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Titel des Beitrags:
Analysis of the Interaction of Surface Acoustic Waves with Charge Carriers in Layered Structures

Abstract:
We have computed the propagation behavior of surface acoustic waves (SAW's) under a non-piezoelectric, conducting layer on a semi-infinite piezoelectric substrate. Due to the finite conductivity of the film which is deposited on the substrate surface the interaction of the SAW with the charge carriers in this layer involves changes in both attenuation and dispersion. In our analysis, mass loading and stress loading are taken exactly into account. We also include the space charge density distribution in the film by using and comparing four different space charge models. As an example, we present the phase velocity and the attenuation coefficient of the fundamental SAW mode propagating on a 128rotYX LiNbO3 substrate coated with a thin layer of amorphous silicon (a:Si) as a function of the silicon conductivity and the film thickness. It is found that an appropriately dimensioned semiconducting film may be used as an efficient absorbing material in SAW devices for consumer and commercial applications.

Stichworte:
absorbing material, amorphous semiconductors, attenuation, attenuation coefficient, charge carriers, commercial applications, consumer applications, dimensioned semiconducting film, dispersion, elemental semiconductors, finite conductivity, fundamental SAW mode, layered structures, lithium compounds, mass loading, phase velocity, propagation behavior, SAW devices, semi-infinite piezoelectric substrate, silicon, Si-LiNbO3, space charge, space charge density distribution, space charge models, stress loading, surface acoustic wave devices, surface acoustic waves, ultrasonic absorption, ultrasonic dispersion, ultrasonic
propagation

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