14AS060 Low-Frequency Noise Measurements in Silicon Power MOSFETs as a Tool to Experimentally Investigate the Defectiveness of the Gate Oxide

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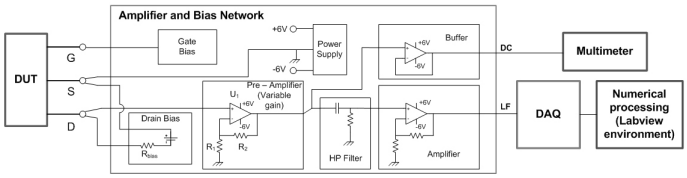
In this work, we implemented a low-noise laboratory set-up and related numerical processing techniques that allow to perform accurate LF noise measurements in power MOSFETs. The experimental results confirmed the suitability of this measurement technique to analyse the gate oxide quality in silicon trench power MOSFETs. Moreover, from a general standpoint, this kind of empirical investigation allows to select the most suitable physical model for the compact description of 1/f-like fluctuations of the drain current. In particular in this paper, by measuring the LF noise spectra as a function of the gate voltage bias level, we proved that the so-called McWorther number fluctuation model is appropriate for the device technology considered. Thus, this model was adopted, in association with the experimental data, in order to estimate the trap density in the gate oxide.

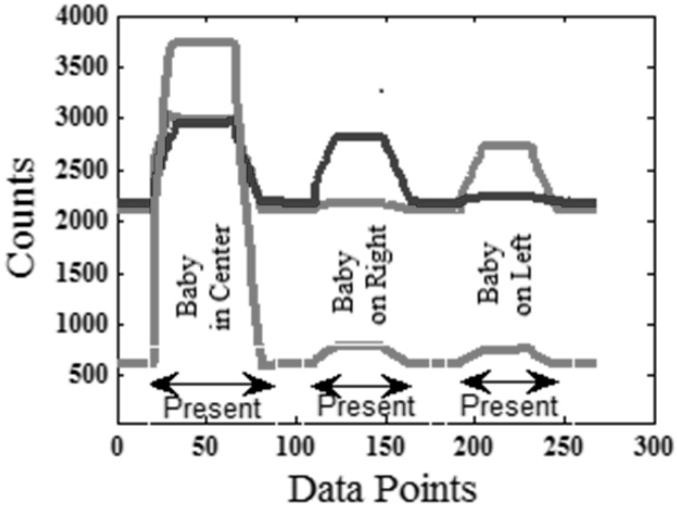


Schematic of the LF noise measurement system for power MOSFETs.

14AS062 A New Capacitance-to-Digital Convertor Suitable for Human Proximity Sensing

Abhishek Ranjan[117], Boby George[117]

This paper proposes a new, simple and efficient dual-slope Capacitance-to-Digital Convertor (CDC) that gives digital value of capacitances in a π-model of a capacitive proximity sensor. Typical capacitive proximity sensors have two electrodes. When a human body approaches the electrodes, it will form three capacitances, i.e., between body and first electrode, between body and second electrode and between body and ground. It can be represented in a T model or in its equivalent π-model. Conventional signal conditioning methods provide only a single output from this network. It will be very useful, in a proximity sensing point of view, if the signal conditioning circuit can capture changes in those three individual capacitances and provide corresponding outputs. Further it will also be useful, to store and process easily, if these outputs are available in digital form. A novel dual-slope CDC that measures all the three capacitance values in a π-model and provides those three digital outputs directly has been developed and details are presented in this paper. Measuring all the three capacitance is advantageous because it can detect proximity as well as provides location of body in relation to sensor electrodes. A prototype CDC has been developed and tested. Results are promising.



Presence of a baby in an infant seat