Programmable gain amplifier

Taped out by M10-Razavus

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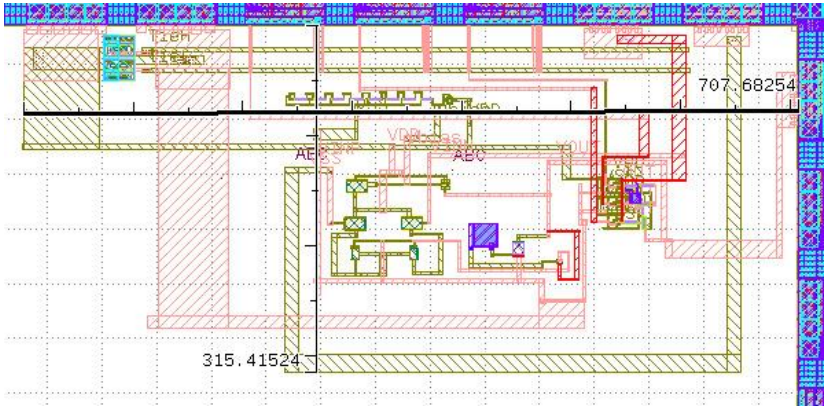
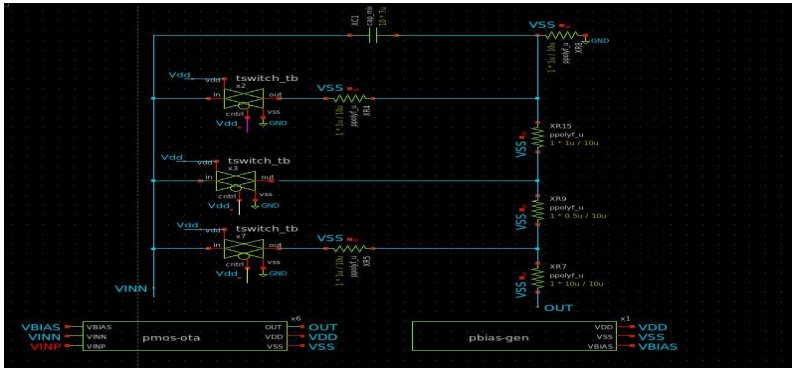
Programmable gain amplifier

The programmable gain amplifier is a MOSBIUS style block that can be digitally controlled using a 3 bit input and gives a gain from 2.5dB to 34dB over a range>10^7Hz





(top level sims) (github)

Lessons learned and best practises

What worked out amazingly?

The guidance from Dr Peter Kinget and the constant help from Mr Bailey were a boon for our team. Also, special thanks to M Taufiqul Huda from team M6 and out integration leader Royce Richmond for helping us out with the DRC.

We also realised that implementing pre existing topologies, no matter how simple is always more handy. In DRC phase we realised that opening the PDK documentation on another tabs saves more time than we had previously imagined, as did using gm/Id approach in implementing a 5T OTA! In the words of Dr Murmann “spice monkeying is a waste of time”. This was definitely something amazing to learn

What did not work out?

I feel that there were some problems with KLayout LVS and as a result implementing LVS was very difficult and we had to manually check the routing many times.

There also seems to be a mismatch between the variants available on klayout vs the variants available on xschem. It was the case with resistors and with capacitors and so the LVS was giving “mismatch” for the capacitor with a “no shield error” which was corrected by a script.

Favourite part of the chipathon?

Definitely the lectures by experts in the field. We learnt a lot about good practises and theory and yes obviously getting to tape out was amazing as well

How did LLMs help?

In getting some ideas for proposal and looking for doable specs. They unfortunately could not help in design or layout much.

Suggestions for next year?

Next year’s chipathon could involve an additional track about EDA tools! Improvements in xschem, MAGIC, KLayout etc would go a long way for the open source community!