

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl. 7
H03K 17/16

(11)
(43)

2003-0038329
2003 05 16

(21) 10-2002-0038150
(22) 2002 07 03

(30) JP-P-2001-00336161 2001 11 01 (JP)

(71) 가 가 2 2 3

(72) 가 2 2-3 가 가

(74)

:

(54)

(13) (1) (8) (11) (VDD) 가 , (VDD) (11)
(11) . RD , (VDD) (12) , (13)
(13) (12) 가 (12) (VDDQ) (12)

1

, , , ,

1 1 .

2 1 (13) .

3 2 .

4	3	(14)	.
5	3		.
6	5	VDC	(15)
7	4		.
8	7	VSSQ	(16)
9	5	VDC	.
10	6	VDC	.
11	7		.
12	8		.
13			.

< >

1, 1a, 1b, ..., 1n :

11 :

11a, 11b, ..., 11n :

12, 12a, 12b, ..., 12n, 90a, 90b, ..., 90n :

13, 14 :

15 : VDC

16 : VSSQ

13 (11) (12)가 13 (1) (12) 가
(1) (1) VDD가 (12) (12) VDDQ
가
, ,
, x 「H」 , 「L」 가 가
, 가

(12)

(11)

가 . ,

(12)

가 .

, , 가 . ,

, (1) .

, 가 가 . , 가

, , , , , ,

가 .

, , , 가 , .

, .

, ,

, , , ,

가 .

, .

, , , ,

가 가 .

, .

, , , , , ,

가 가 .

, .

, ,

(1) VDD가 (11), (12) VDD (11), (13) (11) 가 (13) (12). (8), (1) 2.5V (11), (8)

VDD 1.8V (13) OE ((11) RD (12)) RD

VDDQ가 , RD 가 가 (12) (13) (12).

2 Q24 1 PMOS (13) Q21 NMOS Q22 Q23 Q24 VDD PMOS Q21
RD 가 . PMOS Q24 NMOS Q25, Q26 VSS (11) Q2

PMOS VR1 VG1 Q21 C21 N22 R21 R22 N21 Q26 R21 R22 Q22 R23

OS (13) Q24가 , NMOS Q21, Q23 Q25, Q26 RD 가 「L」 N22 VG1 VDD
TH VR1 N22 , NMOS Q26 NMOS Q25 Q22 VR1 VDD-V_{TH}

RD 가 「H」 VR1 , NMOS Q25, Q26 N22, VG
1, VDDQ R21 R22 , PMOS Q21, Q23 VR1 PMOS Q22 (PMOS Q2
2 |VGS|) 가 , PMOS Q22 VDDQ VR1 Q21 Q2
1 PMOS Q21 가 , VDDQ가 .

가 , VDDQ가 , PMOS Q22 |VGS|가 , PMOS Q
22 가 , VDDQ가 .

59-160219

(13) VDD VDDQ (12)

(12) 가 , (12) (13)

3 VDDQ 2 VDD (13) 1 (1) (14) (1) 3

, VSSQ (9) VSS (12) (14) (1)

4 3 (14) 4 VDD PMOS Q45, Q46 NMOS Q44 RD Q45, Q46 NMOS Q44 NMOS Q43 PMOS N42

Q46 가 PMOS Q45 NMOS Q44 NMOS Q43 NMOS Q42

NMOS Q44, Q41 VSS NMOS Q41 NMOS Q43 Q46 R NMOS C41 , PMOS Q42 VR2 NMOS Q42가

VSSQ가 42, R41 VDD N41 N41 R41 R42 R43 NMOS Q42가

, N42 N41 VG2 NMOS Q41

, 4 (14) RD 가 「H」 VS

N42 S C41 PMOS VG2가 VSS Q45, Q46가 , NMOS Q41, Q43 Q44가

RD VG2, 가 「L」 , PMOS Q45, Q46 N42, , NMOS Q41, Q43 VR2가 NMOS Q42 (NMOS Q41

, VSSQ R41 R42 VSSQ VR2 , NMOS VSSQ가

Q42 |VGS|가 , NMOS Q41 가 , VSSQ가

VG2 NMOS Q41

가 , VSSQ가 , NMOS Q42 |VGS|가 가 , NMOS Q41

가 , NMOS VSSQ가 , NMOS Q41

(12) VSSQ 가 (12) VSS

(14)

, 2 VDD (13) 4 VSS (14)

VDDQ VSSQ (12) VSS (13, 14) VSS (12)

(1) VDD VSS

5 3 1 (

13) Converter) VDD VDDQ VDD VDDQ VDC(Voltage Down VDC (15) ,

IEEE Journal of Solid-State Circuits, Vol. 25, October 1990 P1129 1135

6 5 VDC (15) 6 VDD PMOS Q61, Q63, Q6 P

4, Q68 MOS Q62 PMOS Q61

PMOS Q63, Q64, NMOS Q65 Q67 , PMOS , PMOS

Q63 , PMOS Q64 , NMOS Q66 Q65, Q66

NMOS Q63 NMOS Q65 , NMOS Q67 VSS

PMOS , NMOS Q68 Q67 PMOS NMOS Q65 PMOS Q61 가
 , NMOS Q68 VR3 가 NMOS 2 Q65 가
 , RD , / .

NMOS Q66 PMOS Q62 N61 , N61 가
 VSS . PMOS C61 . PMOS Q62 Q62 RD .
 . PMOS Q61, Q62 , VDDQ가 .

가 , 6 VDC (15) . RD 가 「L」
 가 「H」 OS Q61 , PMOS VDD Q68 VG3 VDD , PM
 가 「H」 가 「H」 PMOS VDD Q62 VDDQ , RD
 PMOS Q62 VDDQ가 C61

RD 가 「H」 , RD 가 「L」 가 , NMOS Q67가
 PMOS Q62 , PMOS Q63, Q64 NMOS Q65 Q67
 가 PMOS Q61 VG3 VR3 , VDDQ가 VDDQ
 3 , VDDQ가 VR3 VDDQ가 VG .

VDC (15) (1) 가 , (1)
 (12) VDC (15)가 , (1)
) (12)

7 VDDQ 4 VDD VDC (15) 5 (1) , 7 V
 SSQ (12) VSS (16) (1)

8 7 VSSQ (16) . 8 , VDD C81
 , PMOS Q87 , PMOS Q85, Q86, Q87
 가 가 NMOS Q83, Q84 PMOS Q85, Q86, Q87
 Q85 , PMOS Q87 Q85, Q86 , PMOS
 81 NMOS Q83, Q88 , NMOS Q

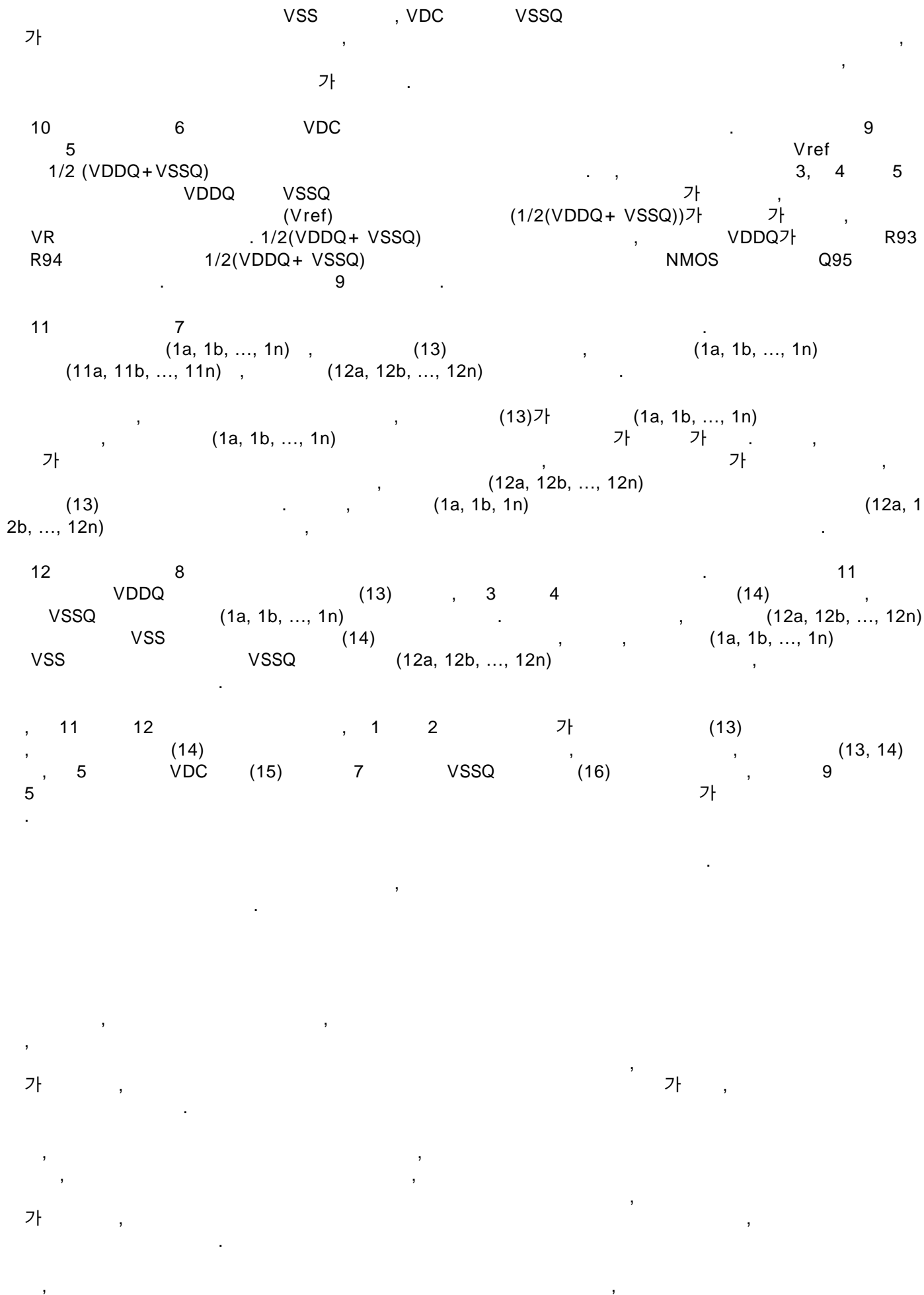
PMOS Q86 NMOS Q84 NMOS Q83, Q84
 . PMOS Q85 RD 가 , PMOS Q87 NM
 OS Q88 Q82 C81 VSSQ . PMOS Q86
 S NMOS Q81 Q82 VSSQ . NMOS Q82 NMO
 Q81 VSSQ . NMOS Q81, Q83, Q84, Q88

8 VSSQ (16) . PMOS Q85 Q87 , NMOS
 Q83, Q84 VSSQ가 , NMOS Q81 VG4 VSSQ가
 , VSSQ가 , NMOS Q81 VG4 VR4
 가 가

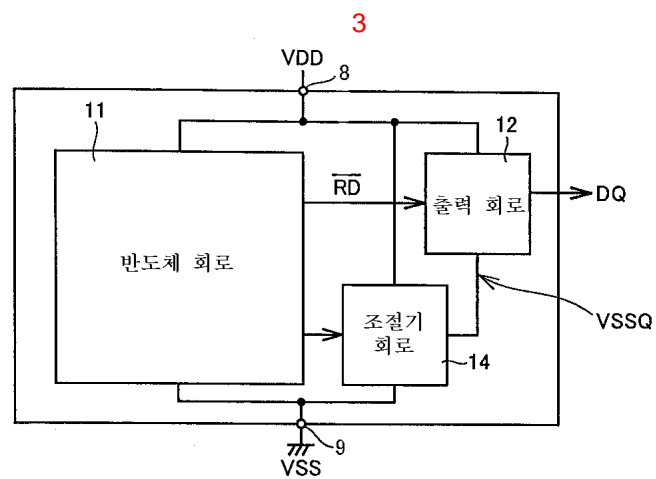
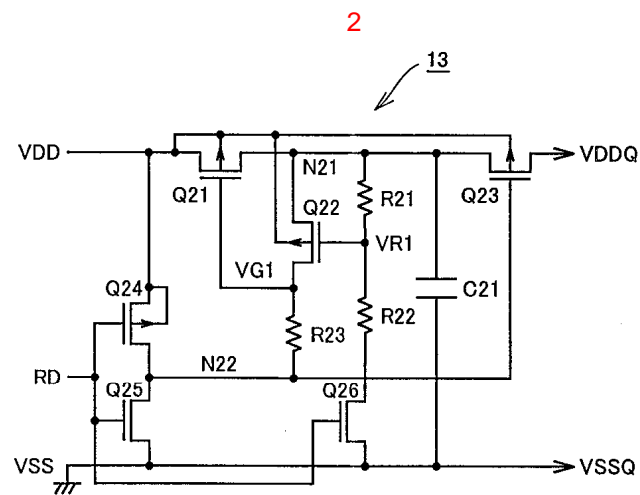
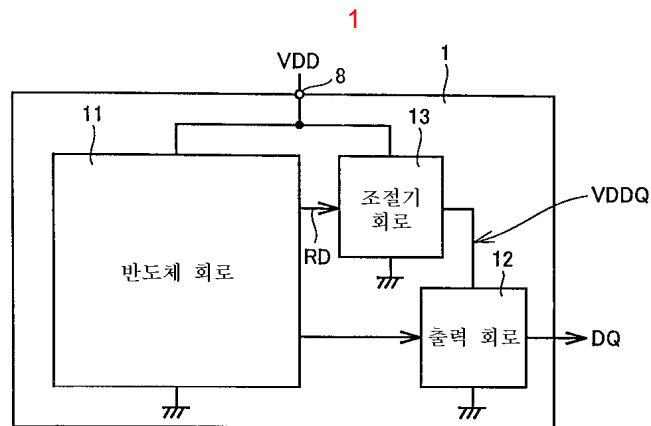
12 , VSSQ (16) VSSQ (12) VSSQ
 (16)가 (12) , (1) VSS VSS
 (12)

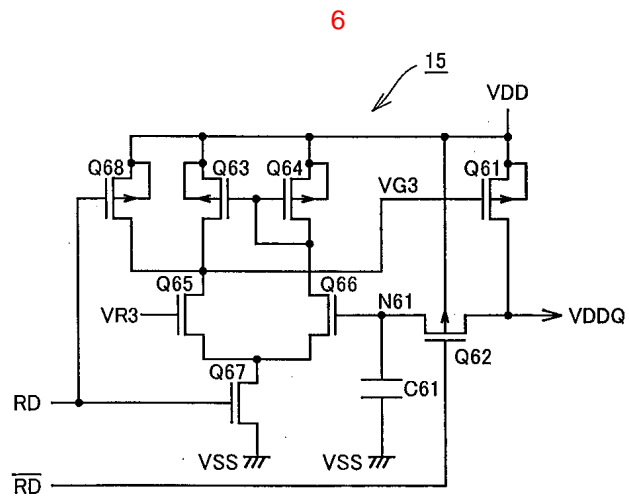
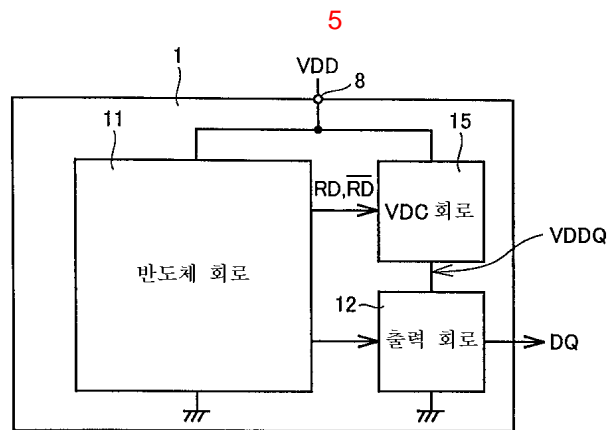
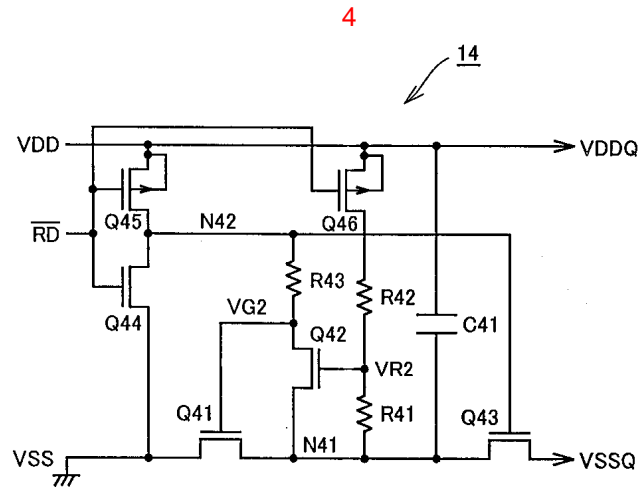
6 VDC (15) , 8 VSSQ (16)

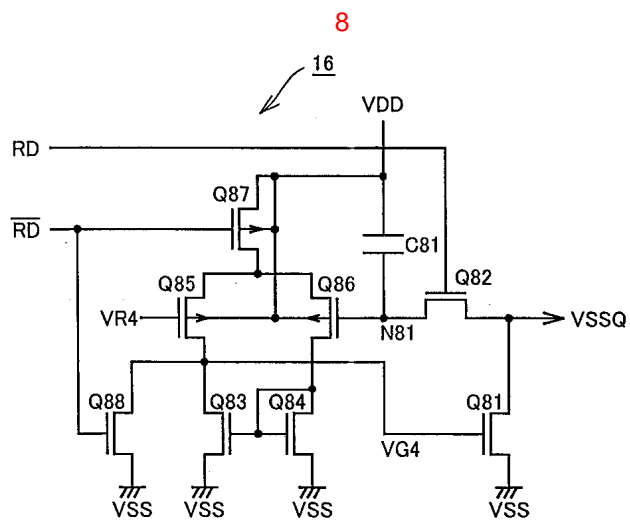
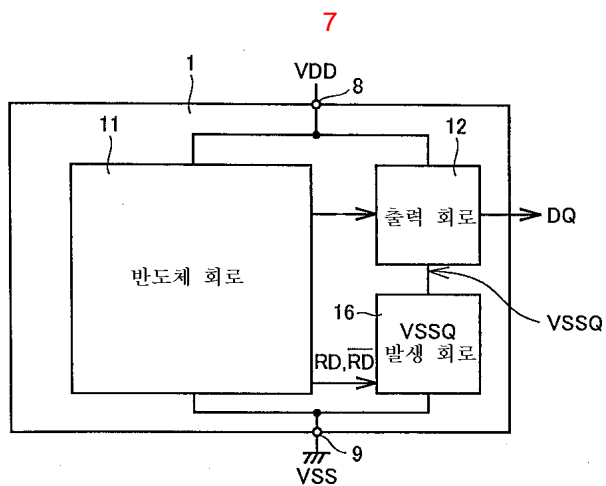
VDDQ (12) VSSQ (12) , (12) VSS (12) , VDC (15) VSSQ (16)가 , (12)
 , (1)
 ,
 9 5 VDC , (90a, 90b, ..., 90n) 3 5 3
 PMOS Q67 가 Q92, Q93 NMOS 가 Q94 Q96 , 6 Q63, Q64 NMOS Q65 Q91a, Q91b, ..., Q91n
 Q91n (90a, 90b, ..., 90n) , PMOS Q91a, Q91b, ..., Q91n VG5가 R91a, R91b, ..., R91n VDDQa, VDDQb, ..., VDDQn R92a, R92b, ..., R92n VR5 C91
 Q91a, Q91b, ..., Q91n C91a, C91b, ..., C91n , R91a, R91b, ..., R91n C91a, C91b R92a, R92b, ..., R92n VDDQa, VDDQb, ..., VDDQn , DC
 (90a, 90b, ..., 90n) NMOS (99a, 99b, 99n) , PMOS (97a, 97b, ..., 97n) , PMOS (98a, 98b, ..., 98n)
 Q97a, 97b, ..., 97n VDDQa, VDDQb, ..., VDDQn
 9 VDC 3085562 (97a)가 ,
 PMOS (91a) PMOS (97a) C91a 가 PMOS Q91a VDDQa가
 C91a 가 , VDDQ VG5가 , PMOS Q91a가 (91a)
 VDDQ가 PMOS Q91a 가 , VDDQ가 VDDQ Q91a C91a PMOS Q91a
 C91a , VDDQ PMOS Q91a
 , VDC C91a , VDDQ가
 9 , PMOS Q91a, Q91b, ..., Q91n (90a, 90b, ..., 90n) ,
 0n) (90a, 90b, ..., 90n) 가 ,
 , VDC , 가 (90a, 90b, ..., 90n)
 , 가 ,
 , 8 4 VSS VSSQ (16) ,
 가 , VSS
 DQ , VSSQ VDC , VSSQ VSS 가 , VD



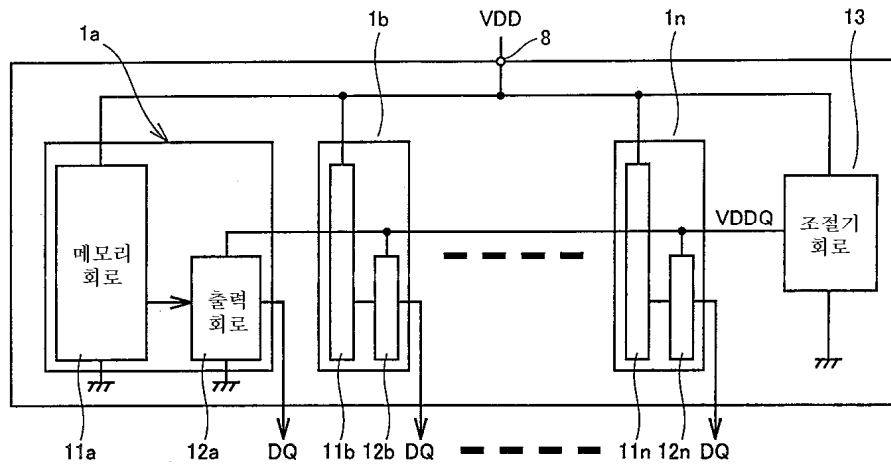
가



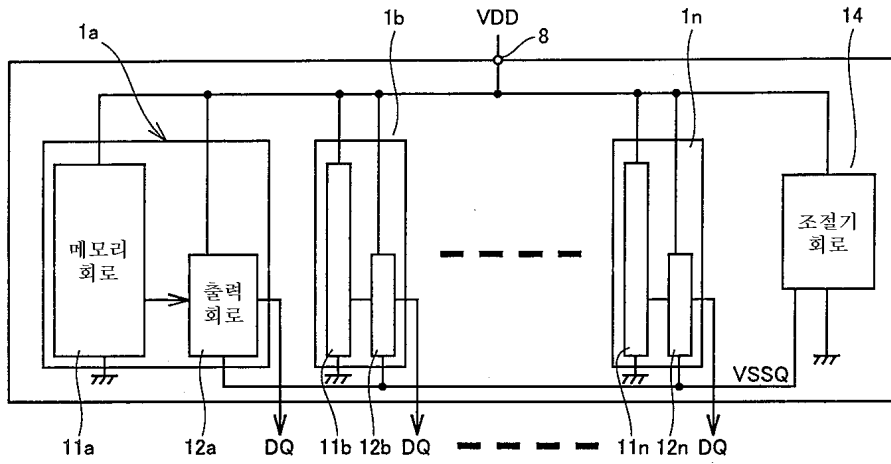




11



12



13

(종래 기술)

