

EXHIBIT 3

(12) **United States Patent**
Nakahata et al.(10) **Patent No.:** **US 7,450,206 B2**
(45) **Date of Patent:** **Nov. 11, 2008**(54) **LIQUID CRYSTAL DISPLAY DEVICE AND METHOD OF FABRICATING THE SAME**(75) Inventors: **Yuji Nakahata**, Kawasaki (JP); **Yoji Taniguchi**, Kawasaki (JP); **Tetsuya Fujikawa**, Kawasaki (JP)(73) Assignee: **Sharp Kabushiki Kaisha**, Osaka (JP)

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(21) Appl. No.: **10/893,790**(22) Filed: **Jul. 16, 2004**(65) **Prior Publication Data**

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Related U.S. Application Data

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May 10, 2002 (JP) 2002-136128(51) **Int. Cl.****G02F 1/1337** (2006.01)**G02F 1/1343** (2006.01)(52) **U.S. Cl.** **349/129; 349/39**(58) **Field of Classification Search** **349/143, 349/129, 39, 38**

See application file for complete search history.

(56) **References Cited****U.S. PATENT DOCUMENTS**

5,073,772 A 12/1991 Takafuji et al.

5,136,407 A *	8/1992	Clerc	349/146
5,229,873 A *	7/1993	Hirose et al.	349/146
5,307,189 A	4/1994	Nishiki et al.	
5,309,264 A *	5/1994	Lien et al.	349/143
5,327,001 A	7/1994	Wakai et al.	
5,627,665 A	5/1997	Yamada et al.	
5,668,649 A	9/1997	Suzuki et al.	
5,680,187 A	10/1997	Nagayama et al.	
5,696,568 A	12/1997	Yamamoto et al.	
5,854,663 A	12/1998	Oh et al.	
5,929,960 A	7/1999	West et al.	
6,081,315 A *	6/2000	Matsuyama et al.	349/143
6,108,061 A	8/2000	Sako et al.	

(Continued)

FOREIGN PATENT DOCUMENTS

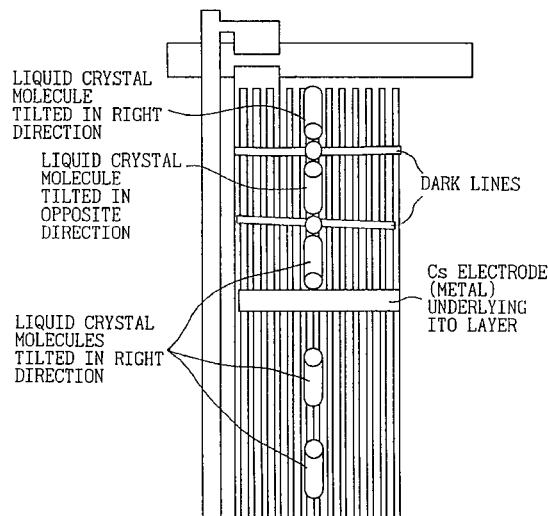
JP 9-244031 A 9/1997

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(57)

ABSTRACT

A liquid crystal display device including a pair of substrates with a liquid crystal layer sandwiched between the pair of substrates. The liquid crystal layer includes a photopolymerizable component mixed therein, and there is a pixel electrode formed on one of the substrates. The pixel electrode includes at least two pixel slit areas separated by a liquid crystal domain boundary area, wherein each of the pixel slit areas includes a plurality of generally parallel slits therein. Further, an additional electrode, having the same potential as the pixel electrode, is formed in at least a portion of the liquid crystal domain boundary area without extending into any of the pixel slit areas.

9 Claims, 43 Drawing Sheets

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U.S. PATENT DOCUMENTS

6,160,604 A *	12/2000	Murai et al.	349/143	6,657,686 B2	12/2003	Choi	
6,181,406 B1	1/2001	Morimoto et al.	349/155	6,657,695 B1	12/2003	Song et al.	
6,243,146 B1	6/2001	Rho et al.		6,771,344 B2	8/2004	Lyu et al.	
6,285,431 B2 *	9/2001	Lyu et al.	349/143	6,778,244 B2	8/2004	Song et al.	
6,287,733 B1	9/2001	Miyazaki et al.	430/7	6,894,735 B2 *	5/2005	Chae et al.	349/38
6,396,077 B1	5/2002	Kubota et al.		6,919,945 B2	7/2005	Ha	
6,445,437 B1	9/2002	Miyazaki et al.	349/156	6,937,311 B2 *	8/2005	Song et al.	349/129

* cited by examiner

Fig.1

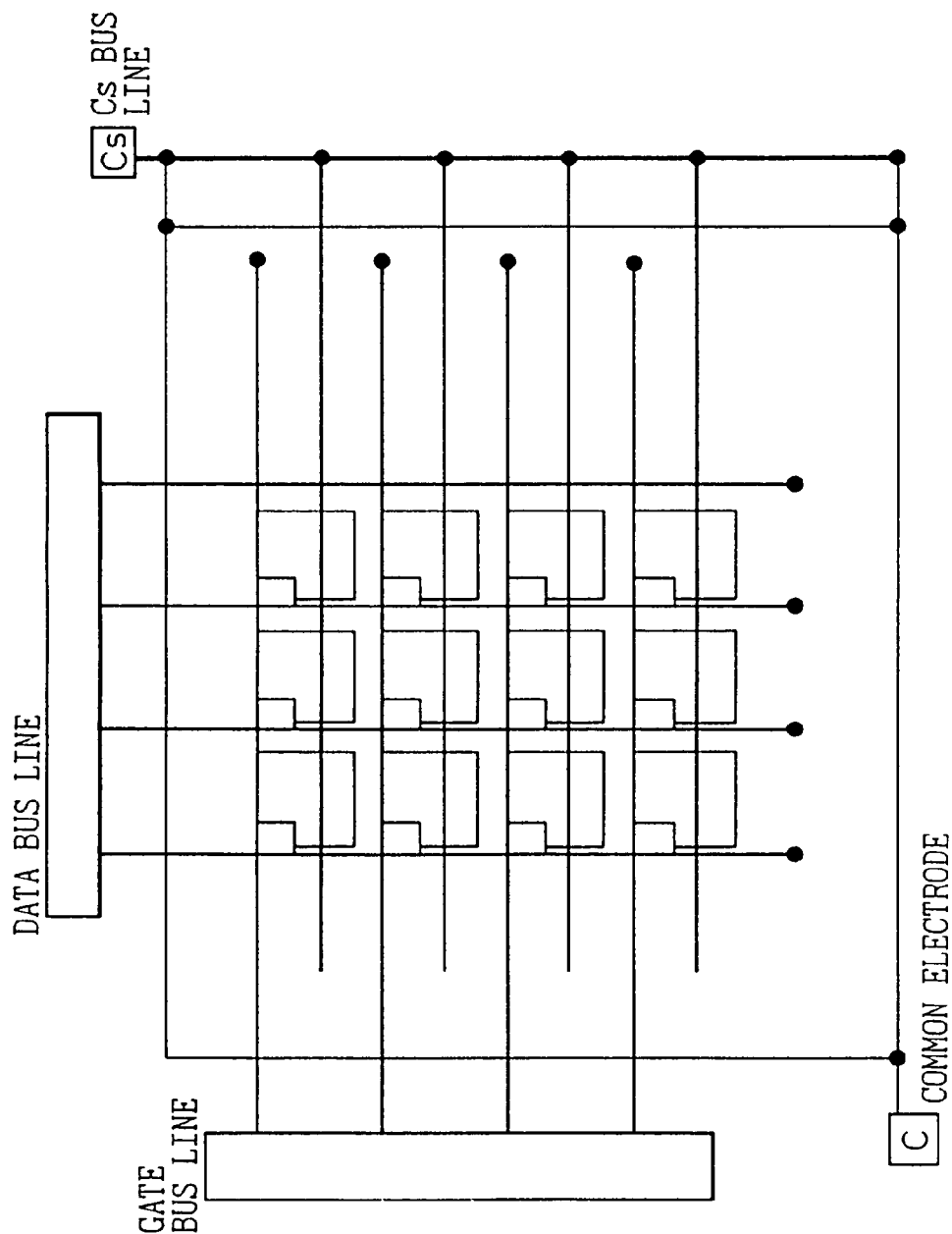
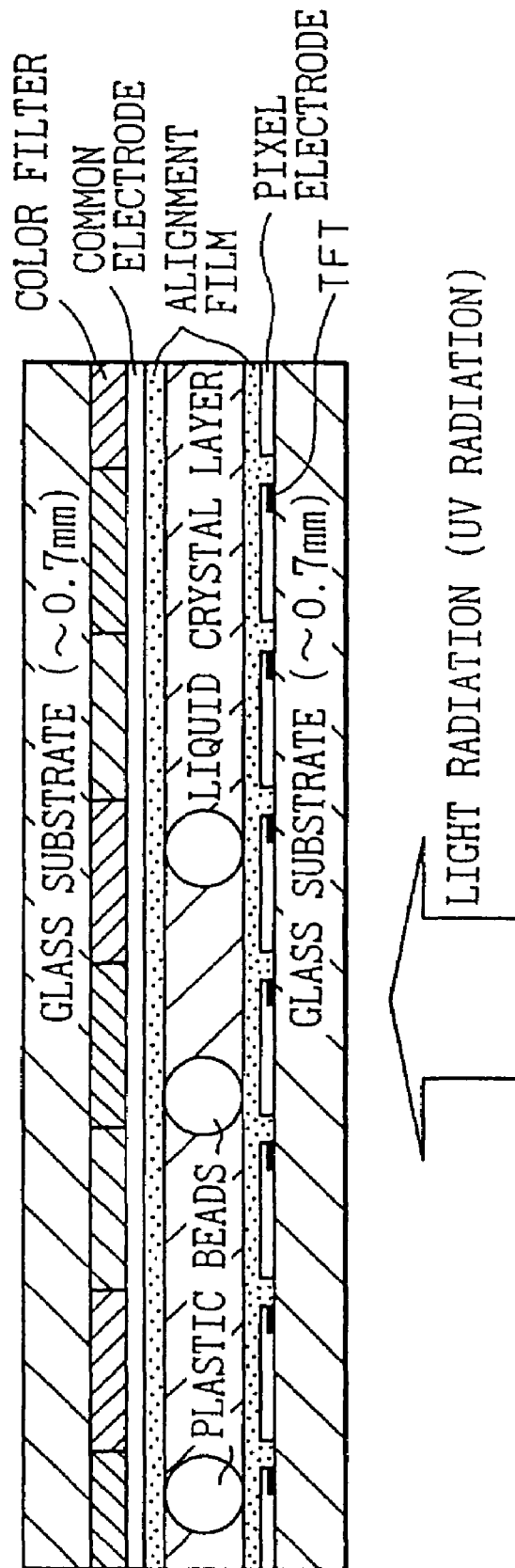


Fig. 2



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