Abstracts

Real-Time Linear Time-Domain Network Analysis Using Picosecond Photoconductive Mixer and Samplers

S.-L.L. Huang, C.H. Lee and H.-L.A. Hung. "Real-Time Linear Time-Domain Network Analysis Using Picosecond Photoconductive Mixer and Samplers." 1995 Transactions on Microwave Theory and Techniques 43.6 (Jun. 1995 [T-MTT]): 1281-1289.

Ion-implanted GaAs photoconductive (PC) switches have been used as an optical-microwave frequency mixer and electrical waveform samplers in a real-time sampling system. This high fidelity system has a bandwidth of 100-GHz, time resolution of 4-ps and a measurement sensitivity of 5-µV//spl radic/Hz. Because of this high sensitivity capability, the magnitude of the testing signal can be maintained sufficiently small to allow network analysis of a device or circuit in the linear mode without signal distortion. In this paper, a linear time-domain network analysis of a broadband monolithic microwave integrated circuit (MMIC) amplifier has been demonstrated in real-time by the optoelectronic technique. A measurement time of less than 40 µs is used to acquire waveform data. The dynamic range of the system can be further improved to 40 dB by reducing the repetition rate of the step recovery diode. Since the PC switches are fabricated with processes compatible to MMIC manufacturing, this real-time system is well-suited for on-wafer MMIC characterization.

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