

# A 1nA-Photocurrent Optical Receiver used in Fire and Smoke Detection Systems

A. Descombes<sup>1)</sup>, A.Banyai<sup>1)</sup>, Y.Vougal<sup>1)</sup>, K.Hess<sup>2)</sup>, U.Köstli<sup>2)</sup>

- 1) EM Microelectronic Marin, Rue des Sors 3, CH-2074 Marin, Switzerland
- 2) Cerberus AG, Alte Landstr. 411, CH-8708 Mönnedorf, Switzerland

## Abstract

A receiver circuit being able to detect very small currents from an external photodiode and convert them into a voltage treatable by an A/D converter is presented. Its equivalent input noise current is 34 pA<sub>rms</sub> at a system bandwidth of approx. 40kHz and equivalent DC offset is less than 1nA. The circuit has been designed in a standard low-cost 'digital' 2 (m double-metal (single-poly) medium-voltage CMOS process. The receiver system is briefly explained and the most relevant measurement data are discussed, this with special emphasis to reproducibility in fabrication. Comparisons are made between a differential and a single-ended version. The active chip surface occupied by the receiver block itself is 5.3 mm<sup>2</sup> and its current consumption is less than 500(A @ 5V.