

With the development of VLSI integrated circuits, SoC becomes more and more complex, which not only consists of transitional analog circuits, but also comprises registers, memory, and Digital Signal Processing (DSP) circuits. Since the power determines the operation duration of hearing-aid SoC and both supply voltage and volume voltage are 1 V, to minimize the power consumption and realize accurate control, a mixed-signal programmable TD-POR and volume control circuit based on SAR ADC for hearing-aid SoC is presented in this paper. The EOC signal of SAR ADC is used as the mode-change signal so that the circuit can detect the battery voltage and volume voltage alternately, which reduces both circuit size and total power consumption. The zinc-air battery that supplies hearing-aid SoC has a large voltage variation from 1.4 V to 0.7 V. When supply voltage reaches or drops to the right threshold, to ensure the accurate power-on control and low-voltage warning, the POR with ADC must be needed. DTPOR and DTBOR are the delay time to generate the POR and BOR pulse when the supply voltage reaches VPOR or drops under VBOR, respectively. The resistance and capacitance devices are affected by temperature, voltage, and other parameters in the process of integrated circuit, and the uncertainty of the delay time can be easily caused. So it can greatly affect the detection accuracy of the POR and BOR voltage that can hardly meet the high-resolution requirement. Transitional POR circuits are pure analog circuit that are based on delay cell and Schmitt Trigger [1–4].