Title: A 0.8-V 180-nm CMOS PTAT Voltage Reference with Improved Supply-Voltage Insensitivity

Abstract: This paper presents a low-power proportional to absolute temperature (PTAT) voltage reference operating from a 0.8-V supply. To achieve low-voltage operation, diode-connected MOSFETs operating in the subthreshold region are biased using an NMOS current mirror. Furthermore, the supply-voltage sensitivity is reduced by suppressing the drain–source voltage dependence of the PMOS current mirror. The proposed circuit was fabricated in a ROHM 180-nm CMOS process. Measurement results demonstrate that the output voltage exhibits a linear PTAT characteristic over a temperature range from −20 ° C to 125 ° C. The measured supply-voltage sensitivity is 0.54 %/V over a supply-voltage range of 0.8 to 1.8 V. Simulation results at 25 ° C show a PSRR of −48 dB at 100 Hz and a power consumption of 307 nW.