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**Shirasaki et al.**

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(54) **DISPLAY PANEL**

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(52) **U.S. Cl.** ..... **257/72; 257/40; 257/79**

(58) **Field of Classification Search** ..... **257/40, 257/72, 79**  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,684,365 A	11/1997	Tang et al.
6,297,589 B1	10/2001	Miyaguchi et al.
6,717,357 B2	4/2004	Okuyama et al.
6,839,057 B2	1/2005	Iguchi
7,358,529 B2	4/2008	Childs et al.
7,402,948 B2	7/2008	Yamazaki et al.
2003/0047730 A1	3/2003	Konuma
2003/0137325 A1	7/2003	Yamazaki et al.

2003/0146693 A1	8/2003	Ishihara et al.
2003/0151355 A1	8/2003	Hosokawa
2003/0168992 A1	9/2003	Noguchi et al.
2003/0193056 A1	10/2003	Takayama et al.
2004/0003939 A1	1/2004	Nishi et al.
2004/0160170 A1	8/2004	Sato et al.
2004/0165003 A1	8/2004	Shirasaki
2004/0256617 A1	12/2004	Yamada et al.

(Continued)

**FOREIGN PATENT DOCUMENTS**

CN 1434668 A 8/2003

(Continued)

**OTHER PUBLICATIONS**

Related U.S. Appl. No. 11/235,605, filed Sep. 26, 2005; Inventors: Satoru Shimoda et al; Title: Display Panel.

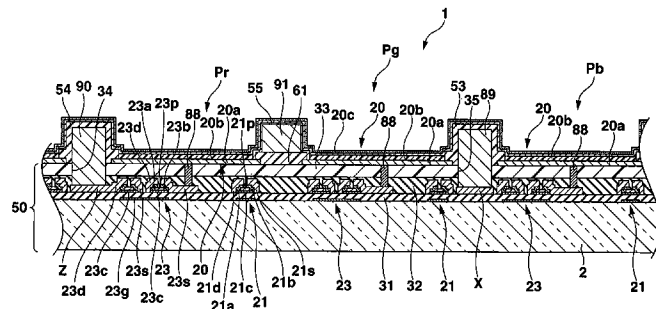
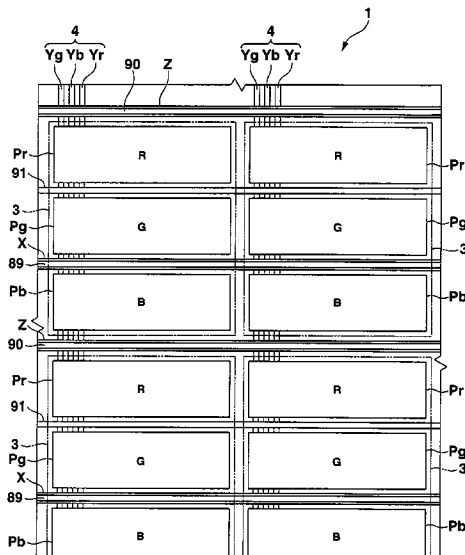
(Continued)

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(57) **ABSTRACT**

A display panel includes a transistor array substrate which has a plurality of pixels and is formed by providing a plurality of transistors for each pixel, each of the transistor having a gate, a gate insulating film, a source, and a drain. A plurality of interconnections are formed to project to a surface of the transistor array substrate and arrayed in parallel to each other. A plurality of pixel electrodes are provided for each pixel and arrayed between the interconnections on the surface of the transistor array substrate along the interconnections. Each of a plurality of light-emitting layers is formed on each pixel electrode. A counter electrode is stacked on the light-emitting layer.

**22 Claims, 13 Drawing Sheets**



## U.S. PATENT DOCUMENTS

2005/0062409	A1	3/2005	Yamazaki et al.
2005/0073264	A1	4/2005	Matsumoto
2005/0088086	A1	4/2005	Park et al.
2005/0258741	A1	11/2005	Kim et al.
2006/0066219	A1	3/2006	Shimoda et al.

## FOREIGN PATENT DOCUMENTS

CN	1437177	A	8/2003
EP	1 331 666	A2	7/2003
EP	1 349 208	A1	10/2003
JP	8-330600	A	12/1996
JP	2002-195008	A	7/2001
JP	2002-352963	A	12/2002
JP	2003-076327	A	3/2003
JP	2003-186420	A	7/2003
JP	2003-288994	A	10/2003
JP	2003-317971	A	11/2003
JP	2004-258172	A	9/2004

KR	2002-0000875	A	1/2002
KR	10-2004-0051611	A	6/2004
TW	591574	A	5/2002
TW	521336	A	2/2003
TW	584824	A	4/2004
TW	594628	A	6/2004
WO	WO 03/079441	A1	9/2003
WO	2004/019314	A1	3/2004

## OTHER PUBLICATIONS

Japanese Office Action (and English translation thereof) dated Apr. 30, 2008, issued in a counterpart Japanese Application.

Chinese Office Action (and English translation thereof) dated Jun. 6, 2008, issued in a counterpart Chinese Application.

Chinese Office Action (and English translation thereof) dated Jun. 6, 2008, issued in related U.S. Appl. No. 11/235,605 in counterpart Chinese Application No. 2005800156930.

Japanese Office Action (and English translation thereof) dated Jun. 10, 2008, issued in related U.S. Appl. No. 11/235,605 in counterpart Japanese Application No. 2004-283963.



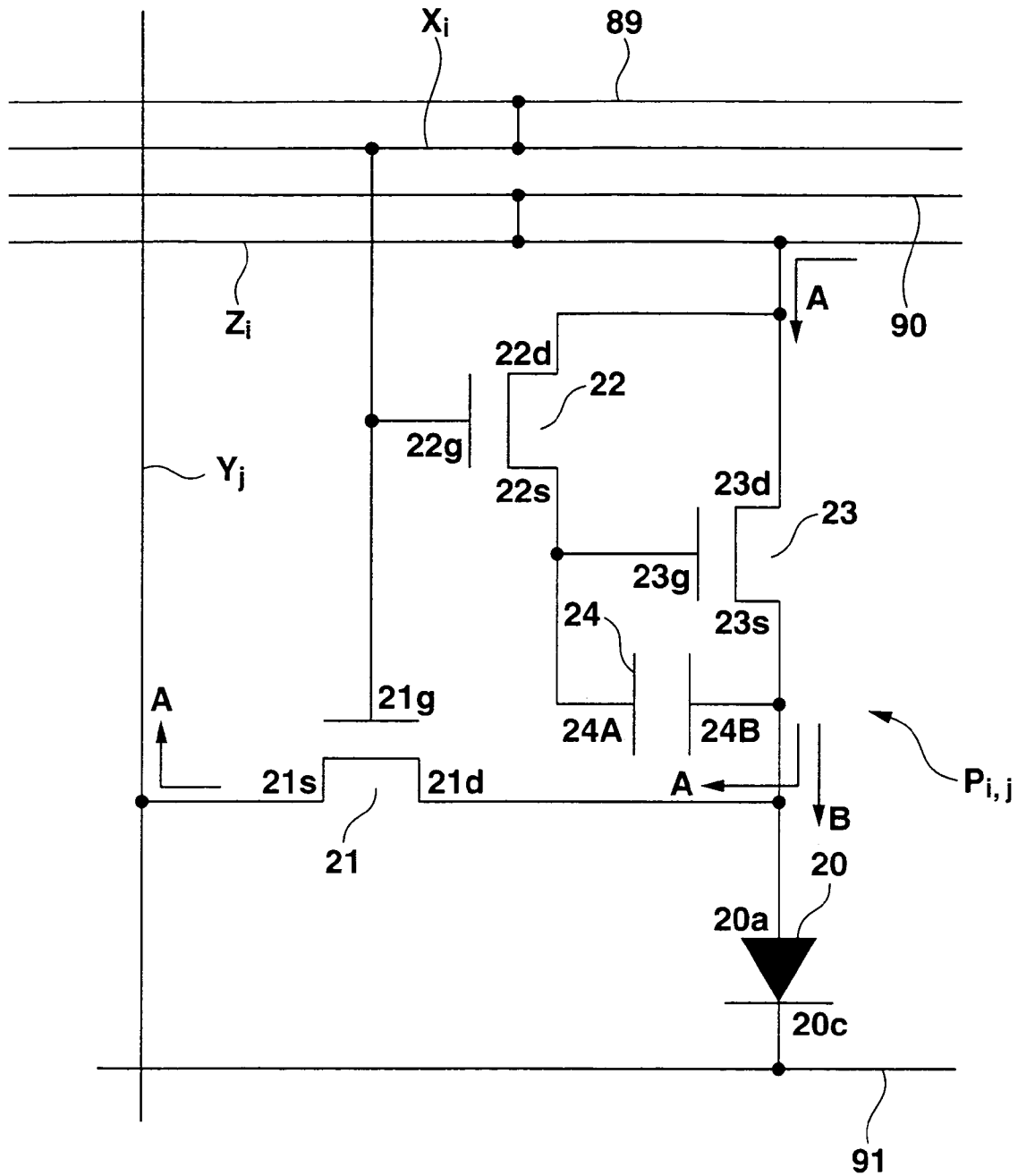


FIG.2



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