

# **SENSITIVITY IMPROVEMENT OF WIRELESS PRESSURE SENSOR BY INCORPORATING A SAW REFLECTIVE DELAY LINE**

Haekwan Oh, Weng Wang, Keekeun Lee, Ikmo Park, and Sang Sik Yang\*

Division of Electronics Engineering

Ajou University, Suwon, S. Korea, 443-749

\*Email: [ssyang@ajou.ac.kr](mailto:ssyang@ajou.ac.kr)

Abstract - this paper presents a wireless surface acoustic wave (SAW) pressure sensor on 41°YX LiNbO<sub>3</sub> for tire pressure monitoring system (TPMS) application, in which a reflective delay line composed of an interdigital transducer (IDT) and several reflectors was used as the sensor element. Using the coupling of modes (COM), the SAW reflective delay line was simulated, and the optimal design parameters were determined. The fabricated 2.4GHz SAW sensor was wirelessly characterized by the network analyzer. Sharp reflection peaks, few spurious signals, and relatively high signal-to-noise (S/N) ratio were observed. High sensitivity of 2.9 deg/kPa and good linearity were observed.

Index terms: coupling of modes, interdigital transducer, LiNbO<sub>3</sub>, piezoelectric substrate, reflective delay line, surface acoustic wave, wireless pressure sensor, temperature compensation