

GEI810

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INTRODUCTION

Spécifications demandées:

Un gain en tension A_v en boucle ouverte de $> 5000V/V$

GBW de ≥ 5 MHz

Une puissance dissipée ≤ 1 mW

Une vitesse de balayage (slew rate) ≥ 10 V/ μ s

Une plage dynamique en sortie $V_o \sim 1$ V

ICMR au minimum de 0.9 V à 1.5 V

Marge de phase de ≥ 60 degrés

0 décalage systématique à l'entrée

Le niveau DC de la sortie $V_o = V_{DD}/2$.

Taille minimum

Une charge capacitive à la sortie V_o de $C_L = 1$ pF

V_{DD} de 1.8 V par rapport à la masse ($V_{SS} = 0$ V)

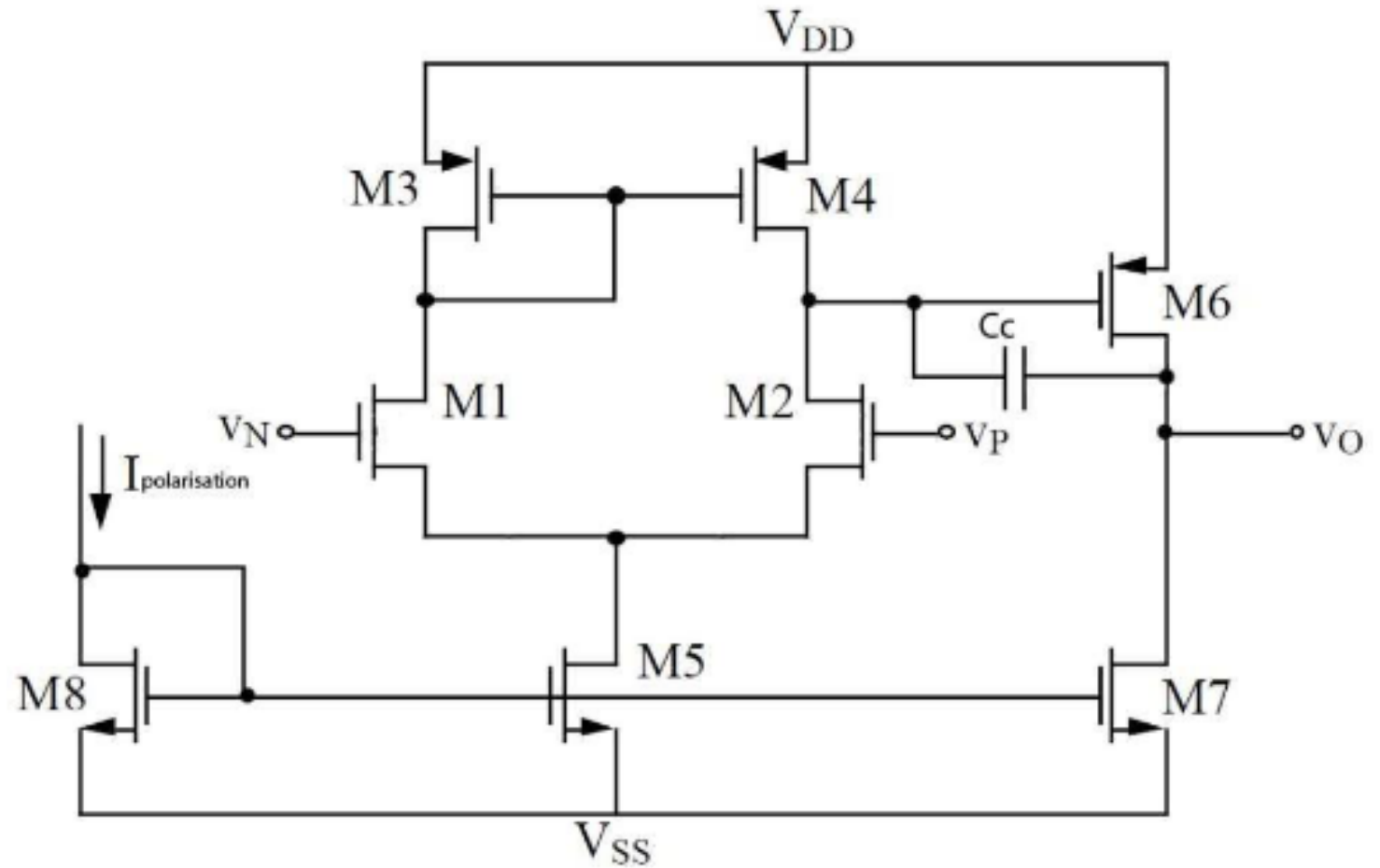


SCHÉMA DU CIRCUIT CONÇU

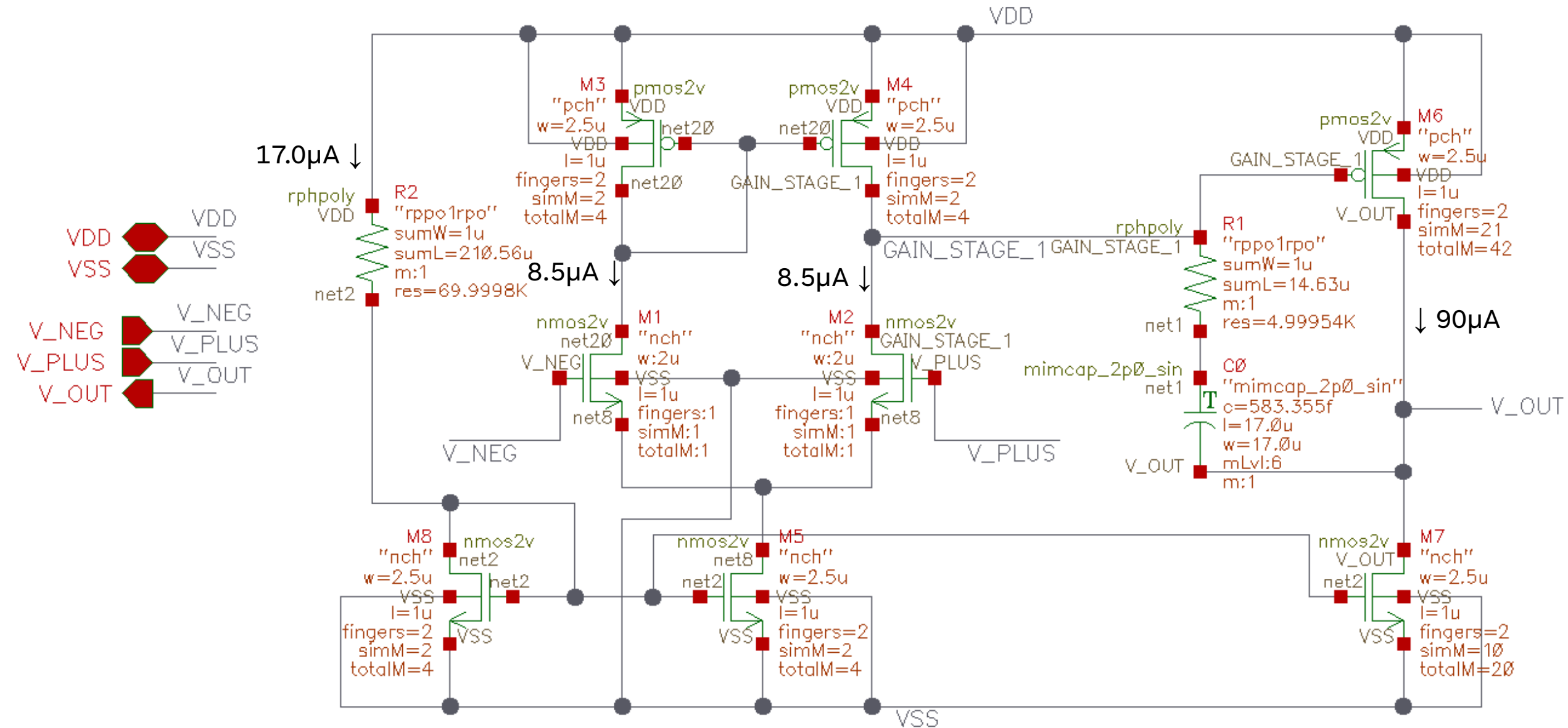
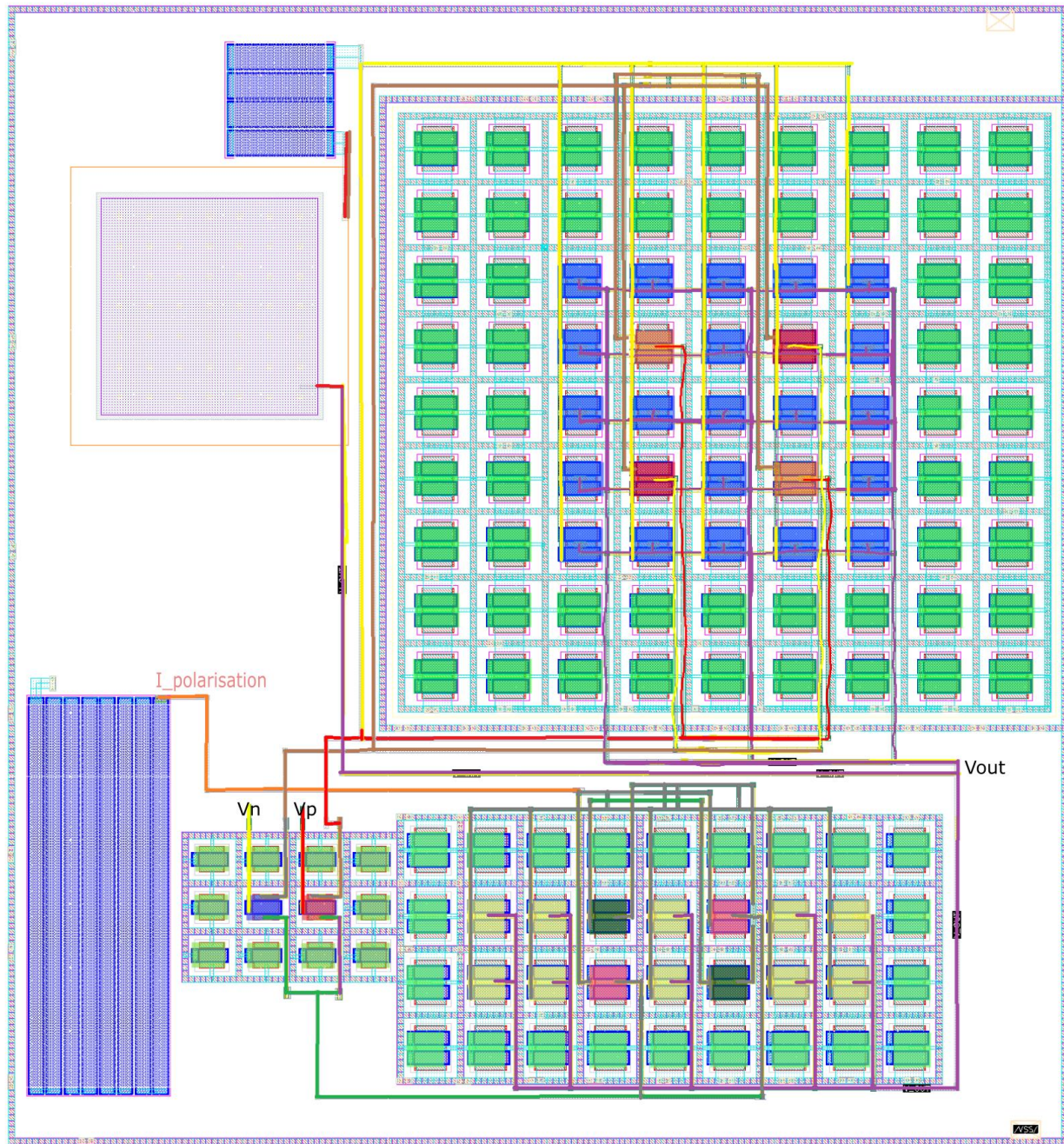


SCHÉMA DU CIRCUIT CONÇU (DONNÉES)

CMOS						
	W	L	W/L	Fingers	M	Total
M1	2.0μm	1μm	2	1	1	1
M2	2.0μm	1μm	2	1	1	1
M3	2.5μm	1μm	2.5	2	2	4
M4	2.5μm	1μm	2.5	2	2	4
M5	2.5μm	1μm	2.5	2	2	4
M6	2.5μm	1μm	2.5	2	21	42
M7	2.5μm	1μm	2.5	2	10	20
M8	2.5μm	1μm	2.5	2	2	4

Passifs			
	Valeur	W	L
R1	5KΩ	2μm	28.82μm
R2	70KΩ	1.15μm	240.08μm
C1	583.355fF	17μm	17μm

DES MASQUES DE L'OTA



D	D	D	D	D	D	D	D	D
D	D	D	D	D	D	D	D	D
D	D	6	6	6	6	6	D	D
D	D	6	4	6	3	6	D	D
D	D	6	6	6	6	6	D	D
D	D	6	3	6	4	6	D	D
D	D	6	6	6	6	6	D	D
D	D	D	D	D	D	D	D	D
D	D	D	D	D	D	D	D	D

D	D	D	D	D	D	D	D	D
D	7	7	8	7	5	7	7	D
D	7	7	5	7	8	7	7	D
D	D	D	D	D	D	D	D	D

D	D	D	D
D	1	2	D
D	D	D	D

TABLEAU RÉSUMÉ

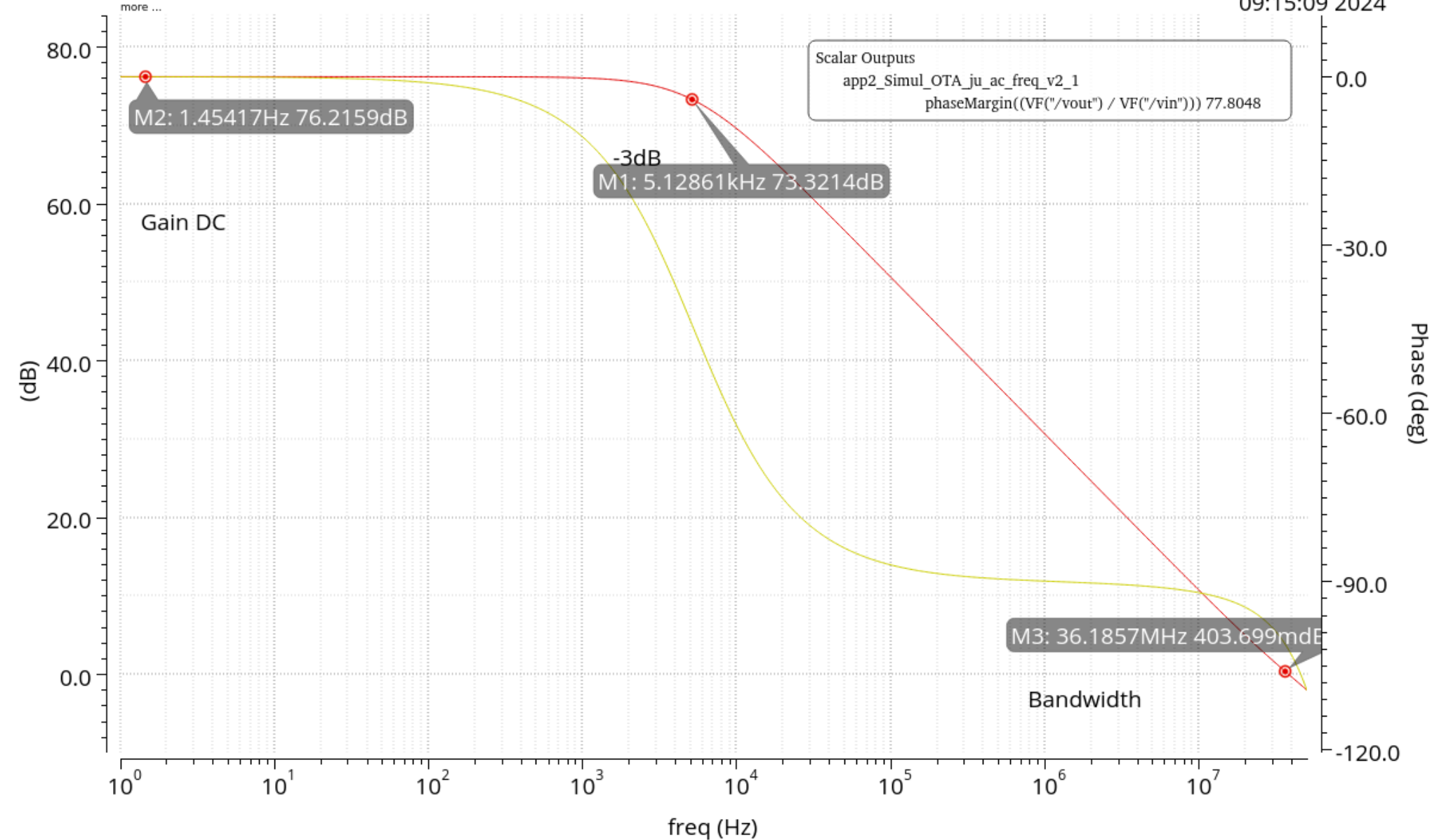
	Demandé	Calculs	Simulations	Parasites
Slew Rate (V/us)	10	29.16	22.576	19.94
Av1 (V/V)	-	-162.43	-	-
Av2 (V/V)	-	-204.10	-	-
A (dB)	74	90.41	76	76.21
Gain BW (MHz)	5	139.30	40	36.19
Pole 2 (MHz)	-	12.93	-	-
Zero 1 (MHz)	-	22.17	-	-
P CMR (V)	1.5	1.63	1.8	1.8
N CMR (V)	0.8	0.82	0.812	0.812
Marge Phase (°)	60	89.93	82.49	77.80
Pdiss (uW)	1mW	223.2	232.5	232.2
Plage Sortie (V)	1	1.497	1.72	1.72
Taille	1mmx1mm	-	-	88umx82um
Décalage (uV)	0	0	2.90	4.8
CMRR	-	65585	-	-

Gain & Marge de Phase

Mon Nov 4

1

09:15:09 2024



GAINS

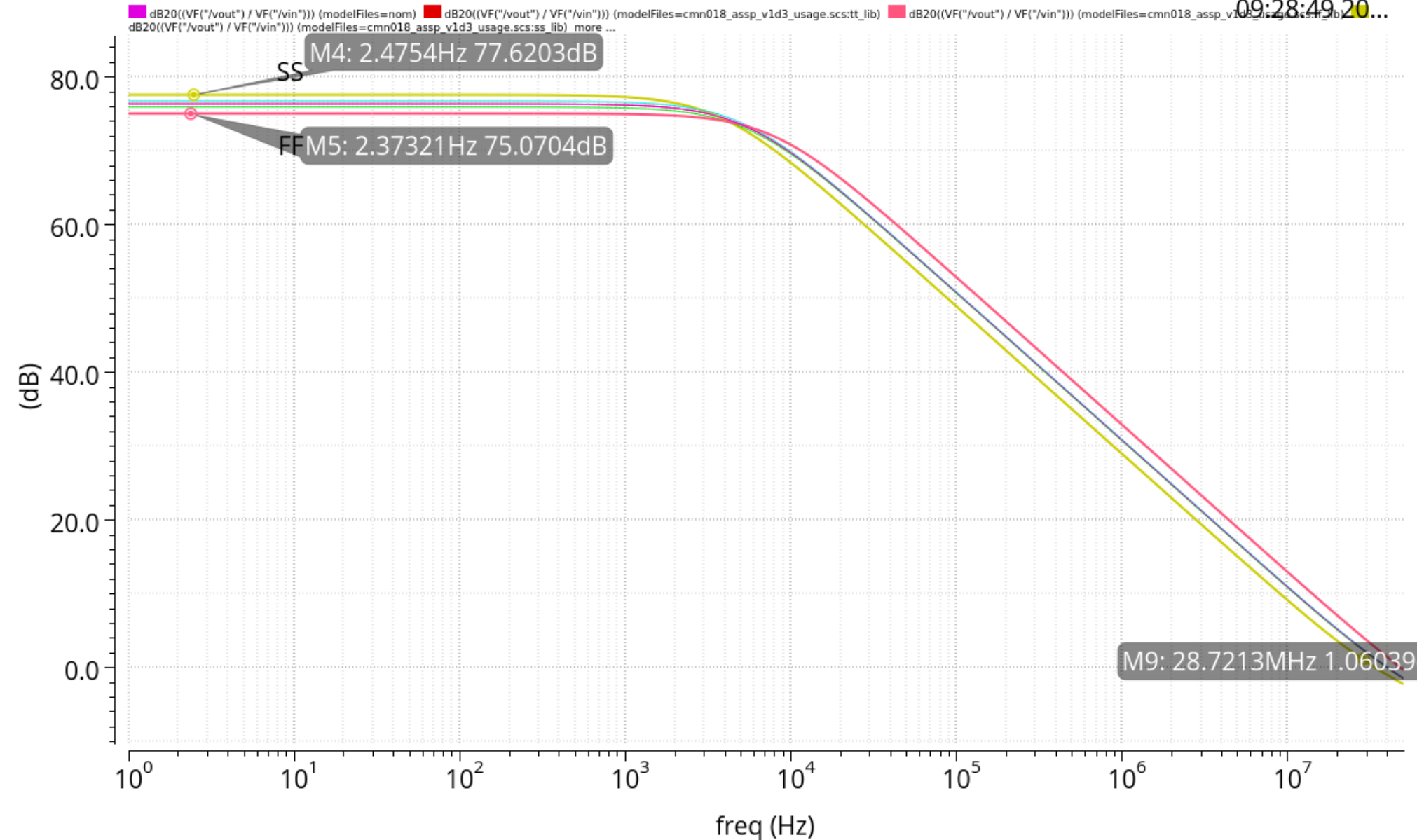
GRAPHIQUES DES CORNERS

$\text{dB20}((\text{VF}("/\text{vout}")) / \text{VF}("/\text{vin}"))$

Mon Nov 4

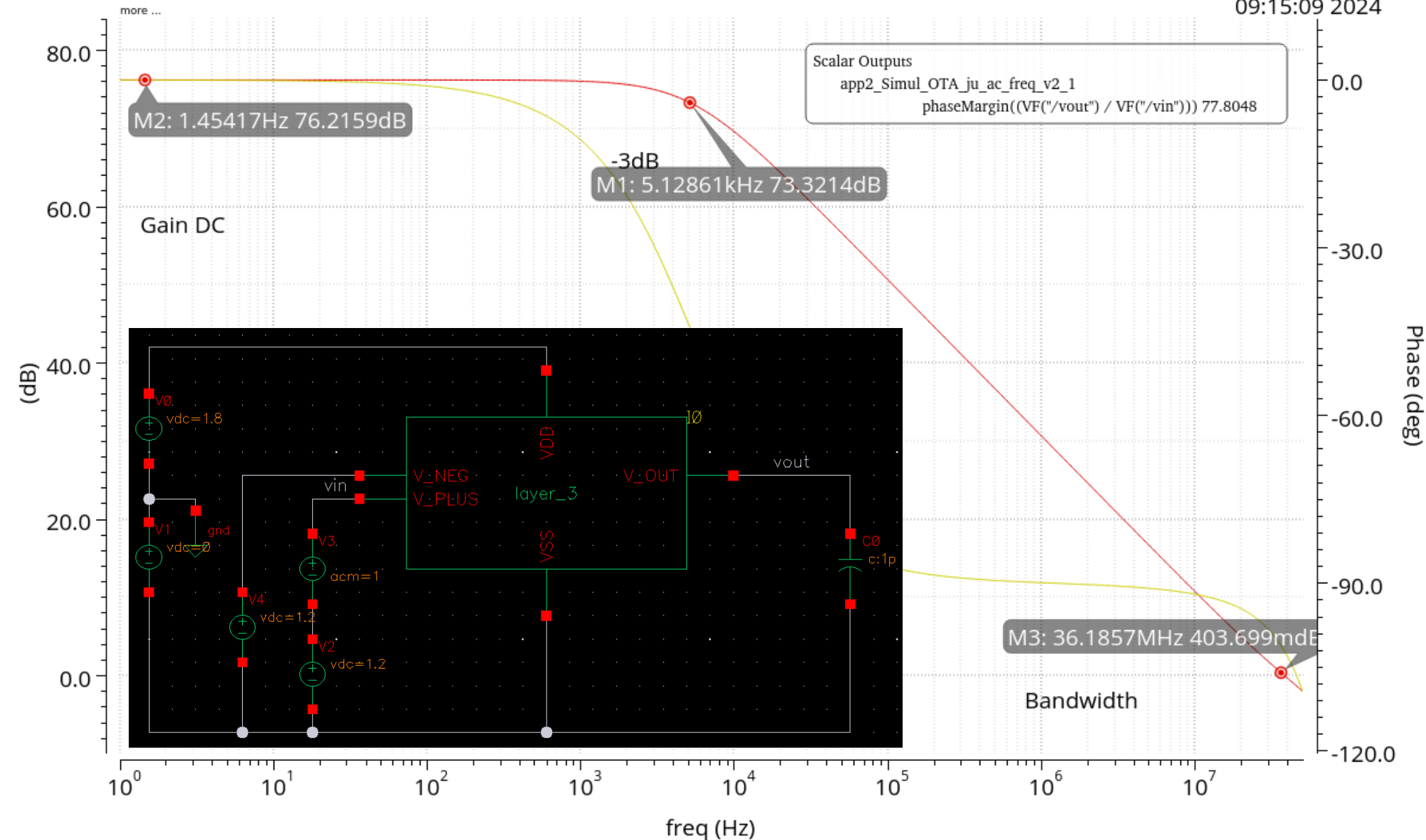
2

09:28:49.20...



GRAPHIQUES PEX

•

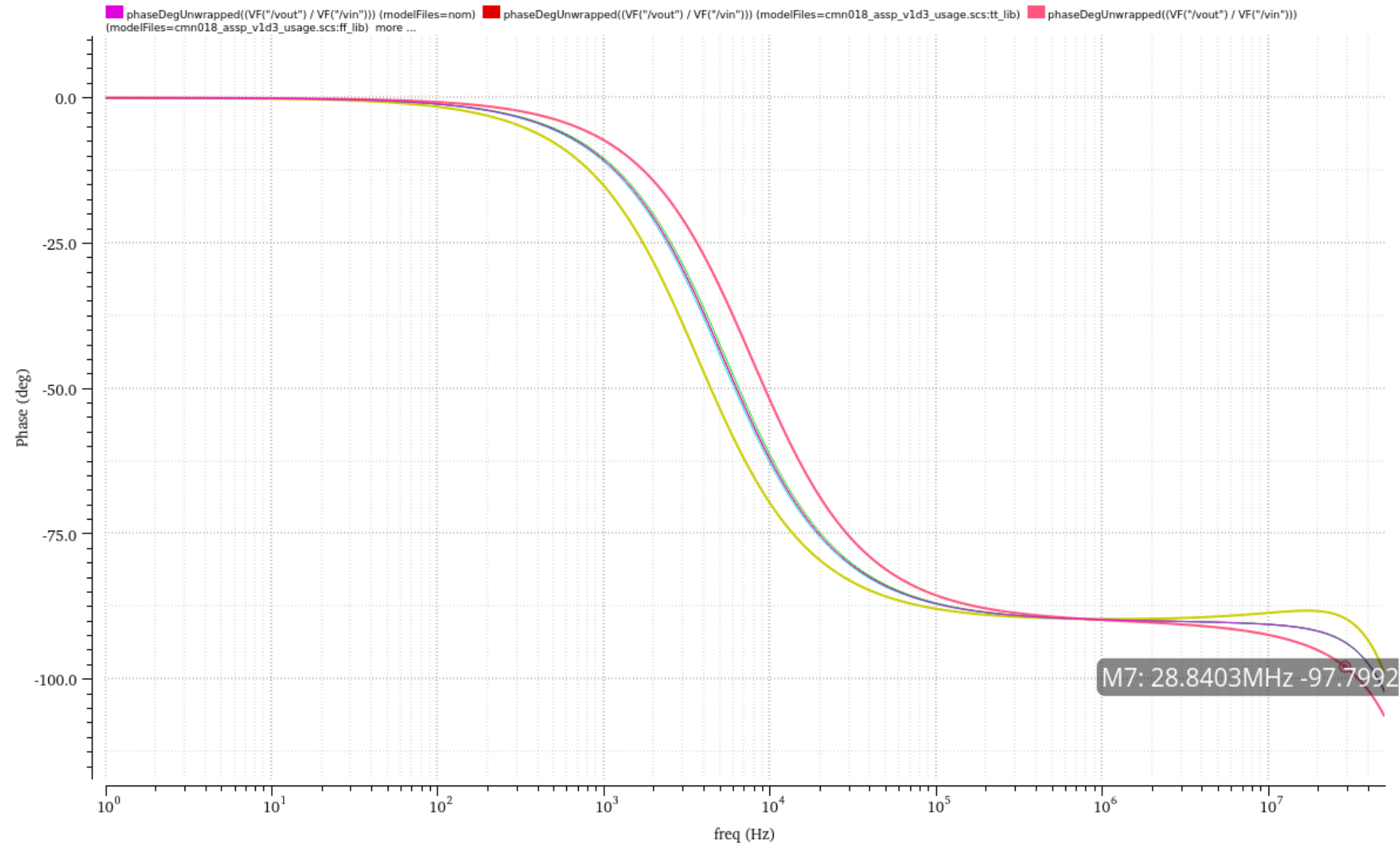


MARGES DE PHASE

GRAPHIQUES DES CORNERS

phaseDegUnwrapped((VF("/vout") / VF("/vin")))

Mon Nov 4 09:28:49 20... 3

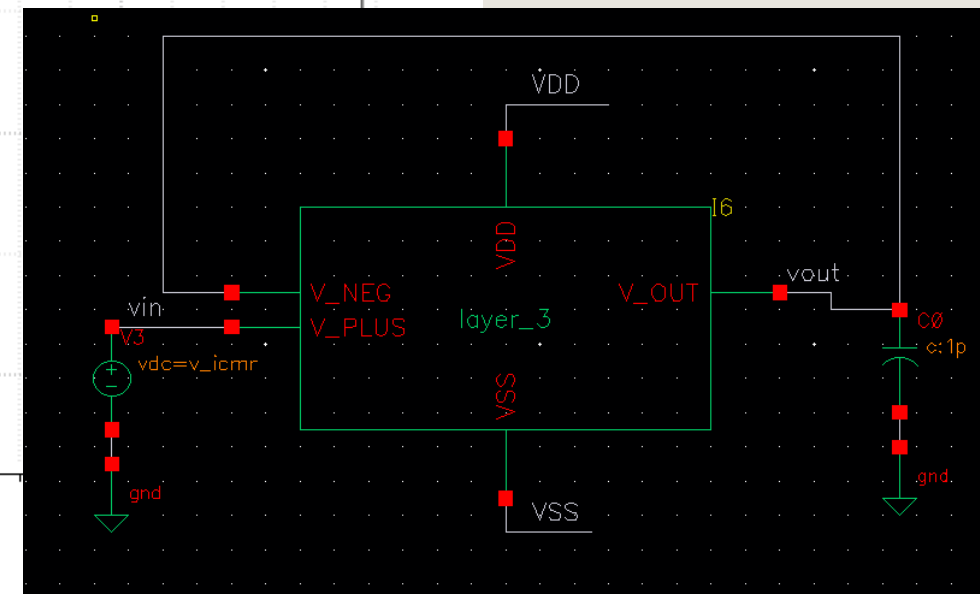
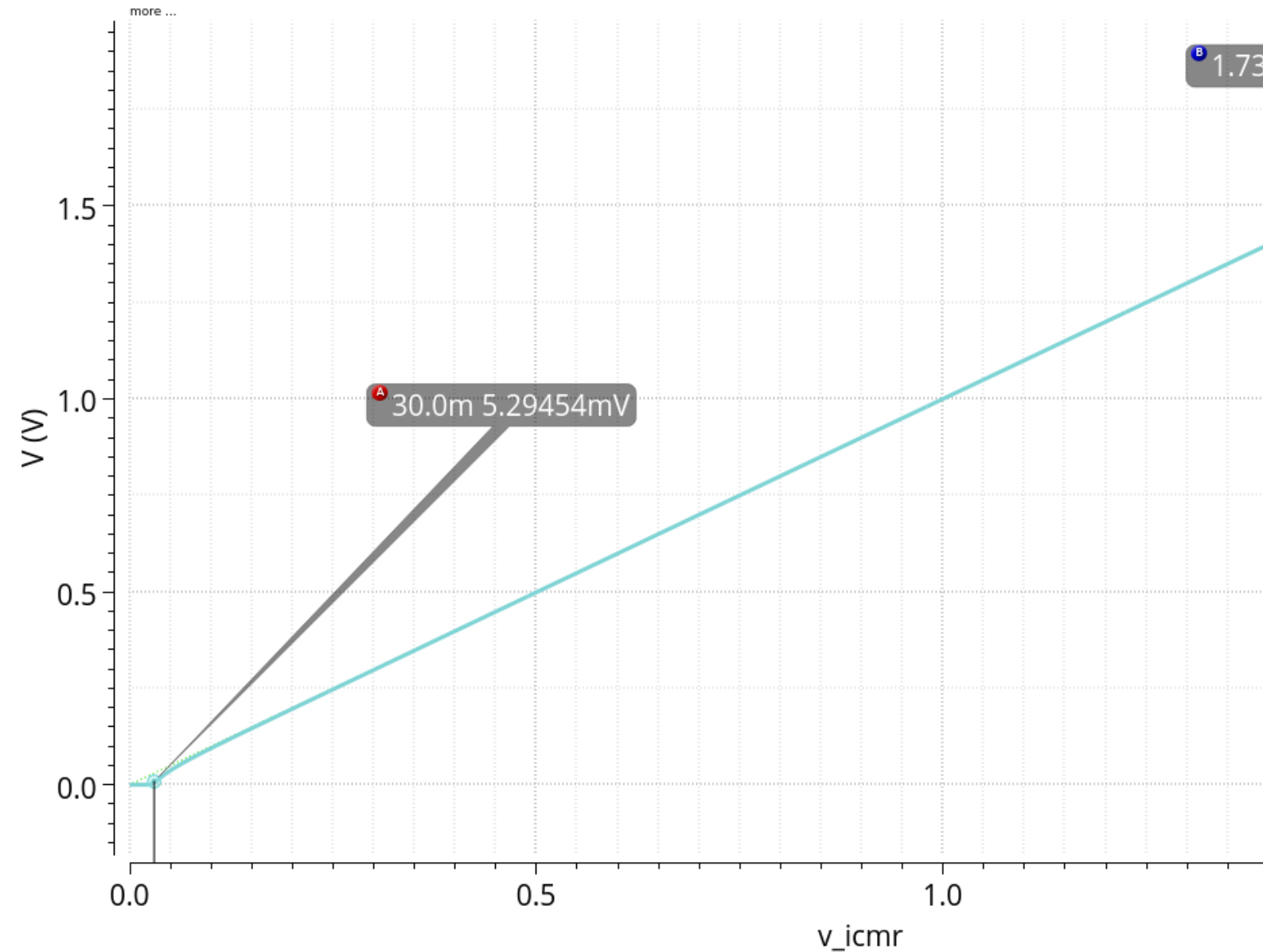


Plage Sortie

Mon Nov 4

1

09:46:27 20...



Plage Dynamique

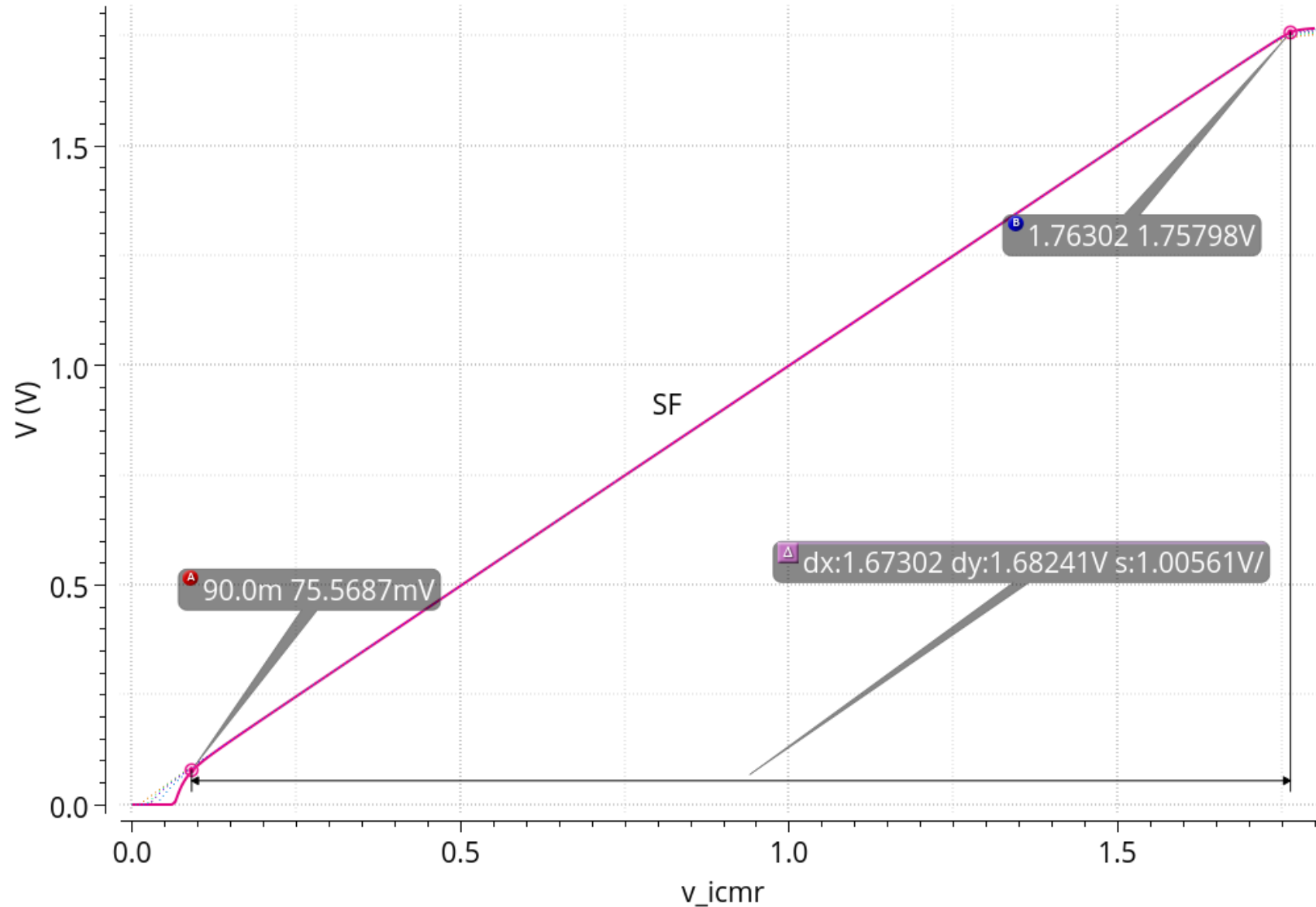
Name ... Corner

/vin		
/vout		
/vout		nom
/vout		SS
/vout		SF
/vout		FS
/vout		FF
/vout		TT

Mon Nov 4

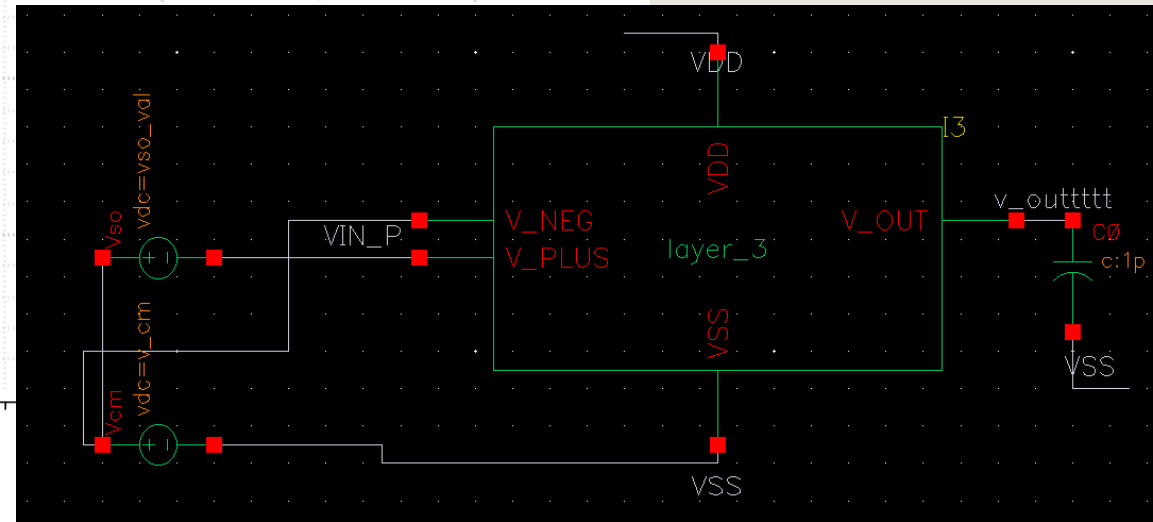
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11:35:19 20...



GRAPHIQUES PEX

Mon Nov 4 11:45:40 20...



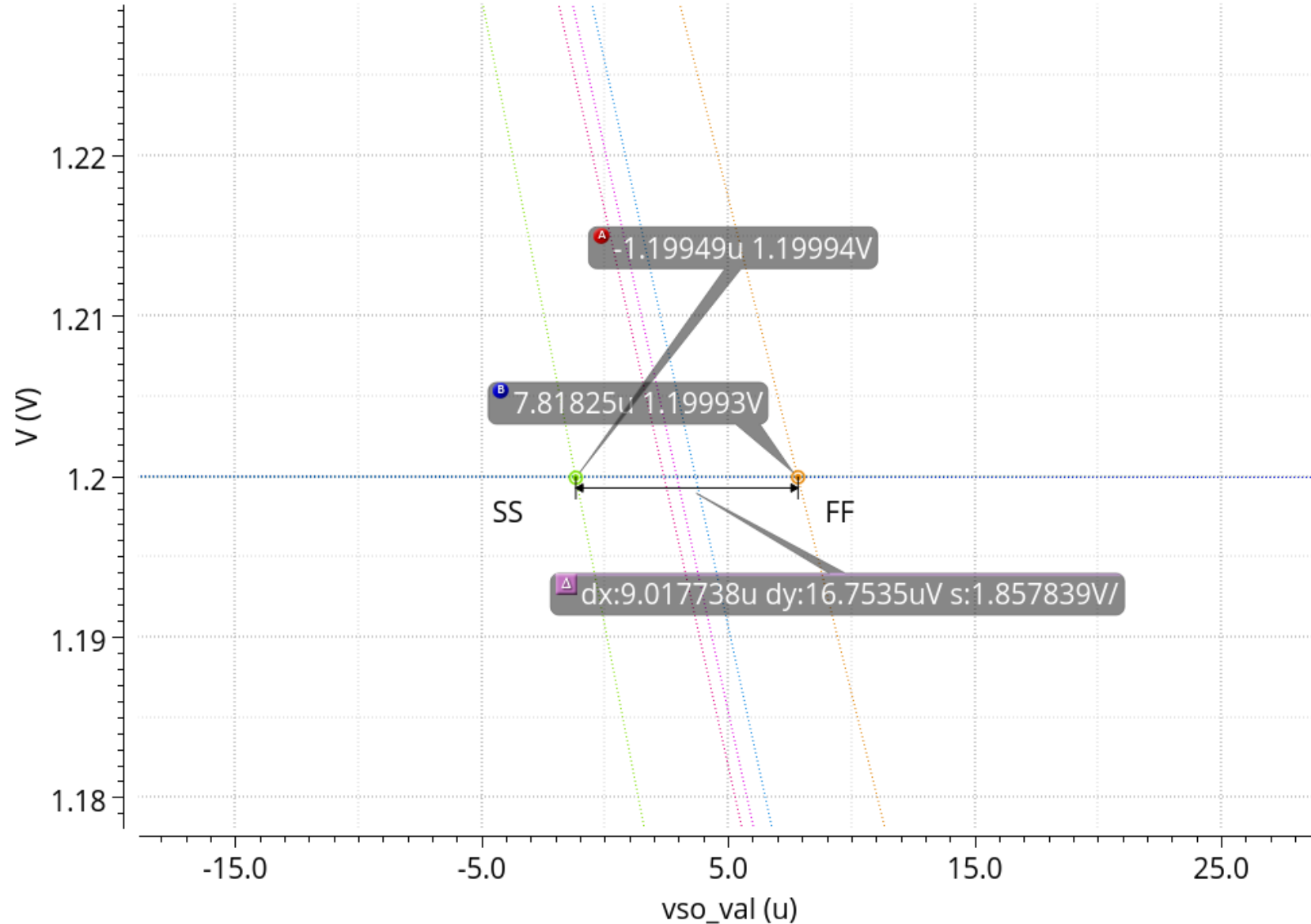
Decalage

Mon Nov 4

1

11:31:52 20...

Name	...	Corner
/VIN_P		
/v_outtttt		
/v_outtttt		SS
/v_outtttt		FF
/v_outtttt		SF
/v_outtttt		FS
/v_outtttt		TT



SLEW RATE

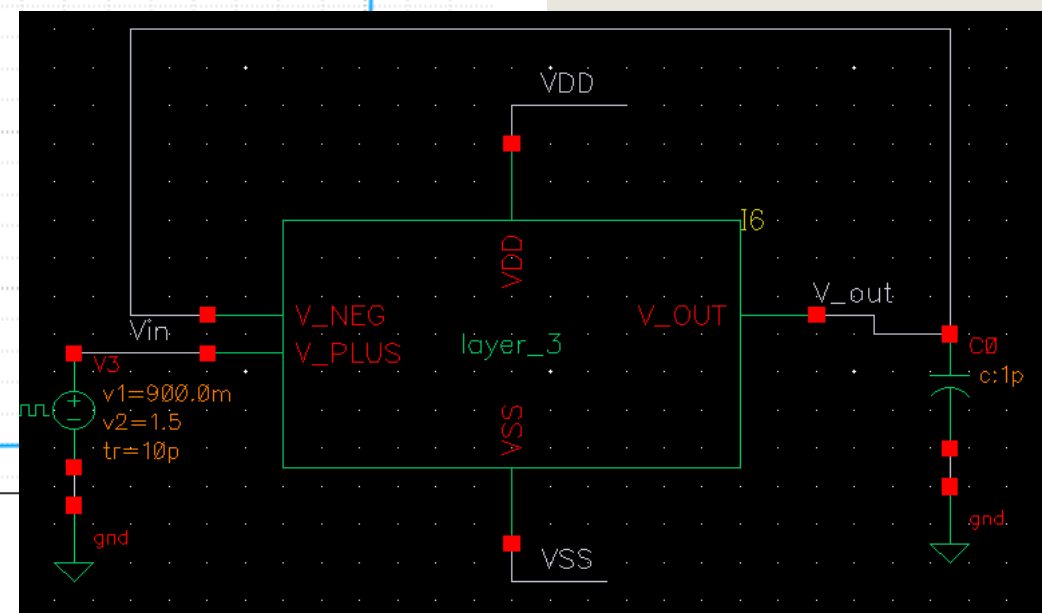
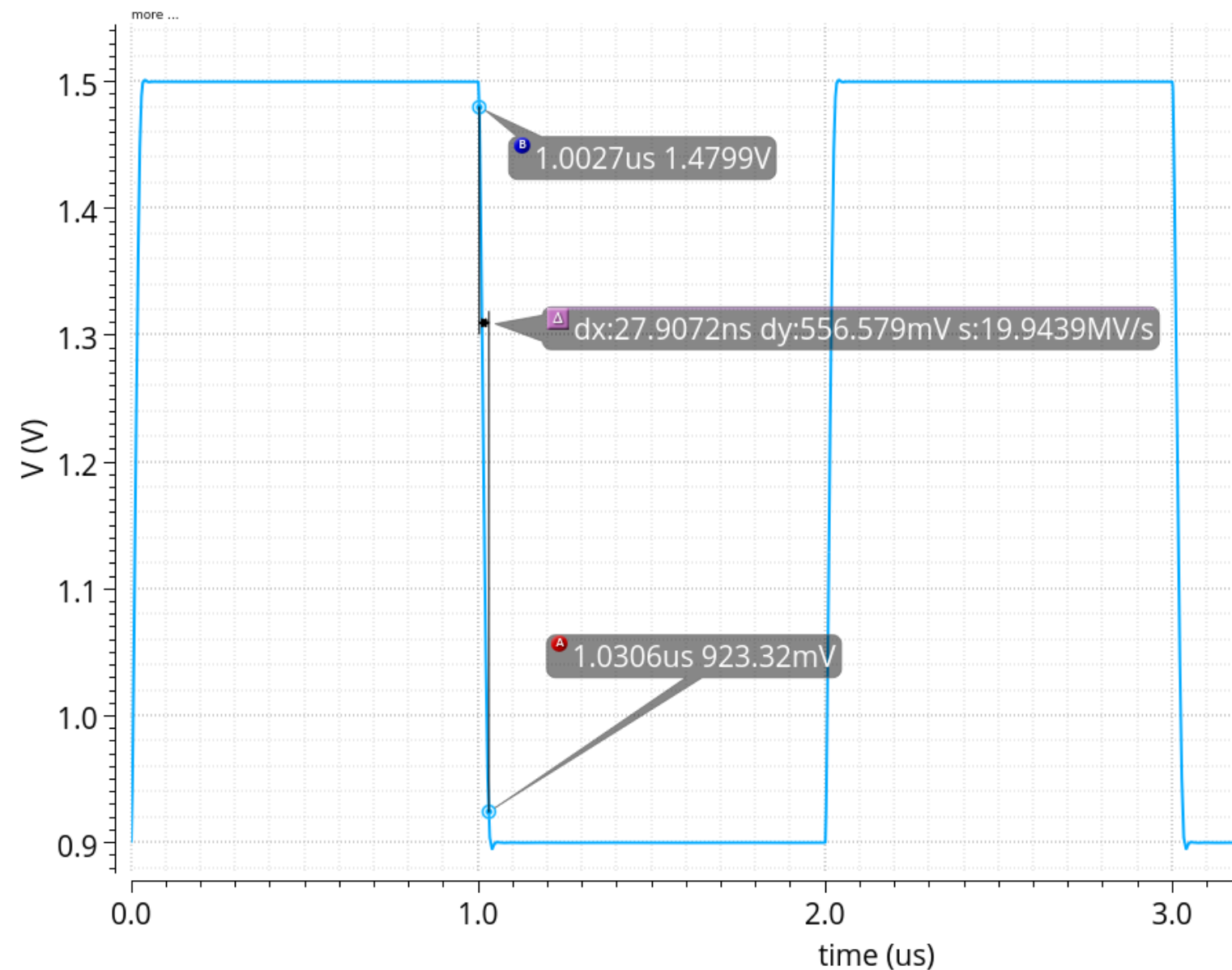
GRAPHIQUES PEX

Slewrate

Mon Nov 4

1

10:10:21 20...

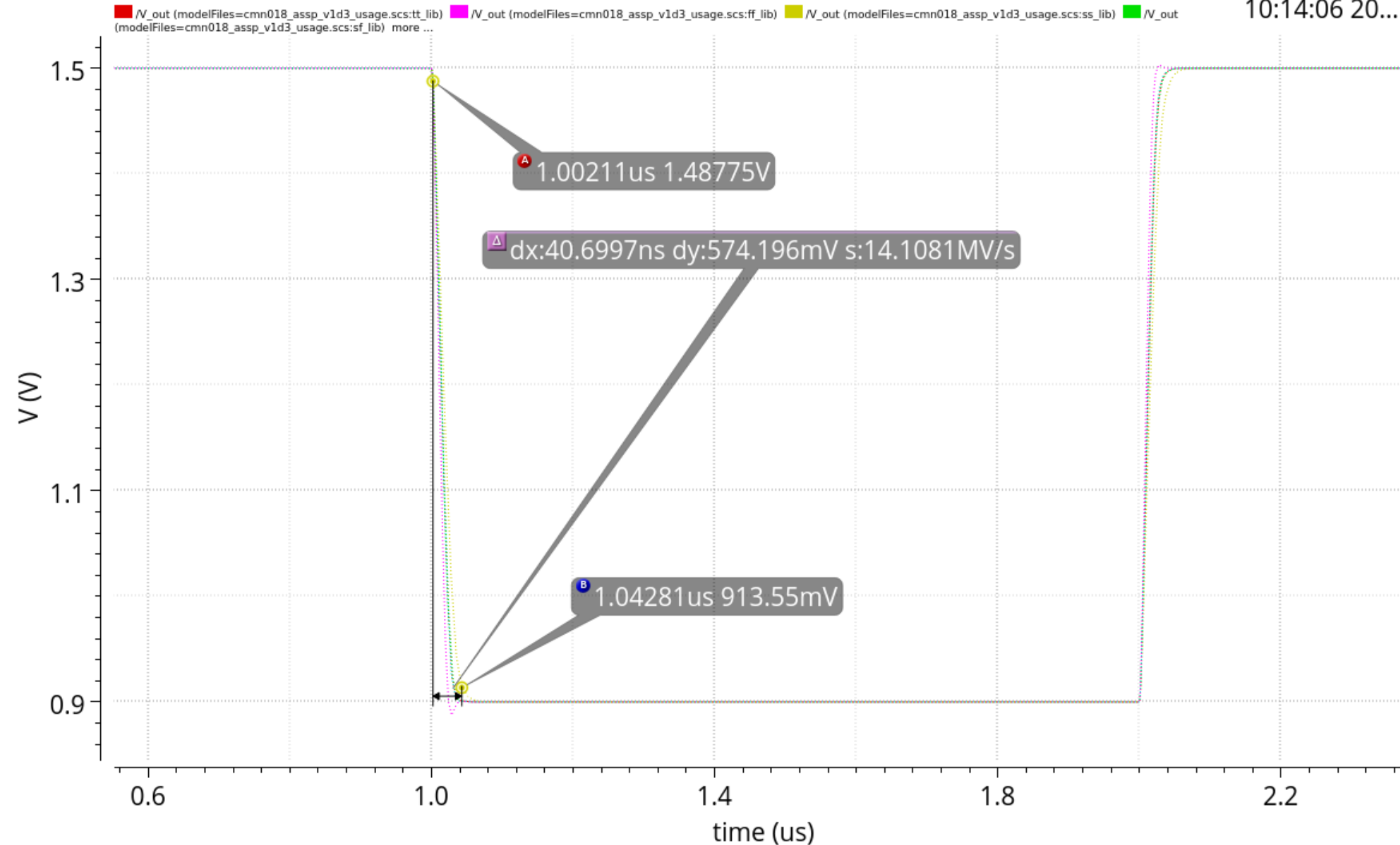


Transient Response

Mon Nov 4

1

10:14:06 20...



SATURATION

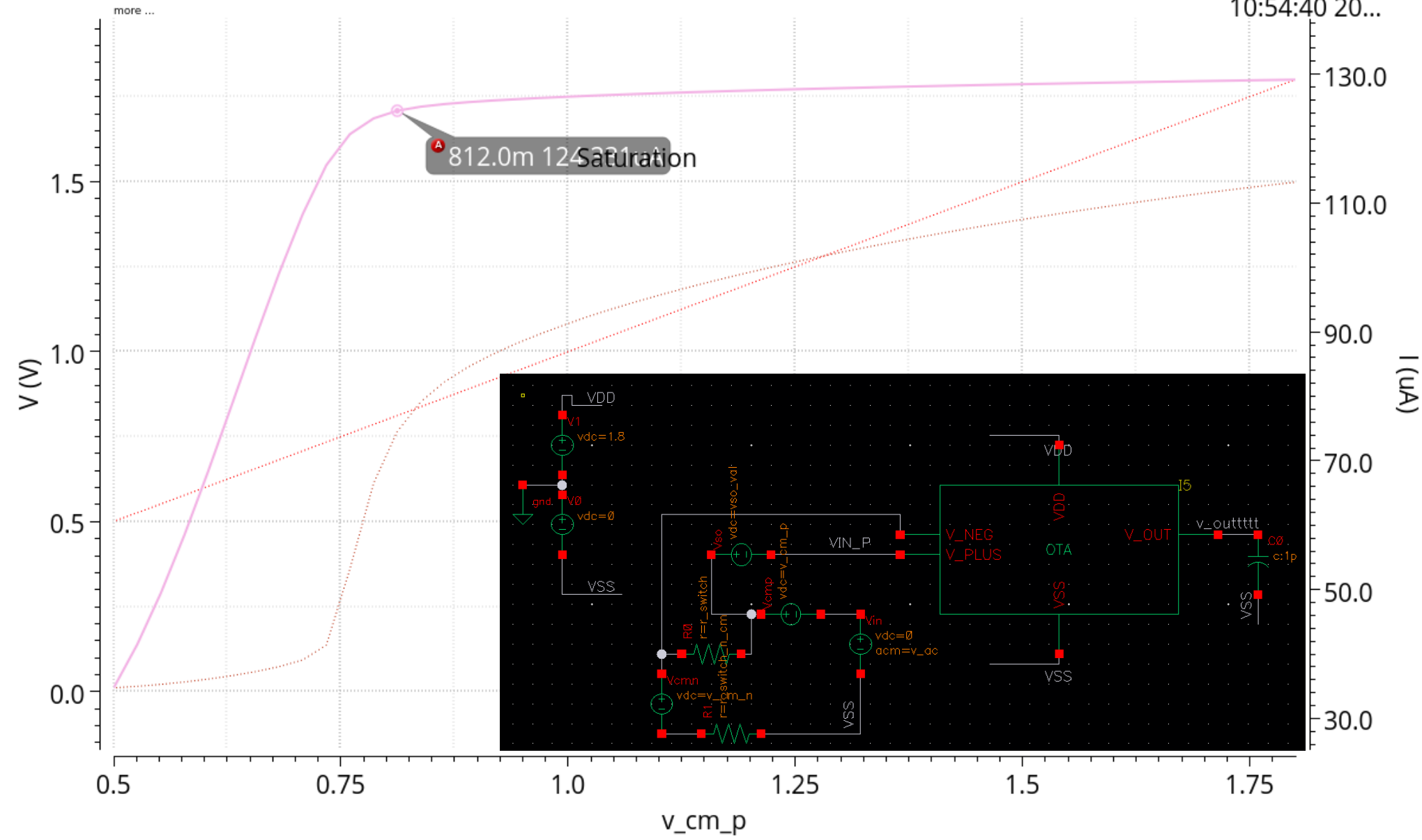
GRAPHIQUES PEX

DC Response

Mon Nov 4

1

10:54:40 20...



SATURATION

GRAPHIQUES DES CORNERS

Saturation

Name ... Corner

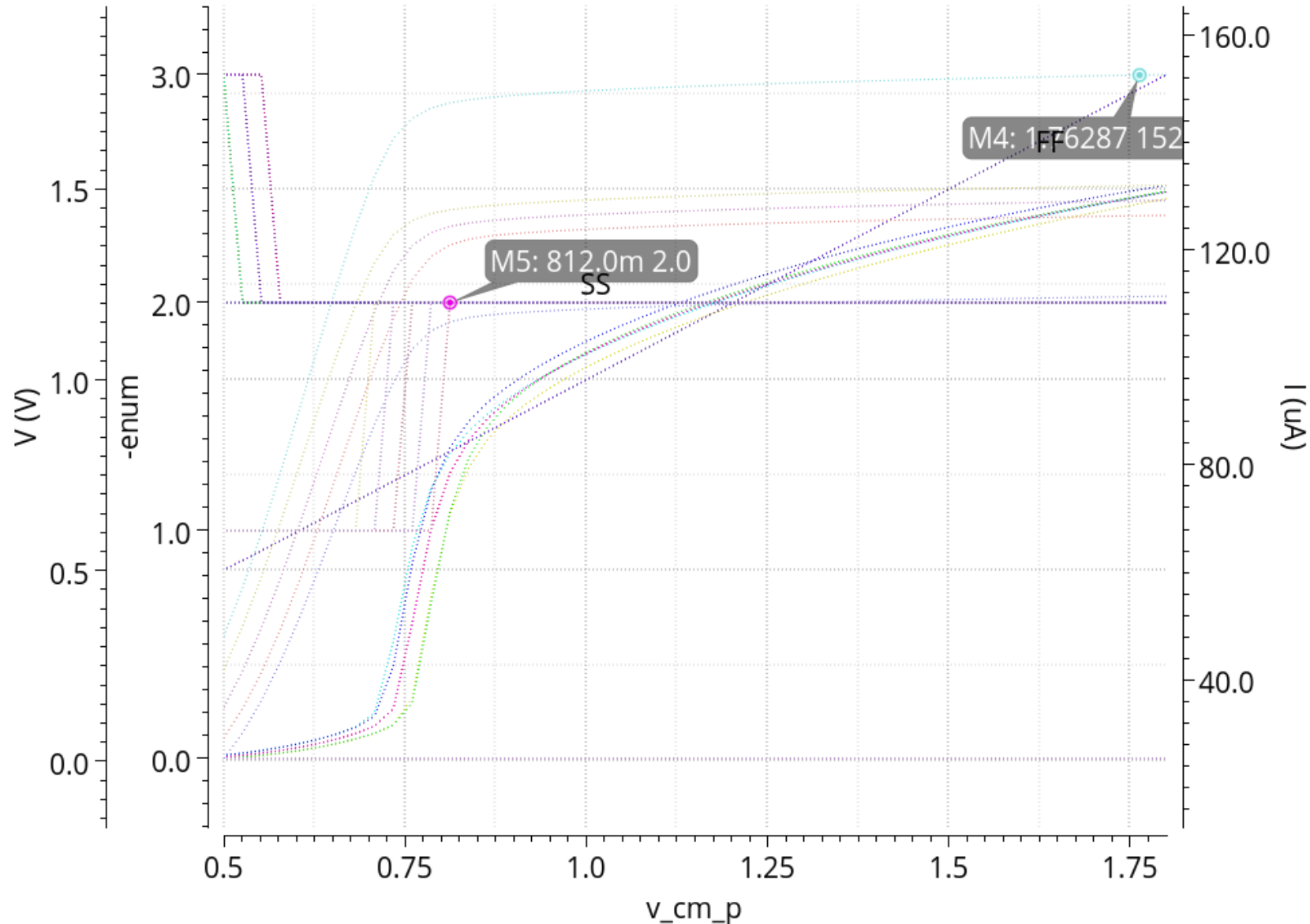
/v_outtttt		
/net4		
/I0/VDD		
/I0/VDD		nom
/I0/VDD		TT
/I0/VDD		FF
/I0/VDD		SS
/I0/VDD		FS
/I0/VDD		SF

/I0/M1:region		
/I0/M2:region		
/I0/M3:region		
/I0/M3:id		
/I0/M4:region		
/I0/M5:region		
/I0/M5:region		nom
/I0/M5:region		TT
/I0/M5:region		FF
/I0/M5:region		SS
/I0/M5:region		FS
/I0/M5:region		SF

Mon Nov 4

1









10:46:23 20...



RÉSULTAT DU DRC FINAL

Calibre - RVE v2023.2_35.23 : layer_3.drc.results



FileViewHighlightToolsWindowSetupHelp















Search


Filter: Show Not Waived


layer_3, 6 Results (in 6 of 514 Checks)


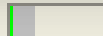


Check / Cell	Results
  Check DRM.R.1	1
  Check M1.R.1	1
  Check M2.R.1	1
  Check M3.R.1	1
  Check M4.R.1	1
  Check M5.R.1	1

DRM R 1 { @ DRM R 1 is a warning message to remind t

 Calibre Run Completed Successfully -- Results are Valid

 Check DRM.R.1



RÉSULTAT DU LVS ET PEX

gegi-acad-alma.gegi.usherbrooke.ca - Remote Desktop Connection

Calibre - RVE v2023.2_35.23 : svdb layer_3 Nov 4 10:57

Calibre Interactive - nmLVS v2023.2_35.23 : /home/guaj2506/Bureau/gei810-automne2024/workdir/LVS3/LVS_CLICK_HERE *

File Settings Configurations Help

layer_3.lvs.report x

7 ##
8 ## L V S R E P O R T ##
9 ##
10 #####

Calibre Info

Calibre View generation completed with 0 WARNINGS and 0 ERRORS. Please consult the CIW transcript for messages.

Close

14 REPOR
15 LAYOUT NAME: layer_3.sp ('layer_3')
16 SOURCE NAME: layer_3.src.net ('layer_3')
17 RULE FILE: _calibre.lvs_
18 CREATION TIME: Mon Nov 4 10:55:14 2024
19 CURRENT DIRECTORY: /home/guaj2506/Bureau/gei810-automne2024/workdir/LV
20 USER NAME: guaj2506
21 CALIBRE VERSION: v2023.2_35.23 Tue Jun 6 15:41:38 PDT 2023

22
23
24
25 OVERALL COMPARISON RESULTS

26
27
28
29 #
30 #
31 # # CORRECT #
32 # #
33 #

34
35
36
37
38 *****
39 CELL SUMMARY
40 *****
41
42 Result Layout Source
43 -----

Calibre - RVE v2023.2_35.23 : layer_3.drc.results

File View Highlight Tools Window Setup Help

Filter: Show Unresolved layer_3, 6 Results (in 6 of 514 Checks)

Check / Cell	Results
Check DRM.R.1	1
Check M1.R.1	1
Check M2.R.1	1
Check M3.R.1	1
Check M4.R.1	1
Check M5.R.1	1

DRM R 1 / A DRM R 1 is a warning message to remind t

Calibre Run Completed Successfully -- Results are Valid

Check DRM.R.1

Calibre - RVE v2023.2_35.23 : svdb layer_3

File View Highlight Tools Window Setup Help

Navigator

Results

- Extraction Results
- Comparison Results
- ERC
- ERC Results
- ERC Summary
- Reports
- Extraction Report
- LVS Report
- Rules
- Rules File
- View
- Info
- Finder
- Schematic

Comparison Results x

Layout Cell / Type	Source Cell	Nets	Instances	Ports
layer_3	layer_3	10L, 10S	11L, 11S	5L, 5S

Cell layer_3 Summary (Clean)

CELL COMPARISON RESULTS (TOP LEVEL)

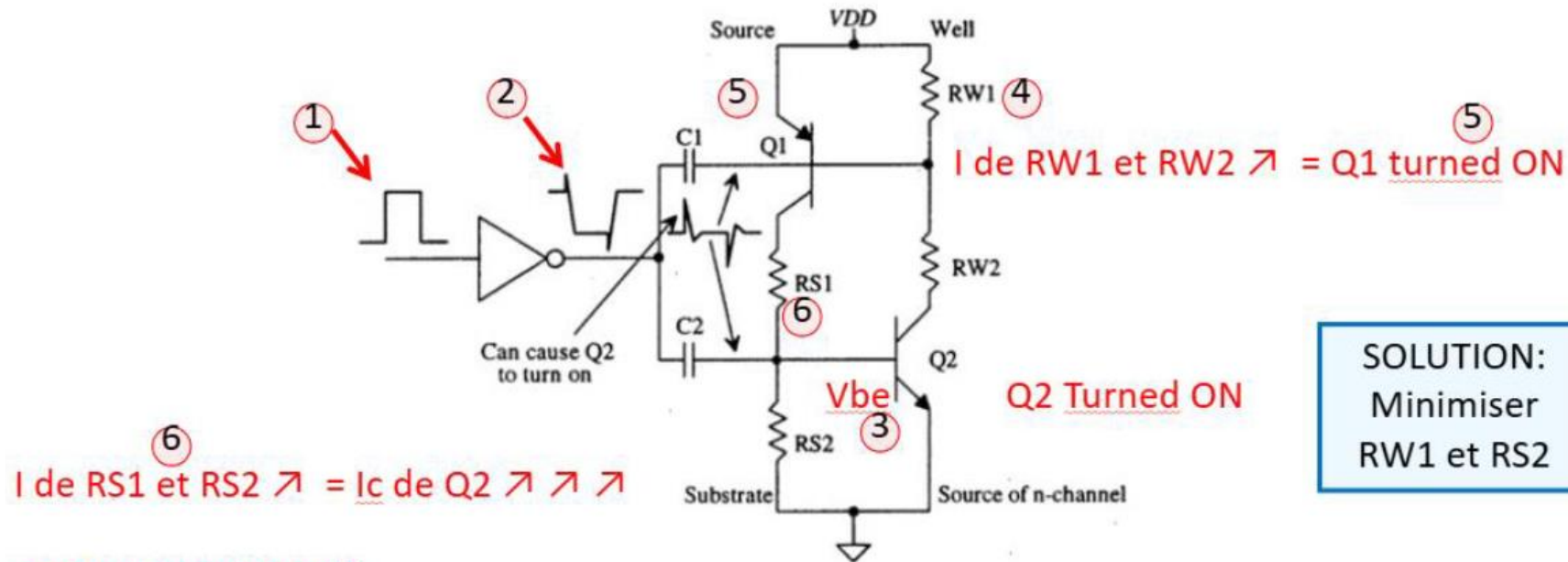
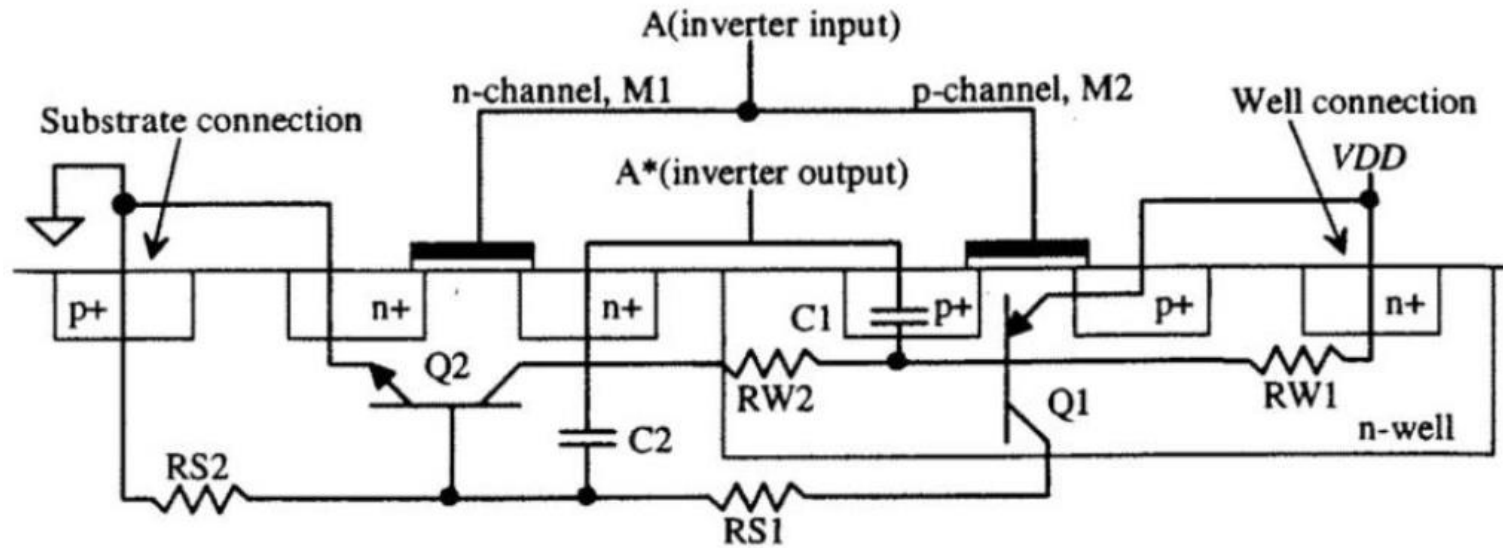
YOUT CELL NAME: layer_3

CONCLUSION

Chose à améliorer pour un futur design

- Un meilleur Excel pour faire les calculs de W/L
- Layout plus compacte (optimisation des coût)
- Meilleure utilisation du logiciel
- Raccourcis claviers

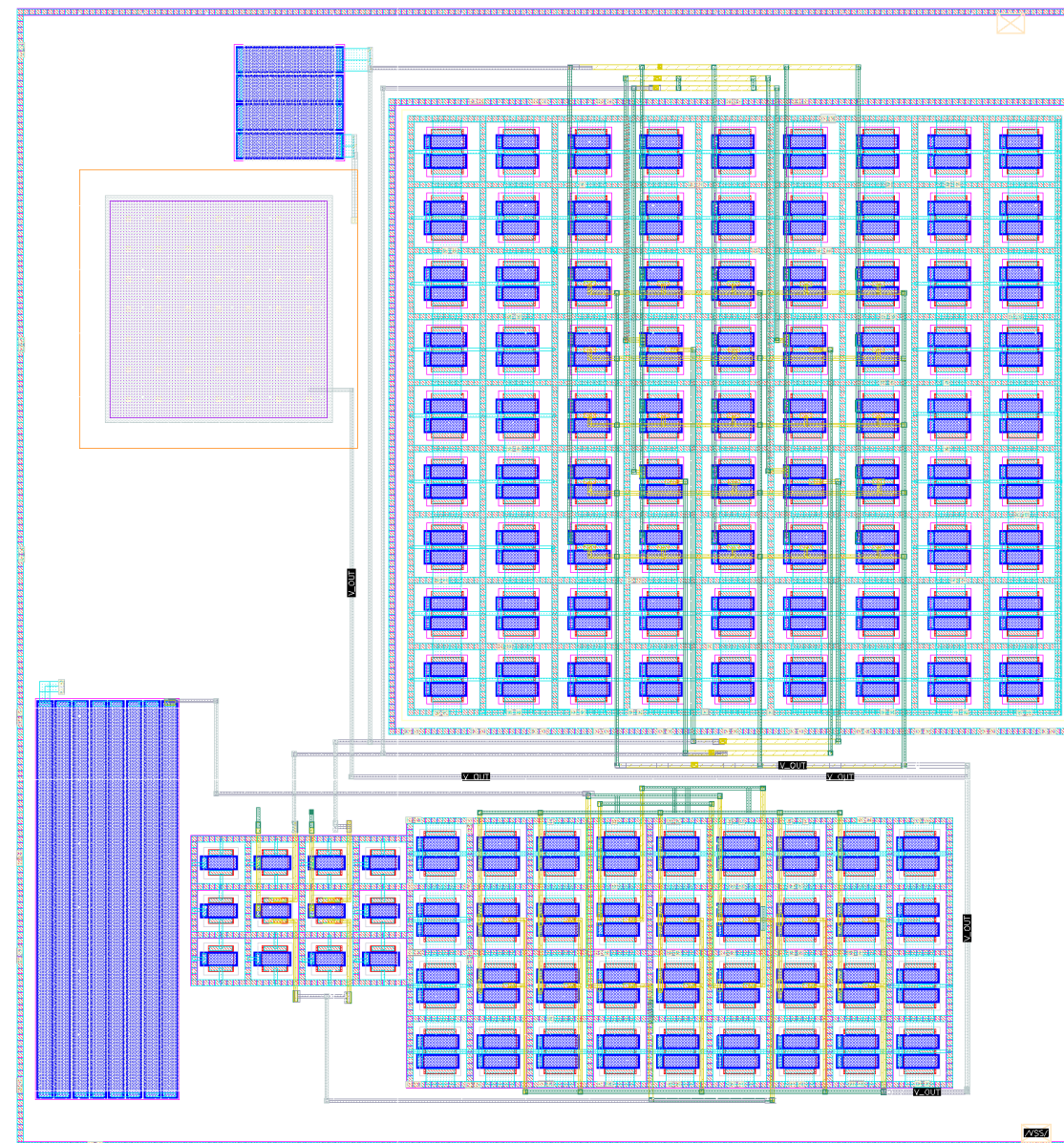
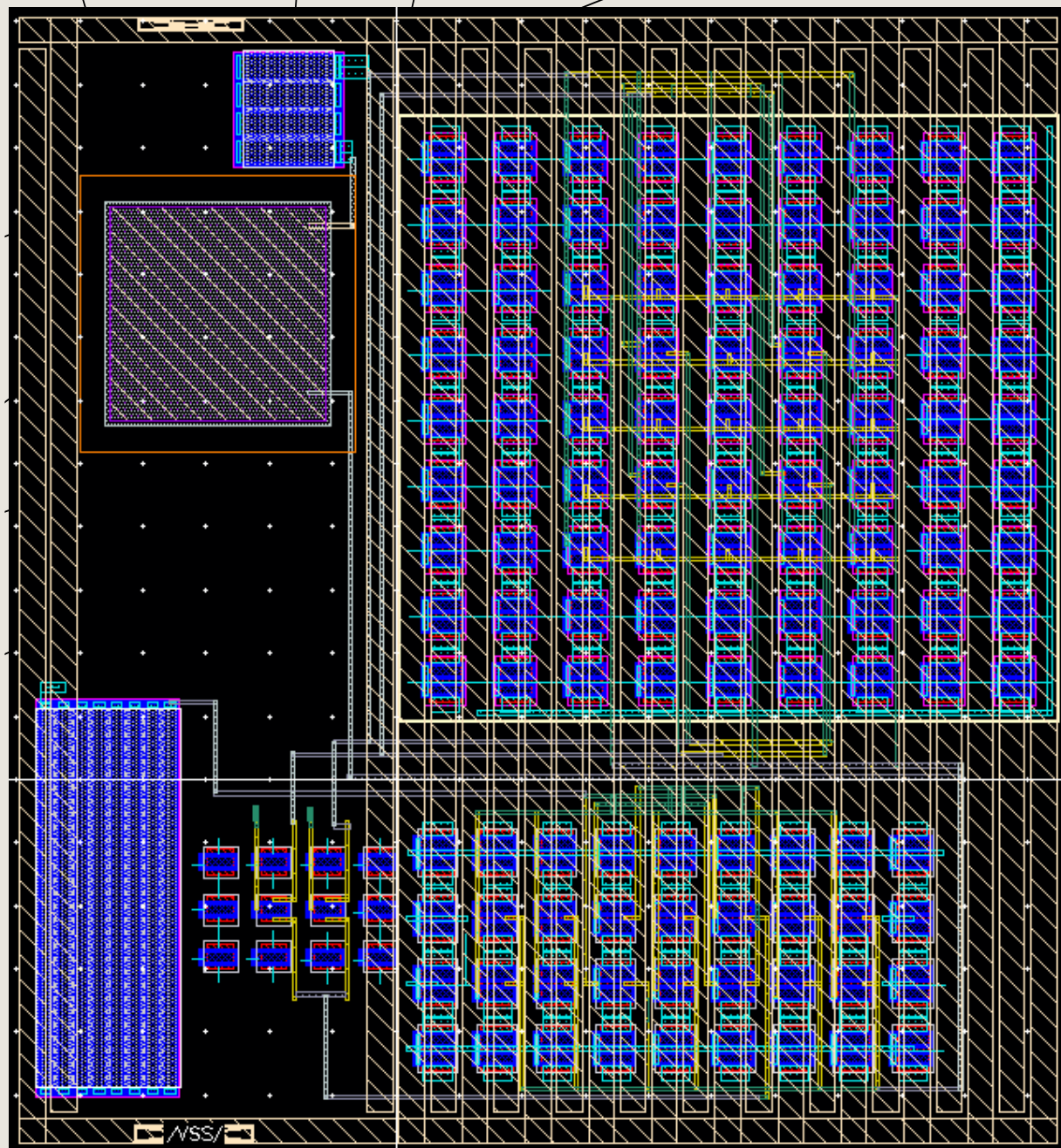
QUESTION 6



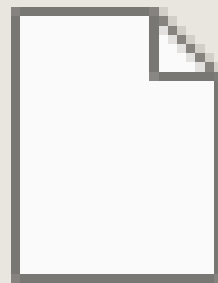
FEEDBACK POSITIF!!!

Figure 11.15 Schematic used to describe latch-up.

Source: Baker, 1998



FICHIERS GDSII



bilf0901_guaj2506.gds