Now input signal → $I_D \cdot 10m\Omega$

$I_D \cdot 0.01\Omega$

0.1mV reference voltage → 0.1A · 0.01Ω → 9mV

0 ~ 0.1mV ⇒ 4.1V output.

$\frac{4.1}{0.9mV} = 4556$ gain

output 4.1V

gain = ~~$\frac{4.1V}{0.1mV} = 4.56 \times 10^4$~~ 4556

gain = 120dB

$20\log(x) = 120$

$\log(x) = 6$

$x = 10^6$ 5×10^4

1M 1Ω

10M ↔ 100Ω

10M ↔ 10Ω.

$R_2/R_1 = 1$ or smaller

$\frac{1}{R_2 C}$ → Bandwidth for R_2/R_1 gain

~~330k~~ 330k ~ 12mk.

~~450k~~ ~ 2.25M

320k ~ 2.25M 2250k

$2.25 \times 10^6 Hz = \frac{1}{R_2 C}$ $C = 1\mu$

m μ n p

$= \frac{1}{R_2 \times 1 \times 10^{-6}}$

$R_2 = \frac{1}{2.25 \times 10^6 \times 10^{-6}}$

$= \frac{10^3}{0.25}$

= 444.4Ω

if $C = 10p = 1 \times 10^{-11} C$

$R_2 = \frac{1}{2.25 \times 10^6 \times 10^{-11}}$

$= 0.444 \times 10^5$

= 44.4kΩ

$R_1 = 9.7\Omega$

if $C = 1p = 1 \times 10^{-12}$ $C = 0.1p$

4.4MHz

$R_2 = 444k\Omega \Rightarrow 4440k$

$R_1 = 9.7\Omega = 10\Omega \Rightarrow$ ~~10000Ω~~

if $R_1 = 10k\Omega$

$R_2 = 4556k$

$= 45M\Omega$

$C = \frac{1}{R \times 2.25 \times 10^6}$

$= \frac{}{4556 \times 10^3 \times 2.25 \times 10^6}$

$= \frac{10^{-9}}{}$

$= 9.76 \times 10^{-9} \times 10^{-5}$

$= 0.976 \times 10^{-15}$

⇒ 0.1V ripple → 10mΩ

0.1 / 10mΩ = 0.1 / 0.010Ω

0.1V → 1.044 ~ 0.954A

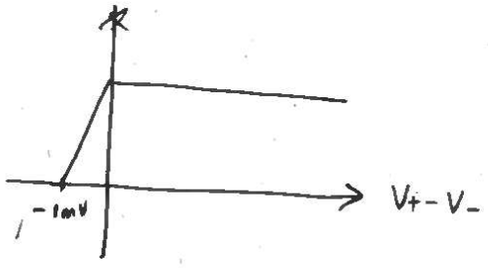
Ripple. 0.09A

$V = 0.09 \times 0.010\Omega$

$\times 10^{-2}$ $\times 10^{-2}$

$= \frac{9 \times 10^{-4}}{2} V$

$= 4.5 \times 10^{-4} V$



~~Vo = Vc~~

$V_{cc} = 5V$ 5/0.1mV

$= \frac{5000}{0.1} = 50000$ gain

105mV →

for Parallel MOSFET → 4 stages $\frac{5A}{4} = 1.25A$

$1.25A \times 5\Omega = 6.25V$

↓

~~sense resistor [illegible]~~

$\frac{5}{1.25} = 4$

3Ω resistor - sense

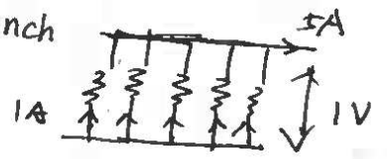
↓

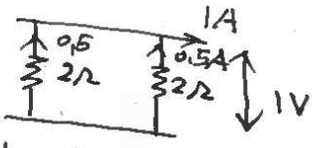
0.25Ω min Load resistance $\frac{1V}{5A} = 0.25$

$\frac{5}{0.25} = Q_0$ $\log_2(20) = 4.32 \approx 5$ stages

$\frac{5A}{5} = 1A$ per branch

$1 \times 5\Omega = 5V$





$\frac{1}{2} + \frac{1}{2} = 1\Omega$

$\frac{1}{5} \times 5 = 1\Omega$

$\frac{1}{5} + \frac{1}{5} \rightarrow 0.2 \rightarrow 2.5$

$\frac{1}{5} + \frac{1}{5} \rightarrow 2.5$

1.25

1.25

4

8

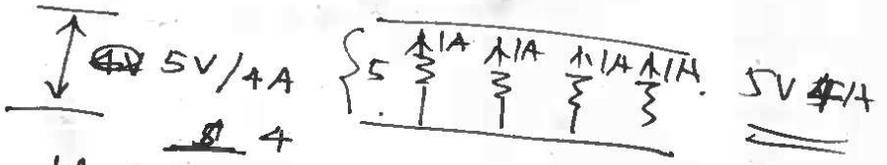
0.625 + 0.625 → 16

0.3125 + 0.3125 → 36

0.

1.25

5Ω sense resistor



4

1A → sense resistor

4A $I^2R = 0.25W$ power resistor

$4^2 = 16 \times R = 0.25$

$R = \frac{0.25}{16}$

But if 4 stages → each ~~stage~~ branch has 1A

→ 1Ω $\frac{1}{1} + \frac{1}{1} + \frac{1}{1} + \frac{1}{1} = 4$

5 stages $\frac{1}{4} = 0.25\Omega$

each branch: $\frac{4}{5} = 0.8A$

1A → I^2R → R = 1Ω

$I^2R = 1W$ & X (0.25W)

0.4A

$(0.4)^2 \times 1 = 0.16W$

0.25W 0.2W

$I^2 = 0.2$

Vref - 1V

Vinput = 1.00014 V ~ 0.99987 V } 1V

+ 0.14mV ~ - 0.13 mV . ⟶ output V_{out} = 5.47442V

~ 5.47372 V

V_{cc} = 10V V_{SS} = GND

$$Gain = \frac{5.47}{0.1\times10^{-3}} = \frac{5.47\times10^{4}}{54700} \times 2.25MHz$$

1mV → 5

(0.5mV → 5V)

$$\frac{5}{0.5\times10^{-3}} = \frac{5}{5\times10^{-4}} = 10^{4}.$$