EE203 LAB3 Biasing a FET Transistor

NAME: Hanlin Cai

FZU: 832002117

MU:20122161

* EQUIPMENT :

A voltage source, voltmeters, a laboratory lead kit A signal generator and an oscilloscope.

* OBJECTIVE :

The purpose of this experiment is to demonstrate various biasing techniques for FET transistors

Part1

For PMOS, I measure that the Vin is 1.99V,

So that, Vt=Vgs=-Vsg=Vin-5=-3.01V

一些电子设备

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For NMOS, I measure that the Vin is 1.96V,

so Vt=Vg=Vin=1.96V

电脑屏幕的照片

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So PMOS Vt= -3.01V,

And NMOS Vt=1.96V

Part2

PMOS,

屏幕上有字

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I measure that when the Vin is 1.59, the Vout is 2.5V

Vgs=-Vsg=Vin-5=-3.41V

Vgs-Vt=-0.4V

So Vds = Vout-0 =2.5V

Vds> Vgs-Vt ,

This equation is true So it meets the formula, I verify it is in saturation.

NMOS

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I measure that when the Vin is 3.01, the Vout is 2.5V Vgs=Vin=3.01V

Vgs-Vt=1.05V

So Vds = Vout-0 =2.5V

Vds> Vgs-Vt,

This equation is true So it meets the formula, I verify it is in saturation.

PART3

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I measure that when

Rbias1=831Ω

Rbias2=1212Ω,

I could make Vout=2.5V.

So the ratio of two resistances is Rbias1\Rbias2=1212Ω\831Ω=1.46

the ratio of divider resistance is 1.46

**Would there be any benefit to going for very small resistors as compared to very big resistors?**

Because the resistance betIen GS is not infinite actually, so I could use a small resistor. It would minims error.Gate resistance is small, switching device on and off fast, small switching loss; Otherwise, it is slow and the switching loss is large.

PART4

图片包含 游戏机, 体育

描述已自动生成

I measure that

Ids= 2.7mA

Vout=5V- Ids

R = 2.3V

And, Vds=Vout-0=2.3V

So the equivalent resistance of MOS is Vds/Ids= 851.85Ω

For this Drain-feedback biasing model. The voltage of THE VDD will be partially applied to the G terminal to achieve the effect of controlling the Vgs.

* Summary

1. Firstly, I successfully construct the circuit, and measure values that I want.
2. Then I calculate the Vt of NMOS and PMOS.
3. Next, I also set two biasing approaches to finish the required tasks and use resistor divider correctly and get the ratio of two resistance.
4. Ultimately, I set Drain-feedback biasing model, I successfully get the equivalent resistance.

That’s all, thank you!

832002117

20122161

Hanlin Cai