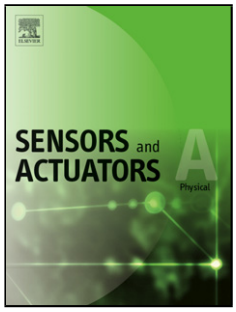

Title: Differential Temperature Sensor with high sensitivity, wide dynamic range and digital offset calibration

Authors: Eva Vidal, Sergio Ruiz, Jérémy Duquenoy, J.L. González, Josep Altet

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Differential Temperature Sensor with high sensitivity, wide dynamic range and digital offset calibration.

Eva Vidal [a], Sergio Ruiz [a], Jérémy Duquenoy [b], J.L. González[c] and Josep Altet [a].

[a] Electronic Engineering Department, Universitat Politècnica de Catalunya, Barcelona, Spain.

[b] ENSEIRB-MATMECA, Bordeaux Institute of Technology, Talence, France.

[c] DACLE/LAIR CEA-Leti, MINATEC Campus, Grenoble, France.

Highlights

- A new differential temperature sensor topology is proposed.
- New features: digital offset compensation
- May offer both wide dynamic range and high sensitivity
- Suited applications (but not restricted to): test/characterization of RF and MMW analogue circuits, measurement of temperature gradients within integrated circuits
- Detailed characterization of thermal offset is presented.

Abstract

The goal of this paper is twofold: first to add together all different causes that can alter the offset of a differential temperature sensor and, second, to present a new differential temperature sensor architecture that can digitally compensate for this behavior and therefore extends the sensor dynamic range. Measurements performed on a 65nm CMOS differential temperature sensor are presented to illustrate the discussion. As evolution of the state of the art, an automatic calibration procedure and the new sensor topology is presented. With this new topology, not only the thermal offset can be digitally calibrated, but the application field of differential temperature sensors is widened, being now suitable for use in measurements where both wide input range and high differential sensitivity are required.

Keywords:

Differential Temperature Sensors, Integrated Circuits, CMOS temperature sensors, thermal testing, offset temperature correction.