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10 - 0308193
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(43) 2001 01 15

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3 416

(72)

315 - 11 101

(74)

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(54) -

· 1 2 , 1 2 , ·

· 1, 2 3 ·

2 , 1 2 1

· - ·

DC , 가 가 ·

- 1 - ;
- 2 1 ;
- 3 1 ;
- 4 - ;
- 5 4 - ;
- 6 4 ;
- 7 5 ;
- 8 4 .

*

100 : 200 :

300 : 400 :

가 -

(mixed - mode system) 가 (analog - digital converter; , ADC) 가 , DVDP(digital video disk player) DBSR(direct broadcasting for satellite receiver) 가 가 CMOS (one chip) 가 (radio frequency signal; RF) ADC (RF) 100MHz(mega hertz) (medium resolution) 가 ADC

(type) ADC ADC ADC 가

ADC , ADC Andrew G. F. DINGWALL IEEE J, Solid - State Circuit, vol SC - 14, pp 926 - 932, December 1979 ADC (device) 가 , ADC

1 , ADC (10), (20) (30) .
 (10) 64 (R1, R2, ..., R63, R64) , 1
 2 (Vref_top, Vref_bot) 가 64 (Vref1,
 Vref2, ..., Vref63, Vref64) (20) (PA1, PA2, ..., PA63, PA64)
 , (Vin) (10) (Vref1, Vref2, ..., Vref6
 3, Vref64) (Vamp1, Vamp2, ..., Vamp63, Vamp64) .
 (30) (L1, L2, ..., L63, L64) , (20) (Vamp1, Vam
 p2, ..., Vamp63, Vamp64) (Vamp1, Vamp2, ..., Vamp63, Vamp64)
 (Dout1, Dout2, ..., Dout63, Dout64) . (30) (Dout1,
 Dout2, ..., Dout63, Dout64) 6 (bit) .

1 , ADC (Vin) (noise)
 (element parameter) (static offset) 가 ,
 (Vref, Vrefb) (Vin, Vinb) ,
 - (auto - zero function) ,
 (sampling capacitor) RC (RC delay time) 가
 , 100MHz ADC
 가 .

J. Spalding and D. Dalton 'A 200 MSample/S 6 b
 flash ADC in CMOS', ISSCC Dig. tech. Papers, Feb. 1996, pp 320 - 321
 가 - , ADC ,
 - , ADC

S. Tsukamoto 'A CMOS 6 - b 200 MSample/s 3V supply A/D conve
 rter for a PRML read channel LSI', IEEE J. Solid - State Circuit, vol. 31, no. 11, pp 1248 - 1257, Sep 1996
 가

, ADC
 (bandwidth) (slew rate)
 ability) (proragation delay time) (latching time) (metast
 , ADC AD
 가 1/2 , MHz
 ADC , ADC 가 CMOS
 (current driving ability) 10 20 MHz
 1 (20) (PA1, PA64) .

2a 3c , 1 (20) (PA1, PA32, PA64) 2a 2c
 가 (Vref1, Vref32, Vref64) (Vin) (Vamp1, V
 amp32, Vamp64) (PA32) 2b (Vref32) (V
 in) (PA1, PA64) 2a 2c (Vref1, Vref64)
 (Vin) (Vref1, Vref63) (Vin)
 ref63, Vref64) 'Vref1 Vref2 ... Vref63 Vref64' (Vref1, Vref2, ..., V

64) (PA1, PA64) 가 (PA1, PA (PA1, PA
 가 가 , (PA1, PA64) (Vin) (Vref64)
 (Vin)가 (positive) (swing) , (negative) 가 , 3b
 (PA1) (Vref1) , (Vref64) 가 ,
 (Vin)가 (Vref1) (Vin)가 (Vref1) ,
 (PA1, PA64) (PA1, PA64) (PA1, PA64) 가
 (Vamp1, Vamp64) 가 가 가가 가
 가 가 가 가 가
 ADC 가 가 가

가 -
 ()
 -
 1 2 , 1 2 , 1, 2 3 , 1, 2
 3 , 1 2 , 1 2
 , 1 , 1 2 , 1 2
 1 , 1 2 , 1
 2 1 , 2
 3 , 1
 , 1 1 2 , 1

1 . 2 1 2 1 2

1 , 1 1, 2, 3 4 . 1
1 . 2 1 1 2
3 2
4 1

2 , 2 5, 6 7 8 . 5
6 1 1 2
7 1
8 1

1 2 . 1 1
1 2 . 2 1
3 4 .

1 , 1 1 2 , 1 , 9 10
1 . 2 3 4
2 1 2 1 2 1 1 1
2 1 2 9 1 1
10 1 1 1 1 2
2 .

2 3 4 , 2 , 11 12
3 5 6 7 8
4 4 2 3
4 1 2 3 4 2 3



()

가

가

가

()

4 8

4, (300), (400), (100), (200), (Vref_top, Vref_bot, Vref_topb, Vref_botb), (100), (Vref1, Vref2, ..., Vref63, Vref64), (200), (QL), 1, 2, 3, (Q1, Q1b, Q2, Q2b, Q1P, Q2P), (200), (PA1, PA2, ..., PA31, PA32), 1, 2, (Vref1, Vref2, ..., Vref63, Vref64, Vref1b, Vref2b, ..., Vref63b, Vref64b), 1, 2, (Vin, Vinb), (Vamp1, Vamp2, ..., Vamp31, Vamp32, Vamp1b, Vamp2b, ..., Vamp31b, Vamp32b), (400), (300), (Vamp1, Vamp2, ..., Vamp31, Vamp32, Vamp1b, Vamp2b, ..., Vamp31b, Vamp32b), (300), (PA1, PA2, ..., PA31, PA32), DC, (400), (300), (Vamp1, Vamp2, ..., Vamp31, Vamp32, Vamp1b, Vamp2b, ..., Vamp31b, Vamp32b), 가, 가.

4, 5, (200), (300), (400), (100), (100), 1, 2, (110, 120), 1, (110), (R1, R2, ..., R63, R64), 가, (Vref_top, Vref_bot), (Vref1, Vref2, ..., Vref63, Vref64), 2, (120), 1, (110),

(Vref_topb, Vref_botb) 가
 (Vref1b, Vref2b, ..., Vref63b, Vref64b)

(300) (200) (Q1, Q1b, Q2, Q2b, Q1P, Q2P) .
 (pre - amp; PA1, PA2, ..., PA31, AP32) , (20
 0) (Q1, Q1b, Q2, Q2b, Q1P, Q2P) (Vin, Vinb)
 (100) (Vref1, Vref2, ..., Vref63, Vref64, Vref1b, Vref2b, ..., Vref6
 3b, Vref64b) (Vamp1, Vamp2, ..., Vamp31, Vamp32, Vamp1b, Vamp2b, ..., Vamp3
 1b, Vamp32b) (400) (300) (Vamp1, Vamp2, ...,
 Vamp31, Vamp32, Vamp1b, Vamp2b, ..., Vamp31b, Vamp32b)
 (Dout1, Dout2, ...,Dout63, Dout64)

6 , (300) (310) 1 (311), (312), 2
 (313) (314) . 1 (311) (S1, S2, ..., S7,
 S8) (S1) (Vref) (312)
 (C1) (S2) (Vin) (C1)

(S3) (Vinb) (312) (C2)
 (S4) (Vrefb) (C2)
 (S5) (Vref) (312) (C3)
 (S6) (Vin) (C3)
 (S7) (Vinb) (312) (C
 4) (S8) (Vrefb) (C4)

(312) (C1, C2, C3, C4), (A1, A2) (S9, S10, S11, S12)
 (C1) (S1, S2) , (A1)
 1 (C2) (S3, S4) ,
 (A1) 2 (C3) (S5, S6)
 8) (A2) 1 (C4) (S7, S
 (A2) 2

(A1) 1 (C1) , 2 (C2)
 , 1 (313) (S13) 2
 (313) (S14) (A2) 1 (C3)
 , 2 (C4) , 1 2 (313)
 (S15) 2 2 (313) (S16)

(S9) (A1) 1 (A1) 1
 (S10) (A1) 2 (A1) 2
 (S11) (A2) 1 (A2) 2
 (S12) (A2) 2

2 (313) (S13, S14, S15, S16, S17) (S13)
 (A1) 1 (314) (SA) 1
 (S14) (A1) 1 (SA) 2
 (S15) (A2) 1 (SA)

(S16) (A2) 2 (SA) 2
 (S17) (SA) 1 (SA) 2
 (314) (SA) 1
 (S13, S15) (SA) 2
 (L) 1 (S4, S16) 2
 (L) 2

, 4 8 , -

, 4 8 , -

(100) (110, 120) (Vref_top, Vref_bot, Vref_topb, Vref_botb) 가 1 2 (Vref1, Vref2, ..., Vref63, Vref64) 2 (Vref1b, Vref2b, ..., Vref63b, Vref64b) 1

(200) (Q1, Q2, Q1b, Q2b, Q1P, Q2P, QL)
 (300) (Q1, Q2, Q1b, Q2b, Q1P, Q2P, QL)
 1 2 (Vref1, Vref2, ..., Vref63, Vref64, Vref1b, Vref2b, ..., Vref63b, Vref64b)
 (Vin, Vinb) (Vamp1, Vamp2, ..., Vamp31, Vamp32, Vamp1b, Vamp2b, ..., Vamp31b, Vamp32b) (400) (300)
 (Vamp1, Vamp2, ..., Vamp31, Vamp32, Vamp1b, Vamp2b, ..., Vamp31b, Vamp32b)
 (Dout1, Dout2, ..., Dout63, Dout64)

PA31, PA32) (300) (400) DC (300) (PA1, PA2, ..., 가
 (PA1, PA2, ..., PA31, PA32) 가

6 7 (300) (PA) (Vin, Vinb) (V
 ref, Vrefb) (300) (400) DC (200)
 (Q1, Q1b, Q2, Q2b) (311) (Vin, Vinb)
 (100) 1 2 (Vref, Vrefb) (312)

7 (Q1, Q2b) (Q1b, Q2)
 S8) (311) (S1, S4, S6, S7) (S2, S3, S5,
 (C2) (312) (C1) (Vref) 가
 (C4) (Vrefb) (Vinb)가 (C3) (Vin)가
 Vref, Vrefb) (C3, C4) (C1, C2) (Vin, Vinb)

(312) (S9, S10) (Q1b)가 가 ,
 (S11, S12) (Q2b)가 가 (S9, S10) -
 (A1) 1 2 1 2 (S11, S12) -
 (A2) 1 2 1 2

(A1) 1 2 (C1, C2) (Vref, Vr
 efb) (A1) DC {Vref - Vos1, Vrefb - Vos1b; , Vos1 (A1)
 1 DC , Vos1b (A1) 2 DC } 가 .
 (A2) 1 2 (C3, C4) 가 (S11, S1
 2) (Vin, Vinb) 가 (A2)

(Q1, Q2b) (Q1b, Q2)
 S7) (311) (S2, S3, S5, S8) (S1, S4, S6,
 C2) (312) (C1) (Vin)가 (Vref)
 (C4) (Vinb) (Vrefb)가 (C3) (C1, C2)
 (Vin, Vinb) (C3, C4) (Vr
 ef, Vrefb)

(312) (S9, S10) (Q1b)가 가 ,
 (S11, S12) (Q2b)가 가 (S9, S10) -
 (A1) 1 2 1 2 (S11, S12) -
 (A2) 1 2 1 2

efb) (A2) 1 2 (C3, C4) (Vref, Vr
 1 DC (A2) DC {Vref - Vos2, Vrefb - Vos2b; , Vos2 (A2)
 2) (A1) 1 2 (C3, C4) (S11, S1
 (Vin, Vinb) 가 (A1)
 (A1, A2) (Q1, Q1b, Q2, Q2b) -

가 (C1, C2) (A2) 1 2 (Vin, Vinb)
 (A1) 1 (Vin - Vref - Vos1) 2
 (Vinb - Vrefb - Vos1b) (A2) 1 2
 (Vin - Vref - Vos1, Vinb - Vrefb - Vos1b) {Vamp, Vampb; , Vamp= (
 Vin - Vref - Vos1), Vamp= (Vinb - Vrefb - Vos1b) (SA) .}

(A1) (Vamp, Vampb) (Q1P)
 (S13, S14) (314) (S15, S16)
 (Q2P) (314) (SA)
 (A1) (S13, S14) (Vamp, Vampb) {Va
 mp', Vampb'; , Vamp' = (Vin - Vref - Vos1), Vampb' = (Vinb - Vrefb - Vos1b) (A1)
 .}

(A32) 2 (313) (S17) (, 300MHz) 가
 (QL) (314) (Vamp'64)가 8 가 5 (P
 (Vref64)
 가 (400) (L)

(Vref64) (SA) 1 2 (S17)가 (QL)
 (Vamp'64)
 (314) (Vamp64', Vampb64')
 (400) (410, L64) (Dout64)
 (ROM) (400) (Dout1, Dout2, ..., Dout63, Dout64)
 (Dout1, Dout2, ..., Dout63, Dout64)
 6

(A1, A2) (PA) (A1, A2) - (S17)가
 (Vamp, Vampb) 가 (QL)
 (Dout)가 가

가 , 가 , 가

, 가 ,

가 , 가 가 .

(57)

1.

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1, 2 3

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1 2 , 1, 2 3 ;

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1 2 , 1 , 1 2

1 , 1 2 ,

2 3 ,

2

2.

1 ,

1 ,

1
2 1 , 1

2
2 2 1

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3.

2 ,

1 ,

1 1 , 1

1 ,

1 2

2 ,

2 3 ,

1 4

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4.

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2 ,

2 1

5 ,

1 2

6 ,

2 7 ,

1 8

- .

5.

1 ,

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1

1 2 1 ,

1

3 4

2

- .

6.

5 ,

1 ,

1 2 1

1 ,

3 4 2 2 ,

1 2 1 2 1 2 1 2 ,

1 9 1 1 1

1 10 1 2 2

7.

5 ,

2 ,

5 6 3

3 ,

7 8 4 2 ,

3 4 1 2 2 3 4 3 4 ,

2 11 2 1 1

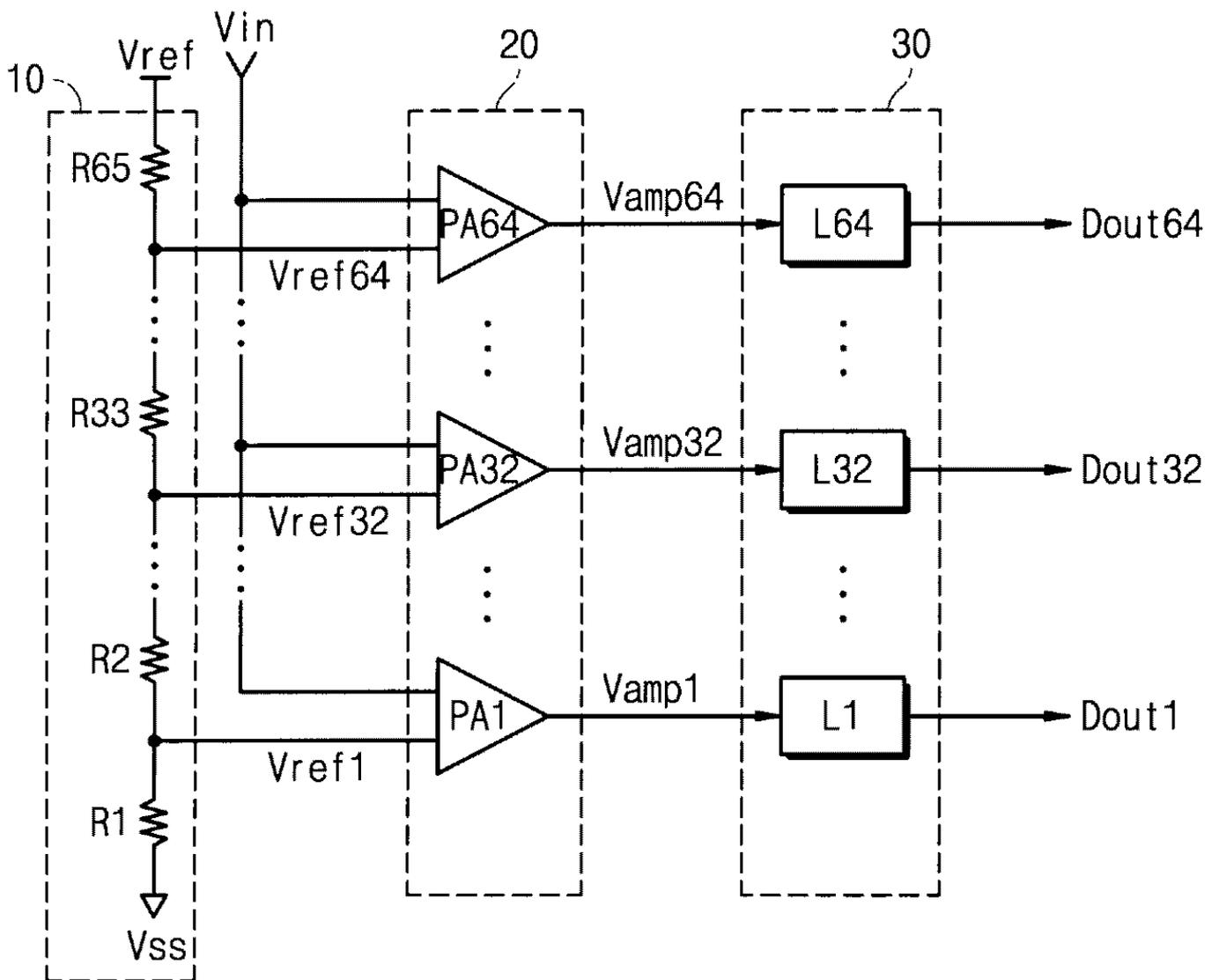
2 12 2 2 2

8.

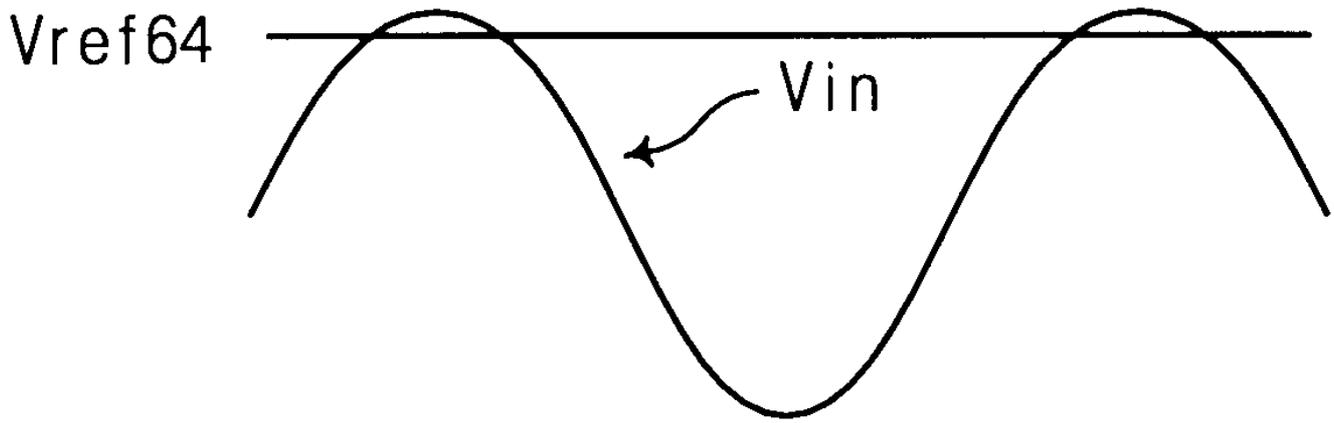
1 ,

2 ,
 3 1
 13 ,
 1 14 ,
 3 2
 15 ,
 2 16 ,
 13 15 14 16
 17

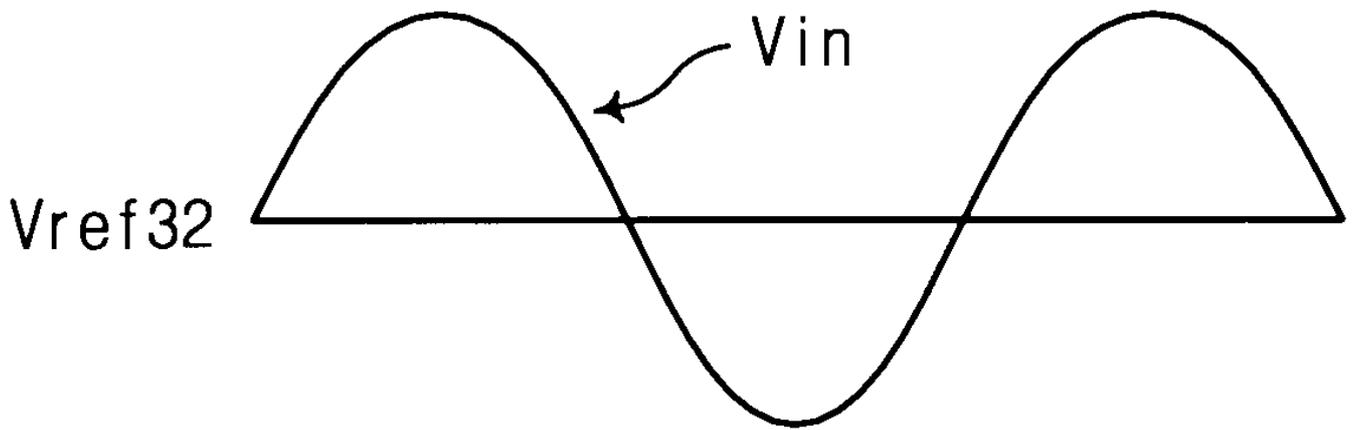
1



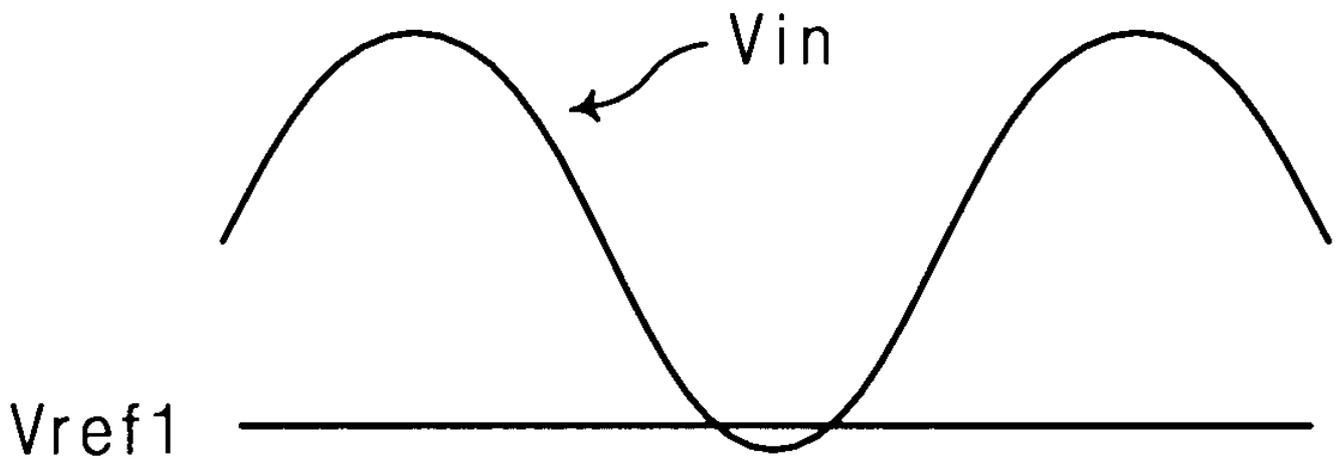
2a



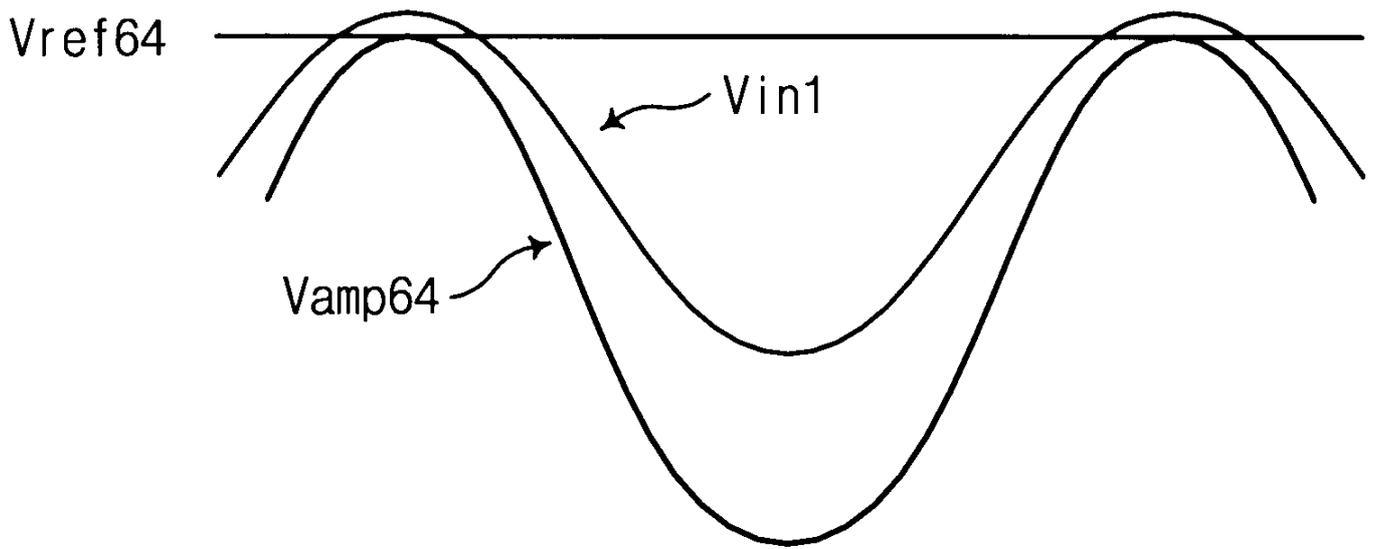
2b



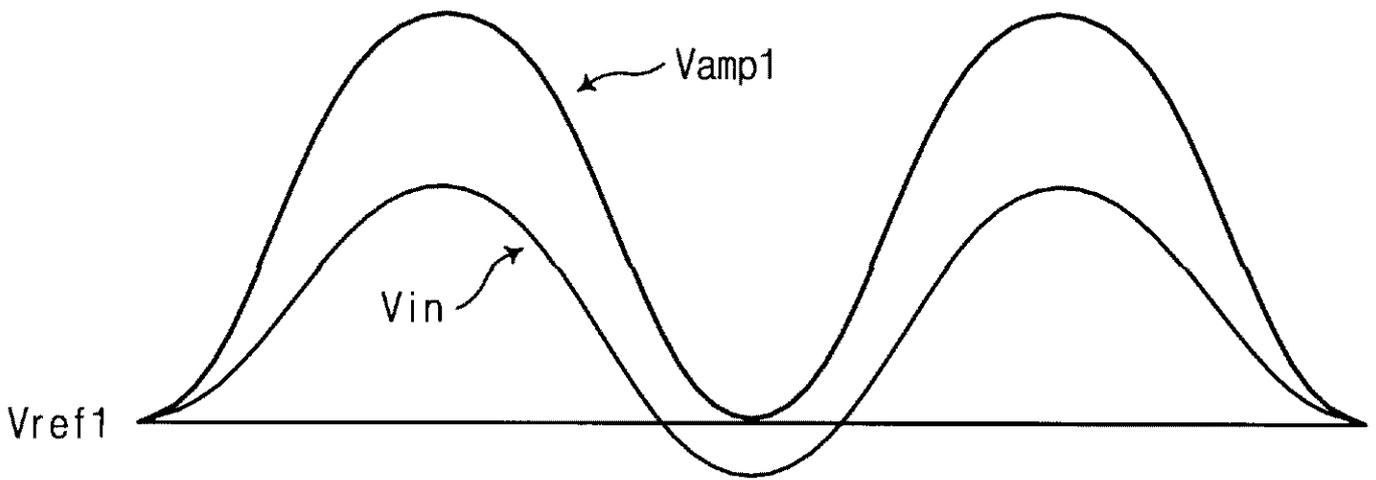
2c

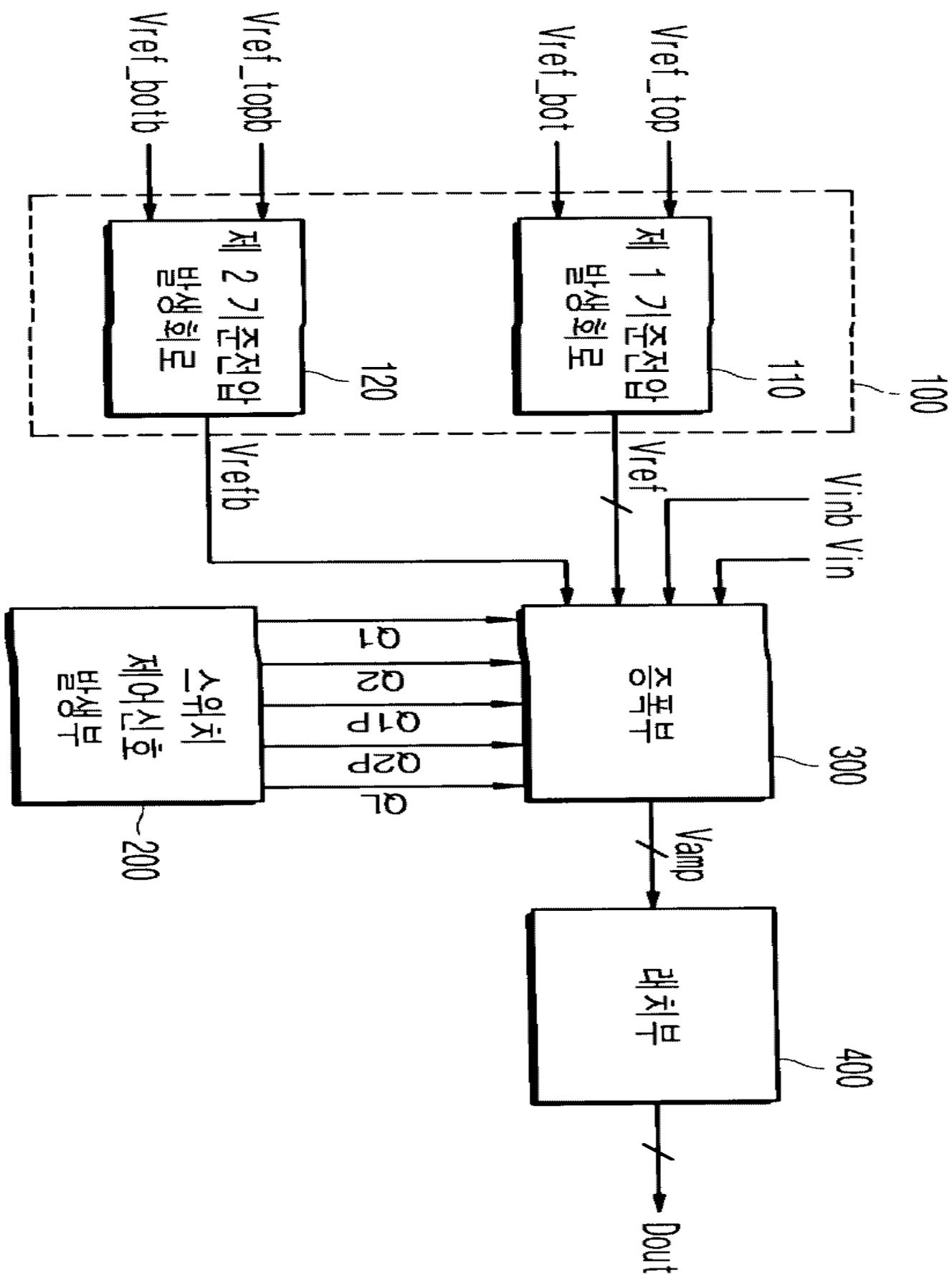


3a

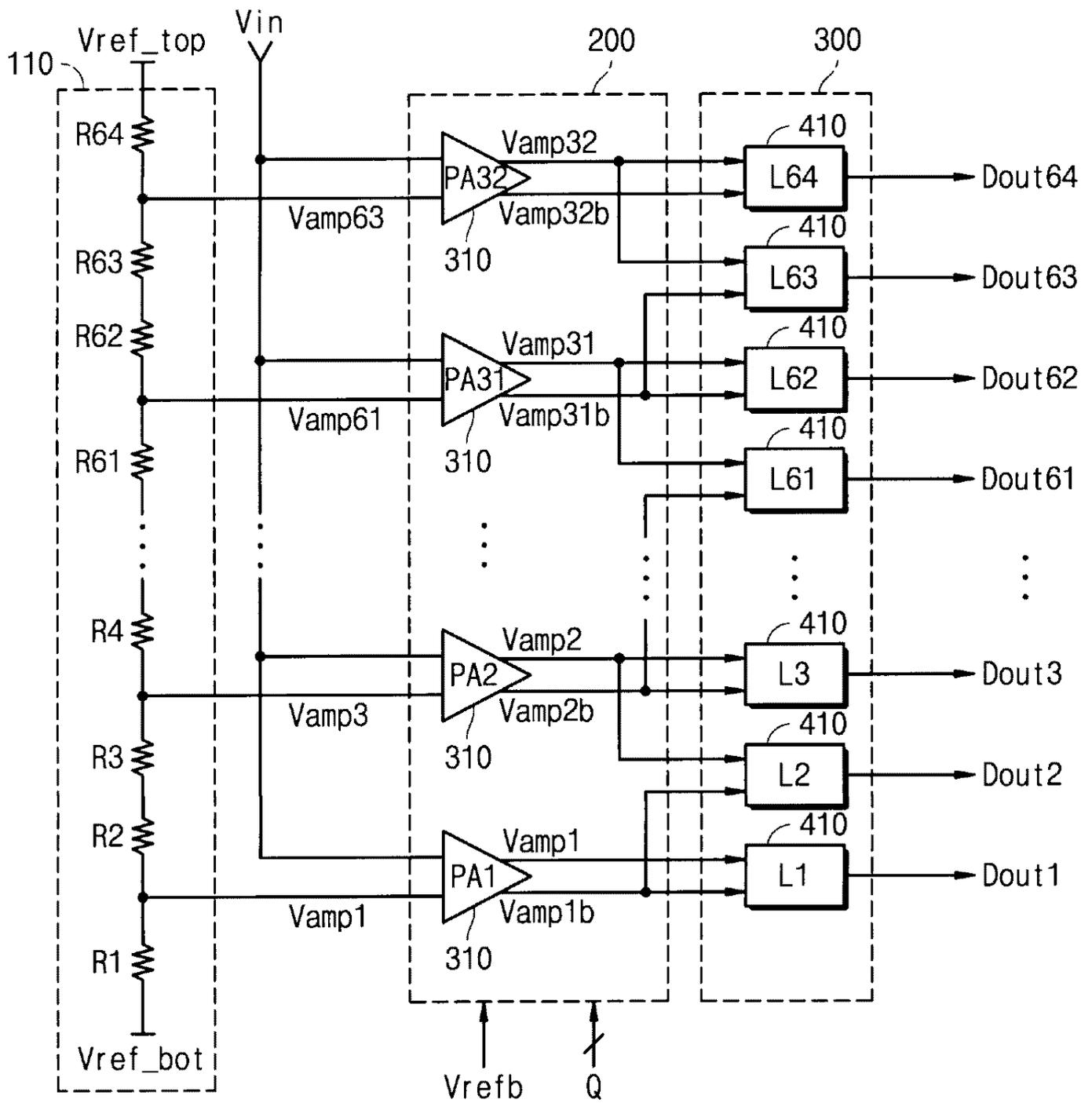


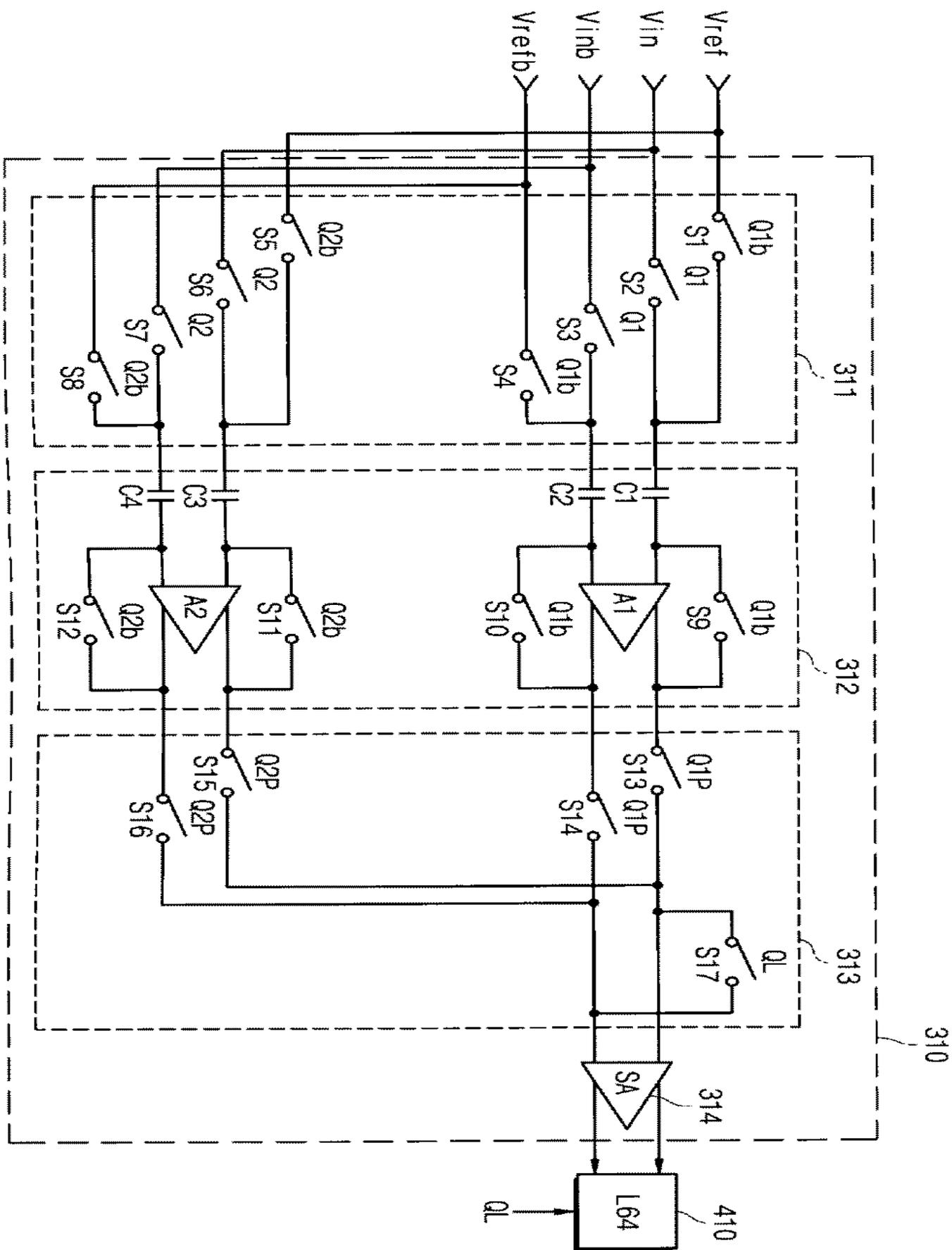
3b



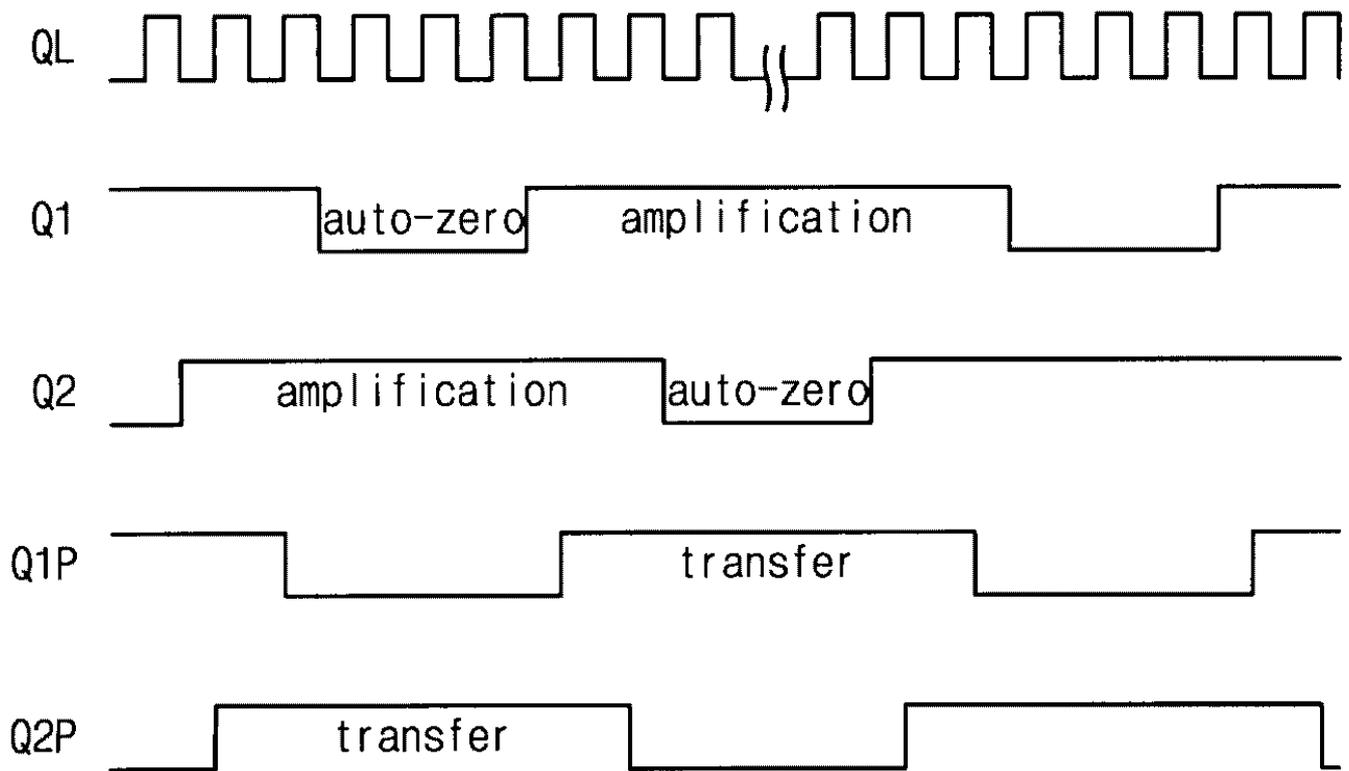


5





7



8

