Abstracts

Compact reflective-type phase-shifter MMIC for C-band using a lumped-element coupler

F. Ellinger, R. Vogt and W. Bachtold. "Compact reflective-type phase-shifter MMIC for C-band using a lumped-element coupler." 2001 Transactions on Microwave Theory and Techniques 49.5 (May 2001 [T-MTT]): 913-917.

The design and results of an ultra-compact single-load reflective-type monolithic-microwave integrated-circuit phase shifter at 6.2 GHz for a satellite radar system is presented in this paper, which has been fabricated using a commercial 0.6-/spl mu/m GaAs MESFET process. A 3-dB 90/spl deg/ coupler with lumped elements enables significant circuit size reduction in comparison to former approaches applying microstrip branch line or Lange couplers. Phase control is enabled using MESFET varactors with capacitance control ratios (C/sub max//C/sub min/) of only four. Equations are derived to precisely describe the phase control ranges versus capacitance control ratios for different load configurations to allow efficient optimizations. Furthermore, the design tradeoff between low loss and high phase control range is discussed. Within a phase control range of 210/spl deg/, a loss of 4.9 dB/spl plusmn/0.9 dB and a 1-dB input compression point of higher than 5 dBm was measured for the designed phase shifter. The circuit size is less than 0.5 mm/sup 2/, which, to our knowledge, is the smallest reflective-type phase-shifter size reported to date.

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