

# Extraction of Electrical Equivalent Circuit of One Port SAW Resonator Using FEM-based Simulation

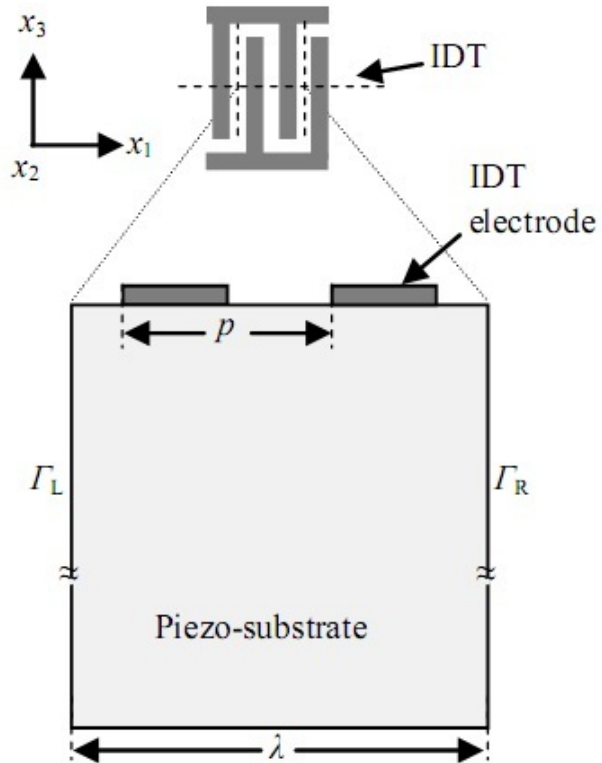
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## Abstract

The paper presents a method of extraction of electrical equivalent circuit of a one port surface acoustic wave (SAW) resonator from the results of simulation based on finite element method using COMSOL Multiphysics software. A one port SAW resonator consists of large number of periodic interdigital transducer (IDT) electrodes fabricated on the surface of a piezoelectric substrate. A section of aluminum IDT structure patterned on YZ lithium niobate piezoelectric substrate with periodic boundary condition is incorporated in the simulation. The equivalent circuit of a SAW resonator consists of motional resistance, capacitance and inductance connected in series, and static capacitance in parallel. The electrical resonance characteristics of SAW resonator obtained from frequency domain analysis provided by COMSOL Multiphysics are used to calculate the equivalent circuit parameters. The calculation of electrical equivalent circuit parameters is useful in designing matching circuits for SAW devices.

## Figures used in the abstract



**Figure 1:** 2D Geometry used for simulation of a one port SAW resonator