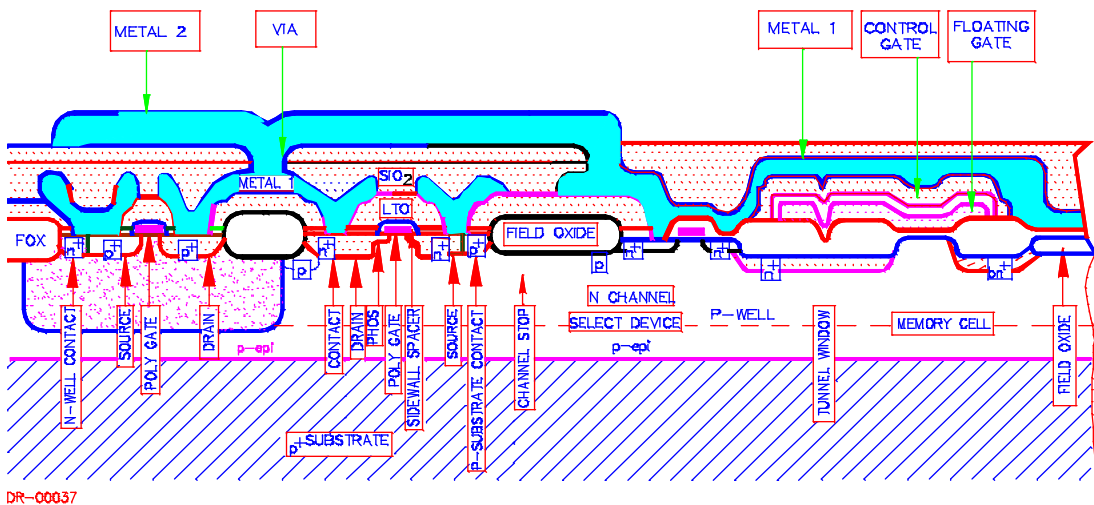
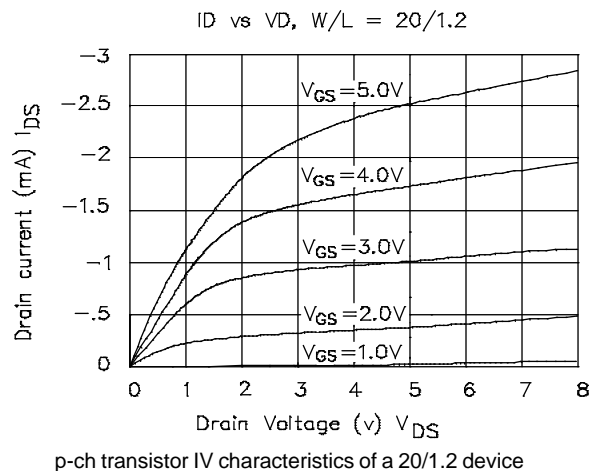
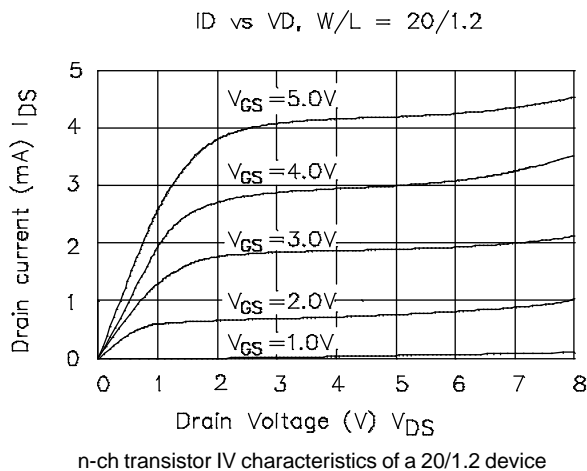


Physical Characteristics

Process Geometry	1.2 Micron	Metal II Width	2.5 μ
Process Number	C1209	Metal II Space	1.5 μ
Operating Voltage	5V	Gate Poly Width	1.5 μ
Well Doping	N-WELL	Gate Poly Space	2.0 μ
Metal Layers	2	Bottom Poly Width	3.0 μ
Poly Layers	2	Bottom Poly Space	2.0 μ
Contact	1.5 μ	N+/P+ Width	2.0 μ
Via	1.5 μ	N+/P+ Space	2.0 μ
Metal I Width	2.5 μ	N+ to N-WELL	7.0 μ
Metal I Space	1.5 μ	N+ to P+	9.0 μ



CROSS-SECTIONAL VIEW OF THE EECMOS1.2 PROCESS



EECMOS 1.2 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}	0.55	0.75	0.95	V	100/1.2 device
Body Factor	γ_N		0.34		$V^{1/2}$	100/1.2 device
Conduction factor (normalized)	β_N	64	75	86	$\mu A/V^2$	100/100 device
Effective Channel Length	L_{eff_N}	0.8	1.0	1.2	μm	100/1.0 device
Width Encroachment	ΔW_N		0.6		μm	per side
Punch Through Voltage	$BVDSS_N$	9			V	100/1.0 device
Poly Field Threshold	$VTF_{P(N)}$	10			V	
Threshold Voltage Offset (two Sigmas)	ΔVT_N		5		mV	100/10 device

p-ch transistor

Threshold Voltage (linear extrapolated)	V_{TO_P}	-1.1	0.9	-0.7	V	100/1.2 device
Body Factor	γ_P		0.38		$V^{1/2}$	100/1.2 device
Conduction Factor (normalized)	β_P	21	25	29	$\mu A/V^2$	100/100 device
Effective Channel Length	L_{eff_P}	0.9	1.1	1.3	μm	100/1.2 device
Width Encroachment	ΔW_P		0.8		μm	per side
Punch Through Voltage	$BVDSS_P$			-9	V	100/1.2 device
Poly Field Threshold	$VTF_{P(P)}$			-10	V	
Threshold Voltage Offset (two Sigmas)	ΔVTP		5		mV	100/10 device

EECMOS Characteristics

Tunnel Thickness	$t_{TUNNEL\ OX}$		90		Å	
Interpoly Oxide Thickness	$T_{INTERPOLY\ OX}$		400		Å	
Buried N+ Sheet Resistance	P_{BN+}		200		Ω/\square	
Initial Program/Erase Window			6		V	
Unprogrammed Memory Threshold	VT		1.7		V	
Endurance			10^6		Cycles	
Programming Voltage	V_{PP}		13		V	

diffusion & thin films

Well (field) Sheet Resistance	$\rho_{N-(f)}$	0.6	1.0	1.3	$k\Omega/\square$	n-well
N+ Sheet Resistance	ρ_{N+}	20	35	50	Ω/\square	
N+ Junction Depth	X_{jN+}		0.30		μm	
P+ Sheet Resistance	ρ_{P+}	50	75	100	Ω/\square	
P+ Junction Depth	X_{jP+}		0.30		μm	
Gate Poly Sheet Resistance	$\rho_{POLY(N)}$	15	22	30	Ω/\square	
Bottom Poly Sheet Resistance	ρ_{M1}		35		$m\Omega/\square$	
Metal 1 Sheet Resistance	ρ_{M1}		50		$m\Omega/\square$	
Metal 2 Sheet Resistance	ρ_{M2}		30		$m\Omega/\square$	

capacitance

Gate Oxide	C_{OX}	1.28	1.38	1.58	$fF/\mu m^2$	
Poly Gate To Bottom Poly	C_{DP}		0.86		$fF/\mu m^2$	Interpoly capacitor
Metal 1 to Poly	C_{M1P}		0.057		$fF/\mu m^2$	
Metal 2 to Metal 1	C_{MM}		0.035		$fF/\mu m^2$	