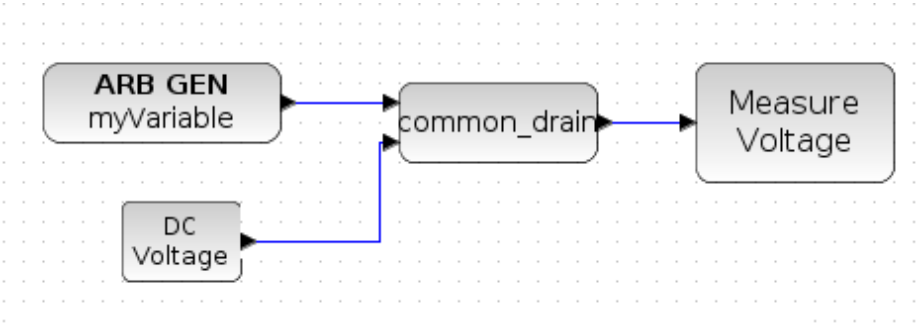
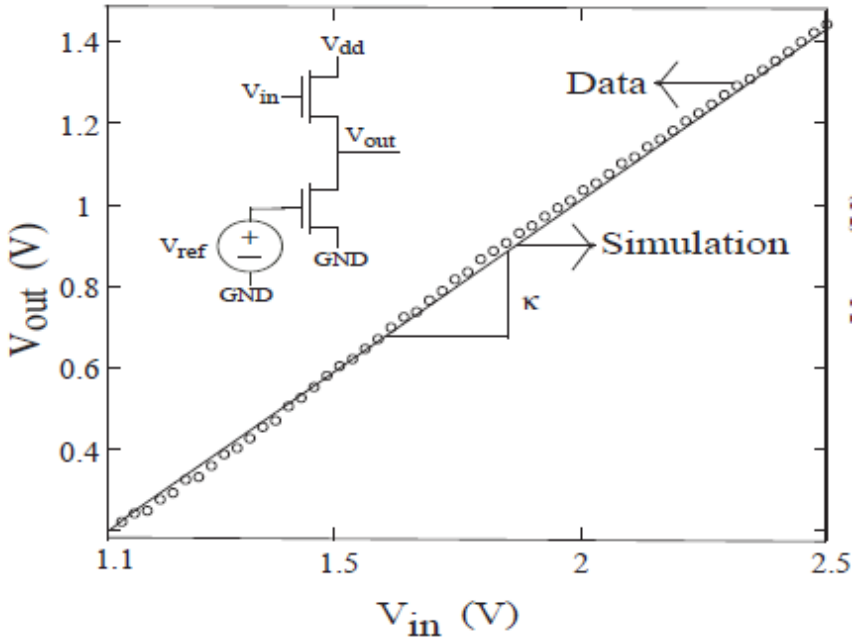
Two Transistor Amplifiers

Source follower (Common Drain)



$$I_{th}e^{(\kappa(V_{in}-V_{T0})-V_{out})/U_T} = I_{th}e^{(\kappa(V_{ref}-V_{T0}))/U_T}$$

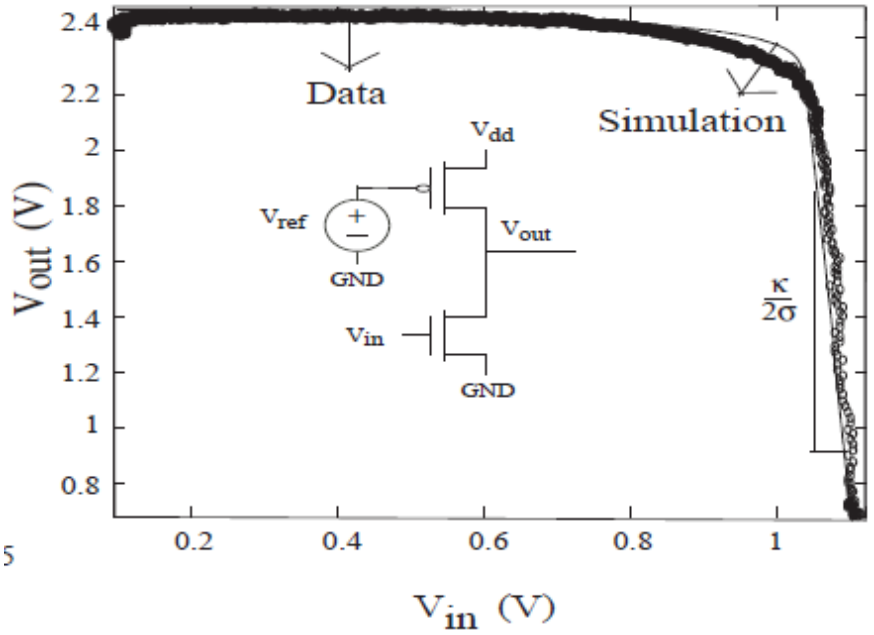
$$V_{out} = \kappa(V_{in} - V_{ref})$$



Common source

$$\kappa(V_{dd} - V_{ref}) + \sigma_p V_{dd} = (\sigma_p + \sigma_n)V_{out} + \kappa V_{in}$$

$$V_{out} = \frac{-\kappa}{\sigma_p + \sigma_n}V_{in} + V_{constant}$$

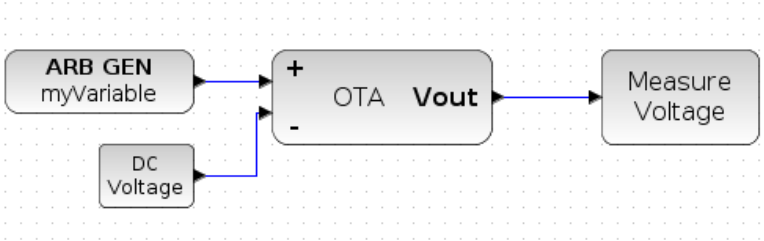


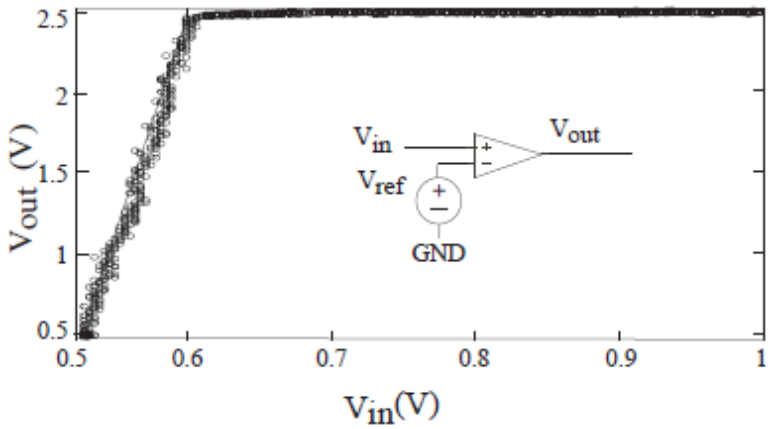
Transconductance Amplifier

OTA = Operational Transconductance Ampifier
~ Transconductance Amplifier

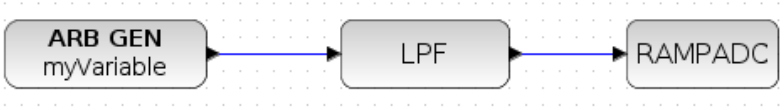
OTA: Differential pair + output stage
(current mirrors)

Open loop response of OTA

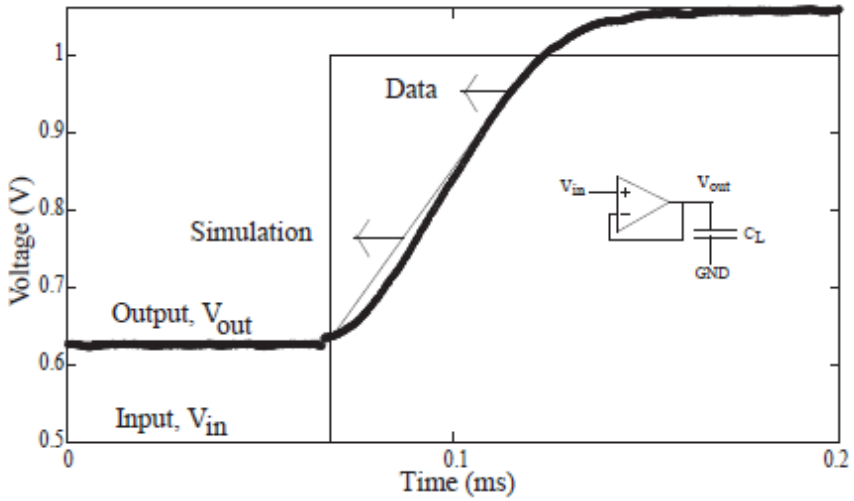




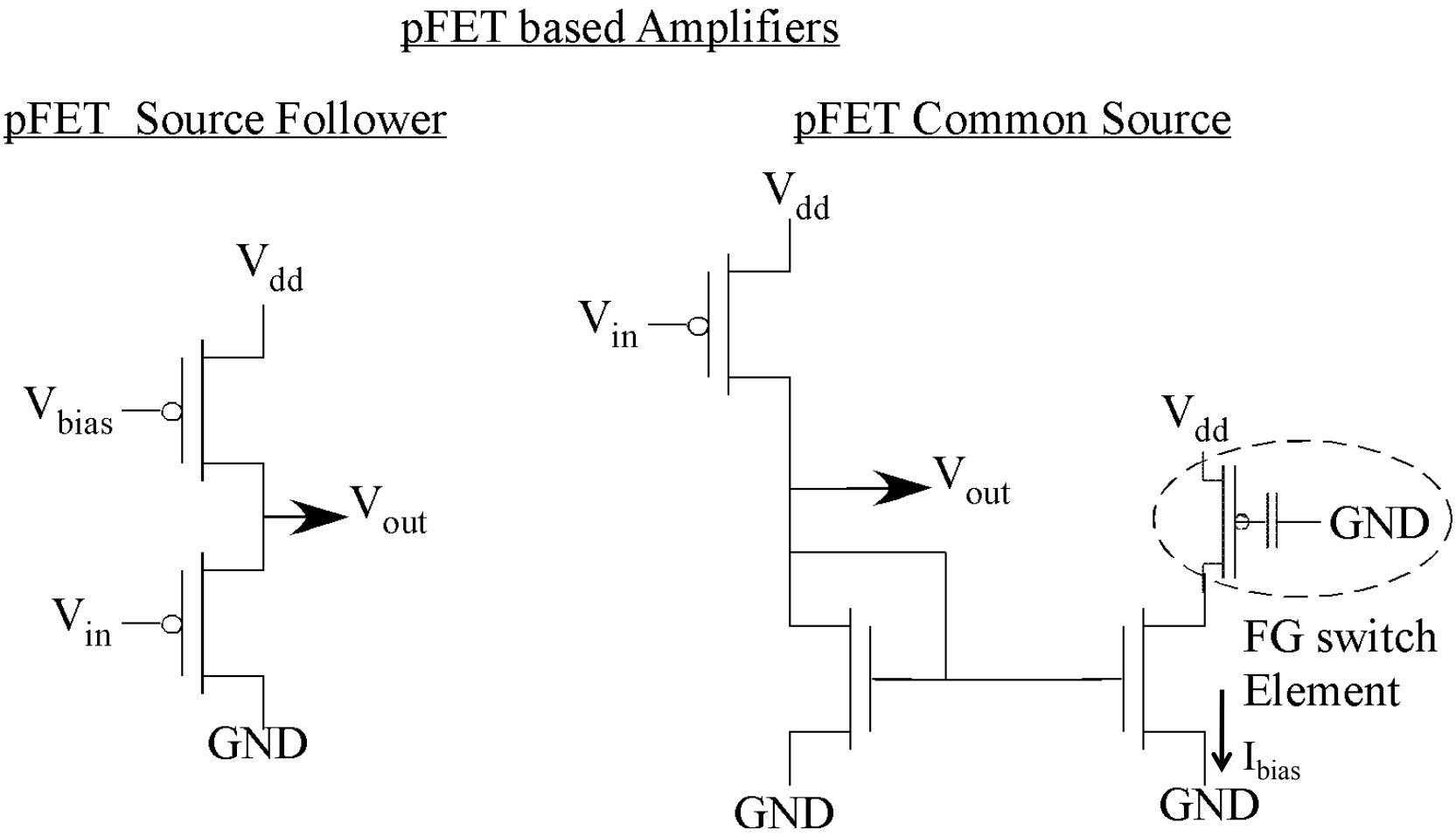
OTA follower step response



$$C\frac{\mathrm{d}V_{out}}{\mathrm{d}t} = I_{bias}\tanh\frac{\kappa(V_{out}-V_{in})}{2U_T}$$



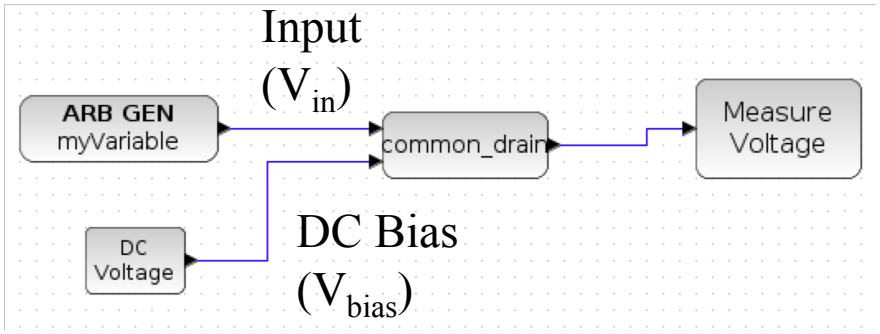
pFET based Amplifiers to use



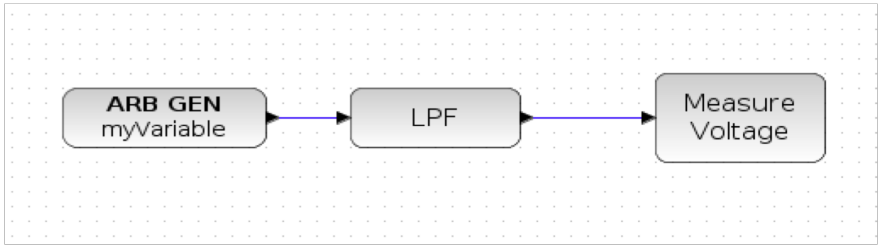
Components in the blocks for Source Follower and Common Source

Summary of some Testsetups

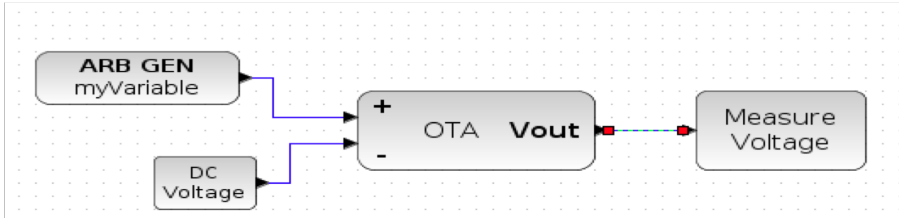
Common drain



Operational Transconductance amplifier



OTA open loop



Common source

Input
(V_{in})

Bias current
is programmed I_{bias}