0.35u CMOS
Approximate model parameters for hand calculations
8/22/2008
Spice model library: 5827_035.lib

NMOS
nmos_035.asy
NMOS transistor
B (p substrate) must be tied to most negative supply rail

PMOS
pmos_035.asy
PMOS transistor
B is n-well, usually most positive supply rail

RPN
rpn_035.asy
Rsheet = 1.2 kΩ/square, TC = −400 ppm/°C
“square” = L/W

RPP
rpp_035.asy
Rsheet = 50 Ω/square, TC = +830 ppm/°C
“square” = L/W

WDIODE
wdiode.asy
Unit-area (5µ*5µ) p+ diffusion to n-well diode
n = area multiple. Cathode must be tied to the most negative supply rail
Approximate models for hand calculations

\[ V_m \approx 0.48 \text{ V} \]
\[ \mu_n C_{ox} \approx 90 \text{ \(\mu\text{A}/\text{V}^2\)} \]
\[ \lambda_n \approx \begin{cases} 0.035 \text{ 1/V (L=1\(\mu\))} \\
0.025 \text{ 1/V (L=2\(\mu\))} \\
<0.015 \text{ 1/V (L>4\(\mu\))} \end{cases} \]

\[ V_{tp} \approx -0.62 \text{ V} \]
\[ \mu_p C_{ox} \approx 36 \text{ \(\mu\text{A}/\text{V}^2\)} \]
\[ \lambda_p \approx \begin{cases} 0.046 \text{ 1/V (L=1\(\mu\))} \\
0.019 \text{ 1/V (L=2\(\mu\))} \\
<0.01 \text{ 1/V (L>4\(\mu\))} \end{cases} \]

Beware: do not expect very accurate results using hand calculations, especially for short channel lengths (L < 2 \(\mu\))
Approximate models for hand calculations

\[ C_{gs} \approx \left[3 \text{ fF}/(\mu\text{m})^2\right] \times W \times L \]
\[ C_{gd} \approx \left[0.3 \text{ fF}/(\mu\text{m})\right] \times W \]
\[ C_{db} \approx \left[1.5 \text{ fF}/(\mu\text{m})\right] \times W \]
\[ C_{sb} \approx \left[1.5 \text{ fF}/(\mu\text{m})\right] \times W + \left[0.75 \text{ fF}/(\mu\text{m})^2\right] \times W \times L \]

Beware: do not expect very accurate results using hand calculations, especially for short channel lengths (L < 2 \mu)