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**A 30-GHz Hexagonal Ferrite Phase Shifter** A. S. SEMENOV, S. F. KARMANENKO, B. A. KALINIKOS, St.Petersburg Electrotechnical University, St.Petersburg, Russia, A. N. SLAVIN, G. SRINIVASAN, Oakland University, Rochester, MI, J. V. MANTESE, Delphi Research Labs, Shelby Township, MI —
Highly-anisotropic hexaferrites, such as barium ferrite $BaFe_{12}O_{19}$ (BFO), are ideal for millimeter wave phase shifters due to a large ferromagnetic resonance frequency at low magnetic bias field $H$. It enables one to make millimeter-wave devices with compact magnetic systems. Here we discuss the design, fabrication and characterization of a BFO phase shifter. A microstrip line deposited on a ferrite substrate supports the propagation of electromagnetic wave, leading to a phase shift $kb$, where $k$ is the wave number and $b$ is the length of the microstrip line. As $k$ is a function of the bias $H$, we obtain a differential phase shift with a change of $H$. A phase shifter consisting of a single crystal (7 x 7 x 0.5 $mm^3$) BFO and a 500 $\mu$m wide stripline was evaluated at 30 GHz. A differential phase shift of 30 deg. was measured for H=1.2 kOe. The measured value of the insertion loss was about 10 dB. -Work supported by a grant from the Delphi Automotive Corporation.

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