

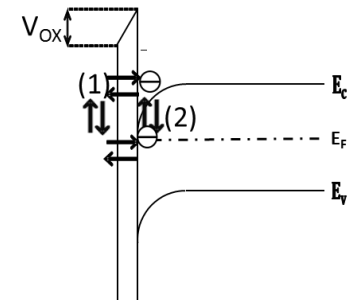
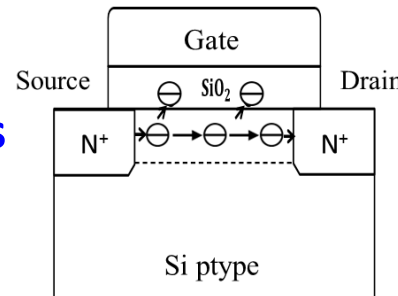
Research on Gate Voltage Dependent 1/f Noise Variance Modeling for n-Channel MOSFETs

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Purpose Development of 1/f noise variance model in MOSFETs

1/f noise caused by
Mobility Fluctuation and Interface Traps

Increase of Oscillator Circuits Noises



from the Si to the gate oxide between interface traps

Results

SPICE2 Model

$$S_{I_D} = \frac{KF \cdot I_D^{AF}}{C_{OX} \cdot L_{eff}^2 \cdot f^{EF}}$$

Hooge's 1/f Model

$$S_{I_D} = \frac{\alpha_H \cdot \mu_{eff} \cdot 2kT \cdot I_D}{f \cdot L_{eff}^2}$$

Comparison with These Models → Variability model incorporated in mobility fluctuations

$$KF = C_{OX} \cdot \mu_{eff} \cdot 2 \cdot k \cdot T \cdot \alpha_{H_{nominal}} \cdot D \cdot e^{-(V_{gs} - V_{th})}$$