

## 무선 센서용 표면탄성파의 3차원 모델링

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### **3D modeling of a surface acoustic wave for wireless sensors**

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**Abstract :** In this work, we discuss simulation of surface acoustic wave device using Comsol Multiphysics. The structure SAW device based on piezoelectric thin film aluminum-nitride (AlN) on silicon was simulated. Some parameters of SAW device such as surface velocity, displacement of piezoelectric thin film were evaluated by software. Many modes and shapes of wave are also discussed in this paper. For evaluation physical parameters of AlN piezoelectric layer, the SAW resonator was modeled and simulation results were also compared with experiment results. we simulated and evaluated the surface Rayleigh wave of AlN thin film on silicon substrate. Results simulation and experiment showed the surface velocity of AlN thin film was about 5200 m/s and shape of surface wave was also displayed. This paper has also proposed as method to study SAW characteristic of piezoelectric thin film and found out measurement values accurately of film such as stiffness matrix, piezoelectric matrix. These values are very important in calculation and design SAW device or MEMS device based on AlN piezoelectric layer.

**Key Words :** surface Rayleigh wave; resonator; IDT; AlN/Si; Comsol Mutiphysics