Abstracts

V-band low-loss and low-voltage distributed MEMS digital phase shifter using metal-air-metal capacitors

Hong-Teuk Kim, Jae-Hyoung Park, Yong-Kweon Kim and Youngwoo Kwon. "V-band low-loss and low-voltage distributed MEMS digital phase shifter using metal-air-metal capacitors." 2002 MTT-S International Microwave Symposium Digest 02.1 (2002 Vol. I [MWSYM]): 341-344 vol.1.

A low-loss digital distributed phase shifter has been developed using micromachined capacitive shunt switches for V-band communication system. Instead of conventional MIM (metal-insulator-metal) capacitors, high-Q MAM (metal-air-metal) capacitors were used in series with the MEMS shunt capacitive switches to minimize the dielectric loss. The operation voltage for the phase shifter was also reduced by applying the bias directly to the MEMS shunt switches through choke spiral inductors. The fabricated 2-bit (270/spl deg/) distributed phase shifter showed low average insertion loss of 2.2 dB at 60 GHz. The return loss is better than 10 dB over a wide frequency range from 40 to 70 GHz. The circuit operates at 15-20 V bias voltages. This phase shifter is very promising for the integrated circuits at V-band requiring low loss and good return loss over a broad band.

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