Abstracts

Plasma Varactor X-Band Phase Shifters

J.Y. Wada, R.C. Knechtli, B.J. Forman and A. Fafarman. "Plasma Varactor X-Band Phase Shifters." 1967 G-MTT International Microwave Symposium Program and Digest 67.1 (1967 [MWSYM]): 188-191.

A microwave phase shifter (x-band) which utilizes plasma varactors has been developed. It has demonstrated continuous phase shifting of 360 degrees with low rf loss, low noise and high average rf power handling capability heretofore unobtainable in previous microwave plasma devices or in solid state devices. The plasma varactor is a high Q variable microwave reactance produced by means of a low pressure and highly efficient electron injection mode of gas discharge. Overall rf losses, including the reflection, circuit and plasma losses, smaller than 0.5 dB have been obtained over a bandwidth of 12% at X-band for continuously variable phase angles up to more than 360°. An average power handling capability in excess of 200 W has been obtained from this device. Excess noise temperature of the phase shifter is smaller than 100°K for phase shifts up to 360° over the same frequency range. Extrapolations from the performance of this prototype indicate that the average rf power handling capability could be increased to the multi-KW level, without deterioration of the other characteristics.

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