

Time Parameter Based for the Detection of Catastrophic Faults in Analog Circuits

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Abstract : In this paper, a new test technique of analog circuits using time mode simulation is proposed for the single catastrophic faults detection in analog circuits. This test process is performed to overcome the problem of catastrophic faults being escaped in a DC mode test applied to the inverter amplifier in previous research works. The circuit under test is a second-order low pass filter constructed around this type of amplifier but performing a function that differs from that of the previous test. The test approach performed in this work is based on two key- elements where the first one concerns the unique square pulse signal selected as an input vector test signal to stimulate the fault effect at the circuit output response. The second element is the filter response conversion to a square pulses sequence obtained from an analog comparator. This signal conversion is achieved through a fixed reference threshold voltage of this comparison circuit. The measurement of the three first response signal pulses durations is regarded as fault effect detection parameter on one hand, and as a fault signature helping to hence fully establish an analog circuit fault diagnosis on another hand. The results obtained so far are very promising since the approach has lifted up the fault coverage ratio in both modes to over 90% and has revealed the harmful side of faults that has been masked in a DC mode test.

Keywords : analog circuits, analog faults diagnosis, catastrophic faults, fault detection

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