Statistical Simulations of Bandgap Circuits

Wolfgang Kraus

Atmel Germany
wolfgang.kraus@atmel.com

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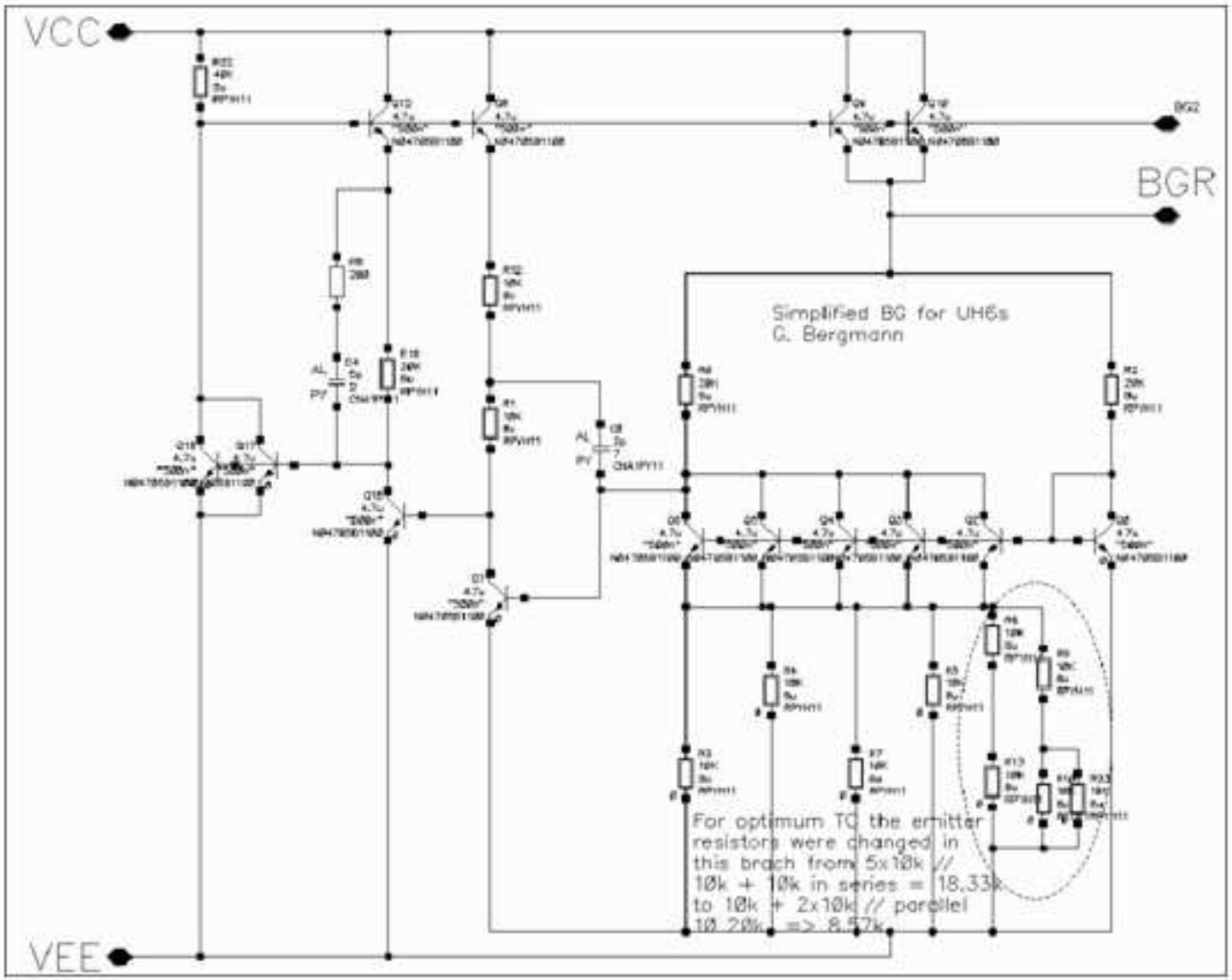
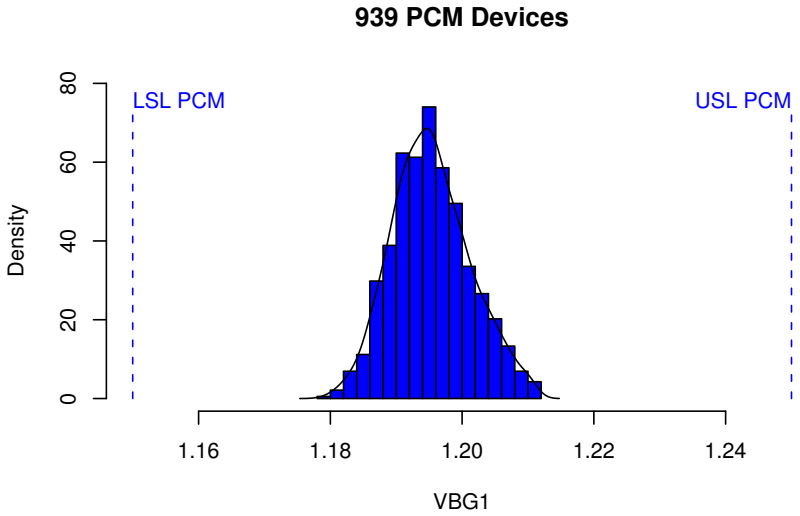
Introduction

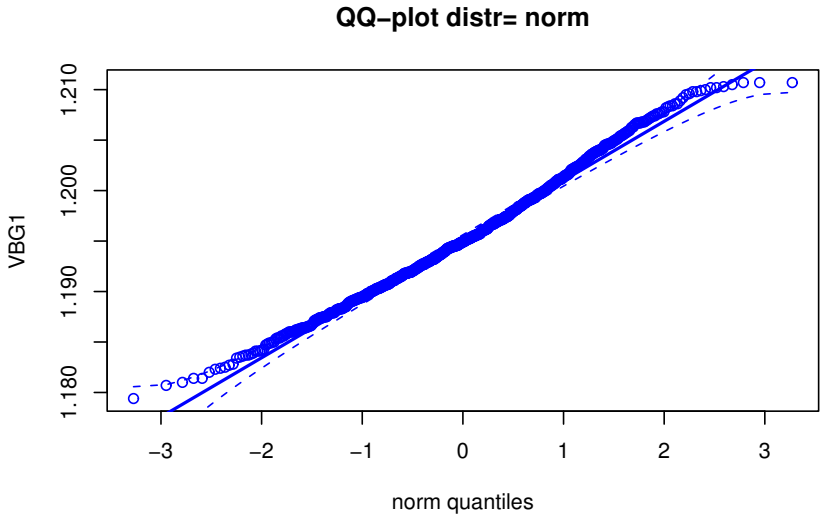
- 1st statistical circuit simulation results have been published in [4] on transimpedance amplifiers
- here: extension to bandgap designs
- PCM contains bandgap circuits as general purpose monitor
- 2 different sizings used
- statistical models use data from 50 lots, Feb to May 05
- bandgap measurements from 1th half of 2007

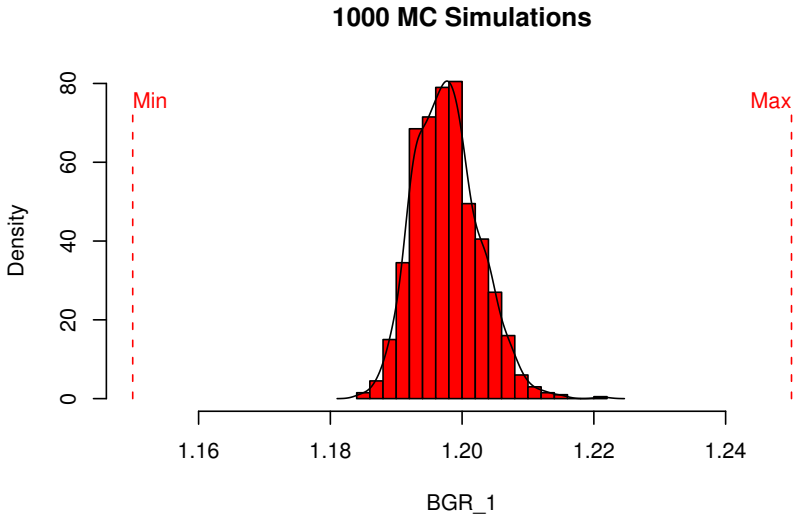
bandgap circuit

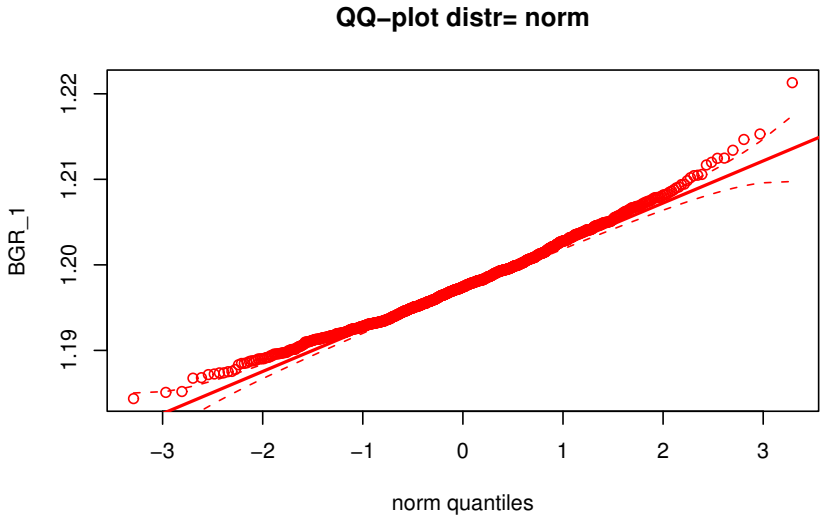


bandgap 1

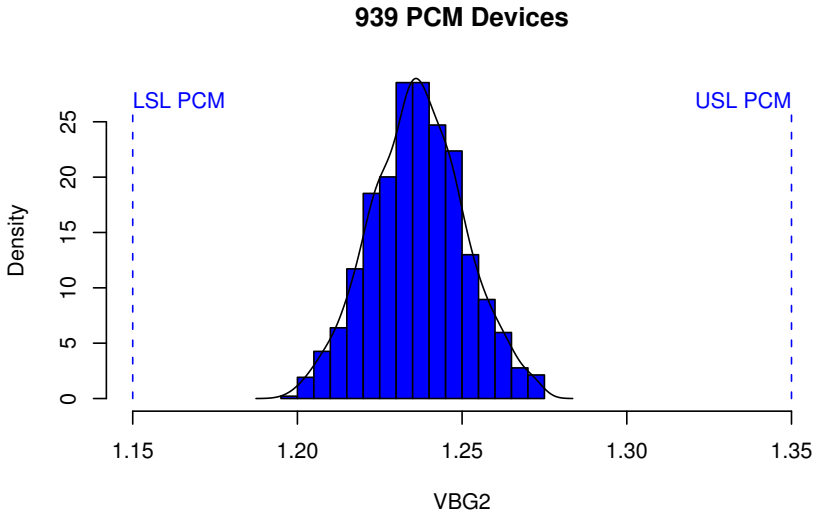


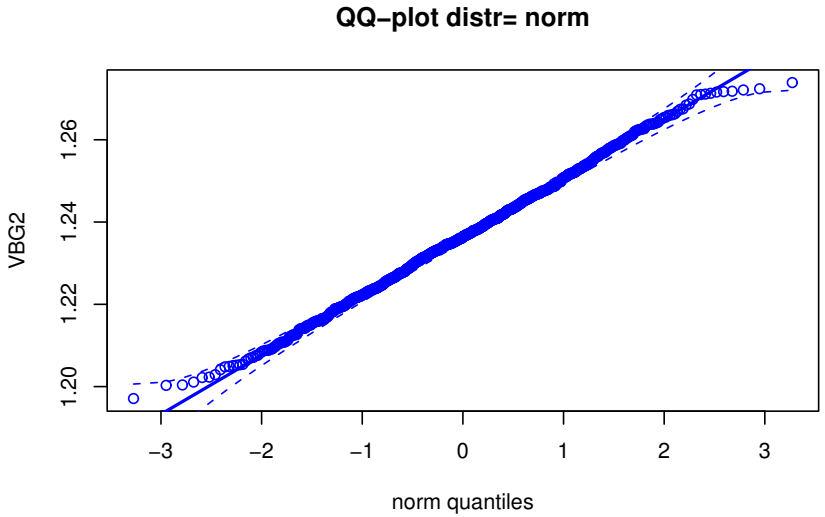


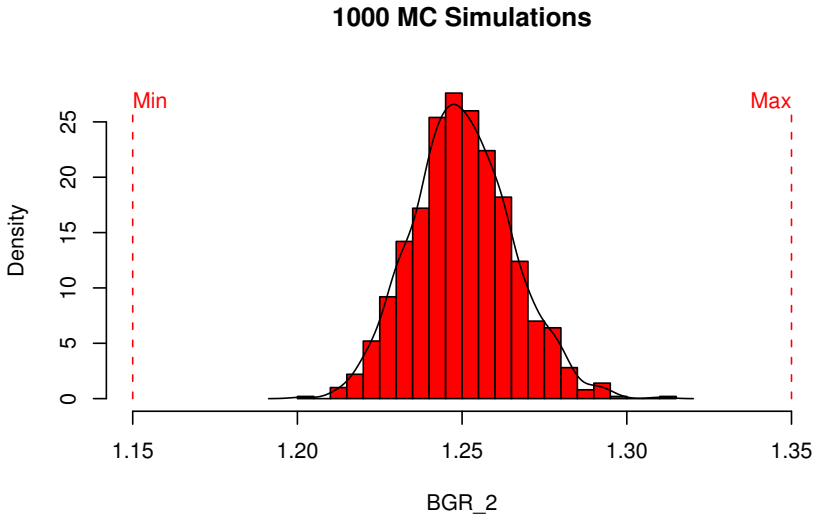


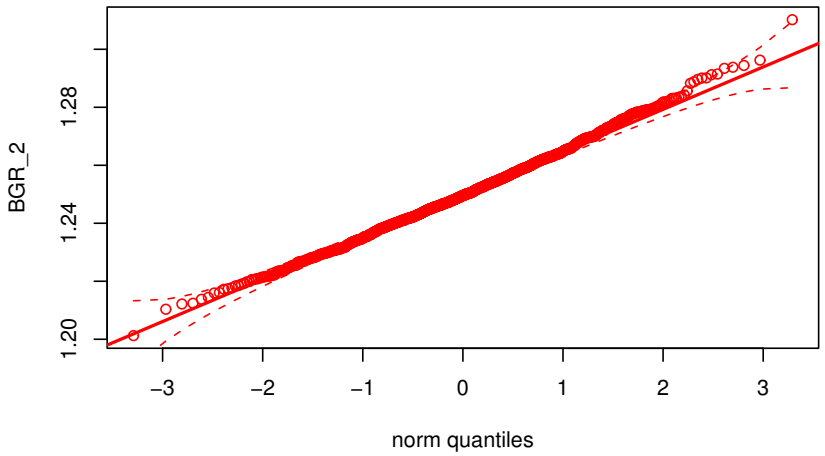


bandgap 2









summary

Comparison measurement vs simulation, $T = 25°C$

	unit	BGR_1	BGR_2
emitter size	μm	4.7/0.5	0.7/0.5
resistor width	μm	8.0	1.6
mean (measurements)	V	1.195	1.236
sdev (measurements)	mV	5.9	14.1
mean (simulation)	V	1.198	1.250
sdev (simulation)	mV	4.9	15.1

- under way : further mismatch modeling
- to do : extend statistics to s-parameters
- Acknowledgments to H. Dietrich for providing measurement data of the bandgap circuits and W. Schneider who did the simulations

References

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