# Abstracts

## A wide-band reflection-type phase shifter at S-band using BST coated substrate

*Dongsu Kim, Yoonsu Choi, M.G. Allen, J.S. Kenney and D. Kiesling. "A wide-band reflection-type phase shifter at S-band using BST coated substrate." 2002 Transactions on Microwave Theory and Techniques 50.12 (Dec. 2002 [T-MTT] (Special Issue on 2002 International Microwave Symposium)): 2903-2909.*

The design and experimental results of a wide-band monolithic reflection-type phase shifter are presented in this paper. The phase shifter fabricated on Ba/sub 0.6/Sr/sub 0.4/TiO/sub 3/ (BST)/sapphire consists of a coplanar waveguide (CPW) Lange coupler, a series resonated LC termination, and a bias network. The CPW Lange coupler results in a power split of 3.5 dB/spl plusmn/0.5 dB in the range of 1.6-3.2 GHz. The BST interdigital capacitor has a tunability (C/sub max//C/sub min/) of 3.1 with 140 V. Measured and simulated performance of a series resonated LC termination was described. The phase shifter has achieved a phase-shift range of over 90/spl deg/ with an insertion loss of better than 2.0 dB and a return loss of higher than 14 dB in the frequency range of 1.9-2.5 GHz over a bias voltage range from 0 to 160 V. A figure-of-merit of maximum 72/spl deg//dB at 2 GHz was obtained. The smaller phase shifter using the folded-type CPW Lange coupler, which maintains a smaller aspect ratio for easier packaging, has an insertion loss of better than 2.3 dB with a phase-shift range of over 130/spl deg/ at 2.5 GHz. Two-tone measurements of the phase shifter indicate an input IP/sub 3/ of 32 dBm with 0 V and 41.9 dBm with 60 V. Total size of the monolithic BST phase shifter is 11.2 mm /spl times/ 4.9 mm /spl times/ 0.43 mm for the straight coupler design and 5.4 mm /spl times/ 6.5 mm /spl times/ 0.43 mm for the folded-type design.

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