Operational NMOS amplifier with NMOS differential pair

February 12, 2024

1 current bias generation characteristic's

Fig.1 represents the minimum voltage allowed for the current reference to work as supposed.

Corner	Minimum VOUT
Nominal	0.43
Worst corner	0.51
Best corner	0.37

Figure 1: minimum voltage

Fig.2 represent the output current characteristic fo nominal, worst and best case scenario.

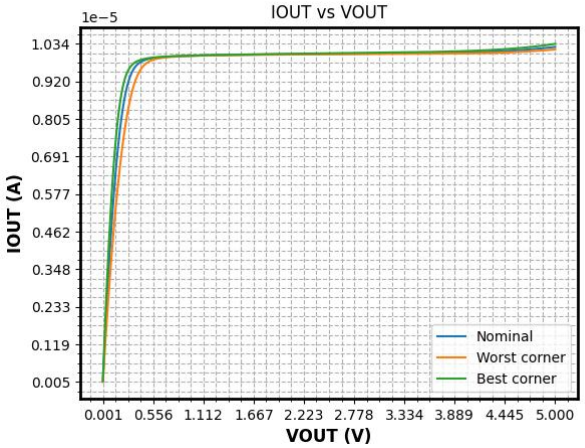

Figure 2: IOUT vs VOUT

Fig.3 represent the output impedance characteristic fo nominal, worst and best case scenario.

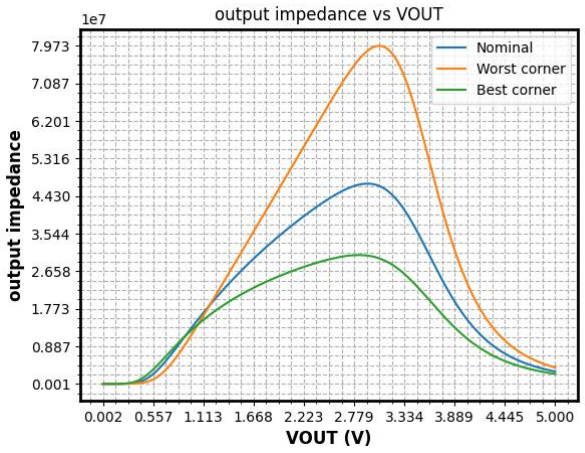

Figure 3: output impedance

Fig.**??** represent the current variation face an ac signal fo nominal, worst and best case scenario.

Corner	Maximum IOUT variation
Nominal	3.529843528582433e-08
Worst corner	2.929382780791912e-08
Best corner	4.521654961564536e-08

Figure 4: ac variation

Fig.5 represent the current variation at vout = VDD/2 with 200 runs.

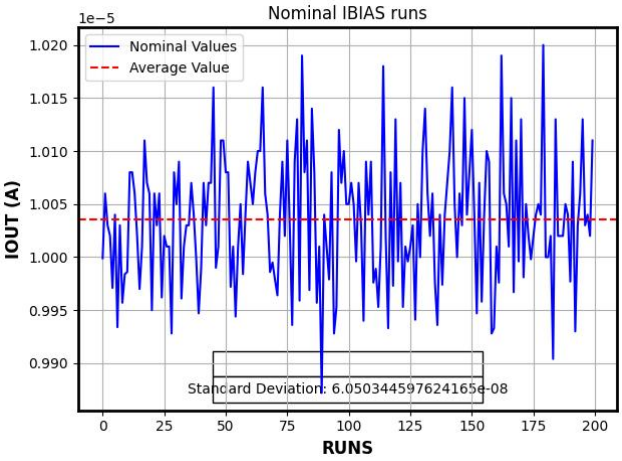

Figure 5: Monte carclo variations

Fig.6 represent the histogram.

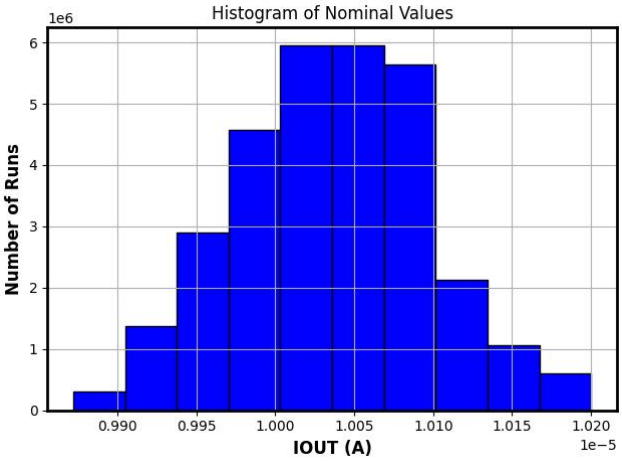

Figure 6: Monte carclo variations

2 load and VOUT characteristics

Load impedance with the bias generator, determines the dc value of vout, to this cae we center its value to VDD/2 at 27 degrees at tt corner. Fig.7 shows the dispersion of VOUT at the worst corners.

Corner	VOUT at 27 celsius
Nominal	2.505
ff_corner	2.301
ss_corner	2.693

Figure 7: VOUT defenition in fucntion of the load

Fig.8 shows the variation of VOUT in fucntion of temperature.

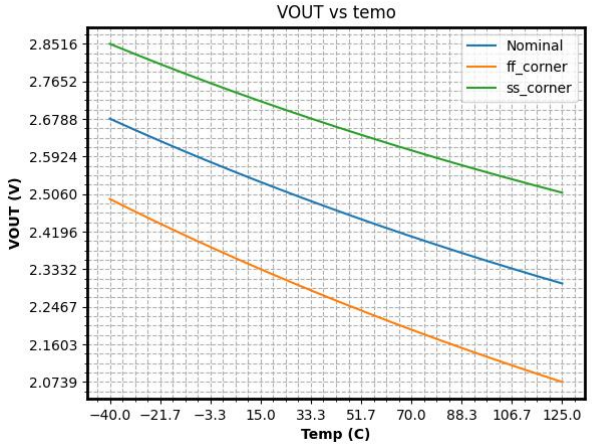

Figure 8: VOUT defenition in function of the temperature

Fig.8 shows the variation of VOUT in fucntion of a monte carlo simulation.

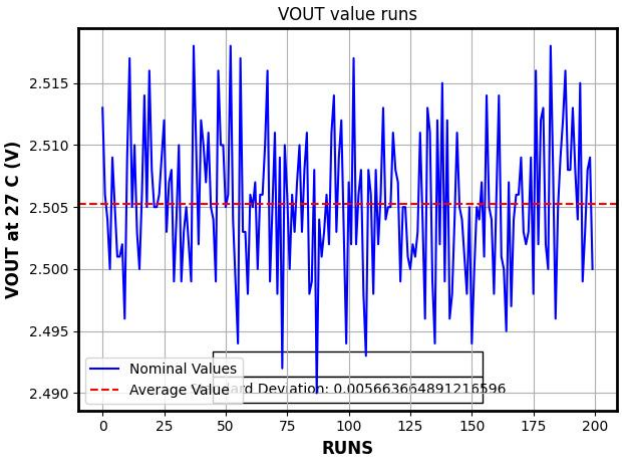

Figure 9: VOUT vs monte carlo

Fig.8 shows the variation of VOUT in fucntion of a monte carlo simulation in histogram form.

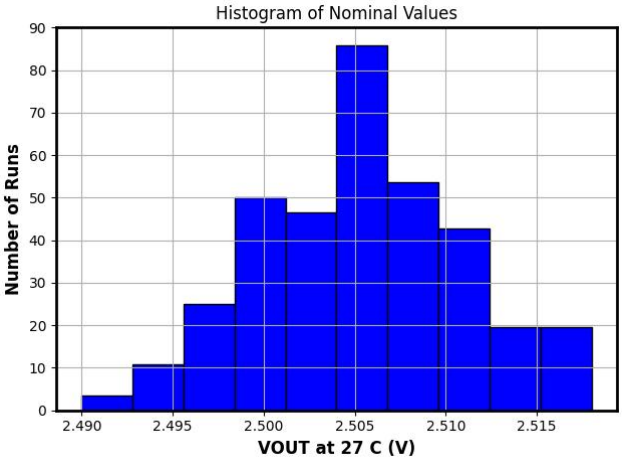

Figure 10: VOUT vs monte carlo histogram