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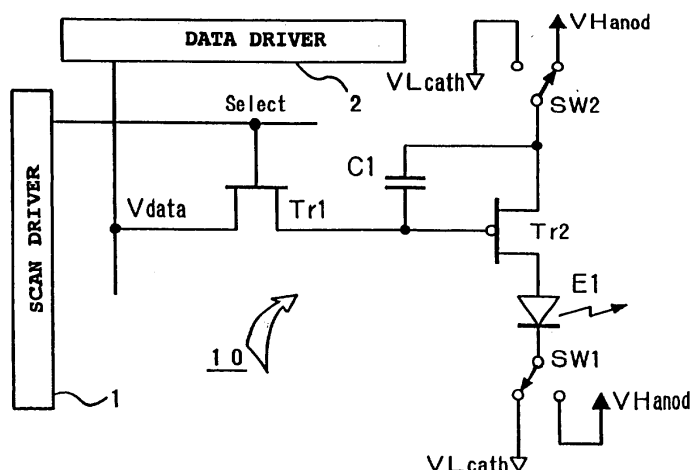
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(54) **Drive methods and drive devices for active type light emitting display panel**

(57) In a drive device for an active type light emitting display panel which can apply a reverse bias voltage to an EL element, in order to be able to compensate deterioration in light-emitting efficiency of the EL element accompanied by applying of the reverse bias voltage and the like, one pixel 10 is composed of a controlling TFT (Tr1), the driving TFT (Tr2), a capacitor C1, and the EL element E1. Switching switches SW1, SW2 mutually enables a supplying state of a forward current to the EL element E1 and an applying state of the reverse bias

voltage to be selected. In one control form according to the present invention, when the applying state of the reverse bias voltage shifts to the supplying state of the forward current, by switching one switch first, the anode and cathode of the EL element E1 are made to the same electrical potential to allow electrical charges to be discharged. Thus, charge of the forward current for a parasitic capacitance of the EL element E1 can be performed rapidly, and rising of the lighting operation of the EL element can be advanced.

**FIG. 2**





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# EUROPEAN SEARCH REPORT

Application Number  
EP 03 02 5419

## DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 100 28 598 A1 (NIPPON ELECTRIC CO [JP]) 29 March 2001 (2001-03-29) * column 11, lines 3-42; figure 7 * & US 6 525 704 B1 (KONDO YUJI [JP] ET AL) 25 February 2003 (2003-02-25) -----	1,2,11, 12	INV. G09G3/32
D,A	EP 1 191 512 A (SEIKO EPSON CORP [JP]) 27 March 2002 (2002-03-27) * paragraphs [0052] - [0055]; figure 2 * -----	1,2,11, 12	
A	EP 1 197 943 A (SEIKO EPSON CORP [JP]) 17 April 2002 (2002-04-17) * paragraphs [0038] - [0046]; figure 2 * -----	1,2,11, 12	
X	US 6 348 906 B1 (DAWSON ROBIN MARK ADRIAN [US] ET AL) 19 February 2002 (2002-02-19) * column 3, lines 56-59 * * column 5, lines 10-18; figure 2 * -----	3,4	
X	US 2001/026251 A1 (HUNTER IAIN M [GB] ET AL) 4 October 2001 (2001-10-04) * paragraph [0041]; figures 2,3 * -----	3,4	TECHNICAL FIELDS SEARCHED (IPC)
X	WO 02/075710 A (CANON KK [JP]; KONDO SHIGEKI [JP]; NAKAMURA HIROYUKI [JP]) 26 September 2002 (2002-09-26) * page 12, line 20 - page 13, line 24; figure 3 * & US 2003/020705 A1 (KONDO SHIGEKI [JP] ET AL) 30 January 2003 (2003-01-30) -----	5,6	G09G
A	EP 1 220 191 A2 (SAMSUNG SDI CO LTD [KR]) 3 July 2002 (2002-07-03) * paragraphs [0047] - [0049]; figures 12,13 * ----- -/--	5,6	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 July 2007	Examiner Kunze, Holger
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.02 (P04C01)



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Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 03 02 5419

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
P,X	WO 03/049074 A (PIONEER CORP [JP]) 12 June 2003 (2003-06-12) * page 14, lines 15-25; figure 15 *	7,8	
A	US 6 011 529 A (IKEDA NAOYASU [JP]) 4 January 2000 (2000-01-04) * column 12, lines 5-11; figure 14 *	7,8	
X	US 2002/021268 A1 (YAMAZAKI SHUNPEI [JP] ET AL) 21 February 2002 (2002-02-21) * paragraphs [0193] - [0196]; figure 10a *	9,10	
X	US 2002/047120 A1 (INUKAI KAZUTAKA [JP]) 25 April 2002 (2002-04-25) * paragraph [0074]; figure 3 *	9,10	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search Munich		Date of completion of the search 17 July 2007	Examiner Kunze, Holger
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.02 (P04C01)

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1,2,11,12

Invention 1: Active matrix OLED display comprising one or more switches adapted to discharge the parasitic capacitance of the OLED. Object: To increase the light-emitting efficiency.

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2. claims: 3,4

Invention 2: Active matrix OLED display comprising switches adapted to charge the parasitic capacitance of the OLED. Object: To optimize the timing of the different phases of the driving sequence.

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3. claims: 5,6

Invention 3: Active matrix OLED display comprising means allowing a charge operation of the parasitic capacitance of the OLED, whereby specific electrical connections are used. Object: To increase the lighting time rate.

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4. claims: 7,8

Invention 4: Active matrix OLED display comprising means allowing a charge operation of the parasitic capacitance of the OLED, whereby specific currents are used. Object: To advance the rising for the lighting of the OLED.

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5. claims: 9,10

Invention 5: Active matrix OLED display comprising means allowing a bypass of the driving transistor. Object: To allow to rapidly raise the OLED to a light emitting state.

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-07-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 10028598	A1	29-03-2001	JP 3259774 B2	25-02-2002
			JP 2000347621 A	15-12-2000
			KR 20010020964 A	15-03-2001
			TW 507469 B	21-10-2002
			US 6525704 B1	25-02-2003
US 6525704	B1	25-02-2003	DE 10028598 A1	29-03-2001
			JP 3259774 B2	25-02-2002
			JP 2000347621 A	15-12-2000
			KR 20010020964 A	15-03-2001
			TW 507469 B	21-10-2002
EP 1191512	A	27-03-2002	CN 1345021 A	17-04-2002
			JP 3736399 B2	18-01-2006
			JP 2002169510 A	14-06-2002
			KR 20020022572 A	27-03-2002
			TW 508553 B	01-11-2002
			US 2002047839 A1	25-04-2002
EP 1197943	A	17-04-2002	CN 1348163 A	08-05-2002
			JP 2002189448 A	05-07-2002
			KR 20020029317 A	18-04-2002
			TW 554307 B	21-09-2003
			US 2002050962 A1	02-05-2002
US 6348906	B1	19-02-2002	JP 2004503794 T	05-02-2004
			KR 20060092293 A	22-08-2006
US 2001026251	A1	04-10-2001	WO 0175852 A1	11-10-2001
			EP 1272999 A1	08-01-2003
			JP 2003529805 T	07-10-2003
			TW 507179 B	21-10-2002
WO 02075710	A	26-09-2002	US 2003020705 A1	30-01-2003
US 2003020705	A1	30-01-2003	WO 02075710 A1	26-09-2002
EP 1220191	A2	03-07-2002	CN 1361510 A	31-07-2002
			JP 2002215096 A	31-07-2002
			KR 20020056353 A	10-07-2002
			US 2002118150 A1	29-08-2002
WO 03049074	A	12-06-2003	AU 2002354421 A1	17-06-2003
			EP 1451798 A1	01-09-2004
			JP 2003195806 A	09-07-2003
			US 2003107536 A1	12-06-2003

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 02 5419

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-07-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6011529 A	04-01-2000	NONE	
US 2002021268 A1	21-02-2002	NONE	
US 2002047120 A1	25-04-2002	CN 1322015 A EP 1150273 A2 TW 531901 B	14-11-2001 31-10-2001 11-05-2003

专利名称(译)	用于有源型发光显示板的驱动方法和驱动装置		
公开(公告)号	<a href="#">EP1418566A3</a>	公开(公告)日	2007-08-22
申请号	EP2003025419	申请日	2003-11-05
[标]申请(专利权)人(译)	东北先锋股份有限公司		
申请(专利权)人(译)	TOHOKU PIONEER CORPORATION		
当前申请(专利权)人(译)	TOHOKU PIONEER CORPORATION		
[标]发明人	YOSHIDA TAKAYOSHI KANAUCHI KATSUHIRO		
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IPC分类号	G09G3/32 H01L51/50 G09G3/10 G09G3/20 G09G3/30 H05B33/14		
CPC分类号	G09G3/3233 G09G3/3241 G09G3/325 G09G2300/0809 G09G2300/0819 G09G2300/0842 G09G2300/0852 G09G2300/0866 G09G2310/0254 G09G2310/0256 G09G2320/0252 G09G2320/043		
优先权	2002325335 2002-11-08 JP		
其他公开文献	EP1418566A2		
外部链接	<a href="#">Espacenet</a>		

#### 摘要(译)

在用于可以向EL元件施加反向偏压的有源型发光显示板的驱动装置中，为了能够补偿伴随施加反向偏压的EL元件的发光效率的劣化和如图所示，一个像素10由控制TFT ( Tr1 )，驱动TFT ( Tr2 )，电容器C1和EL元件E1组成。开关SW1，SW2相互使能向EL元件E1的正向电流的供给状态和反向偏置电压的施加状态。在根据本发明的一种控制形式中，当反向偏置电压的施加状态转换到正向电流的供给状态时，通过首先切换一个开关，EL元件E1的阳极和阴极被制成相同的电气。允许电荷放电的潜力。因此，可以快速执行EL元件E1的寄生电容的正向电流的充电，并且可以提高EL元件的点亮操作的上升。

FIG. 2

