

Surface Acoustic Wave Based MEMS Resonator

S. Dixit¹, R. C. Jain¹

¹Jaypee Institute of Information Technology, Noida, Uttar Pradesh, India

Abstract

SAW resonators are key component for Modern communication systems they are used as narrow band filter, oscillator, RFID tags, sensors etc. This SAW resonator presented here is designed for

wireless communication which will be used as band pass filter with frequency 2.43 GHz. We have analysed the propagation of ayleigh wave on YZ LiNb at 2.4 GHz. The geometry is drawn in 2D and piezoelectric physics is used. The piezoelectric substrate used is Lithium Niobate and Aluminium is used for IDT. Since IDTs are periodic in nature consisting of positive and negative potential alternately, thus four electrodes are adequate to model two ports SAW resonator as whole. These electrodes function as two input and two output ports.

Simulation of SAW resonator at 2.43 GHz on Lithium Niobate was presented in this paper. The critical design parameter were calculated based on theoretical equations with few assumptions were made. The Resonance graph shows the band pass response. The bandwidth is 8.8 MHz and the quality factor is 278.

Reference

1. C. K. Campbell, "Surface Acoustic Wave Devices for Mobile and Wireless Communications", San Diego: Academic Press Inc., 1998.
2. S. Datta, "Surface Acoustic Wave Devices", New Jersey: Prentice Hall, 1986
3. H. Campanella, "Acoustic Waves and Electromechanical Resonators", Norwood: Artech House, 2010.