

Table 1 CMOS Process and Derived Parameters

	0.8 μm CMOS		0.5 μm CMOS		0.25 μm CMOS		0.18 μm CMOS		0.13 μm CMOS	
	NMOS	PMOS	NMOS	PMOS	NMOS	PMOS	NMOS	PMOS	NMOS	PMOS
t_{ox} (nm) *	15	15	9	9	6	6	4	4	2.7	2.7
V_{T0} (V) *	0.7	-0.7	0.7	-0.8	0.5	-0.6	0.5	-0.5	0.4	-0.4
μ_o (cm ² /Vs) *	600	220	500	180	460	160	300	100	300	100
C_{ox} (fF/μm ²) **	2.3	2.3	3.8	3.8	5.8	5.8	8.8	8.8	13	13
k' (μA/V ²) **	138	51	190	68	267	93	264	88	390	130
V_{DD} (V) ***	5	5	3.3	3.3	2.5	2.5	1.8	1.8	1.3	1.3

* Data adapted from A.S. Sedra and K.C. Smith, Microelectronics, 6th Ed., 2011, p 530.

** Derived parameters: $C_{ox} = \epsilon(\text{SiO}_2)/t_{ox}$ $k' = \mu_o C_{ox}$

*** Supply voltage limited by MOSFET breakdown.

$$\epsilon(\text{SiO}_2) = 3.97\epsilon_o = 35 \text{ pF/m}$$

$$\epsilon(\text{Si}) = 11.7\epsilon_o = 104 \text{ pF/m}$$

Table 2 TINA Enhancement Mode MOSFET Parameter Settings for 0.25 μm Process Minimum Settings (without junction and overlap capacitances)

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Tolerance Model: ☒ None ☐ General

Model: S Level-3 (3F5)

Type: Noname

Model Parameters

Usage: n-channel power MOS

vto	[V]	500m
kp	[A/V]	267u
gamma	[V ^{1/2}]	0
phi	[V]	600m
rd	[Ohm]	0
rs	[Ohm]	0
rg	[Ohm]	0
rb	[Ohm]	0
rds	[Ohm]	0
cbd	[F]	0
cbs	[F]	0
is	[A]	10f
N	[-]	1
pb	[V]	800m
cgso	[F/m]	0
cgdo	[F/m]	0
cgbo	[F/m]	0
rsh	[Ohm/square]	0
cj	[F/m ²]	0
mj	[-]	500m
cjsw	[F/m]	0
mjsw	[-]	330m
js	[A/m ²]	0
tox	[m]	6n
ld	[m]	0
uo	[cm ² /Vs]	460
fc	[-]	500m
nsub	[1/cm ²]	0

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Catalog Editor

Library: Tina

Tolerance Model: ☒ None ☐ General

Model: S Level-3 (3F5)

Type: Noname

Model Parameters

Usage: p-channel power MOS

vto	[V]	-600m
kp	[A/V]	93u
gamma	[V ^{1/2}]	0
phi	[V]	600m
rd	[Ohm]	0
rs	[Ohm]	0
rg	[Ohm]	0
rb	[Ohm]	0
rds	[Ohm]	0
cbd	[F]	0
cbs	[F]	0
is	[A]	10f
N	[-]	1
pb	[V]	800m
cgso	[F/m]	0
cgdo	[F/m]	0
cgbo	[F/m]	0
rsh	[Ohm/square]	0
cj	[F/m ²]	0
mj	[-]	500m
cjsw	[F/m]	0
mjsw	[-]	330m
js	[A/m ²]	0
tox	[m]	6n
ld	[m]	0
uo	[cm ² /Vs]	160
fc	[-]	500m
nsub	[1/cm ²]	n

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Table 3 TINA Enhancement Mode MOSFET Parameter Settings for 0.25 μm Process
Comprehensive Settings

Catalog Editor

Library: Tina

Tolerance Model: ☒ None ☐ General

Model: S Level-3 (3F5)

Type: Noname

Model Parameters

Usage: n-channel power MOS

vto	[V]	500m
kp	[A/V]	267u
gamma	[V ^{1/2}]	0
phi	[V]	600m
rd	[Ohm]	0
rs	[Ohm]	0
rg	[Ohm]	0
rb	[Ohm]	0
rds	[Ohm]	0
cbd	[F]	0
cbs	[F]	0
is	[A]	10f
N	[-]	1
pb	[V]	900m
cgso	[F/m]	300p
cgdo	[F/m]	300p
cgbo	[F/m]	0
rsh	[Ohm/square]	0
cj	[F/m ²]	2m
mj	[-]	500m
cjsw	[F/m]	280p
mjsw	[-]	330m
js	[A/m ²]	0
tox	[m]	6n
ld	[m]	0
uo	[cm ² /Vs]	460
fc	[-]	500m
nsub	[1/cm ²]	0

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Catalog Editor

Library: Tina

Tolerance Model: ☒ None ☐ General

Model: S Level-3 (3F5)

Type: Noname

Model Parameters

Usage: p-channel power MOS

vto	[V]	-600m
kp	[A/V]	93u
gamma	[V ^{1/2}]	0
phi	[V]	600m
rd	[Ohm]	0
rs	[Ohm]	0
rg	[Ohm]	0
rb	[Ohm]	0
rds	[Ohm]	0
cbd	[F]	0
cbs	[F]	0
is	[A]	10f
N	[-]	1
pb	[V]	900m
cgso	[F/m]	300p
cgdo	[F/m]	300p
cgbo	[F/m]	0
rsh	[Ohm/square]	0
cj	[F/m ²]	2m
mj	[-]	500m
cjsw	[F/m]	220p
mjsw	[-]	330m
js	[A/m ²]	0
tox	[m]	6n
ld	[m]	0
uo	[cm ² /Vs]	160
fc	[-]	500m
nsub	[1/cm ²]	0

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