

**Runtime Performance of PSP,
with simkit 2.3.2 and spectre 5.0.33**

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Device Modeling
Maxim Integrated Products

DAC Result (huge circuit)

- With Simkit
 - PSP102 w/o GIDL → 46% longer than BSIM3

Model	BSIM3_mxim	PSP102_mxim	PSP102_mxim
GIDL?	no	yes	no
tunneling?	no	no	no
SB/DB diode	basic	basic	basic
simulator	spectre 5.0.3	spectre 5.0.3	spectre 5.0.3
simkit	2.3.2	2.3.2	2.3.2
# capacitor	13,639	13,639	13,639
# resistors	11,953	11,953	11,953
# bsim3v3	33,724	508	508
# bsim4	0	0	0
# psp102	0	33,216	33,216
transient steps	51,401	44,744	44,742
CPU time (hr)	12.08	20.10	17.62

ADC Result (smaller circuit)

Straightfoward comparison between PSP102 and BSIM4 is difficult for the models sent to Maxim. Using linear approximation, the PSP102 takes 47% longer than BSIM4.

	testing models from NXP		actual silicon models from MXIM		
Model	BSIM4_nxp	PSP102_nxp	BSIM3_mxim	PSP102_mxim	PSP102_mxim
GIDL?	no	no	no	yes	no
tunneling?	no	no	no	no	no
SB/DB diode	basic	basic	basic	basic	basic
simulator	spectre 5.0.33	spectre 5.0.33	spectre 5.0.33	spectre 5.0.33	spectre 5.0.33
simkit	2.3.2	2.3.2	2.3.2	2.3.2	2.3.2
# capacitor	3,497	3,497	3,497	3,497	3,497
# resistors	1,640	1,640	1,640	1,640	1,640
# bsim3v3	1,742	1,742	2,227	1,312	1,312
# bsim4	485	0	0	0	0
# psp102	0	485	0	915	915
transient steps	221,075	222,859	221,951	222,539	222,531
CPU time (hr)	4.71	5.26	4.52	5.71	5.64

Summary

1. **When running spectre 5.0.33 with Simkit, PSP102 takes 46% longer CPU than BSIM3.
→ Designers view this as a major hurdle.**
2. **We don't have spectre 6 which can run PSP102 without using simkit.**
3. **We wonder if...
simkit can be optimized to reduce the CPU time.
PSP102 model itself can be further optimized.**