

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

An Electrically Tunable Barium Strontium Titanate Phase Shifter S.F. KARMANENKO, A.A. SEMENOV, B.A. KALINIKOS, St. Petersburg Electrotechnical University, St. Petersburg, Russia, A.N. SLAVIN, G. SRINIVASAN, Oakland University, Rochester, MI, J.V. MANTESE, Delphi Research Lab, Shelby Township, MI — It is well known that a slot-line fabricated on a dielectric substrate supports the propagation of electromagnetic waves. In order to realize electrical tuning of the slot-line characteristics, nonlinear dielectrics such as barium strontium titanate (BST) could be used as substrates. A prototype BST phase shifter was fabricated and characterized at 47 GHz. The design is based on a multi-slot line patterned on an alumina substrate and a BST film of thickness $0.6 \mu\text{m}$ and dielectric permittivity of 1500. The electrode topology on the BSTO film includes three inner copper electrodes of thickness $3 \mu\text{m}$. The width of the inner electrodes is equal to $50 \mu\text{m}$, and the gap between them is also $50 \mu\text{m}$. A part of the outer electrodes had a funnel-shape configuration in order to provide necessary coupling with input/output circuits. Measurements of the phase shift at 47 GHz revealed a differential phase shift of 270 deg. for a bias voltage of 500 V. The total signal attenuation was about 7 dB. -Work supported by a grant from the Delphi Automotive Corporation.

Gopalan Srinivasan
Oakland University

Date submitted: 30 Nov 2004

Electronic form version 1.4