.....2

.....6

.....13

.....17

.....22

2 8

1 ئي

1) 6

5Hz 2400MHz

100mV

4 5 FM

5 7

6 8

7 9

AM FM

8 10

1

2

3

525KHz 1605KHz

525KHz 1605KHz 465KHz

10MHz 15MHz 4.5MHz 200KHz

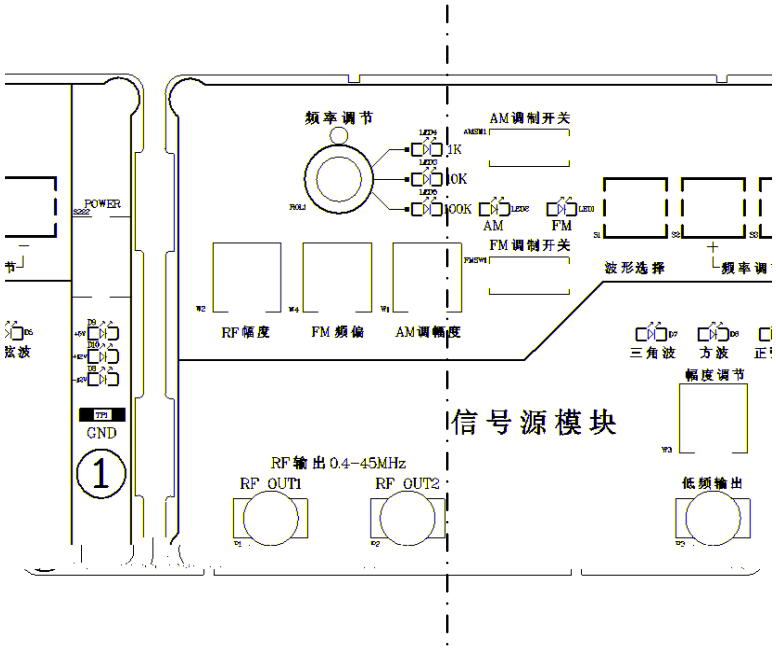
40KHz 4MHz

FM 88MHz 108MHz 10.7MHz

4

5

1



“ POWER ”

1KHz 10KHz 100KHz 1MHz “ ”

1KHz 10KHz 100KHz 1MHz

“ ” “ ”

“ ”“ ”

“ RF ” “ ”

“ FM ” “ ON ” “ FM ”

“ FM ” “ OFF ” “ FM ”

“ AM ” “ ON ” “ AM ”

“ AM ” “ OFF ” “ AM ”

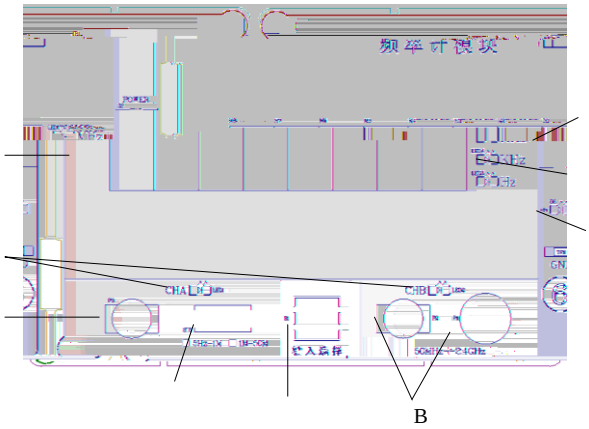
“ FM ” “ AM ”

“ RF OUT1 ” “ RF OUT2 ” 400KHz 45MHz

“ RF OUT1 ”

“ RF OUT2 ” “ ” 200Hz 10KHz

2



8

100 “ Hz ” 100Hz A B “

” A 5Hz 50MHz SW1

5Hz 1MHz 1MHz 50MHz

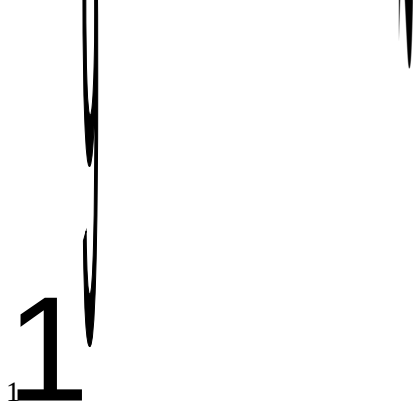
SW1 B BNC P1

1

2

3

4 ( )



1

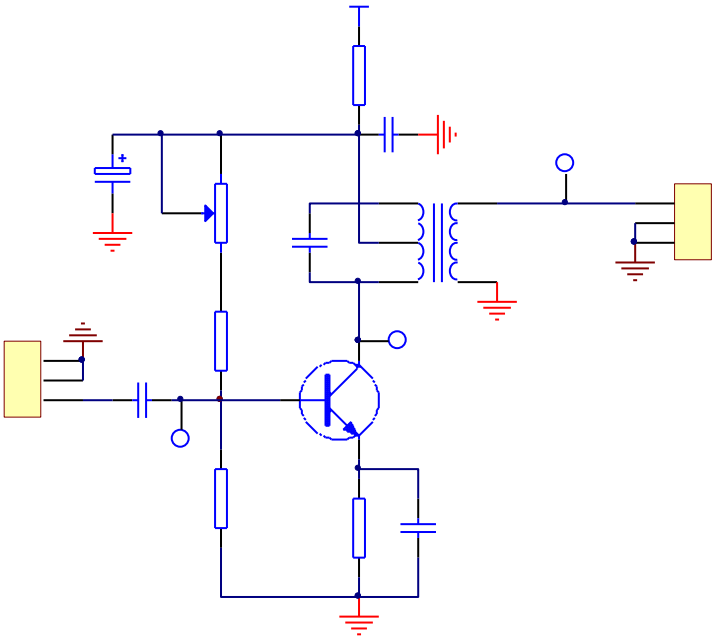
2

3

f_0

T

f_0



1-1

2

A_{V0} A_{V0}

$$A_{V0} = -\frac{V_0}{V_i} = \frac{-p_1 p_2 y_{fe}}{g_\Sigma} = \frac{-p_1 p_2 y_{fe}}{p_1^2 g_{oe} + p_2^2 g_{ie} + G}$$

g_Σ y_{fe} $v_0(t)$

$v_i(t)$ 180° $180^\circ + \varphi_{fe}$ V_0 V_i

A_{V0} 1-1 V_0

V_i A_{V0}

$A_{V0} = V_0 / V_i$ $A_{V0} = 20 \lg (V_0 / V_i)$ dB

3

A_V

A_{V0} 0.707 BW

$BW = 2 f_{0.7} = f_0 / Q_L$

Q_L

A_{V0} BW

$$A_{V0} \cdot BW = \frac{|y_{fe}|}{2\pi C_{\Sigma}}$$

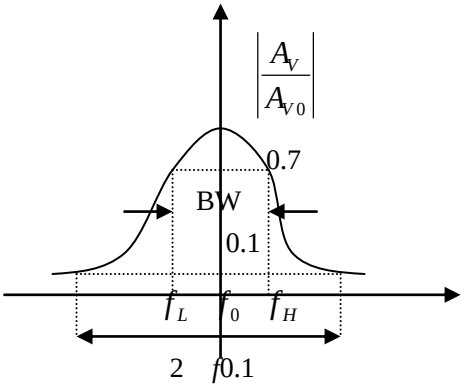
y_{fe} C_{Σ} A_{V0} BW

BW

f_0 A_{V0}

1-2

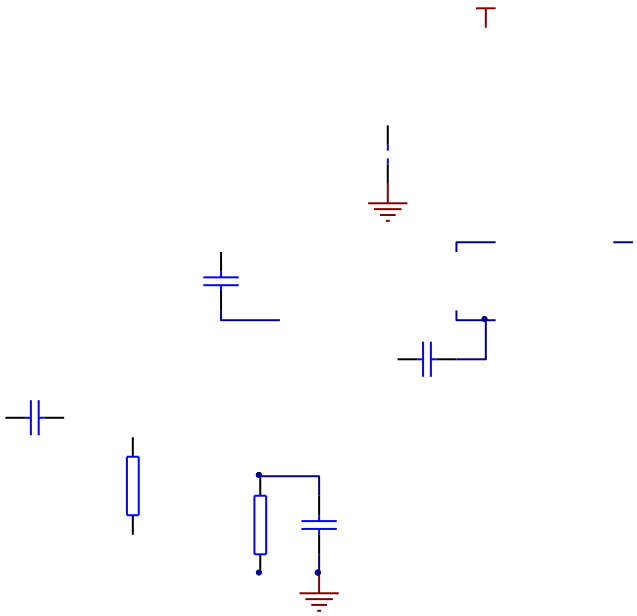
$$BW = f_H - f_L = 2\Delta f_{0.7}$$



y_{fe}

C

1-2



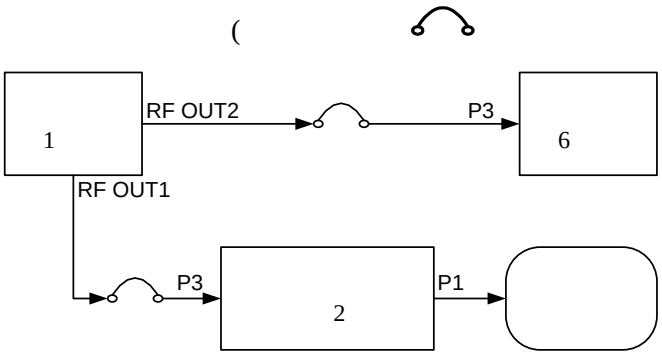
1-3

1 $$A_{V0} = -\frac{V_0}{V_i} = \frac{-p_1 p_2 y_{fe}}{2g}$$

2

$$BW = 2 \quad f_{0.7} = \sqrt{2}\, f_0/Q_L$$

1 ( )



1-4

1-1

1 RF OUT1 $V_{i(p\text{-}p)}$ = 200mV fs = 10.7MHz	2 P3	
1 RF OUT2	6 P3	

P-P peak

2

1 TP3 200mV 10.7MHz

2 W1 TP1 TP1

3

TP3

TP1

A_V

1-2

f_i MHz	10.7MHz			
$V_{i(p\text{-}p)}$ mV TP3	100	200	300	400/500
$V_{o(p\text{-}p)}$ TP1				
A_V				

4

TP3

TP1

1 RF OUT1 $V_{i(p\text{-}p)}$ = 150mV f = 465KHz	2 P5	
1 RF OUT2	6 P3	

2

1 TP6 150mV 465KHz

2 W1 T2 T3 TP7

3

TP6

TP7

A_V

1-5

fs KHz	465KHz			
$V_{i(p\text{-}p)}$ mV TP6	100	150	200	250
$V_{o(p\text{-}p)}$ TP7				
A_V				

4

TP6

TP7

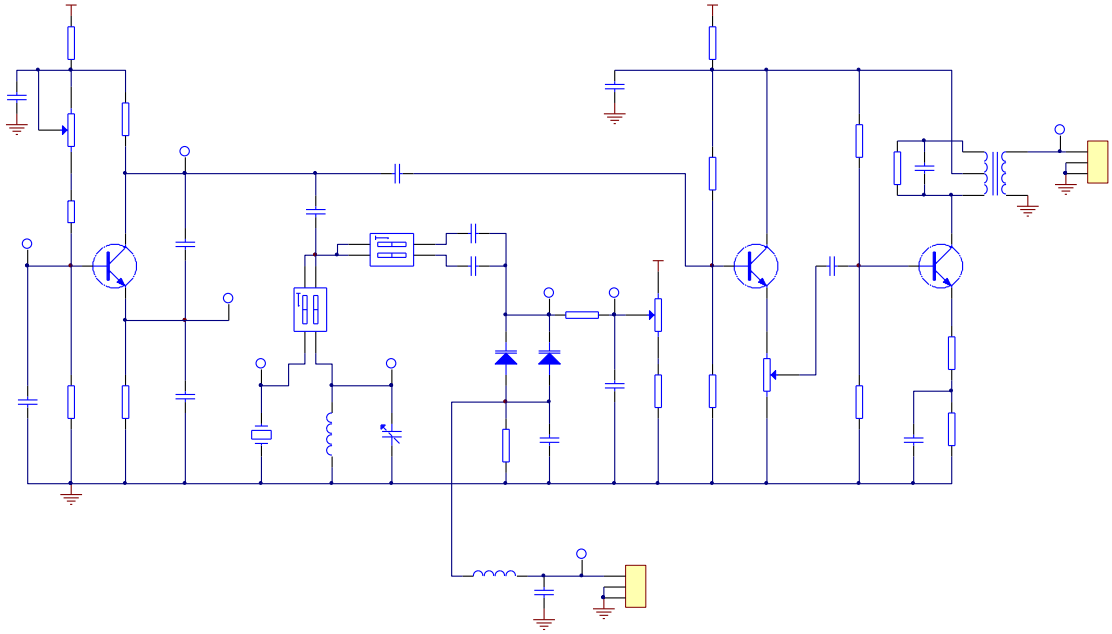
-

1-6 -

$V_{i\ p\text{-}p}$ mV TP6	150mV							
fs KHz	435	445	455	465	475	485	495	505
$V_{o(p\text{-}p)}$ TP7								
A_V								

1

2



2-1 4.5MHz

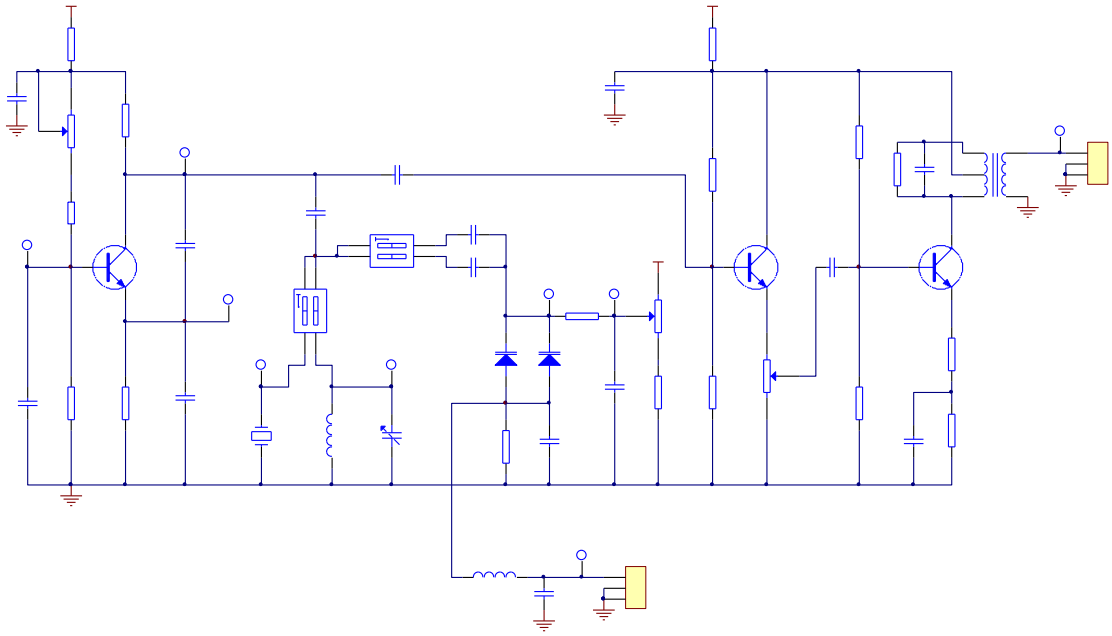
3

2 S2 “ 00 ” S1 “ 10 ” N1 C3 C10 C11 CRY1 C4

3 LC S2 “ 10 ” “ 01 ” S1 “ 01 ” D1 D2 L1

W2 D1 D2 D1 D2 C_j

4 S2 “ 10 ” “ 01 ” S1 “ 10 ”



2-2 4.5MHz

1 2-1

2

1 S1 “ 01 ” S2 “ 00 ” LC

2 W1 N1 I_{eo} ($=\frac{V_e}{R_{11}}$ R_{11}=1KΩ) TP2

V_e TP4 **×10** $V_{\text{TP4 P-P}}$ 2-1

2-1

	$V_{\text{TP4 P-P}}$ V	I_{eo} mA
	0	

I_{CQ} g_m g_m I_{CQ}

A_V I_{CQ}= 1~5mA

3

P1 CC1 TP8

2-2

2-2

$f_{\max}$	
$f_{\min}$	
	4.5 MHz

4 4.5 MHz

1 LC P1

2 N1 20

3 S1 “ 01 ” LC “ 10 ” 2-3

2-3

		20s	40 s	60 s	80 s	100 s
LC f_1						
(f_2)						

5 4.5 MHz

1 LC S1 “ 01 ” S2 “ 10 ” “ 01 ” P1

TP7

2 W2 → →

3 S1 “ 10 ” S2 “ 10 ” “ 01 ” 2

2-4

W2		W2	W2	W2
V_{D1} V_{D2}				
	LC f_1			
	f_2			

1

2 f_o

3 2-1

1

2 m

3

1

2

3

1 1

2 1

3 4 1

4 1

1

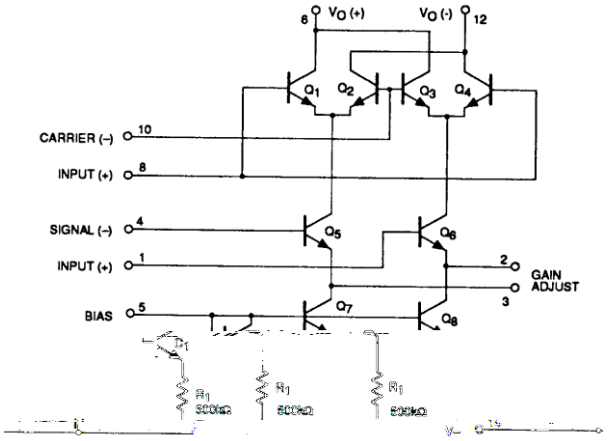
465KHz 1KHz

BG314 F1595 F1596 MC1495 MC1496 LM1595 LM1596

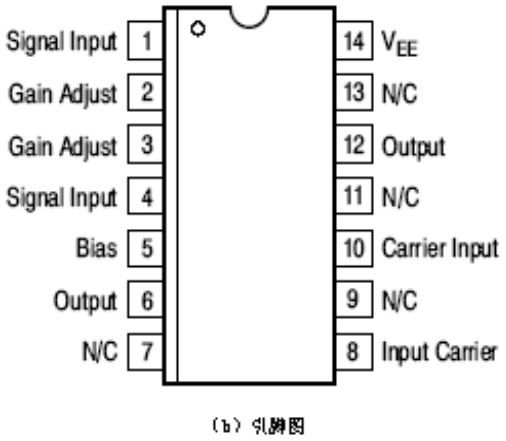
1) MC1496

MC1496 MC1496

3-1 Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q5 Q6



a



(b) 引脚图

3-1 MC1496

2

(1)

-

2V

(2)

I_0

14 5 R $+V_{CC}$ I_0 I_5

R I_0

$$I_0 \approx I_5 = \frac{V_{CC} - 0.7V}{R + 500}$$

14 $-V_{ee}$ 5 R R I_0

$$I_0 \approx I_5 = \frac{V_{ee} - 0.7V}{R + 500}$$

MC1496 4mA $I_0 \approx I_5 = 1\text{mA}$ R

6.8KΩ R15

2

MC1496 3-2

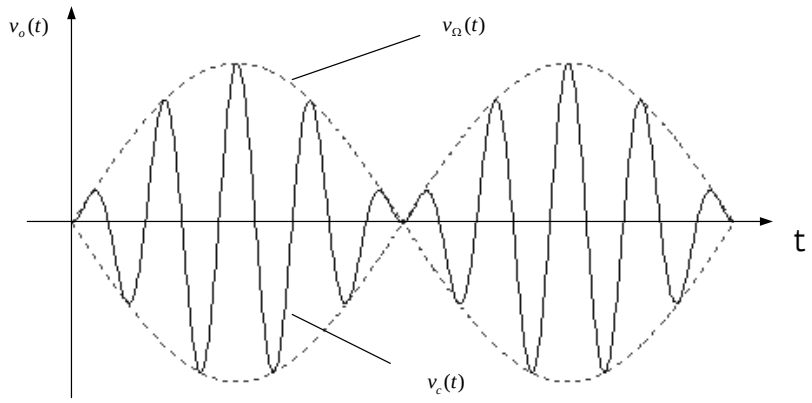
W1 1 4 12V 8V 5

R15 R1 R2 R4 R5 R6

V1 V4 8 10 V_C C1 10

C2 8 V5 V6 1 4

v C5 1 2 3 1KΩ



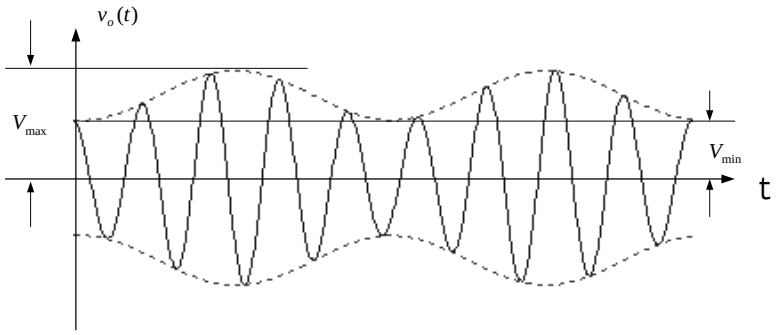
3-4

1 P1 W1 V_O t TP6 V_1

V_4 , MC1496 1 4

2 P3 TP6 3-5

AM V_{max} V_{min} m

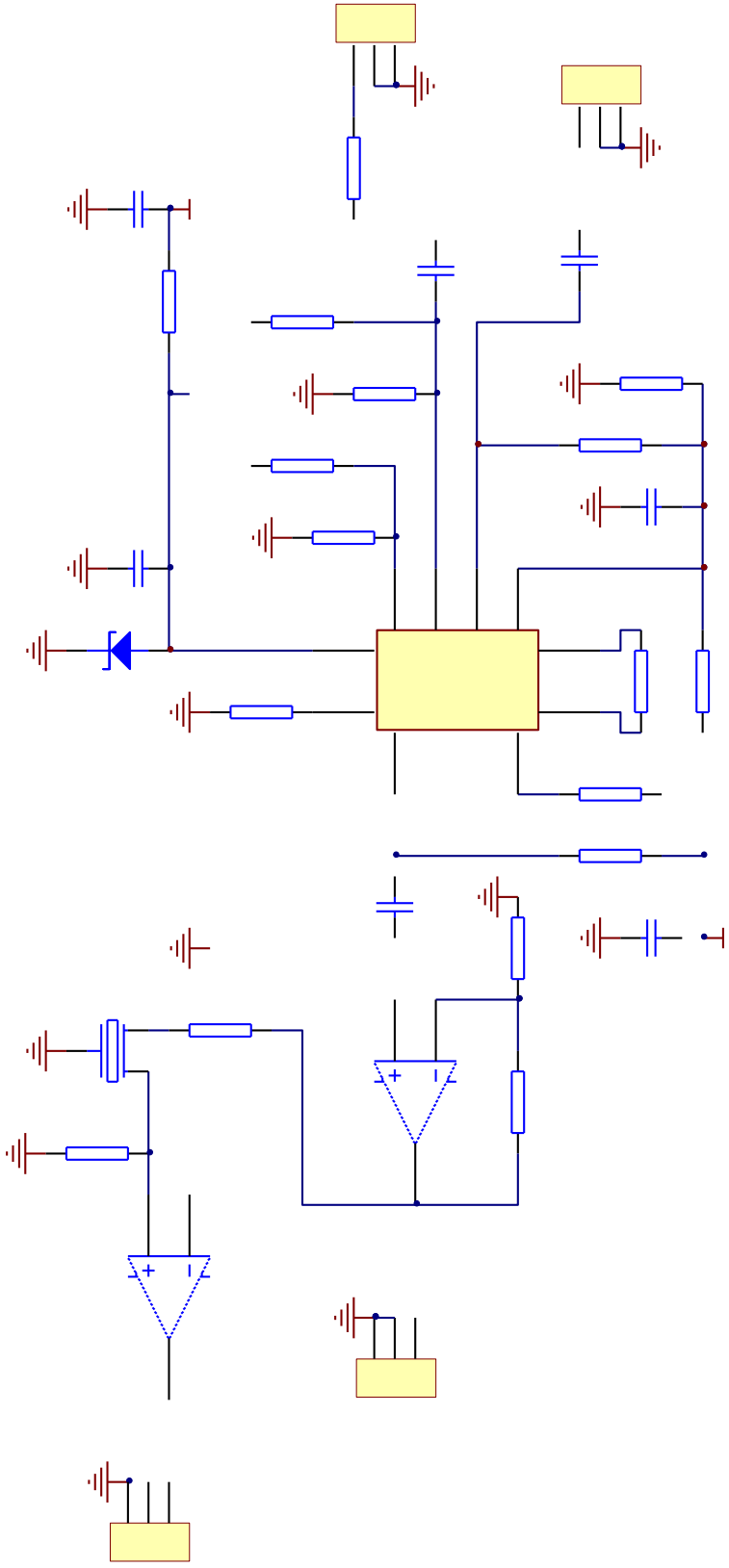


3-5

10KHz P5 TP7

1

2 m<100 m 100 m > 100%



3-2

1

2

3

4

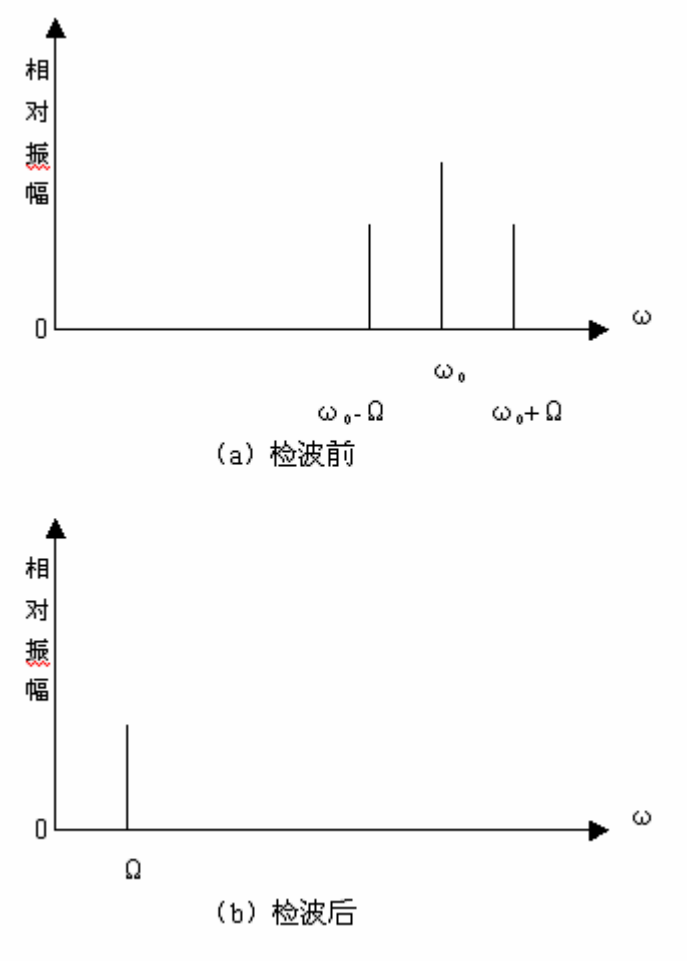
1

2

3

1		1
2		1
3	4	1
4		1

5-1 Ω



4-1

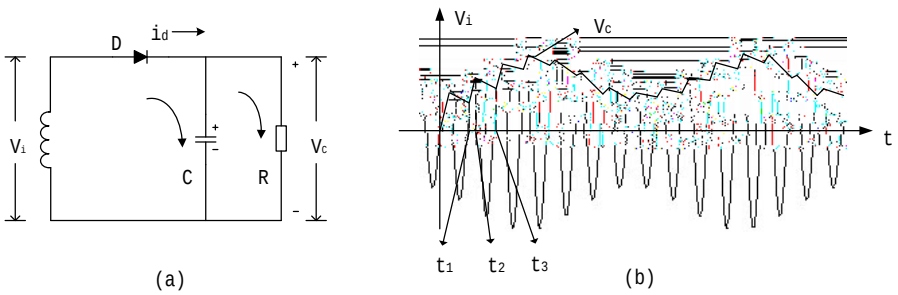
1

(0.5)

4-2 a

C i_D V_C

4-2 a



4-2

D C

V_C V_i . V_C

R RC

4-2 b

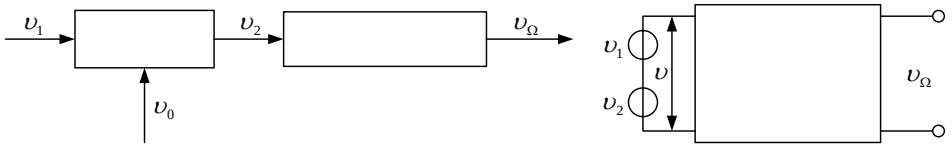
t_1 t_2

4-2 b t_2 t_3 R

4-2 b v_c $R_d C$ (R_d

)

1



a b

4-4

4-4(a)

4-4(b)

υ_1

$$v_1 = V_1 \cos\Omega t \cos\omega_1 t$$

$$v_0 = V_0 \cos(\omega_0 t + \varphi)$$

ω_0 ω_1 $\omega_1 = \omega_0$, φ

1

$$v_2 = V_1 V_0 (\cos\Omega t \cos\omega_1 t)\cos(\omega_2 t + \varphi)$$
$$= \frac{1}{2} V_1 V_0 \cos\varphi \cos\Omega t + \frac{1}{4} V_1 V_0 \cos[(2\omega_1 + \Omega)t + \varphi]$$
$$+ \frac{1}{4} V_1 V_0 \cos[(2\omega_1 - \Omega)t + \varphi$$

$2\omega_1$ Ω

$$v_\Omega = \frac{1}{2} V_1 V_0 \cos\varphi \cos\Omega t$$

φ $\varphi=0$ φ

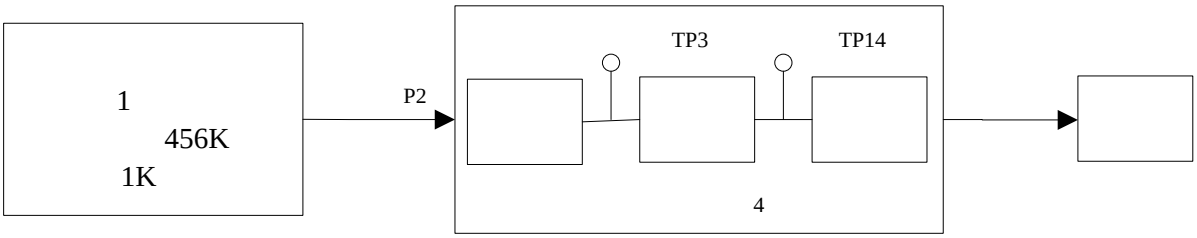
“ ”

2

4-8 MC1496 P7

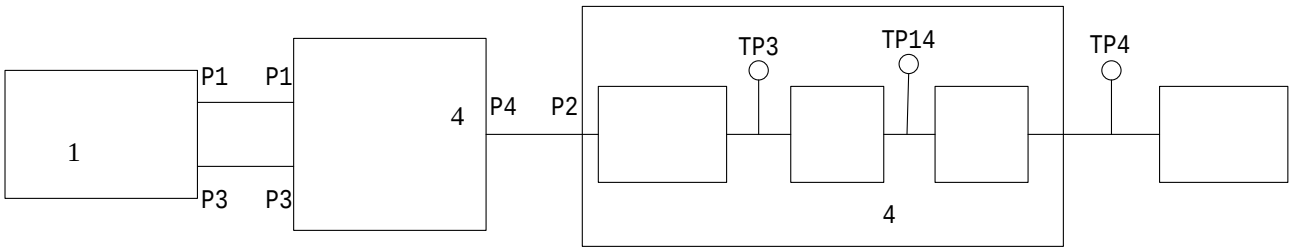
W3 C13 U3A 8 10 v_{AM} (t) P8 C14 1 4 12

1 4-5



4-5

2 4-6



4-6

1 *m*<30%

2V *m*<30% (1KHz

) 4 S1 10 S2 00 TP4

2 *m*=100%

3 2 2 TP4

S1 “ 01 ” 2.2KΩ 20KΩ TP4

4 S2 “ 10 ” S1 “ 01 ” TP4

1 4-7

2

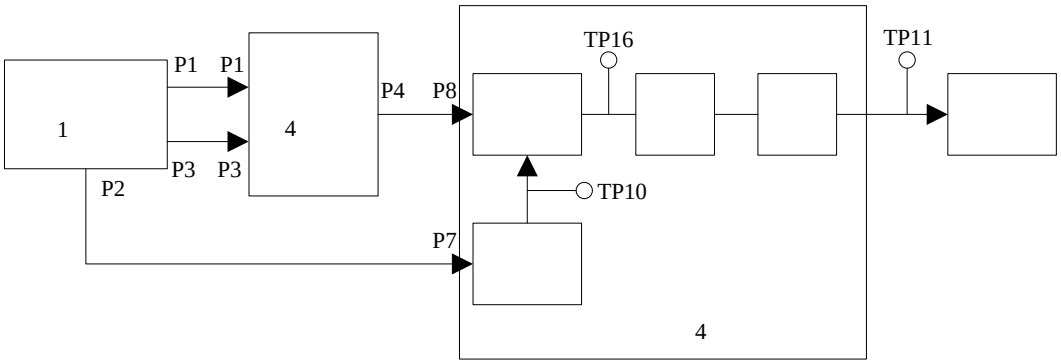
30 100 >100

P8 P7

3

P8

P7

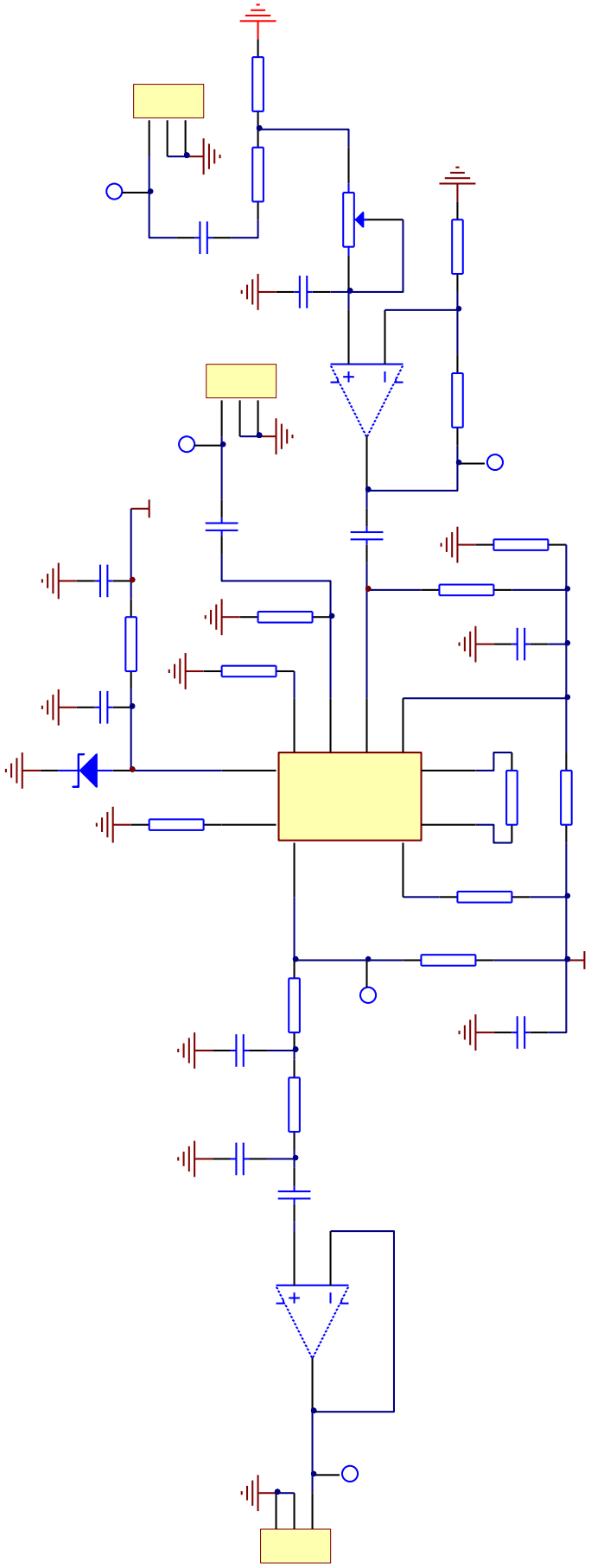


4-7

1

2

3



4-8