

(19) (KR)
(12) (B1)

(51) 。 Int. Cl. ⁷ (45) 2003 02 11
H03D 7/18 (11) 10 - 0371876
(24) 2003 01 28

(21) 10 - 2000 - 0011599 (65) 2001 - 0006759
(22) 2000 03 08 (43) 2001 01 26

(30) 1999 - 61440 1999 03 09 (JP)
(73) 가 가 1 1 1
(72) 가 가 5 - 1 - 106
가 가 9 - 19 - 1 - 421
가 가 가 1781 - 3 가 - - 407
가 가 가 6 - 27 - 15

(74)

:

(54)

(LO) (1) (2) (3) (1) (RF)
(2) (1) (3)
(4)가 (4) (2) 가

1a

1a

1b

2 1a

3 4

5 7
,

8 7

9 13

14 15

16 15

17 18

19 2

가

20 19

가

21

22 21

23

24

가
 「Ken Leong Fong, Chistopher Dennis Hull, and Robert G, Meyer IEEE J.Solid - State Circuit, vol.32, No.8, AUGUST 1997, p.1166, "A Class AB Monolithic Mixer for 900 - MHz Application"(1)」가

23 1 (Q101,Q102,Q103) (乗算回路;multipl
 ying circuit) (Q102,Q103) RF() LO()
 IF() 가 (L101, L102) (C101, C102) 2 LC
 (R100,R101,R102) 가 (50)

, PHS(personal hand - phone system) GSM(global system for mobi
 le communication) kHz CDMA(code division multiple access)
 OFDM(orthogonal frequency division multiplex) MHz

200MHz IF

23

23 , LC 가 Q
 가 , S/N Q

(Q102,Q103) 24 (CS104,CS105)
 (Q104,Q105) IF (Q101,Q102,
 Q103) (R101, R102)

24 (Q102,Q103) IF
 LO 가 (Q104,Q105)

LO (duble balancing mixer)가 , LO
 가 , LO 2 가 24 가 , LO

, S/N

가

S/N

가

(差異)

1 ,

가

2 ,

1 2

1 2

1 2

1 2

1 2

가

1 2

가

1 2LC

1 2LC

1a

(1) (2)

(3)

(1)

(RF)

(LO)

(1) (V_{cc} ;)

(3)

(2)

(2)

(4)

(3)

(4)가

(1)

(4)

()

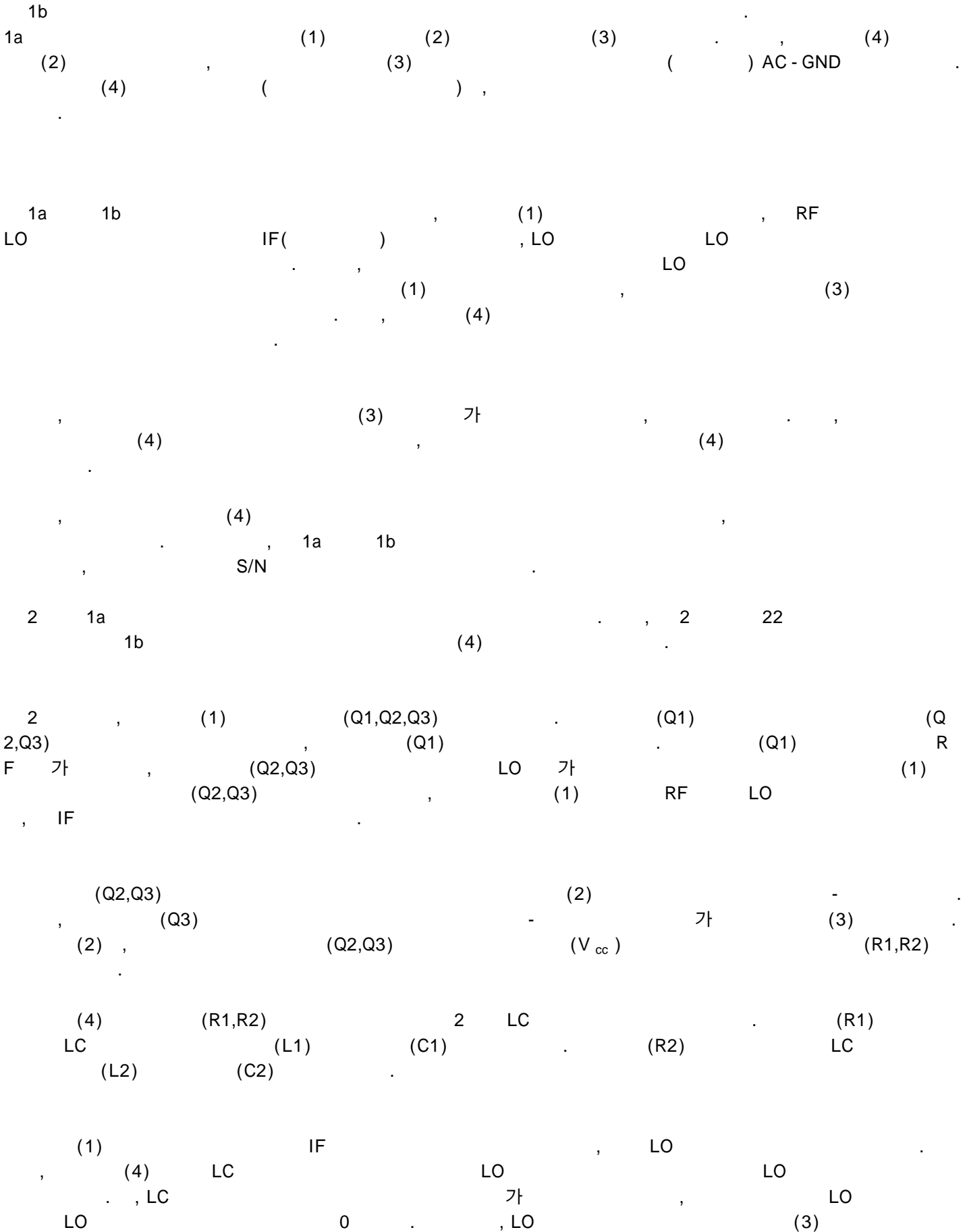
) ,

()

가

(谷値)

(3)



(3) (Q4)가 LO

(3) (1) LO (3)

2 PNP MOS, V_{cc} 2 NPN 2

1a 1b 3 4

(1)

3 (Vb) RF 가 가 IF (Q5) 2 (Q1) (CS5) (Q5) RF (Q5) LO

4 RF (Q11,Q12) LO 가 (Q11~Q16) (CS10) (Q13,Q14) (Q13,Q14) (Q11,Q12) (Q15,Q16) (Q15,Q16)

RF (Q13,Q15) LO LO (Q14,Q16) IF 4

5 6 7 (2) (4) 5 ((

R1) (L1) (C1) LC 가 6 (2) (

(L2) (C2) LC 가 7 (L1) (R)

(C1) LC (L2) (C2) LC 가 (R)

5 6 7 (1) (1) (1)

가 (V_{cc}), AC - GND 2 4 IN)가 (1) (1)

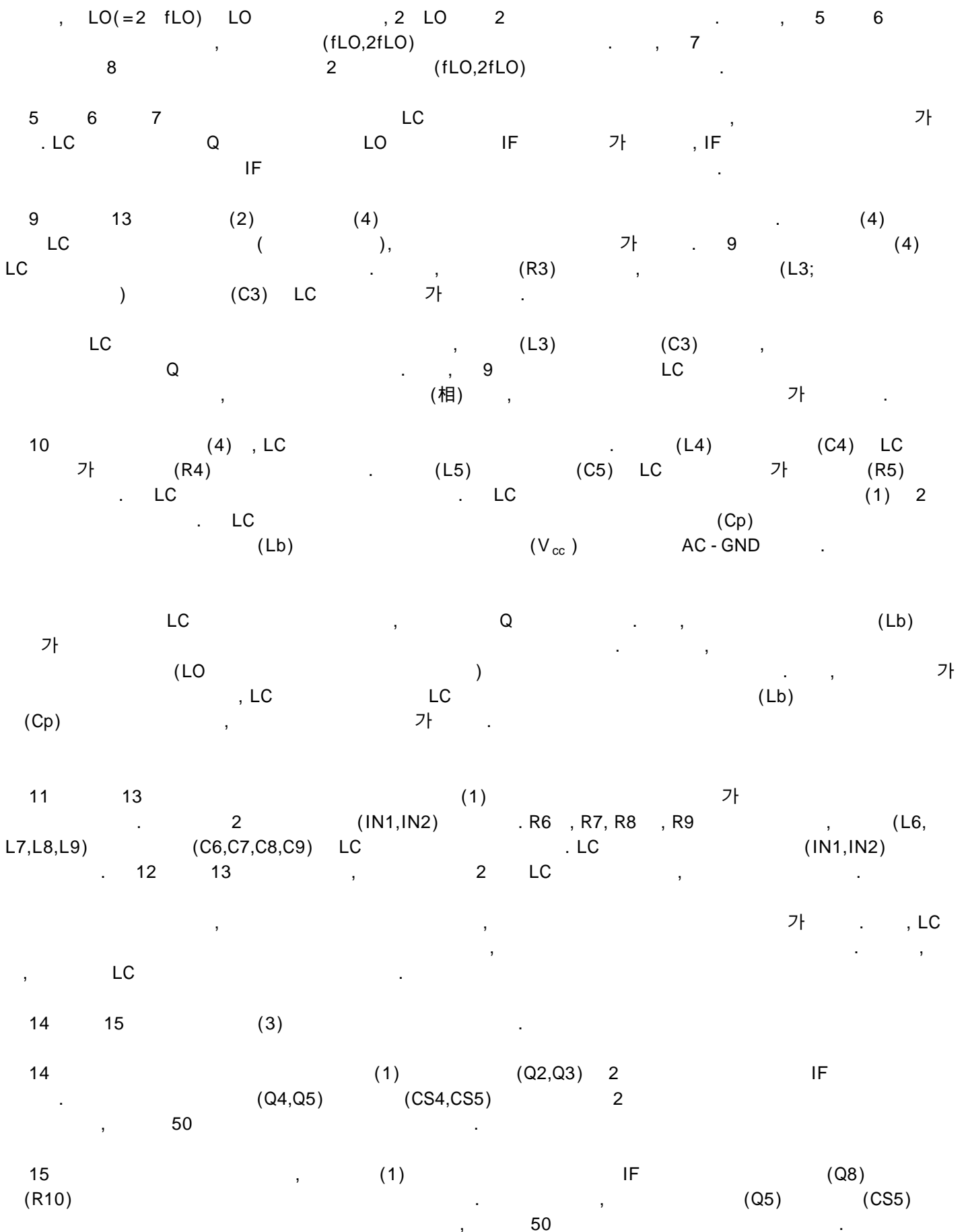
(1) 2 (1) (+, -) 2

AC - GND

5 6 7 L1 C1 C2 (1) (2)

LO=1/(L1 · C1)^{1/2} ... (1)

2 $LO=1/(L1 \cdot C1)^{1/2} \dots(2)$



16 , LO IF IF 가 LC Q 가 ,
 , , , .
 , (trans - impedance amp) (3)
 . , (1) 16 , IF

17 18 (3)

17 (Q6) (Q6) , (Q6) (CS6),
 (R12) 가 (R11) , (Q6) (V_{cc}) (Q6)
 (Q4)

18 (Q6) , 17 (R11) ,
 (Q6) (Vb) 가 . (Q4) (1)
 , (1) 2 .
 , 2 ,

17 18 , ,
 16 (2) 가 . (1) ,
 , 17 (R11) , 18 (R12) .
 , 16 (R) ,
 . , (4) ,
 , (3) , (3) 가 가

19 22 .
 2 , (Q3)
 . , (2,4) 가 19 LC
 . , 19 (1) 2 (R1,R2) , R L C
 . , 19 C (L1,L2) (C1,C2) ,

19 LC , (3) .

$$Z_{LC} = j\omega \left\{ \left(\omega^2 LC - 1 \right) / \omega C \right\} \dots (3)$$

, J , .

LC
) (R) LC 가
 (4)

$f_0 (= 1/2 (LC)^{1/2})$
 , f0
 19

$Z_{LCC} = R[(1 + j R[C(1 - 2LC) - 1 + C^{-1}] - 1)]^{-1} \dots (4)$

$f = f_0 = 1/2 (LC)^{1/2}$
 $f = f_1 = f_0(1 + C/C)^{1/2}$
 , 가 (R)

20 19 (C)
 (4) LC LO
 LO

(f1) (C) , LO (=)
 가 , LO (f1)가 LO

21 (V_{cc}) (R1,R2) (C21,C22)가 (Q2,Q3)
 (5)

$f_2 = f_0 \{1 + C/(C + C')\}^{1/2} \dots (5)$

, C LC (C1,C2) , C' 가 (C21,C22)

(C21,C22) f1 f2 (C21,C22)
 (f2)가 LO 가 가

(C21,C22) IF (C21,C22) , IF
 , 1/2 R · C21fIF, 1/2 R · C22fIF

(C21,C22)² , LO (C21,C22)² , LO

22 (C21,C22) LO 2 (2fLO)
 가 , 3

S/N 가

1.

,

,

,

,

가

.

2.

1 , LC , LC

.

3.

2 , , LC

.

4.

3 ,

.

5.

C 2 , 1 2 1 2LC 1 2 , L

.

6.

5 , 1 2LC

.

7.

2 LC , 1 2 1 2 ,

.

8.

7 , LC 1 2LC ,

1 2LC

.

9.

7 , LC 1 2LC ,
1 2LC .

10.

1 , .

11.

1 , 2 가 2 .

12.

11 , 2 .

13.

11 , 1 2LC , 1 2LC
2

14.

1 , .

15.

14 , .

16.

2 , LC .

17.

2 , LC .

18.

1 2 ,
1 2 ,

1 2 1 2 ,

,

1 2 ,

가

1 2
가

1 2LC

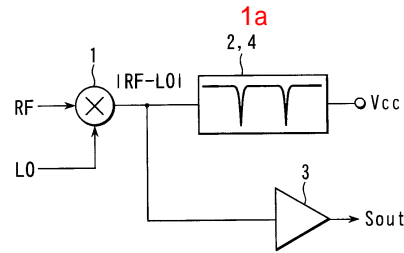
, 1 2LC

19.

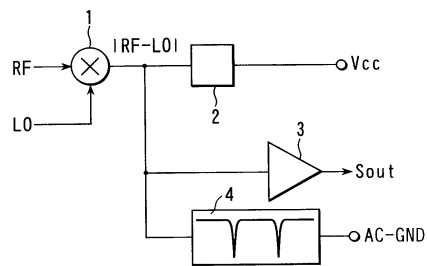
18 , 1 2LC

20.

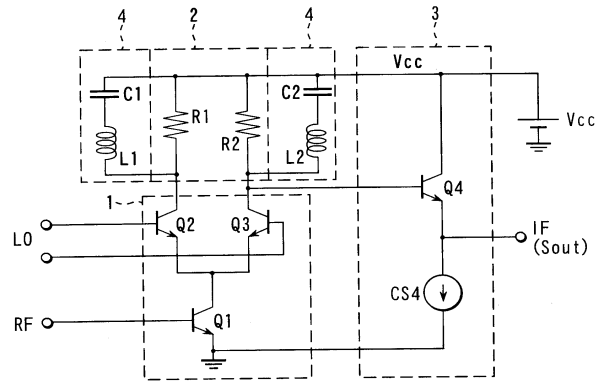
18 , 1 2 , 1 2LC 1
2



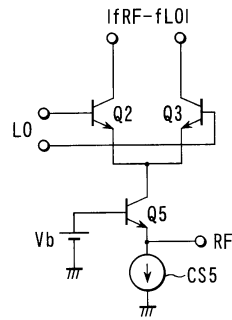
1b



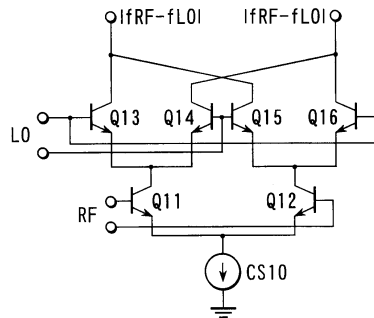
2



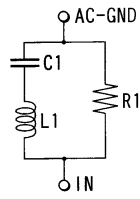
3



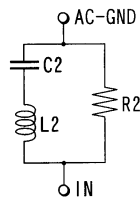
4



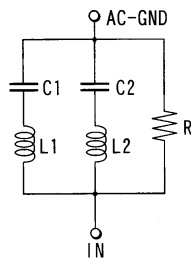
5



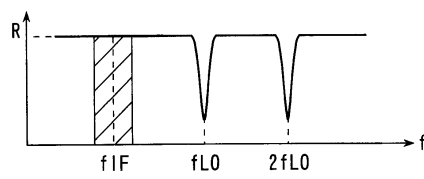
6



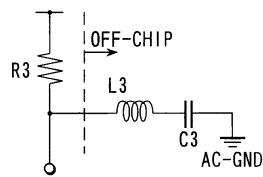
7



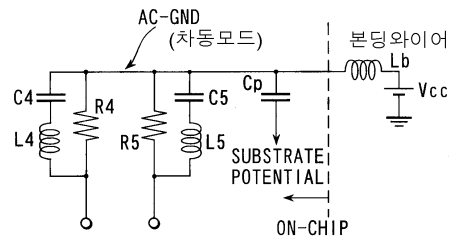
8



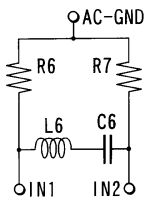
9



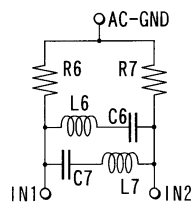
10



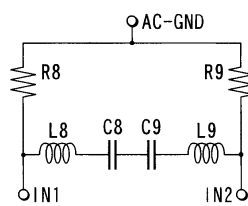
11



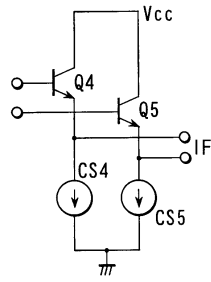
12



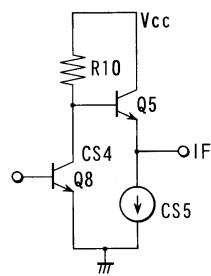
13



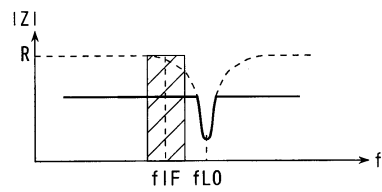
14



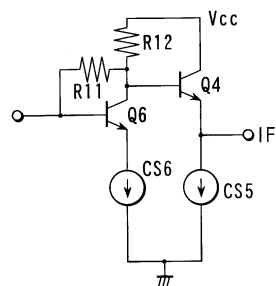
15



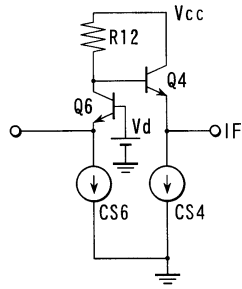
16



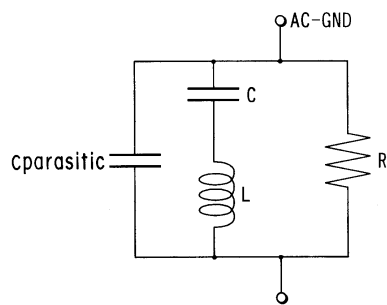
17



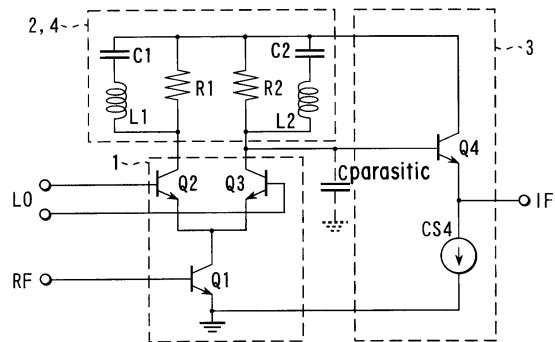
18



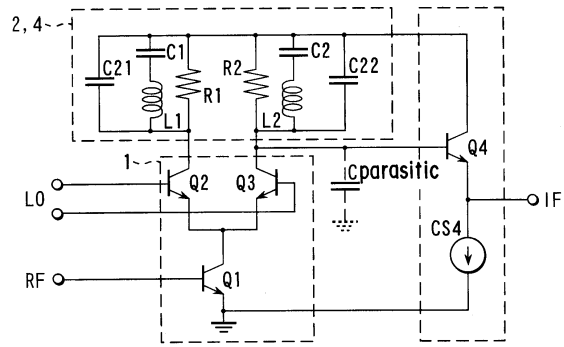
19



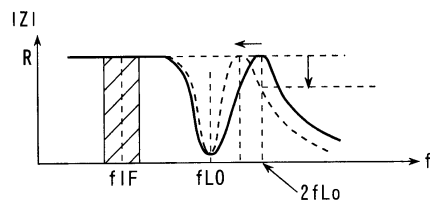
20



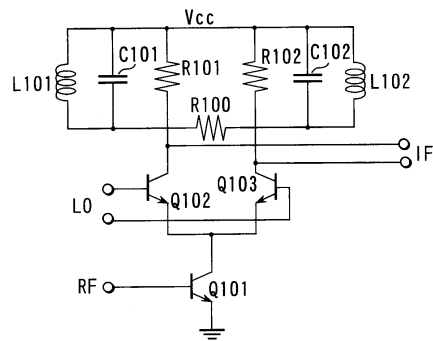
21



22



23



24

