



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 030 288 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
06.12.2000 Bulletin 2000/49

(51) Int Cl.⁷: **G09G 3/36**, H02M 3/07,
G05F 3/20

(43) Date of publication A2:
23.08.2000 Bulletin 2000/34

(21) Application number: **00400446.1**

(22) Date of filing: **18.02.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Maekawa, Toshikazu, Sony Corporation
Tokyo (JP)**
• **Nakajima, Yoshiharu, Sony Corporation
Tokyo (JP)**
• **Morita, Shintarou, Sony Corporation
Tokyo (JP)**

(30) Priority: **18.02.1999 JP 3941399**
24.12.1999 JP 36723599

(71) Applicant: **SONY CORPORATION
Tokyo (JP)**

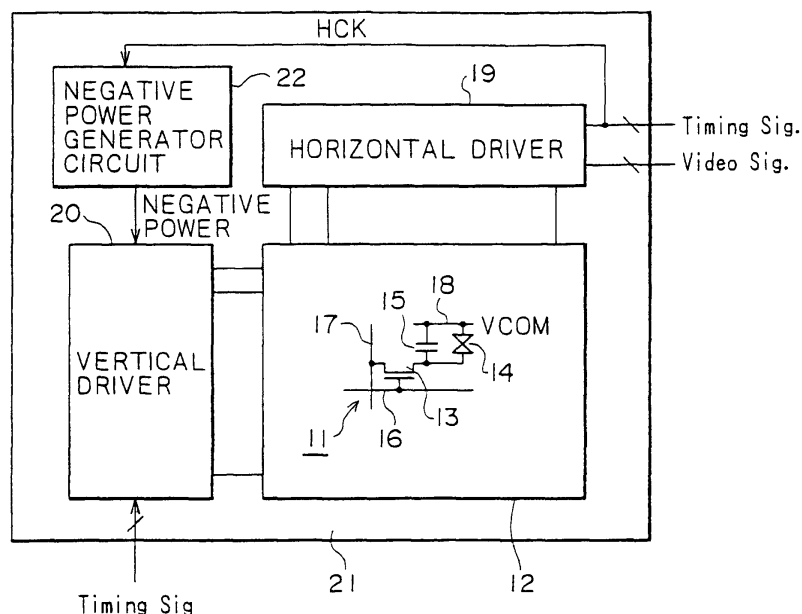
(74) Representative: **Thévenet, Jean-Bruno et al
Cabinet Beau de Loménié
158, rue de l'Université
75340 Paris Cédex 07 (FR)**

(54) **Power generator circuit, power generating method and liquid crystal display device using the circuit and/or the method**

(57) A power generator circuit and generation method for a liquid crystal display that allows the generation of a negative voltage when the external power supply

only supplies positive voltages. The disclosed structure is particularly adapted to be used in a power generator that is integrated on the LDC panel itself.

FIG. 1



EP 1 030 288 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 40 0446

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 307 333 A (HARGROVE ARTHUR K) 22 December 1981 (1981-12-22)	1,2,5-7	G09G3/36 H02M3/07 G05F3/20
Y	* column 3, line 36 - column 5, line 27 * * figures 1-3 *	14,15,18	
A	US 4 581 546 A (ALLAN JAMES D) 8 April 1986 (1986-04-08) * column 2, line 8 - column 4, line 15 * * figure 1 *	1,6,14	
A	US 4 961 007 A (KUMANOYA MASAKI ET AL) 2 October 1990 (1990-10-02) * column 15, line 18 - column 16, line 24 * * figures 10-12 *	1,6,14	
A	US 5 003 197 A (NOJIMA ISAO ET AL) 26 March 1991 (1991-03-26) * column 6, line 37 - column 8, line 27 * * figure 2 *	1,6,14	
A	EP 0 469 587 A (TEXAS INSTRUMENTS INC) 5 February 1992 (1992-02-05) * page 6, line 33 - line 55 * * figure 13 *	1,6,14	G09G H02M G05F
X	US 5 754 155 A (KUBOTA YASUSHI ET AL) 19 May 1998 (1998-05-19)	8-10	
Y	* column 11, line 50 - column 12, line 11 * * column 14, line 47 - column 15, line 15 * * figures 8,14 *	13-15,18	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 October 2000	Examiner Farricella, L
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	

EPO FORM 1503 03.82 (P04C01)



European Patent
Office

Application Number
EP 00 40 0446

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:



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 40 0446

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)	
Y	KOYAMA J ET AL: "LOW-TEMPERATURE POLY-SI TFT-LCDS WITH DIGITAL INTERFACE" INTERNATIONAL CONFERENCE ON SOLID STATE DEVICES AND MATERIALS,JA,JAPAN SOCIETY OF APPLIED PHYSICS. TOKYO, 1 September 1997 (1997-09-01), pages 348-349, XP000728142 * the whole document *	13		
A	SAITO S ET AL: "A 6-BIT DIGITAL DATA DRIVER FOR COLOR FTF-LCDS" NEC RESEARCH AND DEVELOPMENT,JP,NIPPON ELECTRIC LTD. TOKYO, vol. 36, no. 4, 1 October 1995 (1995-10-01), pages 485-492, XP000546441 ISSN: 0547-051X * figure 1 *	13		
A	MANO H ET AL: "TFT-LCD DRIVE METHOD AND DRIVER LSI" HITACHI REVIEW,JP,HITACHI LTD. TOKYO, vol. 45, no. 4, 1 August 1996 (1996-08-01), pages 177-182, XP000679689 ISSN: 0018-277X * figure 4 *	13		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	DE 198 32 297 A (SEMICONDUCTOR ENERGY LAB) 21 January 1999 (1999-01-21)			
The present search report has been drawn up for all claims				
Place of search THE HAGUE		Date of completion of the search 9 October 2000	Examiner Farricella, L	
<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 & : member of the same patent family, corresponding document</p>				

EPO FORM 1503 03.82 (P04C01)



European Patent
Office

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 00 40 0446

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:

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

EP 00 40 0446

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.

09-10-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4307333 A	22-12-1981	NONE	
US 4581546 A	08-04-1986	GB 2149251 A,B GB 2184902 A,B JP 1724771 C JP 4003110 B JP 60173866 A	05-06-1985 01-07-1987 24-12-1992 22-01-1992 07-09-1985
US 4961007 A	02-10-1990	JP 2113152 C JP 2156499 A JP 8017033 B	21-11-1996 15-06-1990 21-02-1996
US 5003197 A	26-03-1991	WO 9008426 A	26-07-1990
EP 0469587 A	05-02-1992	US 5220534 A DE 69123302 D DE 69123302 T JP 6150650 A	15-06-1993 09-01-1997 07-05-1997 31-05-1994
US 5754155 A	19-05-1998	JP 8201763 A	09-08-1996
DE 19832297 A	21-01-1999	JP 11038447 A	12-02-1999

专利名称(译)	发电电路，发电方法和使用该电路和/方法的液晶显示装置		
公开(公告)号	EP1030288A3	公开(公告)日	2000-12-06
申请号	EP2000400446	申请日	2000-02-18
[标]申请(专利权)人(译)	索尼公司		
申请(专利权)人(译)	索尼公司		
当前申请(专利权)人(译)	索尼公司		
[标]发明人	NAKAJIMA YOSHIHARU SONY CORPORATION MORITA SHINTAROU SONY CORPORATION		
发明人	MAEKAWA, TOSHIKAZU, SONY CORPORATION NAKAJIMA, YOSHIHARU, SONY CORPORATION MORITA, SHINTAROU, SONY CORPORATION		
IPC分类号	G09G3/36 G02F1/133 G05F3/20 G09G3/20 G09G5/00 H02M3/07		
CPC分类号	G09G3/3696 G09G3/3674 G09G2310/0289 G09G2330/02 H02M3/07		
优先权	1999367235 1999-12-24 JP 1999039413 1999-02-18 JP		
其他公开文献	EP1030288B1 EP1030288A1		
外部链接	Espacenet		

摘要(译)

一种用于液晶显示器的发电电路和产生方法，其允许在外部电源仅提供正电压时产生负电压。所公开的结构特别适用于集成在LDC面板本身上的发电机。

