

Development of an auto-calibrated interfacing circuit for thick film multi-gas sensor

ABSTRACT

A simple, cheap, and integrated architecture is introduced to measure gases with a thick film gas sensor. The temperatures of the sensors are stabilized by controlling the heaters of the sensors. The heaters' temperatures are measured by sampling the heaters resistance through the use of a voltage divider and ADCs. A microcontroller accordingly adjusts the output of DACs in order to apply the appropriate steering voltage to the heaters. The method employed to measure the gases is to sample the voltage drop over the resistances of the sensors, which are depending on the gases, by ADCs. The innovation lies in the simplicity of the design and the use of different simple methods and commercially available technologies to fabricate the circuit. Also, a single microcontroller is used to drive and control the heaters' temperature, to compensate ambient temperature of the heaters, to measure and monitor the amount of gases detected by sensors and finally, to select the sensors. This opens the possibility to use these gas sensors for monitoring purposes at a large scale, for example in alarms and computers.

Keyword: Gas sensor; Driving heater; Ambient temperature; Auto calibration; Measuring gases densities