Abstracts

Distortion in p-i-n Diode Control Circuits

R.H. Caverly and G. Hiller. "Distortion in p-i-n Diode Control Circuits." 1987 Transactions on Microwave Theory and Techniques 35.5 (May 1987 [T-MTT]): 492-501.

Traditionally, distortion in p-i-n diodes has been thought to be only a function of the carrier lifetime and frequency of operation. This understanding is based on empirical evidence and is not entirely accurate. This paper will discuss the origins of p-i-n diode distortion and study the effects of various devices parameters on distortion performance. Included in the investigation on single-diode circuits will be switching circuits and reflective attenuators. In switch circuits, the analysis shows that distortion can be minimized by maximizing the stored-to-charge resistance ratio in the diode. In attenuators, the analysis shows that maximizing the i-region thickness will minimize distortion, independent of the device carrier life-time. In attenuators where multiple p-i-n diodes are used (the bridged-tee and PI are discussed), maximizing the i-region thickness also minimizes the distortion, independent of carrier lifetime. The model accurately predicts distortion signal cancellation in both single and multiple p-i-n diode circuits.

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