

## Design of ultra-low voltage 0.5V CMOS current bleeding mixer

### ABSTRACT

This paper presents an ultra-low voltage and low power current bleeding CMOS double balanced mixer targeted for ZigBee application in 2.4GHz frequency band. It introduces and discusses a modified CMOS based current bleeding mixer topology adopting a combination of NMOS current bleeding transistor, with a PMOS Local Oscillator (LO) switching stage and integrated inductors to achieve ultra-low voltage headroom operation at 0.5V. This mixer is simulated and verified in 0.13 $\mu$ m standard CMOS technology. The result shows a conversion gain (CG) of 11.84dB, 1dB compression point (P1dB) at -14.36dBm, third-order intercept point (IIP3) of -5dBm and a noise figure (NF) of 15dB and with a power consumption of 930 $\mu$ W.

**Keyword:** CMOS; Current bleeding; Mixer; Ultra-low voltage; ZigBee