

A TEMPERATURE COMPENSATED CMOS RING OSCILLATOR FOR WIRELESS SENSING APPLICATIONS

**JAMEL NEBHEN^{1,2}, STÉPHANE MEILLÈRE¹, MOHAMED MASMOUDI², JEAN-LUC SEGUIN¹,
HERVÉ BARTHELEMY³, KHALIFA AGUIR¹**

¹Aix-Marseille Université, IM2NP-CNRS-UMR 7334 Avenue Escadrille Normandie Niemen - Case 152, 13397
Marseille Cedex 20, France

²EMC Research Group-National Engineering, school of Sfax, Electrical Engineering Department, Route de Soukra
Km 2.5, BP. 1173 – 3038, Sfax, Tunisia

³Université du Sud-Toulon Var, IM2NP-CNRS-UMR 7334 Avenue de l'Université - BP20132 83957 La Garde
Cedex - France

ABSTRACT

This paper presents a CMOS voltage controlled ring oscillator (VCO) with temperature compensation circuit suitable for low-cost and low-power wireless sensing applications. To operate at low frequency, a control voltage generated by a CMOS bandgap reference (BGR) is described and the measurement results of the fabricated chips are presented. The output voltage of the reference is set by resistive subdivision. In order to achieve small area and low power consumption, n-well resistors are used. This design features a reference voltage of 1V. The chip is fabricated in AMS 0.35 μm CMOS process with an area of 0.032mm². Operating at 1.25V, the output frequency is within 200 \pm 10kHz over the temperature range of -25°C to 80°C with power consumption of 810 μ W.

KEYWORDS: Voltage-controlled oscillator, CMOS, bandgap, temperature compensation, low-power