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(71) 가 가 가
가 가
1 6 2

(72) 197 - 3
가
가 가 가 6 - 1 - 12
가
가 가 가 3 - 375 - 2 - 6

(74)
:

(54)

(W/L) (RS(1), RS(2), ...) 6 TFT , TFT(1 6)

1	1	.
2	1	.
3	2	.
4		.
5	4	.
6		TFT .
7	6a	.
8	4	.
9		.
10		.
11	3	.
12	11	.
13	3	.
14	13	.
15	3	.
16	15	.
17	15	.
18	3	.
19	18	.
20	2	3
21	20	.
22	20	.

23a	2	1
, 23b		
24a	2	1
, 24b		
25	20	
26	20	
27	2	
28	27	
29	27	
30	2	
31	27	
32	27	

1 6: TFT 16:

19: 21 26: TFT

61: 64a, 64b, 64c:

65, 67: 66, 68:

69a, 69b, 69c, 69d:

72: 150:

151: 152:

153: 161: TFT

162: 201:

202: 202a:

210: 211:

212: 212a:

212b: 212c: 「 + 」

212d: 「 - 」 213:

220: CCD 221: A/D

222: CPU 223: ROM

224: RAM 225: /

226: 230:

240:

TFT

1

TFT

TFT

가

가

TFT

가

TFT

TFT

1

1

1

1

1

1

ON

2

2

1

1

가

2

ON

2

2

2

1

2

,
3 , 3 1 1 가
ON , 3
3 ,
4 , 4 가 ON , 4 4
2 2 , 4 4
4 ,
(4) / 4) (2 /
2) .
2 ,
1 , 1 ON ,
1 1 1 ,
2 , 2 1 1 가
ON , 2 2 1 2
2 2 ,
3 , 3 3 3
,
4 , 4 1 1 가
ON , 3 4
4 , 3
4
5 , 5 3 가 ON ,
5 2 2 , 5
5 5 ,
6 , 6 ON 가 2
2 1 1 가
6 ,
(5) / 5) (1 /
1) .
3 ,
가 , 1 가 1 ,
가 , 2 가 2 ,

(210)

(201) (211) , (212b) , 「 + 」 (212c) , 「 - 」 (212d) ,
 (213) (211) ON/OFF
 (212b), 「 + 」 (212c) 「 - 」 (212d) (212a) (212)

(212b) 「 + 」 (212c) 「 - 」 (212d) (210)
 / (213)
 (,)

(202) (202a) (202)
 (201) 360° 가

2
 CCD(Charge Coupled Device) (220), A/D(Analogue/Digital) (221), CPU(Central Pr
 ocessing Unit)(222), ROM(Read Only Memory)(223), RAM(Random Access Memory)(224), /
 (225), (226) (210), (212) (213)
 (230) CCD (220) A/D (221)
 (240) (2
).

CCD (220) , (202a)
 . A/D (221) CCD (220)

CPU(222) (212) ROM(223)
 . ROM(23) CPU(222)가 . RAM(224)
 . RAM(224) CPU(222)가 . RAM(224)
 (210) VRAM
 / (225) (212b)가 CCD (220) , A/D (221)
 (212) (226) / (225)
 (226) 가 가
 (226) 가

3 (210)
 (150) , (151) , (152) , (153)
 (152) (Gcnt) , (153) (Dcnt) (data)가
 (150)

(150) CPU(222) (Gcnt, Dcnt) (152)
 (153) CPU(222) RAM(224)
 VRAM (data) (153)

(151) TFT(161)가 (19) a - Si (G
 L) , (DL) , TFT(161) (G
 (Vcom) 가 ,
 (162) (162) 가
 (151)

(152) (150) (Gcnt)
 (152) (150) (Gcnt) (GL)
 (152)

a) (153) (150) (Dcnt) (150) (dat
 (Dcnt) . 1 (data) (153) (150)
 (GL) TFT(161)(ON) (DL) (152) (152)
 (162)

3 (152) 4 (152)
 (1) (152) (GL)) n
 (152) n (RS(2) RS(n)) (RS(n))
 (RS(n+1)) (RS(n+2)) 4 n 2

(Gcnt) (RS(1), RS(3), ..., RS(2t - 1)) (CK1)가
 (RS(2), RS(4), ..., Rs(2t)) (CK2)가
 (Vss) (CK1, CK2) + 15(V), - 15(V) (Vss)
 - 15(V)

1 (RS(1)) (Dst)가 (Dst) + 15(V),
 - 15(V) . 2 (RS(2) RS(n)) (RS(1) RS(n - 1))
 (OUT1 OUTn - 1)가 (RS(k))(k: 1 n) (RS(k + 1))
 (OUTk + 1)((RS(n)) (Dend))가 (RS(1))
 RS(n)) (OUT1 OUTn) (1) (GL)

5 (152) (RS(1) RS(n)) ()
 RS(1) RS(n)) 6 TFT(Thin Film Transister)(21 26) . TFT(21 26)
 n MOS

(RS(k)) TFT(21) (RS(k - 1)) TFT(25)
 TFT(21) TFT(22) , TFT(25) TFT(24)
 . TFT(22) TFT(23) TFT(26) , TFT(22)
 TFT(24) (Vss) . TFT(23)

(Vdd) , TFT(25) (CK1)가 , TFT(25)
 (CK3)가 , TFT(25) TFT(26) , TFT(26)
 (Vss) . TFT(24) . (OUTk + 1)가 .

6 TFT(21) TFT(26)
 , 7 6 - .

(72) (151) (19) (72) ,
 (19) (16) , (72)
 (61) , (61) (64a, 64b, 64
 c) , (64a) (61) (69a) ,
 (64a) (61) (64b) ,
 (61) (69b) , (64b) (64c)
 (61) (69c) , (64c)
 9b) , (69c) (69d) (65), (66), (67) (6
 (68) , (16), (64a, 64b, 64c), (65, 67) (66, 68)

(72), , (65 68) , 가
 (61) 6 (69a, 69b, 69c, 69d) n .

1 TFT(21) TFT(26)
 (RS(1)) .

TFT(21) (Dst)가 . TFT(21) TFT(25) , TFT(22)
 , TFT(24) . TFT(25) TFT(21) (Ca(1)) (NO
 DE)가 ON . TFT(25) (CK1)가 TFT(25) O
 N , TFT(26)가 OFF 가 (RS(1)) (OUT1)

TFT(23) (Vss) , 가 (Vdd) T
 FT(23) ON (Vdd) . TFT(23) TFT(22)
 , TFT(23)가 TFT(22) (Vdd) TFT(22) TFT
 (21) (Ca(1)) 가 ON , TFT(23)
 (Vdd) (Vss) .

TFT(26) TFT(22)가 OFF TFT(23) (Vdd) ON ,
 (OUT1) (Vss) . TFT(26) TFT(22)가 ON OFF ,
 (OUT2) (CK1) (OUT1) . TFT(24) RS(2)
 ON , TFT(21) TFT(25) TFT(22) (Ca)

가 (Vss)

1 (RS(2t)) (OUT2t)가 (RS(1)) (RS(2t+2))(t: 0 n
/2) TFT(21) (RS(2t+1)) (OUT2t+1)가 , T
FT(25) (CK1) (CK2)가 1 (RS(1))
(RS(n+2)) TFT(24) (Dend)가 (150)
3 (RS(3)) (OUT3)
, TFT(21) TFT(26)

TFT(21) TFT(26) (61) 가 2 (L₁)
(W₁) , 2 (L₂) (W₁) , 2
(L₃) (W₁) TFT(21) TFT(26)
(W/L) (L₄), (L₅), 6, 7
(W/L) TFT (L₁) (L₃) 3 (61)
(W/L) TFT 2
(Ids) 1

[1]

$$I_{ds} (W_1/L_1 + W_1/L_2 + W_1/L_3) = (W/L)$$

$$L_1 = L_2 = L_3 \quad (W/L) = 3W_1/L_1$$

TFT(21) TFT(26) ((W/L))
((W/L)) (W/L) (W/L)
(W/L) TFT(21), TFT(25)
가 가 , (W/
L)

TFT(25) 가 (CK1) (CK2)가 ,
ON () (OUT1 OUTn) 가 가 가
(OUT1 OUTn) 가
(W/L)
FT(25) TFT(25) 가 - - T

TFT(21) 가 (Dst) 가
(Ca) , (Ca)
TFT(25) 가 , TFT(21) TFT(25) (W/L)
TFT(25) 3 1

TFT(23) TFT(22) TFT(26)
 가 , 가 TFT
 (23), TFT(22) (W/L) TFT(21), TFT(25)
 TFT(23) TFT(25) 20 1 (W/L) , TFT(25) 5 1 (W/L)

TFT(22) (OUT1 OUTn) 가 TFT(22) (W/L) TFT(21, 23 26)
 (W/L) 가
 TFT(26) (OUT1 OUTn)가 ON () OFF ()
 (Vss) (W/L)

TFT(25) OFF , TFT(25) ()
 CK1 CK2) TFT(25)
 (GL) OFF (OUT1 OUTn) 가 가
 가 (GL) OFF ON
 TFT(26)가 OFF (GL)
 TFT(25) (W/L)

TFT(21)가 TFT(25) ON () TFT(24) TFT(25) OFF ()
 TFT(24) (W/L) TFT(21) 가
 , TFT(21) TFT(26) (W/L) 가
 TFT(21) TFT(26)
 (W/L) TFT(21)
 TFT(26) (W/L) (耐用)

8 4

(T0 T1) , (Dst)가 1 1 (RS(1)) TFT(21)가 ON , 가
 TFT(21) 1 (RS(1)) (Ca(1)) 가
 TFT(25), TFT(22)
 ON TFT(23) (Vdd) TFT(26) , TFT(25, 22)가 ON . TFT(22)가
 가 ON TFT(22)가 ON TFT(23) (Vdd) TFT(26) TFT(26)
 TFT(26) OFF (CK1)가 (OUT
 1)

(T1) (CK1)가 1 (RS(1)) TFT(25)
 (OUT1) (Ca(1))
 TFT(25) (OUT1)
 (CK1) (OUT1) (T2) (CK1)

가 가 .

(T1 T2) 1 (RS(1)) (OUT1) 2 (RS(2))
 TFT(21) ON , (Ca(2)) 가 . 2 (RS(2)) TFT(25),
 TFT(22)가 ON , TFT(26)가 OFF .

(T2) (CK2)가 2 (RS(2)) TFT(25)
 (OUT2) . (Ca(2))
 TFT(25) (OUT2)
 4) (CK2) . (OUT2)가 1 (RS(1)) TFT(2
 1 (RS(1)) TFT(24)가 ON , (Ca(1))
 (Vss) . (OUT2) (T3) (CK2)가
 가 .

(T2 T3) 2 (RS(2)) (OUT2) 3 (RS(3))
 TFT(21)가 ON , (Ca(3)) 가 . 3 (RS(3)) TFT(25),
 TFT(22)가 ON , TFT(26)가 OFF .

(T3) (CK1)가 3 (RS(3)) TFT(25)
 (OUT3) . (Ca(3))
 TFT(25) (OUT3)
 (CK1) . (OUT3)가 2 (RS(2)) TFT(24)
 2 (RS(2)) TFT(24)가 ON (Ca(2))
 (Vss) . 가 (Tn)((T0)) 1 (Q)
 (OUT1 OUTn)가 (OUT1 OUTn)
 (RS(1)) (RS(n)) . 1 (Q) (Dst)가 ,

(GL) (RS(n)) (OUTn) (Ca(n))
 , (OUTn) (RS(n+1)) (OUTn+1) (
 RS(n)) TFT(24)가 ON , (Ca(n)) (Vss) 가 (RS(n+2))
 (OUTn+2) (RS(n+1)) TFT(24)가 ON , (Ca(n+1)) (Vs
 s) . (RS(n+2)) (Ca(n+2)) (Dend)가 (RS
 (n+2)) TFT(24) (Vss) .

8 ,
 TFT(21) TFT(26) 가 가 .
 TFT(25) TFT(21) (Ca) 가 (C
 K1 , TFT(25), TFT(22)가 ON
 가 .

가

(152) (Gcnt) (Gcnt) (CK1, C

(GL) (Dst), (Vdd) (Vss) (Gcnt)

K2), (151) TFT(161) (153) (152)가

(152)가 (GL) TFT(161) (GL) 1 가

(152)가 (GL) TFT(161)가 ON (GL) 1 가

(153) (DL) (Data) 1 가 , (GL) ON

TFT(161) (162) (162) (DL) ON

가

(152)가 (GL) TFT(161) 가 , (DL)

TFT(161)가 가 (153) TFT(161) (DL)

가 (162) 가

TFT(21) TFT(26) (W/L) TFT(161) 가

(152) (162) 가 가

TFT(21) TFT(26) (W/L) 가 (151) T

(152) (19) TFT TFT

FT(21 26)가 TFT(21) TFT(26) (W/L)

가 TFT(21) TFT(26) (W/L)

(152) 1 TFT(21) (W/L) 60
 /L) 120, TFT(25) (W/L) 320 , TFT(22) TFT(24), TFT(26) (W/L) 60
 ((A) (J)) 가 TFT(21) W/L 120 TFT(21) (W/L) 120
 , TFT(21) (W/L) 120
 TFT(21), TFT(25) (W/L) 65

샘플	채널폭/채널길이의 비(W/L)					
	TFT21	TFT22	TFT23	TFT24	TFT25	TFT26
A	120	24	32	120	320	320
B	120	36	48	120	320	480
C	120	48	64	120	320	640
D	120	12	16	120	320	320
E	120	48	64	120	320	320
F	120	24	24	120	320	320
G	120	24	40	120	320	320
H	120	24	48	120	320	320
I	120	24	32	80	320	320
J	120	24	32	160	320	320

6) TFT(21) TFT(26) (L) 9μm TFT(25), TFT(2
 (L) 12μm , TFT(21) TFT(24) (L) 9μm 9μm
 1(A) (J) 10 가 , 가
 2 2 , " G " 가
 , " NG " ,

샘플	외부온도(℃)											
	25	35	45	55	60	65	70	75	80	85	90	
A	G	G	G	G	G	G	G	G	NG	NG	NG	
B	G	G	G	G	G	G	G	G	G	G	G	
C	G	G	G	G	G	G	G	G	G	G	G	
D	G	G	G	G	G	G	NG	NG	NG	NG	NG	
E	G	G	G	G	G	G	G	G	G	G	G	
F	G	G	G	G	G	G	NG	NG	NG	NG	NG	
G	G	G	G	G	G	G	G	G	NG	NG	NG	
H	G	G	G	G	G	G	G	G	G	G	G	
I	G	G	G	G	G	G	NG	NG	NG	NG	NG	
J	G	G	G	G	G	G	G	G	G	G	G	

1, 2 (A), (B), (C) 65
 TFT(26) (W/L) TFT(25) (W/L) TFT(26) (W/L) TFT
 (25) (W/L) TFT(23), TFT(22) (W/L) 90

1, 2 (A), (D), (E) 65
 TFT(23) (W/L) TFT(25) (W/L) 20 1 TFT(23) (W/L) TFT(25)
 (W/L) 5 1 90

1, 2 (A), (F), (G), (H) 65
 TFT(23) (W/L) TFT(22) (W/L) . TFT(23) (W/L) TFT(22) (W/L)
 /L) 2 90 .

1, 2 (A), (I), (J) 65
 TFT(24) (W/L) TFT(21) (W/L) 2/3 . TFT(24) (W/L) TFT(21)
 4/3 90 .

TFT(21) (W/L) TFT(25), TFT(26) (W/L) , TFT(23), TFT(22) (W/L)
 , TFT(24) (W/L) TFT(25), TFT(26) (W/L) TFT(23), TFT(22) (W/L)
 80 .

가 , 가 . 가

(RS(1), RS(2), ...) 6 TFT(21) TFT(26)
 , 9 (RS(1), RS(2), ...) 7
 가 TFT(27) (W/L) 2 , (Vdd1)
 (Vdd) , (Vdd2) (Vdd1) 4
 . 4, 9 TFT(23) .

TFT(21) TFT(26)

p , TFT(21) TFT(26) TFT n , .
 , n .

(152)

EL
 가

가

10

(73) , (74) , (70), (71), (72),

1) (71) (81) (8)
 (91) (TGL) , (92) (BGL) , (93)
 (DL) , (94) (GrL) 가 (71)
 (81) 가

(71) (81) (91) 가 +25(V) ,
 (92) 가 0(V) (91)
 (94) (93) 0(V) , (91) 가 -15(V) , (81)

(92) 가 0(V) , -

(81) , 가 (81) (92) , 가 (81) 가 (81) 가 ()

n - 15(V) , (92) 가 +10(V) , (91) 가 (가)
 (81) 가 (81) 가 n (DL)

Tcnt) (72) (71) (TGL) , (70) ()
 (72) (TGL) +25(V) - 15(V) .
 4 10 , (152), (72), (73)

(Bcnt) (73) (71) (BGL) , (70) (73)
 (BGL) +10(V) 0(V) . 4
 10 , (152), (72), (73)

(74) (71) (DL) , (70) (Dcnt)
 (DL) (+10(V)) ,
 (74) (81)
 (DATA) (70) (DL)

(70) (Tcnt, Bcnt) (72), (73) ,
 (72, 73) . (70) (Dcnt) (71)
 (74) (DL) , (DATA)

11 3 10 (152), (72), (73) (151)

(GL) n (RS(1) RS(n))(n:)

(152) (150) (Gcnt)

(CK1, CK2), (Vdd), (Vss(< Vdd)), (Dst) (Dend)가

(Vdd) (Vss) (RS(1) RS(n)) , (CK1) (RS(1), RS

(3), ..., RS(n - 1)) , (CK2) (RS(2), RS(4), ..., RS(n)) , (Dst) 1

(RS(1)) , (Dend) n (RS(n))

Si 1 (RS(1)) , (RS(1)) TFT(161) a -

6 TFT(1 6) . TFT(1 6) (n

)

TFT(1) (Dst)가 . TFT(1) (Vdd) . TFT(

1) TFT(2) , TFT(5) , TFT(6) . TFT(1) , TF

T(2) , TFT(5) TFT(6) , (A1)

(Vdd) (2 A2 An). (Dst)가 TFT(1)가 ON

(A1) 가 .

TFT(2) (CK1)가 , TFT(2)가 ON (CK1)

(OUT1) , 1 (GL) . TFT(2) TFT(3)

TFT(4) (Vdd) , ON . TFT(4) (Vdd)

TFT(5) . TFT(5) TFT(5) (Vss) . TFT(4)

TFT(5)가 ON TFT(4) TFT(5) TFT(3) , T

(Vss)

TFT(3) TFT(4) TFT(5) , TFT(5)가 OFF TFT

(4) (Vdd) ON . TFT(5)가 ON TFT(4) TFT(

5) 가 TFT(3) , OFF .

TFT(6) 2 (RS(2)) (OUT2)가 . TFT(6) (

A1) , (Vss) . (OUT2)가 TFT(6)가

ON , (A1)

1 (RS(3), RS(5), ..., RS(n - 1)) TFT(1) (RS(2), RS(4),

..., RS(n - 2)) (OUT2, OUT4, ..., OUTn - 2)가 1 (RS(1)) .

n (RS(2), RS(4), ..., RS(n - 2)) TFT(1) (RS(1), RS(3),

..., RS(n - 3)) (OUT1, OUT3, ..., OUTn - 3)가 , TFT(2) (CK2)가

1 (RS(1)) . n (RS(n)) TFT(6) (Dend)

가 (RS(2), RS(4), ..., RS(n - 2)) .

(152), (72), (73) TFT(1 6)
 , TFT(1 6) (151) TFT(161) TFT(1 6)
 (152), (72), (73) (1)
 51) TFT(161)

(152) 12
 (152) (150) (Gcnt)

(Vdd) (CK1, CK2), (Dst) (Dend) (Q)
 (210) 1 (Vss) . 1 (Q)

(RS(1) RS(n)) (T0) (OUT1 OUTn)
 TFT(5) ON, TFT(3) OFF (A1 An) 가 , TFT(2)

(T0 T1) (Dst)가 1 (RS(1)) TFT(1)가 ON , (Vdd) TFT(1) 가 1 (RS(1)) (A1) 가 ,
 TFT(2) TFT(5)가 ON . TFT(5)가 ON TFT(4) TFT(5)
 가 , TFT(3)가 OFF . 1 (RS(1)) TFT(2) ON ,
 (CK1) (OUT1)

(T1) , (CK1)가 1 (RS(1)) TFT(2)
 , (OUT1) (A1)
 (Vdd) 2 TFT(2)
 TFT(2) , (OUT1) (CK1)
 (OUT1) (Vdd) (T2)
 (CK1)가 (OUT1)

(T1 T2) 1 (RS(1)) (OUT1) 2 (RS(2))
 TFT(1)가 ON . 2 (RS(2)) TFT(1) (Vdd)
 (A2) 가 , 2 (RS(2)) TFT(2) TFT(5)가 ON , TFT(3)가 OFF .

(T2) , (CK2)가 2 (RS(2)) TFT(2)
 , (OUT2) . 1 (RS) (RS)
 (1) TFT(6)가 ON , (A1) 가 TFT(6) (Vss)
 (OUT1) 가 , 1 (RS(1)) TFT(2) TFT(5)가
 OFF , TFT(3)가 ON . (OUT1) (Vss) , 가
 (Tn+1) . (T3) (CK2)가 (OUT2)

(T2 T3) TFT(1)가 ON (A3) 가 (RS(2)) TFT(1) (RS(3)) TFT(2) TFT(5)가 ON (OUT2) (Vdd) TFT(3)가 OFF (RS(3))

(T3) (CK1)가 (OUT3) (RS(3)) TFT(2) (RS(2)) TFT(1) (RS(1)) T (OUT1) TFT(6)가 ON (A2) TFT(6) (Vss) TFT(5)가 OFF , TFT(3)가 ON (RS(2)) TFT(2) TFT(3)가 ON (OUT2) (Vss) 가 (Tn+1) (T3) (CK1)가 (OUT3)

(T3 T4) TFT(1)가 ON (A4) 가 (RS(3)) TFT(1) (RS(4)) TFT(2) TFT(5)가 ON (OUT3) (Vdd) TFT(3)가 OFF (RS(4))

4 (RS(4), RS(5), ...) 1 (Q) 가 (O UT4, OUT5, ...)가 1 (Q) (Tn - 1 Tn) (RS(n)) TFT(1)가 ON (An) 가 (RS(n)) TFT(1) (Vdd) TFT(2) TFT(5)가 ON , TFT(3)가 OFF

(Tn) (CK2)가 (OUTn) (CK2)가 (OUTn) (RS(n)) TFT(2) (Tn+1)

(Tn+1) TFT(1)가 ON (A2) 가 (Dend) (RS(2)) TFT(2) TFT(5)가 OFF , TFT(3)가 ON (n) (RS(1)) RS (n) (A1 An) , TFT(2) TFT(5) ON, TFT(3) OF

T(1) 1 (RS(1)) n (RS(n)) 가 가 TF (RS(3)) TFT(1) 3

TFT(1) (T2 T3) (OUT2)가 (Vdd) TFT(1) (Vdd) TFT(1) (T2) (A3) 가 (T3 T4) (CK1)가 (Vdd) 2 (T4) 4

(RS(4))

(Dst) TFT(1) (OUT_k - 1)가 (RS(k)) TFT(1) (Vss)
 (CK1, CK2), (Dst) (Dend)가 (Vdd),
 (Vss) (CK1 CK2)가

(CK1, CK2), (Dst) (Dend) TFT(1) -
 (T3 T4) (A3) TFT(1)
 k (RS(k)) TFT(1)

(152) TFT(1)

가
 가

FT(1)가 ON ON (A1 An) TFT(1) T
 가

(152) (210)

(210) 11
 (150) 12 (152) 가

13 (152), (72), (73) 가
 11 (RS(1), RS(3), ..., RS(n - 1)) TFT(1)
 S(n) (CK2)가 (CK1, CK2), (RS(2), RS(4), ..., R
 (Vdd) (Vss) (Dst) (Dend)

13 (T0 T1) 11 14
 (1)가 ON TFT(1) (Dst)가 , 1 (RS(1)) TFT
 (CK2)가 , (A1) 가

(T1 T2) , 1 (RS(1)) (OUT1)가 , 2 (RS(2))
TFT(1)가 ON , TFT(1) (CK1)가 (A2) 가
가 , (Tn - 1 Tn) , n - 1 (RS(n - 1)) (OUT
n - 1)가 , n (RS(n)) TFT(1)가 ON , TFT(1)
(CK2)가 (An) 가 .

, 14 3 3 (RS(3)) TFT(1)
, (T2 T3) 2 (RS(2)) (OU
T2)가 (Vdd) . (CK2)가
(Vdd) 2 (T3 T4) (T2) (A3) 가 Vdd
(CK1)가

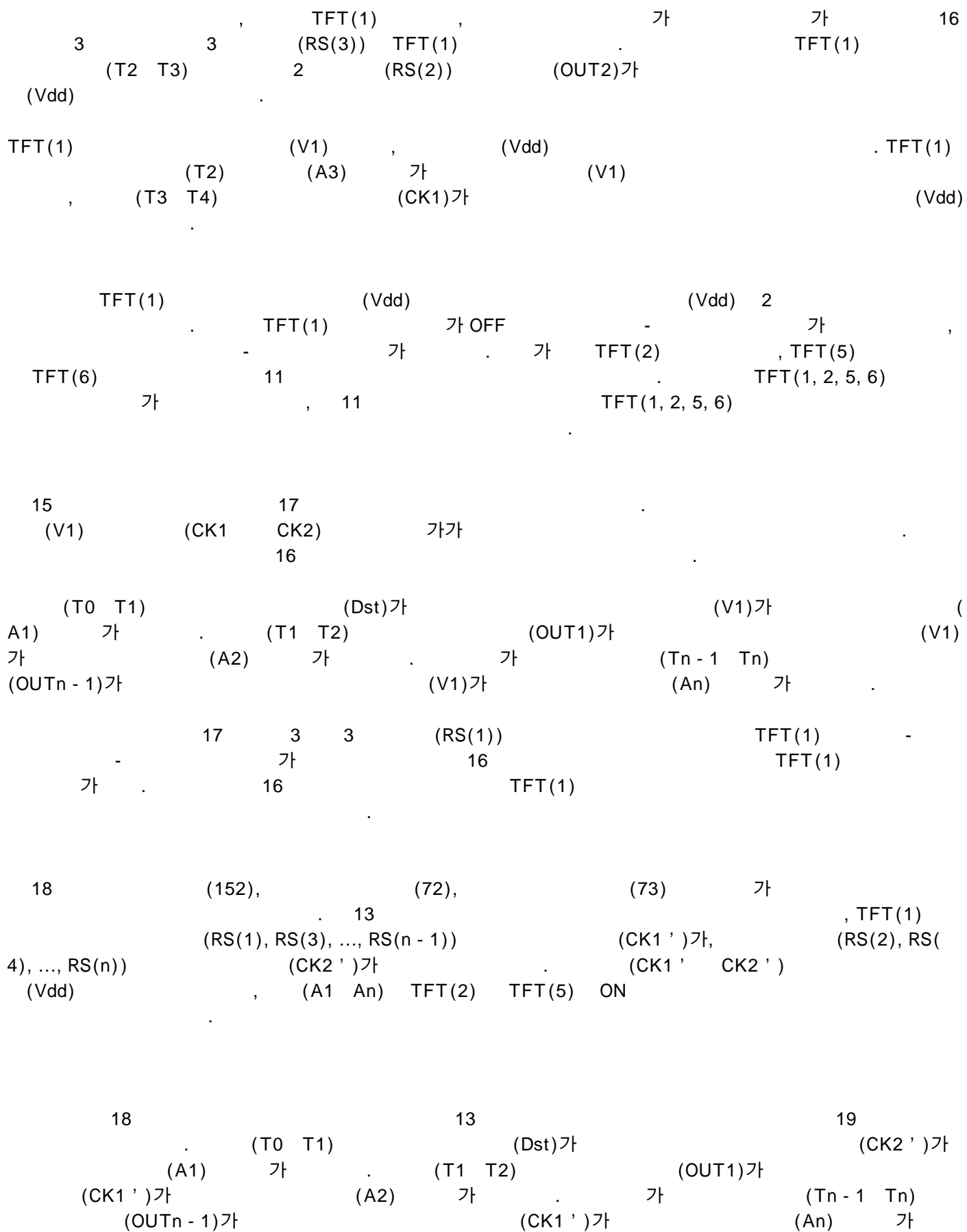
TFT(1)
, OFF (A) 가 가 , T
TFT(1) 11 T
FT(1) 가 11 , TFT(1)

15 (152), (72), (73) 가 (V1)
가 (V1) (Vdd) , (A1 An) TFT(2)
TFT(5) ON (CK1, CK2), (Dst) (Dend) (Vss)
, (Vss) (Vdd)

15 11 16
(V1)

(T0 T1) , (Dst)가 , 1 (RS(1)) TFT(1)가 ON
(V1)가 TFT(1) , (A1) 가 (A1)
(Vdd) (V1) TFT(1) , TFT(2) TF
T(5) 1 (RS(1)) TFT(2) TFT(5)가 ON , TFT(3)가 O
FF (T1) (CK1)가 (OUT1)

가 (Tn - 1 Tn) n - 1 (RS(n - 1)) (OUTn - 1)가
, n (RS(n)) TFT(1)가 ON . (An) (V1) TFT(1)
T(3)가 OFF . (Tn) , n (RS(n)) TFT(2) TFT(5)가 ON , TF
(CK2)가 (OUTn)



19 3 3 (RS(3)) TFT(1) TFT(1)
 (Vdd) (Vdd) 2
 가 TFT(2) , TFT(5) TFT(6) 13
 TFT(1, 2, 5, 6) 가 15
 TFT(1) - 가
 13, 15 TFT(1, 2, 5, 6)

[2]

1 (240) (210) (152) , 2 가
 (150) (Gcnt)
 U(222) (240) (202) (201) (240) CP
 , CPU(222) (152) (210)
 20 (152)
 (RS(1) RS(n)) (151) (GL) n (RS(1) RS(n))
 TFT(1 6) 11 n 6 TFT(1 6)
 20 TFT(1) 11 (V1)가 (RS(1) RS(n)) TFT(6)
 (Vss) (Vdd) (V2)가
 1 (RS(1)) TFT(1) (Dst) (D1)가 n (RS(n))
 TFT(6) (Dend) (D2)가 (V1, V2)
 (D1, D2)
 (152)
 , 21, 22
 (CK1, CK2), (V1, V2), (D1, D2)
 (Vdd) (Vss) 1 (
 Q) (210) 1
 (RS(1) RS(n)) (T0) (OUT1 OUTn)
 (A1 An) 가 , TFT(
 2) TFT(5) ON, TFT(3) OFF
 21 (V1) (Vd
 d) (V2) (Vss)
 (D1) (T0) (T1) (D2) (Tn)
 (Tn+1)

1 (D1) (Dst) (D2) (Dend) 1
 2 (OUT1 OUTn)가 (Q)

22 (Vss) (V2) (Vdd) (V1)
 (D2) (T0) (T1) (D1) (Tn)
 (Tn+1)

(T0 T1) (D2)가 n (RS(n)) TFT(6)가 ON ,
 (V2)가 TFT(6) n (RS(n)) (An) 가
 TFT(2) TFT(5)가 ON , TFT(3)가 OFF n (RS(n)) TFT(2) ON ,
 (CK2) (OUT2)

(T1) , (CK2)가 n (RS(n)) TFT(2)
 (CK2)가 , (OUTn) (T2)
 (CK2)가 (OUTn)

(T1 T2) n (RS(n)) (OUTn) n-1 (RS
 (n-1) TFT(6)가 ON . n-1 (RS(n-1) TFT(6)
 (V2)가 (An-1) 가 n-1 (RS(n-1)) TFT(2) TFT(
 5)가 ON , TFT(3)가 OFF .

2) (T2) , (CK1)가 n-1 (RS(n-1)) TFT(
 (RS(n)) TFT(1)가 ON , (An) (OUTn-1) n
 (5)가 OFF , TFT(3)가 ON (T3) (RS(n)) TFT(2) TFT
 n-1) (CK1)가 (OUT

(T1 T2) n-1 (RS(n-1)) (OUTn-1) n-2
 (RS(n-2)) TFT(6)가 ON . n-2 (RS(n-2) TFT(6)
 (V2)가 (An-2) 가 n-2 (RS(n-2)) TFT(2)
 TFT(5)가 ON , TFT(3)가 OFF .

n-2 (RS(n-2), RS(n-3), ...) 1 (Q)
 가 (OUTn-2, OUTn-3, ...)가 1 (Q)
 (Tn-1 Tn) 2 (RS(2)) (OUT2) 1
 (RS(1)) TFT(6)가 ON . 1 (RS(1)) (A1) 가 TFT(2) TF
 T(5)가 ON , TFT(3)가 OFF .

(Tn) , (CK1)가 1 (RS(1)) TFT(2)
 (CK1)가 , (OUT1) (Tn+1)
 (CK1)가 (OUT1)

(Tn+1) (D1) 1 (RS(1))

TFT(1)가 ON (A1) 가 2 (RS(2)) TFT(2) TFT(5)가 O
 FF , TFT(3)가 ON (D2)가 (RS(1) RS(n))
 (A1 An) , TFT(2) TFT(5) ON, TFT(3) OFF 가

1 (210) CPU(222) (240) CPU(222) (202) (201)

(210) (150)가, (202) (202a)가 (210) (152) (G
 cnt) 가 CPU(222) (D1, D2) (V1, V2) (202a)가 (210) (G
 (Gcnt) 가 CPU(222) (D1, D2) (V1, V2) (152)

210) (202) (212a) (201) (210)
 (152) (240) CPU(222) (151)

23A (202) (202a) (201) (201)
 210) (202) (201) 0° (151)

(151) 23A (151) (P(1, 1) P(n, m)) (202)
 (202a) CCD (220) 23A 가 ,
 가 RAM(224) VRAM

(210) , 23B (151) 1 m (DL) 가 (1
 , 1 (151) 1 n (23B) (GL)

CCD (220) 가
 (151) (23B) , CCD (220) (23B)
 , 23B

24A 가 가 , 가 (210)
 (202a) (201) (210) , (202) (202)
 180° (201)
 (151) (152)

(151) 24A (151) (P(1, 1) P(n, m))
 (202)
 (224) VRAM (202a) CCD (220) 24A 가 , 가 RAM

(210) , 24B 가 (1)
 , 1 (151) 1 n m (DL) (GL)
 52) (151) 1 n (24B) (24B)

CCD (220) 가
 (151) (24B) , CCD (220)
 , 24B 가 (151) (24B)

(152)
 , TFT(6) TFT(1) (A1 An) , TFT(6) TFT(1)
 (A1 An)

TFT(1, 6) (RS(1) RS(n)) TFT(1 6) 1
 (152) , (152) (151) 1

(152)
 (150) (152) (Gcnt) (210) CCD
 (220) . (201) VRA

M
 (152) 20 , (150)
 21 , 22 (152) 가
 , (152)

25, 26 20
 25 (CK1) (CK2)가 (V2)가 21 (V1)
 (D1)가 (CK1) 1 (T0 T1)
 N (A1) 가 (RS(1)) TFT(1)가 O

26 (V2) (CK1) (CK2)가 (V1)가 22
 (D2)가 (CK2) n
 (An) 가
 TFT(1) TFT(6) 가 21,
 22 TFT(1) TFT(6)

27 (152) 가 (RS(1), RS(3), ..., RS(n -
 1)) TFT(1) (V2)가, TFT(6) (V1)가
 (RS(2), RS(4), ..., RS(n)) , TFT(1) (V1)가, TFT(6)
 (V2)가

27 (T0 T1) 28, 29 (D1)가 1 (RS(1)) TFT(1)가 ON
 (CK1)가 (V2) (A1) 가 (T1 T2) 2 (RS(2))
 1 (RS(1)) (OUT1)가 (A2) 가 (RS(2))
 TFT(1)가 ON (V1) (A2) 가

2)가 (T2 T3) 3 (CK2)가 2 (RS(2)) (OUT
 (A3) 가 (RS(3)) TFT(1)가 ON (V2)
 (V1) (OUT2) 1 (RS(1)) TFT(6)가 ON
 (A1) 가

가 (Tn Tn+1) (CK2)가 n (RS(n))
 (OUTn)가 n-1 (RS(n-1)) TFT(6)가 ON (V1)
 가 (An-1) 가 (Tn+1)
 (D2)가 n (RS(n)) TFT(6)가 ON (V2)
 (An) 가

TFT(6)가 ON (T0 T1) (D2)가 n (RS(n))
 (CK2)가 (V2) (An) 가 (T1 T2)
 n-1 (RS(n-1)) TFT(6)가 ON (OUTn)가
 (V2) (An-1) 가

(T2 T3) (OUTn - 1)가 (An) n (CK1)가 (RS(n)) TFT(1)가 ON , (RS(n - 1)) (V1)가

가 (Tn Tn+1) (OUT1)가 (A2) 2 (CK1)가 (RS(2)) TFT(1)가 ON , 1 (RS(1)) (V1)가 (D1)가 (A1) 1 (RS(1)) TFT(1)가 ON (V2) (Tn+1)

30 (152) 가 (RS(1), RS(), ..., RS(n + 1)) TFT(1) (V2)가, TFT(6) (V4)가 (RS(2), RS(4), ..., RS(n)) TFT(1) (V1)가, TFT(6) (V3) 가

30 31, 32 (RS(1), RS(3), ..., RS(n - 1)) TFT(6) V4 (RS(2), RS(4), ..., RS(n)) TFT(6) V3 27

31 (V3, V4) (RS(1) RS(n)) TFT(6) ((V3, V4) n) TFT(1) ((V1, V2)) (RS(1) RS(TFT(1) TFT(6) TFT(1) TFT(6) TFT(1) TFT(6) 가 TFT(1) TFT(6)

(V1 V6) (Vdd) (A1 An) TFT(1) TFT(6), TFT(2) TFT(5) ON TFT(1) TFT(6), 가 TFT(2) TFT(5)

2 TFT(1), TFT(2), TFT(3), TFT(4), TFT(5), TFT(6) (W/L) 1 2 TFT(21), TFT(25), TFT(26), TFT(23), TFT(22), TFT(24) (W/L) 가

[]

1, 2

2 (152)
(240)가 (202) (201) 가 (2
12)

11, 13, 15, 18, 20, 27 30 (1
52) , EL 가 ,
10 가 ()

11, 13, 15, 18, 20, 27 30

1, 2 TFT(1 6) n , n p
p , n

1, 2 ,

2

1 2

1, 2 1, 2 가

1, 2 , 가

가

(57)

1.

1 , 1 1 ON ,
 2 , 2 1 1 가
 2 ON , 2 2 1 2
 2 2 ,
 ,
 3 , 3 1 1 가
 3 ON , 3
 3 3 ,
 4 , 4 가 ON , 4 4
 2 2 2 , 4 4
 4 4
 (4) / 4) (2 /
 2) .

2.

1 ,
 5 , 5 ON 가 2
 2 1 1 가
 5 .

3.

1 , 1 1 ON ,
 2 , 2 1 1 가
 2 ON , 2 2 1 2
 2 2 ,
 3 , 3 3 3
 ,
 4 , 4 1 1 가
 4 ON , 3 3 4
 4 , 3
 4 ,

5 5 , 5 3 가 ON ,
 5 2 2 , 5
 5 5 ,
 (3) / 3) (2 /
 2) 20 1 .

4.

3 ,
 6 6 ON 2
 2 1 1 가
 6 .

5.

1 , 1 ON ,
 1 1 1 ,
 2 , 2 1 1 가
 ON , 2 2 1 2
 2 2 ,

3 , 3 3 3
 ,
 4 , 4 1 1 가
 ON , 3 4
 4 , 3
 4 ,

5 5 , 5 3 가 ON ,
 5 2 2 , 5
 5 5 ,
 6 6 ON 2
 2 1 1 가
 6 ,

(5) / 5) (1 /
 1) .

6.

5

$$1 \quad (\quad 2 \quad) \quad / \quad 2 \quad) \quad (\quad 1 \quad /$$

7.

$$5 \quad ,$$

$$6 \quad (\quad 5 \quad) \quad / \quad 5 \quad) \quad (\quad 6 \quad /$$

8.

$$5 \quad ,$$

$$6 \quad (\quad 2 \quad) \quad / \quad 2 \quad) \quad (\quad 6 \quad /$$

9.

$$5 \quad ,$$

$$3 \quad (\quad 1 \quad) \quad / \quad 1 \quad) \quad (\quad 3 \quad /$$

10.

$$5 \quad ,$$

$$3 \quad (\quad 6 \quad) \quad / \quad 6 \quad) \quad (\quad 3 \quad /$$

11.

$$5 \quad ,$$

$$4 \quad (\quad 1 \quad) \quad / \quad 1 \quad) \quad (\quad 4 \quad /$$

12.

$$5 \quad ,$$

$$4 \quad (\quad 6 \quad) \quad / \quad 6 \quad) \quad (\quad 4 \quad /$$

13.

,

,

가 , 1 가 1 ,

가 , 2 가 2 ,

1, 2 가 , 1 2

1 2 ON OFF , ON 3

1, 2

14.

13 ,

1, 2 1 가 ON

ON , 1, 2 2 가

15.

13 ,

1, 2 , 1, 2 1, 2

16.

15 ,

1, 2

17.

13 ,

1 2 180°

18.

13 ,

19.

13 ,
 1, 2 가 , ON, OFF 3
 , ON 4 ,
 가 ON , 4 가 ON 5
 가 ON 3 .

20.

(A) 1 , 1 1 ON ,
 1 1 ,
 2 , 2 1 1 가
 ON , 2 1 2
 2 2 ,
 3 , 3 3 3
 ,
 4 , 4 1 1 가
 ON , 3 4
 4 , 3
 4 ,
 5 , 5 3 가 ON ,
 5 2 2 , 5
 5 5 ,
 6 , 6 ON , 2
 2 1 1 가
 6 ,

(B) 2 ,
 (5 / 5) (1 /)
 1) .

21.

20 ,
 (2 / 2) (1 /)
 1) .

22.

20 ,

6 (5) / 5) (6 /

23.

20 ,

6 (2) / 2) (6 /

24.

20 ,

3 (1) / 1) (3 /

25.

20 ,

3 (6) / 6) (3 /

26.

20 ,

4 (1) / 1) (4 /

27.

20 ,

4 (6) / 6) (4 /

28.

20 ,

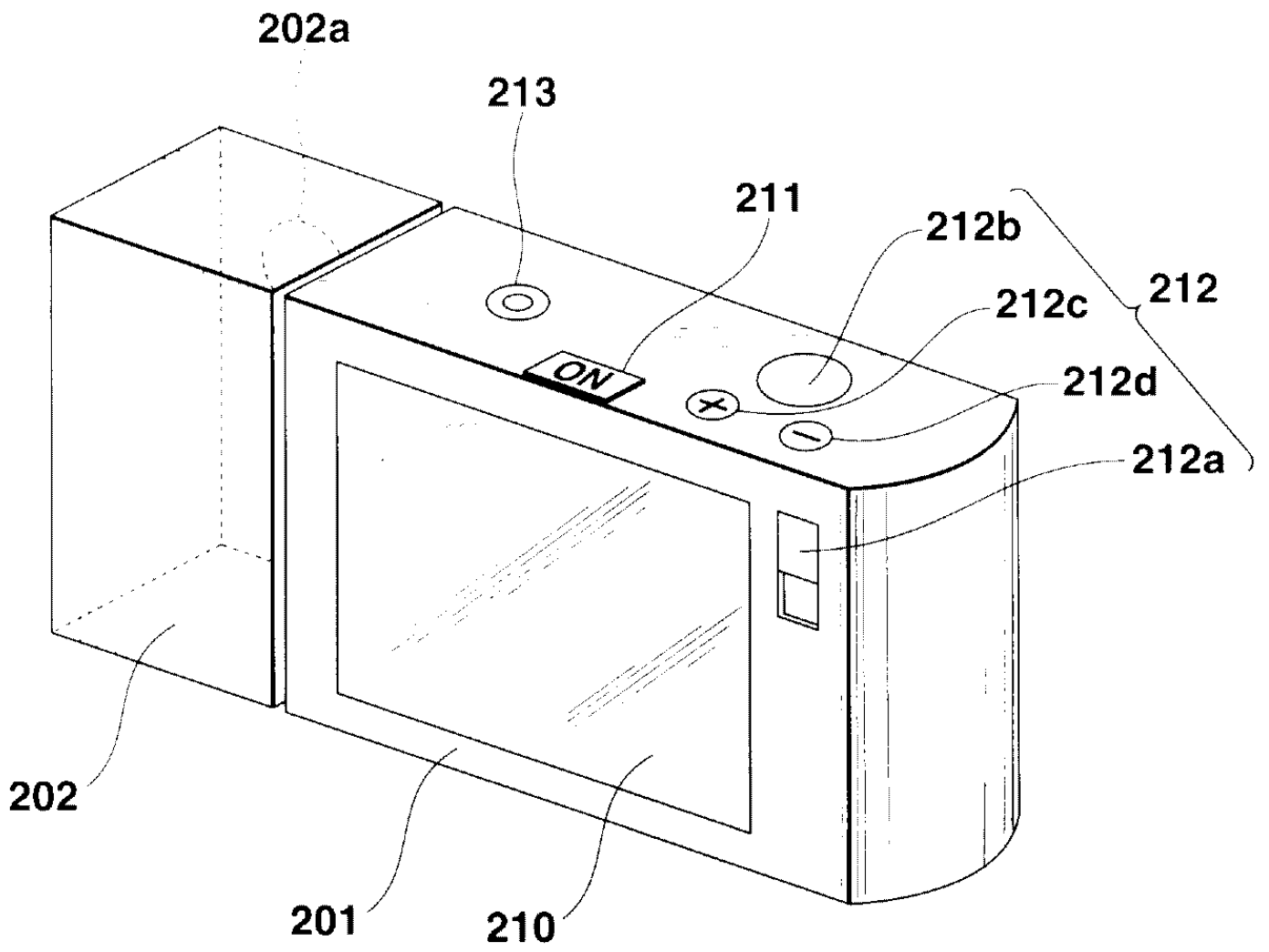
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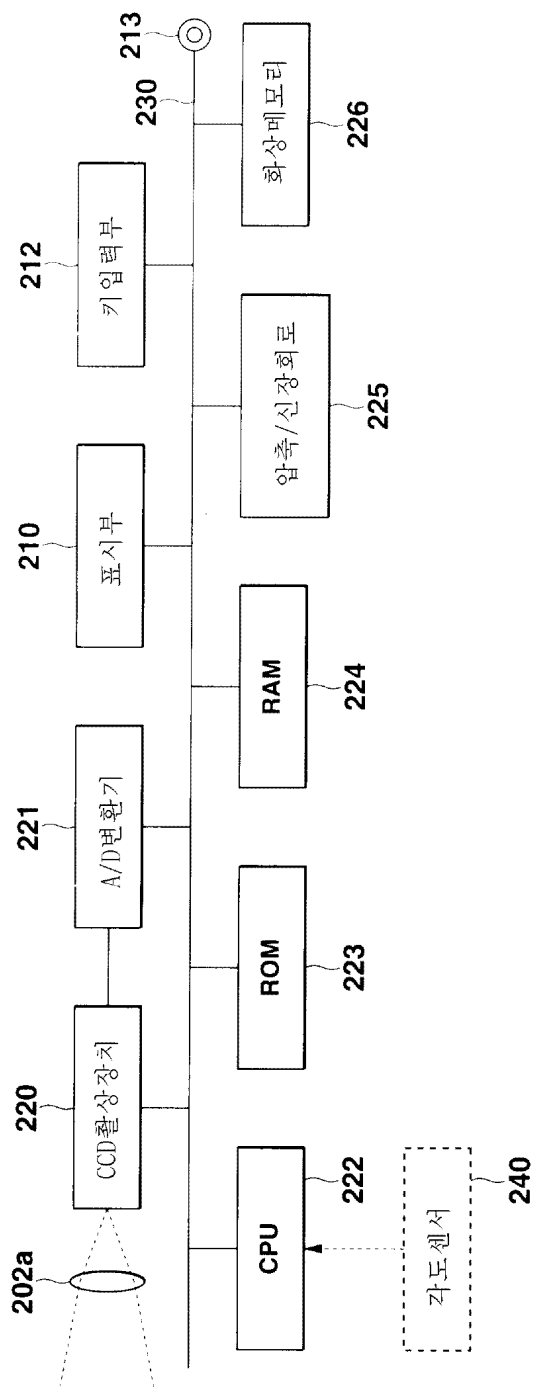
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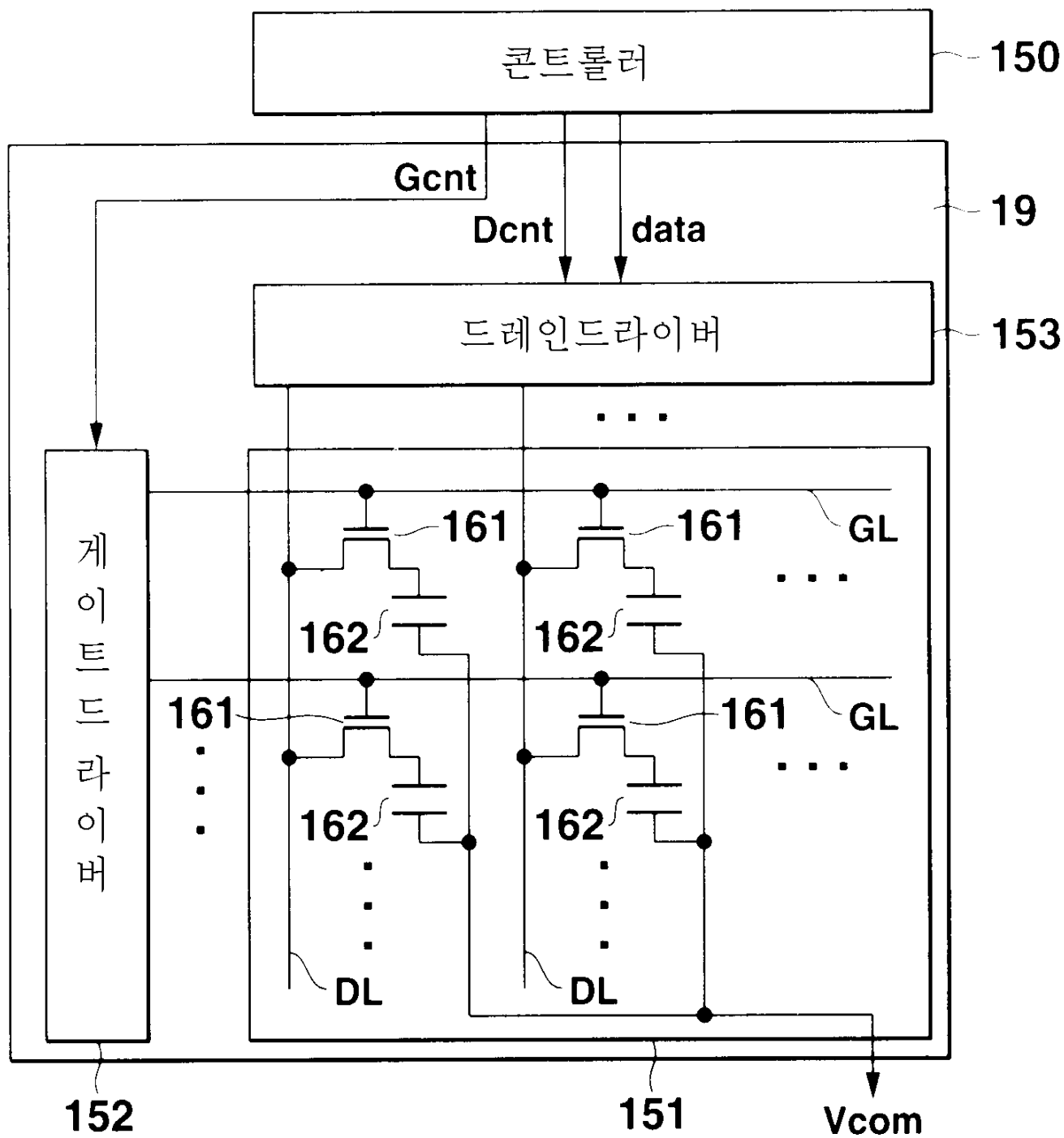
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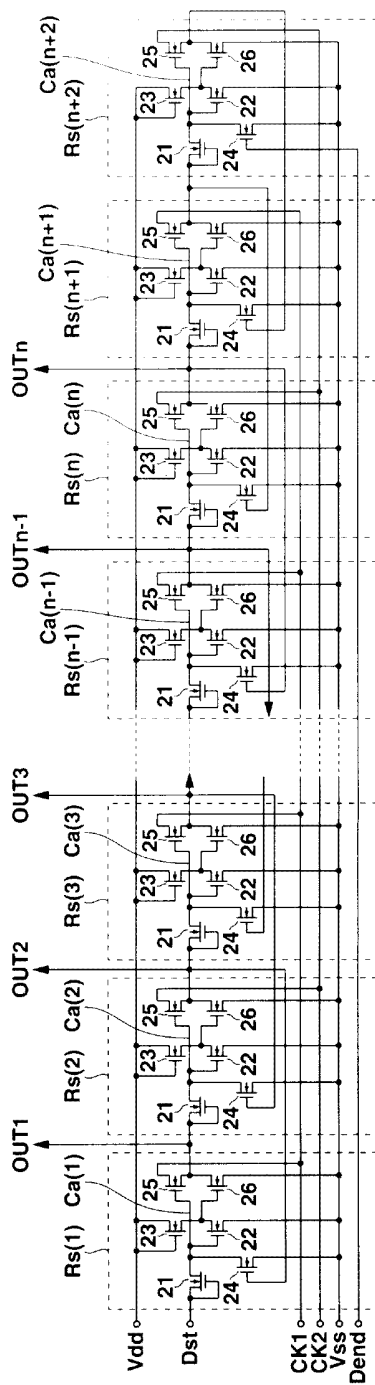
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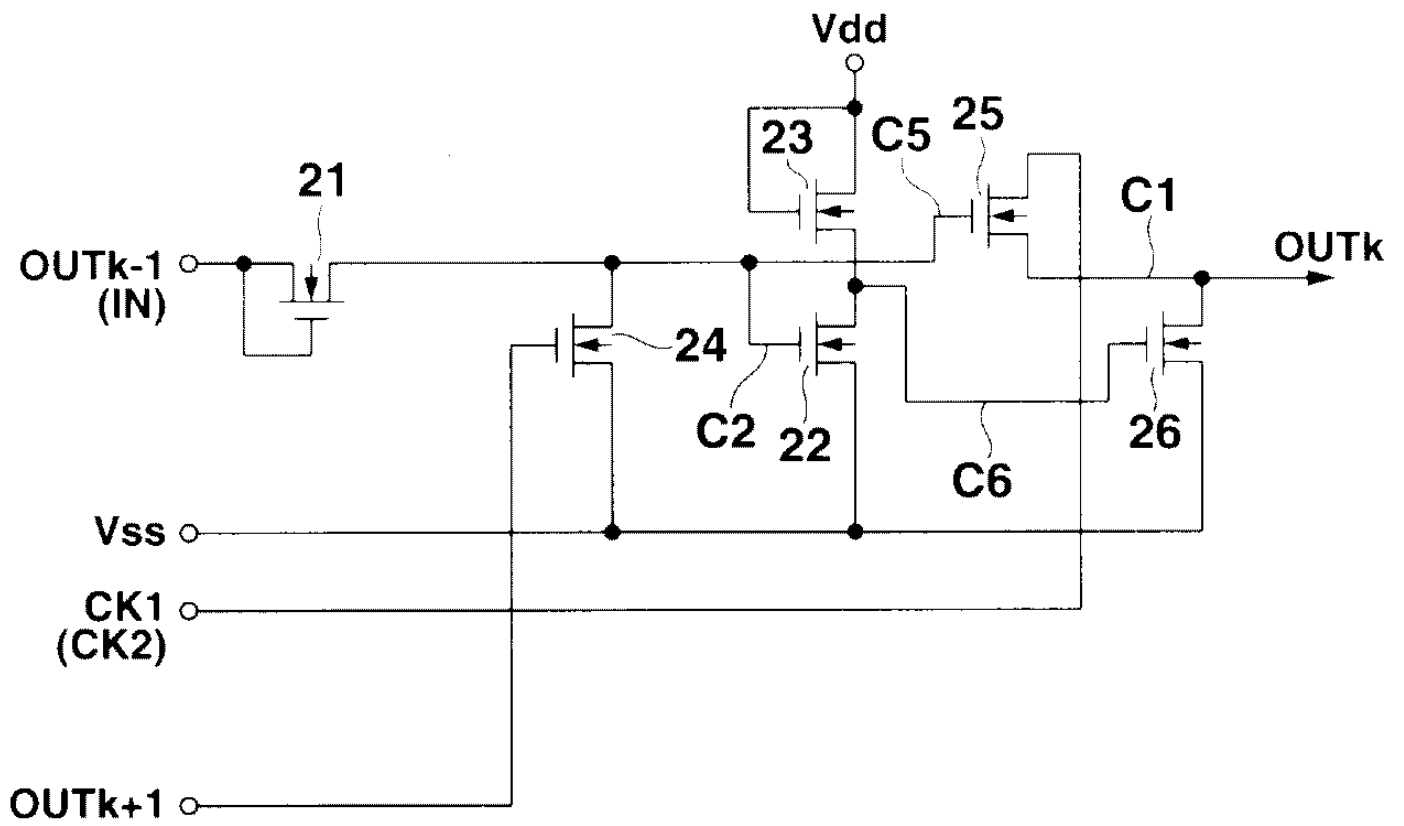


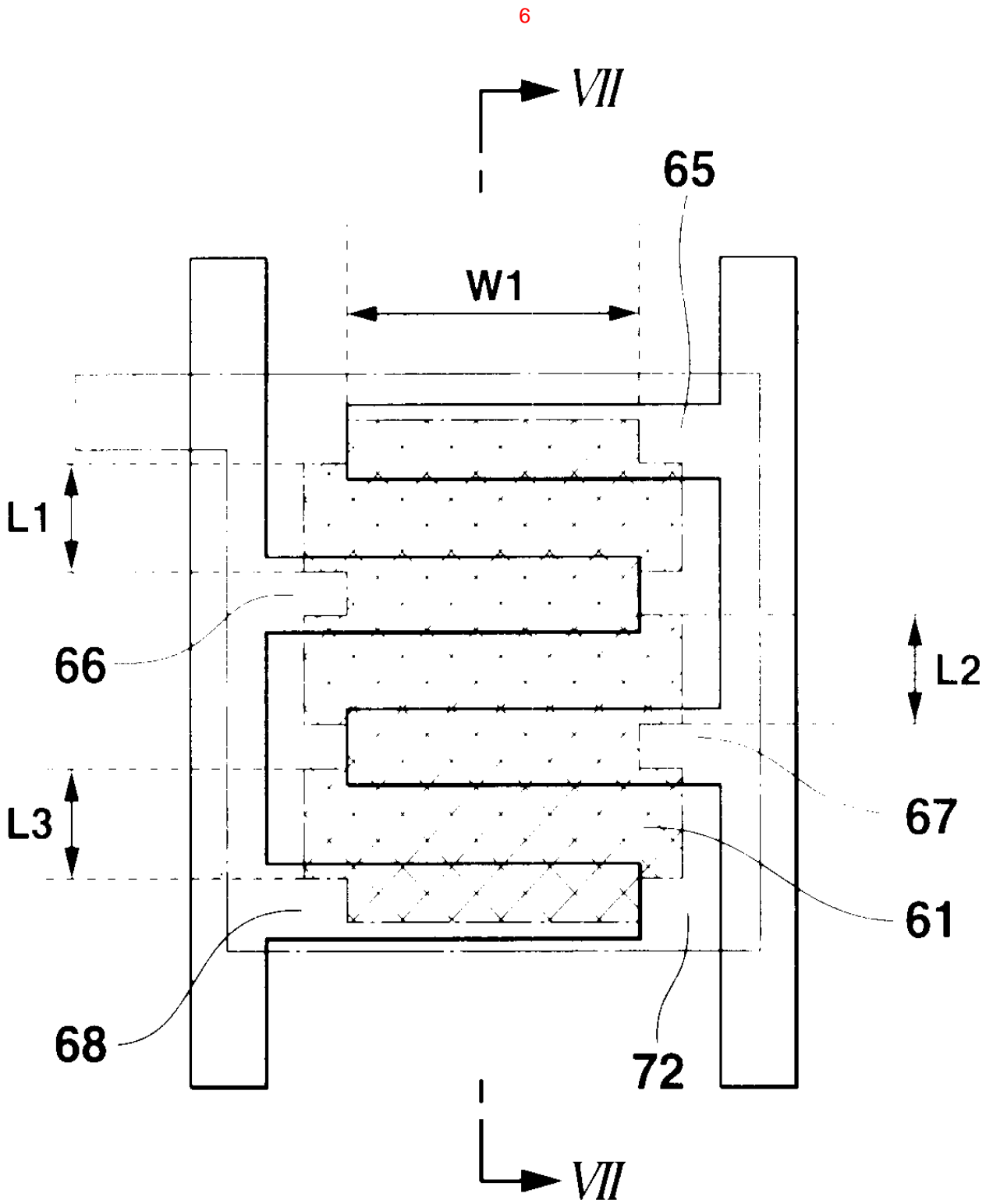




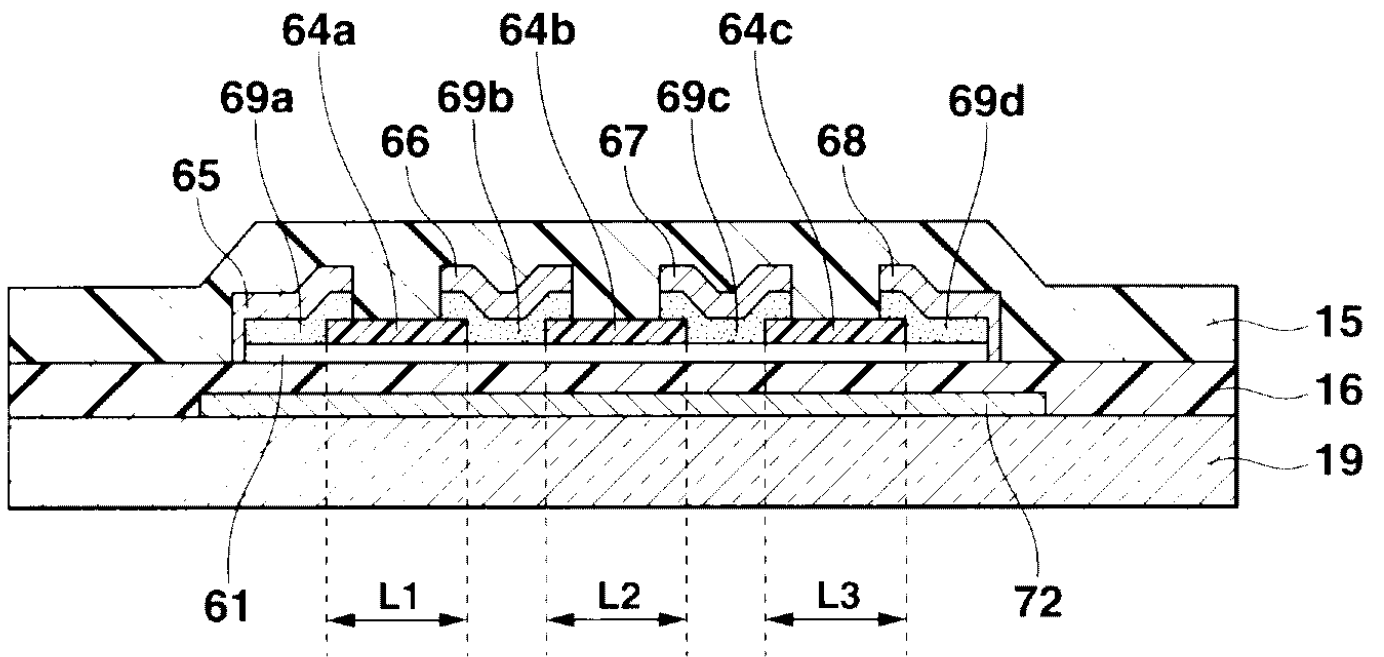


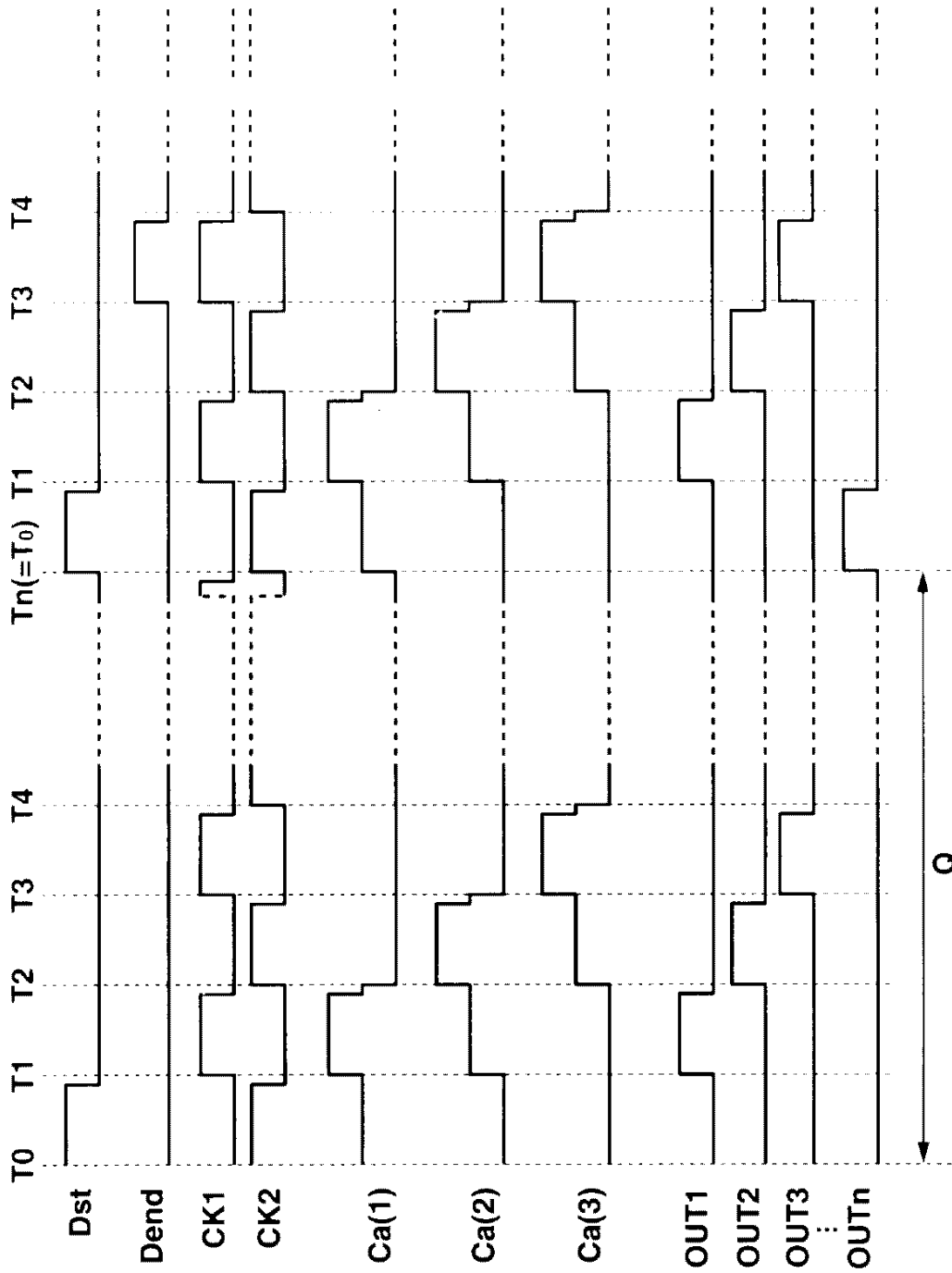
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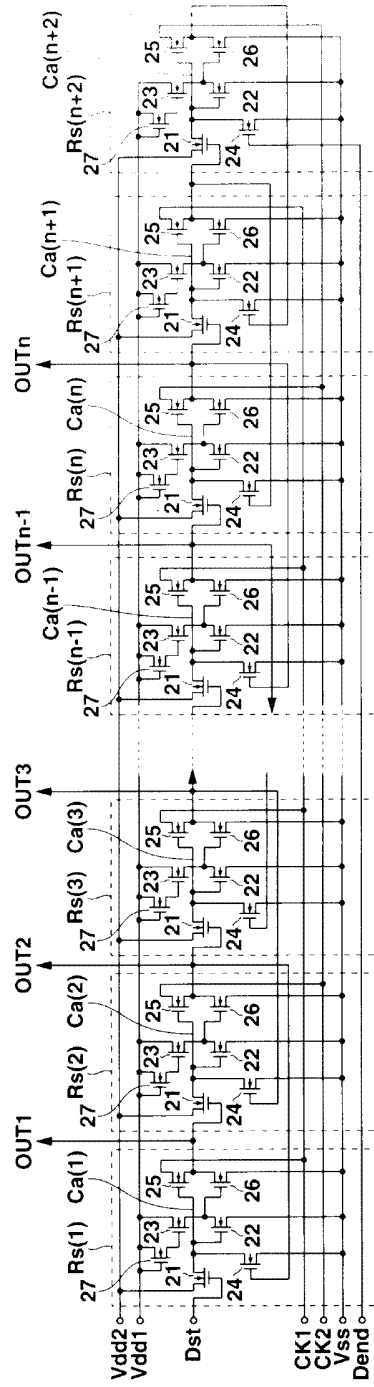




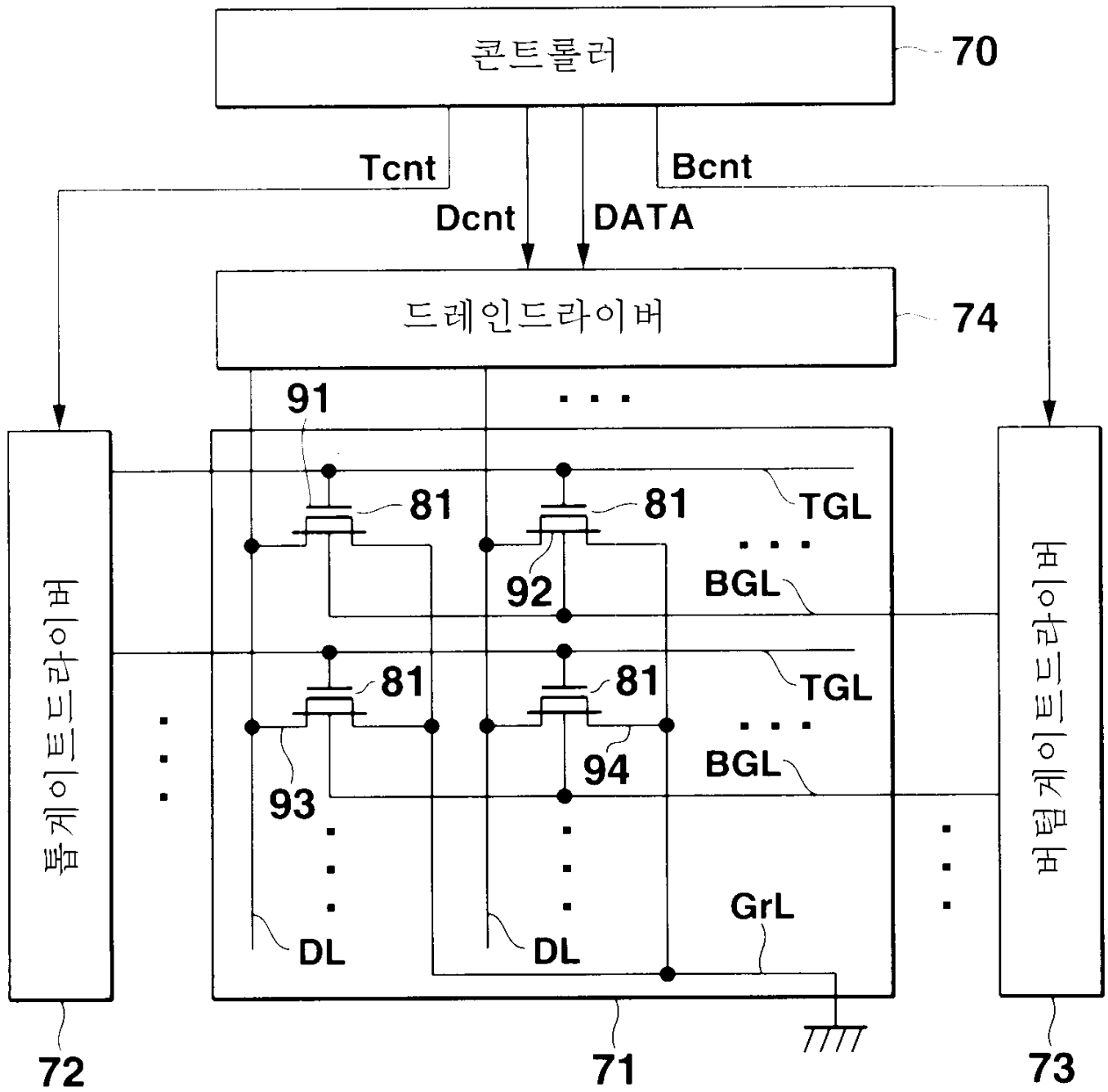
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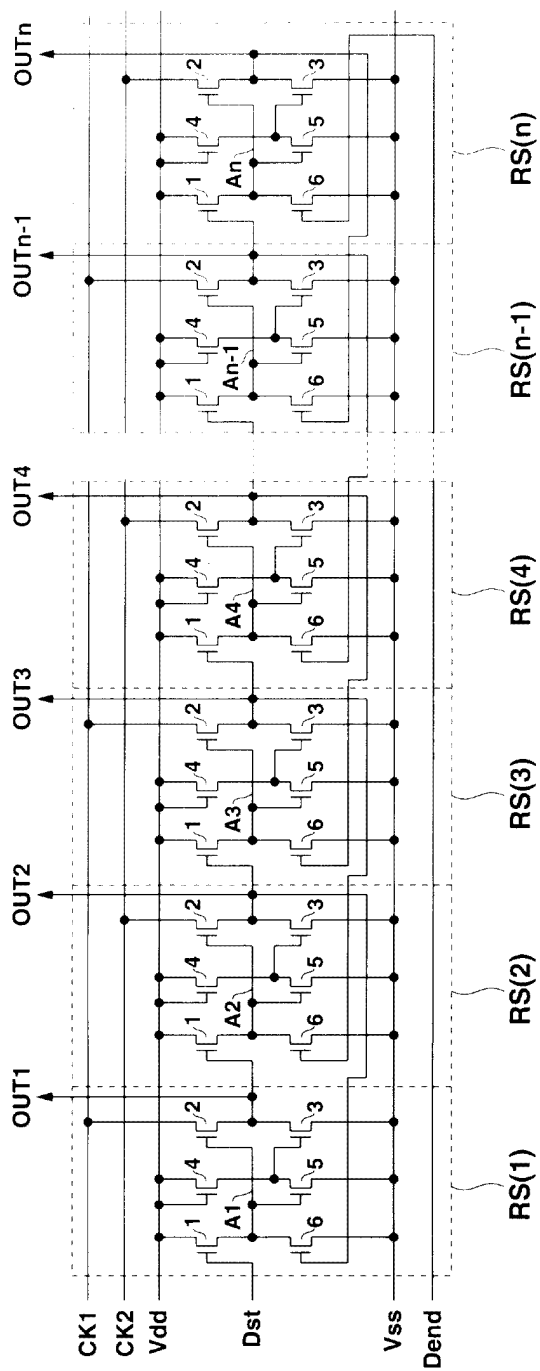




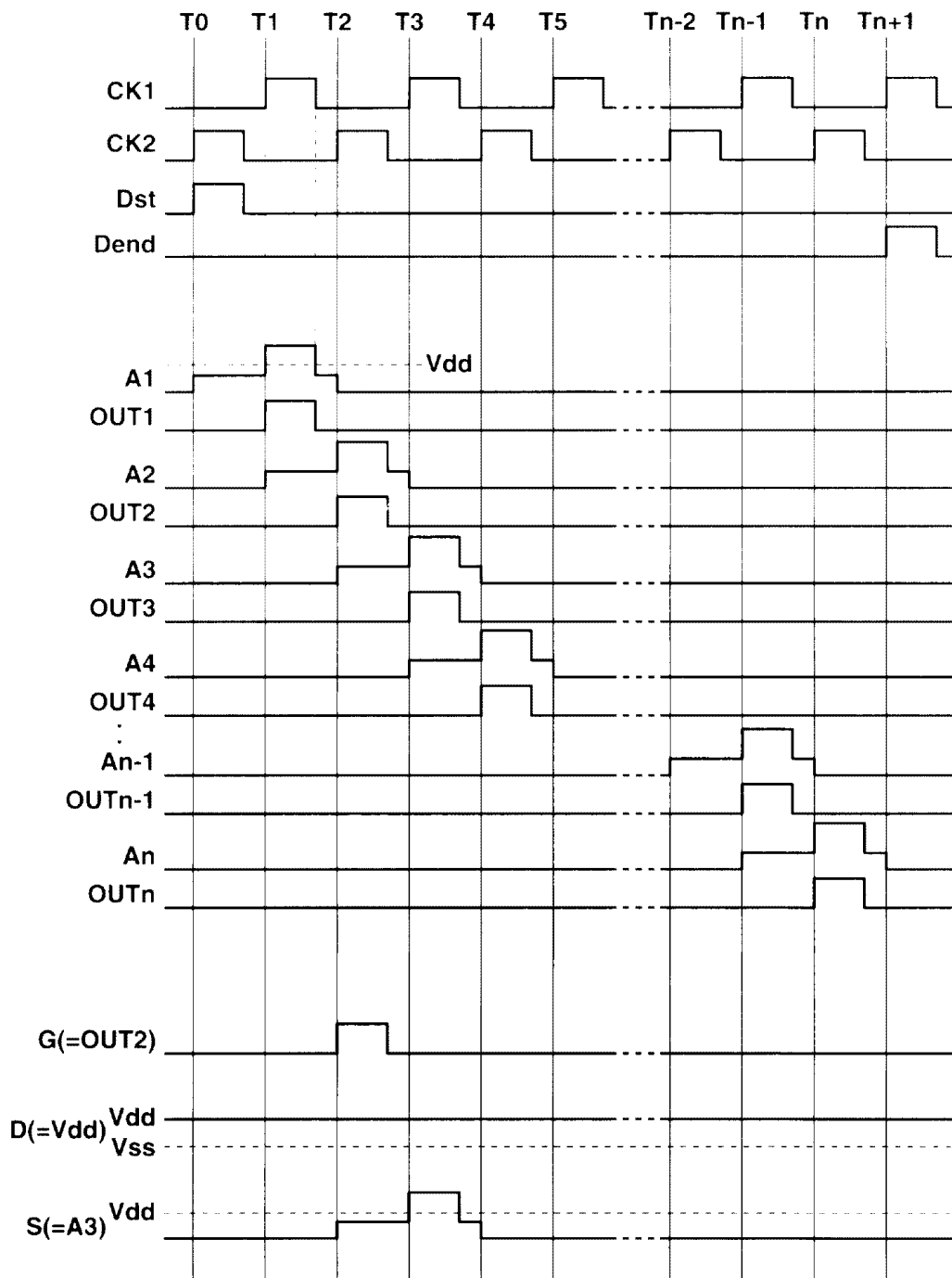


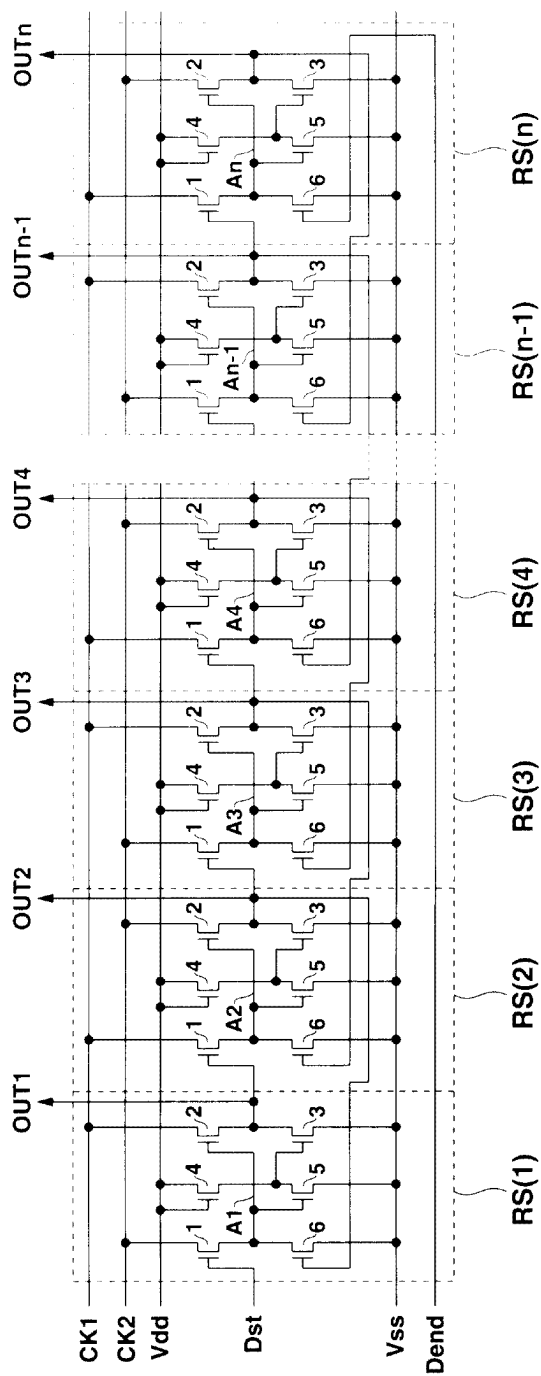
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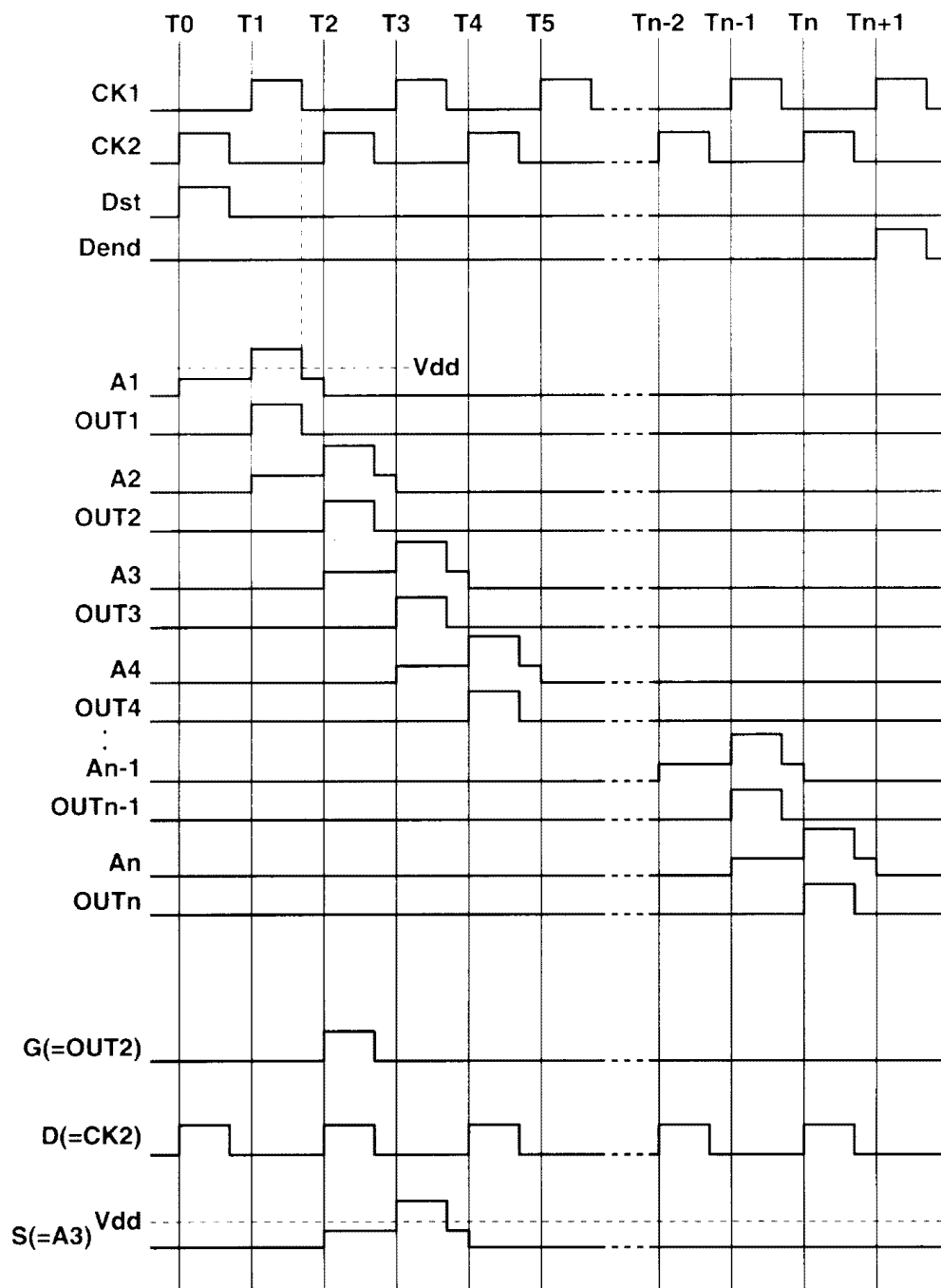


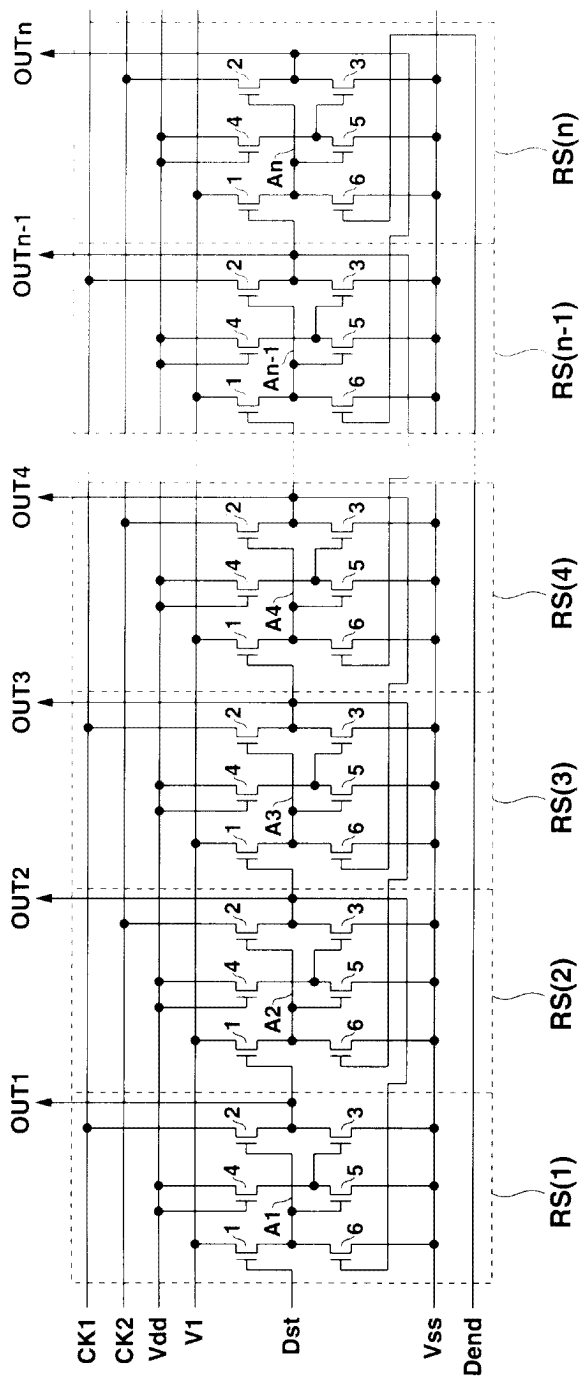
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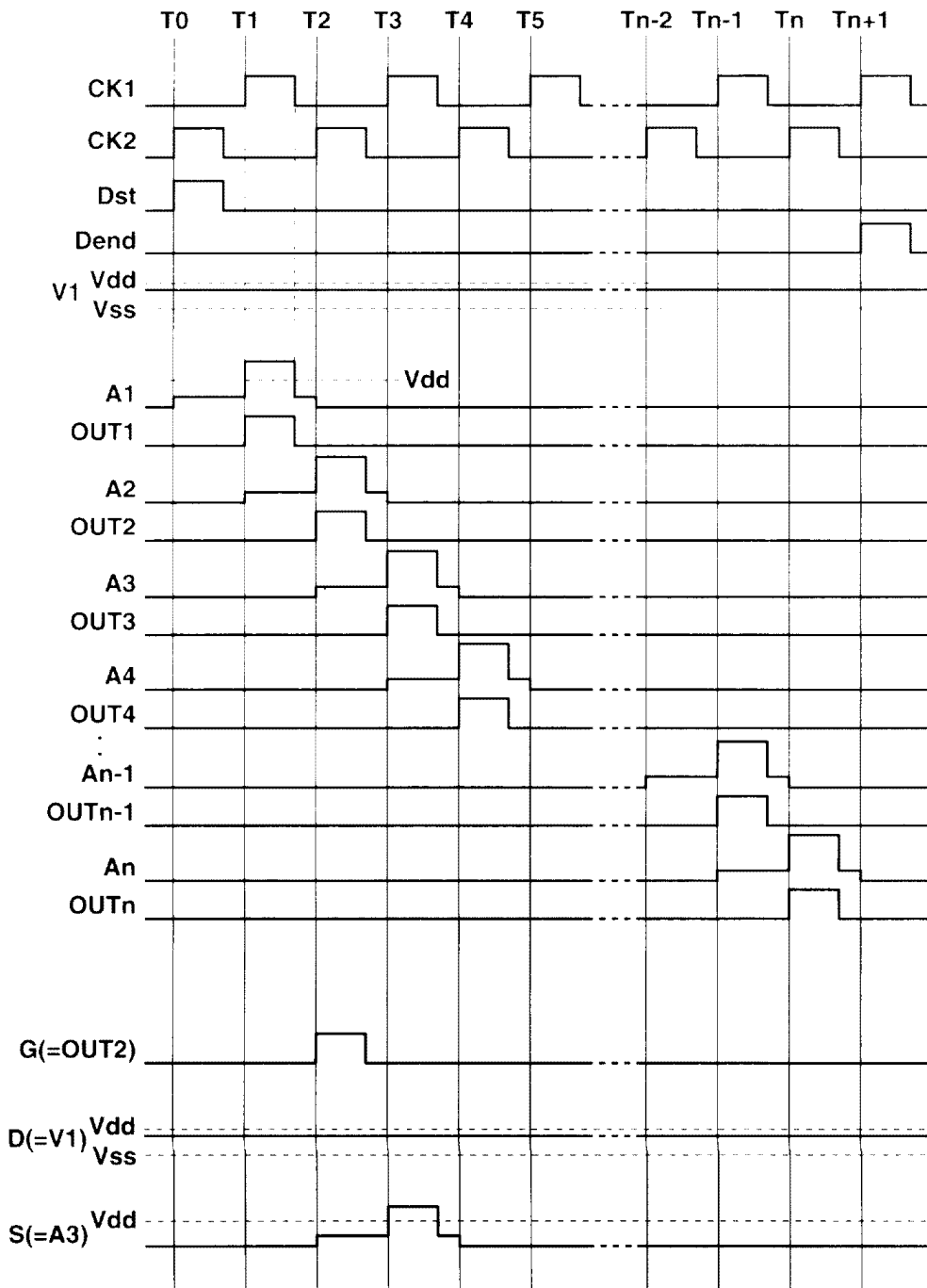




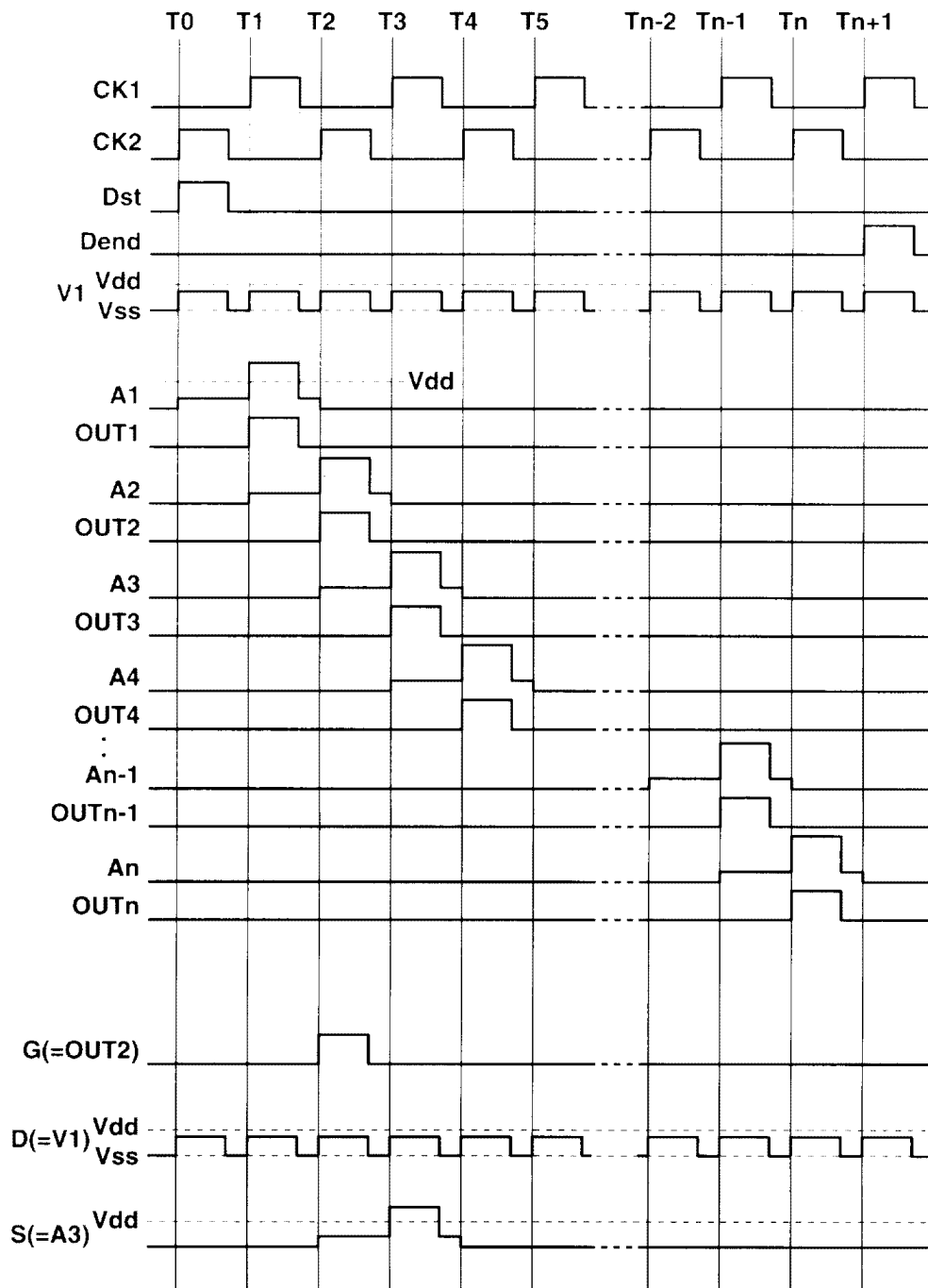
14

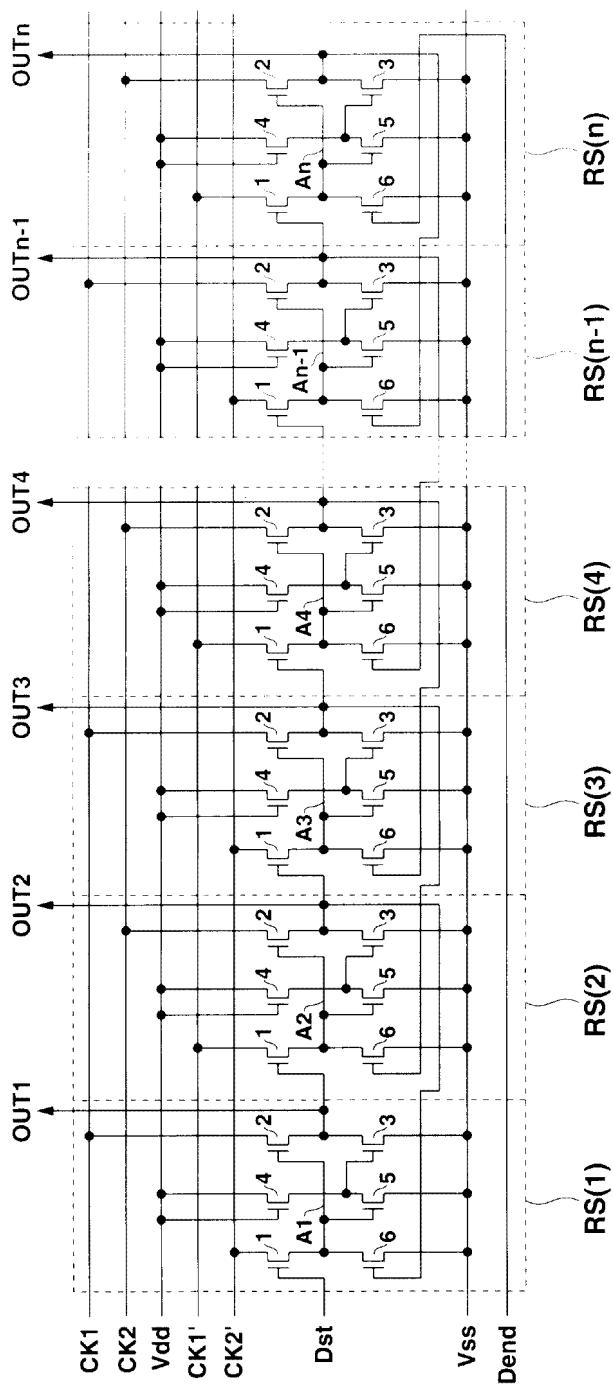




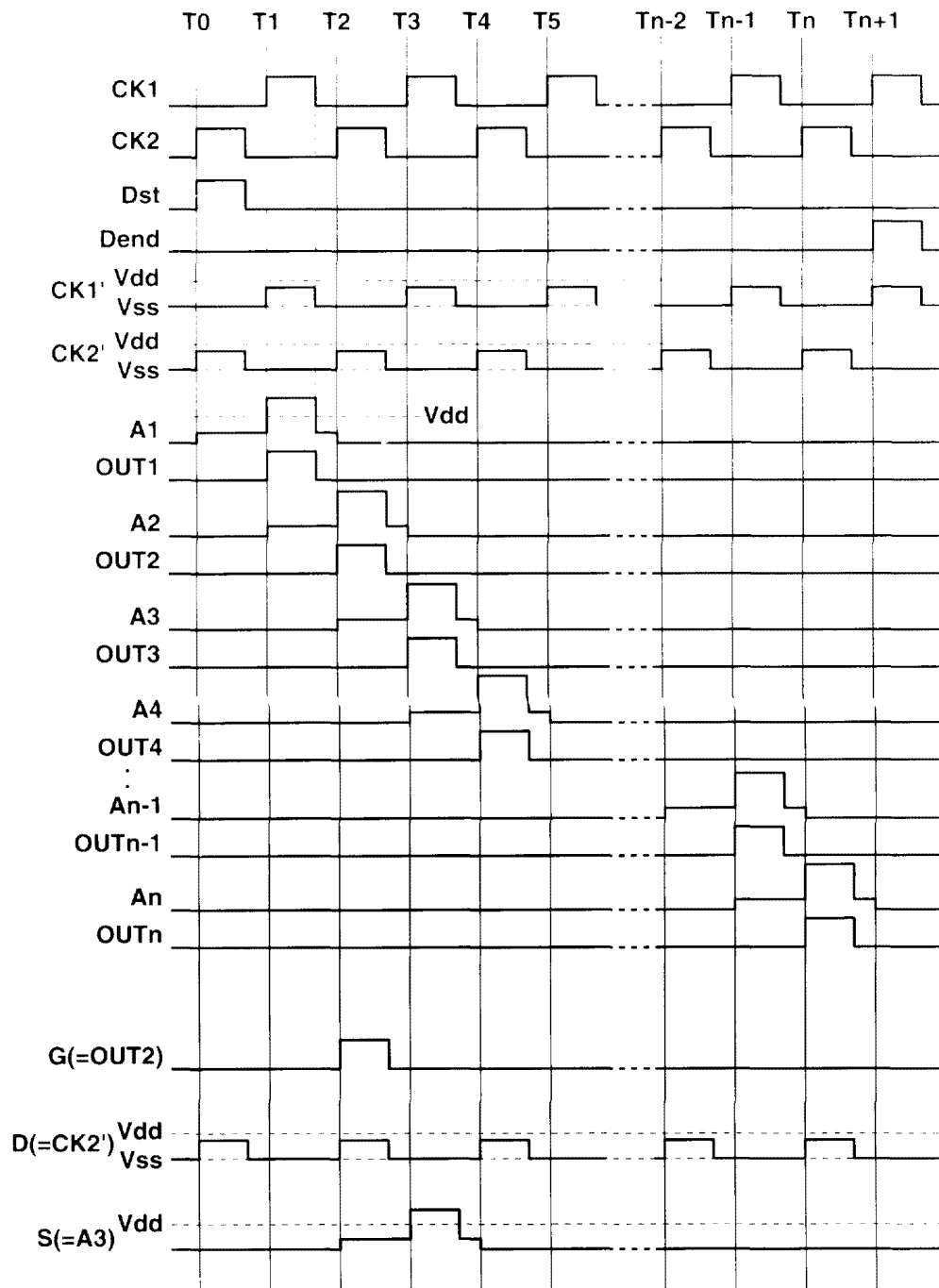


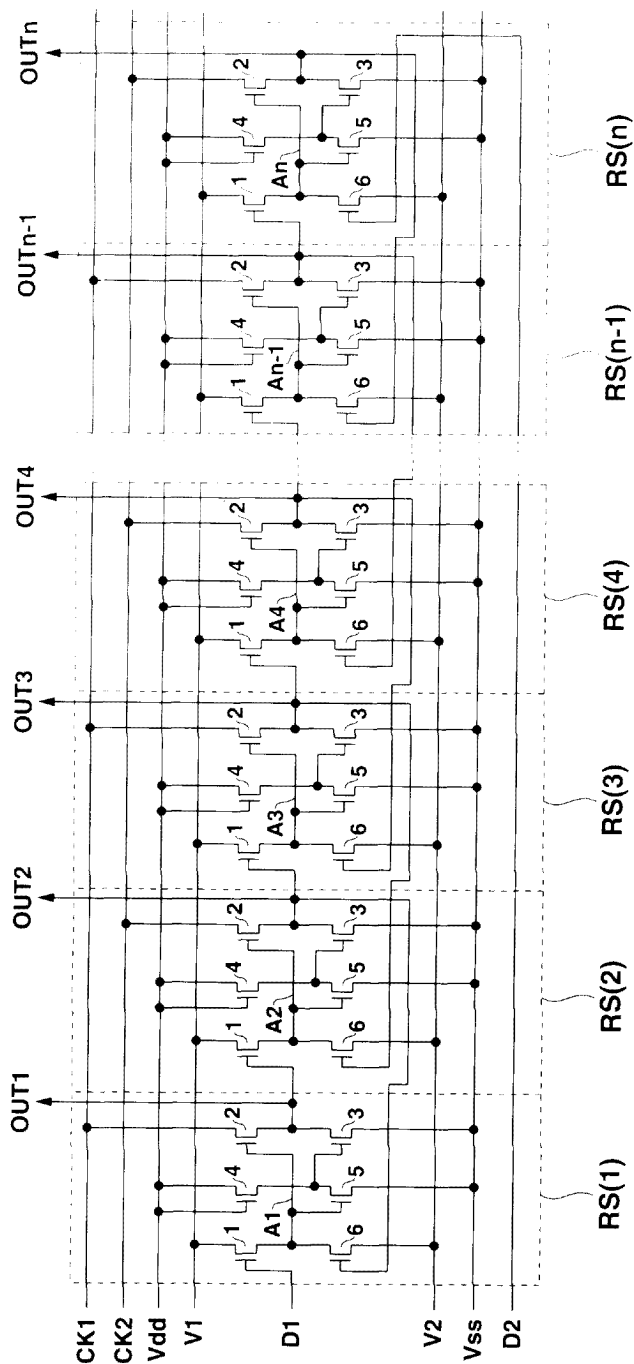
17

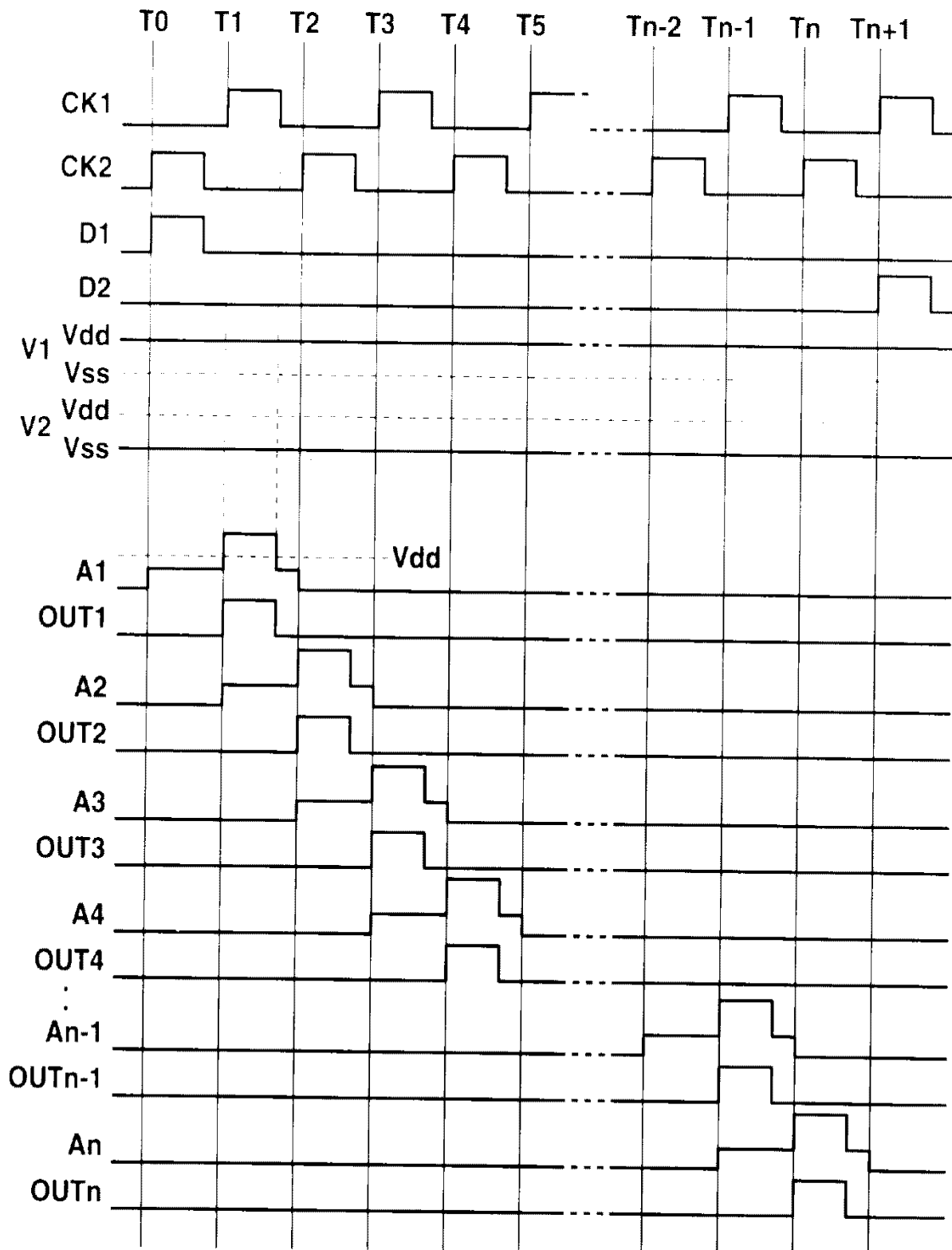


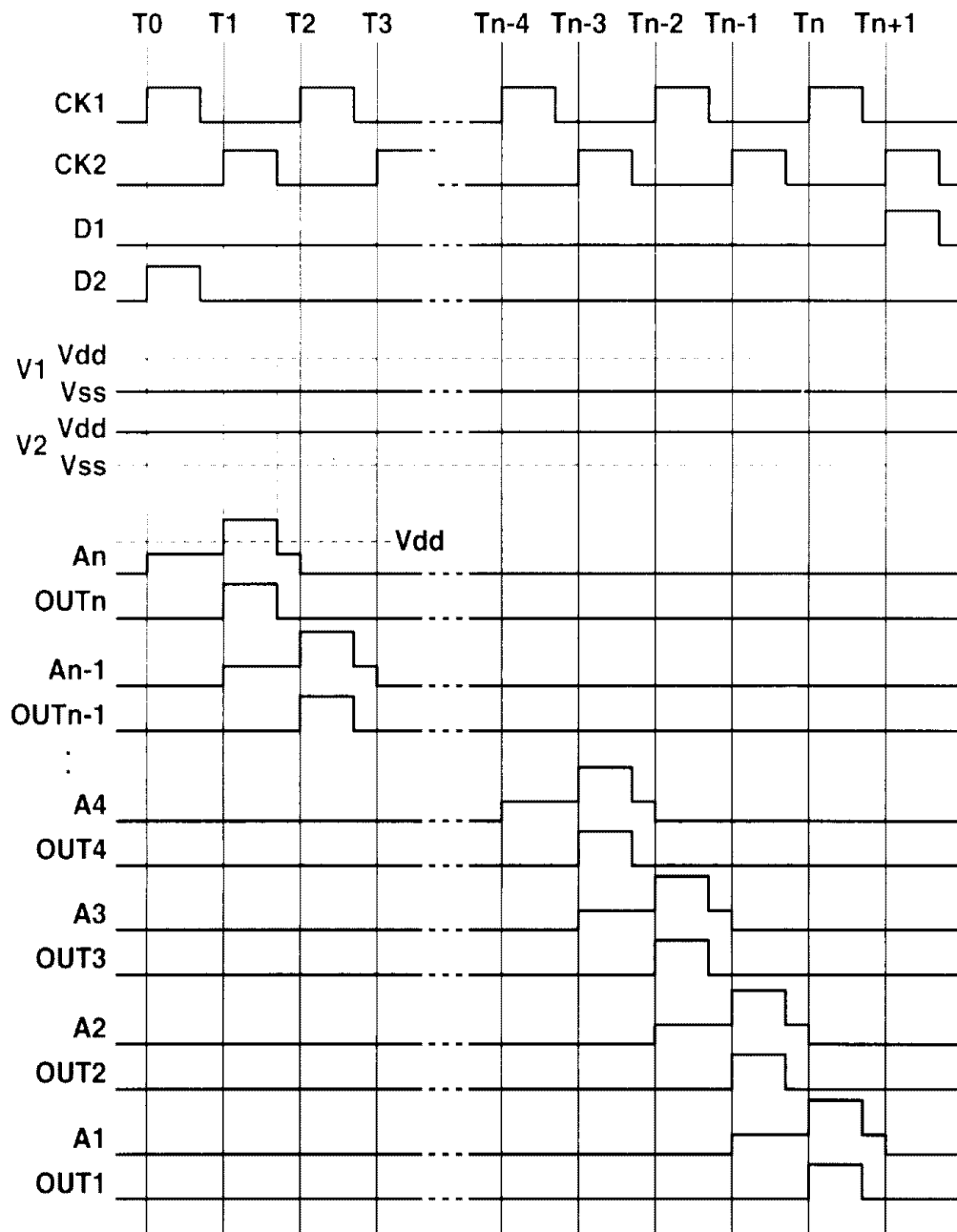


19

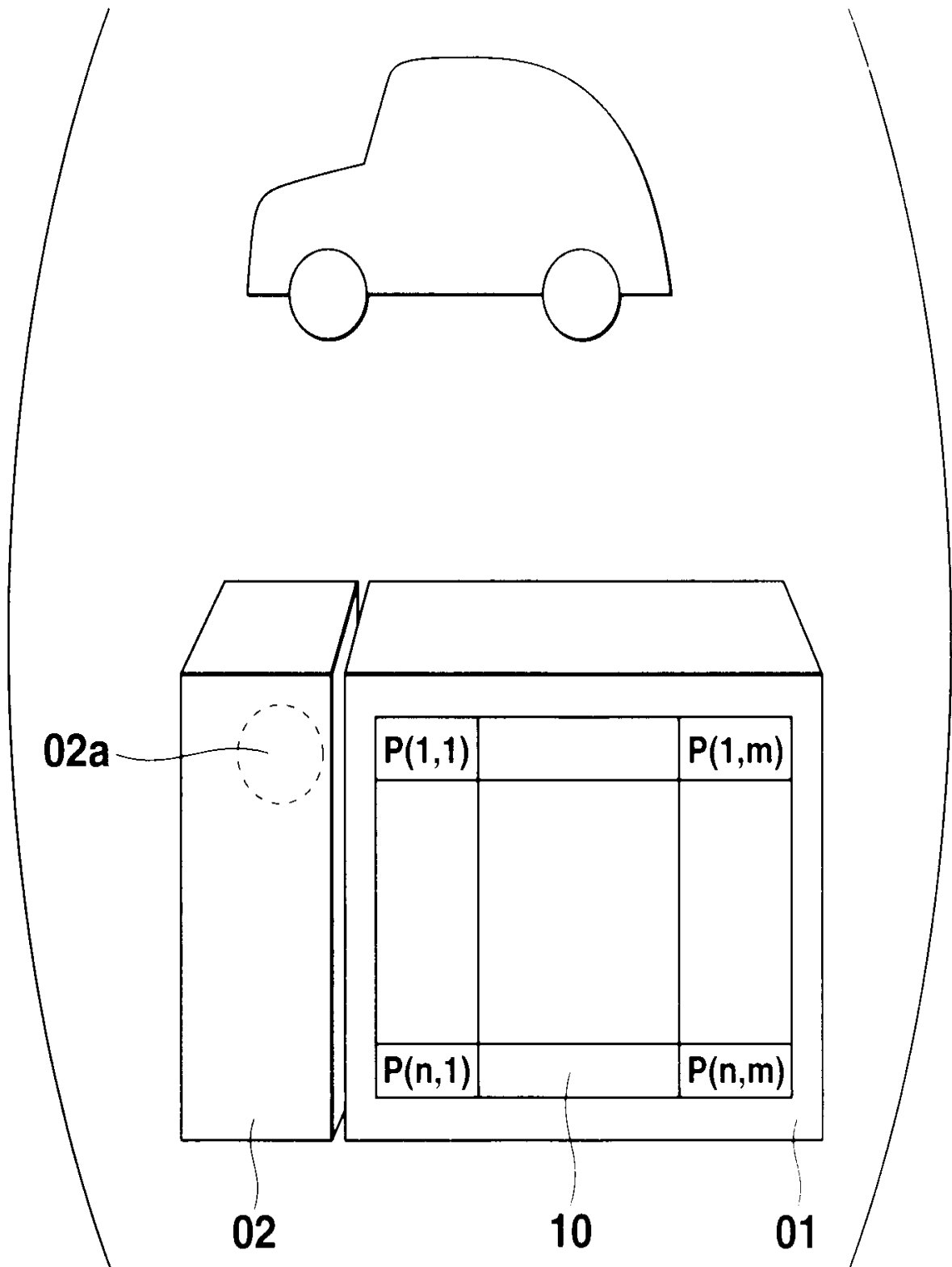




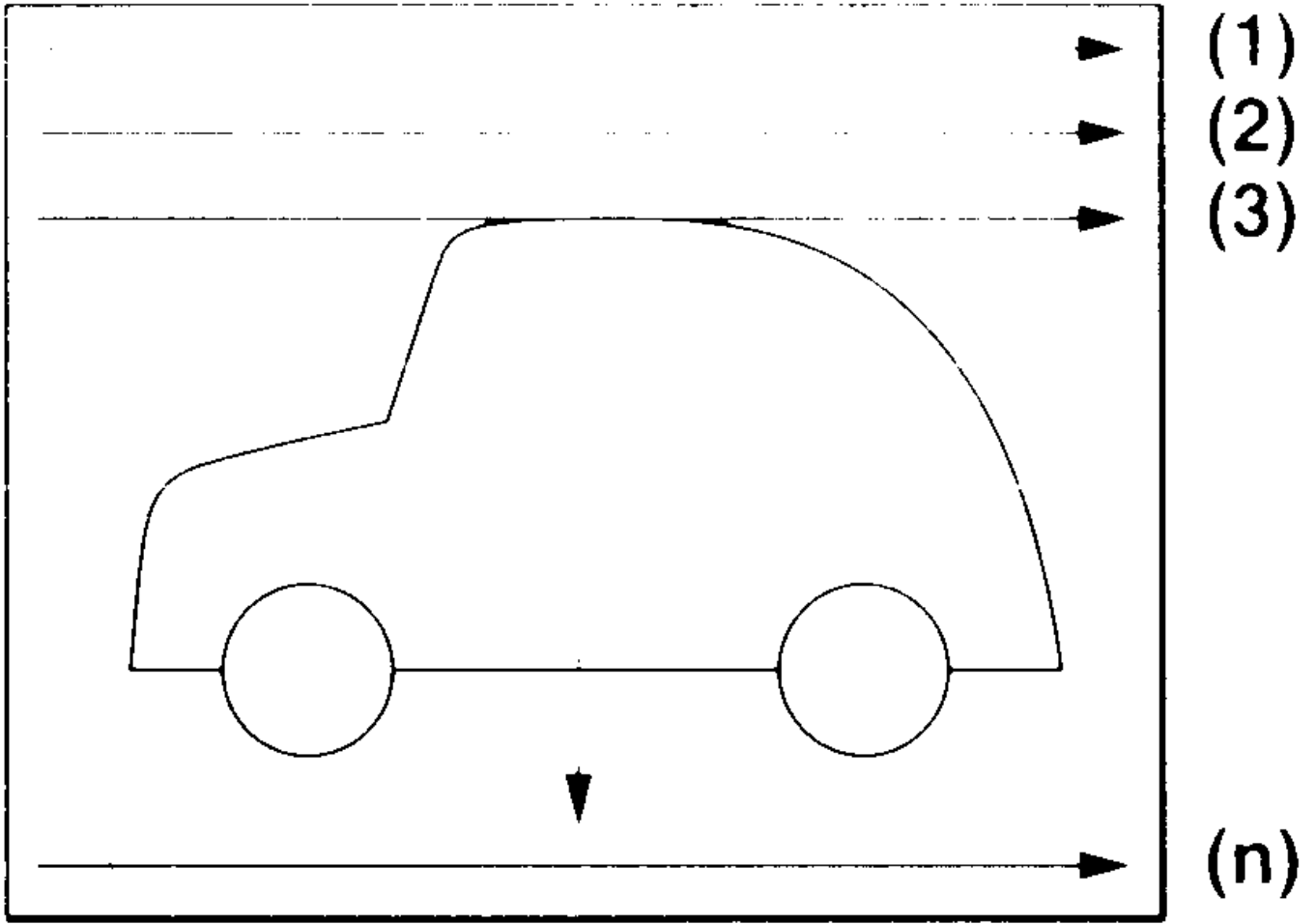




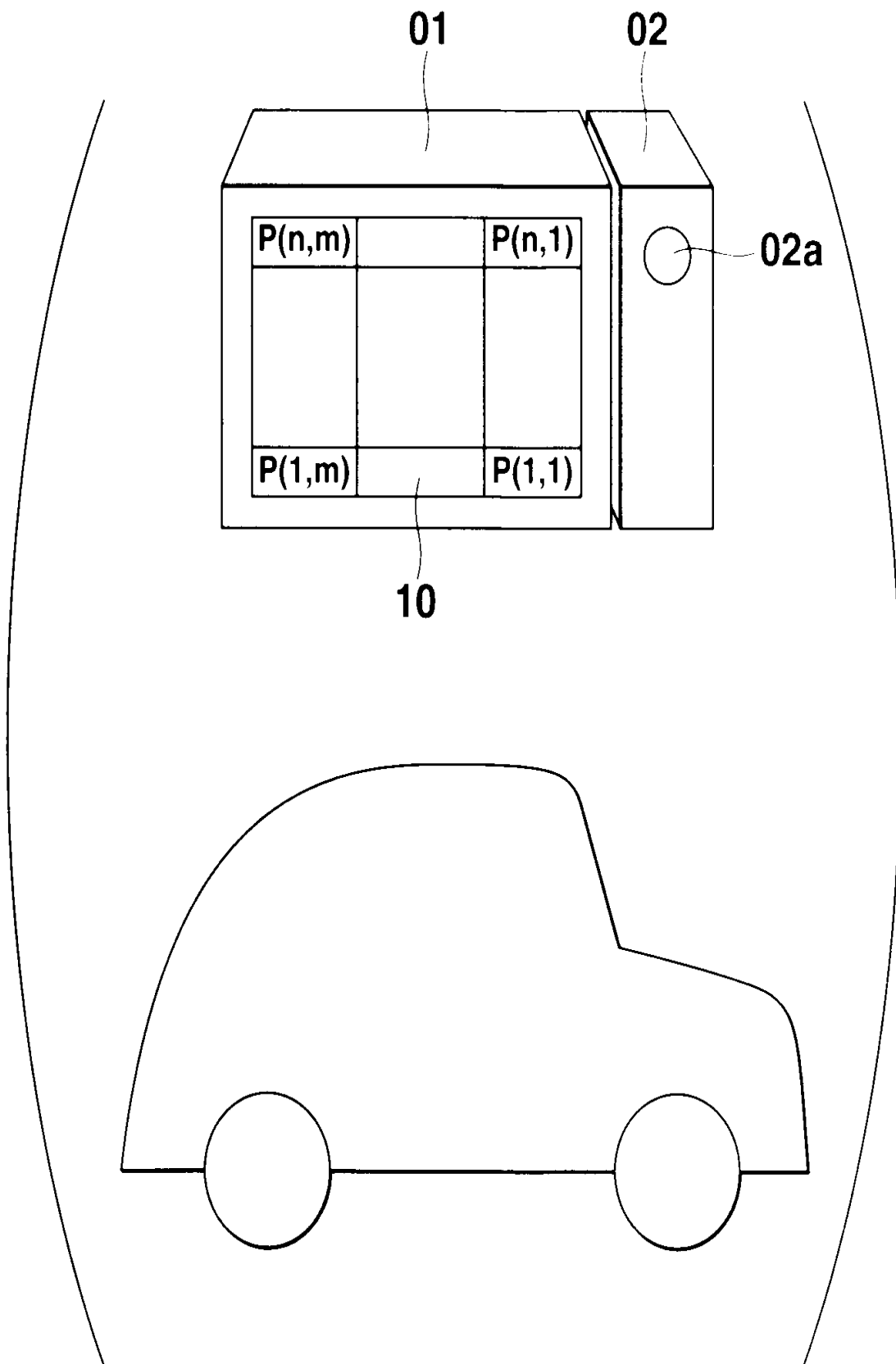
23a



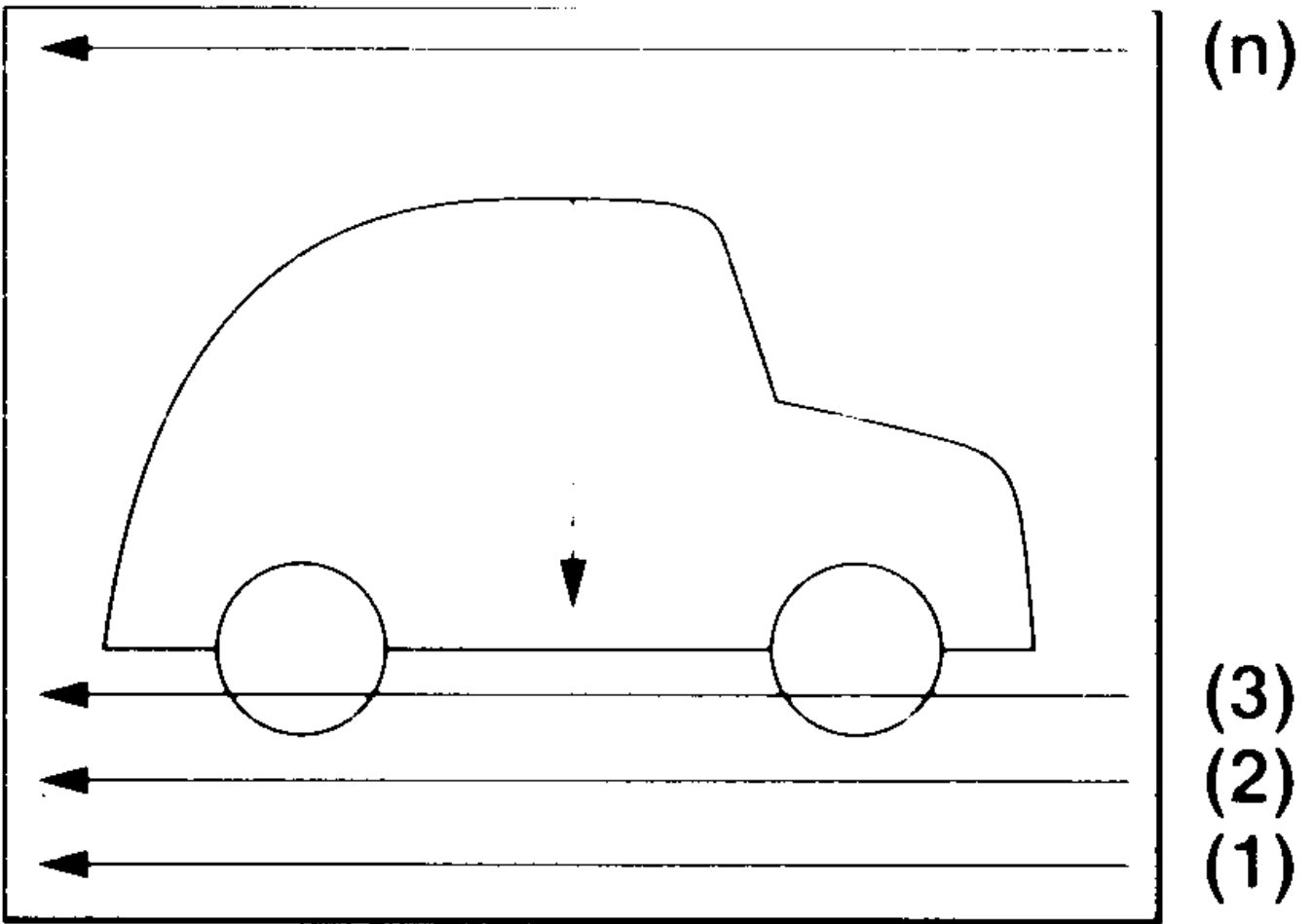
23b

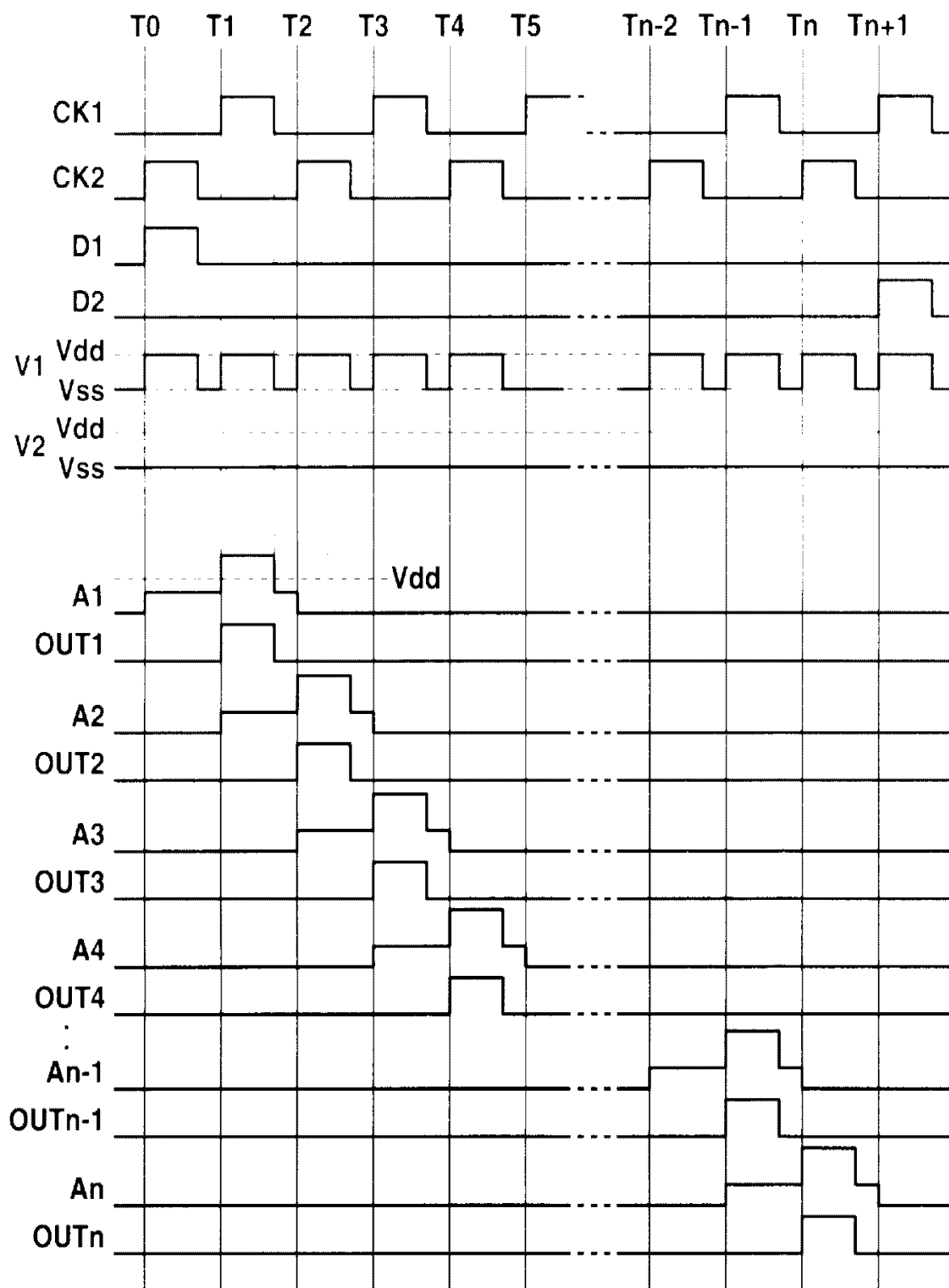


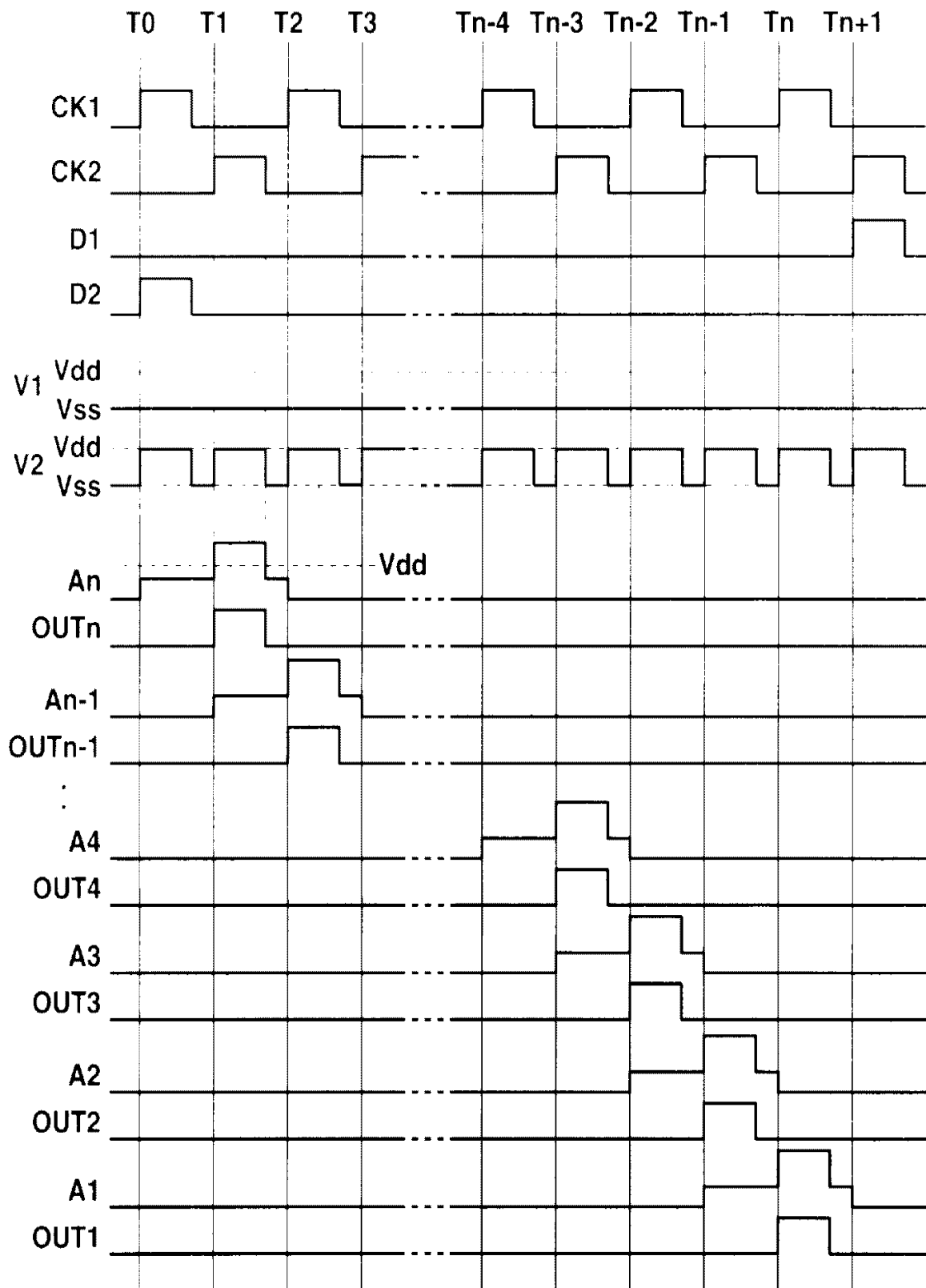
24a

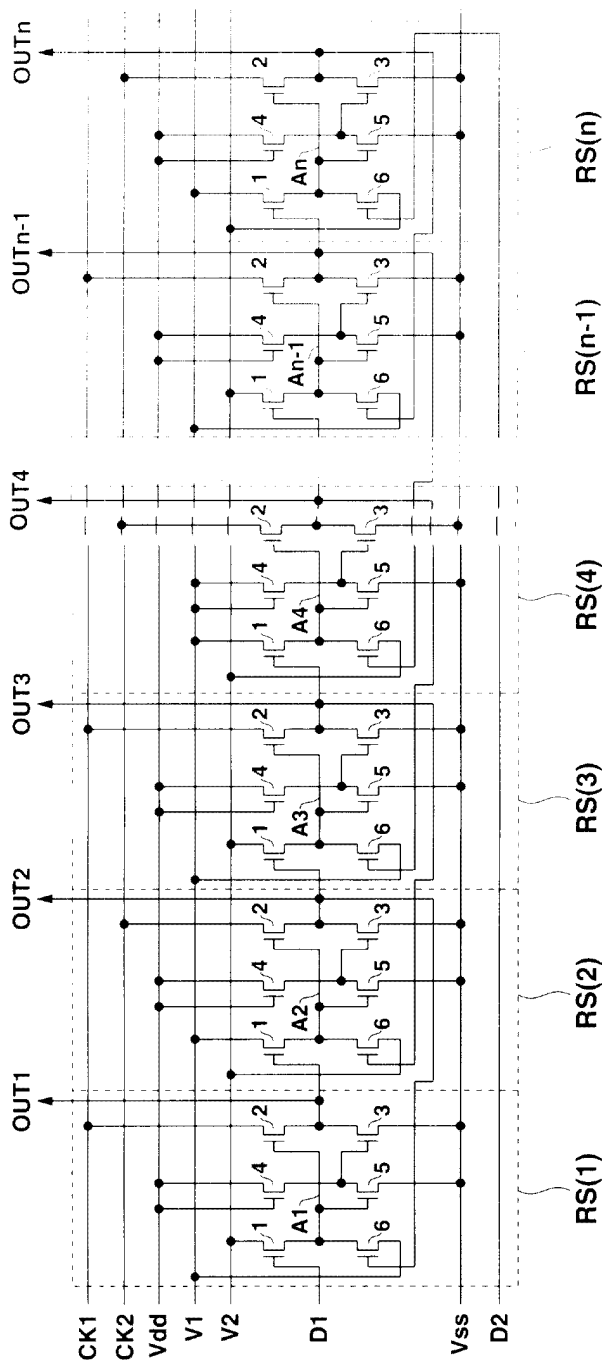


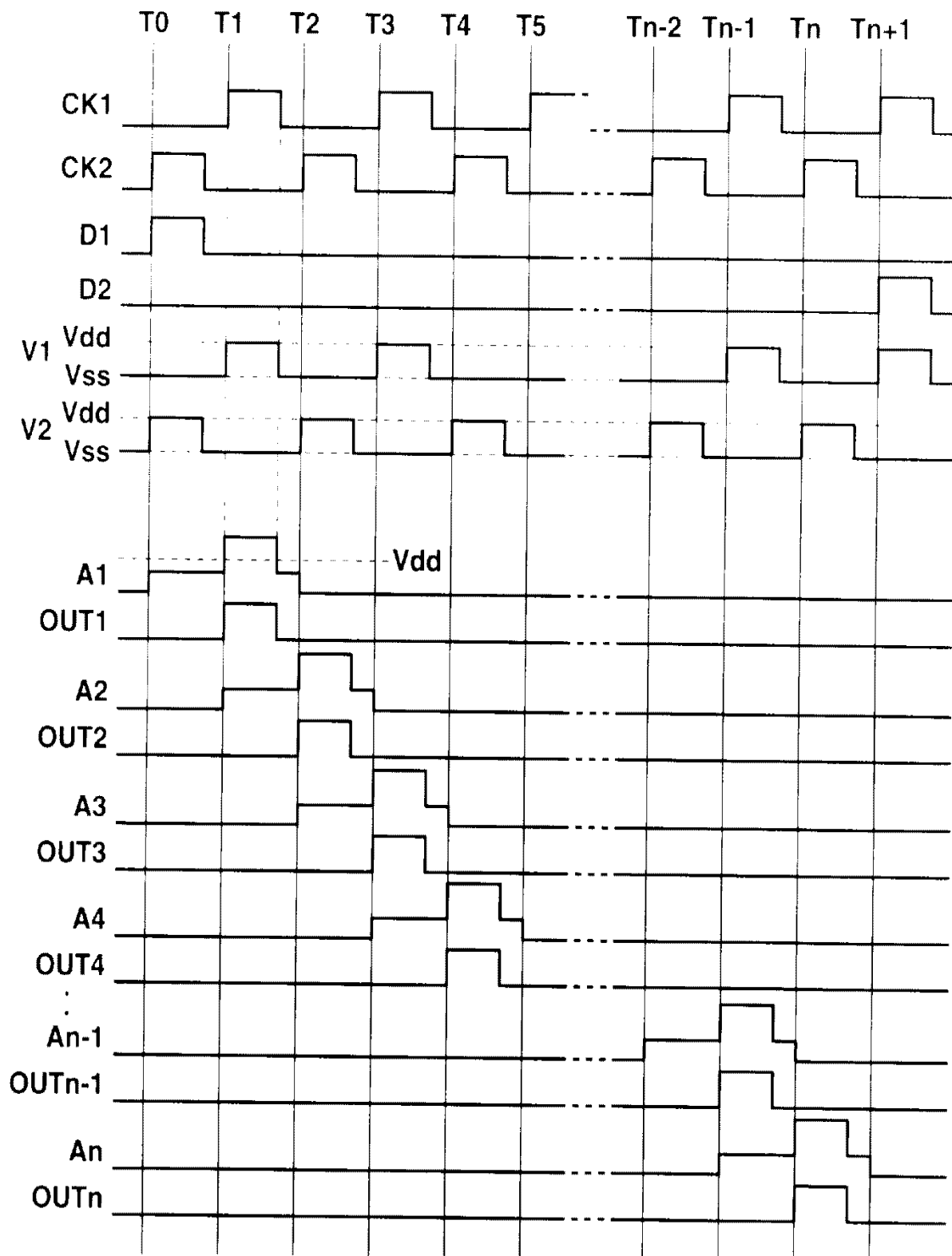
24b

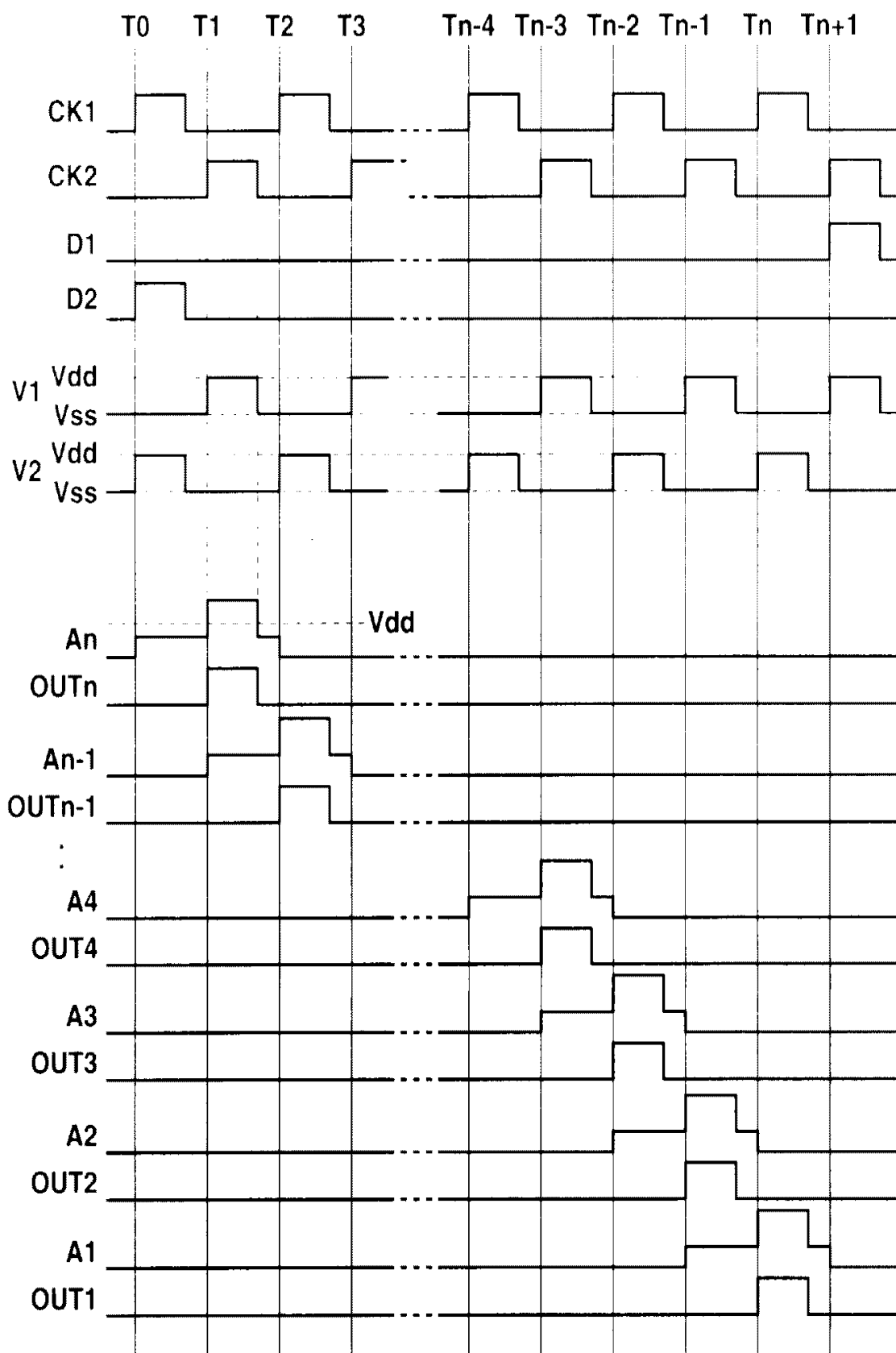


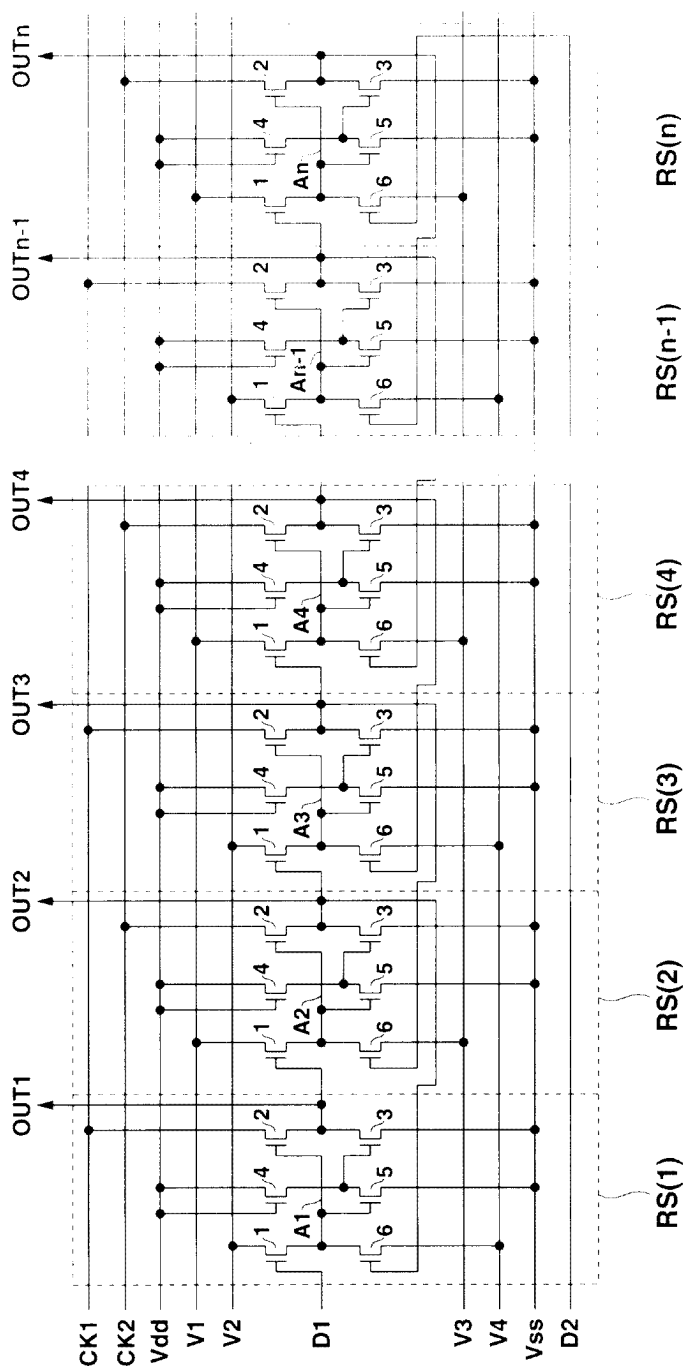












31

