RTS noise reduction of CMOS image sensors using amplifier-selection pixels

ABSTRACT

This paper describes a RTS (random telegraph signal) noise reduction technique for an active pixel CMOS image sensor (CIS) with in-pixel selectable dual source-follower amplifiers. In this CMOS image sensor, the lower-noise transistor in each pixel is selected in the readout operation using a table of determining the lower-noise transistors of all the pixels. A prototype image sensor with 65×290 pixels for demonstrating the effectiveness of this technique has been implemented using 0.18μm CMOS image sensor technology with pinned photodiode option. The measured result shows that the maximum noise using the amplifier-selection technique is reduced to 9.6e- from 17.2e- which is the maximum noise of the image array using one of two amplifiers in each pixel without selection.

Keyword: Active-pixel CMOS image sensor; Amplifier-selection pixel; Correlated multiple sampling; Noise reduction; 1/f noise; RTS noise