture.

Claim 1 is illustrative of the invention (disputed limitation in *italics*):

1. A transparent Thin Film Transistor (TFT) comprising:

transparent source and drain electrodes;

a transparent semiconductor activation layer arranged to contact the source and drain electrodes and having source and drain regions arranged therein; and

a doping section arranged between the transparent source and drain electrodes and the transparent semiconductor activation layer and having the same doping type as that of the source and drain regions and having a doping concentration different from that of the source and drain regions,

wherein the doping section comprises regions of the transparent semiconductor activation layer including a surface contacting the source and drain electrode,

*wherein the doping section comprises doping layers interposed between and in contact with both the source and drain electrodes and the transparent semiconductor activation layer.*

### *Rejection on Appeal*

The Examiner rejected claims 1, 4, 5, 8, 11, 12, and 29-31 under 35 U.S.C. § 103(a) as being unpatentable over Yamazaki (US 6,849,872 B1, Feb. 1, 2005). Ans. 4-12.

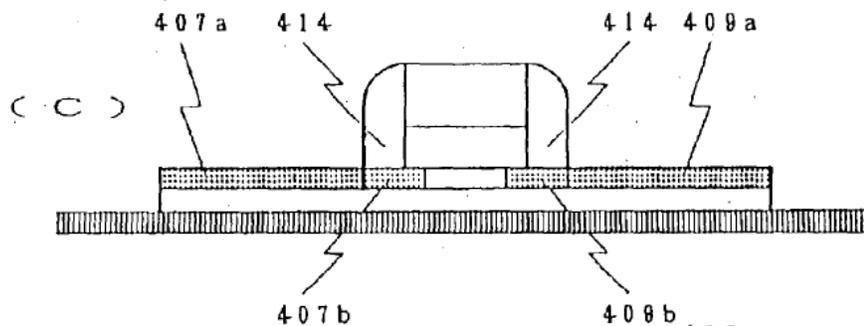
*Issue on Appeal*

Based on Appellants' arguments, the issue on appeal is whether Yamazaki teaches or suggests a doping section that "comprises doping layers interposed between and in contact with both the source and drain electrodes and the transparent semiconductor activation layer," as recited in claim 1.

ANALYSIS

We have reviewed the Examiner's rejections in light of Appellants' contentions that the Examiner has erred. We disagree with Appellants' conclusions. We adopt as our own the findings and reasoning set forth in the Examiner's Answer. We highlight and address the following findings and arguments for emphasis.

The Examiner finds that Yamazaki describes a TFT with doping layers interposed between and in contact with source and drain electrodes and the semiconductor activation layer, as recited in claim 1. Ans. 4-5, 12-19. The Examiner refers to Figure 4 of Yamazaki. Figure 4(C) of Yamazaki is reproduced below:



**Figure 4(C) shows a partially formed TFT with source regions 407a and 407b and drain regions 409a and 409b.**

The Examiner finds that regions 407a and 409a in Figure 4(C) (formed within source and drain regions 407 and 409) correspond to the claimed “doping layers” and are in contact with source and drain regions 407b and 409b (the remaining portions of source and drain regions 407 and 409), which are within the semiconductor activation layer. Ans. 4-5; Yamazaki, col. 6, ll. 36-53. Thus, Yamazaki teaches “doping layers” in contact with the semiconductor activation layer, as recited in claim 1. Ans. 5.

While Figure 4 does not explicitly show source and drain electrodes, the Examiner finds that Yamazaki describes adding them to the TFT shown in Figure 4(D) in such a way that doping layers 407a and 409a are interposed between and in contact with the source and drain electrodes and the semiconductor activation layer, as recited in claim 1. Ans. 4. Specifically, after the structure in Figure 4(D) is obtained (by adding a silicon nitride film 405 to the surface of the structure in Figure 4(C)), Yamazaki explains that a phosphosilicate glass (PSG) film is formed on the surface “and a hole for an electrode [is] made to form an aluminum electrode[] in a source region and a drain region.” Ans. 4; Yamazaki, col. 10, ll. 24-26; *see also* Yamazaki, col. 8, ll. 31-33 (describing another example in which “a hole [is] made to provide an aluminum electrode[] in the source and the drain regions”). Based on this description, the Examiner finds that Yamazaki teaches source and drain electrodes formed through the outer layer to contact source and drain regions 407a and 409a (i.e., the doping layers). Ans. 4, 13-14. The Examiner notes that the electrodes must contact source and drain regions 407a and 409a (the doping layers) rather than source and drain regions 407b and 409b because “otherwise, such

electrodes would go through the side wall spacers 414 (fig. 4C), which would lead to short-circuit problems with the gate 410.” Ans. 14. As the Examiner properly finds, the result of such formation of electrodes in source and drain regions 407a and 409a, as shown in Figure 4(D), is that doping layers 407a and 409a are interposed between and in contact with both the source and drain electrodes and the semiconductor activation layer, as recited in claim 1. Ans. 14.

We are not persuaded by Appellants’ arguments to the contrary. First, Appellants’ arguments regarding Figure 3 of Yamazaki (App. Br. 12-13; Reply Br. 12) are unpersuasive as the Examiner relies on the configuration shown in Figure 4 rather than Figure 3. Second, we do not agree with Appellants’ assertion that Yamazaki “actually teaches that in Figure 4 the electrodes **do not adjoin** the source/drain regions.” App. Br. 14 (emphasis in original); *see also* Reply Br. 12. Appellants cite the following from Yamazaki (col. 6, ll. 63-65): “In the example of FIG. 4, a silicon nitride film, a gate electrode, and a source or a drain region do not adjoin . . . .” App. Br. 13; Reply Br. 12. That statement refers only to a *gate electrode*, and therefore is not pertinent to whether Figure 4 of Yamazaki teaches doping layers in contact with *source and drain electrodes*, as recited in claim 1. *See* Ans. 17-18.

Finally, we are not persuaded by Appellants’ argument that Yamazaki does not teach or suggest source and drain electrodes in contact with doping layers 407a and 409a. Reply Br. 14. Appellants allege that electrodes could be formed through side walls 414 (presumably to contact source and drain regions 407b and 409b) because “[m]easures to insulate any cavity in the side walls 410 [sic] are known in the art.” *Id.* Yamazaki, however, only

describes making holes for providing electrodes in outer layers, not creating cavities in the side walls that insulate the gate and forming electrodes within those cavities. *See* Yamazaki, col. 8, ll. 31-33; col. 10, ll. 24-26. Therefore, we concur with the Examiner's reading of Yamazaki as teaching source and drain electrodes formed through outer layers to contact doping layers 407a and 409a, thus meeting the limitation of "doping layers interposed between and in contact with both the source and drain electrodes and the transparent semiconductor activation layer," as recited in claim 1.

For at least these reasons, we sustain the Examiner's § 103(a) rejection of claim 1 as well as claims 4, 5, 8, 11, 12, and 29-31, for which Appellants have not made separate, detailed arguments.

#### CONCLUSION

The Examiner has not erred in rejecting claims 1, 4, 5, 8, 11, 12, and 29-31 as being unpatentable under 35 U.S.C. § 103(a).

#### DECISION

The Examiner's rejection of claims 1, 4, 5, 8, 11, 12, and 29-31 is affirmed.

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

AFFIRMED