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Qchannel = CoxWL ( Vgs – Vt – Vds/2)

Vgs = Voltage difference between gate and source

Vt = Threshold voltage

Vds = Voltage difference between drain and source

Current = Charge / time

I = Q/t

Qchannel = CoxWL ( Vgs – Vt – Vds/2)

t = Lˆ2/ µVds

Ids = µVds CoxW ( Vgs – Vt – Vds/2) /L

Ids = µ Cox W/L ( Vgs – Vt – Vds/2) Vds

Geometry and technology dependent constant, β = µ Cox W/L

Vgs – Vt appears too often… Vgs – Vt = VGT

Linear equation 🡪 Ids = β ( VGT – Vds/2) Vds

Saturation 🡪 takes place … VGT = Vdsat

Ids = β ( VGT – VGT /2) VGT

Ids = β ( VGT /2) VGT

Saturation equation 🡪 Ids = (β/2) VGT ^2