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2003 06 18

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(71) 가 가
가 가 398

(72) 가 가 398가 가

(74)

:

(54)

. EL , EL , EL , OLED
P , ,

1

, EL, , OLED,

1

2

3

4

- 5 ,
- 6 ,
- 7 ,
- 8 ,
- 9 ,
- 10 ,
- 11 ,
- 12 ,
- 13 ,
- 14 가 가 .

* *

- 101 : 102 :
- 103, 104 :
- 105 : 106 :

OLE

D , , , , .

, 가 , , .

, (PDA) , , .

, 가 , .

, , TFT() , TFT , 가 가

, 가 , 가 , , .

, , TFT , , TFT 가 , , ,

, 가 , , 가 , , .

(OLED) , OLED ,
 () , 3 OLED ()
 OLED () OLED
 Tang / / / / / / / /
 가 . , ,
 OLED OLED OLED , OLED ,
 OLED
 3 , OLED
 가 (G1 Gy) , 가 TFT(301)
 (S1 Sx) , TFT(301) OLED TFT(302) 가 (303)
 (303) (V1 Vx) 가 OLED
 TFT(302) (V1 Vx) , 가 OLED
 (304)
 OLED (304) , OLED 가 OLED (304) O
 LED TFT(302) , OLED (304) OLED TFT(302) (304)
 , OLED (304)
 가 OLED , OLED OLED
 가
 OLED , OLED
 , OLED 3
 '1 (L)' 3 OLED 'y' , 1
 , 1 y (L1 Ly)
 OLED 가 , 1 가 , OLED
 (V1 Vx) , ()
 , OLED 가
 1 (L1) , G1 가 ,
 (S1 Sx) 가
 G1 TFT(301) , 가 (S1 Sx)
 TFT(301) OLED TFT(302)
 TFT(301)가 , OLED TFT(302)
 , OLED TFT(302) Id-Vg
 가 1 1 , OLED TFT(302)
 , (OLED)가 , 가 OLED
 OLED 가

가 OLED 가 가 .

가 가 .

$(SF_1 \quad SF_n)$ $(Ta_1 \quad Ta_n)$
 $SF_1 \quad SF_n$ $(Ts) \quad T_{s1} \quad T_{sn}$

$Ts_1 : Ts_2 : Ts_3 : \dots : Ts_{(n-1)} : Ts_n = 2^0 : 2^{-1} : 2^{-2} : \dots : 2^{-(n-2)} : 2^{-(n-1)}$

$Ts_1 \quad Ts_n$ Ts_1

Ts_n Ts_2 Ts_2

$(n-2)$ $Ts_3, Ts_4 \dots Ts_n$

n 1 가 가
 100% $Ts_1 \quad Ts_2$ 가 $n=8$ 가 $Ts_3 \quad Ts_5 \quad Ts_8$
 16% 75%

n 1

OLED 가

OLED OLED $200cd/m^2$ OLED 3.5
 mA/cm^2 가, $1 mA/cm^2$ 가, $3 mA/cm^2$ 가 3.5
 $14 mA, 4 mA, 12 mA$ 가 OLED $8V, 5V, 7V$
 3 2 (follower) 가

V_{ds} () 가 MOS V_{ds} 가 $5V$ 5
 V , $8V$, $6V$ V_{ds} , VCC 가 OLED $184 mW$ 가

$70 mW, 40 mW, 72 mW$ $184 mW$ 가

OLED

OLED

, OLED , OLED 가
 , , 가 OLED , , , OLED 가
 OLED , , OLED 가
 가 .
 , , 가 OLED , , , OLED
 가 , , OLED 가 , , , OLED
 , OLED p
 , , , OLED 가 , , , OLED
 , OLED n
 가 , , OLED , , , OLED
 , OLED p
 가 , , OLED 가 p
 가 , , OLED , , , OLED
 , OLED n
 가 n
 , , OLED , , , 2
 , 가 .
 , , 가
 , , 가
 , 가 , , , 가

p TFT , 가 .
 , 6 .
 (609) (601) (601) 6 가 , (611)
 , (602, 603) , (607) (610)
 , (603) 가 가 (603) 604 605 , (610)
 , (602) 가 (603) (604) (603) (606) (608) 가
 , (606) 가 , (606) (608) 가
 . , (606) VDD 가 p , 가 p (61)
 , 가 . (601) (611) , (61

2) , .
 , VDD 1V , OLED
 9V(OLED 8V+ 1V)가 . 4V, 2V가 .
 14mW, 16mW, 24mW가 , 54mW가 .
 , 184mW , 3
 1 . , 3 1 , 가 . 3
 , OLED 가 , , ,
 . OLED , , ,
 , OLED 가 , n , GND 6
 가 n , ,

[]

(1)

7 , 가 가 , ,
 (702, 703) (706) , ,
 (712) (713) p 가 , ,
 (712) 가 , (702, 703) 가 6 (702, 703)
 , 가 가 , (714, 715) (716, 7
 17) , ,

(701) (711) , 가 , (718) ,
 . 가 , OLED , n , G
 ND 가 , n , n , G
 7 .

, OLED , 가 .
 (2)
 8 , 2 , ,
 가 , 2 , ,
 , OLED , 가 .
 (3)
 3 , OLED (, ,
) TFT , ,
 , CMOS .
 , 9a , #7059 #1737
 (5001)
 (5002) , CVD SiH₄, NH₃, N₂ S
 O (5002a) 10 200[nm](50 100[nm]) ,
 iH₄, N₂O (5002b) 50 200[nm](100 150[nm])
 (5002) 2 , 2
 (5003 5006) , (5003 5006) 25 80[nm](
 30 60[nm]) ,
 (SiGe) ,
 YVO₄ , YAG ,
 , 가
 , 30[Hz] , 100 400[mJ/cm²](
 , 200 300[mJ/cm²) , YAG , 2
] 1 10[kHz] , 300 600[mJ/cm²](350 500[mJ/cm²)
 . 100 1000[μm], 400[μm]
 , 80 98[%] , 2001-365302
 CWLC .
 (5003 5006) (5007) (5007) ,
 CVD 3 , 120[nm] 40 150[nm] (5007)
 , (5007)
 40[Pa], 300 400[] CVD TEOS(Tetraethyl Orthosilicate) O₂
 , (13.56[MHz]), 0.5 0.8[W/cm²)
 , 400 500[]
 , (5007) 1 (5008) 2 (5009)
 0 300[nm] , 1 (5008) Ta 50 100[nm] , 2 (5009) W 10
 Ta , Ta Ar , Ar Xe Kr 가 ,
 Ta , Ta 20[μ cm]
 . Ta 180[μ cm]
 Ta , Ta 가 10 50[nm]
 Ta Ta

W, W, 6, (WF₆) 가, W
 CVD, 20[μm] .W 가, W
 ,W, 99.9999[%] W, 9 20[μm] .
 , 1 (5008) Ta, 2 (5009) W, ,
 Ta, W, Ti, Mo, Al, Cu, ,
 (5009) W, 1 (5008) (TaN), 1 (5008) (TaN), 2 (5009) Cu, 2 (5009) Al, .
 (5008) (TaN), 2 (5009) Cu, .
 (5010) , 1, 가 CF₄ Cl
 3 ICP(Inductively Coupled Plasma:) , 가 CF₄ Cl
 2 , 1[Pa] 500[W] RF(13.56[MHz])
 () 100[W] RF(13.56[MHz]) ,
 가 .CF₄ Cl₂ W Ta .
 , 1, 2 가 , 15 45° 가 .W
 , 10 20[%] 가 .W
 , 2 4(3) , 1, 2
 20 50[nm] (5011 5016)(1 (5011a 5016a) 2 (5011b 5016b))
 , (5007) , 1 (5011 5016) 20 50[nm]
 (9b).
 , 1 n 가 , 1×10¹³ 5×10¹⁴ [atoms/cm²] ,가 60
 100[keV] .n , 15 (P)
 (As) (P) , (5011 5015) n
 5) 1×10²⁰ 1×10²¹ [atoms/cm³] 1 (5017 5025) . 1 (5017 502
 가 (9b).
 , 9c , 2 , 가 CF₄
 Cl₂ O₂ ,W , 2 (5026 5031a) 2 (5026b 5031b)) , 2 (5026 5031) , 2
 (5026 5031) 20 50[nm] .
 W Ta CF₄ Cl₂ 가 ,
 .W Ta ,W ,WF₆가
 a , WCl₅, TaF₅, TaCl₅ , CF₄ Cl₂ 가 ,W T
 O₂ 가 CF₄ O₂가 가 Co F가 ,F
 F , 가 , Ta W ,O₂
 Ta F가 Ta ,Ta ,Ta ,Ta
 가 ,W Ta ,W Ta
 가 .
 , 10a 2 , 1 ,가 70 120[keV]
 가 , 1×10¹³ [atoms/cm²] , 9b 1
 , 2 (5026 5030)
 , 1 (5026a 5030a) 가 가 , 3 (5026a 5030a) (50
 32 5036) . 3 (5032 5036) 가 (P) , 1 (5026a 5030a)
 , 1 (5026a 5030a) , 가

10b 3 가 CHF₆ (RIE)
 (5026a 5030a)
 5042a) 2 (5037b 5042b)) (5007) (5037 5042)(1 (5037a 5037 5)
 042) 20 50[nm]
 3 (5032a 5036a) , 1 3 (5032 5036) , 1 2 (5037a 5041a) 3 (5032b 5036b)
 10c , p TFT (5004) 1
 4 (5043 5048) , 3 (5038b)
 006) (5042) (5200) , n TFT (5043 5048) (5003, 5005, 5
 가 (B₂H₆)
 가 2×10²⁰ 2×10²¹ [atoms/cm³]가
 (5037 5041) , (5042) , 3
 (5200) , 가
 (RTA) 가 1[ppm] ,
 0.1[ppm] 400 700[], 500 600[] 500[
] 4 , 3 (5037 5042) 가
 가, 3 100[%] , 300 450[] 1 12
 ()
 11a , 1 (5055) 100 200[nm]
 (5056) (5007) 2 (5056) , 1 (5055), 2
 5062, 5064) , (5062) (5063) (5057)
 2 (5056) , (5056) , 가 ,
 , BCB() , 2 TFT
 , 1 5[μm](2 4[μm])
 (5043 5048) , n (5017, 5018, 5021, 5023 5025) p
 (5042) ()
 () (5057 5062, 5064) , Ti 100[nm], Ti
 300[nm], Ti 150[nm]
 (5063) (5062) (5063) MgAg 110[nm] (5063) OLED
 (11a).
 11b () 500[nm]
 , (5063) 3 (5065)

OLED 가 가 , 가

, OLED (5066) () (5067) ,
, OLED (5066) , 80 200[nm] (100 120[nm]), (5067) ITO

, OLED
, OLED
OLED

OLED
OLED 가
OLED

, RGB 3 OLED OLED (: CCM) OLED ()
RGB OLED OLED

D , OLED (5066) , , , , 4 OLE

, (5067) TFT () ,

, (5067) ITO (5063) MgAg ,
(5067) (5063)

, OLED (5066) (5068) 300[nm] , OLED (5068)

11b OLED 가 , Ta, W OLED
, AI ,

TFT OLED TFT
TFT TFT

가 가

OLED , , , Ni TFT 가 ,
가 , , 10[MHz] 가 , 가

, 가 CMOS n TFT TFT ,

OFF) LDD (L_{ov}), , , LDD (L

OLED (4204) , OLED ,

OLED (4204) (4205) , (4205) OLED (4204) 가
 (4205) OLED (4204) 가
 (4205) 가

(4203), OLED (4204) (4205) OLED (4303)가
 , OLED (4303) , (4302) (4209) (4209) , OLED

4005a , TFT(4201)
 (4005a) (4009) (4001) , (4300) FPC(4006)가 FP
 (4333)

(4008) , (, FRP(Fiberglass - Reinforced Plastics) , PVF(P
) ,)

VF , OLED

(4210) , , PVB() EVA(
 . PVC() ,)

(4210) (,)
 (4008) (4001) (4007) (4207)
) (4207) , (4007) , (4207)
 8) (4208) , (4207) (4207)

, OLED (4303)

12c , (4203) , (4005a) (4203a)

(4300) (4300a) (4001) FPC(4006) , (400
 1) (4203a) FPC(4006) FPC (4333) (4300a)

, OLED , 가

(5)

13a 13b OLED , OLED OLED TFT ,
 OLED

13a , (1600) TFT(1601)가 , TFT(1601) , 1 (1603a) , 2
 (1603b) , 1 2 , (1602) (1605)
 (1604) TFT . TFT(1601) , 1604a,

1604c TFT(1601)가 (1606) .
 , TFT(1601) . TFT(1601) , TFT
 , ITO (1608) (1606) TFT(1601) (1608) , 1604a 1604c
 , Ti , Ti Al Ti
 , 1607 1609 1609 (1608) 가
 , , OLED (1614) (1608)
 , (1610) , OLED
 , OLED (1611) , OLED (1614) () (1612) , 2[nm] (Cs)
 10[nm] (Ag) , OLED (1614) (1612) , (1614) (1612) (1600)
 612) , OLED (1611) (1612) , (1613)
 , (1600) , OLED (1614) , OLED (1614) ,
 (1600) TFT(1601) , OLED (1614) 가 ,
 , (1608) , TiN , (1612) ITO
 OLED (1611) (1600)
 13b , 13a OLED
 13b , 13a
 13b , TFT(1601) , (1606) , 13a
 , (1606) , TFT(1601) (1604a, 1604c)
 , Ti , Ti Al Ti , ITO
 1621, 1619 , (1620) (1620) OLED (1624) 1607 1608b
 , (1610) , OLED (1624) (1620)
 , OLED (1611) , OLED (1624) () (1612) , 2[nm] (Cs)
 10[nm] (Ag) , OLED (1624) (1612) , (1624) (1612) (1600)
 , OLED (1611) (1612) , (1613)
 , (1600) , OLED (1624) ,
 (1600) TFT(1601) , OLED (1624) 가 ,
 , (1620) (1621) TiN , (1612)
 ITO (1612) (1)
 600) OLED (1611)

, 가 OLED TFT , n

13b (1619) , 13a (1620) , TFT

가 가

, OLED

가

(6)

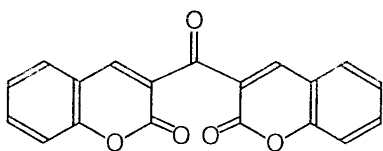
, 3

가 가

, 3 (T.Tsutsui, C.Adachi, S.Saito, Photochemical Processes in Organized Molecular Systems, ed.K.Honda, (Elsevier Sci.Pub., Tokyo, 1991) p.4 37.).

(coumarin)

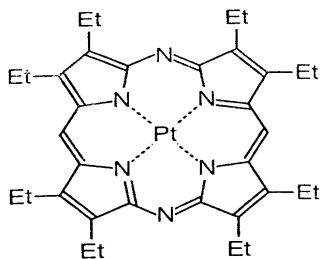
[1]



(M.A.Baldo, D.F.O' Brien, Y.You, A.Shoustikov, S.Sibley, M.E.Thompson, S.R.Forrest, Nature 395(1998) p.15 1)

(Pt)

[2]



(M.A.Baldo, S.Lamansky, P.E.Burrows, M.E.Thompson, S.R.Forrest, Appl.Phys.Lett.,75(1999) p.4.)

(T.Tsutsui, M.-J.Yang, M.Yahiro, K.Nakamura, T.Watanabe, T.tsuji, Y.Fukuda, T.Wakimoto, S.Mayaguchi, Jpn.Appl.Phys.,38(12B)(1999) L1502)

(Ir)

[3]

CATV(가 TV)

가

1 6

, OLED

가

OLED

가

(57)

1.

가

2.

가

1

가

2

가

3

3.

가

21 , , p

22 **26.** , , p

23 **27.** , , p

24 **28.** , , p

21 **29.** , , n

22 **30.** , , n

23 **31.** , , n

24 **32.** , , n

25 **33.** , , 가 p

26 **34.** ,

가 , .

27 **35.** ,

28 **36.** ,

29 **37.** ,

가 , .

30 **38.** ,

가 , .

31 **39.** ,

32 **40.** ,

3 **41.** ,

4 **42.** ,

22 **43.** ,

24 **44.** ,

가 p

가 p 가

가 p 가

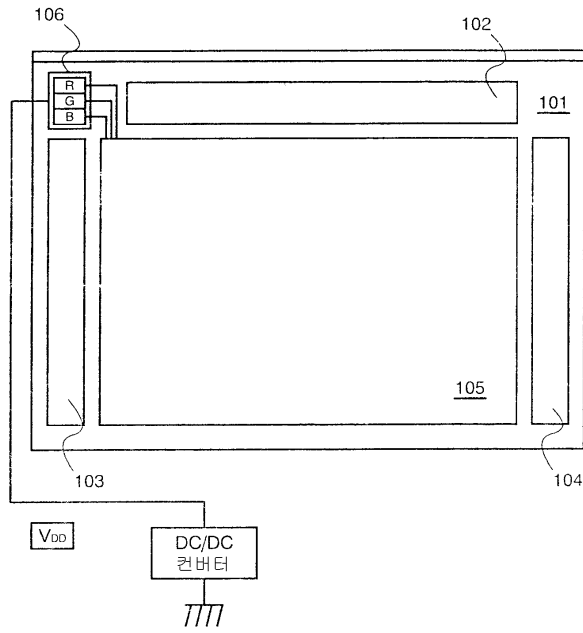
가 n

가 n

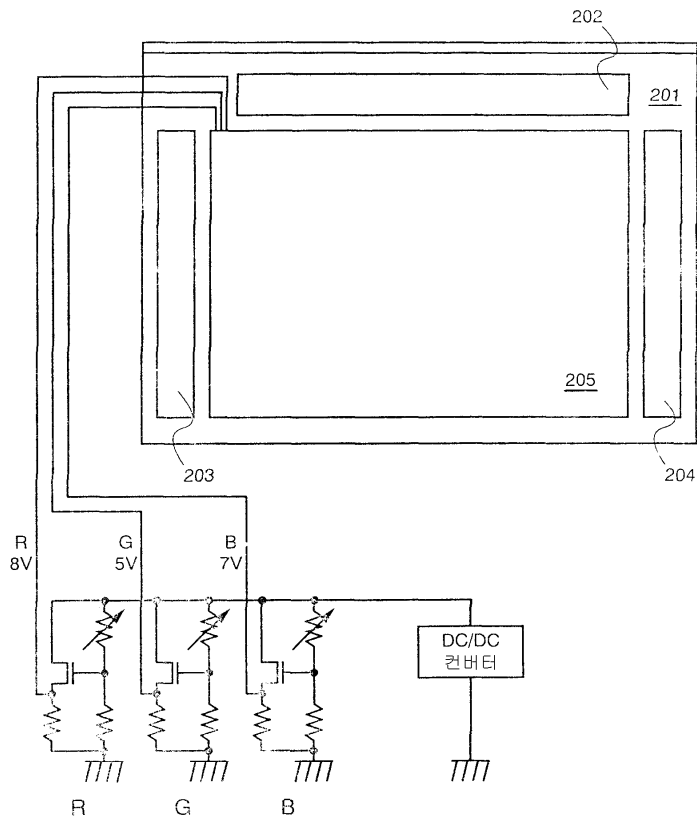
가 n 가

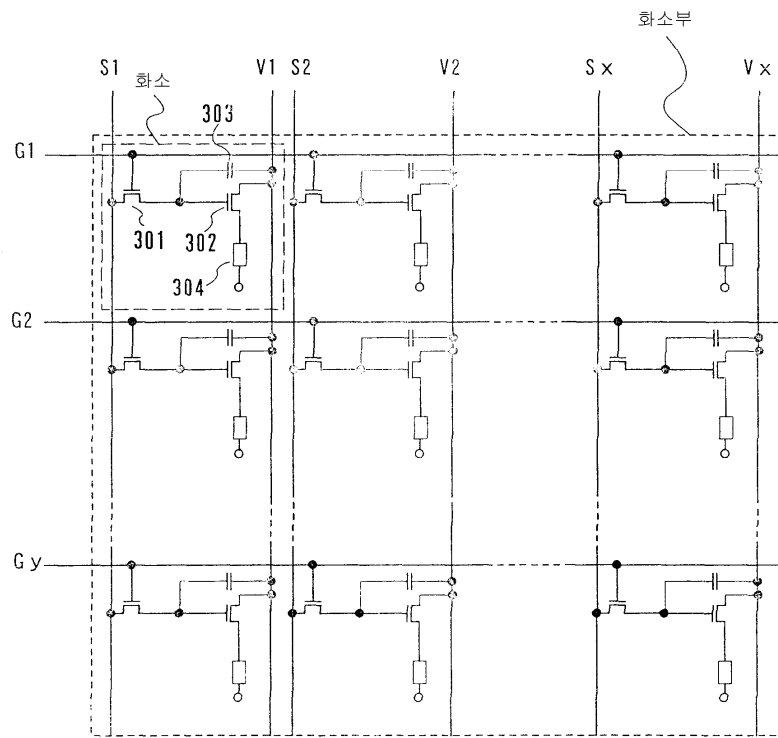
가 n 가

1

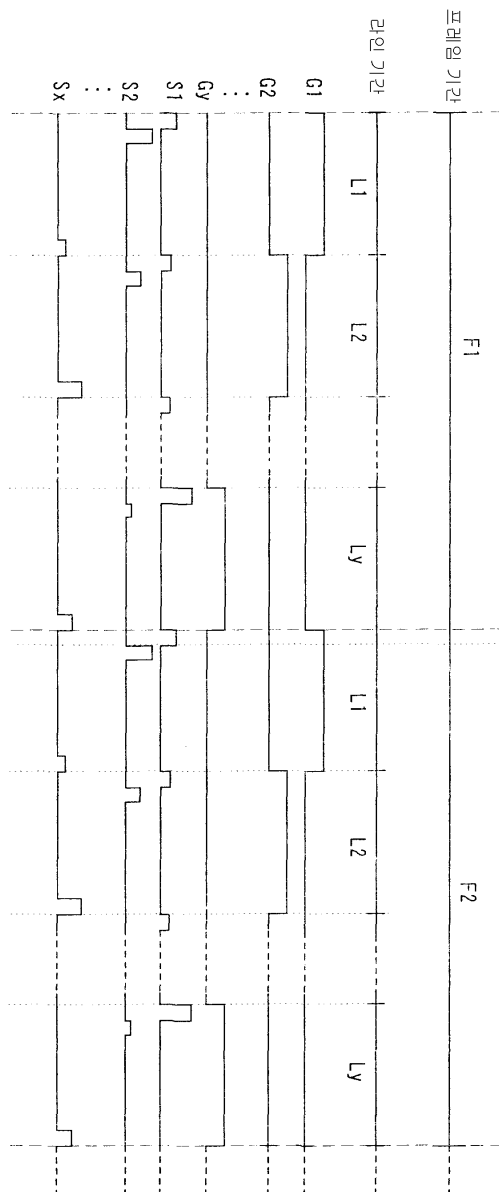


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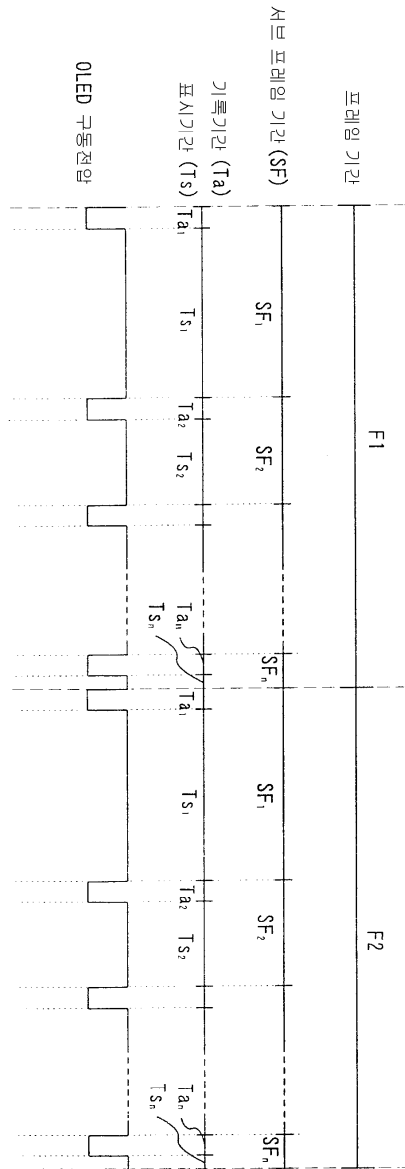




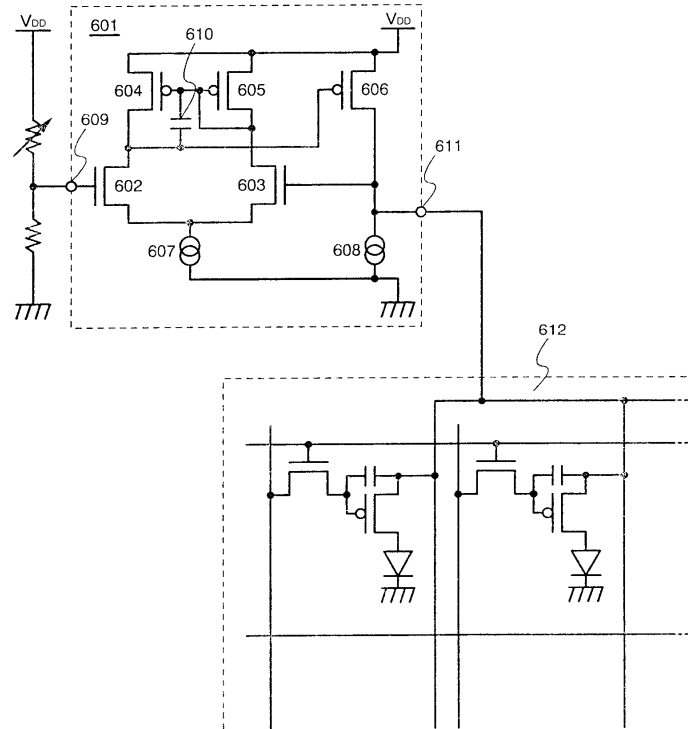
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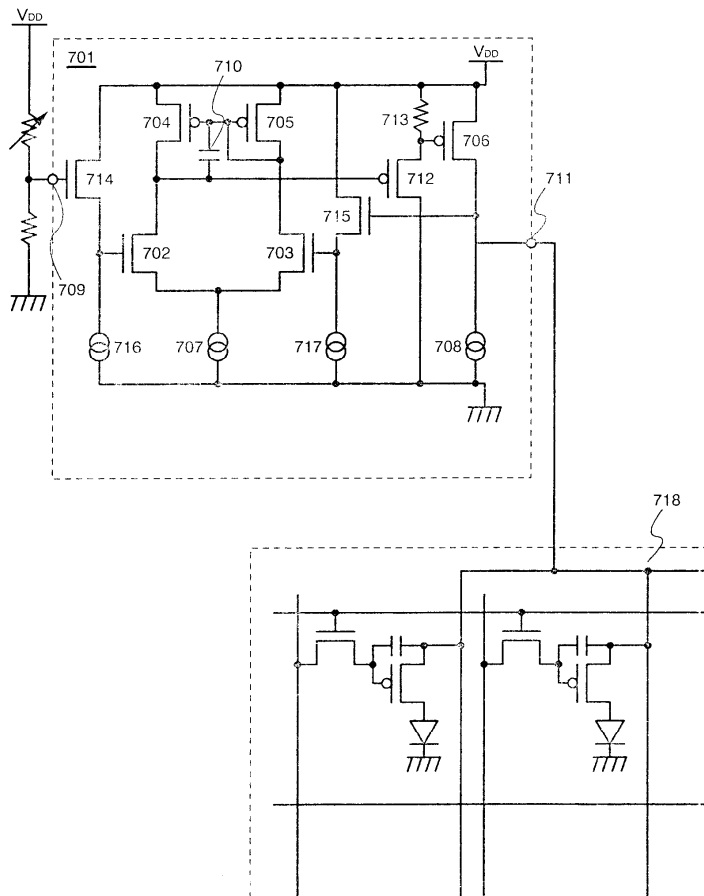
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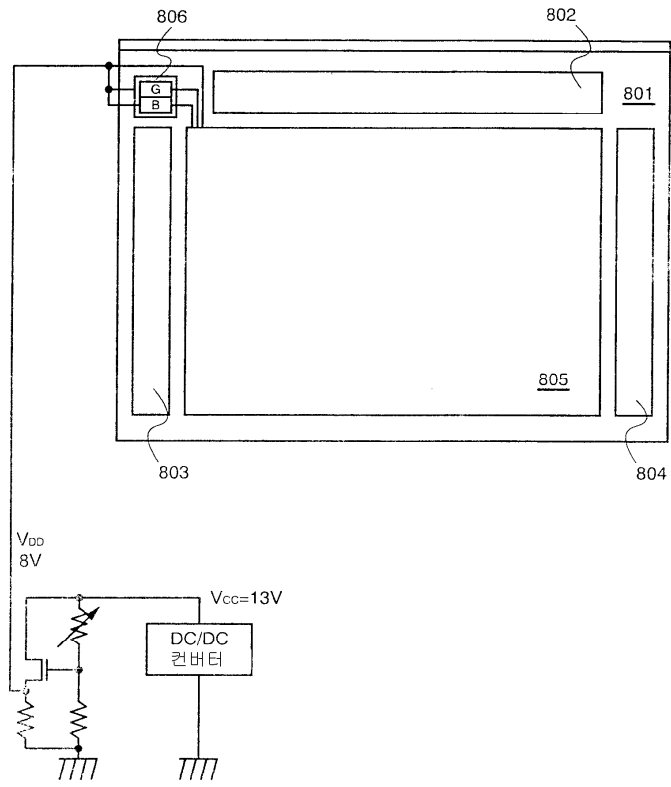
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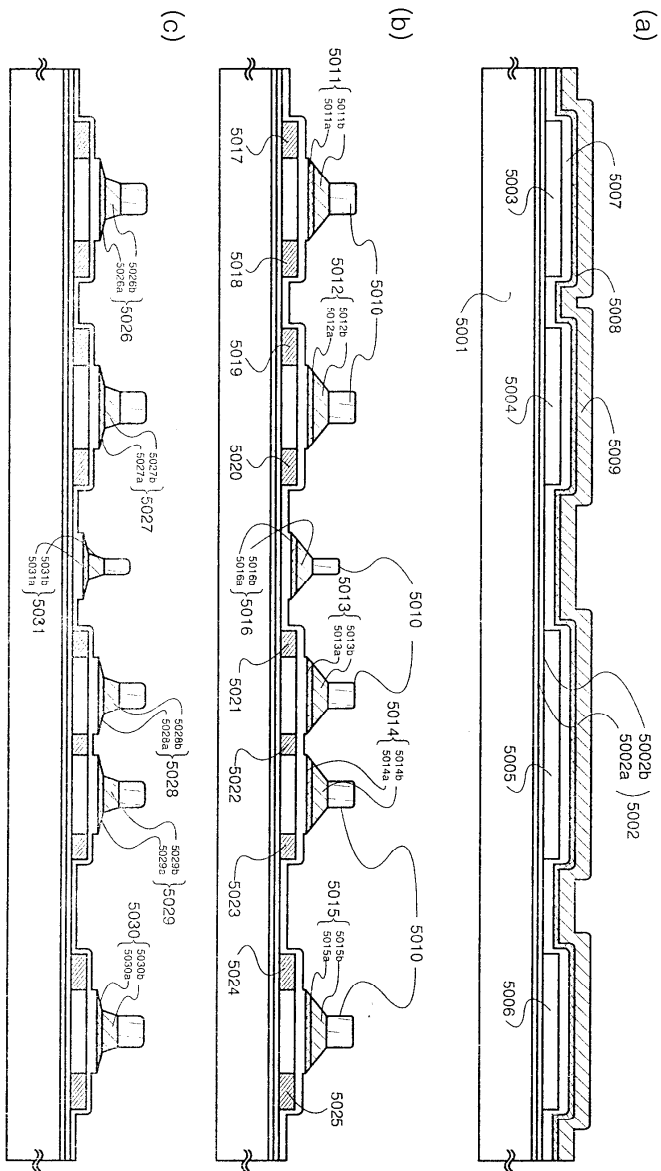
7

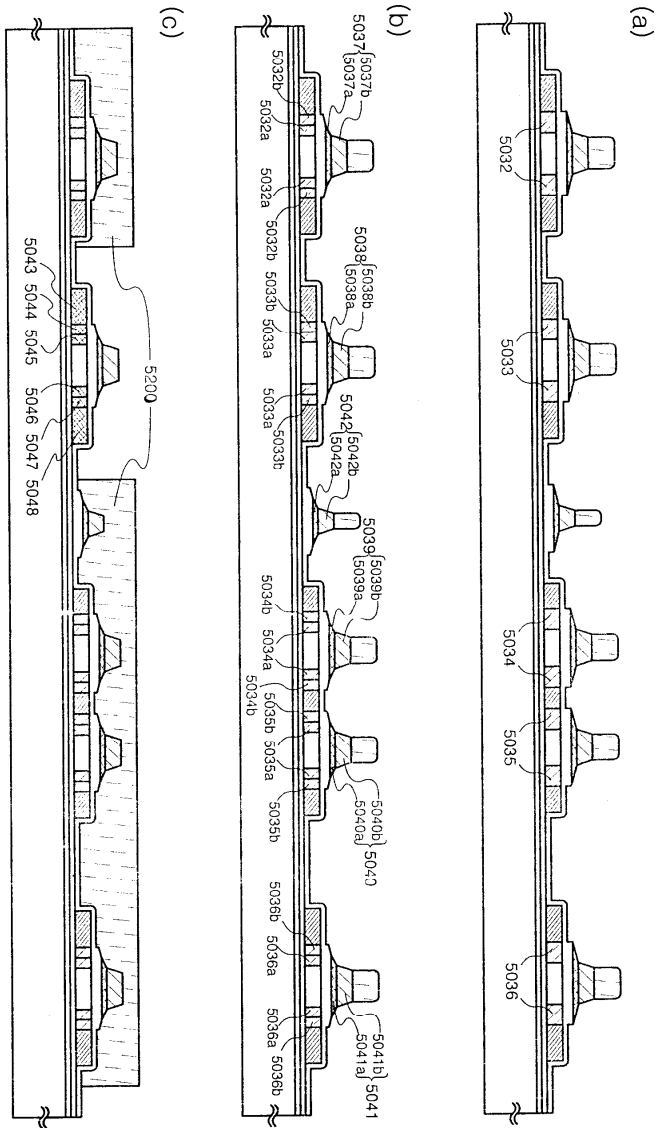


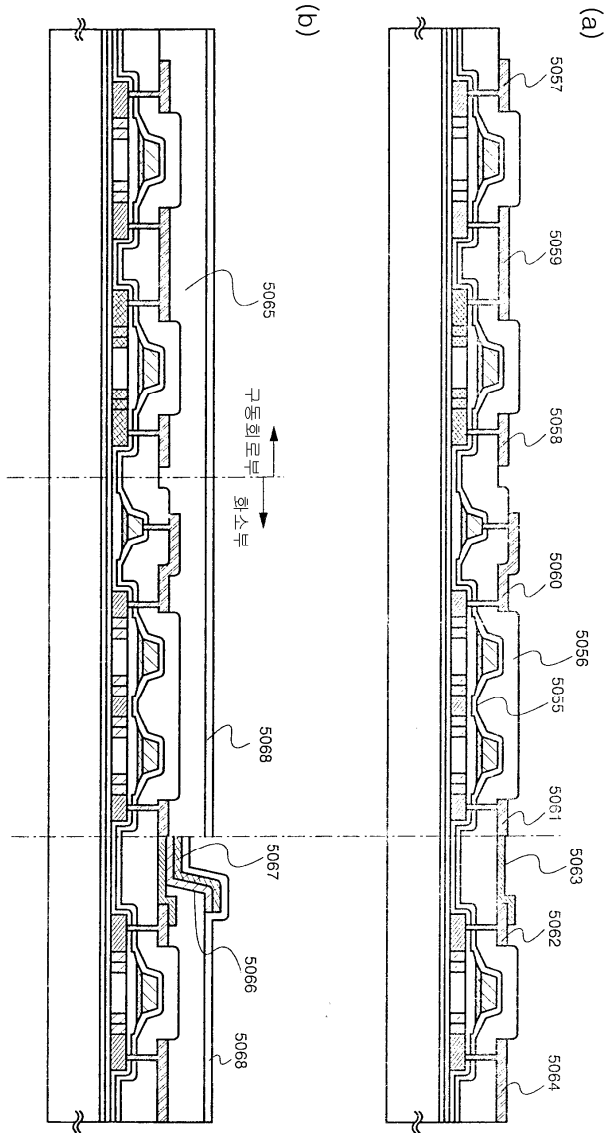
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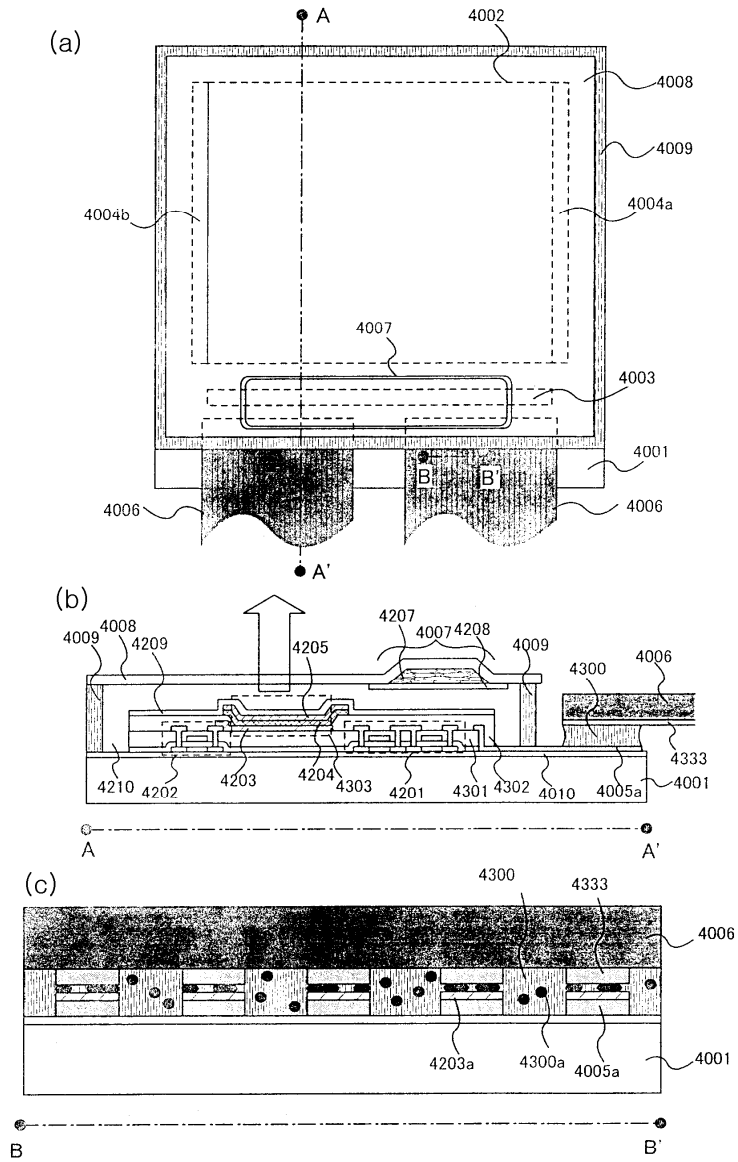
6



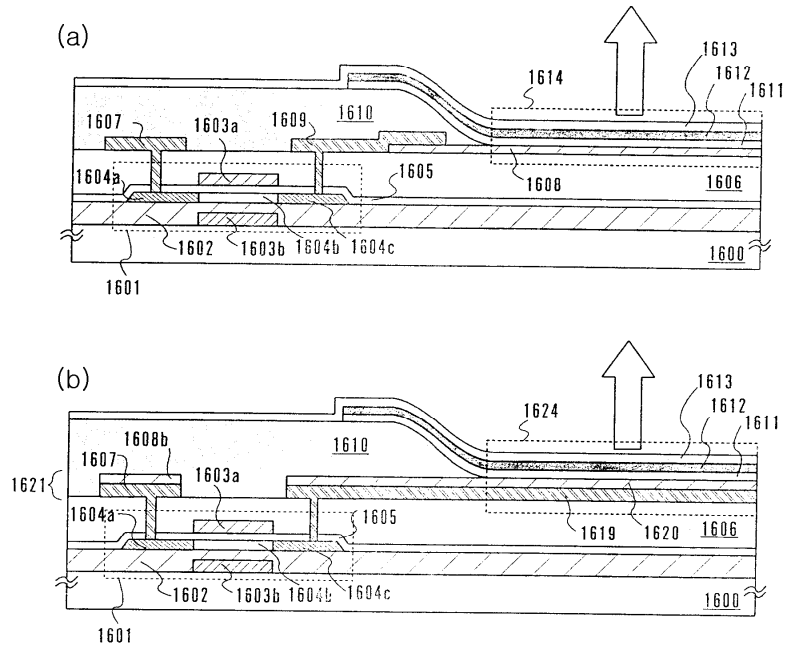




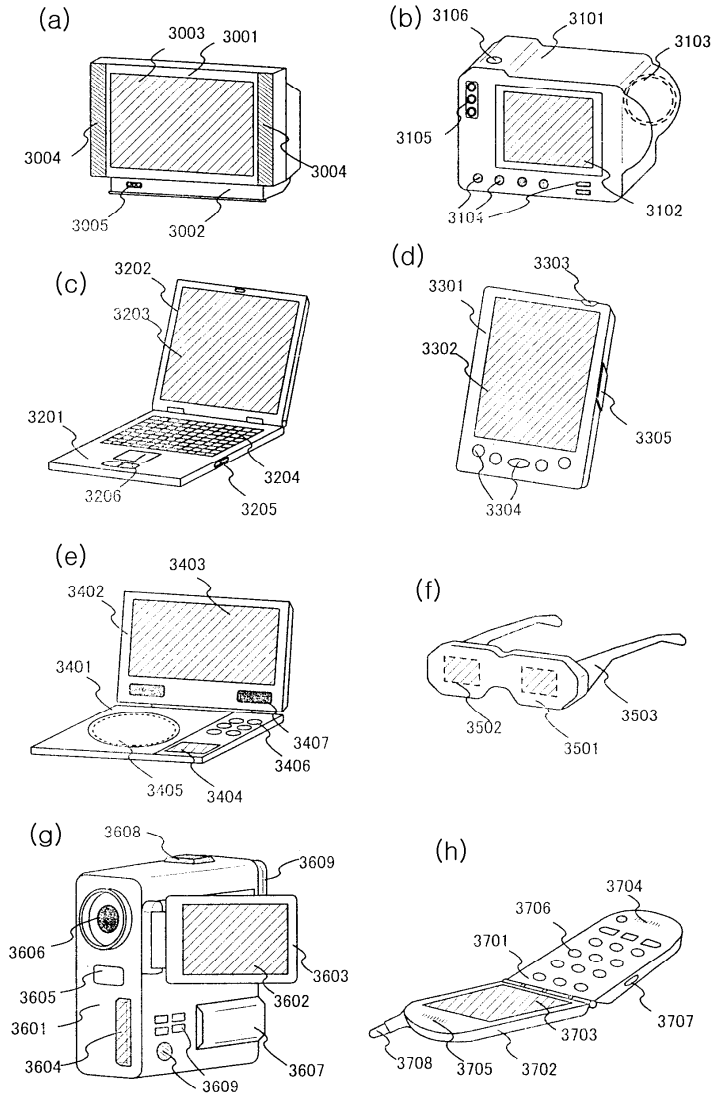
12



13



14



专利名称(译)	显示装置和使用其的电子设备		
公开(公告)号	KR1020030047800A	公开(公告)日	2003-06-18
申请号	KR1020020077281	申请日	2002-12-06
[标]申请(专利权)人(译)	株式会社半导体能源研究所		
申请(专利权)人(译)	株式会社绒布器肯kyusyo极限戴哦		
[标]发明人	KOYAMA JUN 코야마준		
发明人	코야마준		
IPC分类号	H05B33/00 G09G3/20 G09G3/32 H01L27/32		
CPC分类号	G09G3/2022 G09G3/3233 G09G2300/0408 G09G2300/0842 G09G2330/02 G09G2330/028 H01L27/3244		
代理人(译)	金红豆 권태복 Yihwaik		
优先权	2001374938 2001-12-07 JP		
其他公开文献	KR100934396B1		
外部链接	Espacenet		

摘要(译)

目的：提供一种显示装置和使用该显示装置的电子设备，以减小安装区域的尺寸，每个部件的成本和电力消耗。组成：显示装置包括多个像素（105），a多个源极信号线和多个栅极信号线（103,104）以矩阵形状排列在基板上，多个发光元件设置在多个像素中的每一个上，每个发光元件包括至少一个光发光层包括有机材料，以及在基板上的电源电路，用于向发光元件施加电流和电压中的至少一个。©KIPO 2004

