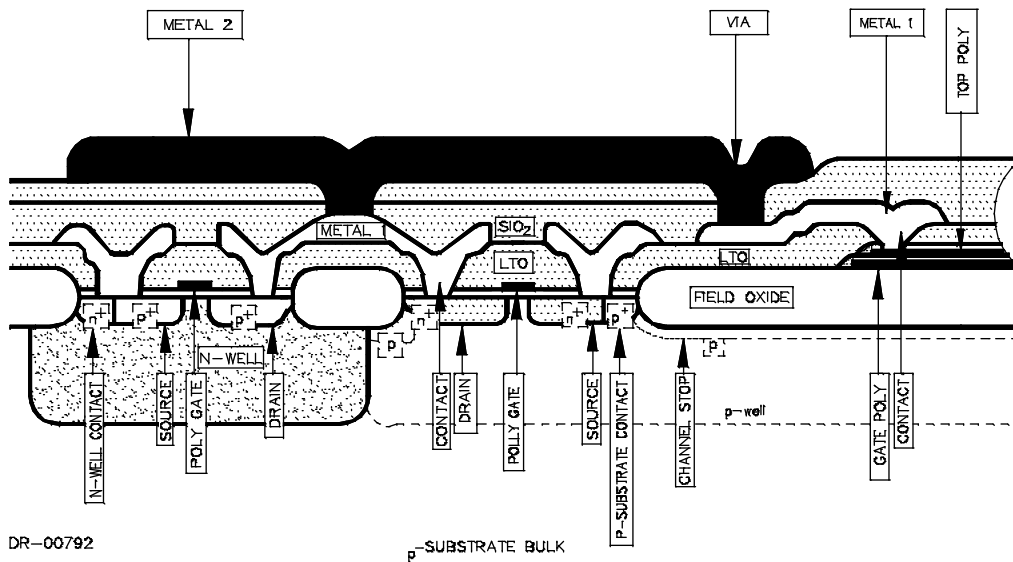
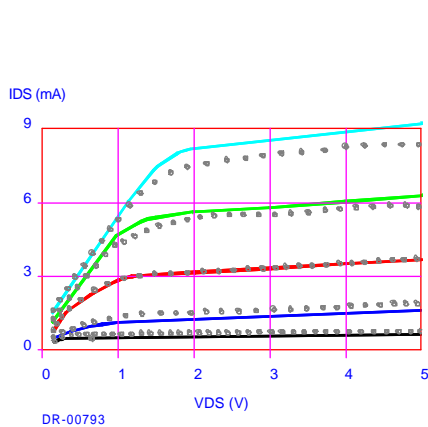


Physical Characteristics

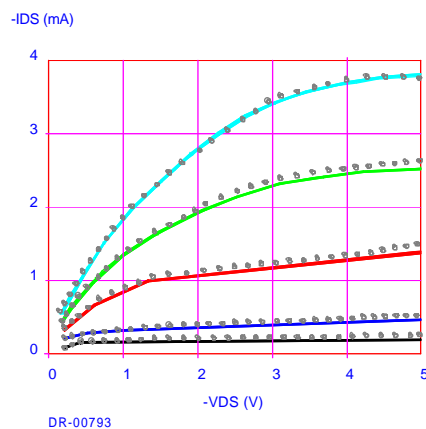
Process Geometry	2.0 Micron	Metal II Width	3.0 μ m
Process Number	C2020	Metal II Space	1.4 μ m
Operating Voltage	5v	Gate Poly Width	2.4 μ m
Well Doping	N-WELL	Gate Poly Space	2.0 μ m
Metal Layers	2	Top Poly Width	3.0 μ m
Poly Layers	2	Top Poly Space	2.0 μ m
Contact	2.0 x 2.0 μ m	N+/P+Space	2.0 μ m
Via	2.0 x 2.0 μ m	N+ to N-WELL	4.4 μ m
Metal I Width	3.0 μ m	N+ to P+	8.8 μ m
Metal I Space	1.4 μ m		



CROSS SECTIONAL VIEW OF THE CMOS2.0 PROCESS



NMOS transfer characteristics of a typical wafer. W/L = 40/2, VGS = 1.5, 2, 3, 4, 5V. • = measured, solid line = MOS2 model.



PMOS transfer characteristics of a typical wafer. W/L = 40/2, -VGS = 1.5, 2, 3, 4, 5V. • = measured, solid line = MOS2 model.

CMOS2.0 N-Well Process

Electrical Characteristics

n-ch transistor

(T = +25°C unless otherwise noted)

Parameters	Sym	Min	Typ	Max	Unit	Comments
Threshold Voltage (Sat. extrapolated)	V_{TO_N}	0.6	0.75	0.90	V	40/2 device
Body Factor	γ_N	0.8	0.95	1.10	$V^{1/2}$	40/40 device
Gain factor	KPN	52	61	70	$\mu A/V^2$	40/40 device
Effective Channel Length	L_{eff_N}	0.85	1.15	1.45	μm	40/2 device
Width Encroachment	ΔW_N		0.6		μm	per side
Punch Through Voltage	$BVDSS_N$	10	15		V	40/2 device
Poly Field Threshold	$VTF_{P(N)}$	10	17		V	50/2 device

p-ch transistor

Threshold Voltage (Sat. extrapolated)	V_{TO_P}	-0.92	-0.80	-0.65	V	40/2 device
Body Factor	γ_P	0.48	0.55	0.62	$V^{1/2}$	40/40 device
Gain Factor	KPP	18	22	26	$\mu A/V^2$	40/40 device
Effective Channel Length	L_{eff_P}	1.05	1.35	1.65	μm	40/2 device
Width Encroachment	ΔW_P		0.6		μm	per side
Punch Through Voltage	$BVDSS_P$		-14	-10	V	40/2 device
Poly Field Threshold	$VTF_{P(P)}$		-15	-10	V	

diffusion & thin films

Well (field) Sheet Resistance	$R_{W(+f)}$	1.8	2.2	2.6	$k\Omega/\square$	n-well
N+ Sheet Resistance	R_{N+}	20	30	40	Ω/\square	
N+ Junction Depth	X_{jN+}		0.5		μm	
P+ Sheet Resistance	R_{P+}	45	70	100	Ω/\square	
P+ Junction Depth	X_{jP+}		0.55		μm	
Gate Poly Sheet Resistance (n-ch)	R_{POLYN}	13	17	21	Ω/\square	
Gate Poly Sheet Resistance (p-ch)	R_{POLYP}	14	22	30	Ω/\square	
Top Poly Sheet Resistance	R_{POLYB}	20	48	75	Ω/\square	
Metal 1 Sheet Resistance (DLM)	R_{M1}		100		$m\Omega/\square$	
Metal 2 Sheet Resistance (DLM)	R_{M2}		70		$m\Omega/\square$	

capacitance

Gate Oxide	C_{OX}	1.05	1.11	1.19	$fF/\mu m^2$	
Poly Gate To Bottom Poly (Area)	C_{PP}	0.41	0.45	0.49	$fF/\mu m^2$	interpoly capacitor
Metal 1 to Gate Poly (Area)	C_{M1P}	0.043	0.049	0.058	$fF/\mu m^2$	
Metal 2 to Metal 1	C_{MM}		0.05		$fF/\mu m^2$	