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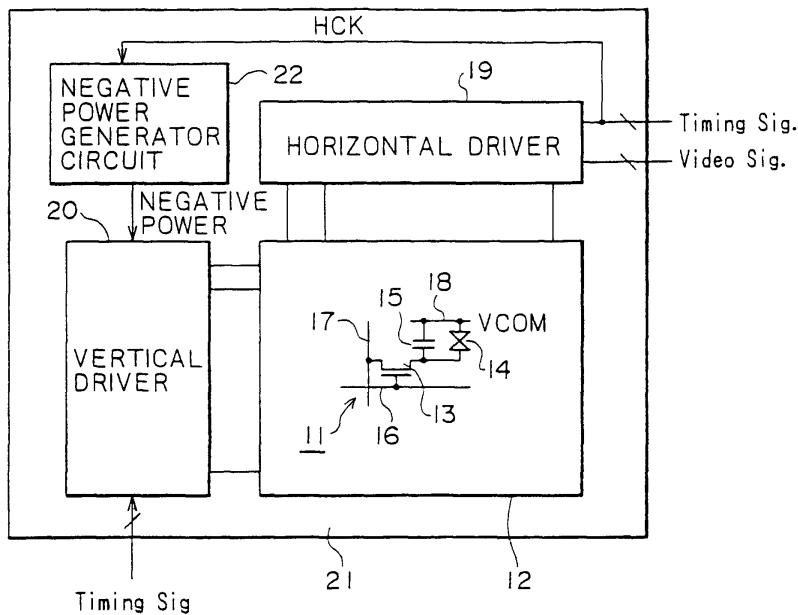
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### (54) Power generator circuit, power generating method and liquid crystal display device using the circuit and/or the method

(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.

F I G. I





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## EUROPEAN SEARCH REPORT

Application Number  
EP 00 40 0446

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
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 (KUMANOWA 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		Date of completion of the search	Examiner
THE HAGUE		9 October 2000	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 ..... P : member of the same patent family, corresponding document			

**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:



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## EUROPEAN SEARCH REPORT

Application Number

EP 00 40 0446

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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 TFT-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		Date of completion of the search	Examiner
THE HAGUE		9 October 2000	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			



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**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	05-06-1985
			GB	2184902 A, B	01-07-1987
			JP	1724771 C	24-12-1992
			JP	4003110 B	22-01-1992
			JP	60173866 A	07-09-1985
US 4961007	A	02-10-1990	JP	2113152 C	21-11-1996
			JP	2156499 A	15-06-1990
			JP	8017033 B	21-02-1996
US 5003197	A	26-03-1991	WO	9008426 A	26-07-1990
EP 0469587	A	05-02-1992	US	5220534 A	15-06-1993
			DE	69123302 D	09-01-1997
			DE	69123302 T	07-05-1997
			JP	6150650 A	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/或方法的液晶显示装置		
公开(公告)号	<a href="#">EP1030288A3</a>	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		
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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	<a href="#">EP1030288B1</a> <a href="#">EP1030288A1</a>		
外部链接	<a href="#">Espacenet</a>		

## 摘要(译)

一种用于液晶显示器的发电机电路和产生方法，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。

## FIG. I

