

## A compact 5-bit phase-shifter MMIC for K-band satellite communication systems

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The design and performance of a compact K-band 5-bit phase-shifter monolithic microwave integrated circuit (MMIC) is presented. Extensive electromagnetic simulation and compact circuit design techniques were employed to yield an MMIC with a 1.693 mm/spl times/0.750 mm (1.27 mm/sup 2/) die size. Measured performance of the phase shifter at 19 GHz demonstrates 5 dB/spl plusmn/0.6 dB insertion loss and 30 r.m.s. phase error.

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