Review Presentation
L33 : Source Follower

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Youtube Lecture.41

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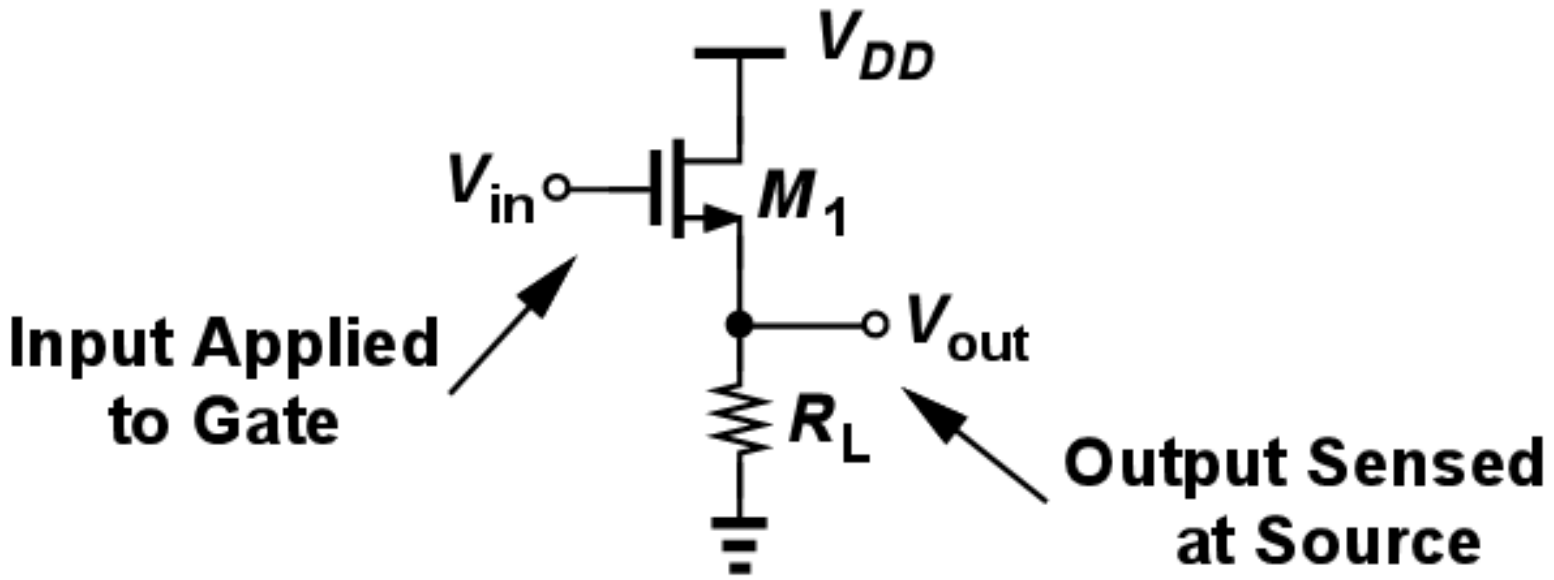
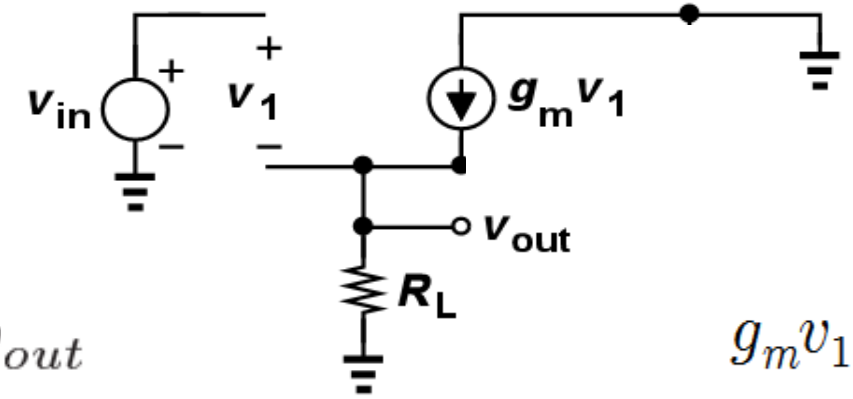
What is Source Follower?



Voltage gain of Source Follower

(When λ is 0)



$$v_{in} = v_1 + v_{out}$$

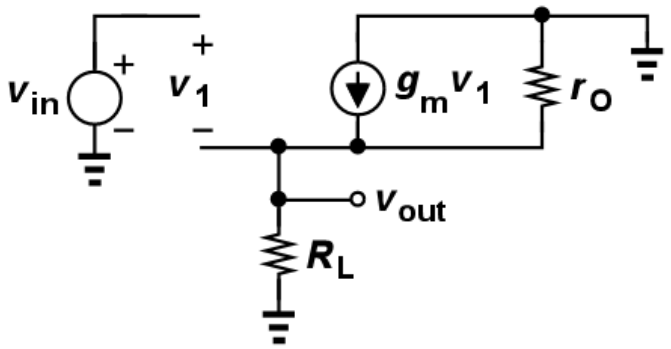
$$g_m v_1 = \frac{v_{out}}{R_L}$$

$$\frac{v_{out}}{v_{in}} = \frac{R_L}{\frac{1}{g_m} + R_L}$$

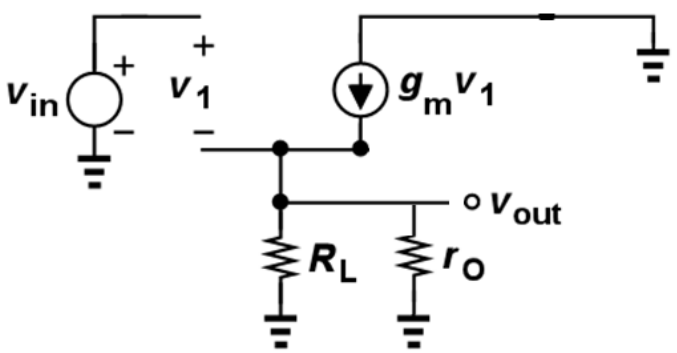
$$\frac{v_{out}}{v_{in}} = \frac{resistance\ tied\ between\ source\ and\ ground}{\frac{1}{g_m} + resistance\ tied\ between\ source\ and\ ground}$$

Voltage gain of Source Follower

(When λ is not 0 , λ>0)



(a)



(a)

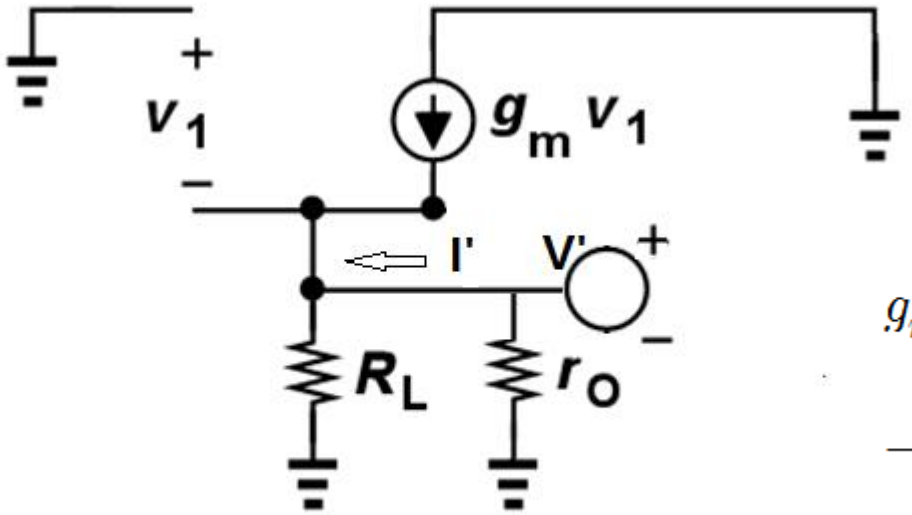
$$\frac{v_{out}}{v_{in}} = \frac{\text{resistance tied between source and ground}}{\frac{1}{g_m} + \text{resistance tied between source and ground}}$$

$$\frac{v_{out}}{v_{in}} = \frac{R_L \| r_o}{\frac{1}{g_m} + R_L \| r_o}$$

※ Voltage gain < 1 (when R ↑ , Av ≒ 1)

Impedance of Source Follower

(When λ is not 0 , λ>0)



(a)

At low frequency,

$R_{in} = \infty$

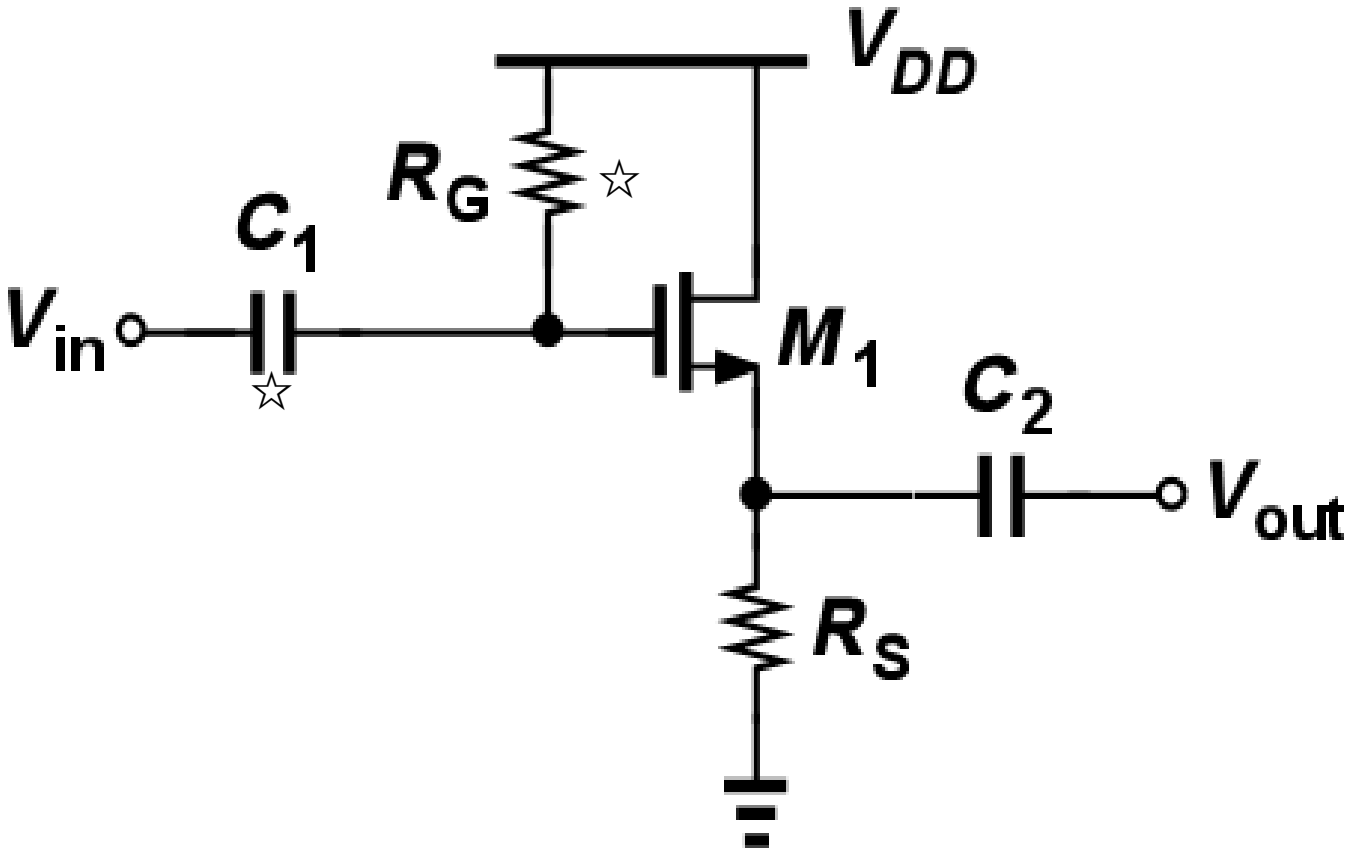
$$g_m v_1 + i' = \frac{v'}{r_o} + \frac{v'}{R_L}$$

$$-v_1 = v'$$

$$\frac{v'}{i'} = \frac{1}{g_m + \frac{1}{r_0} + \frac{1}{R_L}}$$

$$R_{out} = \frac{1}{g_m} \| r_0 \| R_L$$

Biased design



Thank you for listening.