LP SRAM DUAL PORT HVT MODELS (NHVTPDDP, NHVTPGDP, PHVTPUDP)

1. CONDITIONS OF EXTRACTION

- Maturity: Pre production
- Geometrical extraction domain:
- Density 2.30µm^2
  - Pull Down Transistor : W=0.475µm, L=0.115µm
  - Pass Gate Transistor : W=0.155µm, L=0.13µm
  - Pull Up Transistor : W=0.165µm, L=0.115µm
- Density 1.99µm^2
  - Pull Down Transistor : W=0.435µm, L=0.1µm
  - Pass Gate Transistor : W=0.125µm, L=0.115µm
  - Pull Up Transistor : W=0.13µm, L=0.115µm
- Temperature extraction domain:
  - -40 ˚C to 150 ˚C
- Bias extraction domain:
  - Gate bias: 0 ≤ |VGS| ≤ 1.32 V (Vdd + 10%)
  - Drain bias: 0 ≤ |VDS| ≤ 1.32 V (Vdd + 10%)
  - Bulk bias: 0 ≤ |VBS| ≤ 1.32 V (Vdd + 10%)

2. CONDITIONS OF SIMULATION

- Temperature:

  25C
- Threshold Voltages:

  VTLIN = Vgs for Ids = 40nA x (Wdrawn/Ldrawn) at Vds = 25 mV and Vbs = 0 V.

  VTSAT = Vgs for Ids = 40nA x (Wdrawn/Ldrawn) at Vds = 1.2 V and Vbs = 0 V
- Currents:

  ION = Ids at Vgs = 1.2 V, Vds = 1.2 V and Vbs = 0 V.

  IOFF = Ids at Vgs = 0 V, Vds = 1.2 V and Vbs = 0 V.

  IG_ON = Igs at Vgs = 1.2 V, Vds = 1.2 V and Vbs = 0 V.

  IG_OFF = Igs at Vgs = 0 V, Vds = 1.2 V and Vbs = 0 V.
- SRAM Figures of Merit:

  Stand-By Current (Isb)

Read current (ICell2)

Write Margin (WM)

Static Noise Margin (SNM)

3. MAIN ELECTRICAL CHARACTERISTICS OF NHVTPDDP TRANSISTORS

W=0.475µm, L=0.115µm

PARAMETERS	SS	SF	TT	FS	FF	Units
VTLIN	575	589	518	447	459	mV
ION	108.3	113.9	136.8	160.3	171.7	µA
IOFF	1.11	1.18	3.22	11.4	10.8	pA
IG_ON	0.72	1.34	1.47	1.61	3.0	pA
IG_OFF	-0.18	-0.36	-0.36	-0.36	-0.72	pA

W=0.435µm, L=0.1µm

PARAMETERS	SS	SF	TT	FS	FF	Units
VTLIN	591	606	532	458	471	mV
ION	105.4	107.6	134.5	159.2	171.5	µA
IOFF	1.23	1.29	3.88	1.54	1.51	pA
IG_ON	0.57	1.08	1.17	1.28	2.38	pA
IG_OFF	-0.17	-0.33	-0.33	-0.33	-0.66	pA

4. MAIN ELECTRICAL CHARACTERISTICS OF NHVTPGDP TRANSISTORS

W=0.155µm, L=0.13µm

PARAMETERS	SS	SF	TT	FS	FF	Units
VTLIN	527	540	468	395	409	mV
ION	37.7	41.7	51.1	61.4	68.7	µA
IOFF	0.32	0.35	1.18	5.85	5.09	pA
IG_ON	0.26	0.50	0.56	0.62	1.19	pA
IG_OFF	-0.05	-0.11	-0.11	-0.11	-0.23	pA

W=0.125µm, L=0.115µm

PARAMETERS	SS	SF	TT	FS	FF	Units
VTLIN	528	542	468	391	406	mV
ION	32.7	36.8	45.3	54.6	62.5	µA
IOFF	0.32	0.36	1.45	8.79	8.14	pA
IG_ON	0.18	0.36	0.4	0.44	0.86	pA
IG_OFF	-0.04	-0.09	-0.09	-0.09	-0.19	pA

5. MAIN ELECTRICAL CHARACTERISTICS OF PHVTPUDP TRANSISTORS

W=0.165µm, L=0.115µm

PARAMETERS	SS	SF	TT	FS	FF	Units
VTLIN	544	366	470	560	386	mV
ION	17.1	31.1	24.1	18.6	34.2	µA
IOFF	0.21	13.6	1.0	0.18	8.67	pA
IG_ON	0.06	0.17	0.14	0.12	0.33	pA
IG_OFF	-0.005	-0.01	-0.01	-0.01	-0.02	pA

W=0.13µm, L=0.115µm

PARAMETERS	SS	SF	TT	FS	FF	Units
VTLIN	545	366	470	560	385	mV
ION	13.4	24.7	19.1	14.7	27.5	µA
IOFF	0.16	10.6	0.78	0.14	6.84	pA
IG_ON	0.05	0.13	0.11	0.10	0.27	pA
IG_OFF	-0.005	-0.009	-0.009	-0.009	-0.02	pA

6. MAIN ELECTRICAL CHARACTERISTICS OF DUAL PORT SRAMS

2.30µm^2

PARAMETERS	SS	SF	TT	FS	FF	Units
Isb per Cell	2.96	17.4	8.65	25.5	33.94	pA
ICell2	23.4	17.4	32.4	39.8	44.3	µA
WM	316.1	238.1	342.1	451.1	367.1	mV
SNM	266.1	292.9	244.5	193.2	218.2	mV

1.99µm^2

PARAMETERS	SS	SF	TT	FS	FF	Units
Isb per Cell	2.82	14.1	9.2	34.8	41.65	pA
ICell2	21.8	24.1	30.66	37.85	42.9	µA
WM	334.1	261.1	362.1	469.1	390.1	mV
SNM	262.8	284.5	240.4	191.6	211.5	mV

7. COMPARISON VERSUS PREVIOUS RELEASE

2.30µm^2

SRAM Dual Port 2.30µm^2		**V1.1.x**
ICell2 (µA)	TT 1.2V 25C	32.4
	SS 1.08V 125C	13.8
Isby (pA/cell)	TT 1.2V 25C	8.65
	FF 1.32V 25C	38.9
SNM (mV)	TT 1.2V 25C	244.5
	FS 1.08V 125C	155.8
WM (mV)	TT 1.2V 25C	342.1
	SF 1.08V -40C	177.1

1.99µm^2

SRAM Dual Port1.99µm^2		**V1.1.x**
ICell2 (µA)	TT 1.2V 25C	30.66
	SS 1.08V 125C	13.15
Isby (pA/cell)	TT 1.2V 25C	9.2
	FF 1.32V 25C	47.4
SNM (mV)	TT 1.2V 25C	240.4
	FS 1.08V 125C	150.4
WM (mV)	TT 1.2V 25C	362.1
	SF 1.08V -40C	199.1

8. MISMATCH PARAMETERS CHANGE

AVT (mV.µm)	**V1.1.x**
Pass Gate	4.82
Pull Down	5.95
Pull Up	4.29