

# Oven-Controlled References

## Precise Reference IP's with an On-Chip Micro-Oven

*Design of an LC-oscillator IC with temperature stabilization*  
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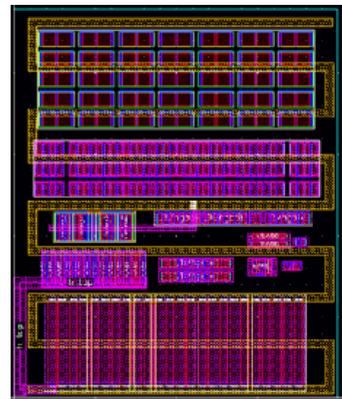
High-precision references are fundamental to modern integrated circuits. They support nearly all critical functions in a system, such as compute timing, memory IP, and sensor readout. Yet their accuracy is challenged by environmental and manufacturing variations. Hence, robust solutions are required to maintain reliable performance.

### What can be a high-precision reference?

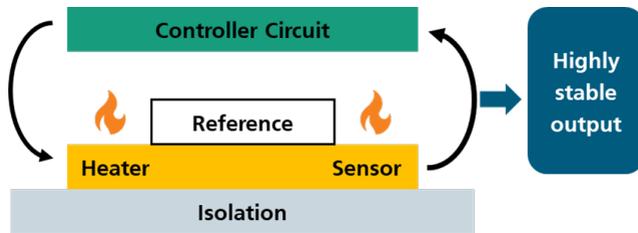
- Voltage and current
- Frequency (time)
- Temperature
- Performance parameters (e.g., gain, sensitivity, ...)

### What is our IC design solution for stability?

A major challenge in today's microchips is parameter drift due to thermal variations. Instead of classic compensation schemes, we use a fully integrated micro-oven to stabilize the temperature locally on-chip. The tiny control system with heater and sensor electronics allows us to achieve ppm-precision of various signals, while avoiding calibration effort.



*Compact (475  $\mu\text{m}^2$ ) voltage/temperature reference in 22 nm SOI technology*



*An on-chip thermal control system for high-precision references*

## How can the Micro-Oven approach benefit your business?

On-chip references:

- Replace costly crystal oscillators
- Enable significant cost savings during IC testing
- Reduce effort for in-package and multi-point calibration
- Improve key SoC performance parameters

## Why you should work with us?

- Broad expertise in mixed-signal IC and sensor design at advanced CMOS nodes
- “Out-of-the-box” approach with proven innovations & various patents
- Dedicated research team with industry background & close collaborations with leading universities
- Experience with international customer projects



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## Contact us now:

Dr. Matthias Eberlein  
Circuit Design

Tel. +49 89 54759 229

[Matthias.Eberlein@emft.fraunhofer.de](mailto:Matthias.Eberlein@emft.fraunhofer.de)



**Fraunhofer EMFT**

Hansastraße 27d  
80686 München