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10-2002-0027435  
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(74)  
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(54)

T 가 2 EL 가 3 EL 가 TF

3d

EL, 3 EL , , TFT,

1a 1b 2 EL  
1c 1e 2 EL  
2a 3 EL  
2b 2d 2a 3 EL  
2e 3 EL  
2f 2h 2e 3 EL  
3a 3d 3 EL  
4a 4b EL  
5a 3 EL

5b 3 EL  
 5c 3 EL  
 6 3 EL  
 7 3 TFT 3 EL  
 8a 8c 4 TFT 3 EL  
 9a 9b 2 EL 3 EL

(organic electroluminescence, EL) (EL) )  
 ( EL EL ) 3 E  
 L ( ) , 3 EL  
 IC ( ) ,  
 EL 2 EL , 3 ( EL ) EL  
 ( , triode) EL 3 (three-terminal) EL EL  
 1 (singlet excitation) EL 3 (triplet excit  
 ation) EL  
 , EL EL 2 EL 가 , 2 EL 가  
 1a EL 2 EL 가 EL (organi  
 c light emitting diode; OLED)  
 가 2 EL , (11) (16)  
 , 'Tang' , '( /  
 / / / )'  
 EL 가  
 13) / (14) / 1b (15) (11) (12) / ( )  
 (13) / (14) / (15) / ( ) , (11) (12) /  
 , 'Tang' , (14)  
 , (11) (16)  
 'EL' , (12), (13), (14), (15), ( )  
 (14) 2 EL 가 (16) (11)  
 EL EL EL EL  
 1c 1e , ' -'  
 (14), (15) (16) 1 (A), (HIL), (HTL), (11), (12), (13),  
 (ETL), 2 (C) , A C (A) (C) (EML),  
 , EA IP . HOMO LUMO (high  
 est occpied molecular orbital, valance band) (lowest unoccupied molecular orbital  
 , conduction band) , 1c (A)(11) (C)(16) (V<sub>CA</sub>)가  
 가 , (HIL)(12), (HTL)(13), (EML)(14), (ETL)(  
 15) (V<sub>CA</sub>)가 가 , 1d 가 (A)(11) (HIL)(12) HOMO  
 , 가 V<sub>CA</sub> 가 가 (turn-on) (HTL)(16) LUMO , (EML)  
 )(14) , EL (HIL)(12), 1e (HTL)(13), 가 V<sub>CA</sub> 가 V<sub>on</sub>  
 set 가 , (ETL)(15)

(EML)(14) EL (Passive) EL (Active) (1e).  
 2 EL ) 가 , ( ) (ON)'  
 IC TAB(Tape Automated Bonding)  
 2 EL  
 (Thin Film Transistor, 'TFT')  
 2 EL 2 EL TFT TFT  
 TFT 2 TFT 1 가 TFT TFT  
 가 (amorphous-silicon) TFT TFT (mobility)  
 가  
 EL  
 , EL (back light)가  
 ( , , ) EL 가  
 EL 가

가 3 EL 가 3 EL  
 EL 3 ( , triode) EL 가  
 , EL (TFT)가  
 1 (11), 1 (11) 2a 3 EL (10),  
 2 (26), 2 (22), 1 (22)  
 (16) 1 (11) 2 (16) 1 (11) 2 (22)  
 20) 1 (11) 2 (16) , 3 EL 3 ( )  
 Li 3 (20) 1 (11) 2 (16) 3 (20) ITO, Ag, Al, Mg, Ca,  
 (porous network)  
 1 2 가  
 1 (11) 2 (16)  
 가 3 (20) , 3 (20) 가 (14)

001-0032045, 10- 2001-0065442 PCT PCT/KR02/00103 3 EL 10-2  
 , 1, 2 (22, 26) (12) (13), (14) (15)  
 A) , 2 (16) 1 (11) 1 (22) ( , C)

1, 2 (11, 16) 3 (20) 가 1 2 (11, 16) 3 (20) 1 2  
 (14) 가 (550 nm) Alq3(tris-8-quinolinolato-alumin ZnPBO, Balq (oxadiazole) OXA-D,  
 um; -8- (strylarylene), BeBq2, Almq, DPVBi, BczVBi ( ) 가 ( )  
 (14) (14) PPP( (p- )), PPV(polyphenylene vinyl (polycarbonate)  
 ne; ), PVK(polyvinyl carbazole; (12) (13) 1 (11) TPD(triphen  
 ylamine derivative; (15) 2 (16) 가 , Alq3  
 (14), (14) (12) (13) (15) EL  
 5 800 nm 가 (11) (16)  
 1 (11) (hole injection) (A) 가  
 (Indium Tin Oxide;ITO), (Indium Zinc Oxide; IZO), , Ag  
 가 Al, Mg, Ca, Li 2 (16) (electron injection) (C) LiF  
 3 (20) ITO, Ag, Al, Mg, Ca, Li  
 3 (20) 가 가 3 (20) 가 1, 2  
 3 EL 2b 2d 가 가 (12), 2b (14), (15) (Fermi level) V<sub>CA</sub> 가  
 13, (11) (16), 3 (20) 가 가 (11) 2 (16) V<sub>CA</sub> 가  
 가 1 (11) (12) HOMO (turn-on) (V<sub>onset</sub>) EL  
 (16) LUMO (14) , 가 V<sub>CA</sub> 가 (12) HOMO (turn-on) (V<sub>onset</sub>) EL  
 (20) V<sub>CG</sub> 가 가 2c 1 (11) 3 (20) V<sub>AG</sub> 2 (16) 3  
 (16) (12), (13), (15) EL 1 (11) 2  
 (14) (14) 가 가 가 가 (14) EL  
 1 (11) 2 (16) 가 V<sub>CA</sub> 가 V<sub>onset</sub> V<sub>CA</sub> 가 가 (2d), V<sub>CG</sub> 가 가 EL  
 가 가 가 가 가 (2d), V<sub>CG</sub> 가 가 EL  
 2e 3 EL (10), 1 (11),  
 1 (11) 1 (22), 1 (22) 2 (26)  
 ), 2 (11) 2 (16) (26)  
 22, 26) 2 , 3 EL 3 (20) 가 , 1  
 2 , 3 EL 가 , 3  
 1 2  
 3 EL 2f 2h 가 가 (12), 2f (11) (16), 3 (20) 가 가 (12), (



3 (11), TFT (815) TFT 3  
3 (20) (11) 3 (20) 가 3 (20)  
TFT 3b EL 2 EL TFT 3b  
(16) 3 (20) (16) 3 (20) (20)  
(51A, 51B)가 3 (20)  
3 EL (203) (17) 3 EL (203)  
( ( ( ) ) 3a ( ) )  
3a 3b 3 EL (203) TFT(102) (11) TFT(102) 3c 3d  
3 EL (16) TFT(102) TFT n TFT 3  
EL (11) 3a 3b ( 3c) ( 3d)  
EL 가 3 3 3  
가 EL 'EL 가 3a 4a 4b  
4a 4b 4a A-A' 4a 4b 4a 4b  
3 (V) 3 EL TFT TFT  
TFT TFT TFT  
TFT TFT 3 EL 3  
가 1 1  
4a '211' '213' TFT '212'가  
(212) (214) FPC(가 (213)  
'216' 3 3 EL (203) ) (215)  
(216) (217) 가  
4b (211) (211) (213)  
(213) (213) (203) ( )  
n TFT(109) p TFT(108) CMOS 가 )  
4b (211) (213)가 )  
(213) IC LSI 가  
(211) (211) 가 (203)  
TFT( ) TFT(102)가 TFT  
TFT( ) TFT( ) TFT( )  
TFT( ) TFT)가 . 3 EL 가 50 nm 가 1  
000 nm BC  
B( ) 가  
EL 가



가, EL (V)(811)  
 3 (T)(815) 가 3b ( )  
 3 EL 3 EL  
 TFT(808) EL 3c 3d  
 EL 가 3 가 3 EL 가  
 5c 3 EL  
 0.5 1 mA/m<sup>2</sup> 200 cd/m<sup>2</sup> EL 가 3 EL 가  
 가 가 가 3 EL 가  
 5 6 (time division method time-sharing method) 가  
 8 256 (16.77 ) 가  
 1 1 1 8 EL 가 60 Hz 1 60  
 가 (Ta) 가 (Ts) 가 ( ) EL 가  
 가 가 F1 2 8 가 F2 F8  
 (Ta) F1 F8 (Ts) Ts1 : Ts2 : Ts3 : Ts4 : Ts5 : Ts6 : Ts7 : Ts8 = 1 : 1/  
 Ts1 Ts8 (Ts) F1 F8 가 256  
 2 : 1/4 : 1/8 : 1/16 : 1/32 : 1/64 : 1/128 가 6 )  
 가 .n 가 가 )  
 가 가 가 가 )  
 EL )  
 ) )

[ 3]  
 3 가 7 '1001' TFT(1002)  
 '1003' TFT(1002) '1004'가 TFT '1005'가  
 ( ) '1006' (V) '1007' TFT '1008'  
 '1009'가 3 EL TFT(1004)  
 04) (1006) 3 EL (1009) , 3 EL (1009) TFT(1004)  
 3 (1010) TFT(1002) (1001)  
 (1003) TFT(1004) (1006) 3 (1010)  
 (1001) TFT(1004) (1006) TFT(1007) TFT(1007)  
 007) TFT(1004) TFT(1004) TFT(1007) TFT(1002)  
 04) TFT p TFT TFT(1007) TFT(1002) TFT(1007) n  
 (1010) 2 TFT(1004) 3 EL (1009) (V)(1006) 3  
 가 , 2 가 (V)(1006) 가 , 1 (V) 2

[ 4]  
 4 가 8a '1101' 1 TFT(1102)  
 '1103' 1 TFT(1102) 2 TFT

'1104' TFT(1102) (i + 1) '1105' TFT(1103)

03) i EL 3

TFT(1106) 3 (V)(1107) '1106' TFT TFT(1108) 8a

(V)(1107) TFT(1106) (i - 1) TFT(1108) 2 TFT(1103)

TFT(1108) 3 EL (1110) TFT(1108) TFT(1006)

TFT(1106) n TFT p TFT TFT(1108) 3

(1102) 가 TFT가 1 TFT(1102) 2 TFT(1103) , 1 TFT

가 (i - 1) , (i + 1) , TFT(1106) 가

(i - 1) , i , (i + 1) 가 8a

EL , 8c 가 , 8b 가

가 , 가

[ 5] 1 2

3 3 TFT가 , 3 EL TFT가 1

TFT가 4 4 TFT가

[ 6] 2

1 5

[ 1] 2 EL 3 EL 가

EL 3 EL

( ) (CuPc), 4,4',4' - (

N-3- -N- ) (mTDATA), 4,4' - [N- -N- ] ( -NPD)

(Alq3) 2 (16) Al:Li 3 EL

( 3a ) 40 nm, 20 nm, 가

60 nm, 20 nm 1, 2 3 (11, 16, 20) 3 (20)

9a 9b 3 (20)

1 V<sub>CA</sub> 2 (11, 16) V<sub>CA</sub> 가 2 V<sub>CA</sub> = 6V (V<sub>onset</sub>)

) 9a V<sub>CA</sub> 가 가 가 가 2 V<sub>CA</sub> = 9V 1000(arb. unit) 1000(arb. unit)

9a V<sub>CA</sub> = 6V 9V V<sub>CA</sub> (20) V<sub>CG</sub> 가 , V<sub>CA</sub> 1, 2 (11, 16)

V<sub>CA</sub> 3a V<sub>CG</sub> 가 가 V<sub>CA</sub> V<sub>onset</sub> , (6 V) 가

9a , V<sub>CG</sub> = 0V , V<sub>CA</sub> = 4V EL 9b 가

가 , V<sub>CA</sub> = 9V 2500(arb. unit) V<sub>CA</sub> 가 가 9b 가

b. unit) V<sub>CA</sub> 4 V 9 V V<sub>CA</sub> 5V

가 V<sub>CA</sub> 3a 3 가

3

3 EL TFT

TFT 3 EL 가

가 . ,

(57)

1.

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 , ,  
 , ,  
 , 3 ;  
 3 ,  
 3 3 ,  
 3 3 ,

2.

1 , ,  
 , 2 , 가  
 가

3.

2 , ,

4.

3 , ITO, IZO

5.

1 , ,

6.

5 , ,

7.

6 , Al, Ca, Mg, Li, Ag, Ba

8.

1 5 , ,

9.

1 5 , 1 3 ,

10.

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 ;  
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 ;  
 , 2 3 , 1  
 1 , 1 3 , 2 1  
 2 , 3 ,  
 3 , 2 1 ,  
 3 1 2 3 ;

3 가 3

11.  
10



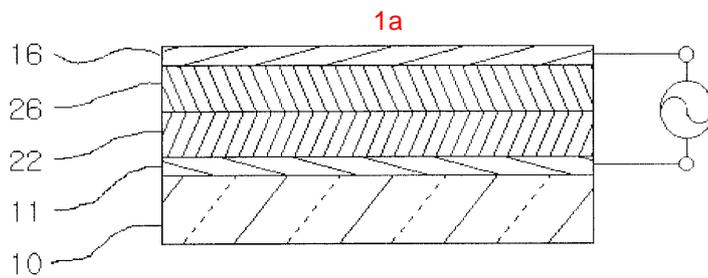
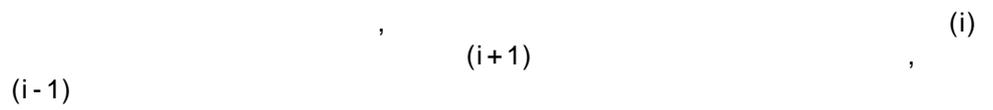
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10

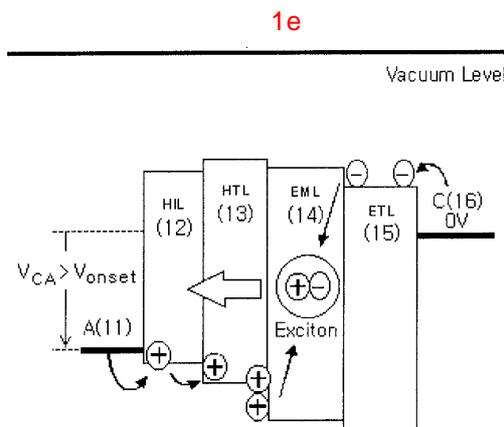
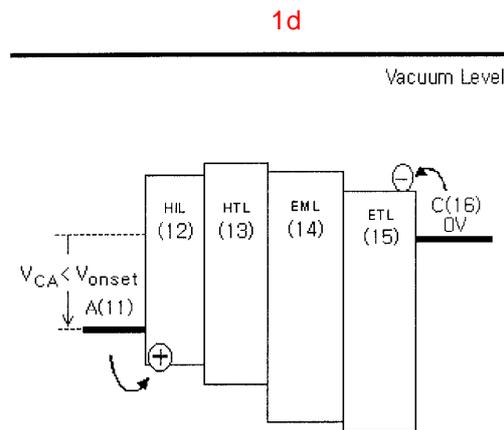
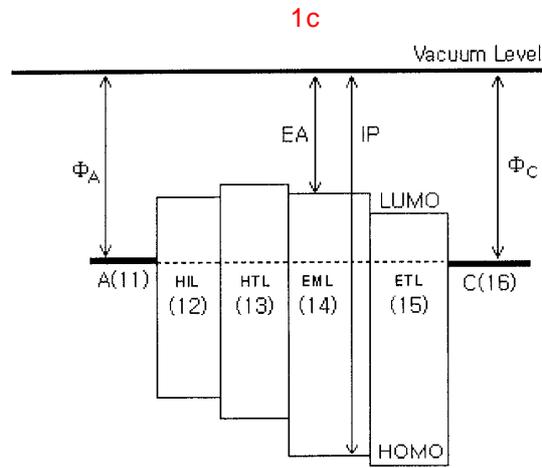
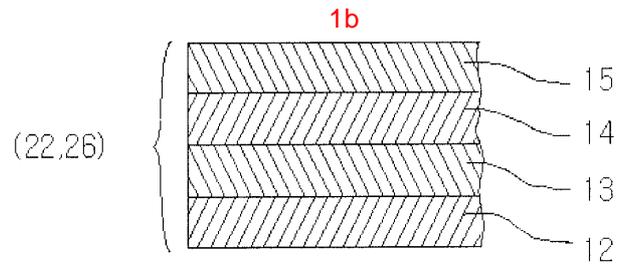


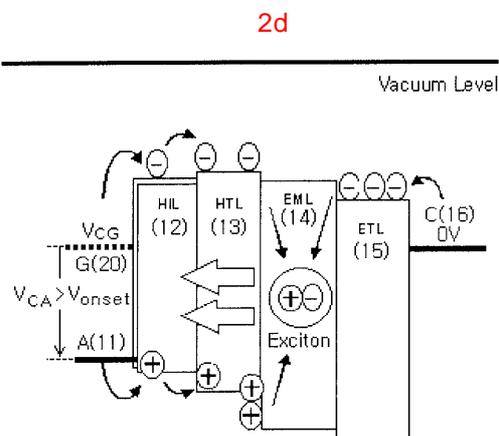
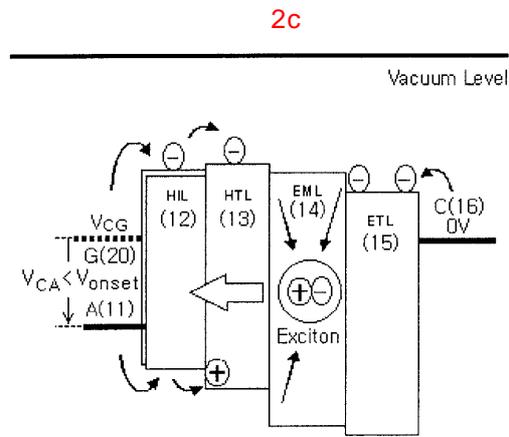
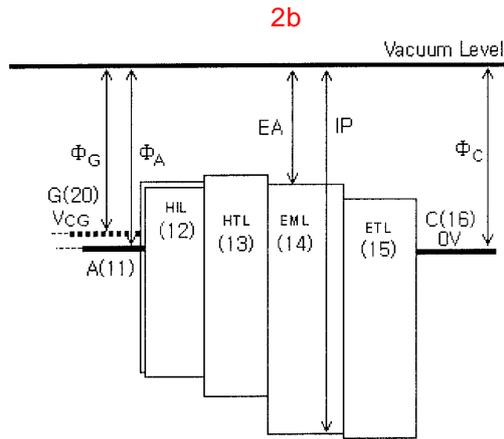
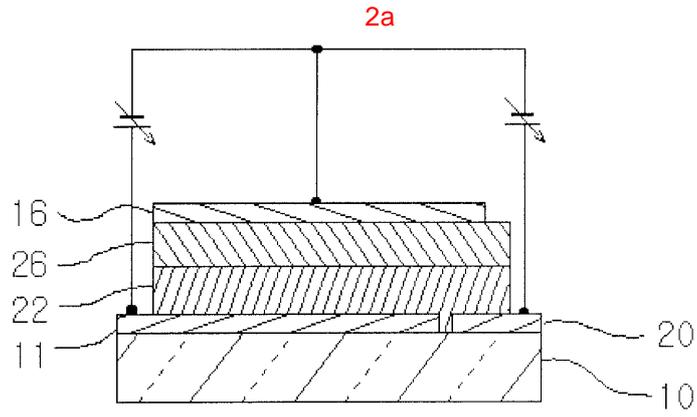
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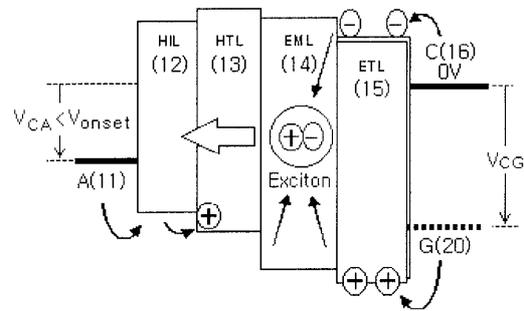
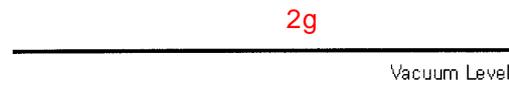
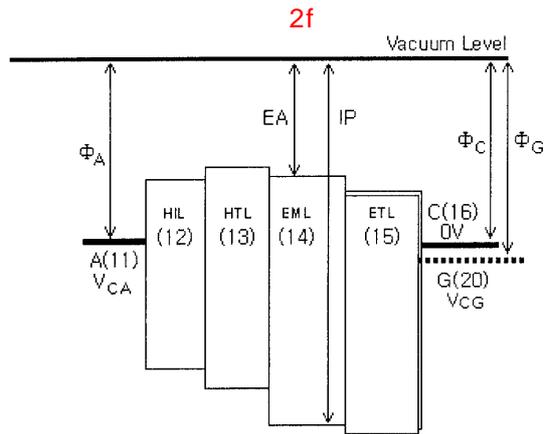
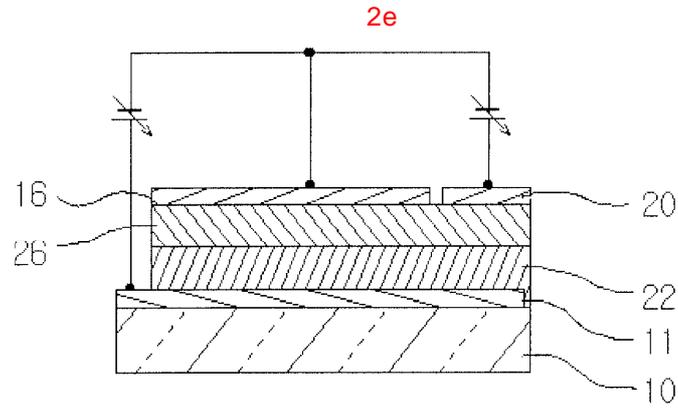
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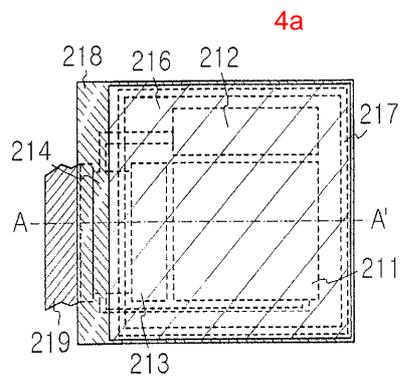
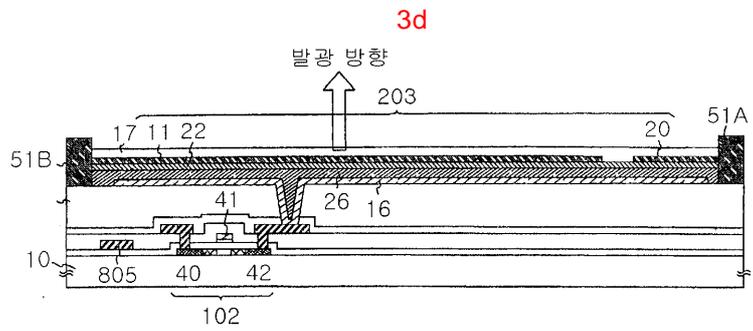
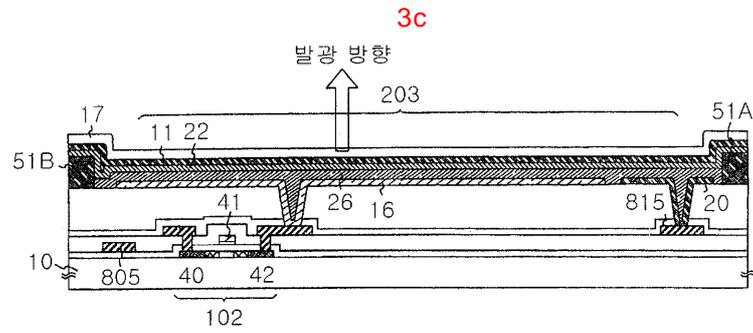
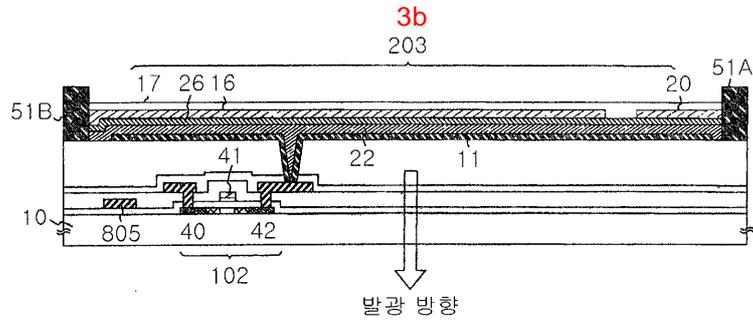
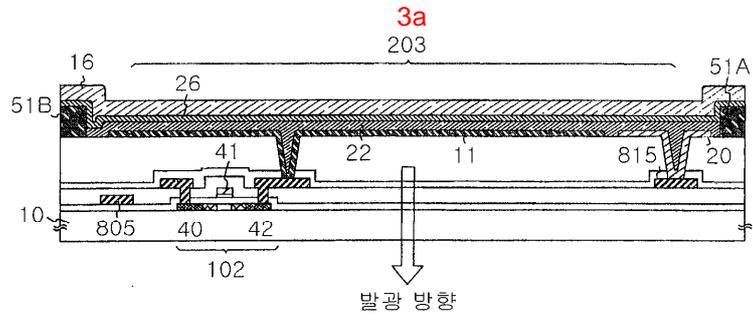
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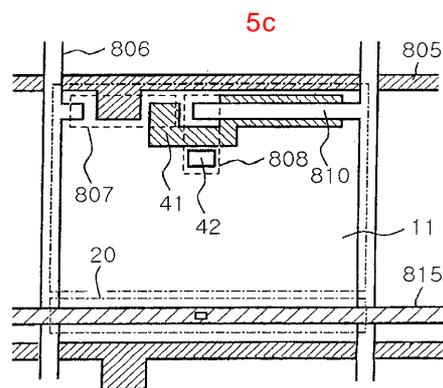
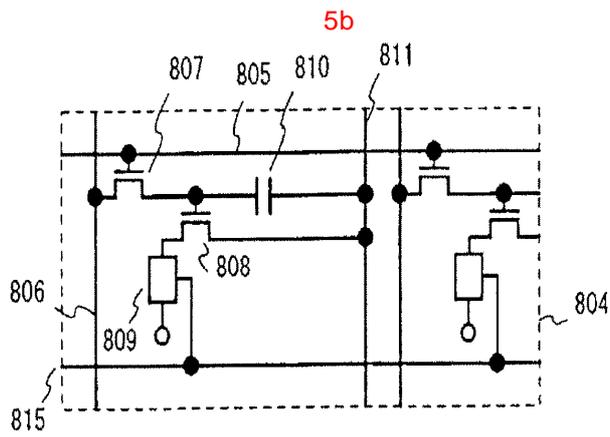
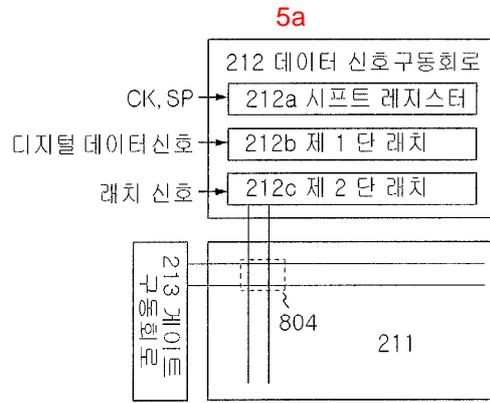
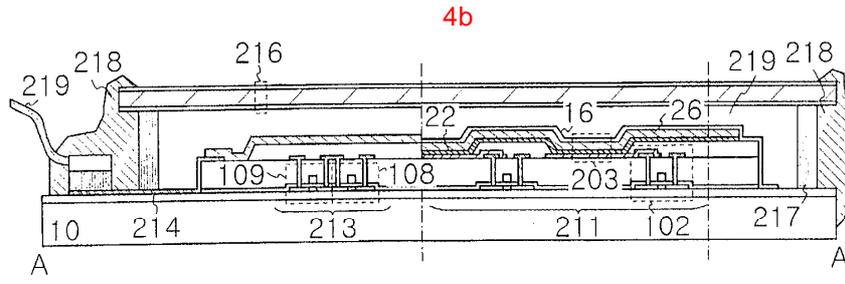




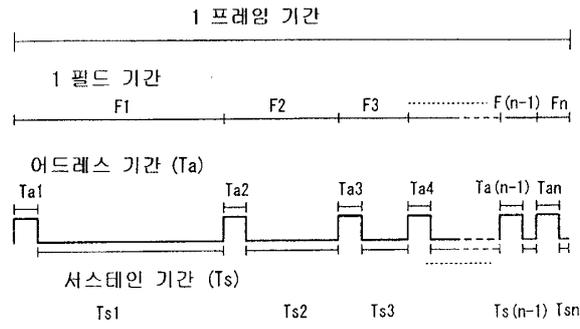




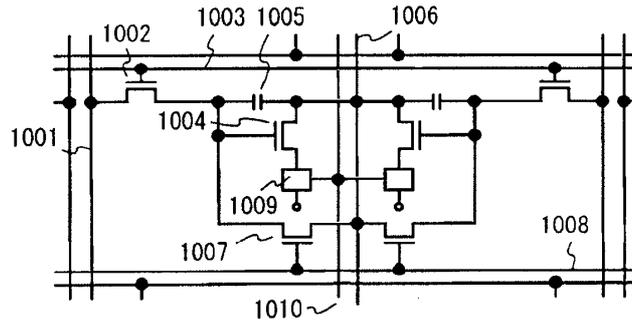




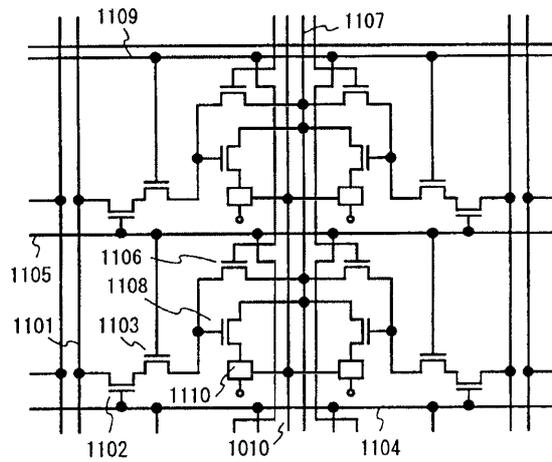
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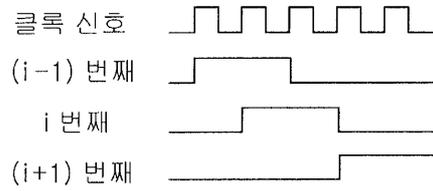
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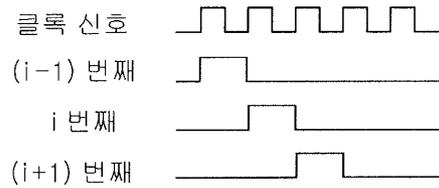
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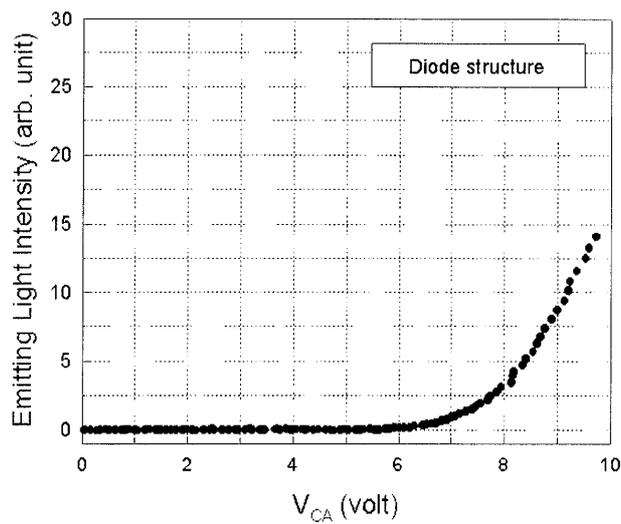
8b



8c



9a



9b

