Bandgap Design

This is a 1V bandgap circuit, designed on 0.13 um Sky130 PDK.

The reference for this design is from Ref_bgr

The following modifications were done to the original reference design

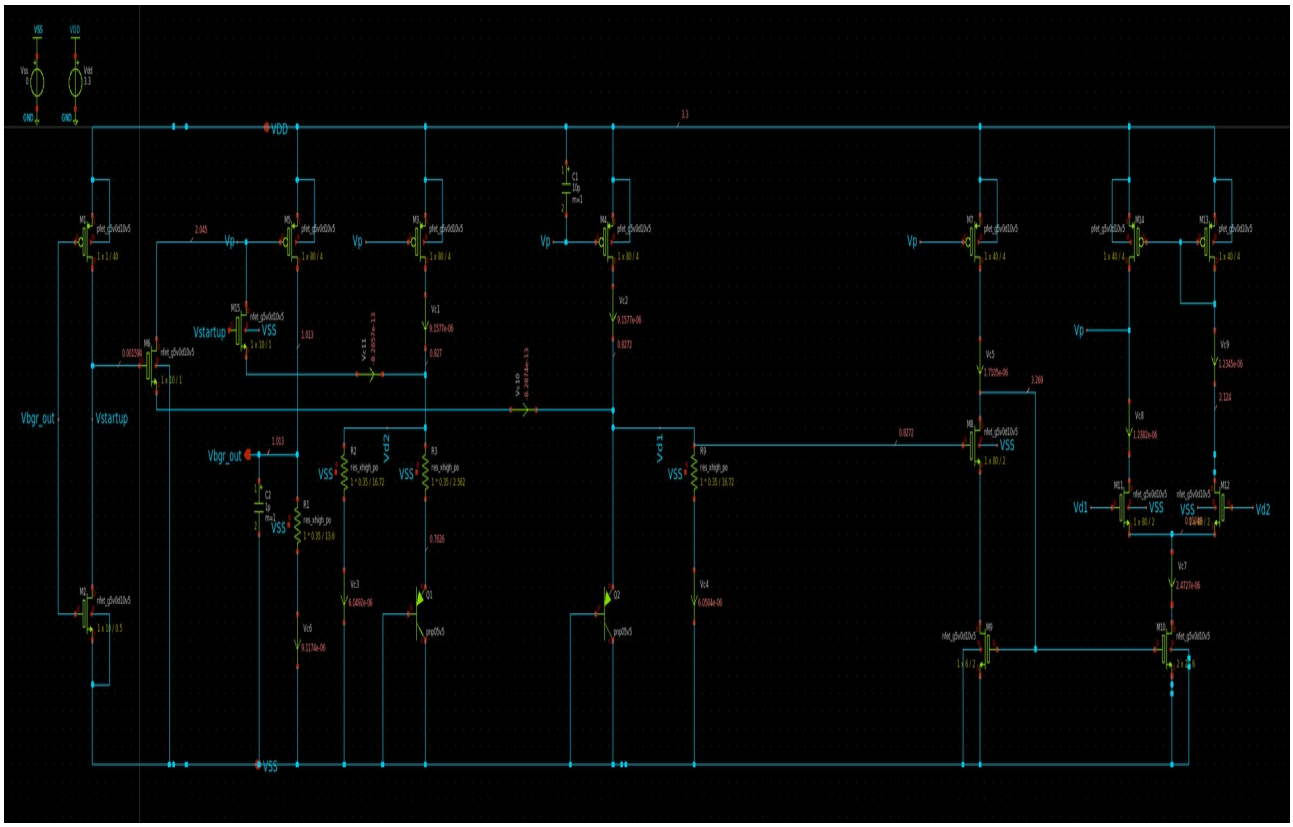
1. Added the startup nmos to Vd2 node for robust PVT performance

Tools used

Schmatic entry: Xschem

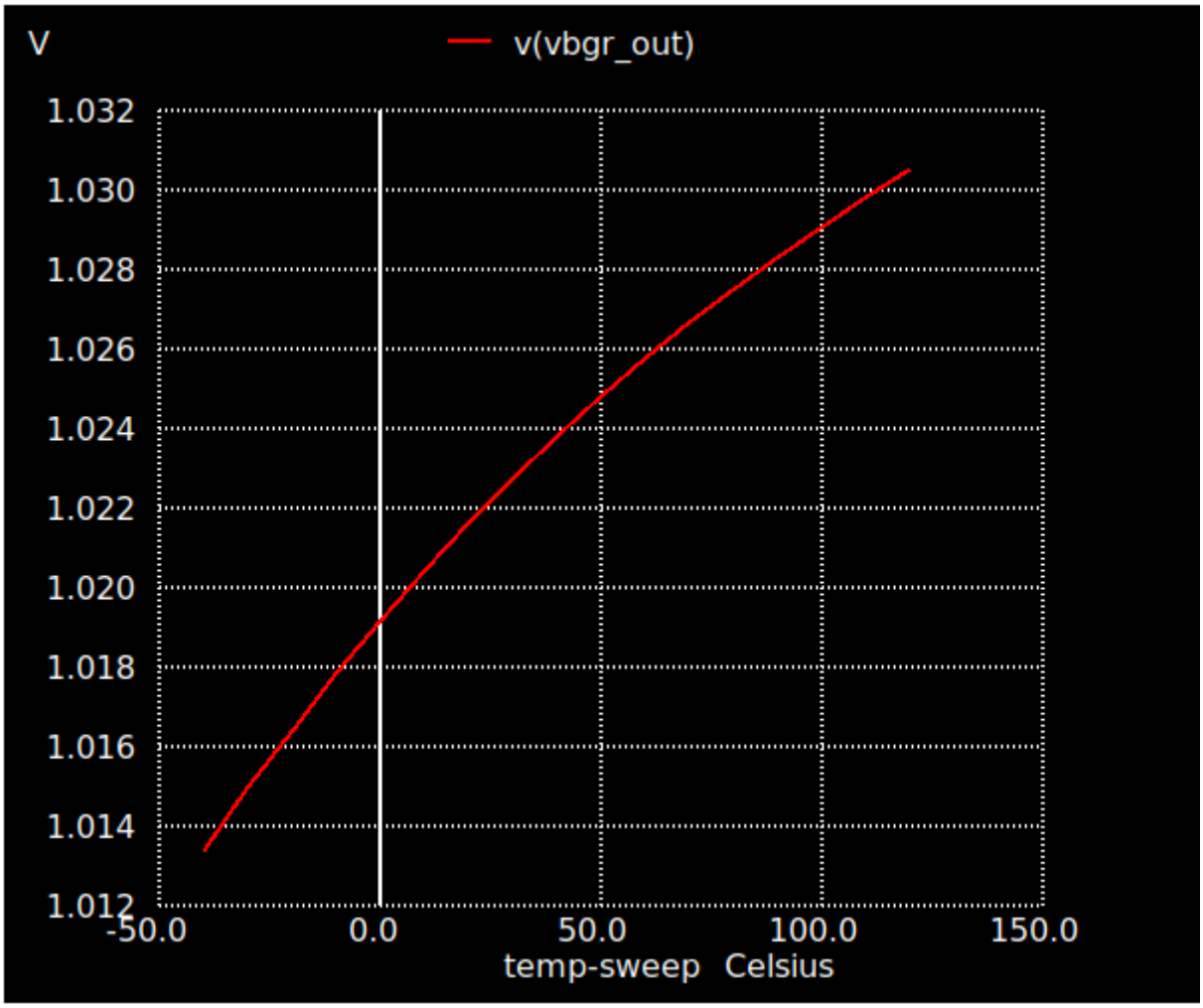
Simulator: ngSpice

Schematic

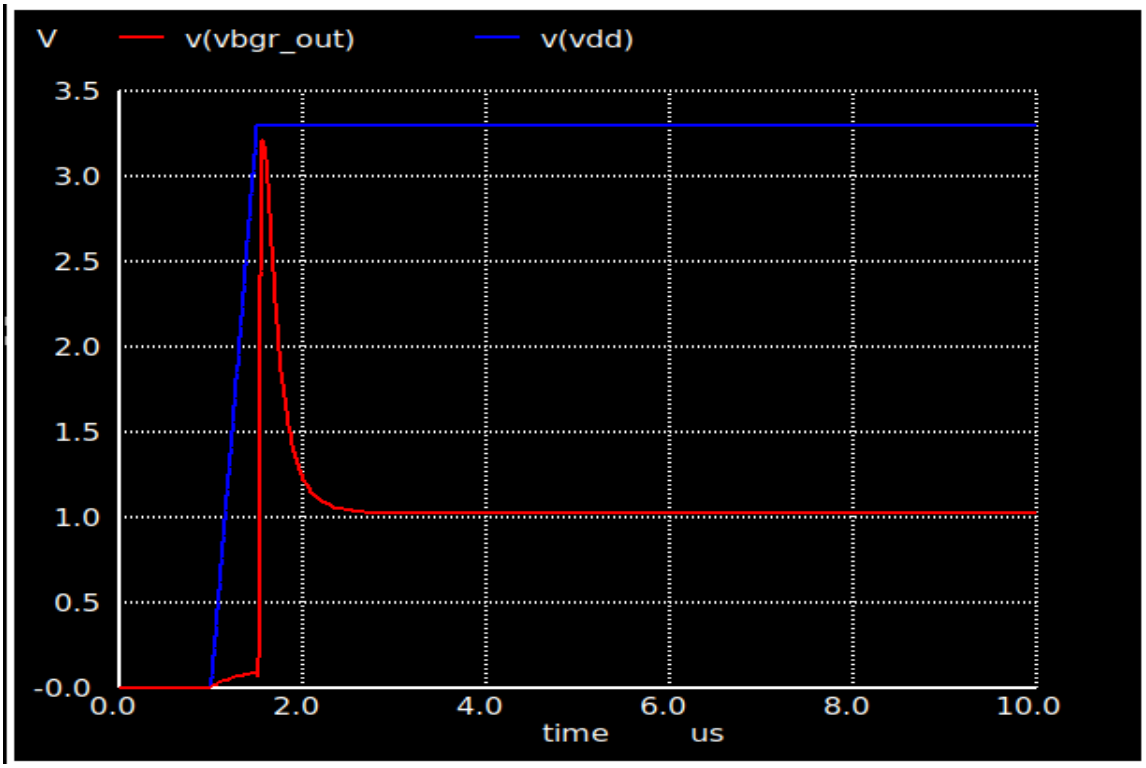


Simulation results:

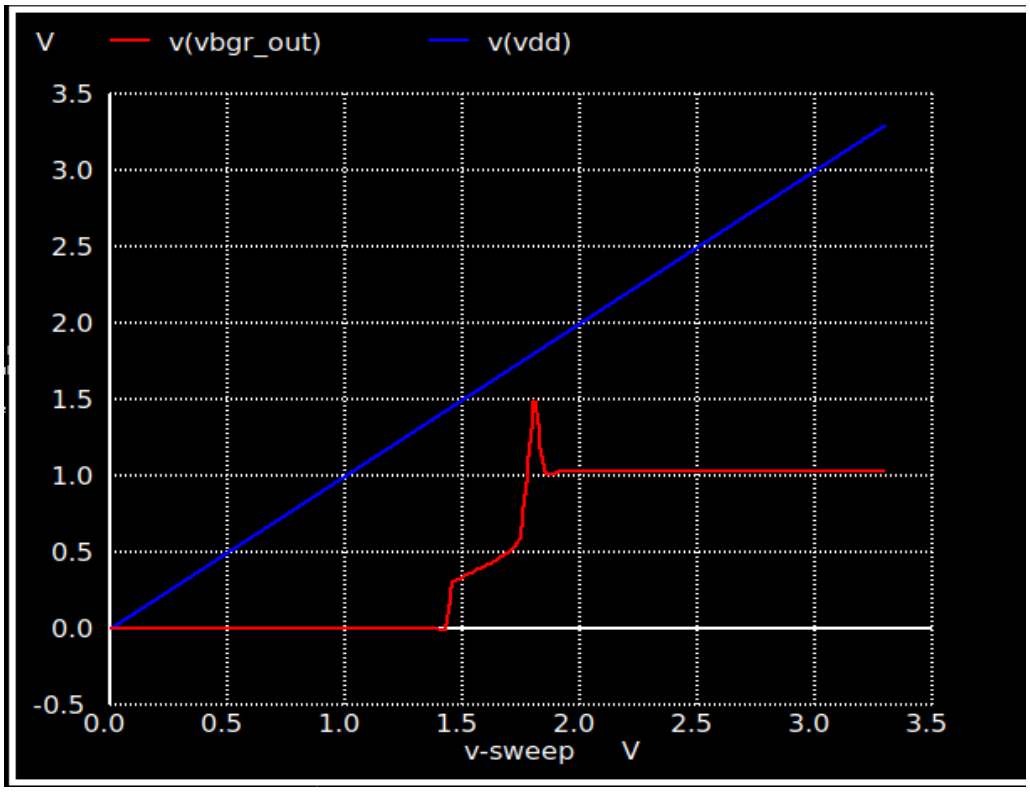
Temp variation TT/3.3V



Transient sims TT/27Deg/3.3V



DC Sweep TT/27Deg



PT variations

Vdd=3.3	-40	27	125
ss	1.014	1.02500	1.0353
tt	1.0133	1.02240	1.03
ff	1.011	1.01928	1.0265

Things to do:

1. 3 bit output voltage trimming
2. Curvature compensation
3. Modify Opamp design

Thanks and acknowlegements

1. Stefan Schippers for his Youtube videos on Xschem + sky130 pdk installations
2. bminch Youtube channel