

Abstract of Dissertation presented to UFPE as a partial fulfillment of the requirements for the degree of Master in Electrical Engineering

## **RADIO FREQUENCY IDENTIFICATION USING SURFACE ACOUSTIC WAVES DEVICES**

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This dissertation presents the design of surface acoustic waves (SAW) tags for radio frequency identification (RFID). It has also been developed the microfabrication steps required and the characterization methodology using an impedance meter, a network analyzer and a spectrum analyzer. Radio frequency identification is a technology based on the reading of devices, often called tags, by means of radio frequency waves. The RFID system consists basically of a set of tags and in one or more reading units. Each tag is responsible for carrying an unique identification code. Because it uses radio waves, the reading mechanism dismisses an unobstructed line-of-sight contact between the reader and the tag unlike the optical readers. Essentially, the SAW RFID tag works like a delay line partially reflecting the interrogation signal. The identity returns as a pattern of echoes according to an encoding method based on the positions of metallic acoustic wave reflecting structures upon a piezoelectric substrate. Hence, the SAW RFID tag is a truly passive device since it doesn't require any DC power. Finally, a discussion about the integration of tags and readers in a sensor network, by Internet (TCP/IP) or mobile network (GSM) by General Packet Radio Service protocol (GPRS).