MODULE 3 Assignment

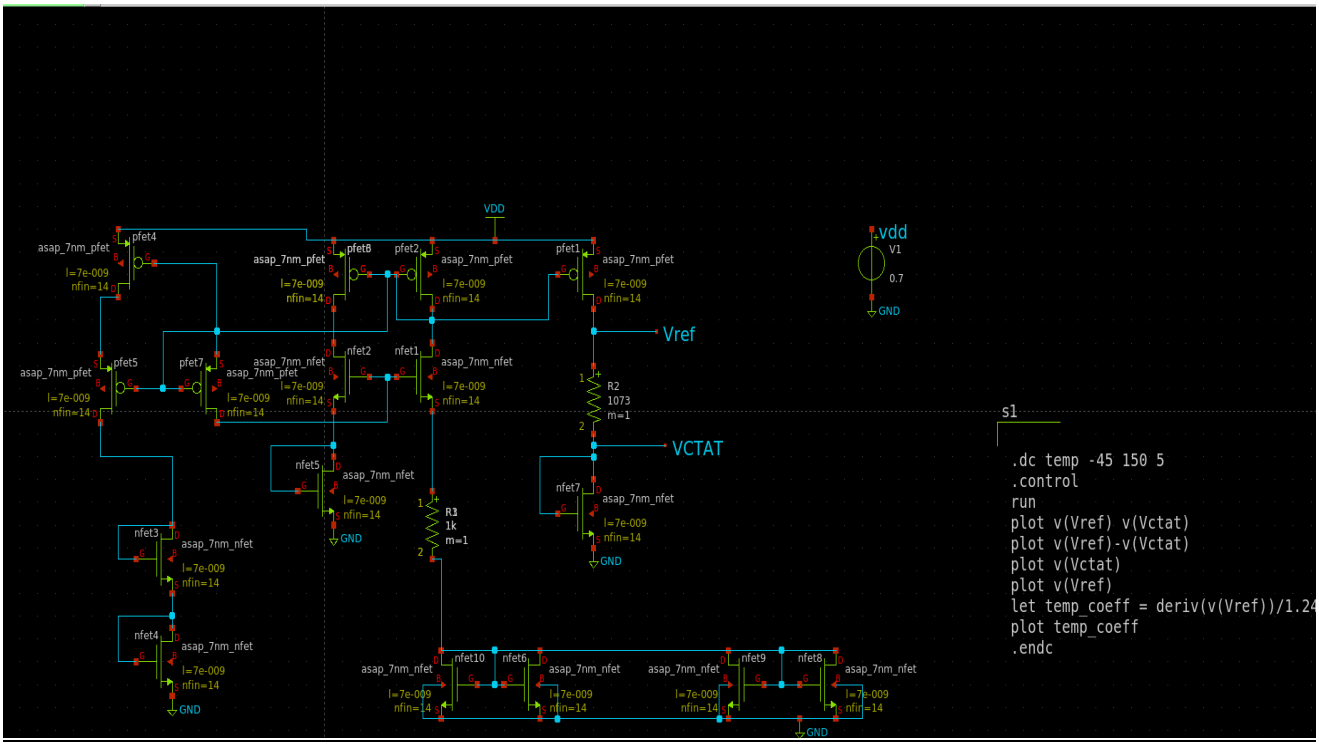
Bandgap Reference Design and Simulation using Xschem

For my user name ‘rlvsk’ the ASCII sum in ohms is 562 ohms.

Characteristic Table

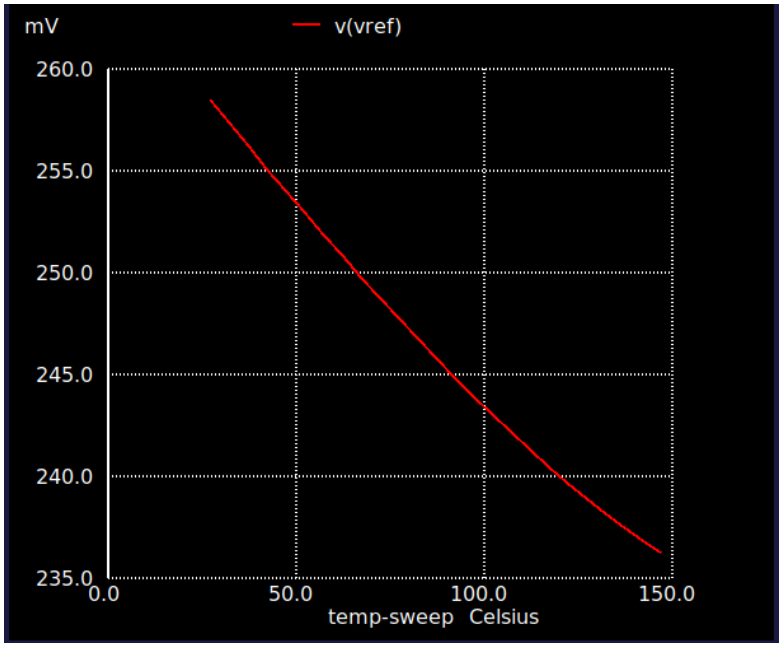
S.No	VDD (V)	Temp (°C)	Vref (mV)	Line Reg. (mV/V)	Startup Time (ns)
1	0.8	27	214	267.5	5.12
2	0.9	27	236	262.2	3.81
3	1	27	258	258	3
4	1	-40	274	274	64
5	1	125	239	239	2.04

Bandgap Reference Circuit

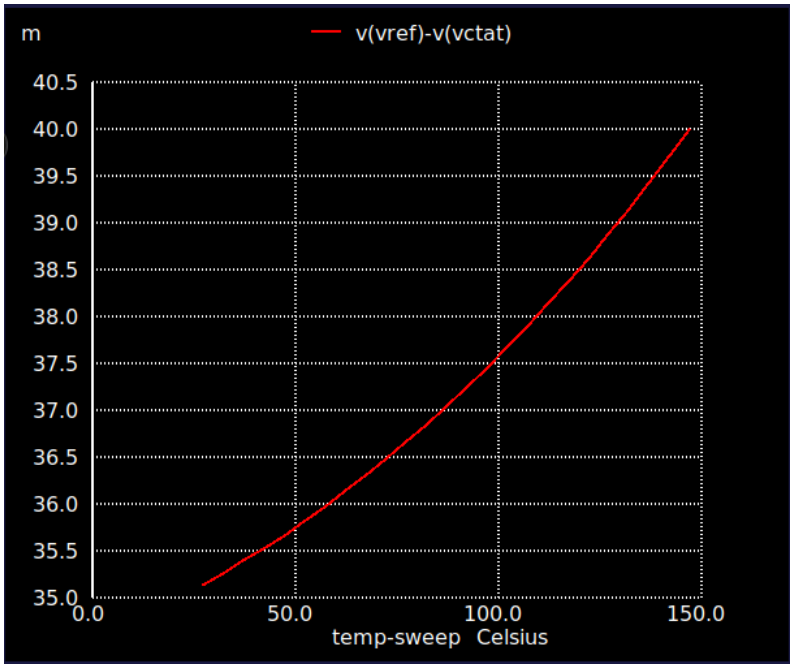


Results:

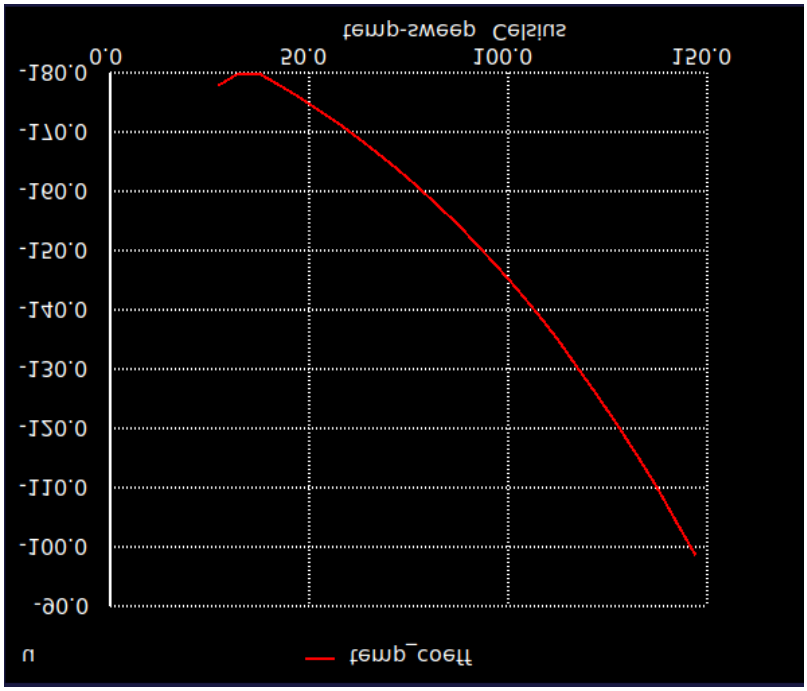
1. **Vref**



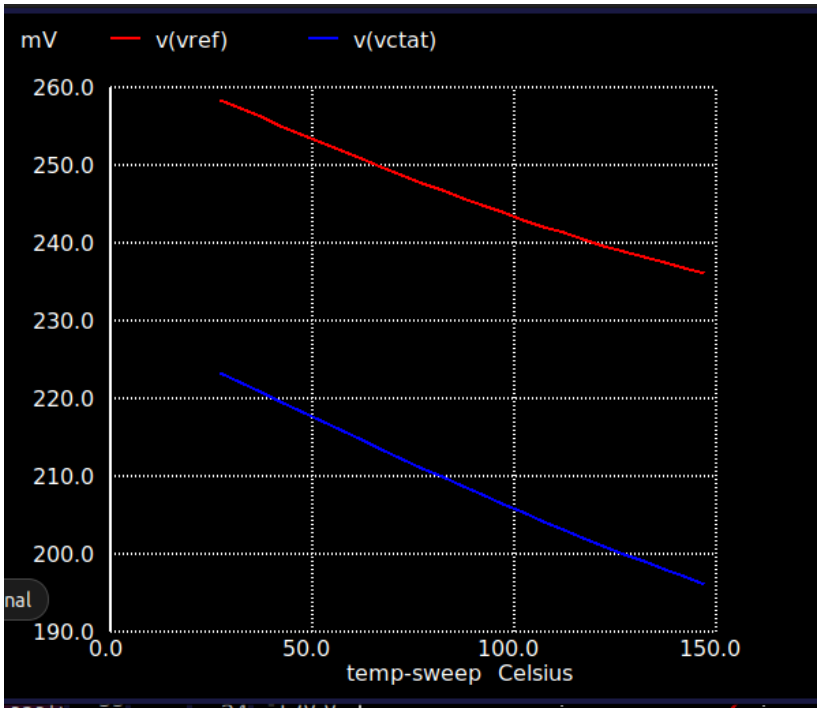
2. **Vptat**



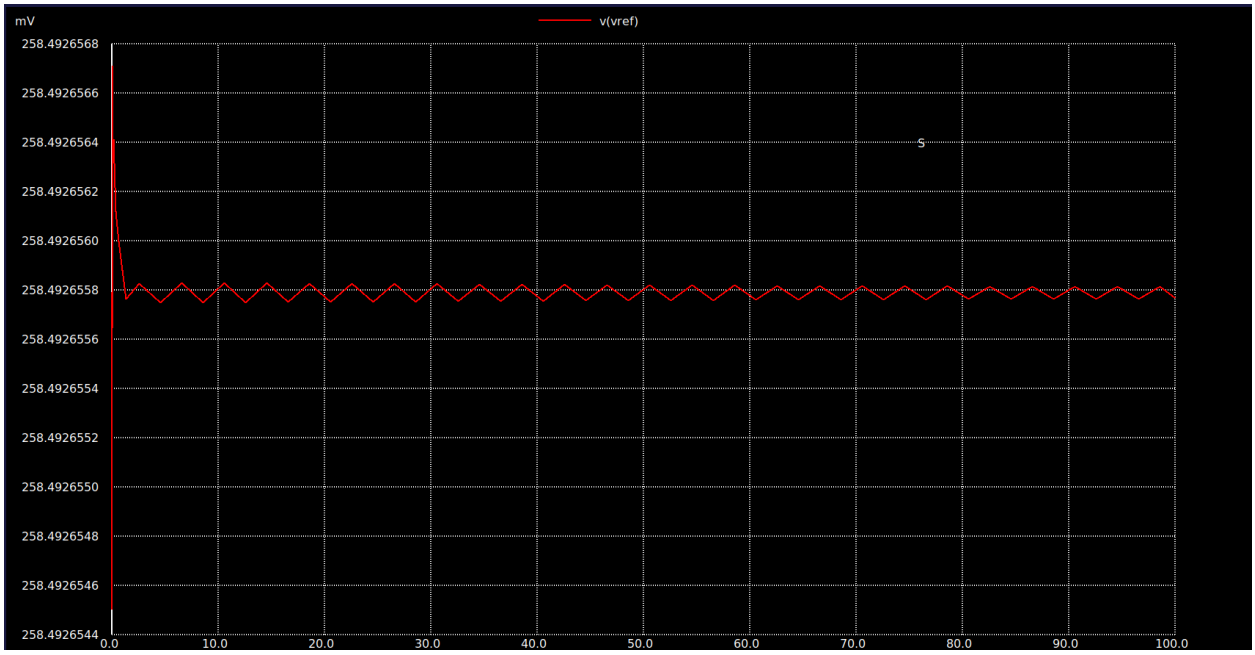
3. **Temp_coeff**



4. **Vctat & Vref**



5. **Transient waveform showing startup time**



Index	time	v(vref)
55	9.456000e-08	2.584927e-01
56	9.656000e-08	2.584927e-01
57	9.856000e-08	2.584927e-01
58	1.000000e-07	2.584927e-01

Temp sweep analysis:

1. **1V and 27 deg.**

Index	temp-sweep	vref
0	2.700000e+01	2.584927e-01
1	3.200000e+01	2.573848e-01
2	3.700000e+01	2.562644e-01
3	4.200000e+01	2.551550e-01
4	4.700000e+01	2.540580e-01

2. **1V and -40 deg.**

Index	temp-sweep	vref
0	-4.00000e+01	2.743604e-01
1	-3.50000e+01	2.731797e-01
2	-3.00000e+01	2.719696e-01
3	-2.50000e+01	2.707615e-01