

Optimising lab-on-a-chip applications

- **SCHEDA**
- **APPROFONDIMENTI**

Identificativo proposta: *TODE20211007002*

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Lab-on a chip applications often need to be able to measure the smallest currents on CMOS (complementary metal-oxide semiconductor) chips. A German university offers a new measurement circuit, an offset and 1/f noise compensated current-to-digital conversion that can be integrated directly on the chip. Thus a current measurement can be realized cost-efficiently over a very large measurement range (fA - μ A). License agreements are offered.

Lab-on-a-chip systems can fully and automatically analyse the smallest quantities of a biological or chemical liquid. The basis for this is a microchip. In many cases, very small electrical currents of only a few femto amperes have to be measured on this chip. A German university offers a technology for low-cost, simple measurement of a current: it can significantly reduce both costs and technological risks in the development of lab-on-a-chip systems. The solution comprises an amplifier with one input each for current and reference voltage. A capacitor with a switch connected in parallel (for discharging the capacitor) is used: Its first contact is connected to the output of the amplifier, and the second contact is connected to the current input. The inputs of the comparator are connected to the contacts of the capacitance, and the output is connected to a counter. In addition, an adjustable counter frequency is applied to the comparator (see the diagram). The amplifier and the comparator are designed as chopped components. This means that the result shown in the counter is proportional to the magnitude of the current. By setting the counter frequency, it can be adjusted over a wide measuring range (fA - μ A). Therefore, this circuit can be used to measure very small currents on lab-on-a-chip applications in a cost-effective and simple way. Industrial licensees are sought who are interested in using the technology in their electronics and chemical analytical activities.

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