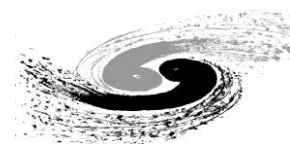


Analog front-end design

Ying ZHANG

2018-12-7



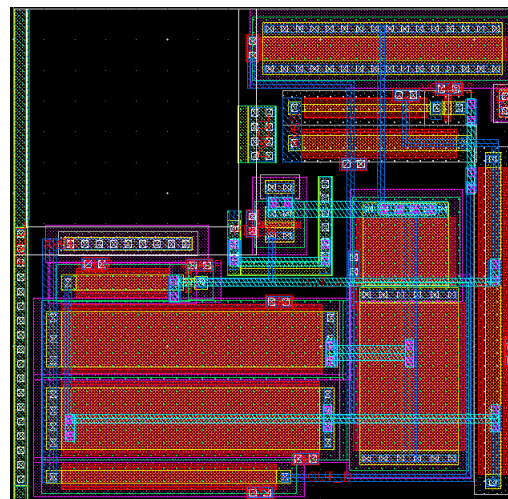
Front_end sector 0

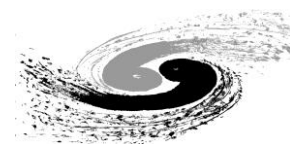
■ 电路参数

- MOS管尺寸与ALPIDE相同
- **Cs = 220 fF**

■ 仿真设置

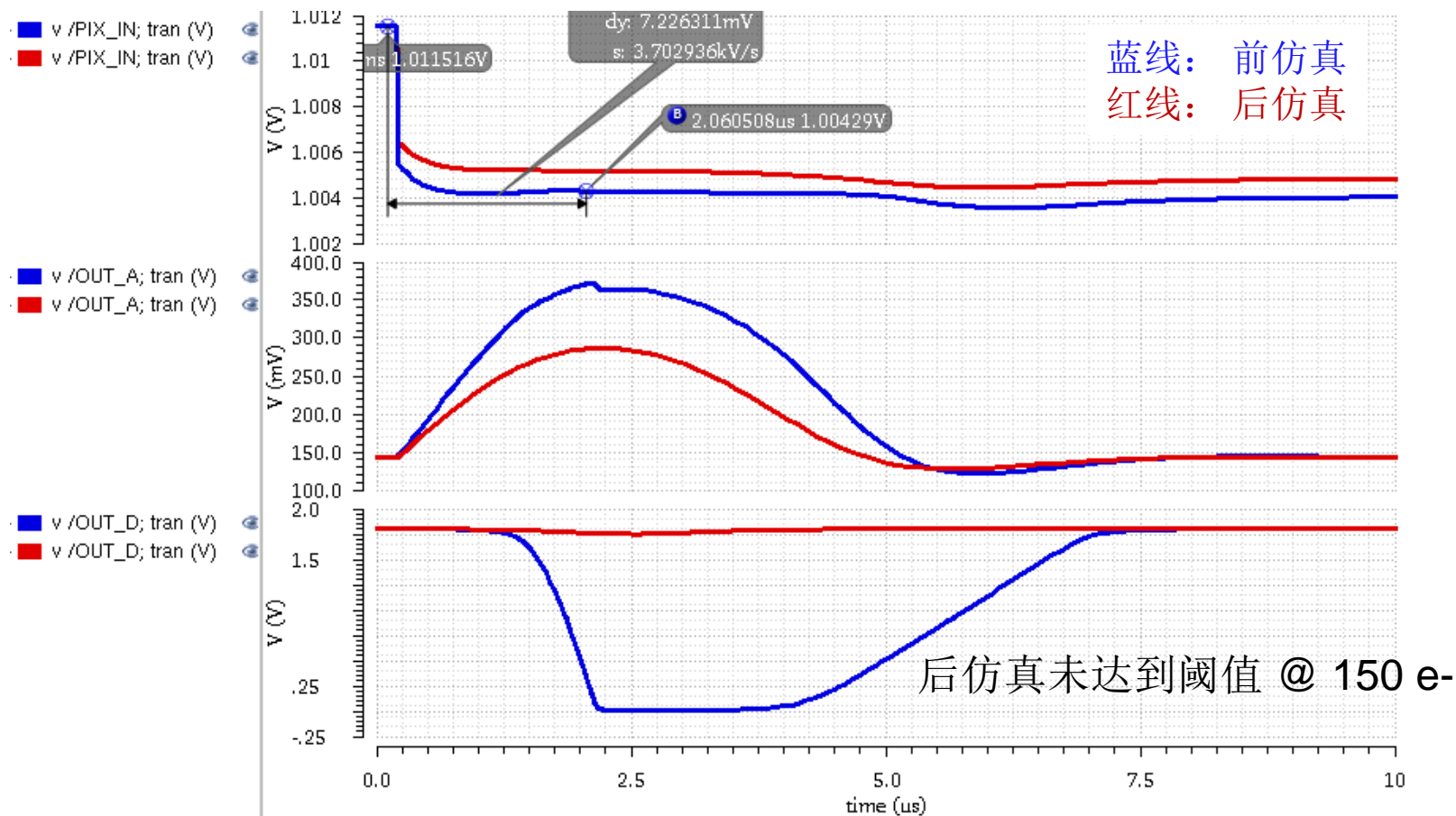
- I_{bias} = 20 nA, I_{DB} = **4.5 nA**
- I_{THR} = 0.5 nA, C_d = **2.5 fF**
- I_{leak} = 400 fF, V_{reset} = **1.4 V**
- V_{CASP} = 600 mV, V_{CASN} = 400 mV, V_{CASN2} = 500 mV
- C_{out_A} = **2 fF**, C_{out_D} = **6 fF** (前仿真)
C_{out_A} = **0 fF**, C_{out_D} = **0 fF** (后仿真)
- V_{clip} = 0, V_{sub} = 0 V
- M1 衬底与源级相连

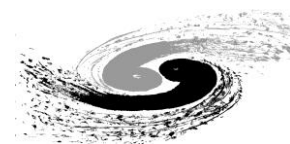




瞬态响应

- 与前仿真相比，后仿真结果输入信号减小13%，模拟输出幅度减小37%
- 寄生电容：**PIX_IN 0.7 fF, OUT_A 4.0 fF, OUT_D 2.62 fF**





前后仿真结果

■ 噪声性能对比

	阈值	瞬态噪声	阈值失配
前仿真	138.1 e ⁻	3.3 e ⁻	2.7 e ⁻
后仿真	162.7 e ⁻	3.2 e ⁻	---