APPENDIX K

TYPICAL PARAMETER VALUES FOR IC DEVICES FABRICATED IN CMOS AND BIPOLAR PROCESSES

Table K.1 Typical Values of CMOS Device Parameters

	0.8 μm		0.5 μm		0.25 μm		0.18 μm		0.13 μm		65 nm		28 nm	
Parameter	NMOS	PMOS	NMOS	PMOS	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	1.4	1.4	1.4	1.4
C_{ox} (fF/μm^2)	2.3	2.3	3.8	3.8	5.8	5.8	8.6	8.6	12.8	12.8	25	25	34	34
μ (cm^2/V·s)	550	250	500	180	460	160	450	100	400	100	216	40	220	200
μC_{ox} (μA/V^2)	127	58	190	68	267	93	387	86	511	128	540	100	750	680
V_{t0} (V)	0.7	–0.7	0.7	–0.8	0.5	–0.6	0.5	–0.5	0.4	–0.4	0.35	–0.35	0.3	–0.3
V_{DD} (V)	5	5	3.3	3.3	2.5	2.5	1.8	1.8	1.3	1.3	1.0	1.0	0.9	0.9
$\lvert V'_A \rvert$ (V/μm)	25	20	20	10	5	6	5	6	5	6	3	3	1.5	1.5
C_{ov} (fF/μm)	0.2	0.2	0.4	0.4	0.3	0.3	0.37	0.33	0.36	0.33	0.33	0.31	0.4	0.4

Table K.2 Typical Parameter Values for BJTs*

	Standard High-Voltage Process		Advanced Low-Voltage Process	
Parameter	*npn*	Lateral *pnp*	*npn*	Lateral *pnp*
A_E (μm^2)	500	900	2	2
I_S (A)	5×10^{-15}	2×10^{-15}	6×10^{-18}	6×10^{-18}
β_0 (A/A)	200	50	100	50
V_A (V)	130	50	35	30
V_{CEO} (V)	50	60	8	18
τ_F	0.35 ns	30 ns	10 ps	650 ps
C_{je0}	1 pF	0.3 pF	5 fF	14 fF
$C_{\mu 0}$	0.3 pF	1 pF	5 fF	15 fF
r_x (Ω)	200	300	400	200

*Adapted from Gray et al. (2001); see Appendix I.

Note: For more information, refer to Appendix G (on the book's Website).