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(74)

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가 MOS , MOS
가 , MOS
1 , 1 , 가
1 , 가
1 ,

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Q_{C1}, Q_{C2}, Q_{T1}, Q_{T2}, Q_{S1}, Q_{S2}
 N₁, N₂ ...
 DL, /DL, DL₁₁, /DL₁₁, DL₁₂, /DL₁₂
 WL₁, WL₂, WL₁₁, WL₁₂, WL_{n1}, WL_{n2}
 PL₁, PL₂, PL'₁, PL'_m, PL₁₁, PL₁₂, PL_{n1}, PL_{n2}
 PLC... , MC, MC₁, MC₄ , Vss... , Vcc... , V_{CH} ...
 , Q_{P1}, Q_{P2}, Q_P, Q'_{P1} ... , CE... , PC... , P, /'P,
 P₁, P₂, 'P₁ ... , AMP... , SP, SN... , Q_{EQ} ... , R₁,
 R₂ ... , W₁, W₂ ... , RW₁ ... / , A_X, A_Y ... , Q_{W1}, Q
 , Din, Dout... , /WE... , Q_{R1}, Q_{R2} ... , Q_{W1}, Q
 W₂ ... , SPG... , XDEC, DRV... , YDEC, DRV...
 , I/O, /I/O... , RWC... / , RWB... / , Q_{L1}, Q_{L2}, Q_{L3},
 Q_{L4} ... , X₁, X_n ... , INTF... , CORE...
 , VDC... , Vcc1, Vcc2... , VC1, VC2, VC3... , PCG...
 , LCA, LCB... , RX1, RX2... , GL1, GLn... , RY1 ... ,
 WY1, / WY1 ... , Q_{PL1}, Q_{PL2} ... , V_{WB} ... , MA1, MA2
 ... , sr1, sr2... , sp1, sp2... , TC1, TC2...
 , GA11, GAn1, GA12, GAn2... NAND

MOS () MIS MOS (, MOS
 () MOS
 (V_T) 가 MOS V
 T MOS V_T , V_T 0.4V 가

MOS 가 가 MOS C
 가 가 가 가 , , ,
 V_T 0.4V 가
 () , V_T
 2 CMOS (SRAM) WL 0V
 N₂ 가 V_{cc} 1V N₁ 0
 0V .4V N MOS Q_{S2} P MOS Q_{C1} V_T 0
 C1 SRAM Q_{S2}, Q_{C1} V_{cc} V_{cc}-V_T 가 Q_{S2} Q
 V_T 가 , V_T 0.4V V_T 가 , V_{cc}
 Q_{S2}, Q_{C1} V_T 가 가 가
 , V_T () 128K SRAM 10mA 가
 가 V_T SRAM 10μA
 MOS , 0.5V V_T 0.4V V_{cc} , V
 T MOS 가 6nm , MOS 가 0.5μm , V
 가 V_{cc} 1.5 1.0V V_{cc}
 V_{cc} Q_{S1} V_{cc}-V_T , V_{cc}가 V_T
 V_T (Q_{S1} Q_{S2}, Q_{C1} Q_{C2})
 () 가 V_T가 0.5V V_{cc}가 WL
 (V_T 1V V_{cc}가 가 Q_{T1} Q_{S1} DL Q_{S2} DL
 MOS) DL (0.2V)가 , Q_{S2}
 가 가 가 가 가 Q_{S1}, Q_{T1} DL
 Q_{S1} Q_{T1} V_T V_{cc} V_{cc}-V_T , V_{cc}
 가 가 가 가 가 가
 , SRAM SRAM 가 MOS
 V_{cc} 가 가 가
 MOS 가 가 가 2 가
 가 가 2 가 1 가 2
 가 가 가 가 가 가
 1 (a) 1 (c) 1 (a) 1 (b) Q_p V_{CH}가
 , 1 (c) Q_p Q_p 가 , 1 (b) Q_p V_{CH}가
 V_T 0.5V 1 (a) 가 V_{CH}
 P MOS Q_{C1}, Q_{C2} MC V_{CH} N
 MOS Q_{S1}, Q_{S2} V_{ss}(0V) MC

MC MOS Q
 C_1 Q_{S1} Q_{C2} Q_{S2} N_1, N_2 가 , MOS Q
 T_1, Q_{T2} , V_{CC} V_{CH} 가 V_{CC}
 Q_{T2} V_T 0 가 $V_{CC}-V_T$ 가, V_{CC} Q_{P1} N_1, N_2 Q_{T1}
 N_2) $V_{CC}-V_T$, Q_{P1} $V_{CC}=1V, V_T=0.5V$ 0.5V (N_1
 V_{CH} 0 $V_{CC}-V_T$ V_{CH} V_{CH} (2V) 가
 N_1, N_2 V_{CH} V_{CH} Q_{P1}
DL, /DL 가 Q_{P1} $N_1,$
 N_2 N_1, N_2 Q_{P1} V_{CH} Q_{S1} Q_{S2} $N_1,$
 Q_{P1} Q_{P1} Q_{P1} 가 가
 Q_{P1} V_{CH} 가 Q_{P1} Q_{P1} 가 가
1 (b) , MC Q_{C1} 0, Q_{C2} Q_{P1} $V_{CC}-V_T$ (0.5V)가 가 , MC Q_{C1}
 Q_{C1} PL_1 MC_2 V_{CH} $V_{CC}-V_T$ PL_1 $V_{CC}-V_T$ M
 C_2 WL 1 가 MC_2 V_{CH} PL_1 $V_{CC}-V_T$ Q_{P1}
0.2V $V_{CC}-V_T$ 가 V_{CH} 가 , MC 2 V_{CH} MC_1 가 V_{CH} (PL_2) V_C
 PL_1 V_{CH} 가 1 V_{CH} MC_1 가 V_{CH} (PL_2) V_C
H , (Q_{P2}) MC_1 가 V_{CH} (PL_2) V_C
1 (c) Q_{P1} Q_{P1} Q_{P1} Q_{P1} V
 CH 가 가 가 1 (b) , PL_1 PL
 2 1 1 1 가
, SRAM MOS MOS
60-38796 2-108297 , MOS
1 (b)
3 P MOS N MOS 5
 V_T 0.5V
 $V_{CC}=1V, V_{CH}=2V$ 가 SRAM V_{CC}
[1] (PL_1, PL_2) 가 $(3, 2V)$,
[2] $(DL_1, /DL_1, DL_2, /DL_2)$ $(3, V_{CC}=1V)$
[3] V_T

V_T (V_{CH}) , O_{T1}, Q_{T2}
 CE SRAM SRAM (, SRAM)가 SRAM
 (PL₁, PL₂) (V_{CC}) P
 V_{CH} , V_{CH} , V
 -MOS Q_{P1}, Q_{P2} VC2 VC2 V_{CC}
 CH 0.5V
 가 , 가 SRAM 10 μ A
 가 , V_{CH} , 1994 11), p.315」
 「1995 Symposium on VLSI Circuits Digest of Technical Papers, (1995), pp.75-76)」
 MOS 0.6V MOS
 V_{CC}
 가 , SRAM 6-2
 23581 SRAM CE (DL₁, /DL₁, DL₂, /DL₂)
 2 (/DL₁) PC $V_{CC}/2$ V
 cc VC1 $V_{CC}/2$ 「LSI」 p.324 4.60
 $V_{CC}/2$ $V_{CC}/2$ 0 $V_{CC}/2$ 64 128
 c V_{CC} AMP AMP 0 V_{CC} Vc
 , $V_{CC}/2$ Q_{EQ} 가 $V_{CC}/2$, AMP
 $V_{CC}/2$, SRAM CE
 SRAM (MC₁, MC₂) WL₁ WL₁ V_{CH} 가 가 WL₁
 XDEC, Q_{T1} Q_{S1} Q_{C2}, Q_{T2} MC₁ N₁, N₂ 0V, 2V(= V_{CH})가
 Q_{T1} 0 Q_{S1} Q_{C2}, Q_{T2} DL₁ 0V , Q_{S2} Q_{C2}
 가 DL₁, /DL₁ 0V, 1V AMP SP, SN SRAM
 0.2V 가 , AMP SP SN SPG
 가 , () 0.5V AMP YDEC, DRV
 R_1, Q_{R1} R_2, Q_{R2} I/O , / RWB Dout Q
 DL₁ 0V 가 I/O 가 , /DL₁ R 1V //I/O 가
 , Q_{R1} Q_{R2} V_T 가 () 0.2V , AMP RWB
 가 V_T 가
 가 (4) MC₁ Q_{P1} Q_{P2} PL₁ Q_{P1}
 가 Q_{P2} 가 V_{CH} 가 V_{CH} (2V) 가
 V_{CH} 가 V_{CH}

가 V_T 0.4V , P 0.4V
 0.6V V_{CH} $V_{CC} / 2$ 가 V_{CH}
 , 가 N_1, N_2 가
 가 , 가 N_1, N_2 가
) 16 (10) 2 (PL_1) V_{CH} 가 (PL_1)
) N_1, N_2 가 P 가 (Q_{P1})
 17 (Q'_{P1}) , N_1, N_2 가 ' P 가
 n V_{CH} 가 , MOS(Q_P) PMOS
 p V_{CH} 가 , PMOS V_{CH} n V_{CC}
 18 V_{CH} 가 (가), MOS MOS PMOS
 가 MOS 가 가
 19 가 . 1 (a) MOS가
 MOS V_{CH} PMOS가
 20 MOS N PMOS N
 MOS PMOS P , N
 21 SRAM 1 SRAM 가 가 ($MA_1,$
 MA_2, \dots)
 ($WL_{11}, \dots, WL_{n1}, WL_{12}, \dots, WL_{n2}, \dots$) m , ($DL_{11}, /DL_{11}, \dots, DL_{12}, /$
 DL_{12}, \dots, \dots) n $m \times n$ MC MOS (Q_{PL11}
 , $\dots, Q_{PLn1}, Q_{PL12}, \dots, Q_{PLn2}, \dots$) V_{CH} 가
 가 ($PL_{11}, \dots, PL_{n1}, PL_{12}, \dots, PL_{n2}, \dots$)
 , 9 , 22 MC MOS
 ($Q_{C1}, Q_{C2}, Q_{S1}, Q_{S2}$) V_T 0.5V, MOS (Q_{T1}, Q_{T2}) V_T 0.2V ,
 MOS SRAM 가 SRAM
 $V_{CC} 1V, V_{CC}$ $V_{CH} 2V(=2V_{CC}),$ 가 V_{CC}
 V_3 $-V_{WB}$ 0.2V
 1 WL_{11} 가 $-V_{WB}$ ($-0.2V$) $V_{CC}(1V)$
 R_{X1} YDEC, DRV TC R_{X1} LCB $-V_{WB}$
 $MA1$ V_{CC} R_{X1} 가 , GL_1 sr1 LCB V_{CC} $-V_{WB}$
 WB GL_1 가 , GL_1 GL_1 Ax V_{CC} $-V_{WB}$
 $XDEC, DRV$, GL () Rx V_{CC} $-V_{WB}$
 LCA MOS ($P_1, P_2 \dots$) P_1 0 V_{CH}
 $0V$, PL_{11}, \dots, PL_{n1} P_1 0V V_{CH} YDEC, DR
 V TC 2 $MA1$
 $sp1$ WL_{11} (MC) V_{CC} 가
 Q'_{D1}, Q'_{D2} Q'_{D1}, Q'_{D2} 가 (R_{Y1}) / ,
 RWC 3 가 , I/O N P MOS가
 V_T ($WY1, / WY1$)

- 3 4. , MOS
- 1 5. , MOS 1 MOS 가 1 1
- 4 6. , MOS MOS
- 1 7. , MOS MOS
- 1 8. ,
- 1 9. , 1
- 10. 1 가 , ; ; ; 1 2 2 ; ; 10 11. , 1 1/2 3 2 , 2 3 , 10 12. , 2 3 2 , 1 3 , 10 13. , 1 1/2 3 2 2 4 3 3 , 4 1 3 , 10 14. ,

10 15. 1 1 1 2 1 2 MOS 1 MOS 1 2 MOS MOS

15 16. 1 2 3 1 2 1 2 3 1 2

10 17. MOS MOS 1 MOS 2 1 1 1

17 18. MOS

19. 1 가 1 2 ; 1 2 ; 1 2 1 2 1 1 2 1 2

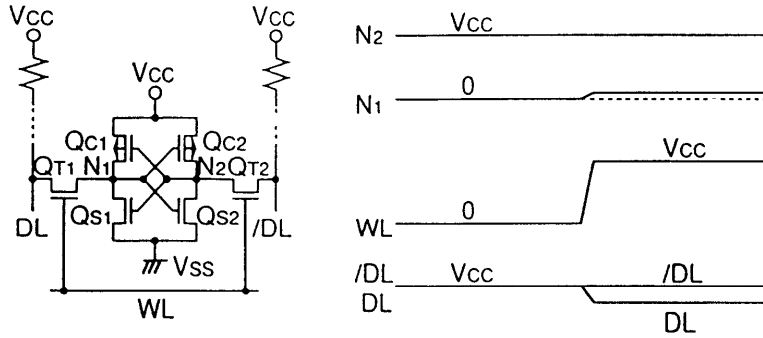
19 20. 1 1/2 3 2 3 2

19 21. 2 3 2 3 2

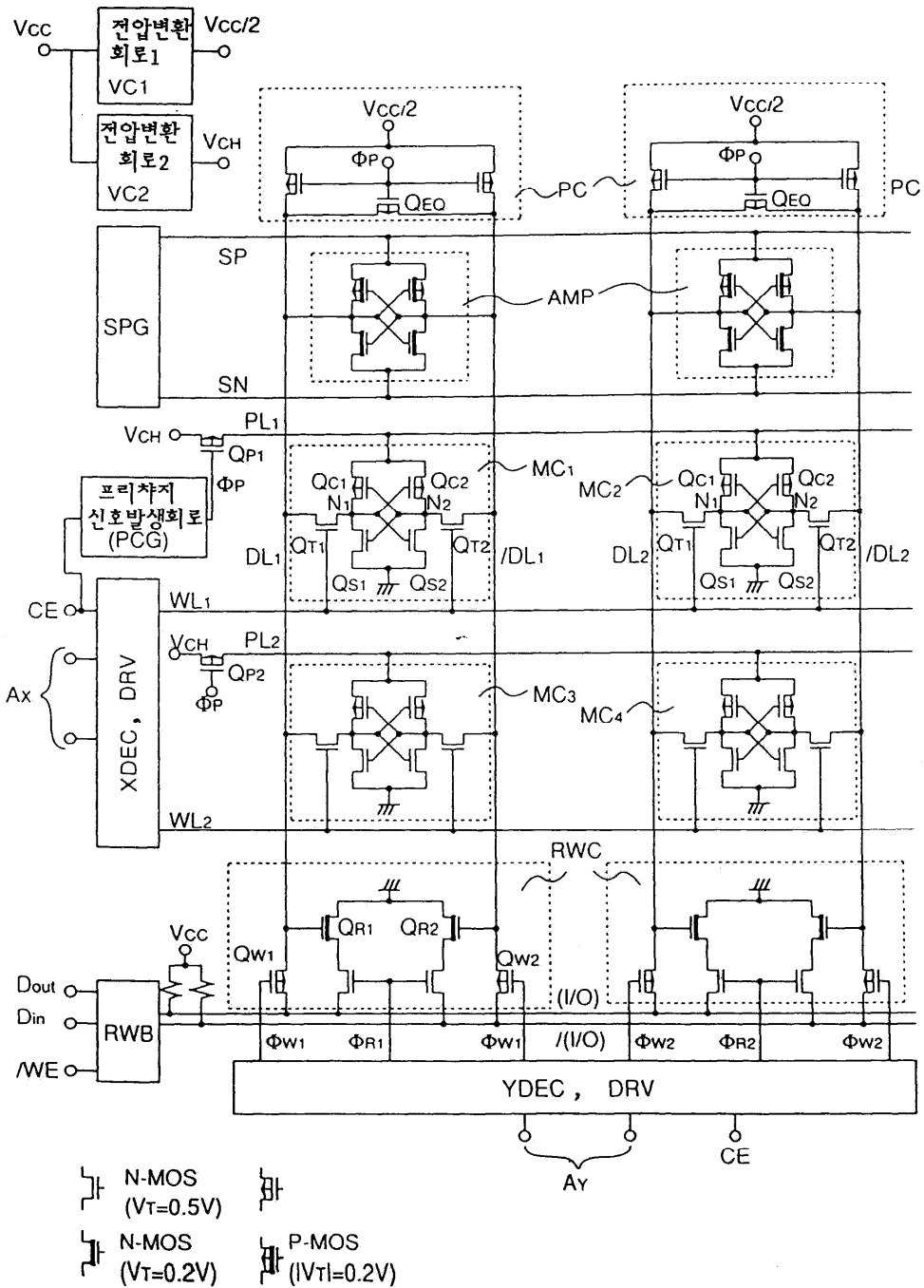
19 22. 1 1/2 3 2 2 4 3 3

- 19 23. 4 , 1 3 , .
- 19 24. 1 1 1 2 , 2 MOS 1
- 24 25. 1 MOS 1 2 MOS .
- 19 26. 1 2 MOS 1 2 MOS .
- 26 27. 1 2 3 1 2 ,
- 19 28. 3 1 1 MOS 2 1 1 1
- 26 29. MOS MOS , 1 MOS 2 1 1 1
- 1 MOS 30. MOS MOS , 1 MOS 1 1 1
- 28 31. MOS MOS , 1 MOS 1 1 1
- 30 32. MOS MOS , 1 MOS 1 1 1

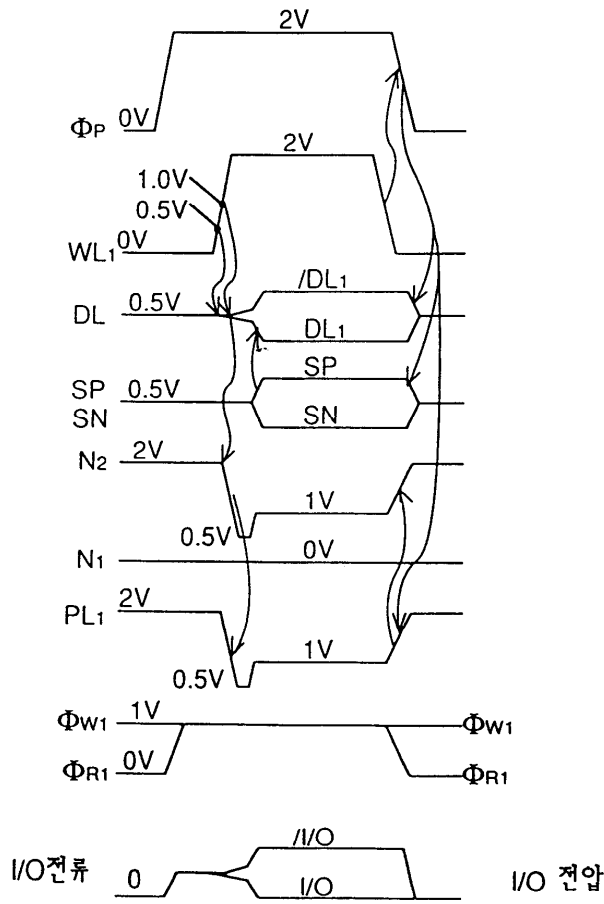
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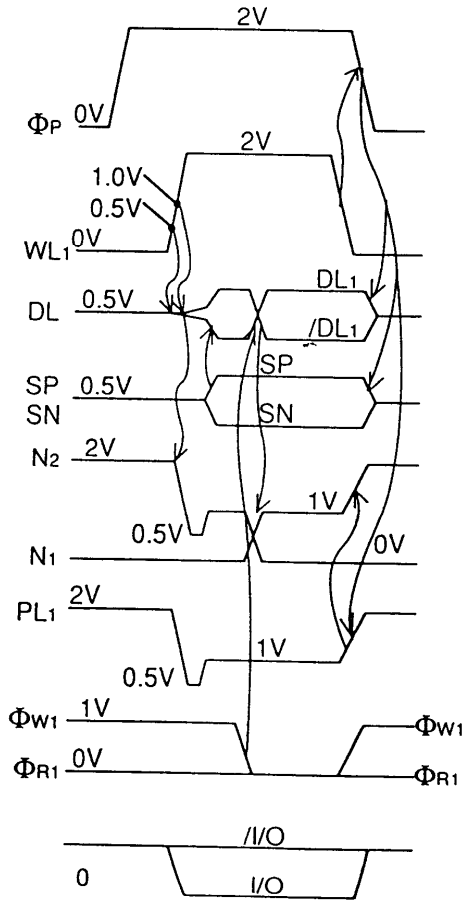
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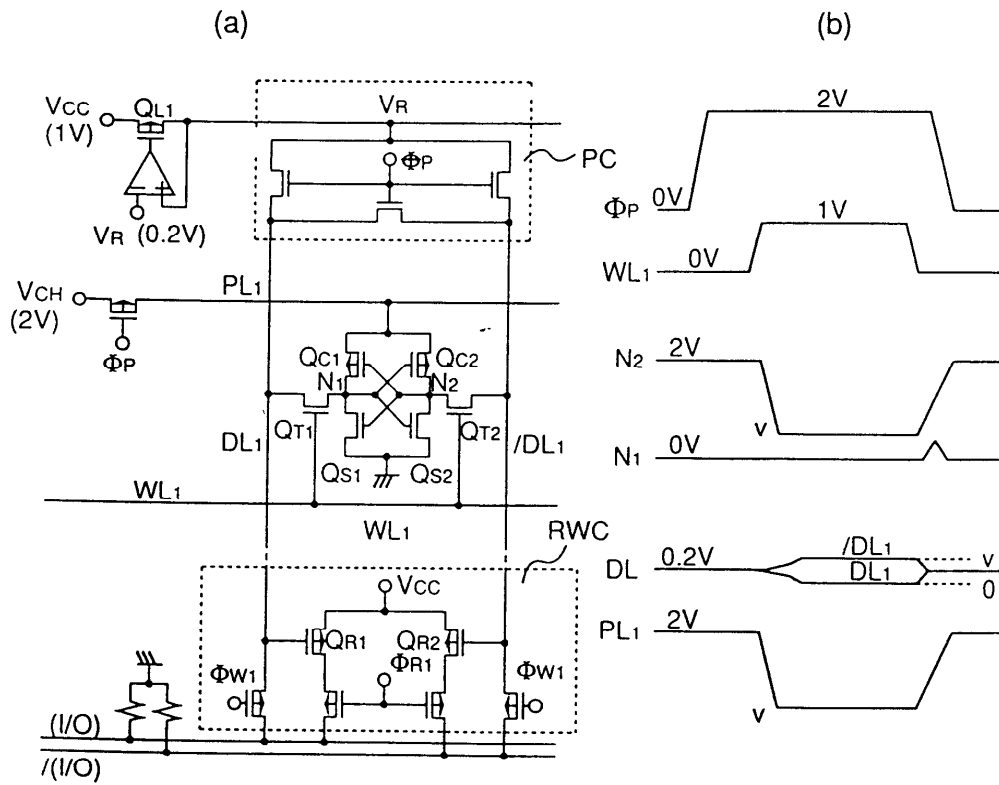
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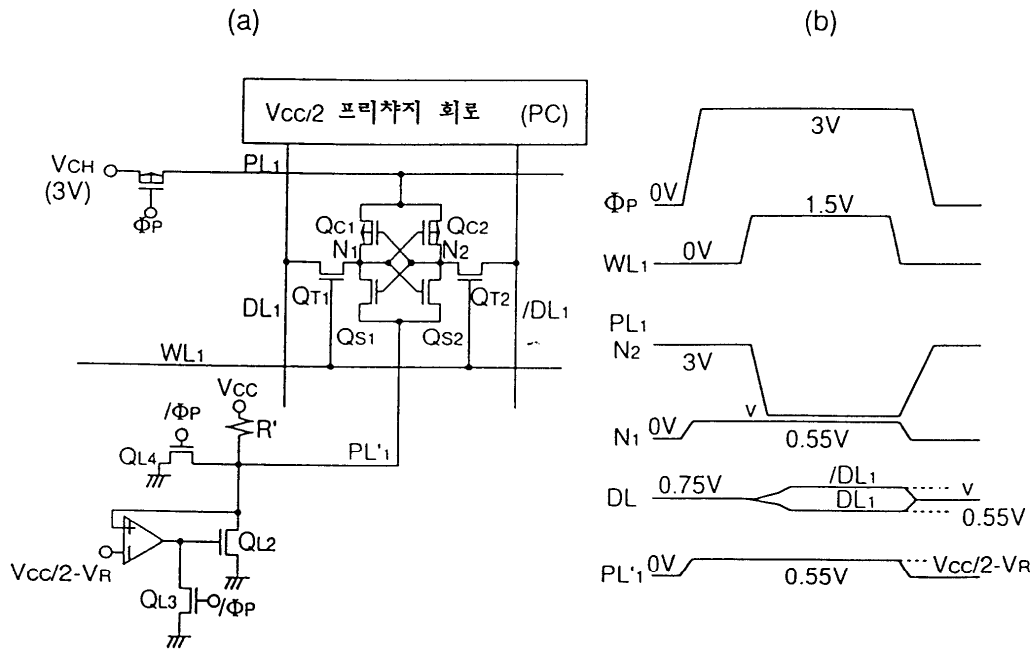
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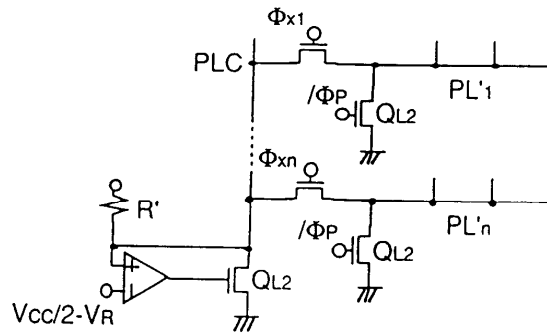
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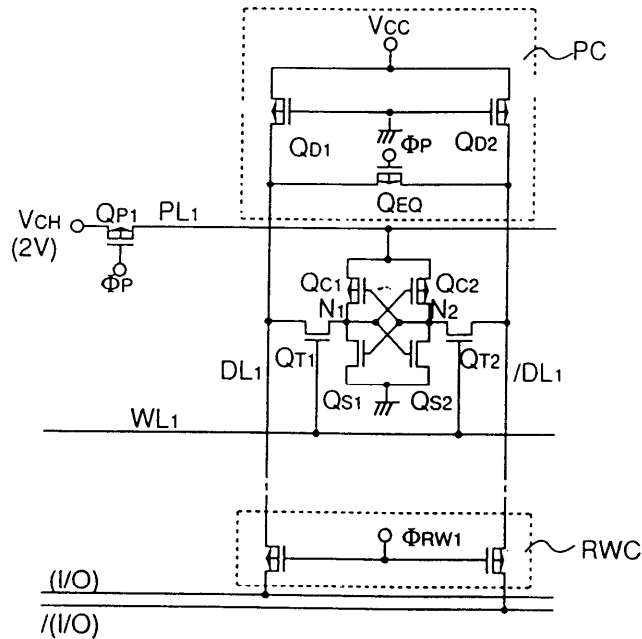
7



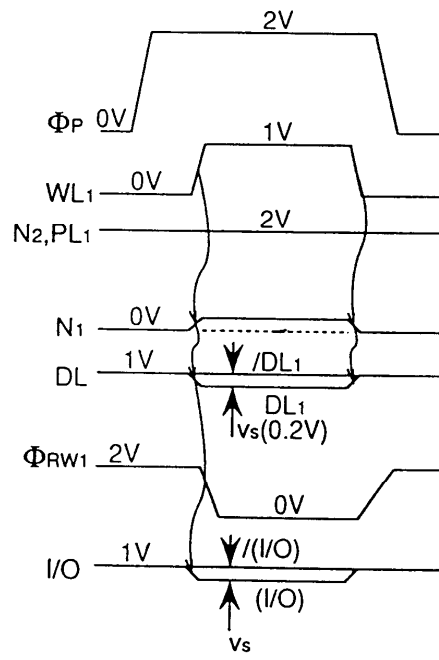
8



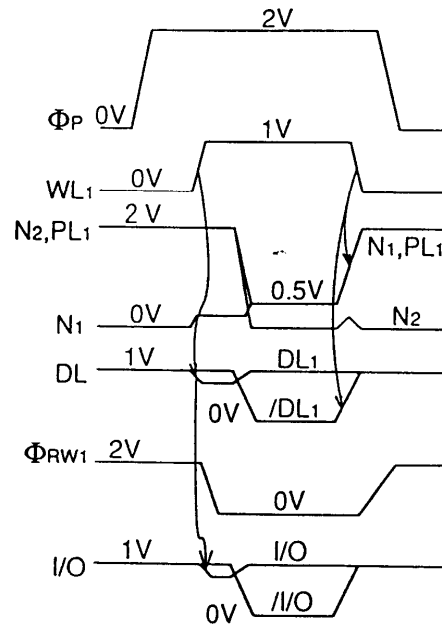
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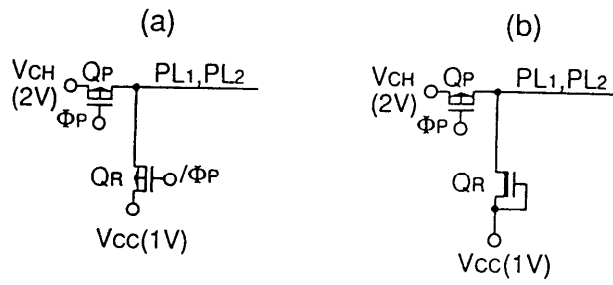
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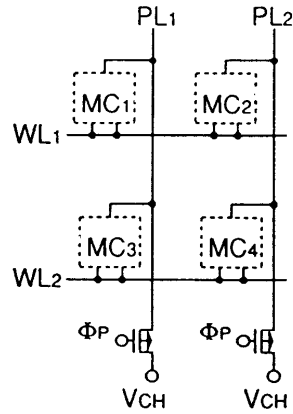
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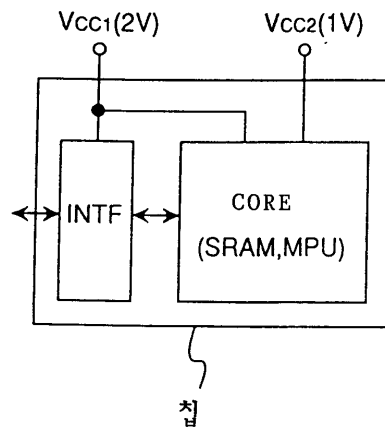
12



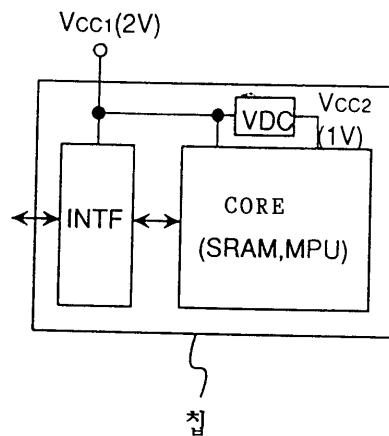
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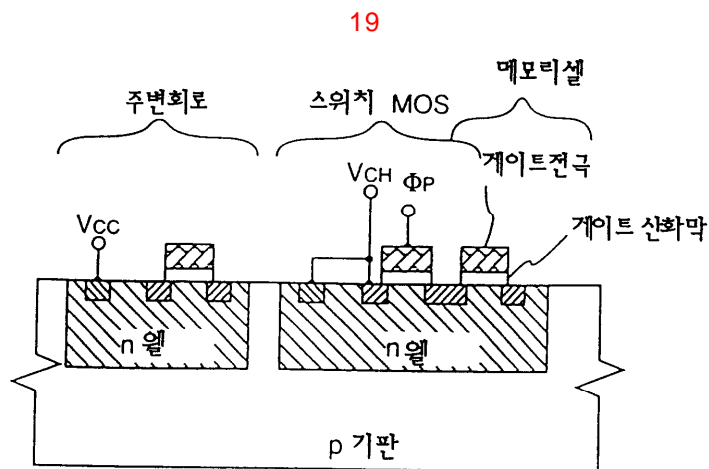
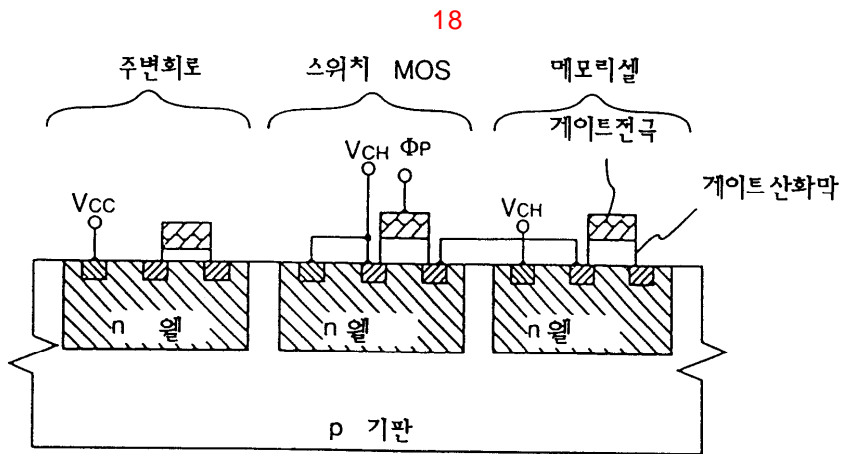
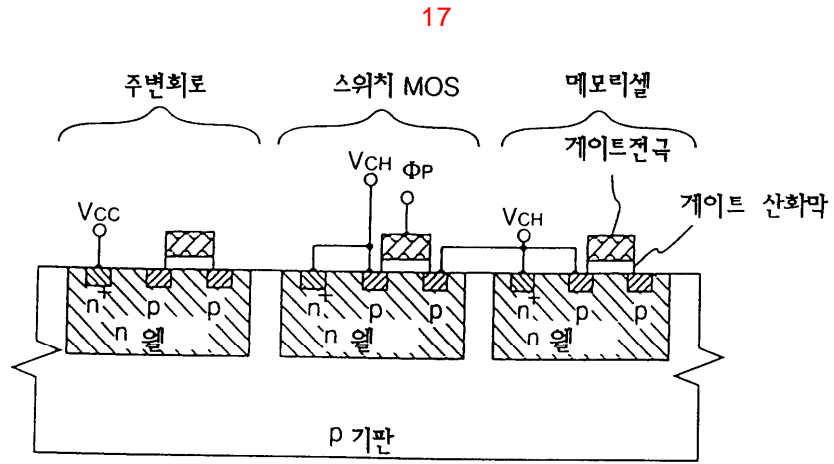
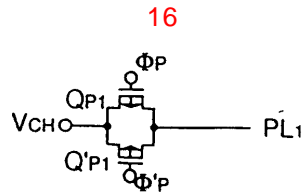


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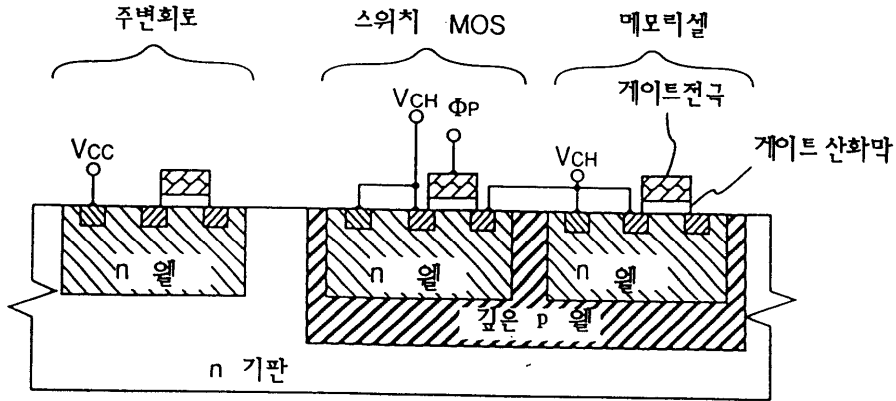


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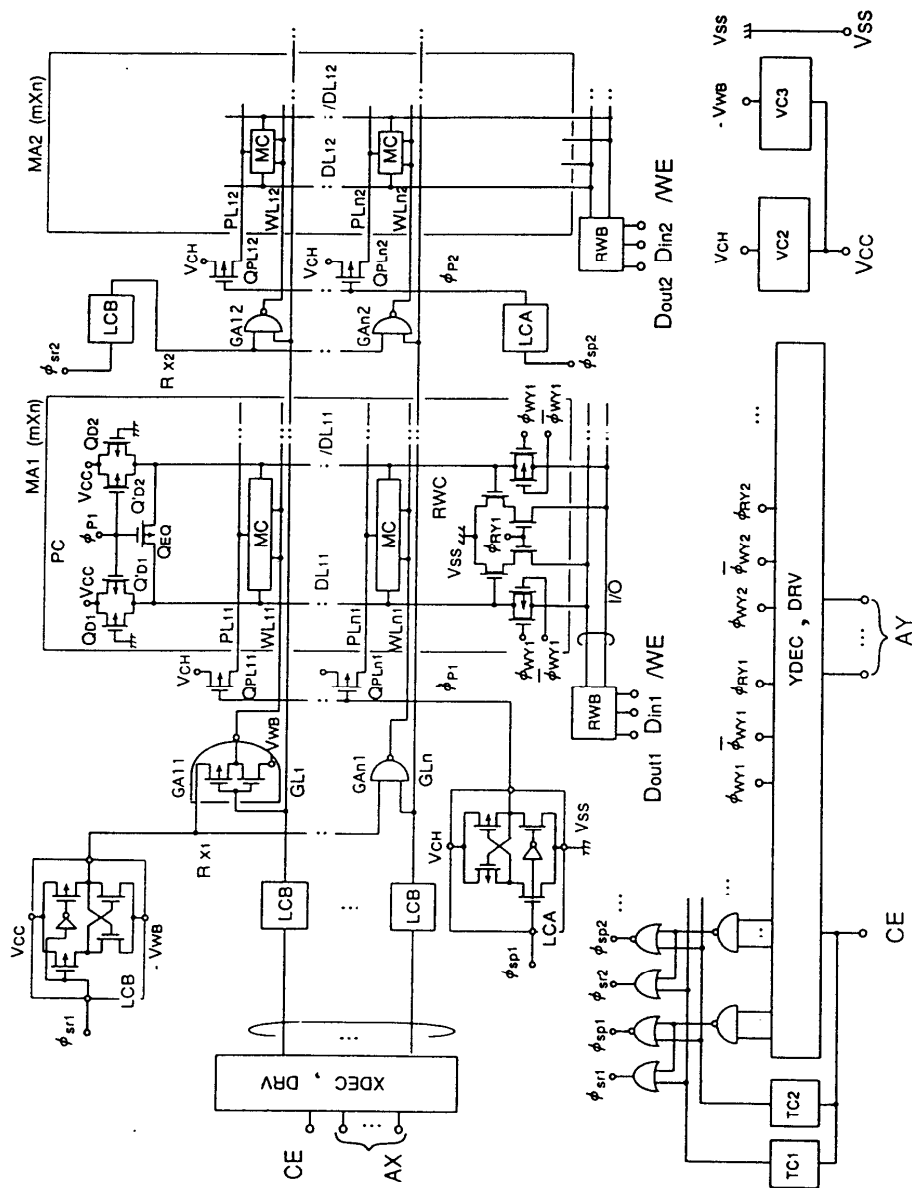




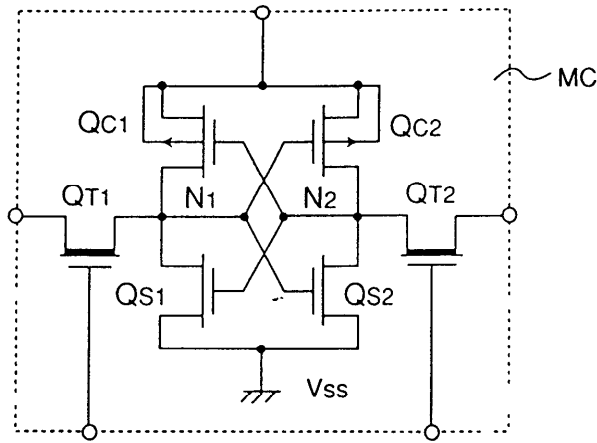
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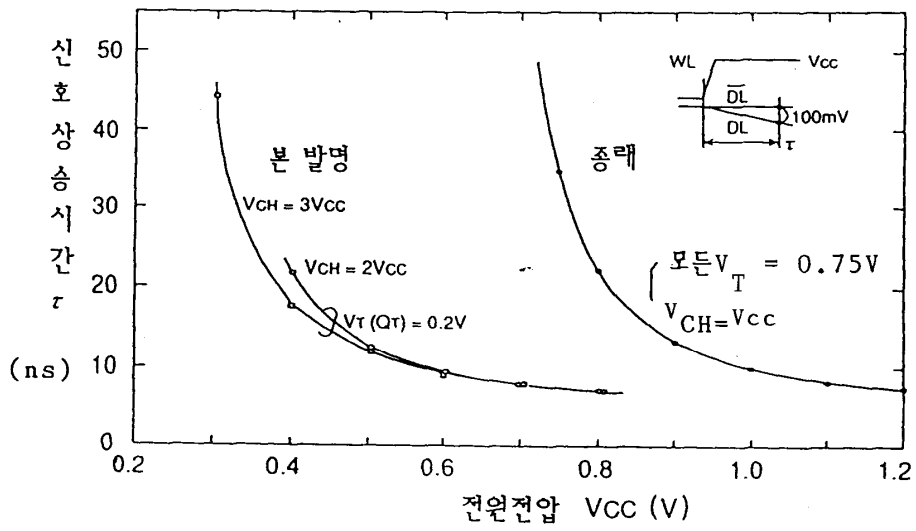
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