

# 一种低功耗高电源抑制比亚阈值基准电压源

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摘要: 本文针对传统带隙基准功耗高、电源抑制比低的问题, 提出了一种适用于能量采集、无线传感网络等的低功耗、高电源抑制比和宽电源电压范围的亚阈值基准电压源. 该基准源通过采用非对称共栅极自级联电流镜结构结合负反馈提高了电压源的电源抑制比和线性调整率. 电路采用 Global Foundry 0.18  $\mu\text{m}$  BCD 工艺设计, 仿真结果表明: 基准电压源的电源电压范围为 2.7~5.5 V, 输出电压为 1.2 V, 功耗最低可达 446.2 nW; 在 3.3 V 电源电压下、-40~125 $^{\circ}$  C 的温度范围内, 温度系数为 30.3 ppm; 室温下线性调整率低至 0.013%/V; 在 100 Hz 处电源抑制比为 -75 dB.

关键词: 低功耗; 高电源抑制比; 亚阈值; 共栅极自级联电流镜

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## **A Low Power and High Power Supply Rejection Ratio Voltage Reference Based on Subthreshold**

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Abstract: To solve the problem of high power consumption and low power supply rejection ratio(PSRR) in traditional bandgap reference, a subthreshold reference voltage source for low power consumption, high PSRR and wide power supply voltage range is presented in this paper, applying for systems such as energy harvesting and wireless sensor networks, etc. The reference enhances the PSRR and linearity regulation of the voltage source through the Asymmetric Self-Cascode current mirror and negative feedback. Designed in the Global Foundry 0.18  $\mu\text{m}$  BCD process, the simulation results show that the reference circuit is able to operate under a supply voltage range of 2.7~5.5 V, the output reference voltage is 1.2 V and the lowest power consumption is 446.2 nW. Under 3.3 V power supply voltage, the temperature coefficient is 30.3 ppm in a temperature range from -40 $^{\circ}$  C to 125 $^{\circ}$  C. The linear adjustment rate at room temperature is 0.013%/V. The PSRR is -75 dB at 100 Hz frequency.

Key words: low power; high PSRR; subthreshold; asymmetric self-cascode current mirror

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