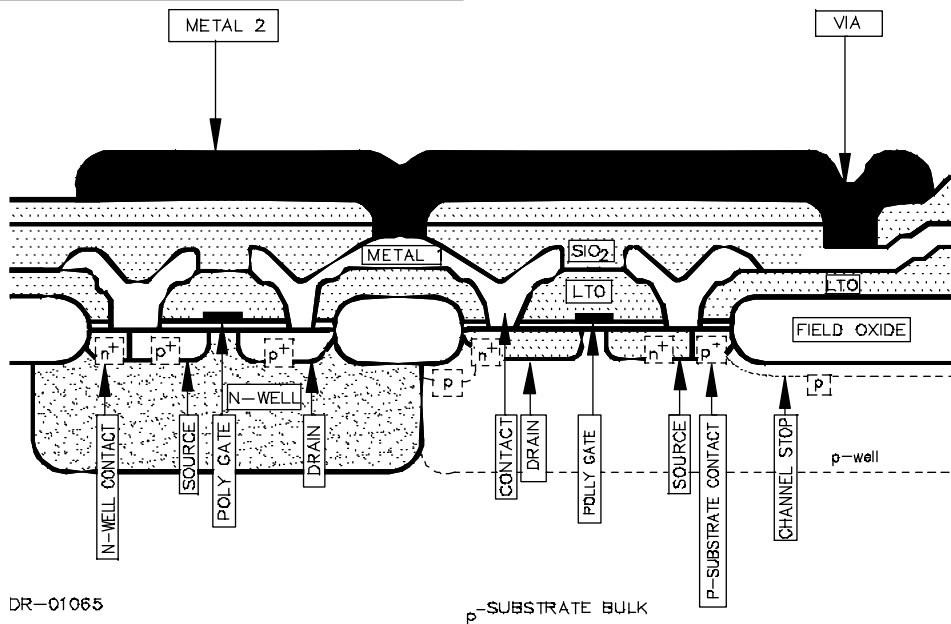
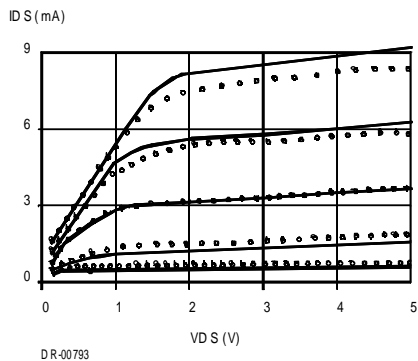


Physical Characteristics

Process Geometry	2.0 Micron	Metal I Space	3 μ m
Process Number	C2040	Metal II Width	3.0 μ m
Operating Voltage	5v	Metal II Space	4.0 μ m
Well Doping	TWIN-WELL	Gate Poly Width	2.0 μ m
Metal Layers	2	Gate Poly Space	2.5 μ
Poly Layers	1	N+/P+Space	4 μ
Contact	2.0 x 5.0 μ m	N+ to N-WELL	7 μ m
Via	2.0 x 2.0 μ m	N+ to P+ in NWELL	3.5 μ m
Metal I Width	2.0 μ m		

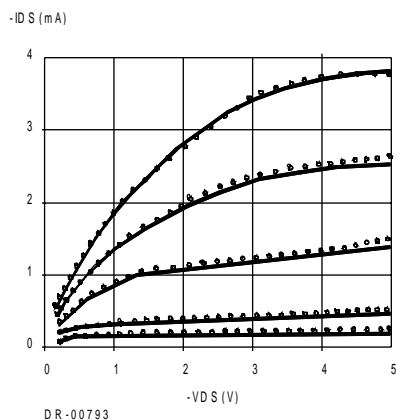


CROSS SECTIONAL VIEW OF THE CMOS2.0 PROCESS



DR-00783

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



DR-00793

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

Twin-Well Single Poly Process

Electrical Characteristics

n-ch transistor

(T = +25°C unless otherwise noted)

Parameters	Sym	Min	Typ	Max	Unit	Comments
Threshold Voltage (Linear extrapolated)	V_{TO_N}	0.58	0.7	0.82	V	50/2 device
Body Factor	γ_N	0.5	0.6	0.8	$V^{1/2}$	50/50 device
Gain factor	KPN	44	53	60	$\mu A/V^2$	
Effective Channel Length	L_{eff_N}	1.25	1.50	1.75	μm	50/2 device
Width Encroachment	W_{eff_N}	2.6	2.9	3.2	μm	3/50 device
Punch Through Voltage	$BVDSS_N$	10	16		V	50/2 device
Poly Field Threshold	$VTF_{P(N)}$	15	19		V	50/3.5 device

p-ch transistor

Threshold Voltage (Linear extrapolated)	V_{TO_P}	-0.82	-0.70	-0.58	V	50/2 device
Body Factor	γ_P	0.5	0.54	0.80	$V^{1/2}$	50/50 device
Gain Factor	KPP	17	19	21	$\mu A/V^2$	
Effective Channel Length	L_{eff_P}	1.35	1.6	1.85	μm	50/2 device
Width Encroachment	W_{eff_P}	2.6	2.9	3.2	μm	3/50 device
Punch Through Voltage	$BVDSS_P$		-16	-10	V	50/2 device
Poly Field Threshold	$VTF_{P(P)}$		-12	-10	V	

diffusion & thin films

Well Sheet Resistance	R_W	2.6	3.5	3.8	$k\Omega/\square$	n-well
N+ Sheet Resistance	R_{N+}	24	27	30	Ω/\square	
N+ Junction Depth	X_{jN+}		0.5		μm	
P+ Sheet Resistance	R_{P+}	80	95	110	Ω/\square	
P+ Junction Depth	X_{jP+}		0.55		μm	
Gate Poly Sheet Resistance	RPOLY	23	27	32	Ω/\square	
Metal 1 Sheet Resistance (DLM)	R_{M1}	35	43	60	$m\Omega/\square$	
Metal 2 Sheet Resistance (DLM)	R_{M2}	25	30	50	$m\Omega/\square$	

capacitance

Gate Oxide	C_{OX}	0.79	0.845	0.910	$fF/\mu m^2$	
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		$fF/\mu m^2$	