Monolithic Integration of a Silicon Nanowire FET Array on a CMOS Chip for Bio-chemical Sensor Applications

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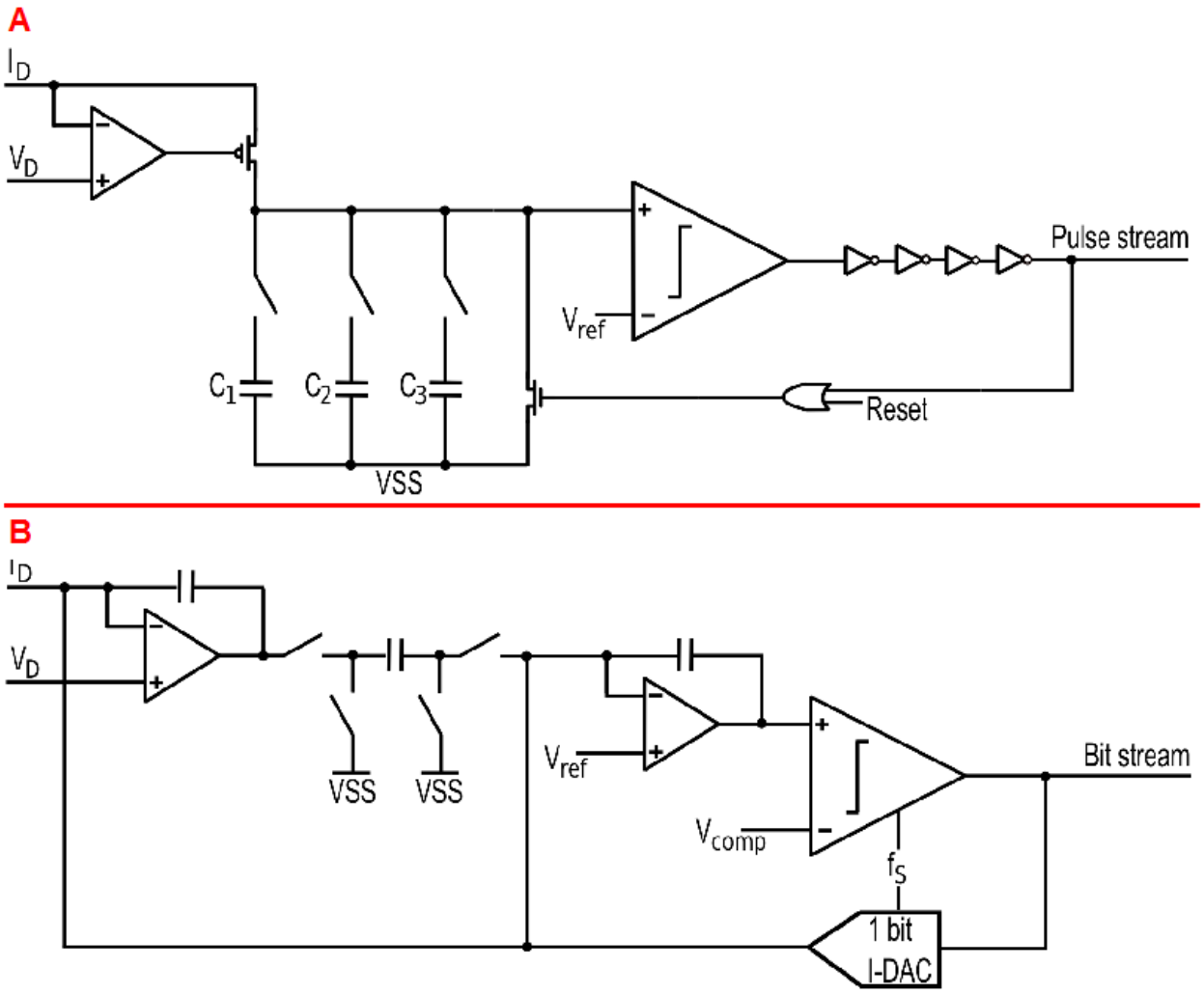
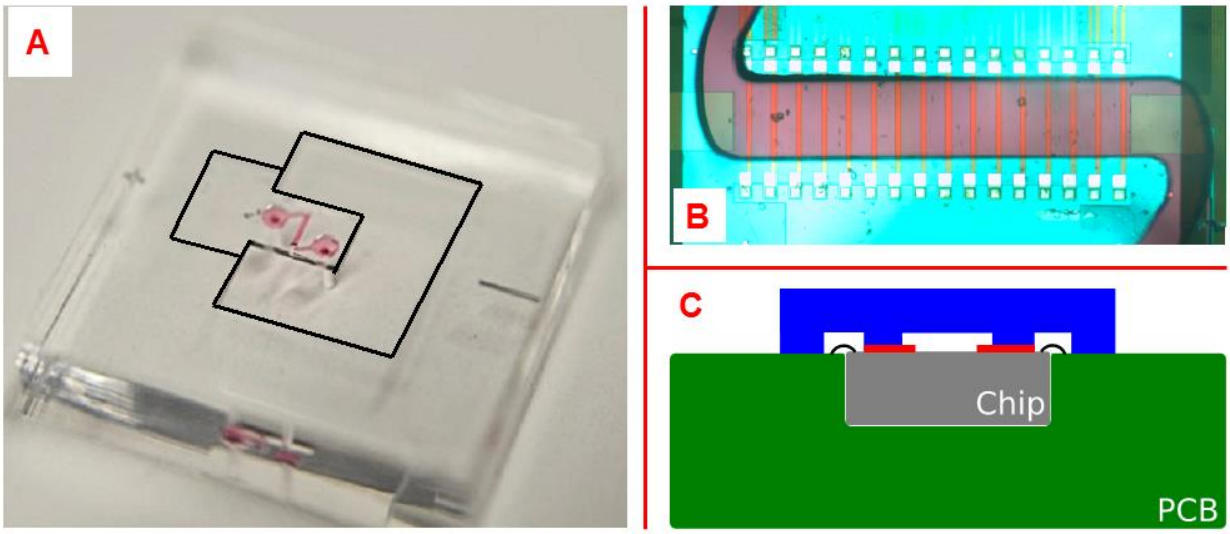
SUPPORTING INFORMATION.

In this supporting information we provide the circuit schematics of the current-to-frequency converter as well as of the sigma-delta converter presented in the paper. A photograph of the fabricated PDMS package with the microfluidic channel being highlighted is also shown. Finally, a micrograph of the microfluidic channel placed over the sensing area and a sketch of the cross section of the packaged CMOS chip are presented.



Supplementary Figure 1 (SF1). (A) Circuit schematic of the current-to-frequency converter. (B) Circuit schematic of the second-order sigma-delta converter.



Supplementary Figure 2 (SF2). (A) Photograph of the fabricated PDMS block: the microfluidic channel has been filled with a red-colored liquid for visualization; the solid black lines highlight (i) the cavity that protects the bond wires (right), and (ii) the location of the CMOS chip (left). (B) Micrograph showing the fabricated microfluidic channel filled with a red-colored liquid. The picture shows that only the sensor area is exposed to the liquid. (C) Schematic cross-section of the PDMS block placed over the CMOS chip. The image shows that the CMOS chip is embedded in the PCB so that the height of the bond wires can be reduced, and a flat surface is achieved, which facilitates a good adhesion of the PDMS block to the PCB surface.